DISCRETE SEMICONDUCTORS

Power Diodes

Data Handbook SC11
CD-ROM included
1999

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PRODUCT SAFETY

In striving for state-of-the-art perfection, we continuously improve components and processes with respect to environmental demands. Our components offer no hazard to the environment in normal use when operated or stored within the limits specified in the data sheet.

Some components unavoidably contain substances that, if exposed by accident or misuse, are potentially hazardous to health. Users of these components are informed of the danger by warning notices in the data sheets supporting the components. Where necessary the warning notices also indicate safety precautions to be taken and disposal instructions to be followed. Obviously users of these components, in general the set-making industry, assume responsibility towards the consumer with respect to safety matters and environmental demands.

All used or obsolete components should be disposed of according to the regulations applying at the disposal location. Depending on the location, electronic components are considered to be 'chemical', 'special' or sometimes 'industrial' waste. Disposal as domestic waste is usually not permitted.

Power Diodes

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DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.

Power Diodes

Preface

Philips Semiconductors is working intensively to bring new Power Diode products to the market. These are the products and technologies which appear for the first time in this data handbook:-

Medium Power Diodes

Philips extensive range of medium power diodes in axial and surface mount packages, were formerly listed in data handbook SC01 together with small signal diodes. Now combined with high power diodes in this data handbook. The range includes general purpose rectifiers; fast, ultrafast and hyperfast rectifiers; zener diodes; transient suppressors; damper diodes for deflection applications, high voltage diodes with voltage ratings up to 30 kV, ripple blocking diodes; AM pin diodes and schottky barrier rectifiers.

High Current Diodes

Intended for high current, high frequency rectification in switched mode power supplies. Types BYQ40E, BYQ60E, PBYR4025WT, PBYR7025WT. Power schottky and ultrafast epitaxial rectifiers in the SOT429 package (equivalent to JEDEC TO247). With current ratings up to 70 A, low thermal resistance and reverse surge capability.

Hyperfast 600 V Diodes

Intended for active power factor correction circuits, motor controls and other forced commutation applications. Featuring extremely fast reverse recovery (t_{rr} typ. 19 ns) and low switching losses in the diode and the associated switching transistor. Types BYV1100, BYD1100, BYV2100, BYV4100, BYV99, BYM99, BYG85B, BYC5(B), BYC8(B), BYC10(B) available in both conventional leaded and surface mount packages.

Surface Mount Products

Philips range of surface mount products continues to grow. New in this data handbook:- an extensive range of schottky and ultrafast epitaxial rectifiers in the SOT428 package (equivalent to JEDEC TO252).

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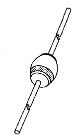
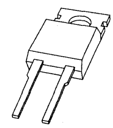
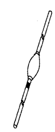
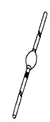
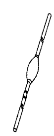
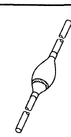
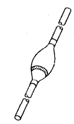
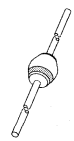
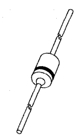
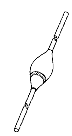
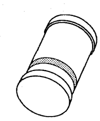
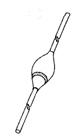
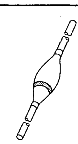
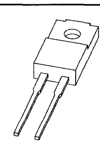
PACKAGE OVERVIEW

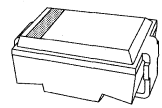
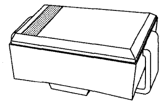
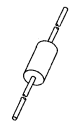
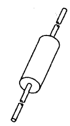
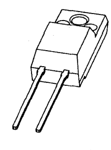
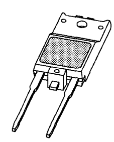
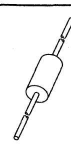
PACKAGE OVERVIEW

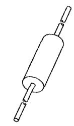
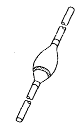
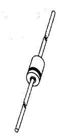
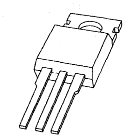
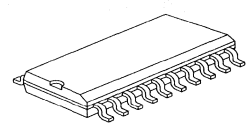
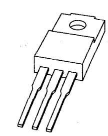
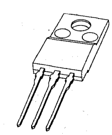
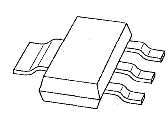
The following table contains a listing of discrete packages in ascending order. The list contains the description of the various packages with their 3-dimensional view and the page number on which the outline drawing can be found. Cross-references from the JEDEC and EIAJ numbers to the equivalent SOD/SOT numbers, where applicable, can be found after this table.

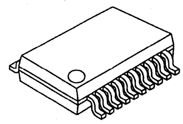
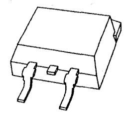
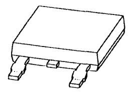
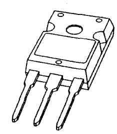
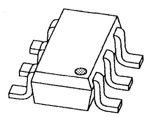
PACKAGES IN ASCENDING ORDER OF SOD/SOT NUMBERS

OUTLINE	DESCRIPTION	3D VIEW (not to scale)	PAGE
SOD57	Hermetically sealed glass package; axial leaded; 2 leads		994
SOD59	Plastic single-ended package; heatsink mounted; 1 mounting hole; 2 lead TO-220		995
SOD61A	Hermetically sealed glass package; axial leaded; 2 leads		996
SOD61H2	Miniature hermetically sealed glass package; axial leaded; 2 leads		996
SOD61AB to AK	Hermetically sealed glass package; axial leaded; 2 leads		997
SOD61AB2 SOD61AC2	Hermetically sealed glass package; axial leaded; 2 leads Hermetically sealed glass package; axial leaded; 2 leads		998

OUTLINE	DESCRIPTION	3D VIEW (not to scale)	PAGE
SOD61AD2	Hermetically sealed glass package; axial leaded; 2 leads		999
SOD64	Hermetically sealed glass package; axial leaded; 2 leads		1000
SOD81	Hermetically sealed glass package; Implotec$^{TM(1)}$ technology; axial leaded; 2 leads **(1) Implotec is a trademark of Philips.**		1000
SOD83A	Hermetically sealed glass package; axial leaded; 2 leads		1001
SOD87	Hermetically sealed glass surface mounted package; 2 connectors; Implotec$^{TM(1)}$ technology **(1) Implotec is a trademark of Philips.**		1001
SOD88A	Hermetically sealed glass package; axial leaded; 2 leads		1002
SOD88B	Hermetically sealed glass package; axial leaded; 2 leads		1002
SOD100	Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2-lead TO-220F exposed tabs		1003

OUTLINE	DESCRIPTION	3D VIEW (not to scale)	PAGE
SOD106	Transfer-moulded thermo-setting plastic small rectangular surface mounted package; 2 connectors		1004
SOD106A	Transfer-moulded thermo-setting plastic small rectangular surface mounted package; 2 connectors		1005
SOD107A	Hermetically sealed plastic package; axial leaded; 2 leads		1006
SOD107B	Hermetically sealed plastic package; axial leaded; 2 leads		1006
SOD113	Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2-leads TO-220 'full pack'		1007
SOD115	Hermetically sealed glass package; axial leaded; 2 leads		1008
SOD117	Plastic single-ended through-hole package; mountable to heatsink; 1 mounting hole; 3 in-line leads (one lead cropped)		1009
SOD118A	Hermetically sealed plastic package; axial leaded; 2 leads		1010

OUTLINE	DESCRIPTION	3D VIEW (not to scale)	PAGE
SOD118B	Hermetically sealed plastic package; axial leaded; 2 leads		1010
SOD119AB	Hermetically sealed glass package; axial leaded; 2 leads		1011
SOD120	Hermetically sealed glass package; axial leaded; 2 leads		1011
SOT78	Plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB		1012
SOT163-1 (SO20)	Plastic small outline package; 20 leads; body width 7.5 mm		1013
SOT186	Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3 lead TO-220 exposed tabs		1014
SOT186A	Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3 lead TO-220		1015
SOT223	Plastic surface mounted package; collector pad for good heat transfer; 4 leads		1016

OUTLINE	DESCRIPTION	3D VIEW (not to scale)	PAGE
SOT339-1 (SSOP20)	Plastic shrink small outline package; 20 leads; body width 5.3 mm		1017
SOT404	Plastic single-ended surface mounted package (Philips version of D^2-PAK); 3 leads (one lead cropped)		1018
SOT428	Plastic single-ended surface mounted package (Philips version of D-PAK); 3 leads (one lead cropped)		1019
SOT429	Plastic single-ended through-hole package; heatsink mounted; 1 mounting hole; 3 lead TO247		1020
SOT457 (TSOP6)	Plastic surface mounted package; 6 leads		1021

CROSS-REFERENCE FROM JEDEC TO SOD/SOT

JEDEC	OUTLINE	PAGE
DO-214AC	SOD106	1004
DO-214AC	SOD106A	1005
MS-013AC	SOT163-1	1013
TO-220AB	SOT78	1012
TO-220AC	SOD59	995
TO-220F	SOD100	1003
TO-220F	SOD113	1007
TO-220F	SOT186	1014
TO-220F	SOT186A	1015
TO-247	SOT429	1020

CROSS-REFERENCE FROM EIAJ TO SOD/SOT

EIAJ	OUTLINE	PAGE
SC-46	SOT78	1012
SC-63	SOT428	1019
SC-67	SOT186	1014
SC-73	SOT223	1016
SC-74	SOT457	1021

SELECTION GUIDES

GENERAL PURPOSE RECTIFIERS

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	$I_{F(AV)}$ max. (A)	I_{FSM} max. (A)	$V_F@I_F$ max. (V)	I_F (A)	$V_{(BR)R}$ min. (V)	C_d typ. (pF)	t_{rr} typ. (μs)	TYPE NUMBER	PAGE
Leaded types											
SOD120	200	200	0.8	15	1.05	1	–	–	3	BYD12D	300
SOD120	400	400	0.8	15	1.05	1	–	–	3	BYD12G	300
SOD120	600	600	0.8	15	1.05	1	–	–	3	BYD12J	300
SOD120	800	800	0.8	15	1.05	1	–	–	3	BYD12K	300
SOD120	1000	1000	0.8	15	1.05	1	–	–	3	BYD12M	300
SOD57	50	50	1	30	1.1	1	–	–	–	1N4001G	82
SOD57	100	100	1	30	1.1	1	–	–	–	1N4002G	82
SOD57	200	200	1	30	1.1	1	–	–	–	1N4003G	82
SOD57	200	200	1.8	50	1	1	225	50	3	1N5059	88
SOD57	400	400	1	30	1.1	1	–	–	–	1N4004G	82
SOD57	400	400	1.8	50	1	1	450	50	3	1N5060	88
SOD57	600	600	1	30	1.1	1	–	–	–	1N4005G	82
SOD57	600	600	1.8	50	1	1	650	50	3	1N5061	88
SOD57	600	600	1.8	50	1	1	650	50	3	BYW54	716
SOD57	800	800	1	30	1.1	1	–	–	–	1N4006G	82
SOD57	800	800	1.8	50	1	1	900	50	3	1N5062	88
SOD57	800	800	1.8	50	1	1	900	50	3	BYW55	716
SOD57	1000	1000	1	30	1.1	1	–	–	–	1N4007G	82
SOD57	1000	1000	1.8	50	1	1	1100	50	3	BYW56	716
SOD57	1250	800	1.8	50	1	1	1250	50	3	BY527	209
SOD57	1600	1600	1.1	25	1.5	2	–	30	3	BYX10G	739
SOD59	300	200	7	60	1.05	5	–	–	–	BY249-300	135
SOD59	600	500	7	60	1.05	5	–	–	–	BY249-600	135
SOD59	800	700	7	60	1.05	5	–	–	–	BY249-800	135
SOD64	200	200	3.6	80	1.15	3	225	90	3	BYM56A	494
SOD64	400	400	3.6	80	1.15	3	450	90	3	BYM56B	494
SOD64	600	600	3.6	80	1.15	3	650	90	3	BYM56C	494
SOD64	800	800	3.6	80	1.15	3	900	90	3	BYM56D	494
SOD64	1000	1000	3.6	80	1.15	3	1100	90	3	BYM56E	494
SOD81	50	50	1	20	1.1	1	–	–	–	1N4001ID	85
SOD81	100	100	1	20	1.1	1	–	–	–	1N4002ID	85
SOD81	200	200	1	20	1.1	1	–	–	–	1N4003ID	85
SOD81	200	200	1.4	20	1.05	1	225	21	3	BYD13D	304
SOD81	400	400	1	20	1.1	1	–	–	–	1N4004ID	85
SOD81	400	400	1.4	20	1.05	1	450	21	3	BYD13G	304
SOD81	600	600	1	20	1.1	1	–	–	–	1N4005ID	85
SOD81	600	600	1.4	20	1.05	1	650	21	3	BYD13J	304

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	$I_{F(AV)}$ max. (A)	I_{FSM} max. (A)	V_F@I_F max. (V)	I_F (A)	$V_{(BR)R}$ min. (V)	C_d typ. (pF)	t_{rr} typ. (μs)	TYPE NUMBER	PAGE
SOD81	800	800	1	20	1.1	1	–	–	–	1N4006ID	85
SOD81	800	800	1.4	20	1.05	1	900	21	3	BYD13K	304
SOD81	1000	1000	1	20	1.1	1	–	–	–	1N4007ID	85
SOD81	1000	1000	1.4	20	1.05	1	1100	21	3	BYD13M	304
Surface mount types											
SOD106	200	200	2.1	30	1	1	300	–	2	BYG50D	434
SOD106	400	400	2.1	30	1	1	500	–	2	BYG50G	434
SOD106	600	600	2.1	30	1	1	700	–	2	BYG50J	434
SOD106	800	800	2.1	30	1	1	900	–	2	BYG50K	434
SOD106	1000	1000	2.1	30	1	1	1100	–	2	BYG50M	434
SOD87	50	50	1.6	20	1.1	1	–	–	–	PRLL4001	967
SOD87	100	100	1.6	20	1.1	1	–	–	–	PRLL4002	967
SOD87	200	200	1.4	20	1.05	1	225	21	3	BYD17D	309
SOD87	400	400	1.4	20	1.05	1	450	21	3	BYD17G	309
SOD87	600	600	1.4	20	1.05	1	650	21	3	BYD17J	309
SOD87	800	800	1.4	20	1.05	1	900	21	3	BYD17K	309
SOD87	1000	1000	1.4	20	1.05	1	1100	21	3	BYD17M	309

FAST RECOVERY RECTIFIERS

- Soft reverse recovery reduces circuit oscillations and EMI
- Glass passivation - excellent stability under all conditions
- Wide range of voltage grades and package styles to suit all applications.

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	$I_{F(AV)}$ max. (A)	I_{FSM} max. (A)	V_F@I_F max. (V)	I_F (A)	$V_{(BR)R}$ min. (V)	C_d typ. (pF)	t_{rr} max. (ns)	TYPE NUMBER	PAGE
Leaded types											
SOD100	200	150	8	60	1.85	20	–	23	135	BY229F-200	131
SOD100	400	300	8	60	1.85	20	–	23	135	BY229F-400	131
SOD100	600	500	8	60	1.85	20	–	23	135	BY229F-600	131
SOD100	800	600	8	60	1.85	20	–	23	135	BY229F-800	131
SOD100	800	600	8	75	1.85	20	–	23	135	BY329F-800	158
SOD100	1000	800	8	75	1.85	20	–	23	135	BY329F-1000	158
SOD100	1200	1000	8	75	1.85	20	–	23	135	BY329F-1200	158
SOD113	200	150	8	60	1.85	20	–	23	135	BY229X-200	131
SOD113	400	300	8	60	1.85	20	–	23	135	BY229X-400	131
SOD113	600	500	8	60	1.85	20	–	23	135	BY229X-600	131
SOD113	800	600	8	60	1.85	20	–	23	135	BY229X-800	131
SOD113	800	800	8	75	1.85	20	–	23	135	BY329X-800	158

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	$I_{F(AV)}$ max. (A)	I_{FSM} max. (A)	$V_F@I_F$ max. (V)	I_F (A)	$V_{(BR)R}$ min. (V)	C_d typ. (pF)	t_{rr} max. (ns)	TYPE NUMBER	PAGE
SOD113	1000	800	8	75	1.85	20	–	23	135	BY329X-1000	158
SOD113	1200	1000	8	75	1.85	20	–	23	135	BY329X-1200	158
SOD59	200	150	8	60	1.85	20	–	23	135	BY229-200	127
SOD59	400	300	8	60	1.85	20	–	23	135	BY229-400	127
SOD59	600	500	8	60	1.85	20	–	23	135	BY229-600	127
SOD59	800	600	8	60	1.85	20	–	23	135	BY229-800	127
SOD59	800	600	8	75	1.85	20	–	23	135	BY329-800	148
SOD59	1000	800	8	75	1.85	20	–	23	135	BY329-1000	148
SOD59	1200	1000	8	75	1.85	20	–	23	135	BY329-1200	148
SOD120	200	200	0.8	15	1.3	1	–	–	250	BYD32D	314
SOD120	400	400	0.8	15	1.3	1	–	–	250	BYD32G	314
SOD120	600	600	0.8	15	1.3	1	–	–	250	BYD32J	314
SOD57	200	200	1.6	30	1.35	1	300	45	100	BYV36A	600
SOD57	200	200	1.6	35	1.6	3	300	45	250	BYV95A	642
SOD57	400	400	1.6	30	1.35	1	500	45	100	BYV36B	600
SOD57	400	400	1.6	35	1.6	3	500	45	250	BYV95B	642
SOD57	600	600	1.6	30	1.35	1	700	45	100	BYV36C	600
SOD57	600	600	1.6	35	1.6	3	700	45	250	BYV95C	642
SOD57	800	800	1.5	30	1.45	1	900	40	150	BYV36D	600
SOD57	800	800	1.6	35	1.6	3	900	40	300	BYV96D	642
SOD57	1000	1000	1.5	30	1.45	1	1100	40	150	BYV36E	600
SOD57	1000	1000	1.6	35	1.6	3	1100	40	300	BYV96E	642
SOD57	1200	1200	1.2	30	2.15	1	1300	35	150	BYV26F	550
SOD57	1200	1200	1.5	30	1.45	1	1300	35	250	BYV36F	600
SOD57	1200	1200	1.6	20	1.65	3	1300	35	500	BYV97F	642
SOD57	1400	1400	1.2	30	2.15	1	1500	35	150	BYV26G	550
SOD57	1400	1400	1.5	30	1.45	1	1500	35	250	BYV36G	600
SOD57	1400	1400	1.6	20	1.65	3	1500	35	500	BYV97G	642
SOD57	2000	2000	1	15	2.4	2	–	30	300	BYV98	661
SOD64	200	200	3	65	1.6	3	300	85	100	BYM36A	482
SOD64	200	200	3.1	70	1.5	5	300	85	250	BYW95A	721
SOD64	400	400	3	65	1.6	3	500	85	100	BYM36B	482
SOD64	400	400	3.1	70	1.5	5	500	85	250	BYW95B	722
SOD64	600	600	3	65	1.6	3	700	85	100	BYM36C	482
SOD64	600	600	3.1	70	1.5	5	700	85	250	BYW95C	721
SOD64	800	800	2.9	65	1.78	3	900	75	150	BYM36D	482
SOD64	800	800	3.1	70	1.5	5	900	75	300	BYW96D	727
SOD64	1000	1000	2.9	65	1.78	3	1100	75	150	BYM36E	482
SOD64	1000	1000	3.1	70	1.5	5	1100	75	300	BYW96E	727

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	$I_{F(AV)}$ max. (A)	I_{FSM} max. (A)	$V_F@I_F$ max. (V)	I_F (A)	$V_{(BR)R}$ min. (V)	C_d typ. (pF)	t_{rr} max. (ns)	TYPE NUMBER	PAGE
SOD64	1200	1200	2.4	45	2.3	2	1300	65	150	BYM26F	472
SOD64	1200	1200	2.9	65	1.57	3	1300	65	250	BYM36F	482
SOD64	1200	1200	3.3	60	1.45	5	1300	65	500	BYW97F	733
SOD64	1400	1400	2.4	45	2.3	2	1500	65	150	BYM26G	472
SOD64	1400	1400	2.9	65	1.57	3	1500	65	250	BYM36G	482
SOD64	1400	1400	3.3	60	1.45	5	1500	65	500	BYW97G	733
SOD81	200	200	1.3	20	1.3	1	300	20	250	BYD33D	318
SOD81	400	400	1.3	20	1.3	1	500	20	250	BYD33G	318
SOD81	600	600	1.3	20	1.3	1	700	20	250	BYD33J	318
SOD81	800	800	1.3	20	1.3	1	900	20	300	BYD33K	318
SOD81	1000	1000	1.3	20	1.3	1	1100	20	300	BYD33M	318
SOD81	1200	1200	0.8	5	2.3	1	1300	20	150	BYD53U	353
SOD81	1200	1200	1.2	6	1.5	1	1300	20	250	BYD43U	334
SOD81	1200	1200	1.3	20	1.3	1	1300	20	500	BYD33U	318
SOD81	1400	1400	0.8	5	2.3	1	1500	20	150	BYD53V	353
SOD81	1400	1400	1.2	6	1.5	1	1500	20	250	BYD43V	334
SOD81	1400	1400	1.3	20	1.3	1	1500	20	500	BYD33V	318
SOD81	1600	–	0.7	6	2.4	1	–	15	300	BYD43-16	334
SOD81	1800	–	0.7	6	2.4	1	–	15	300	BYD43-18	334
SOD81	2000	–	0.7	6	2.4	1	–	15	300	BYD43-20	334
Surface mount types											
SOD106	200	200	1.9	25	1.2	1	300	30	250	BYG60D	438
SOD106	400	400	1.9	25	1.2	1	500	30	250	BYG60G	438
SOD106	600	600	1.9	25	1.2	1	700	30	250	BYG60J	438
SOD106	800	800	1.9	25	1.2	1	900	25	300	BYG60K	438
SOD106	1000	1000	1.9	25	1.2	1	1100	25	300	BYG60M	438
SOD87	200	200	1.3	20	1.3	1	300	20	250	BYD37D	328
SOD87	400	400	1.3	20	1.3	1	500	20	250	BYD37G	328
SOD87	600	600	1.3	20	1.3	1	700	20	250	BYD37J	328
SOD87	800	800	1.3	20	1.3	1	900	20	300	BYD37K	328
SOD87	1000	1000	1.3	20	1.3	1	1100	20	300	BYD37M	328
SOD87	1200	1200	0.9	5	2.3	1	1300	20	150	BYD57U	362
SOD87	1400	1400	0.9	5	2.3	1	1500	20	150	BYD57V	362
SOD87	1600	1600	0.7	10	2.4	1	–	15	300	BYD47-16	343
SOD87	1800	1800	0.7	10	2.4	1	–	15	300	BYD47-18	343
SOD87	2000	2000	0.7	10	2.4	1	–	15	300	BYD47-20	343

ULTRAFAST RECOVERY RECTIFIERS

- Ultrafast reverse recovery giving low switching losses
- Wide range of voltage grades and package styles to suit most applications
- Most types have guaranteed reverse surge capability.

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	$I_{F(AV)}$ max. (A)	I_{FSM} max. (A)	$V_F@I_F$ max. (V)	I_F (A)	$V_{(BR)R}$ min. (V)	C_d typ. (pF)	t_{rr} max. (ns)	TYPE NUMBER	PAGE
Leaded types											
SOD100	150	150	8	80	0.895	8	–	–	25	BYW29F-150	712
SOD100	200	200	8	80	0.895	8	–	–	25	BYW29F-200	712
SOD100	300	300	9	100	1.03	8	–	–	60	BYV29F-300	585
SOD100	400	400	9	100	1.03	8	–	–	60	BYV29F-400	585
SOD100	500	500	8	60	1.5	8	–	–	75	BYR29F-500	538
SOD100	500	500	9	100	1.03	8	–	–	60	BYV29F-500	585
SOD100	600	600	8	60	1.5	8	–	–	75	BYR29F-600	538
SOD100	700	700	8	60	1.5	8	–	–	75	BYR29F-700	538
SOD100	800	800	8	60	1.5	8	–	–	75	BYR29F-800	538
SOD113	150	150	8	80	0.895	8	–	–	25	BYW29EX-150	708
SOD113	200	200	8	80	0.895	8	–	–	25	BYW29EX-200	708
SOD120	200	200	0.5	5	3.6	1	–	–	30	BYD52D	349
SOD120	400	400	0.5	5	3.6	1	–	–	30	BYD52G	349
SOD120	600	600	0.5	5	3.6	1	–	–	30	BYD52J	349
SOD57	200	200	1.2	30	2.5	1	300	45	30	BYV26A	550
SOD57	400	400	1.2	30	2.5	1	500	45	30	BYV26B	550
SOD57	600	600	1.2	30	2.5	1	700	45	30	BYV26C	550
SOD57	800	800	1.2	30	2.5	1	900	40	75	BYV26D	550
SOD57	1000	1000	1.2	30	2.5	1	1100	40	75	BYV26E	550
SOD59	150	150	8	80	0.895	8	–	–	25	BYW29E-150	704
SOD59	150	150	14	150	0.9	14	–	–	30	BYV79E-150	634
SOD59	200	200	8	80	0.895	8	–	–	25	BYW29E-200	704
SOD59	200	200	14	150	0.9	14	–	–	30	BYV79E-200	634
SOD59	300	300	9	100	1.03	8	–	–	60	BYV29-300	582
SOD59	300	300	14	130	1.05	15	–	–	60	BYT79-300	545
SOD59	400	400	9	100	1.03	8	–	–	60	BYV29-400	582
SOD59	400	400	14	130	1.05	15	–	–	60	BYT79-400	545
SOD59	500	500	8	60	1.5	8	–	–	75	BYR29-500	535
SOD59	500	500	9	100	1.03	8	–	–	60	BYV29-500	582
SOD59	500	500	14	130	1.05	15	–	–	60	BYT79-500	545
SOD59	600	600	8	60	1.5	8	–	–	75	BYR29-600	535
SOD59	700	700	8	60	1.5	8	–	–	75	BYR29-700	535
SOD59	800	800	8	60	1.5	8	–	–	75	BYR29-800	535

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	$I_{F(AV)}$ max. (A)	I_{FSM} max. (A)	$V_F@I_F$ max. (V)	I_F (A)	$V_{(BR)R}$ min. (V)	C_d typ. (pF)	t_{rr} max. (ns)	TYPE NUMBER	PAGE
SOD64	200	200	2.3	45	2.65	2	300	85	30	BYM26A	472
SOD64	400	400	2.3	45	2.65	2	500	85	30	BYM26B	472
SOD64	600	600	2.3	45	2.65	2	700	85	30	BYM26C	472
SOD64	800	800	2.3	45	2.65	2	900	75	75	BYM26D	472
SOD64	1000	1000	2.3	45	2.65	2	1100	75	75	BYM26E	472
SOD81	200	200	0.7	5	3.6	1	300	20	30	BYD53D	353
SOD81	400	400	0.7	5	3.6	1	500	20	30	BYD53G	353
SOD81	600	600	0.7	5	3.6	1	700	20	30	BYD53J	353
SOD81	800	800	0.7	5	3.6	1	900	20	75	BYD53K	353
SOD81	1000	1000	0.7	5	3.6	1	1100	20	75	BYD53M	353
Dual, common cathode, leaded types											
SOT186	150	150	10	50	0.895	5	–	–	25	BYQ28F-150	514
SOT186	150	150	20	125	0.85	8	–	–	25	BYV32F-150	593
SOT186	150	150	20	150	0.9	15	–	–	28	BYV42F-150	620
SOT186	200	200	10	50	0.895	5	–	–	25	BYQ28F-200	514
SOT186	200	200	20	125	0.85	8	–	–	25	BYV32F-200	593
SOT186	200	200	20	150	0.9	15	–	–	28	BYV42F-200	620
SOT186A	150	150	10	50	0.895	5	–	–	25	BYQ28EX-150	514
SOT186A	150	150	16	100	0.95	8	–	–	25	BYQ30EX-150	522
SOT186A	150	150	20	125	0.85	8	–	–	25	BYV32EX-150	593
SOT186A	150	150	20	150	0.9	15	–	–	28	BYV42EX-150	620
SOT186A	200	200	10	50	0.895	5	–	–	25	BYQ28EX-200	514
SOT186A	200	200	16	100	0.95	8	–	–	25	BYQ30EX-200	522
SOT186A	200	200	20	125	0.85	8	–	–	25	BYV32EX-200	593
SOT186A	200	200	20	150	0.9	15	–	–	28	BYV42EX-200	620
SOT429	150	150	30	150	0.85	15	–	–	28	BYV72EW-150	627
SOT429	150	150	40	180	0.85	20	–	–	40	BYQ40EW-150	526
SOT429	150	150	60	250	0.85	30	–	–	60	BYQ60EW-150	528
SOT429	200	200	30	150	0.82	15	–	–	28	BYV72EW-200	627
SOT429	200	200	40	180	0.85	20	–	–	40	BYQ40EW-200	526
SOT429	200	200	60	250	0.85	30	–	–	60	BYQ60EW-200	528
SOT429	300	300	30	150	1.12	15	–	–	60	BYV74W-300	631
SOT429	400	400	30	150	1.12	15	–	–	60	BYV74W-400	631
SOT429	500	500	30	150	1.12	15	–	–	60	BYV74W-500	631
SOT78	150	150	10	50	0.895	5	–	–	25	BYQ28E-150	510
SOT78	150	150	16	80	0.95	8	–	–	25	BYQ30E-150	518

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	$I_{F(AV)}$ max. (A)	I_{FSM} max. (A)	$V_F@I_F$ max. (V)	I_F (A)	$V_{(BR)R}$ min. (V)	C_d typ. (pF)	t_{rr} max. (ns)	TYPE NUMBER	PAGE
SOT78	150	150	20	125	0.85	8	–	–	25	BYV32E-150	589
SOT78	150	150	30	150	0.85	15	–	–	28	BYV42E-150	616
SOT78	200	200	10	50	0.895	5	–	–	25	BYQ28E-200	510
SOT78	200	200	16	80	0.95	8	–	–	25	BYQ30E-200	518
SOT78	200	200	20	125	0.85	8	–	–	25	BYV32E-200	589
SOT78	200	200	30	150	0.85	15	–	–	28	BYV42E-200	616
SOT78	300	300	10	50	1.05	5	–	–	60	BYT28-300	542
SOT78	300	300	20	120	1.05	10	–	–	60	BYV34-300	597
SOT78	300	300	30	150	1.12	15	–	–	60	BYV44-300	624
SOT78	400	400	10	50	1.05	5	–	–	60	BYT28-400	542
SOT78	400	400	20	120	1.05	10	–	–	60	BYV34-400	597
SOT78	400	400	30	150	1.12	15	–	–	60	BYV44-400	624
SOT78	500	500	10	50	1.05	5	–	–	60	BYT28-500	542
SOT78	500	500	20	120	1.05	10	–	–	60	BYV34-500	597
SOT78	500	500	30	150	1.12	15	–	–	60	BYV44-500	624
Surface mount types											
SOD106	200	200	0.9	20	3.6	1	300	30	30	BYG70D	442
SOD106	400	400	0.9	20	3.6	1	500	30	30	BYG70G	442
SOD106	600	600	0.9	20	3.6	1	700	30	30	BYG70J	442
SOD87	200	200	0.8	5	3.6	1	300	20	30	BYD57D	362
SOD87	400	400	0.8	5	3.6	1	500	20	30	BYD57G	362
SOD87	600	600	0.8	5	3.6	1	700	20	30	BYD57J	362
SOD87	800	800	0.8	5	3.6	1	900	20	75	BYD57K	362
SOD87	1000	1000	0.8	5	3.6	1	1100	20	75	BYD57M	362
SOT404	150	150	8	80	0.895	8	–	–	25	BYW29EB-150	704
SOT404	150	150	14	150	0.9	14	–	–	30	BYV79EB-150	634
SOT404	200	200	8	80	0.895	8	–	–	25	BYW29EB-200	704
SOT404	200	200	14	150	0.9	14	–	–	30	BYV79EB-200	634
SOT428	150	150	8	80	0.895	8	–	–	25	BYW29ED-150	704
SOT428	200	200	8	80	0.895	8	–	–	25	BYW29ED-200	704
Dual, common cathode, surface mount types											
SOT223	150	150	1.5	6	0.7	0.5	–	–	25	BYV40E-150	612
SOT223ef	200	200	1.5	6	0.7	0.5	–	–	25	BYV40E-200	612
SOT404	150	150	10	50	0.895	5	–	–	25	BYQ28EB-150	510
SOT404	150	150	16	80	0.95	8	–	–	25	BYQ30EB-150	518
SOT404	150	150	20	125	0.85	8	–	–	25	BYV32EB-150	589
SOT404	150	150	30	150	0.85	15	–	–	28	BYV42EB-150	616
SOT404	200	200	10	50	0.895	5	–	–	25	BYQ28EB-200	510

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	$I_{F(AV)}$ max. (A)	I_{FSM} max. (A)	$V_F@I_F$ max. (V)	I_F (A)	$V_{(BR)R}$ min. (V)	C_d typ. (pF)	t_{rr} max. (ns)	TYPE NUMBER	PAGE
SOT404	200	200	16	80	0.95	8	–	–	25	BYQ30EB-200	518
SOT404	200	200	20	125	0.85	8	–	–	25	BYV32EB-200	589
SOT404	200	200	30	150	0.85	15	–	–	28	BYV42EB-200	616
SOT428	150	150	10	50	0.895	5	–	–	25	BYQ28ED-150	510
SOT428	150	150	16	80	0.95	8	–	–	25	BYQ30ED-150	518
SOT428	200	200	10	50	0.895	5	–	–	25	BYQ28ED-200	510
SOT428	200	200	16	100	0.95	8	–	–	25	BYQ30ED-200	518

.OW LOSS ULTRAFAST RECOVERY RECTIFIERS

- Ultrafast reverse recovery and low forward volt drop giving low switching and conduction losses
- Wide range of voltage grades and package styles to suit most applications.

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	$I_{F(AV)}$ max. (A)	I_{FSM} max. (A)	$V_F@I_F$ max. (V)	I_F (A)	$V_{(BR)R}$ min. (V)	C_d typ. (pF)	t_{rr} max. (ns)	TYPE NUMBER	PAGE
Leaded types											
SOD120	50	50	1	25	0.98	1	–	–	25	BYD72A	381
SOD120	100	100	1	25	0.98	1	–	–	25	BYD72B	381
SOD120	150	150	1	25	0.98	1	–	–	25	BYD72C	381
SOD120	200	200	1	25	0.98	1	–	–	25	BYD72D	381
SOD120	250	250	1	25	1.05	1	–	–	50	BYD72E	381
SOD120	300	300	1	25	1.05	1	–	–	50	BYD72F	381
SOD120	400	400	1	25	1.05	1	–	–	50	BYD72G	381
SOD115	600	600	4	–	1.15	–	–	–	50	BYW28-600	694
SOD57	50	50	2.4	50	0.98	2	55	100	25	BYV27-050	560
SOD57	100	100	2.4	50	0.98	2	110	100	25	BYV27-100	560
SOD57	150	150	2.4	50	0.98	2	165	100	25	BYV27-150	560
SOD57	200	200	2.4	50	0.98	2	220	100	25	BYV27-200	560
SOD57	300	300	2.2	50	1.05	2	330	80	50	BYV27-300	560
SOD57	400	400	2.2	50	1.05	2	440	80	50	BYV27-400	560
SOD57	600	600	2	40	1.25	2	675	–	50	BYV27-600	560
SOD64	50	50	4.2	90	1.02	3.5	55	190	25	BYV28-050	572
SOD64	100	100	4.2	90	1.02	3.5	110	190	25	BYV28-100	572
SOD64	150	150	4.2	90	1.02	3.5	165	190	25	BYV28-150	572
SOD64	200	200	4.2	90	1.02	3.5	220	190	25	BYV28-200	572
SOD64	300	300	4.2	90	1.05	3.5	330	150	50	BYV28-300	572
SOD64	400	400	4.2	90	1.05	3.5	440	150	50	BYV28-400	572
SOD64	600	600	3.7	90	1.25	3.5	675	125	50	BYV28-600	572
SOD81	200	200	1.7	25	0.93	1	–	50	25	BYD123	404

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	$I_{F(AV)}$ max. (A)	I_{FSM} max. (A)	V_F@I_F max. (V)	I_F (A)	$V_{(BR)R}$ min. (V)	C_d typ. (pF)	t_{rr} max. (ns)	TYPE NUMBER	PAGE
SOD81	400	400	1.5	25	1.15	1	–	40	50	BYD143	412
SOD81	600	600	1.4	25	1.25	1	–	40	50	BYD163	420
SOD81	50	50	1.7	25	0.98	1	55	50	25	BYD73A	386
SOD81	100	100	1.7	25	0.98	1	110	50	25	BYD73B	386
SOD81	150	150	1.7	25	0.98	1	165	50	25	BYD73C	386
SOD81	200	200	1.7	25	0.98	1	220	50	25	BYD73D	386
SOD81	250	250	1.7	25	1.05	1	275	40	50	BYD73E	386
SOD81	300	300	1.7	25	1.05	1	330	40	50	BYD73F	386
SOD81	400	400	1.7	25	1.05	1	440	40	50	BYD73G	386
Surface mount types											
SOD106	50	50	2.4	36	0.93	1	–	–	25	BYG80A	446
SOD106	100	100	2.4	36	0.93	1	–	–	25	BYG80B	446
SOD106	150	150	2.4	36	0.93	1	–	–	25	BYG80C	446
SOD106	200	200	2.2	36	0.93	1	220	–	25	BYG80D	446
SOD106	300	300	2	32	0.98	1	330	–	50	BYG80F	446
SOD106	400	400	2	32	0.98	1	440	–	50	BYG80G	446
SOD106	600	600	1.8	32	1.2	1	675	–	50	BYG80J	446
SOD87	200	200	1.8	25	0.93	1	–	50	25	BYD127	408
SOD87	400	400	1.6	25	1.15	1	–	40	50	BYD147	416
SOD87	600	600	1.5	25	1.25	1	–	40	50	BYD167	424
SOD87	50	50	1.8	25	0.98	1	55	50	25	BYD77A	395
SOD87	100	100	1.8	25	0.98	1	110	50	25	BYD77B	395
SOD87	150	150	1.8	25	0.98	1	165	50	25	BYD77C	395
SOD87	200	200	1.8	25	0.98	1	220	50	25	BYD77D	395
SOD87	250	250	1.7	25	1.05	1	275	40	50	BYD77E	395
SOD87	300	300	1.7	25	1.05	1	330	40	50	BYD77F	395
SOD87	400	400	1.7	25	1.05	1	440	40	50	BYD77G	395

HYPERFAST RECOVERY RECTIFIERS

- Extremely fast reverse recovery
- Suitable for active power factor correction and freewheeling applications.

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	$I_{F(AV)}$ max. (A)	I_{FSM} max. (A)	V_F@I_F max. (V)	I_F (A)	$V_{(BR)R}$ min. (V)	C_d typ. (pF)	t_{rr} max. (ns)	TYPE NUMBER	PAGE
Leaded types											
SOD57	100	100	2.3	50	0.98	2	120	135	12.5	BYV2100	682
SOD57	600	600	0.9	20	2.7	1	700	75	15	BYV99	667
SOD59	600	500	10	65	1.8	10	–	–	19	BYC10-600	292

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	$I_{F(AV)}$ max. (A)	I_{FSM} max. (A)	$V_F@I_F$ max. (V)	I_F (A)	$V_{(BR)R}$ min. (V)	C_d typ. (pF)	t_{rr} max. (ns)	TYPE NUMBER	PAGE
3OD59	600	500	5	40	1.75	5	–	–	19	BYC5-600	276
3OD59	600	500	8	55	1.85	8	–	–	19	BYC8-600	284
3OD81	100	100	1.7	15	0.96	1	120	70	10	BYV1100	676
3OD64	600	600	1.7	40	3.6	3	700	135	15	BYM99	504
3OD64	100	100	4.2	90	0.98	3.5	120	245	15	BYV4100	688
3urface mount types											
3OD106	100	100	2.3	35	0.98	2	120	110	12.5	BYG85B	459
3OD87	100	100	1.7	15	0.96	1	120	70	10	BYD1100	428
3OT404	600	500	10	65	1.8	10	–	–	19	BYC10B-600	296
3OT404	600	500	5	40	1.75	5	–	–	19	BYC5B-600	280
3OT404	600	500	8	55	1.85	8	–	–	19	BYC8B-600	288

;CHOTTKY RECTIFIERS

Lowest forward volt drop of any rectifier technology

Wide range of voltage grades and packages to suit most applications

Guaranteed reverse surge capability.

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	$I_{F(AV)}$ max. (A)	I_{FSM} max. (A)	$V_F@I_F$ max. (mV)	I_F (A)	$C_d@V_R$ typ. (pF)	V_R (V)	TYPE NUMBER	PAGE
Leaded types										
SOD100	40	40	7.5	100	570	7.5	270	5	PBYR740F	885
SOD100	40	40	10	100	590	10	350	5	PBYR1040F	906
SOD100	40	40	16	120	600	16	470	5	PBYR1640F	921
SOD100	45	45	7.5	100	570	7.5	270	5	PBYR745F	885
SOD100	45	45	10	100	590	10	350	5	PBYR1045F	906
SOD100	45	45	16	120	600	16	470	5	PBYR1645F	927
SOD113	40	40	7.5	100	570	7.5	270	5	PBYR740X	805
SOD113	40	40	10	100	590	10	350	5	PBYR1040X	906
SOD113	40	40	16	120	600	16	470	5	PBYR1640X	921
SOD113	45	45	7.5	100	570	7.5	270	5	PBYR745X	885
SOD113	45	45	10	100	590	10	350	5	PBYR1045X	906
SOD113	45	45	16	120	600	16	470	5	PBYR1645X	921
SOD59	20	20	10	135	400	10	580	5	PBYL1020	831
SOD59	20	20	16	135	460	16	700	5	PBYL1620	840
SOD59	20	20	20	180	430	20	1230	5	PBYL2020	846
SOD59	25	25	10	135	400	10	580	5	PBYL1025	831
SOD59	25	25	16	135	460	16	700	5	PBYL1625	840
SOD59	25	25	20	180	430	20	1230	5	PBYL2025	846

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	$I_{F(AV)}$ max. (A)	I_{FSM} max. (A)	$V_F@I_F$ max. (mV)	I_F (A)	$C_d@V_R$ typ. (pF)	V_R (V)	TYPE NUMBER	PAGE
SOD59	40	40	7.5	135	570	7.5	270	5	PBYR740	879
SOD59	40	40	10	135	570	10	350	5	PBYR1040	894
SOD59	40	40	16	135	570	16	470	5	PBYR1640	915
SOD59	45	45	7.5	135	570	7.5	270	5	PBYR745	879
SOD59	45	45	10	135	570	10	350	5	PBYR1045	894
SOD59	45	45	16	135	570	16	470	5	PBYR1645	915
SOD59	60	60	10	135	700	10	420	5	PBYR1060	955
SOD59	80	80	10	135	700	10	420	5	PBYR1080	955
SOD59	100	100	10	135	700	10	420	5	PBYR10100	955
SOD81	20	20	1	25	450	1	80	4	1N5817	93
SOD81	20	–	1	–	550	1	220	0	BYV10-20	548
SOD81	30	30	1	25	550	1	50	4	1N5818	93
SOD81	30	–	1	–	550	1	220	0	BYV10-30	548
SOD81	40	40	1	25	600	1	50	4	1N5819	93
SOD81	40	–	1	–	550	1	220	0	BYV10-40	548
Dual, common cathode, leaded types										
SOT186	40	40	15	100	570	7.5	270	5	PBYR1540CTF	912
SOT186	40	40	20	100	570	10	380	5	PBYR2040CTF	927
SOT186	40	40	25	135	650	20	530	5	PBYR2540CTF	940
SOT186	45	45	15	100	570	7.5	270	5	PBYR1545CTF	912
SOT186	45	45	20	100	570	10	380	5	PBYR2045CTF	927
SOT186	45	45	25	135	650	20	530	5	PBYR2545CTF	940
SOT186A	40	40	15	100	570	7.5	270	5	PBYR1540CTX	912
SOT186A	40	40	20	100	570	10	380	5	PBYR2040CTX	927
SOT186A	40	40	20	135	650	20	530	5	PBYR2540CTX	940
SOT186A	45	45	15	100	570	7.5	270	5	PBYR1545CTX	912
SOT186A	45	45	20	100	570	10	380	5	PBYR2045CTX	927
SOT186A	45	45	20	135	650	20	530	5	PBYR2545CTX	940
SOT429	20	20	40	180	460	20	900	5	PBYR4020WT	946
SOT429	20	20	70	500	460	35	1400	5	PBYR7020WT	953
SOT429	25	25	40	180	460	20	900	5	PBYR4025WT	946
SOT429	25	25	70	500	460	35	1400	5	PBYR7025WT	953
SOT429	40	40	30	300	600	20	450	5	PBYR3040WT	943
SOT429	40	40	40	180	600	20	1000	5	PBYR4040WT	949
SOT429	40	40	40	350	600	30	1000	5	PBYR6040WT	951
SOT429	45	45	30	300	600	20	450	5	PBYR3045WT	943
SOT429	45	45	40	180	600	20	1000	5	PBYR4045WT	949
SOT429	45	45	40	350	600	30	1000	5	PBYR6045WT	951
SOT429	60	60	30	180	700	15	600	5	PBYR3060WT	964

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	$I_{F(AV)}$ max. (A)	I_{FSM} max. (A)	$V_F@I_F$ max. (mV)	I_F (A)	$C_d@V_R$ typ. (pF)	V_R (V)	TYPE NUMBER	PAGE
SOT429	80	80	30	180	700	15	600	5	PBYR3080WT	964
SOT429	100	100	30	180	700	15	600	5	PBYR30100WT	946
SOT78	20	20	10	50	540	5	160	5	BYV116-20	673
SOT78	20	20	15	90	420	7.5	350	5	PBYL1520CT	837
SOT78	20	20	30	135	430	12.5	600	5	PBYL2520CT	852
SOT78	20	20	30	135	430	15	700	5	PBYL3020CT	855
SOT78	25	25	10	50	540	5	160	5	BYV116-25	873
SOT78	25	25	15	90	420	7.5	350	5	PBYL1525CT	837
SOT78	25	25	30	135	430	12.5	600	5	PBYL2525CT	852
SOT78	25	25	30	135	430	15	700	5	PBYL3025CT	855
SOT78	40	40	15	135	570	7.5	270	5	PBYR1540CT	909
SOT78	40	40	20	135	570	10	380	5	PBYR2040CT	924
SOT78	40	40	30	180	620	20	530	5	PBYR2540CT	937
SOT78	45	45	15	135	570	7.5	270	5	PBYR1545CT	909
SOT78	45	45	20	135	570	10	380	5	PBYR2045CT	924
SOT78	45	45	30	180	620	20	530	5	PBYR2545CT	937
SOT78	60	60	20	135	700	10	420	5	PBYR2060CT	961
SOT78	80	80	20	135	700	10	420	5	PBYR2080CT	961
SOT78	100	100	20	135	700	10	420	5	PBYR20100CT	961
Surface mount types										
SOD106A	20	20	1	30	550	1	75	4	BYG90-20	465
SOD106A	30	30	1	30	550	1	75	4	BYG90-30	465
SOD106A	40	40	1	30	550	1	75	4	BYG90-40	465
SOD106A	90	90	1	30	790	1	100	4	BYG90-90	465
SOD87	20	20	1	25	450	1	70	4	PRLL5817	970
SOD87	30	30	1	25	550	1	50	4	PRLL5818	970
SOD87	40	40	1	25	600	1	50	4	PRLL5819	970
SOT404	20	20	10	130	400	10	580	5	PBYL1020B	834
SOT404	20	20	16	135	460	16	700	5	PBYL1620B	840
SOT404	20	20	20	180	430	20	1230	5	PBYL2020B	849
SOT404	25	25	10	130	400	10	580	5	PBYL1025B	834
SOT404	25	25	16	135	460	16	700	5	PBYL1625B	840
SOT404	25	25	20	180	430	20	1230	5	PBYL2025B	849
SOT404	40	40	7.5	135	570	7.5	270	5	PBYR740B	882
SOT404	40	40	10	135	570	10	350	5	PBYR1040B	897
SOT404	40	40	16	135	570	16	470	5	PBYR1640B	918
SOT404	45	45	7.5	135	570	7.5	270	5	PBYR745B	882
SOT404	45	45	10	135	570	10	350	5	PBYR1045B	897
SOT404	45	45	16	135	570	16	470	5	PBYR1645B	918

Power Diodes

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	$I_{F(AV)}$ max. (A)	I_{FSM} max. (A)	$V_F@I_F$ max. (mV)	I_F (A)	$C_d@V_R$ typ. (pF)	V_R (V)	TYPE NUMBER	PAGE
SOT404	60	60	10	135	700	10	420	5	PBYR1060B	958
SOT404	80	80	10	135	700	10	420	5	PBYR1080B	958
SOT404	100	100	10	135	700	10	420	5	PBYR10100B	958
SOT428	20	20	7.5	100	400	7.5	580	5	PBYR720D	876
SOT428	20	20	10	135	410	10	700	5	PBYR1020D	891
SOT428	25	25	7.5	100	400	7.5	580	5	PBYR725D	876
SOT428	25	25	10	135	410	10	700	5	PBYR1025D	891
SOT428	40	40	7.5	100	570	7.5	270	5	PBYR740D	882
SOT428	40	40	10	100	570	10	350	5	PBYR1040D	903
SOT428	45	45	7.5	100	570	7.5	270	5	PBYR745D	882
SOT428	45	45	10	100	570	10	350	5	PBYR1045D	903
Dual, common cathode, surface mount types										
SOT223	20	20	2	6	330	1	160	5	PBYR220CT	858
SOT223	25	25	1	10	300	0.1	100	4	BAT120C	113
SOT223	25	25	2	6	330	1	160	5	PBYR225CT	858
SOT223	40	40	1	10	330	0.1	80	4	BAT140C	116
SOT223	40	40	2	6	450	1	60	5	PBYR240CT	861
SOT223	45	45	2	6	450	1	60	5	PBYR245CT	861
SOT223	60	60	1	10	400	0.1	60	4	BAT160C	119
SOT223	100	100	1	10	790	1	100	4	PBYR2100CT	930
SOT223	150	150	1	10	850	1	100	4	PBYR2150CT	934
SOT404	20	20	10	50	540	5	160	5	BYV116B-20	673
SOT404	20	20	15	90	420	7.5	350	5	PBYL1520CTB	837
SOT404	20	20	30	135	430	12.5	600	5	PBYL2520CTB	852
SOT404	20	20	30	135	430	15	700	5	PBYL3020CTB	855
SOT404	25	25	10	50	540	5	160	5	BYV116B-25	673
SOT404	25	25	15	90	420	7.5	350	5	PBYL1525CTB	837
SOT404	25	25	30	135	430	12.5	600	5	PBYL2525CTB	852
SOT404	25	25	30	135	430	15	700	5	PBYL3025CTB	855
SOT404	40	40	15	135	570	7.5	270	5	PBYR1540CTB	909
SOT404	40	40	20	135	570	10	380	5	PBYR2040CTB	924
SOT404	40	40	30	180	620	20	530	5	PBYR2540CTB	937
SOT404	45	45	15	135	570	7.5	270	5	PBYR1545CTB	909
SOT404	45	45	20	135	570	10	380	5	PBYR2045CTB	924
SOT404	45	45	30	180	620	20	530	5	PBYR2545CTB	937
SOT404	60	60	20	135	700	10	420	5	PBYR2060CTB	961
SOT404	80	80	20	135	700	10	420	5	PBYR2080CTB	961

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	$I_{F(AV)}$ max. (A)	I_{FSM} max. (A)	$V_F@I_F$ max. (mV)	I_F (A)	$C_d@V_R$ typ. (pF)	V_R (V)	TYPE NUMBER	PAGE
SOT404	100	100	20	135	700	10	420	5	PBYR20100CTB	961
SOT428	20	20	3	55	400	1.5	117	5	PBYR320CTD	864
SOT428	20	20	6	65	440	3	160	5	PBYR620CTD	873
SOT428	20	20	10	90	400	5	350	5	PBYR1020CTD	888
SOT428	25	25	3	55	400	1.5	117	5	PBYR325CTD	864
SOT428	25	25	6	65	440	3	160	5	PBYR625CTD	870
SOT428	25	25	10	90	400	5	350	5	PBYR1025CTD	888
SOT428	40	40	3	55	570	1.5	65	5	PBYR340CTD	867
SOT428	40	40	6	65	600	3	96	5	PBYR640CTD	873
SOT428	40	40	10	100	600	5	155	5	PBYR1040CTD	900
SOT428	45	45	3	55	570	1.5	65	5	PBYR345CTD	867
SOT428	45	45	6	65	600	3	96	5	PBYR645CTD	873
SOT428	45	45	10	100	600	5	155	5	PBYR1045CTD	900
Dual, common anode, surface mount types										
SOT223	25	25	1	10	300	0.1	100	4	BAT120A	113
SOT223	40	40	1	10	330	0.1	80	4	BAT140A	116
SOT223	60	60	1	10	400	0.1	60	4	BAT160A	119
Dual, series connected, surface mount types										
SOT223	25	25	1	10	300	0.1	100	4	BAT120S	113
SOT223	40	40	1	10	330	0.1	80	4	BAT140S	116
SOT223	60	60	1	10	400	0.1	60	4	BAT160S	119

MEDIUM POWER TRANSISTOR/SCHOTTKY DIODE MODULES

Transistor section

PACKAGE	V_{CES} max. (V)	I_C max. (mA)	$h_{FE}@I_C$ min.	I_C (mA)	f_T min. (MHz)	t_{on}/t_{off} max. (ns)	$@I_C$ (mA)	NPN/PNP	TYPE NUMBER	PAGE
SOT223	40	200	100	10	300	36/410	50	NPN	PZTM1101	985
SOT223	–40	–200	100	–10	250	30/460	50	PNP	PZTM1102	989

Schottky diode section

PACKAGE	V_R max. (V)	$I_{F(AV)}$ max. (A)	$V_F@I_F$ max. (mV)	I_F (A)	$C_d@V_R$ max. (pF)	V_R (V)	TYPE NUMBER	PAGE
SOT223	40	1	560	1	250	0	PZTM1101	985
SOT223	40	1	560	1	250	0	PZTM1102	989

HIGH VOLTAGE RECTIFIERS

- Glass Passivation for excellent stability under all conditions
- Glass packages with Al-bonded chips allow use under high operating temperature conditions
- Controlled avalanche capable of absorbing transients during flash-over at high voltage output
- Custom-rectifiers on offer - we'll make to your spec!
- Suitable for TV, Medical, Automotive and general purpose switching applications.

PACKAGE	V_{RRM} max. (kV)	V_{RW} max. (kV)	$I_{F(AV)}$ max. (mA)	I_{FRM} max. (mA)	V_F @I_F max. (V)	I_F (mA)	$V_{(BR)R}$ min. (kV)	C_d typ. (pF)	t_{rr} max. (ns)	NOTE	TYPE NUMBER	PAGE
General purpose types												
SOD61	2	2	50	–	–	–	–	–	5000		BYX132G	757
SOD61	3	3	50	–	–	–	–	–	5000		BYX133G	758
SOD61	4	4	50	–	–	–	–	–	5000		BYX134G	759
SOD107A	4	4	50	–	7	10	7.5	–	5000		BYX134GP	760
SOD88	5	3	100	–	5	250	3.5	–	5000		BYX120G	755
SOD61	5	5	50	–	–	–	–	–	5000		BYX135G	761
Ultrafast recovery types												
SOD118A	6	–	10	500	18	10	–	0.34	35	3	BY9206	266
SOD118A	8	–	5	500	22	10	–	0.29	35	3	BY9208	266
SOD118B	10	–	5	500	28	10	–	0.27	35	3	BY9210	266
SOD118B	12	–	5	500	36	10	–	0.23	35	3	BY9212	266
SOD118A	6	–	10	500	19	10	–	0.5	45	3	BY8206	249
SOD118A	8	–	5	500	23	10	–	0.42	45	3	BY8208	249
SOD118B	10	–	5	500	29	10	–	0.35	45	3	BY8210	249
SOD118B	12	–	5	500	35	10	–	0.3	45	3	BY8212	249
SOD88A	10	9	225	–	52	1000	–	–	50		BYX104G	751
SOD88A	5	4.5	340	–	27.7	1000	–	–	50		BYX108G	753
SOD61	5	4	20	500	26	100	–	0.9	60		BY8104	241
SOD61	8	6	10	500	36	100	–	0.65	60		BY8106	241
SOD61	10	8	5	500	44.5	100	–	0.55	60		BY8108	241
SOD61	12	10	5	500	54.5	100	–	0.45	60		BY8110	241
SOD61	14	12	5	500	75	100	–	0.35	60		BY8112	241
SOD61	17	14	5	500	82.5	100	–	0.3	60		BY8114	241
SOD61	19	16	3	500	94	100	–	0.25	60		BY8116	241

PACKAGE	V_{RRM} max. (kV)	V_{RW} max. (kV)	$I_{F(AV)}$ max. (mA)	I_{FRM} max. (mA)	V_F @I_F max. (V)	I_F (mA)	$V_{(BR)R}$ min. (kV)	C_d typ. (pF)	t_{rr} max. (ns)	NOTE	TYPE NUMBER	PAGE
Fast, soft recovery types												
SOD61	1.8	1.5	85	800	8.5	100	–	2	200	1,2	BY584	225
SOD61	2.2	2	50	500	6	50	–	2	300	2	BY614	229
SOD61	2.2	2	85	800	8.5	100	–	2	200	1,2	BY505	205
SOD118A	4	–	10	500	10	10	–	1.2	100	3	BY9304	271
SOD61	5	4	20	500	20	100	–	0.9	100		BY8004	233
SOD61	5	4	20	500	20	100	–	1.2	100	2	BY8404	255
SOD88A	5	4.5	480	–	15.8	1000	–	–	175		BYX107G	753
SOD88A	5	4.5	575	–	12.7	1000	–	–	350		BYX106G	753
SOD88A	5	4.5	650	–	10.9	1000	–	–	600		BYX105G	753
SOD118A	6	–	10	500	14	10	–	0.8	100	3	BY9306	271
SOD83A	7.5	6	550	–	14.5	2000	8	–	350		BYX90G	744
SOD118A	8	–	5	500	20	10	–	0.6	100	3	BY9308	271
SOD61	8	6	10	500	25	100	–	0.65	100		BY8006	233
SOD61	8	6	10	500	25	100	–	0.8	100	2	BY8406	255
SOD107B	10	–	5	500	24	10	–	0.5	100	3	BY9410	274
SOD118B	10	–	5	500	24	10	–	0.5	100	3	BY9310	271
SOD61	10	8	5	500	30	100	–	0.55	100		BY8008	233
SOD61	10	8	5	500	35	100	–	0.6	100	2	BY8408	255
SOD88A	10	9	310	–	29.7	1000	–	–	175		BYX103G	751
SOD88A	10	9	360	–	23.9	1000	–	–	350		BYX102G	751
SOD88A	10	9	400	–	20.5	1000	–	–	600		BYX101G	751
SOD107B	12	–	5	500	30	10	–	0.4	100	3	BY9412	274
SOD118B	12	–	5	500	30	10	–	0.4	100	3	BY9312	271
SOD61	12	10	5	500	38	100	–	0.45	100		BY8010	233
SOD61	12	10	5	500	42	100	–	0.5	100	2	BY8410	255
SOD107B	14	–	5	500	34	10	–	0.35	100	3	BY9414	274
SOD118B	14	–	5	500	34	10	–	0.35	100	3	BY9314	271
SOD61	14	12	5	500	50	100	–	0.35	100		BY8012	233
SOD61	14	12	5	500	52	100	–	0.4	100	2	BY8412	255
SOD107B	16	–	3	500	40	10	–	0.3	100	3	BY9416	274
SOD118B	16	–	3	500	40	10	–	0.3	100	3	BY9316	271
SOD61	17	14	5	500	55	100	–	0.3	100		BY8014	233
SOD61	17	14	5	500	60	100	–	0.35	100	2	BY8414	255
SOD118B	18	–	3	500	44	10	–	0.25	100	3	BY9318	271
SOD61	19	16	3	500	63	100	–	0.25	100		BY8016	233
SOD61	19	16	5	500	70	100	–	0.3	100	2	BY8416	255

PACKAGE	V_{RRM} max. (kV)	V_{RW} max. (kV)	$I_{F(AV)}$ max. (mA)	I_{FRM} max. (mA)	V_F @I_F max. (V)	I_F (mA)	$V_{(BR)R}$ min. (kV)	C_d typ. (pF)	t_{rr} max. (ns)	NOTE	TYPE NUMBER	PAGE
SOD61	22	18	5	500	77	100	–	0.28	100	2	BY8418	255
SOD61	24	20	5	500	88	100	–	0.28	100	2	BY8420	255
SOD61	30	24	5	500	98	100	–	0.28	100	2	BY8424	255

Notes

1. Typical t_{rr} value.
2. Non-controlled avalanche type.
3. 40% over-voltage of V_{RRM} allowed for 5 seconds maximum.

DAMPER AND MODULATOR DIODES

- Low loss
- Low forward volt drop
- Low forward recovery voltage
- Fast switching
- High reverse voltage
- Designed for use with Philips range of deflection transistors.

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	I_{FWM} max. (A)	I_{FSM} max. (A)	V_F @I_F max. (V)	I_F (A)	$V_{(BR)R}$ min. (V)	C_d typ. (pF)	t_{rr} max. (ns)	TYPE NUMBER	PAGE
Leaded types											
SOD100	1500	1300	10	60	1.5	10	0.6	–	–	BY359F-1500	169
SOD100	1500	1300	10	60	1.5	10	0.6	–	–	BY359F-1500S	169
SOD113	1500	1300	6	75	1.2	6.5	0.13	–	–	BY329X-1500	162
SOD113	1500	1300	4	75	1.5	6.5	0.16	–	–	BY329X-1500S	162
SOD113	1700	1300	6	60	1.5	6.5	0.17	–	–	BY329X-1700S	162
SOD113	1500	1300	10	60	1.5	10	0.6	–	–	BY359X-1500	177
SOD113	1500	1300	10	60	1.5	10	0.6	–	–	BY359X-1500S	177
SOD113	1500	1300	10	100	1.2	6.5	0.35	–	–	BY459X-1500	190
SOD113	1500	1300	10	100	1.25	6.5	0.22	–	–	BY459X-1500S	190
SOD113	1700	1300	10	100	1.2	6.5	0.35	–	–	BY479X-1700	201
SOD113	1500	1300	10	100	1.2	6.5	0.35	–	–	BY559X-1500U	221
SOD115	1500	1500	2.5	–	1.7	5	–	–	250	BY558	214
SOD115	1700	1500	2.5	–	1.7	5	–	–	250	BY578	214
SOD117	1500	1300	10	60	1.5	10	0.6	–	–	BY359DX-1500	172
SOD117	1500	1300	10	100	1.2	6.5	0.35	–	–	BY459DX-1500	194
SOD117	1500	1300	10	100	1.2	6.5	0.35	–	–	BY459DX-1500S	194
SOD57	1650	1500	4	30	1.6	3	–	–	1000	BY448	185

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	I_{FWM} max. (A)	I_{FSM} max. (A)	V_F @I_F max. (V)	I_F (A)	$V_{(BR)R}$ min. (V)	C_d typ. (pF)	t_{rr} max. (ns)	TYPE NUMBER	PAGE
SOD59	1500	1300	6	75	1.35	6.5	0.23	–	–	BY329-1500	152
SOD59	1500	1300	6	75	1.5	6.5	0.16	–	–	BY329-1500S	152
SOD59	1700	1300	6	60	1.5	6.5	0.17	–	–	BY329-1700S	155
SOD59	1500	1300	10	60	1.5	10	0.6	–	–	BY359-1500	169
SOD59	1500	1300	10	60	1.75	10	0.35	–	–	BY359-1500S	169
SOD59	1500	1300	10	100	1.2	6.5	0.35	–	–	BY459-1500	190
SOD59	1500	1300	10	100	1.25	6.5	0.22	–	–	BY459-1500S	190
SOD59	1500	1300	20	150	0.9	10	1	–	–	BY559-1500	218
SOD59	1500	1300	10	60	1.5	10	0.6	–	–	BY559-1500U	221
SOD64	1650	1500	5	50	1.5	5	–	–	1000	BY228	122
SOD64	1700	1650	5	50	1.5	5	–	–	1000	BY278	138
SOD64	1500	1400	6	60	1.45	5	–	–	500	BY328	143
SOD64	1500	1500	4	50	1.95	4	–	–	250	BY428	180

AM PIN DIODES

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	$I_{F(AV)}$ max. (A)	I_{FSM} max. (A)	V_F@I_F max. (V)	I_F (A)	$V_{(BR)R}$ min. (V)	C_d typ. (pF)	t_{rr} max. (ns)	TYPE NUMBER	PAGE
Leaded types(1)											
SOD81	100	100	1	–	1.1	0.1	–	12	–	BAQ800	100
Surface mount types											
SOD106	100	100	–	–	1.1	0.1	–	11	–	BAQ806	107

Note

1. T_{tp} = 55 °C, lead length = 10 mm.

RIPPLE BLOCKING DIODES

PACKAGE	V_{RRM} max. (V)	V_R max. (V)	$I_{F(AV)}$ max. (A)	I_{FSM} max. (A)	V_F@I_F max. (V)	I_F (A)	$V_{(BR)R}$ min. (V)	C_d typ. (pF)	t_{rr} max. (ns)	NOTE	TYPE NUMBER	PAGE
Leaded types												
SOD57	300	300	1.2	30	2.15	1	–	35	150	1	BYQ63	530
SOD64	300	300	2.4	45	2.3	2	–	65	150	1	BYM63	499
SOD81	300	300	0.8	5	2.3	1.7	–	17	150	1	BYD63	371
Surface mount types												
SOD87	300	300	0.9	5	2.3	1.7	–	17	150	2	BYD67	376

Notes

1. T_{tp} = 55 °C, lead length = 10 mm.
2. T_{tp} = 110 °C.

ZENER DIODES AND TRANSIENT VOLTAGE SUPPRESSOR DIODES

- High quality zeners and transient voltage suppressors in a wide range of voltages
- Glass passivated for excellent stability under all conditions
- Very low leakage current.

PACKAGE	P_{tot} max. (W)	@T_{tp} max. (°C)	P_{ZSM} max. (W)	@T_j max. (°C)	@t_p max. (ms)	P_{RSM} (W)	V_Z nom E24 range (V)	V_R(1) min. (V)	TYPE NUMBER	PAGE
Leaded types										
SOD57	3.25	25	600	25	0.1	300	7.5 to 270	6.2 to 430	BZT03 series	817
SOD64	6	25	1000	25	0.1	500	7.5 to 270	6.2 to 430	BZW03 series	824
SOD81									BZD23 series	795
	2	25	300	25	0.1	–	3.6 to 6.8	–	C3V6 to C6V8	
	2.5	25	300	25	0.1	150	7.5 to 270	6.2 to 430	C7V5 to C510	
Surface mount types										
SOD106	3	100	600	25	0.1	–	10 to 270	–	BZG03 series	809
	–	–	–	–	–	300	–	8.2 to 220	BZG04 series	813
SOD106	4	–	–	–	–		10 to 68	–	PSMA59..B series	981
	–	–	–	–	–	400	–	8.5 to 78	PSMA..A series	977
SOD87									BZD27 series	802
	1.7	105	300	25	0.1	–	3.6 to 6.8	–	C3V6 to C6V8	
	2.3	105	300	25	0.1	150	7.5 to 270	6.2 to 430	C7V5 to C510	

Note

1. V_R min. values apply to device used as a voltage suppressor diode.

TRANSIENT VOLTAGE SUPPRESSOR ARRAYS(1)

PACKAGE	I_F max. (mA)	I_{FSM} max. (A)	I_{ZSM} max. (A)	P_{ZSM} max. (W)	@ t_p max. (ms)	V_Z nom (V)	r_{dif} max. (Ohm)	S_Z typ. (mV/K)	@ I_Z (mA)	No. of diodes	TYPE NUMBER	PAGE
SOT163-1	200	4	2.5	27.5	1	6.8	8	3	5	18	BZA100	762
SOT163-1	100	4.5	2.5	25	1	6.8	100	3	0.25	9	BZA109	765
SOT339-1	100	4.5	2.7	25	1	6.8	100	3	0.25	9	BZA109TS	771
SOT457	100	3.75	0.7	19.6	1	20	125	16.2	1	4	BZA420A	777
SOT457	100	3.75	3	24	1	5.6	400	1.2	1	4	BZA456A	783
SOT457	100	–	–	–	1	6.2	300	12	1	4	BZA462A	789

Note

1. All arrays are common anode.

Power Diodes

Replacement types

TYPE NUMBER	REPLACEMENT TYPE
BR211 series	NONE
BYQ28-100	BYQ28E-150
BYQ28-150	BYQ28E-150
BYQ28-200	BYQ28E-200
BYQ28E-100	BYQ28E-150
BYQ28EB-100	BYQ28EB-150
BYQ28ED-100	BYQ28ED-150
BYQ28EX-100	BYQ28EX-150
BYQ28F-100	BYQ28F-150
BYQ28X-100	BYQ28EX-150
BYQ28X-150	BYQ28EX-150
BYQ28X-200	BYQ28EX-200
BYV118-35	PBYR1540CT
BYV118-40	PBYR1540CT
BYV118-45	PBYR1545CT
BYV118B-35	PBYR1540CTB
BYV118B-40	PBYR1540CTB
BYV118B-45	PBYR1545CTB
BYV118F-35	PBYR1540CTF
BYV118F-40	PBYR1540CTF
BYV118F-45	PBYR1545CTF
BYV118X-35	PBYR1540CTX
BYV118X-40	PBYR1540CTX
BYV118X-45	PBYR1545CTX
BYV133-35	PBYR2040CT
BYV133-40	PBYR2040CT
BYV133-45	PBYR2045CT
BYV133B-35	PBYR2040CTB
BYV133B-40	PBYR2040CTB
BYV133B-45	PBYR2045CTB
BYV133F-35	PBYR2040CTF
BYV133F-40	PBYR2040CTF
BYV133F-45	PBYR2045CTF
BYV133X-35	PBYR2040CTX
BYV133X-40	PBYR2040CTX
BYV133X-45	PBYR2045CTX
BYV143-35	PBYR2540CT
BYV143-40	PBYR2540CT

TYPE NUMBER	REPLACEMENT TYPE
BYV143-45	PBYR2545CT
BYV143B-35	PBYR2540CTB
BYV143B-40	PBYR2540CTB
BYV143B-45	PBYR2545CTB
BYV143F-35	PBYR2540CTF
BYV143F-40	PBYR2540CTF
BYV143F-45	PBYR2545CTF
BYV143X-35	PBYR2540CTX
BYV143X-40	PBYR2540CTX
BYV143X-45	PBYR2545CTX
BYV32E-100	BYV32E-150
BYV32EB-100	BYV32E-150
BYV32EX-100	BYV32EX-150
BYV32F-100	BYV32F-150
BYV40-100	BYV40E-150
BYV40-150	BYV40E-150
BYV40-200	BYV40E-200
BYV40E-100	BYV40E-150
BYV42E-100	BYV42E-150
BYV42EB-100	BYV42EB-150
BYV42EX-100	BYV42EX-150
BYV42F-100	BYV42F-150
BYV72-100	BYV72EW-150
BYV72-150	BYV72EW-150
BYV72-200	BYV72EW-200
BYV72EF-100	NONE
BYV72EF-150	NONE
BYV72EF-200	NONE
BYV79-100	BYV79E-150
BYV79-150	BYV79E-150
BYV79-200	BYV79E-200
BYV79E-100	BYV79E-150
BYV79EB-100	BYV79EB-150
BYW29E-100	BYW29E-150
BYW29EB-100	BYW28EB-150
BYW29ED-100	BYW29ED-150
BYW29EX-100	BYW29EX-150
BYW29F-100	BYW29F-150

TYPE NUMBER	REPLACEMENT TYPE
BZW03 series	NONE
PBYR1035	PBYR1040
PBYR1035B	PBYR1040B
PBYR1035F	PBYR1040F
PBYR1035X	PBYR1040X
PBYR1535CT	PBYR1540CT
PBYR1535CTB	PBYR1540CTB
PBYR1535CTF	PBYR1540CTF
PBYR1535CTX	PBYR1540CTX
PBYR1635	PBYR1640
PBYR1635B	PBYR1640B
PBYR1635F	PBYR1640F
PBYR1635X	PBYR1640X
PBYR2035CT	PBYR2040CT
PBYR2035CTB	PBYR2040CTB
PBYR2035CTF	PBYR2040CTF
PBYR2035CTX	PBYR2040CTX
PBYR235CT	PBYR240CT
PBYR2535CT	PBYR2540CT
PBYR2535CTB	PBYR2540CTB
PBYR2535CTF	PBYR2540CTF
PBYR2535CTX	PBYR2040CTX
PBYR30100PT	PBYR30100WT
PBYR3035PT	PBYR3040WT
PBYR3035PTF	NONE
PBYR3040PT	PBYR3040WT
PBYR3040PTF	NONE
PBYR3045PT	PBYR3045WT
PBYR3045PTF	NONE
PBYR3060PT	PBYR3060WT
PBYR3080PT	PBYR3080WT
PBYR635CT	NONE
PBYR640CT	NONE
PBYR645CT	NONE
PBYR735	PBYR740
PBYR735B	PBYR740B
PBYR735F	PBYR740F
PBYR735X	PBYR740X

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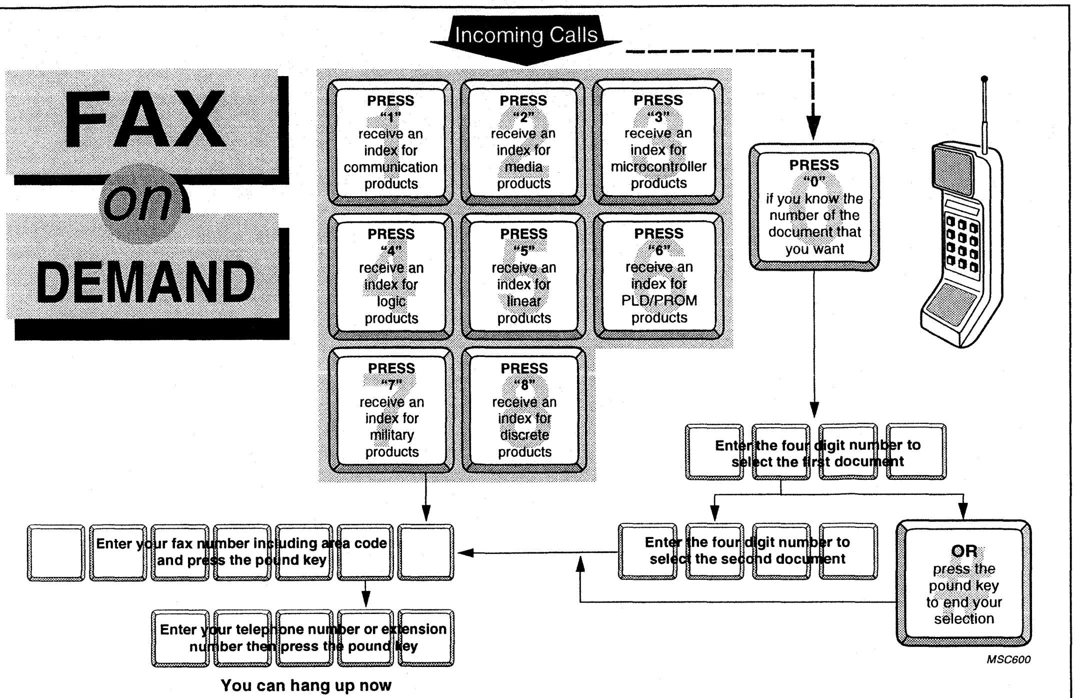

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- Hong Kong
- Japan
- The Netherlands.

GENERAL

TOTAL QUALITY MANAGEMENT

Philips Semiconductors is a Quality Company, renowned for the high quality of our products and service. We keep alive this tradition by constantly aiming towards one ultimate standard, that of zero defects. This aim is guided by our Total Quality Management (TQM) system, the basis of which is described in the following paragraphs.

Quality assurance

Based on ISO 9000 standards, customer standards such as Ford TQE and IBM MDQ. Our factories are certified to ISO 9000 by external inspectorates.

Partnerships with customers

PPM co-operations, design-in agreements, ship-to-stock, just-in-time and self-qualification programmes, and application support.

Partnerships with suppliers

Ship-to-stock, statistical process control and ISO 9000 audits.

Quality improvement programme

Continuous process and system improvement, design improvement, complete use of statistical process control, realization of our final objective of zero defects, and logistics improvement by ship-to-stock and just-in-time agreements.

ADVANCED QUALITY PLANNING

During the design and development of new products and processes, quality is built-in by advanced quality planning. Through failure-mode-and-effect analysis the critical parameters are detected and measures taken to ensure good performance on these parameters. The capability of process steps is also planned in this phase.

PRODUCT CONFORMANCE

The assurance of product conformance is an integral part of our quality assurance (QA) practice. This is achieved by:

- Incoming material management through partnerships with suppliers.
- In-line quality assurance to monitor process reproducibility during manufacture and initiate any necessary corrective action. Critical process steps are 100% under statistical process control.
- Acceptance tests on finished products to verify conformance with the device specification. The test results are used for quality feedback and corrective actions. The inspection and test requirements are detailed in the general quality specifications.
- Periodic inspections to monitor and measure the conformance of products.

PRODUCT RELIABILITY

With the increasing complexity of Original Equipment Manufacturer (OEM) equipment, component reliability must be extremely high. Our research laboratories and development departments study the failure mechanisms of semiconductors. Their studies result in design rules and process optimization for the highest built-in product reliability. Highly accelerated tests are applied to the products reliability evaluation. Rejects from reliability tests and from customer complaints are submitted to failure analysis, to result in corrective action.

CUSTOMER RESPONSES

Our quality improvement depends on joint action with our customer. We need our customer's inputs and we invite constructive comments on all aspects of our performance. Please contact our local sales representative.

RECOGNITION

The high quality of our products and services is demonstrated by many Quality Awards granted by major customers and international organizations.

ENVIRONMENTAL POLICY

Philips Semiconductors is a global company committed to achieving a leading competitive position in the electronics industry through continuous improvements in product innovation, manufacturing excellence, customer service and environmental protection.

Environmental protection is an integral part of our business policy and is based on four principles:

- Sustainable development - development of products and processes that have minimal effect on the quality of the environment today and in the future.
- Prevention is better than cure.
- The total effect on the environment is what counts - embodied in the development of products whose production (including energy usage), operation and disposal at end of life have minimal adverse effect on the environment.
- Open contact with the authorities and customers.

As a leading manufacturer of integrated circuits and discrete semiconductors, Philips Semiconductors regards environmental protection as a major issue. In contrast to many industries, semiconductor manufacture uses relatively few toxic and hazardous materials. Nevertheless it is always our policy to follow working practices that reduce to the absolute minimum any chance of these materials passing into the environment. Every opportunity is taken to refine our manufacturing processes to reduce energy and water consumption and produce as little impact on the surroundings as possible.

Certification

Philips Semiconductors was among the first companies in the world to implement certifiable Environmental Management Systems in line with the ISO 14001 environmental standard. We expect all of our manufacturing centres to be certified before 1999.

We were also one of the first international companies to introduce an internal Environmental Network meeting ISO 14001 requirements.

ISO 14001

The essential elements of an Environmental Management System meeting ISO 14001 requirements are:

- An organisation and well-defined procedures for handling environmental issues.
- Clearly-defined areas of responsibility within the organisation and a framework for setting up and reviewing environmental objectives
- Awareness of environmental factors plus a clear improvement plan prioritising actions on reducing environmental impact.
- A published policy of continuous improvement on environmental issues.

As with Quality standards, companies must be periodically audited, usually by an external party, to verify that they are complying with the requirements.

Gaining certification

As part of the process of gaining environmental certification such as ISO 14001, the headings below describe just some of the work carried out by the Philips Semiconductors sites world-wide.

REDUCING HAZARDOUS MATERIALS

Examples of work carried in this area include:

Replacing nickel leadframes by copper leadframes to reduce the quantity of nickel passing into the environment, both in production and at end-of-life disposal;
Research into finding suitable alternatives to antimony and bromine which are used as flame retardants in semiconductor encapsulations;
Finding suitable alternatives to toxic beryllia in semiconductors, for example aluminium nitride.

INVOLVING PARTNERS

We require our suppliers and subcontractors to be environmentally responsible, to have their own environmental policy and improvement plans and to record environmental information on all raw materials supplied to us. Future preferred suppliers will also be required to have ISO 14001 certification.

LOW-POWER DESIGNS

Continuing developments in our power semiconductors and integrated circuits produce more efficient operation, leading to lower power dissipation, cooler operation and lower drain on the power supply. This pays dividends whatever the power source. In the case of battery power, fewer batteries mean fewer problems from battery disposal.

CUTTING ENERGY CONSUMPTION

Efforts have been made and are ongoing to reduce energy consumption within the company. The overall goal is to improve the efficiency of energy consumption by 25% before the year 2000.

Energy-saving programmes include:
Maintaining clean-air conditions at the work surface by the use of mini-environments within clean-rooms. This can lead to reductions of up to 60% in clean-room energy usage;
Replacing old inefficient lighting with new equipment which uses electronic ballast and controls;
Making the workforce aware of good energy-saving practices which are as relevant in the home as they are in the workplace.

Reducing chemical emissions

Efforts are constantly in progress to reduce chemical emissions. These efforts include:
Improvements to manufacturing processes to reduce the emissions of perfluorinated compounds and volatile organic compounds;
Alternatives introduced for damaging organic materials like ethyl glycol ethers and methanol in photo-lithographic processes.

ODC-free

In the elimination of ozone-depleting chemicals from its production processes, Philips Semiconductors can claim major successes. As early as May 1993, all plants had eliminated chloro-fluorocarbons (CFCs) from their manufacturing processes. This led the way to a complete phasing out of all Class I and Class II ODCs (listed in the 1986 Montreal Protocol) from our products and manufacturing processes in compliance with the US Clean Air Act.

Recycling

Chemicals and water used in production processes are cleaned and recycled for re-use where, previously, they would have been disposed of. In some cases where we cannot re-use waste materials in our manufacturing processes, they are still of sufficient purity for other industries who buy them for their own manufacturing processes.

Examples of waste product re-use are:
Supplying cleaned water from production processes for landscaping irrigation and for supporting other local industries;
Supplying reject wafers to the aluminium industry to be used as pure silicon additives during aluminium smelting;
Re-using sulphuric acid in-house for cleaning furnace tubes and supplying it to third parties for use in electroplating;
The recycling and re-use on-site of solvents such as acetone, isopropanol and N-methyl pyrrolidone.

Paper and cardboard reduction

Our parent company has set a target to reduce the volume of paper and cardboard used in packing materials by 15% by the year 2000. Philips Semiconductors has already passed this target by 1997 with a reduction over the previous 3 years of more than 20%.

Reduced environmental impact of packing

We are reducing the impact of used packing material on the environment by promoting recycling. To make this easier we have switched to 'mono material' (for example, from aluminium-lined boxes to carbon-coated boxes)

Other measures include:

Switching from two-piece to one-piece boxes;
Changing from boxes of white cardboard (which require bleach in manufacture) to brown recycled cardboard;
Using water-based inks (without heavy metals) for marking.
All parts are marked with recycling symbols and the material used (for example, 'PVC' in the case of plastic device tubes).

We actively promote re-use of reels and trays used for discrete semiconductors and integrated circuits. This is helped by marking the boxes with labels giving an address to contact to arrange collection of used reels and trays. Philips is also co-operating with other manufacturers to establish global standards for these materials.

As a result of these actions, our new packing designs are easier to recycle, use less material and are nearly 40% lighter than old designs.

Semiconductor content

We were the first semiconductor manufacturer to publish full details of the chemical content of its products and packaging. This assists manufacturers who wish to evaluate the environmental impact from initial purchase to end-of-life disposal of using our products.

Ratings

A rating is a value that establishes either a limiting capability or a limiting condition for an electronic device. It is determined for specific values of environment and operation, and may be stated in any suitable terms. Limiting conditions may be either maxima or minima.

Characteristics

A characteristic is an inherent and measurable property of a device. It can be expressed as a value for stated or recognised conditions or as a set of related values, usually shown in graphical form.

Ratings system

The rating system used in this data handbook is the Absolute Maximum Rating System defined in IEC publication 134.

Absolute maximum ratings are limiting values of operating and environmental conditions applicable to any electronic device of a specified type.

The limiting values are as defined by the published data.

Limiting values may be either maxima or minima.

These values should not be exceeded under the worst probable conditions.

The limiting values are chosen by the device manufacturer to provide acceptable serviceability taking no responsibility for equipment variations, environmental variations and the effects of changes in operating conditions due to variations in the characteristics of the device under consideration or other electronic devices in the equipment.

The equipment designer should design so that initially and throughout the life of the device, no limiting value for the intended service is exceeded with any device under the worst probable operating conditions. This includes supply voltage variation, equipment component variation, equipment control adjustment, load variations, signal variation, environmental conditions and variations in the characteristics of the device under consideration and all other electronic devices in the equipment.

Back diffused rectifier diodes

A single-diffused P-N diode with a two layer structure cannot combine a high forward current density with a high reverse blocking voltage.

A way out of this dilemma is provided by the three layer structure, the so-called P-I-N diode, where 'I' is a lightly doped (nearly intrinsic) layer. This layer, called the base, is sandwiched between the highly doped diffused P^+ and N^+ outer layers giving a P^+-P-N^+ or P^+-N-N^+ structure. Generally, the base gives the diode its high reverse voltage, and the two diffused regions give the high forward current rating.

Such a three layer diode can be realised using a 'back-diffused' structure. A lightly doped silicon wafer is given a very long N^+ diffusion on one side, followed by a relatively shallow P^+ diffusion on the opposite side. This asymmetric diffusion allows better control of the thickness of the base layer than the conventional double diffusion method, resulting in a better trade-off between low forward voltage and high reverse blocking voltage. Generally, for a given silicon area, the thicker the base layer the higher the V_R and the lower the I_F. Reverse switching characteristics also determine the base design. Fast recovery diodes usually have N-type base regions to give 'soft' recovery with a narrow base layer to give fast switching.

Ultra fast rectifier diodes

Ultra fast rectifier diodes, made by epitaxial technology, are intended for use in applications where low conduction and switching losses are of paramount importance and relatively low reverse blocking voltage (V_{RWM} = 150 V) is required: e.g. Switched mode power supplies operating at frequencies of about 50 kHz.

The use of epitaxial technology means that there is very close control over the almost ideal diffusion profile and base width giving very high carrier injection efficiences leading to lower conduction losses than conventional technology permits. The well defined diffusion profile also allows a tight control of stored minority carriers in the base region, so that very fast turn-off times (35 ns) can be achieved. The range of devices also has a soft reverse recovery and a low forward recovery voltage.

Schottky-barrier rectifier diodes

Schottky-barrier rectifiers find application in low-voltage switched-mode power supplies (e.g. a 5 V output) where they give an increase in efficiency due to the very low forward drop, and low switching losses. Power Schottky diodes are made by a metal-semiconductor barrier process to minimise forward voltage losses, and being majority carrier devices have no stored charge. They are therefore capable of operating at extremely high speeds. Electrical performance in forward and reverse conduction is uniquely defined by the device's metal-semiconductor 'barrier height'. Philips process minimises forward voltage drop, whilst maintaining reverse leakage current at full rated working voltage and $T_{j\,max}$ at an acceptable level.

Philips range of power schottky-barrier diodes can withstand reverse voltage transients and have guaranteed reverse surge capability.

Power diode ratings

A rating is a value that establishes either a limiting capability or a limiting condition for an electronic device. It is determined for specified values of environment and operation, and may be stated in any suitable terms. Limiting conditions may be either maxima or minima.

All limiting values quoted in this data handbook are Absolute Maximum Ratings - limiting values of operating and environmental conditions applicable to any device of a specified type, as defined by its published data, which should not be exceeded under the worst probable conditions.

VOLTAGE RATINGS

V_{RSM} Non-repetitive peak reverse voltage. The maximum allowable instantaneous reverse voltage including all non-repetitive transients; duration < 10 ms.

V_{RRM} Repetitive peak reverse voltage. The maximum allowable instantaneous reverse voltage including transients which occur every cycle, duration < 10 ms, duty cycle < 0.01.

V_{RWM} Crest working reverse voltage. The maximum allowable instantaneous reverse voltage including transients which may be applied every cycle excluding all repetitive and non-repetitive transients.

V_R Continuous reverse voltage. The maximum allowable constant reverse voltage. Operation at rated V_R may be limited to junction temperatures below $T_{j\,max}$ in order to prevent thermal runaway.

CURRENT RATINGS

$I_{F(AV)}$ Average forward current. Specified for either square or sinusoidal current waveforms at a maximum mounting base or heatsink temperature. The maximum average current which may be passed through the device without exceeding $T_{j\,max}$.

$I_{F(RMS)}$ Root mean square current. The RMS value of a current waveform is the value which causes the same dissipation as the equivalent DC value.

I_{FRM} Repetitive peak forward current. The maximum allowable peak forward current including transients which occur every cycle. The junction temperature should not exceed $T_{j\,max}$ during repetitive current transients.

I_{FSM} Non-repetitive forward current. The maximum allowable peak forward current which may be applied no more than 100 times in the life of the device. Usually specified with re-applied V_{RWM} following the surge.

I_{RRM} Repetitive peak reverse current. The maximum allowable peak reverse current including transients which occur every cycle.

I_{RSM} Non-repetitive reverse current. The maximum allowable peak reverse current which may be applied no more than 100 times in the life of the device.

FORWARD CURRENT RATINGS

The forward voltage/ current characteristic of a diode may be approximated by a piecewise linear model as shown in Fig.1 where R_S is the slope of the line which passes through the rated current and V_O is the voltage axis intercept. The forward voltage is then $V_F = V_O + I_F.R_S$, and the instantaneous dissipation is $P_F = V_O.I_F + I_F^2.R_S$. where I_F is the instantaneous forward current.

It can be shown that the average forward dissipation for any current waveform is: $P_{F(AV)} = V_O.I_{F(AV)} + I_{F(RMS)}^2.R_S$, where $I_{F(AV)}$ is the average forward current and $I_{F(RMS)}$ is the RMS value of the forward current. Graphs in the published data show forward dissipation as a function of average current for square or sinusoidal waveforms over a range of duty cycles and form factors.

To ensure reliable operation, the maximum allowable junction temperature T_j max should not be exceeded repetitively, either as a result of the average dissipation in the device or as a result of high peak currents

The average junction temperature rise is the average dissipation multiplied by the thermal resistance; $R_{th\,j\text{-}mb}$ or $R_{th\,j\text{-}hs}$. Subtracting the junction temperature rise from the maximum allowable junction temperature $T_{j\,max}$, gives the maximum allowable mounting base or heatsink temperature.

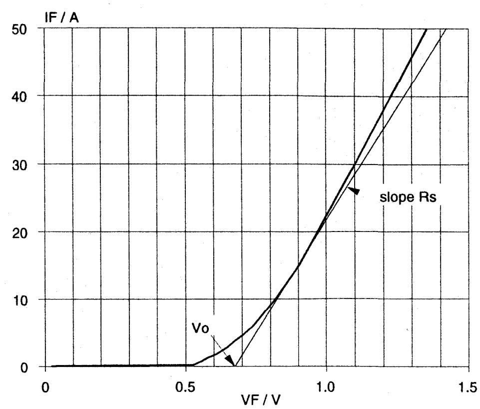


Fig.1 Piecewise linear approximation to diode forward characteristic.

The peak junction temperature rise for a rectangular current pulse may be found by multiplying the instantaneous power by the thermal impedance. Analysis methods for non-rectangular pulses are covered in the *"Power Semiconductor Applications"* handbook.

Power diode characteristics

A characteristic is an inherent and measurable property of a device. Such a property may be expressed as a value for stated or recognised conditions. A characteristic may also be a set of related values, usually shown in graphical form.

REVERSE RECOVERY

When a semiconductor rectifier diode has been conducting in the forward direction sufficiently long to establish the steady state, there will be a charge due to minority carriers present. Before the device can block in the reverse direction this charge must be extracted. This extraction takes the form of a transient reverse current and this, together with the reverse bias voltage results in additional power dissipation which reduces the rectification efficiency. At sine-wave frequencies up to about 400 Hz these effects can often be ignored, but at higher frequencies and for square waves the switching losses must be considered. The parameters of reverse recovery are defined in Fig.2.

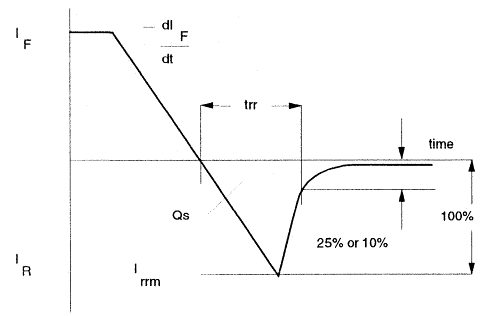


Fig.2 Definition of t_{rr}, Q_s and I_{rrm}.

Stored charge

The area under the I_R versus time curve is known as the stored charge (Q_s) and is normally quoted in microcoulombs or nanocoulombs. Low stored charge devices are preferred for fast switching applications.

Reverse recovery time

Another parameter which can be used to determine the speed of the rectifier is the reverse recovery time (t_{rr}). This is measured from the instant the current passes through zero (from forward to reverse) to the instant the current recovers to either 10% or 25% of its peak reverse value. Low reverse recovery times are associated with low stored charge devices.

The conditions which need to be specified are:

- Steady-state forward current (I_F); high currents increase recovery time.
- Reverse bias voltage (V_R); low reverse voltage increases recovery time
- Rate of fall of anode current (dI_F/dt); high rates of fall reduce recovery time, but increase stored charge.
- Junction temperature (T_j); high temperatures increase both recovery time and stored charge.

Softness of recovery

In many switching circuits it is not just the magnitude but the shape of the reverse recovery characteristic that is important. If the positive-going edge of the characteristic has a fast rise time (as in a so-called 'snap-off' device) this edge may cause conducted or radiated radio frequency interference (rfi), or it may generate high voltages across inductors which may be in series with the rectifier. The maximum slope of the reverse recovery current (dI_R/dt) is quoted as a measure of the 'softness' of the characteristic. Low values are less liable to give rfi problems. The measurement conditions which need to be specified are as above.

Reverse recovery current

The peak value of the reverse recovery current (I_{rrm}) is an important parameter in many switched mode power supply circuits. This is because the high transient current produced by a diode with a high I_{rrm} can be interpreted by the circuit as a short circuit fault, which may cause the power supply to shut down or have apparently poor load regulation. Like the stored charge and reverse recovery time, I_{rrm} increases with increasing temperature, so the effects sometimes only become apparent when the equipment gets hot. I_{rrm} correlates with stored charge Q_s. Thus choosing an Ultrafast diode with low Q_s usually avoids this problem.

Switching losses

The product of the transient reverse current and the reverse voltage is power dissipation, most of which occurs whilst the reverse recovery current is decreasing from the peak value (I_{rrm}) to zero. In repetitive operation an average power can be calculated and added to the forward dissipation to give the total power. The peak value of transient reverse current is known as I_{rrm}. The origin of reverse recovery losses is illustrated in Fig.3.

The conditions which need to be specified are:

- Forward current (I_F); high currents increase switching losses.
- Rate of fall of anode current (dI_F/dt); high rates of fall increase switching losses.This is particularly important in square-wave operation. Power losses in sine-wave operation for a given frequency are considerably less due to the much lower dI_F/dt.
- Frequency (f); high frequency means high losses.
- Reverse bias voltage (V_R); high reverse bias means high losses.
- Junction temperature (T_j); high temperature means high losses.

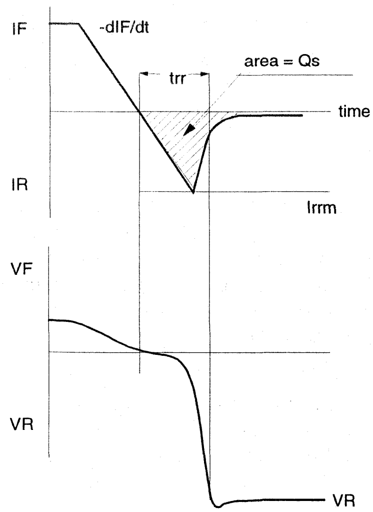


Fig.3 Waveforms showing the origin of reverse switching losses.

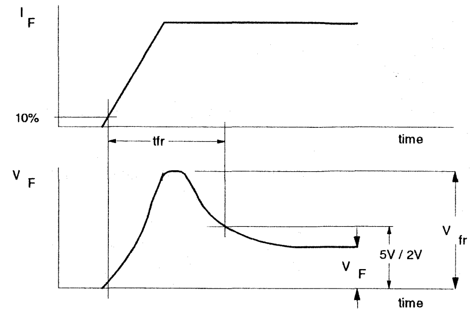


Fig.4 Definition of V_{fr} and t_{fr}.

FORWARD RECOVERY

At the instant a semiconductor rectifier diode is switched into forward conduction there are no carriers present at the junction, hence the forward voltage drop may be instantaneously of a high value. As the stored charge builds up, conductivity modulation takes place and the forward voltage rapidly falls to the steady state value. The peak value of forward voltage drop is known as the forward recovery voltage (V_{fr}). The time from the instant the current reaches 10% of its steady-state value to the time the forward voltage drops below a given value (usually 5 V or 2 V) is known as the forward recovery time (t_{fr}). The forward recovery parameters are defined in Fig.4.

The conditions which need to be specified are:

- Forward current (I_F); high currents give high recovery voltages.
- Current pulse rise time (t_r); short rise times give high recovery voltages.
- Junction temperature (T_j); The influence of temperature is slight.

DISCRETE SEMICONDUCTORS

Basic type number

This type designation code applies to discrete semiconductor devices (not integrated circuits), multiples of such devices, semiconductor chips and Darlington transistors.

FIRST LETTER

The first letter gives information about the material for the active part of the device.

- A Germanium or other material with a band gap of 0.6 to 1 eV
- B Silicon or other material with a band gap of 1 to 1.3 eV
- C Gallium arsenide (GaAs) or other material with a band gap of 1.3 eV or more
- R Compound materials, e.g. cadmium sulphide.

SECOND LETTER

The second letter indicates the function for which the device is primarily designed. The same letter can be used for multi-chip devices with similar elements.

In the following list low power types are defined by $R_{th\ j\text{-}mb} > 15$ K/W and power types by $R_{th\ j\text{-}mb} \leq 15$ K/W.

- A Diode; signal, low power
- B Diode; variable capacitance
- C Transistor; low power, audio frequency
- D Transistor; power, audio frequency
- E Diode; tunnel
- F Transistor; low power, high frequency
- G multiple of dissimilar devices/miscellaneous devices; e.g. oscillators. Also with special third letter, see under “Serial number/special third letter”
- H Diode; magnetic sensitive
- L Transistor; power, high frequency
- N Photocoupler
- P Radiation detector; e.g. high sensitivity photo-transistor; with special third letter
- Q Radiation generator; e.g. LED, laser; with special third letter
- R Control or switching device; e.g. thyristor, low power; with special third letter
- S Transistor; low power, switching
- T Control and switching device; e.g. thyristor, power; with special third letter
- U Transistor; power, switching
- W Surface acoustic wave device
- X Diode; multiplier, e.g. varactor, step recovery
- Y Diode; rectifying, booster
- Z Diode; voltage reference or regulator, transient suppressor diode; with special third letter.

SERIAL NUMBER/SPECIAL THIRD LETTER

The number comprises three figures running from 100 to 999 for devices primarily intended for consumer equipment, or one letter (Z, Y, X, etc.) and two figures running from 10 to 99 for devices primarily intended for industrial or professional equipment.(1) The letter has no fixed meaning, except in the following cases:

- A For triacs, after second letter ‘R’ or ‘T’
- F For emitters and receivers in fibre-optic communication, after second letter ‘G’, ‘P’ or ‘Q’. When the second letter is ‘G’, the first letter should be defined in accordance with the material of the main optical device.
- L For lasers in non-fibre-optic applications, after second letter ‘G’ or ‘Q’. When the second letter is ‘G’, the first letter should be defined in accordance with the material of the main optical device.
- O For opto-triacs, after second letter ‘R’
- T For 3-state bicolour LEDs, after second letter ‘Q’
- W For transient voltage suppressor diodes, after second letter ‘Z’.

EXAMPLES OF BASIC TYPE NUMBERS

AA112	Germanium, low power signal diode (consumer type)
ACY32	Germanium, low power AF transistor (industrial type)
BD232	Silicon, power AF transistor (consumer type)
CQY17	GaAs, light-emitting diode (industrial type)
RPY84	CdS, photo-conductive cell (industrial type).

Version letter(s)

One or two letters may be added to the basic type number to indicate minor electrical or mechanical variants of the basic type. The letters never have a fixed meaning, except that the letter ‘R’ indicates reverse polarity and the letter ‘W’ indicates a surface mounted device (SMD).

(1) When the supply of these serial numbers is exhausted, the serial number may be expanded to three figures for industrial types and four figures for consumer types.

Suffix

Sub-classification can be used for devices supplied in a wide range of variants, called associated types. The following sub-coding suffixes are in use:

VOLTAGE REFERENCE AND VOLTAGE REGULATOR DIODES

One letter and one number, preceded by a hyphen (-). The letter, if required, indicates the nominal tolerance of the Zener voltage.

A 1%

B 2%

C 5%

D 10%

E 20%.

In the case of a 3% tolerance, the letter 'F' is used.

The number denotes the typical operating (Zener) voltage, related to the nominal current rating for the entire range. The letter 'V' is used in place of the decimal point.

Example: BZY74-C6V3 or -C10.

TRANSIENT VOLTAGE SUPPRESSOR DIODES

One number, preceded by a hyphen (-). The number indicates the maximum recommended continuous reversed (stand-off) voltage, V_R. The letter 'V' is used in place of the decimal point.

Example: BZW70-9V1 or –39.

The letter 'B' may be used immediately after the last number, to indicate a bidirectional suppressor diode.

Example: BZW10-15B.

CONVENTIONAL AND CONTROLLED AVALANCHE RECTIFIER DIODES AND THYRISTORS

One number, preceded by a hyphen (-). The number indicates the rated maximum repetitive peak reverse voltage, V_{RRM}, or the rated repetitive peak off-state voltage, V_{DRM}, whichever is the lower. Reversed polarity with respect to the case is indicated by the letter 'R' immediately after the number.

Example: BYT-100 or -100R.

RADIATION DETECTORS

One number, preceded by a hyphen (-). The number indicates the depletion layer in micrometres (μm). The resolution is indicated by a version letter.

Example: BPX10-2A.

ARRAY OF RADIATION DETECTORS AND GENERATORS

One number, preceded by a hyphen (-). The number indicates the number of basic devices assembled into the array.

Examples: BPW50-6, BPW50-9, BPW50-12.

HIGH FREQUENCY POWER TRANSISTORS

One number, preceded by a hyphen (-). The number indicates the supply voltage.

Example: BLU80-24.

INTEGRATED CIRCUITS

Basic type number

This type designation code applies to semiconductor monolithic, semiconductor multi-chip, thin film, thick film and hybrid integrated circuits. The basic type number comprises three letters followed by a serial number.

FIRST AND SECOND LETTERS

Digital family circuits

The first two letters identify the family.(1)

Solitary circuits

The first letter divides solitary circuits into:

S Solitary digital circuits

T Analog circuits

U Mixed analog/digital circuits.

The second letter is a serial letter without any further significance except 'H' which stands for hybrid circuits.(2)

Microprocessors

The first two letters identify microprocessors and related circuits:

MA Microcomputer or central processing unit

MB Slice processor (functional slice of microprocessor)

(1) A logic family is an assembly of digital circuits designed to be interconnected and defined by its base electrical characteristics, such as supply voltage, power consumption, propagation delay, noise immunity.

(2) The first letter 'S' should be used for all solitary memories, to which, in the event of hybrids, the second letter 'H' should be added, for example, SH for bubble memories.

MD Related memories

ME Other related circuits such as interfaces, clocks, peripheral controllers, etc.

Charge-transfer devices and switched capacitors

The first two letters identify:

NH Hybrid circuits

NL Logic circuits

NM Memories

NS Analog signal processing using switched capacitors

NT Analog signal processing using charge-transfer devices

NX Imaging devices

NY Other related circuits.

THIRD LETTER

The third letter indicates the operating ambient temperature range:

A temperature range not specified below

B 0 to + 70 °C

C −55 to +125 °C

D −25 to + 70 °C

E −25 to + 85 °C

F −40 to + 85 °C

G −55 to + 85 °C.

If a device has another temperature range, the letter 'A' or a letter indicating a narrower temperature may be used, for example, the range of 0 to +75 °C can be indicated by 'A' or 'B'. Should two devices with the same basic type number both have temperature ranges other than those specified, one would use the letter 'A' and the other the letter 'X'.

Serial number

This may be a four-digit number assigned by Pro Electron, or the serial number (which may be a combination of figures and letters) of an existing company type designation of the manufacturer.

Version letter

A single version letter may be added to the basic type number. This indicates a minor variant of the basic type or the package. The version letter has no fixed meaning except for 'Z' which means customized wiring. The following letters are recommended for package variants:

C Cylindrical

D Ceramic dual in-line (CERDIL, CERDIP)

F Flat pack (two leads)

G Flat pack (four leads)

H Quad flat pack (QFP)

L Chip on tape (foil)

P Plastic dual in-line (DIL)

Q Quad in-line (QUIL)

T Mini pack (SOL, SO, VSO)

U Uncased chip.

Two-letter suffix

A two-letter suffix may be used instead of a single package version letter to give more information. To avoid confusion with serial numbers that end with a letter, a hyphen should precede the suffix.

FIRST LETTER (GENERAL SHAPE)

C Cylindrical

D Dual in-line (DIL)

E Power DIL (with external heatsink)

F Flat pack (leads on two sides)

G Flat pack (leads on four sides)

H Quad flat pack (QFP)

K Diamond (TO-3 family)

M Multiple in-line (except dual, triple and quad)

Q Quad in-line (QUIL)

R Power QUIL (with external heatsink)

S Single in-line (SIL)

T Triple in-line

W Leaded chip carrier (LCC)

X Leadless chip carrier (LLCC)

Y Pin grid array (PGA).

SECOND LETTER (MATERIAL)

C Metal-ceramic

G Glass-ceramic

M Metal

P Plastic.

Examples

PCF1105WP: digital IC; PC family; operating temperature range –40 to +85 °C; serial number 1105; plastic leaded chip carrier.

GMB74LS00A-DC: digital IC; GM family; operating temperature range 0 to +70 °C; company number 74LS00A; ceramic DIL package.

TDA1000P: analog IC; operating temperature range non-standard; serial number 1000; plastic DIL package.

SAC2000: solitary digital circuit; operating temperature range –55 to +125 °C; serial number 2000.

LETTER SYMBOLS

The letter symbols for transistors and signal diodes detailed in this section are based on IEC publication number 148.

Letter symbols for currents, voltages and powers

BASIC LETTERS

I, i	current
V, v	voltage
P, p	power.

Upper-case letter symbols are used to represent all values except instantaneous values that vary with time, these are represented by lower-case letters.

SUBSCRIPTS

A, a	anode terminal
(AV), (av)	average value
B, b	base terminal
C, c	collector terminal
D, d	drain terminal
E, e	emitter terminal
F, f	forward
G, g	gate terminal
K, k	cathode terminal
M, m	peak value
O, o	as third subscript: the terminal not mentioned is open-circuit
R, r	as first subscript: reverse. As second subscript: repetitive. As third subscript: with a specified resistance between the terminal not mentioned and the reference terminal
(RMS), (rms)	root-mean-square value
S, s	as first or second subscript: source terminal (FETs only). As second subscript: non-repetitive (not FETs). As third subscript: short circuit between the terminal not mentioned and the reference terminal.
X, x	specified circuit
Z, z	replaces R to indicate the actual working voltage, current or power of voltage reference and voltage reference diodes.

No additional subscript is used for DC values.

Upper-case subscripts are used for the indication of:

- Continuous (DC) values (without signal), e.g. I_B
- Instantaneous total values, e.g. i_B
- Average total values, e.g. $I_{B(AV)}$
- Peak total values, e.g. I_{BM}
- Root-mean-square total values, e.g. $I_{B(RMS)}$.

Lower-case subscripts are used for the indication of values applying to the varying component alone:

- Instantaneous values, e.g. i_b
- Root-mean-square values, e.g. $I_{b(rms)}$
- Peak values, e.g. I_{bm}
- Average values, e.g. $I_{b(av)}$.

If more than one subscript is used, the subscript for which both styles exist are either all upper-case or all lower-case.

ADDITIONAL RULES FOR SUBSCRIPTS

Transistor currents

If it is necessary to indicate the terminal carrying the current, this should be done by the first subscript (conventional current flow from the external circuit into the terminal is positive).

Examples: I_B, i_B, i_b, I_{bm}.

Diode currents

To indicate a forward current (conventional current flow into the anode terminal), the subscript F or f should be used. For a reverse current (conventional current flow out of the anode terminal), the subscript R or r should be used.

Examples: I_F, I_R, i_F, $I_{f(rms)}$.

Transistor voltages

If it is necessary to indicate the points between which a voltage is measured, this should be done by the first two subscripts. The first subscript indicates the terminal at which the voltage is measured and the second the reference terminal or the circuit node. Where there is no possibility of confusion, the second subscript may be omitted.

Examples: V_{BE}, v_{BE}, v_{be}, V_{bem}.

Diode voltages

To indicate a forward voltage (anode positive with respect to cathode), the subscript F or f should be used. For a reverse voltage (anode negative with respect to cathode), the subscript R or r should be used.

Examples: V_F, V_R, v_F, V_{rm}.

Supply voltages or currents

Supply voltages or supply currents are indicated by repeating the appropriate terminal subscript.

Examples: V_{CC}, I_{EE}.

If it is necessary to indicate a reference terminal, this should be done by a third subscript.

Example: V_{CCE}.

Subscripts for devices with more than one terminal of the same kind

If a device has more than one terminal of the same kind, the subscript is formed by the appropriate letter for the terminal, followed by a number. In the case of multiple subscripts, hyphens may be necessary to avoid confusion.

Examples:

I_{B2} continuous (DC) current flowing into the second base terminal

$V_{B2\text{-}E}$ continuous (DC) voltage between the terminals of second base and emitter terminals.

Subscripts for multiple devices

For multiple unit devices, the subscripts are modified by a number preceding the letter subscript. In the case of multiple subscripts, hyphens may be necessary to avoid confusion.

Examples:

I_{2C} continuous (DC) current flowing into the collector terminal of the second unit

$V_{1C\text{-}2C}$ continuous (DC) voltage between the collector terminals of the first and second units.

Application of the rules

Fig.1 represents a transistor collector current as a function of time. It comprises a continuous (DC) current and a varying component.

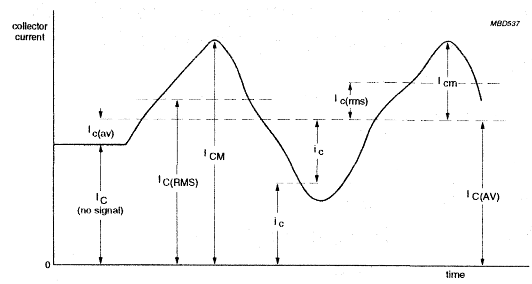


Fig.1 Collector current as a function of time.

Letter symbols for electrical parameters

DEFINITION

For the purpose of this publication, the term 'electrical parameter' applies to four-pole matrix parameters, elements of electrical equivalent circuits, electrical impedances and admittances, inductances and capacitances.

BASIC LETTERS

The following list comprises the most important basic letters used for electrical parameters of semiconductor devices.

B, b susceptance (imaginary part of an admittance)

C capacitance

G, g conductance (real part of an admittance)

H, h hybrid parameter

L inductance

R, r resistance (real part of an impedance)

X, x reactance (imaginary part of an impedance)

Y, y admittance

Z, z impedance.

Upper-case letters are used for the representation of:

- Electrical parameters of external circuits and of circuits in which the device forms only a part
- All inductances and capacitances.

Lower-case letters are used for the representation of electrical parameters inherent in the device, with the exception of inductances and capacitances.

SUBSCRIPTS

General subscripts

The following list comprises the most important general subscripts used for electrical parameters of semiconductor devices.

F, f	forward (forward transfer)
I, i (or 1)	input
L, l	load
O, o (or 2)	output
R, r	reverse (reverse transfer)
S, s	source.

Examples: Z_s, h_f, h_F.

The upper-case variant of a subscript is used for the designation of static (DC) values.

Examples:

h_{FE}	static value of forward current transfer ratio in common-emitter configuration (DC current gain)
R_E	DC value of the external emitter resistance.

The static value is the slope of the line from the origin to the operating point on the appropriate characteristic curve, i.e. the quotient of the appropriate electrical quantities at the operating point.

The lower-case variant of a subscript is used for the designation of small-signal values.

Examples:

h_{fe}	small-signal value of the short-circuit forward current transfer ratio in common-emitter configuration
$Z_e = R_e + jX_e$	small-signal value of the external impedance.

If more than one subscript is used, subscripts for which both styles exist are either all upper-case or all lower-case.

Examples: h_{FE}, y_{RE}, h_{fe}.

Subscripts for four-pole matrix parameters

The first letter subscript (or double numeric subscript) indicates input, output, forward transfer or reverse transfer.

Examples: h_i (or h_{11}), h_o (or h_{22}), h_f (or h_{21}), h_r (or h_{12}).

A further subscript is used for the identification of the circuit configuration. When no confusion is possible, this further subscript may be omitted.

Examples: h_{fe} (or h_{21e}), h_{FE} (or h_{21E}).

DISTINCTION BETWEEN REAL AND IMAGINARY PARTS

If it is necessary to distinguish between real and imaginary parts of electrical parameters, no additional subscripts should be used. If basic symbols for the real and imaginary parts exist, these may be used.

Examples: $Z_i = R_i + jX_i$, $y_{fe} = g_{fe} + jb_{fe}$.

If such symbols do not exist, or if they are not suitable, the following notation is used:

Examples:

Re (h_{ib}) etc. for the real part of h_{ib}

Im (h_{ib}) etc. for the imaginary part of h_{ib}.

THERMAL CONSIDERATIONS

Thermal resistance

Circuit performance and long-term reliability are affected by the temperature of the chip. Normally, both are improved by keeping the chip temperature (junction temperature) low.

Electrical power dissipated in any semiconductor device is a source of heat. This increases the temperature of the chip with regard to some reference point, normally an ambient temperature of 25 °C in still air. The increase in temperature depends on the amount of power dissipated in the device and the net thermal resistance between the heat source and the reference point. This can be expressed as:

$\Delta T_j = P_{tot} \times R_{th\ j\text{-}a}$

where:

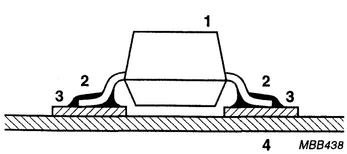
ΔT_j is the increase in junction temperature

P_{tot} is the total power generated in the device

$R_{th\ j\text{-}a}$ is the thermal resistance from junction to ambient.

Surface mounted devices

Heat transfer can occur by radiation, conduction and convention. Surface mounted devices lose most of their heat by conduction when mounted on a substrate. Referring to Fig.2, heat conducts from its source (the junction) via the package leads and soldered connections to the substrate. Some heat radiates from the package into the surrounding air, where it is dispersed by convection or by forced cooling air. Heat that radiates from the substrate is dispersed in the same way.



Heat radiates from the package '1' to ambient.
Heat conducts via leads '2', solder joints '3' to the substrate '4'.

Fig.2 Heat losses.

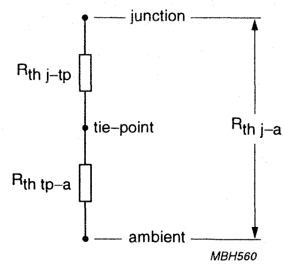


Fig.3 Representation of thermal resistance for a surface mounted diode.

The thermal resistance for surface mounted devices therefore, can be expressed as:

$R_{th\ j\text{-}a} = R_{th\ j\text{-}tp} + R_{th\ tp\text{-}a}$ (see Fig.3)

where:

$R_{th\ j\text{-}a}$ is the thermal resistance from junction to ambient

$R_{th\ j\text{-}tp}$ is the thermal resistance from junction to tie-point

$R_{th\ tp\text{-}a}$ is the thermal resistance from tie-point to ambient.

The $R_{th\ j\text{-}tp}$ value is essentially independent of external mounting method and cooling air, but is sensitive to the materials used in the package construction, the chip bonding method and the chip area, all of which are fixed.

The $R_{th\ tp\text{-}a}$ value depends on the shape and material of the tracks and substrate. For all package types these values are given in Table 1 for mounting on (FR4) printed-circuit board with small pad area. For other pad areas and printed-circuit board configurations see Fig.4 and "Appendix A".

The maximum power handling capability ($P_{tot\ max}$) is given by:

$$P_{tot\ max} = \frac{(T_{j\ max} - T_{amb})}{R_{th\ j\text{-}a}}$$

where:

$T_{j\ max}$ is the maximum junction temperature

T_{amb} is the ambient temperature.

Calculating this maximum power handling capability we have to take into account the maximum junction temperature of the particular device, the maximum temperature of the solder joints (110 °C for long time reliability) and the ambient temperature. Dependent on the ratio of the component parts of the thermal resistance, it will be possible that the junction temperature or the temperature of the solder joints (T_{tp}) will be the limiting factor. This can be shown in the following examples for SOT23 and SOD87 packages mounted on FR4 printed-circuit board.

EXAMPLE FOR THE SOT23 PACKAGE

$$P_{tot\ max} = \frac{(T_{j\ max} - T_{amb})}{R_{th\ j\text{-}a}}$$

$$= \frac{(150\,°C - 25\,°C)}{500\ K/W} = 0.25\ W$$

$$T_{tp} = T_{amb} + P_{tot\ max} \times R_{th\ tp\text{-}a}$$

$$= 25\,°C + 0.25\ W \times 150\ K/W = 62.5\,°C$$

This is below 110 °C, so $T_{j\ max}$ is the limiting factor.

EXAMPLE FOR THE SOD87 PACKAGE

$$P_{tot\ max} = \frac{(T_{j\ max} - T_{amb})}{R_{th\ j\text{-}a}}$$

$$= \frac{(175\,°C - 25\,°C)}{150\ K/W} = 1\ W$$

$$T_{tp} = T_{amb} + P_{tot\ max} \times R_{th\ tp\text{-}a}$$

$$= 25\,°C + 1\ W \times 120\ K/W = 145\,°C$$

This is above 110 °C, so the $P_{tot\ max}$ will be limited by T_{tp}, therefore:

$$P_{tot\ max} = \frac{(T_{tp} - T_{amb})}{R_{th\ tp\text{-}a}}$$

$$= \frac{(110\,°C - 25\,°C)}{120\ K/W} = 0.71\ W$$

The $P_{tot\ max}$ values given in Table 1 are based on:

$T_{amb} = 25$ °C; $T_j = T_j$ max; $T_{tp} \le 110$ °C.

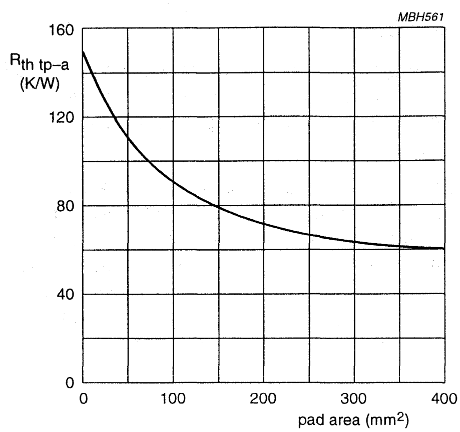


Fig.4 Thermal resistance ($R_{th\ tp\text{-}a}$) as a function of FR4 printed-circuit board pad area.

Table 1 Thermal resistance values and maximum power handling capability of surface mounted packages; typical values

PACKAGE	$R_{th\ j\text{-}a}$ (K/W)	$R_{th\ j\text{-}tp}$ (K/W)	$R_{th\ tp\text{-}a}$ (K/W)	$P_{tot\ max}$ (W)
SOD87	150	30	120	0.71
SOD106(A)	150	25	125	0.68
SOT23	500	330	170	0.25
SOT89	125	15	100	0.85
SOT223	85	15	70	1.21
SOT323 (SC70-3)	625	300	325	0.20
SOT363 (SC70-6)	415	200	215	0.30
SOT457 (TSOP6)	300	150	150	0.42
SO8 (SOT96-1)	155	35	115	0.74
SO20 (SOT163-1)	100	30	70	1.21
SSOP16 (SOT338-1)	145	75	70	0.86
SSOP24 (SOT340-1)	105	35	70	1.19

Leaded devices

Figure 5 illustrates the various components of thermal resistance for an axial leaded diode mounted with symmetrical, equal length leads. The thermal resistance from junction to ambient ($R_{th\ j\text{-}a}$) comprises the following thermal resistances:

$R_{th\ j\text{-}p}$ is the thermal resistance from junction to package

$R_{th\ p\text{-}tp}$ is the thermal resistance from package to tie-point

$R_{th\ tp\text{-}a}$ is the thermal resistance from tie-point to ambient

$R_{th\ p\text{-}a}$ is the thermal resistance from package to ambient.

The values of the thermal components depend on the diode package type, the lead length and the mounting method used.

Using the model in Fig.5 and referring to Table 2, values for the thermal resistance from junction to ambient can be calculated using the formula:

$$R_{th\ j\text{-}a} = R_{th\ j\text{-}p} + \frac{R_{th\ p\text{-}a}\left(R_{th\ p\text{-}tp} + R_{th\ tp\text{-}a}\right)}{R_{th\ p\text{-}a} + R_{th\ p\text{-}tp} + R_{th\ tp\text{-}a}}$$

The maximum power handling capability ($P_{tot\ max}$) is given by:

$$P_{tot\ max} = \frac{\left(T_{j\ max} - T_{amb}\right)}{R_{th\ j\text{-}a}}$$

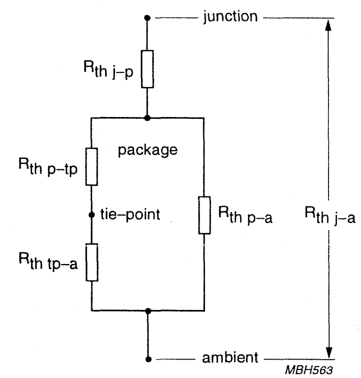


Fig.5 Representation of thermal resistance paths for a leaded device.

where:

$T_{j\ max}$ is the maximum junction temperature and

T_{amb} is the ambient temperature.

Calculating this maximum power handling capability we have to take into account the maximum junction temperature of the particular device, the maximum temperature of the solder joints (110 °C for long time reliability) and the ambient temperature. Depending on the ratio of the component parts of the thermal resistance it is possible that the junction temperature or the temperature of the solder joints (T_{tp}) will be the limiting factor. This can be shown in the following examples for a SOD57 device mounted on an FR4 printed-circuit board, as shown in Fig.6:

$$R_{th\ j\text{-}a} = 14\ K/W + \frac{429\ K/W\ (38\ K/W + 70\ K/W)}{429\ K/W + 38\ K/W + 70\ K/W}$$

$$= 100\ K/W$$

and

$$P_{tot\ max} = \frac{(T_{j\ max} - T_{amb})}{R_{th\ j\text{-}a}}$$

$$= \frac{(175\ °C - 60\ °C)}{100\ K/W} = 1.15\ W$$

$$T_{tp} = T_{amb} + \frac{R_{th\ p\text{-}a} \times R_{th\ tp\text{-}a}}{R_{th\ p\text{-}a} + R_{th\ p\text{-}tp} + R_{th\ tp\text{-}a}} \times P_{tot}$$

Using values in Table 2:

$$T_{tp} = T_{amb} + \frac{429\ K/W \times 70\ K/W}{429\ K/W + 38\ K/W + 70\ K/W} \times P_{tot}$$

is simplified to:

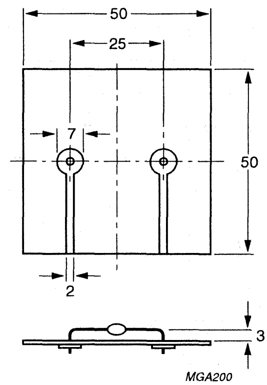
$$T_{tp} = T_{amb} + 56\ K/W \times P_{tot}$$

Using $T_{tp} = 110$ °C and $T_{amb} = 60$ °C the equation becomes:

$$P_{tot} = \frac{(T_{tp} - T_{amb})}{56\ K/W}$$

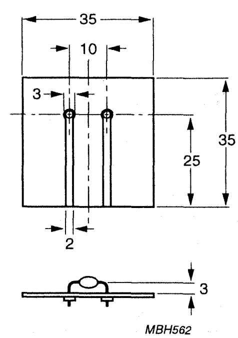
$$= \frac{(110\ °C - 60\ °C)}{56\ K/W} = 0.89\ W$$

This is lower than $P_{tot\ max} = 1.15$ W (for $T_{j\ max} = 175$ °C), so in this particular case $T_{tp} = 110$ °C is limiting the $P_{tot\ max}$.



Dimensions in mm.

Fig.6 Leaded device mounted on printed-circuit board 50 × 50 mm.



Dimensions in mm.

Fig.7 Leaded device mounted on printed-circuit board 35 × 35 mm.

Table 2 Thermal resistance values for leaded packages
All values expressed in K/W, unless otherwise specified.

THERMAL RESISTANCE	CONDITIONS	SOD57 SOD88A	SOD61	SOD64 SOD83A	SOD81
$R_{th\ j\text{-}p}$		14	60	10	28
$R_{th\ p\text{-}tp}$	lead length = 5 mm	19	48	7	19
	lead length = 10 mm	38	96	14	38
	lead length = 15 mm	57	144	21	57
	lead length = 20 mm	76	192	28	76
	lead length = 25 mm	95	240	35	95
$R_{th\ p\text{-}a}$	lead length = 5 mm	586	1261	417	787
	lead length = 10 mm	429	843	293	527
	lead length = 15 mm	338	633	225	396
	lead length = 20 mm	279	507	183	317
	lead length = 25 mm	237	423	154	264
$R_{th\ tp\text{-}a}$	notes 1 and 2	70	70	70	70
	notes 1 and 3	55	55	55	55
	notes 1 and 4	45	45	45	45

Notes

1. Device mounted on a 1.5 mm thick epoxy-glass printed circuit board with a copper thickness $\geq$ 40 μm.
2. Mounted as in Fig.6.
3. Mounted with copper laminate per lead of 1 cm^2.
4. Mounted with copper laminate per lead of 2.25 cm^2.

APPENDIX A

Additional thermal resistance data for SMD packages

All values are expressed in K/W, unless otherwise specified. The data included in Tables 3 to 5 are the results of laboratory investigation into the effect of FR4 printed-circuit board pad area and power dissipation on thermal resistance. Measurements were made with the test samples positioned vertically in still air.

It can be seen that with increased power dissipation, thermal resistance decreases slightly. This is because, as the power dissipation increases, the resulting higher junction temperature causes increased losses due to radiation and natural convection.

Table 3 SOT223 package (Thermal resistance junction to ambient)

PCB PAD AREA (mm^2)	$R_{th\ j\text{-}a}$ (K/W) @ POWER DISSIPATION P		
	P = 0.5 W	P = 1 W	P = 1.5 W
20	110	110	–
49	99	98	–
81	91	90	90
144	88	87	86
256	78	79	78
484	73	74	73
900	68	69	69

Table 4 SOT428 package (Thermal resistance junction to ambient}

PCB PAD AREA (mm^2)	$R_{th\ j\text{-}a}$ (K/W) @ POWER DISSIPATION P					
	P = 0.5 W	P = 1 W	P = 1.5 W	P = 2 W	P = 2.5 W	P = 3 W
20	90	85	–	–	–	–
49	77	75	73	72	–	–
81	71	69	66	65	–	–
144	64	62	60	59	58	–
256	58	56	54	53	52	–
484	54	50	48	47	46	45
900	46	45	43	43	42	41

Table 5 SOT404 package (Thermal resistance junction to ambient)

PCB PAD AREA (mm^2)	$R_{th\ j\text{-}a}$ (K/W) @ POWER DISSIPATION P		
	P = 1 W	P = 2 W	P = 3 W
103.5	60	55	–
192	52	47	–
300	47	43	41
475	41	39	37
825	39	36	34
1200	36	34	32

MARKING CODES

TYPE NUMBER TO MARKING CODE

TYPE NUMBER	MARKING CODE	PACKAGE
1N4001G	1N4001 PH	SOD57
1N4002G	1N4002 PH	SOD57
1N4003G	1N4003 PH	SOD57
1N4004G	1N4004 PH	SOD57
1N4005G	1N4005 PH	SOD57
1N4006G	1N4006 PH	SOD57
1N4007G	1N4007 PH	SOD57
1N4001ID	1N4001	SOD81
1N4002ID	1N4002	SOD81
1N4003ID	1N4003	SOD81
1N4004ID	1N4004	SOD81
1N4005ID	1N4005	SOD81
1N4006ID	1N4006	SOD81
1N4007ID	1N4007	SOD81
1N5059	1N5059 PH	SOD57
1N5060	1N5060 PH	SOD57
1N5061	1N5061 PH	SOD57
1N5062	1N5062 PH	SOD57
1N5817	1N5817	SOD81
1N5818	1N5818	SOD81
1N5819	1N5819	SOD81
BAQ800	BAQ800-PH	SOD81
BAQ806	BAQ 806 PH	SOD106
BAT120A	AT120A	SOT223
BAT120C	AT120C	SOT223
BAT120S	AT120S	SOT223
BAT140A	AT140A	SOT223
BAT140C	AT140C	SOT223
BAT140S	AT140S	SOT223
BAT160A	AT160A	SOT223
BAT140C	AT160C	SOT223
BAT140S	AT160S	SOT223
BY228	BY228 PH	SOD64
BY278	BY278 PH	SOD64
BY328	BY328 PH	SOD64
BY428	BY428 PH	SOD64
BY448	BY448 PH	SOD57
BY505	black	SOD61A
BY527	BY527 PH	SOD57

TYPE NUMBER	MARKING CODE	PACKAGE
BY558	BY558 PH	SOD115
BY578	BY578 PH	SOD115
BY584	orange	SOD61A
BY614	black	SOD61H2
BY8004	violet+black	SOD61AC
BY8006	violet+green	SOD61AD
BY8008	violet+red	SOD61AE
BY8010	violet+violet	SOD61AF
BY8012	violet+orange	SOD61AH
BY8014	violet+lilac	SOD61AI
BY8016	violet+grey	SOD61AJ
BY8104	orange+black	SOD61AC
BY8106	orange+green	SOD61AD
BY8108	orange+red	SOD61AE
BY8110	orange+violet	SOD61AF
BY8112	orange+orange	SOD61AH
BY8114	orange+lilac	SOD61AI
BY8116	orange+grey	SOD61AJ
BY8206	green+green	SOD118A
BY8208	green+red	SOD118A
BY8210	green+violet	SOD118B
BY8212	green+orange	SOD118B
BY8404	black+black	SOD61AB
BY8406	black+green	SOD61AC
BY8408	black+red	SOD61AD
BY8410	black+violet	SOD61AE
BY8412	black+orange	SOD61AF
BY8414	black+lilac	SOD61AG
BY8416	black+grey	SOD61AH
BY8418	black+brown	SOD61AI
BY8420	black+blue	SOD61AJ
BY8424	black	SOD61AK
BY9206	light blue+green	SOD118A
BY9208	light blue+red	SOD118A
BY9210	light blue+violet	SOD118B
BY9212	light blue+orange	SOD118B
BY9304	white	SOD118A
BY9306	white+green	SOD118A
BY9308	white+red	SOD118A

TYPE NUMBER	MARKING CODE	PACKAGE
BY9310	white+violet	SOD118B
BY9312	white+orange	SOD118B
BY9314	white+lilac	SOD118B
BY9316	white+grey	SOD118B
BY9318	white+brown	SOD118B
BY9410	orange+violet	SOD107B
BY9412	orange+orange	SOD107B
BY9414	orange+lilac	SOD107B
BY9416	orange+grey	SOD107B
BYD1100	1 1 1 1	SOD87
BYD123	123 PH	SOD81
BYD127	8 8 8 8	SOD87
BYD12D	12D PH	SOD120
BYD12G	12G PH	SOD120
BYD12J	12J PH	SOD120
BYD12K	12K PH	SOD120
BYD12M	12M PH	SOD120
BYD13D	13D PH	SOD81
BYD13G	13G PH	SOD81
BYD13J	13J PH	SOD81
BYD13K	13K PH	SOD81
BYD13M	13M PH	SOD81
BYD143	143 PH	SOD81
BYD147	8 8 8 8	SOD87
BYD163	163 PH	SOD81
BYD167	8 8 8 8	SOD87
BYD17D	1 1 1 1	SOD87
BYD17G	1 1 1 1	SOD87
BYD17J	1 1 1 1	SOD87
BYD17K	1 1 1 1	SOD87
BYD17M	1 1 1 1	SOD87
BYD32D	32D PH	SOD120
BYD32G	32G PH	SOD120
BYD32J	32J PH	SOD120
BYD33D	33D PH	SOD81
BYD33G	33G PH	SOD81
BYD33J	33J PH	SOD81
BYD33K	33K PH	SOD81
BYD33M	33M PH	SOD81
BYD33U	33U PH	SOD81
BYD33V	33V PH	SOD81

TYPE NUMBER	MARKING CODE	PACKAGE
BYD37D	3 3 3 3	SOD87
BYD37G	3 3 3 3	SOD87
BYD37J	3 3 3 3	SOD87
BYD37K	3 3 3 3	SOD87
BYD37M	3 3 3 3	SOD87
BYD43-16	43-16PH	SOD81
BYD43-18	43-18PH	SOD81
BYD43-20	43-20PH	SOD81
BYD43U	43U PH	SOD81
BYD43V	43V PH	SOD81
BYD47-16	4 4 4 4	SOD87
BYD47-18	4 4 4 4	SOD87
BYD47-20	4 4 4 4	SOD87
BYD52D	52D PH	SOD120
BYD52G	52G PH	SOD120
BYD52J	52J PH	SOD120
BYD53D	53D PH	SOD81
BYD53G	53G PH	SOD81
BYD53J	53J PH	SOD81
BYD53K	53K PH	SOD81
BYD53M	53M PH	SOD81
BYD53U	53U PH	SOD81
BYD53V	53V PH	SOD81
BYD57D	5 5 5 5	SOD87
BYD57G	5 5 5 5	SOD87
BYD57J	5 5 5 5	SOD87
BYD57K	5 5 5 5	SOD87
BYD57M	5 5 5 5	SOD87
BYD57U	5 5 5 5	SOD87
BYD57V	5 5 5 5	SOD87
BYD63	63 PH	SOD81
BYD67	6 6 6 6	SOD87
BYD72A	72A PH	SOD120
BYD72B	72B PH	SOD120
BYD72C	72C PH	SOD120
BYD72D	72D PH	SOD120
BYD72E	72E PH	SOD120
BYD72F	723F PH	SOD120
BYD72G	72G PH	SOD120
BYD73A	73A PH	SOD81
BYD73B	73B PH	SOD81

TYPE NUMBER	MARKING CODE	PACKAGE
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BYD73D	73D PH	SOD81
BYD73E	73E PH	SOD81
BYD73F	73F PH	SOD81
BYD73G	73G PH	SOD81
BYD77A	7 7 7 7	SOD87
BYD77B	7 7 7 7	SOD87
BYD77C	7 7 7 7	SOD87
BYD77D	7 7 7 7	SOD87
BYD77E	7 7 7 7	SOD87
BYD77F	7 7 7 7	SOD87
BYD77G	7 7 7 7	SOD87
BYG50D	50D PH	SOD106
BYG50G	50G PH	SOD106
BYG50J	50J PH	SOD106
BYG50K	50K PH	SOD106
BYG50M	50M PH	SOD106
BYG60D	60D PH	SOD106
BYG60G	60G PH	SOD106
BYG60J	60J PH	SOD106
BYG60K	60K PH	SOD106
BYG60M	60M PH	SOD106
BYG70D	70D PH	SOD106
BYG70G	70G PH	SOD106
BYG70J	70J PH	SOD106
BYG80A	80A PH	SOD106
BYG80B	80B PH	SOD106
BYG80C	80C PH	SOD106
BYG80D	80D PH	SOD106
BYG80F	80F PH	SOD106
BYG80G	80G PH	SOD106
BYG80J	80J PH	SOD106
BYG85B	85B PH	SOD106
BYG90-20	90 20 PH	SOD106A
BYG90-30	90 30 PH	SOD106A
BYG90-40	90 40 PH	SOD106A
BYG90-90	90 90 PH	SOD106A
BYM26A	BYM26A PH	SOD64
BYM26B	BYM26B PH	SOD64
BYM26C	BYM26C PH	SOD64
BYM26D	BYM26D PH	SOD64

TYPE NUMBER	MARKING CODE	PACKAGE
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BYM26F	BYM26F PH	SOD64
BYM26G	BYM26G PH	SOD64
BYM36A	BYM36A PH	SOD64
BYM36B	BYM36B PH	SOD64
BYM36C	BYM36C PH	SOD64
BYM36D	BYM36D PH	SOD64
BYM36E	BYM36E PH	SOD64
BYM36F	BYM36F PH	SOD64
BYM36G	BYM36G PH	SOD64
BYM56A	BYM56A PH	SOD64
BYM56B	BYM56B PH	SOD64
BYM56C	BYM56C PH	SOD64
BYM56D	BYM56D PH	SOD64
BYM56E	BYM56E PH	SOD64
BYM63	BYM63 PH	SOD64
BYM99	BYM99 PH	SOD64
BYQ63	BYQ63 PH	SOD57
BYV1100	BYV1100	SOD81
BYV10-20	V10-20	SOD81
BYV10-30	V10-30	SOD81
BYV10-40	V10-40	SOD81
BYV2100	BYV2100 PH	SOD57
BYV26A	BYV26A PH	SOD57
BYV26B	BYV26B PH	SOD57
BYV26C	BYV26C PH	SOD57
BYV26D	BYV26D PH	SOD57
BYV26E	BYV26E PH	SOD57
BYV26F	BYV26F PH	SOD57
BYV26G	BYV26G PH	SOD57
BYV27-50	BYV27-50	SOD57
BYV27-100	BYV27-100	SOD57
BYV27-150	BYV27-150	SOD57
BYV27-200	BYV27-200	SOD57
BYV27-300	BYV27-300	SOD57
BYV27-400	BYV27-400	SOD57
BYV27-600	BYV27-600	SOD57
BYV28-50	BYV28-50	SOD64
BYV28-100	BYV28-100	SOD64
BYV28-150	BYV28-150	SOD64
BYV28-200	BYV28-200	SOD64

TYPE NUMBER	MARKING CODE	PACKAGE
BYV28-300	BYV28-300	SOD64
BYV28-400	BYV28-400	SOD64
BYV28-600	BYV28-600	SOD64
BYV36A	BYV36A PH	SOD57
BYV36B	BYV36B PH	SOD57
BYV36C	BYV36C PH	SOD57
BYV36D	BYV36D PH	SOD57
BYV36E	BYV36E PH	SOD57
BYV36F	BYV36F PH	SOD57
BYV36G	BYV36G PH	SOD57
BYV40E-150	V40E15	SOT223
BYV40E-200	V40E20	SOT223
BYV4100	BYV4100 PH	SOD64
BYV95A	BYV95A PH	SOD57
BYV95B	BYV95B PH	SOD57
BYV95C	BYV95C PH	SOD57
BYV96D	BYV96D PH	SOD57
BYV96E	BYV96E PH	SOD57
BYV97F	BYV97F PH	SOD57
BYV97G	BYV97G PH	SOD57
BYV98	BYV98 PH	SOD57
BYV99	BYV99 PH	SOD57
BYW54	BYW54 PH	SOD57
BYW55	BYW55 PH	SOD57
BYW56	BYW56 PH	SOD57
BYW95A	BYW95A PH	SOD64
BYW95B	BYW95B PH	SOD64
BYW95C	BYW95C PH	SOD64
BYW96D	BYW96D PH	SOD64
BYW96E	BYW96E PH	SOD64
BYW97F	BYW97F PH	SOD64
BYW97G	BYW97G PH	SOD64
BYX10G	BYX10G PH	SOD57
BYX90G	black	SOD83A
BYX101G	black	SOD88A
BYX102G	red	SOD88A
BYX103G	green	SOD88A
BYX104G	violet	SOD88A
BYX105G	black	SOD88A
BYX106G	red	SOD88A
BYX107G	green	SOD88A

TYPE NUMBER	MARKING CODE	PACKAGE
BYX108G	violet	SOD88A
BYX119G	BYX119G PH	SOD57
BYX120G	orange	SOD88A
BYX130G	violet	SOD88B
BYX132G	red	SOD61AB
BYX132GL	red	SOD119
BYX133G	brown	SOD61AB
BYX133GL	brown	SOD119
BYX134G	blue	SOD61AC
BYX134GP	light blue	SOD107B
BYX135G	green	SOD61AD
BZA100	BZA100	SOT163-1
BZA109	BZA109	SOT163-1
BZA109TS	ZA109TS	SOT339-1
BZA420	Z0	SOT457
BZA456A	Z6	SOT457
BZA462A	Z2t	SOT457
BZD23-C3V6	3V6 PH	SOD81
BZD23-C3V9	3V9 PH	SOD81
BZD23-C4V3	4V3 PH	SOD81
BZD23-C4V7	4V7 PH	SOD81
BZD23-C5V1	5V1 PH	SOD81
BZD23-C5V6	5V6 PH	SOD81
BZD23-C6V2	6V2 PH	SOD81
BZD23-C6V8	6V8 PH	SOD81
BZD23-C7V5	7V5 PH	SOD81
BZD23-C8V2	8V2 PH	SOD81
BZD23-C9V1	9V1 PH	SOD81
BZD23-C10	10 PH	SOD81
BZD23-C11	11 PH	SOD81
BZD23-C12	12 PH	SOD81
BZD23-C13	13 PH	SOD81
BZD23-C15	15 PH	SOD81
BZD23-C16	16 PH	SOD81
BZD23-C18	18 PH	SOD81
BZD23-C20	20 PH	SOD81
BZD23-C22	22 PH	SOD81
BZD23-C24	24 PH	SOD81
BZD23-C27	27 PH	SOD81
BZD23-C30	30 PH	SOD81
BZD23-C33	33 PH	SOD81

TYPE NUMBER	MARKING CODE	PACKAGE
BZD23-C36	36 PH	SOD81
BZD23-C39	39 PH	SOD81
BZD23-C43	43 PH	SOD81
BZD23-C47	47 PH	SOD81
BZD23-C51	51 PH	SOD81
BZD23-C56	56 PH	SOD81
BZD23-C62	62 PH	SOD81
BZD23-C68	68 PH	SOD81
BZD23-C75	75 PH	SOD81
BZD23-C82	82 PH	SOD81
BZD23-C91	91 PH	SOD81
BZD23-C100	100 PH	SOD81
BZD23-C110	110 PH	SOD81
BZD23-C120	120 PH	SOD81
BZD23-C130	130 PH	SOD81
BZD23-C150	150 PH	SOD81
BZD23-C160	160 PH	SOD81
BZD23-C180	180 PH	SOD81
BZD23-C200	200 PH	SOD81
BZD23-C220	220 PH	SOD81
BZD23-C240	240 PH	SOD81
BZD23-C270	270 PH	SOD81
BZD23-C300	300 PH	SOD81
BZD23-C330	330 PH	SOD81
BZD23-C360	360 PH	SOD81
BZD23-C390	390 PH	SOD81
BZD23-C430	430 PH	SOD81
BZD23-C470	470 PH	SOD81
BZD23-C510	510 PH	SOD81
BZD27-C3V6	2 2 2 2	SOD87
BZD27-C3V9	2 2 2 2	SOD87
BZD27-C4V3	2 2 2 2	SOD87
BZD27-C4V7	2 2 2 2	SOD87
BZD27-C5V1	2 2 2 2	SOD87
BZD27-C5V6	2 2 2 2	SOD87
BZD27-C6V2	2 2 2 2	SOD87
BZD27-C6V8	2 2 2 2	SOD87
BZD27-C7V5	2 2 2 2	SOD87
BZD27-C8V2	2 2 2 2	SOD87
BZD27-C9V1	2 2 2 2	SOD87
BZD27-C10	2 2 2 2	SOD87

TYPE NUMBER	MARKING CODE	PACKAGE
BZD27-C11	2 2 2 2	SOD87
BZD27-C12	2 2 2 2	SOD87
BZD27-C13	2 2 2 2	SOD87
BZD27-C15	2 2 2 2	SOD87
BZD27-C16	2 2 2 2	SOD87
BZD27-C18	2 2 2 2	SOD87
BZD27-C20	2 2 2 2	SOD87
BZD27-C22	2 2 2 2	SOD87
BZD27-C24	2 2 2 2	SOD87
BZD27-C27	2 2 2 2	SOD87
BZD27-C30	2 2 2 2	SOD87
BZD27-C33	2 2 2 2	SOD87
BZD27-C36	2 2 2 2	SOD87
BZD27-C39	2 2 2 2	SOD87
BZD27-C43	2 2 2 2	SOD87
BZD27-C47	2 2 2 2	SOD87
BZD27-C51	2 2 2 2	SOD87
BZD27-C56	2 2 2 2	SOD87
BZD27-C62	2 2 2 2	SOD87
BZD27-C68	2 2 2 2	SOD87
BZD27-C75	2 2 2 2	SOD87
BZD27-C82	2 2 2 2	SOD87
BZD27-C91	2 2 2 2	SOD87
BZD27-C100	2 2 2 2	SOD87
BZD27-C110	2 2 2 2	SOD87
BZD27-C120	2 2 2 2	SOD87
BZD27-C130	2 2 2 2	SOD87
BZD27-C150	2 2 2 2	SOD87
BZD27-C160	2 2 2 2	SOD87
BZD27-C180	2 2 2 2	SOD87
BZD27-C200	2 2 2 2	SOD87
BZD27-C220	2 2 2 2	SOD87
BZD27-C240	2 2 2 2	SOD87
BZD27-C270	2 2 2 2	SOD87
BZD27-C300	2 2 2 2	SOD87
BZD27-C330	2 2 2 2	SOD87
BZD27-C360	2 2 2 2	SOD87
BZD27-C390	2 2 2 2	SOD87
BZD27-C430	2 2 2 2	SOD87
BZD27-C470	2 2 2 2	SOD87
BZD27-C510	2 2 2 2	SOD87

TYPE NUMBER	MARKING CODE	PACKAGE
BZG03-C10	03C 10 PH	SOD106
BZG03-C11	03C 11 PH	SOD106
BZG03-C12	03C 12 PH	SOD106
BZG03-C13	03C 13 PH	SOD106
BZG03-C15	03C 15 PH	SOD106
BZG03-C16	03C 16 PH	SOD106
BZG03-C18	03C 18 PH	SOD106
BZG03-C20	03C 20 PH	SOD106
BZG03-C22	03C 22 PH	SOD106
BZG03-C24	03C 24 PH	SOD106
BZG03-C27	03C 27 PH	SOD106
BZG03-C30	03C 30 PH	SOD106
BZG03-C33	03C 33 PH	SOD106
BZG03-C36	03C 36 PH	SOD106
BZG03-C39	03C 39 PH	SOD106
BZG03-C43	03C 43 PH	SOD106
BZG03-C47	03C 47 PH	SOD106
BZG03-C51	03C 51 PH	SOD106
BZG03-C56	03C 56 PH	SOD106
BZG03-C62	03C 62 PH	SOD106
BZG03-C68	03C 68 PH	SOD106
BZG03-C75	03C 75 PH	SOD106
BZG03-C82	03C 82 PH	SOD106
BZG03-C91	03C 91 PH	SOD106
BZG03-C100	03C 100 PH	SOD106
BZG03-C110	03C 110 PH	SOD106
BZG03-C120	03C 120 PH	SOD106
BZG03-C130	03C 130 PH	SOD106
BZG03-C150	03C 150 PH	SOD106
BZG03-C160	03C 160 PH	SOD106
BZG03-C180	03C 180 PH	SOD106
BZG03-C200	03C 200 PH	SOD106
BZG03-C220	03C 220 PH	SOD106
BZG03-C240	03C 240 PH	SOD106
BZG03-C270	03C 270 PH	SOD106
BZG04-8V2	04 8V2 PH	SOD106
BZG04-9V1	04 9V1 PH	SOD106
BZG04-10	04 10 PH	SOD106
BZG04-11	04 11 PH	SOD106
BZG04-12	04 12 PH	SOD106
BZG04-13	04 13 PH	SOD106

TYPE NUMBER	MARKING CODE	PACKAGE
BZG04-15	04 15 PH	SOD106
BZG04-16	04 16 PH	SOD106
BZG04-18	04 18 PH	SOD106
BZG04-20	04 20 PH	SOD106
BZG04-22	04 22 PH	SOD106
BZG04-24	04 24 PH	SOD106
BZG04-27	04 27 PH	SOD106
BZG04-30	04 30 PH	SOD106
BZG04-33	04 33 PH	SOD106
BZG04-36	04 36 PH	SOD106
BZG04-39	04 39 PH	SOD106
BZG04-43	04 43 PH	SOD106
BZG04-47	04 47 PH	SOD106
BZG04-51	04 51 PH	SOD106
BZG04-56	04 56 PH	SOD106
BZG04-62	04 62 PH	SOD106
BZG04-68	04 68 PH	SOD106
BZG04-75	04 75 PH	SOD106
BZG04-82	04 82 PH	SOD106
BZG04-91	04 91 PH	SOD106
BZG04-100	04 100 PH	SOD106
BZG04-110	04 110 PH	SOD106
BZG04-120	04 120 PH	SOD106
BZG04-130	04 130 PH	SOD106
BZG04-150	04 150 PH	SOD106
BZG04-160	04 160 PH	SOD106
BZG04-180	04 180 PH	SOD106
BZG04-200	04 200 PH	SOD106
BZG04-220	04 220 PH	SOD106
BZT03-C7V5	BZT03C7V5	SOD57
BZT03-C8V2	BZT03C8V2	SOD57
BZT03-C9V1	BZT03C9V1	SOD57
BZT03-C10	BZT03C10	SOD57
BZT03-C11	BZT03C11	SOD57
BZT03-C12	BZT03C12	SOD57
BZT03-C13	BZT03C13	SOD57
BZT03-C15	BZT03C15	SOD57
BZT03-C16	BZT03C16	SOD57
BZT03-C18	BZT03C18	SOD57
BZT03-C20	BZT03C20	SOD57
BZT03-C22	BZT03C22	SOD57

TYPE NUMBER	MARKING CODE	PACKAGE
BZT03-C24	BZT03C24	SOD57
BZT03-C27	BZT03C27	SOD57
BZT03-C30	BZT03C30	SOD57
BZT03-C33	BZT03C33	SOD57
BZT03-C36	BZT03C36	SOD57
BZT03-C39	BZT03C39	SOD57
BZT03-C43	BZT03C43	SOD57
BZT03-C47	BZT03C47	SOD57
BZT03-C51	BZT03C51	SOD57
BZT03-C56	BZT03C56	SOD57
BZT03-C62	BZT03C62	SOD57
BZT03-C68	BZT03C68	SOD57
BZT03-C75	BZT03C75	SOD57
BZT03-C82	BZT03C82	SOD57
BZT03-C91	BZT03C91	SOD57
BZT03-C100	BZT03C100	SOD57
BZT03-C110	BZT03C110	SOD57
BZT03-C120	BZT03C120	SOD57
BZT03-C130	BZT03C130	SOD57
BZT03-C150	BZT03C150	SOD57
BZT03-C160	BZT03C160	SOD57
BZT03-C180	BZT03C180	SOD57
BZT03-C200	BZT03C200	SOD57
BZT03-C220	BZT03C220	SOD57
BZT03-C240	BZT03C240	SOD57
BZT03-C270	BZT03C270	SOD57
BZT03-C300	BZT03C300	SOD57
BZT03-C330	BZT03C330	SOD57
BZT03-C360	BZT03C360	SOD57
BZT03-C390	BZT03C390	SOD57
BZT03-C430	BZT03C430	SOD57
BZT03-C470	BZT03C470	SOD57
BZT03-C510	BZT03C510	SOD57
BZW03-C7V5	BZW03C7V5	SOD64
BZW03-C8V2	BZW03C8V2	SOD64
BZW03-C9V1	BZW03C9V1	SOD64
BZW03-C10	BZW03C10	SOD64
BZW03-C11	BZW03C11	SOD64
BZW03-C12	BZW03C12	SOD64
BZW03-C13	BZW03C13	SOD64
BZW03-C15	BZW03C15	SOD64

TYPE NUMBER	MARKING CODE	PACKAGE
BZW03-C16	BZW03C16	SOD64
BZW03-C18	BZW03C18	SOD64
BZW03-C20	BZW03C20	SOD64
BZW03-C22	BZW03C22	SOD64
BZW03-C24	BZW03C24	SOD64
BZW03-C27	BZW03C27	SOD64
BZW03-C30	BZW03C30	SOD64
BZW03-C33	BZW03C33	SOD64
BZW03-C36	BZW03C36	SOD64
BZW03-C39	BZW03C39	SOD64
BZW03-C43	BZW03C43	SOD64
BZW03-C47	BZW03C47	SOD64
BZW03-C51	BZW03C51	SOD64
BZW03-C56	BZW03C56	SOD64
BZW03-C62	BZW03C62	SOD64
BZW03-C68	BZW03C68	SOD64
BZW03-C75	BZW03C75	SOD64
BZW03-C82	BZW03C82	SOD64
BZW03-C91	BZW03C91	SOD64
BZW03-C100	BZW03C100	SOD64
BZW03-C110	BZW03C110	SOD64
BZW03-C120	BZW03C120	SOD64
BZW03-C130	BZW03C130	SOD64
BZW03-C150	BZW03C150	SOD64
BZW03-C160	BZW03C160	SOD64
BZW03-C180	BZW03C180	SOD64
BZW03-C200	BZW03C200	SOD64
BZW03-C220	BZW03C220	SOD64
BZW03-C240	BZW03C240	SOD64
BZW03-C270	BZW03C270	SOD64
BZW03-C300	BZW03C300	SOD64
BZW03-C330	BZW03C330	SOD64
BZW03-C360	BZW03C360	SOD64
BZW03-C390	BZW03C390	SOD64
BZW03-C430	BZW03C430	SOD64
BZW03-C470	BZW03C470	SOD64
BZW03-C510	BZW03C510	SOD64
PBYR2100CT	BYR210	SOT223
PBYR2150CT	BYR215	SOT223
PBYR220CT	BYR220	SOT223
PBYR225CT	BYR225	SOT223

TYPE NUMBER	MARKING CODE	PACKAGE
PBYR240CT	BYR240	SOT223
PBYR245CT	BYR245	SOT223
PBYR280CT	BYR280	SOT223
PBYR290CT	BYR290	SOT223
PRLL4001	1 1 1 1	SOD87
PRLL4002	1 1 1 1	SOD87
PRLL5817	9 9 9 9	SOD87
PRLL5818	9 9 9 9	SOD87
PRLL5819	9 9 9 9	SOD87
PSMA8.5A	SMA 8.5 PH	SOD106
PSMA9.5A	SMA 9.5 PH	SOD106
PSMA10A	SMA 10A PH	SOD106
PSMA11A	SMA 11A PH	SOD106
PSMA12A	SMA 12A PH	SOD106
PSMA13A	SMA 13A PH	SOD106
PSMA14A	SMA 14A PH	SOD106
PSMA15A	SMA 15A PH	SOD106
PSMA16A	SMA 16A PH	SOD106
PSMA17A	SMA 17A PH	SOD106
PSMA18A	SMA 18A PH	SOD106
PSMA20A	SMA 20A PH	SOD106
PSMA22A	SMA 22A PH	SOD106
PSMA24A	SMA 24A PH	SOD106
PSMA26A	SMA 26A PH	SOD106
PSMA28A	SMA 28A PH	SOD106
PSMA30A	SMA 30A PH	SOD106
PSMA33A	SMA 33A PH	SOD106
PSMA36A	SMA 36A PH	SOD106
PSMA40A	SMA 40A PH	SOD106
PSMA43A	SMA 43A PH	SOD106
PSMA45A	SMA 45A PH	SOD106
PSMA48A	SMA 48A PH	SOD106
PSMA51A	SMA 51A PH	SOD106
PSMA54A	SMA 54A PH	SOD106
PSMA58A	SMA 58A PH	SOD106
PSMA60A	SMA 60A PH	SOD106
PSMA64A	SMA 64A PH	SOD106
PSMA70A	SMA 70A PH	SOD106
PSMA75A	SMA 75A PH	SOD106
PSMA78A	SMA 78A PH	SOD106
PSMA5925B	SMA 25B PH	SOD106

TYPE NUMBER	MARKING CODE	PACKAGE
PSMA5926B	SMA 26B PH	SOD106
PSMA5927B	SMA 27B PH	SOD106
PSMA5928B	SMA 28B PH	SOD106
PSMA5929B	SMA 29B PH	SOD106
PSMA5930B	SMA 30B PH	SOD106
PSMA5931B	SMA 31B PH	SOD106
PSMA5932B	SMA 32B PH	SOD106
PSMA5933B	SMA 33B PH	SOD106
PSMA5934B	SMA 34B PH	SOD106
PSMA5935B	SMA 35B PH	SOD106
PSMA5936B	SMA 36B PH	SOD106
PSMA5937B	SMA 37B PH	SOD106
PSMA5938B	SMA 38B PH	SOD106
PSMA5939B	SMA 39B PH	SOD106
PSMA5940B	SMA 40B PH	SOD106
PSMA5941B	SMA 41B PH	SOD106
PSMA5942B	SMA 42B PH	SOD106
PSMA5943B	SMA 43B PH	SOD106
PSMA5944B	SMA 44B PH	SOD106
PSMA5945B	SMA 45B PH	SOD106
PZTM1101	TM1101	SOT223
PZTM1102	TM1102	SOT223

MARKING CODE TO TYPE NUMBER

MARKING CODE	TYPE NUMBER	PACKAGE
AT120A	BAT120A	SOT223
AT120C	BAT120C	SOT223
AT120S	BAT120S	SOT223
AT140A	BAT140A	SOT223
AT140C	BAT140C	SOT223
AT140S	BAT140S	SOT223
AT160A	BAT160A	SOT223
AT160C	BAT160C	SOT223
AT160S	BAT160S	SOT223
BY558 PH	BY558	SOD115
BY578 PH	BY578	SOD115
1 1 1 1	BYD1100	SOD87
85B PH	BYG85B	SOD106
BYV1100	BYV1100	SOD81
BYQ63 PH	BYQ63	SOD57

MARKING CODE	TYPE NUMBER	PACKAGE
BZA109	BZA109	SOT163-1
ZA109TS	BZA109TS	SOT339-1
Z0	BZA420	SOT457
Z6	BZA456A	SOT457
Z2t	BZA462A	SOT457
03C 10 PH	BZG03-C10	SOD106
03C 100 PH	BZG03-C100	SOD106
03C 11 PH	BZG03-C11	SOD106
03C 110 PH	BZG03-C110	SOD106
03C 12 PH	BZG03-C12	SOD106
03C 120 PH	BZG03-C120	SOD106
03C 13 PH	BZG03-C13	SOD106
03C 130 PH	BZG03-C130	SOD106
03C 15 PH	BZG03-C15	SOD106
03C 150 PH	BZG03-C150	SOD106
03C 16 PH	BZG03-C16	SOD106
03C 160 PH	BZG03-C160	SOD106
03C 18 PH	BZG03-C18	SOD106
03C 180 PH	BZG03-C180	SOD106
03C 20 PH	BZG03-C20	SOD106
03C 200 PH	BZG03-C200	SOD106
03C 22 PH	BZG03-C22	SOD106
03C 220 PH	BZG03-C220	SOD106
03C 24 PH	BZG03-C24	SOD106
03C 240 PH	BZG03-C240	SOD106
03C 27 PH	BZG03-C27	SOD106
03C 270 PH	BZG03-C270	SOD106
03C 30 PH	BZG03-C30	SOD106
03C 33 PH	BZG03-C33	SOD106
03C 36 PH	BZG03-C36	SOD106
03C 39 PH	BZG03-C39	SOD106
03C 43 PH	BZG03-C43	SOD106
03C 47 PH	BZG03-C47	SOD106
03C 51 PH	BZG03-C51	SOD106
03C 56 PH	BZG03-C56	SOD106
03C 62 PH	BZG03-C62	SOD106
03C 68 PH	BZG03-C68	SOD106
03C 75 PH	BZG03-C75	SOD106
03C 82 PH	BZG03-C82	SOD106
03C 91 PH	BZG03-C91	SOD106
04 10 PH	BZG04-10	SOD106

MARKING CODE	TYPE NUMBER	PACKAGE
04 100 PH	BZG04-100	SOD106
04 11 PH	BZG04-11	SOD106
04 110 PH	BZG04-110	SOD106
04 12 PH	BZG04-12	SOD106
04 120 PH	BZG04-120	SOD106
04 13 PH	BZG04-13	SOD106
04 130 PH	BZG04-130	SOD106
04 15 PH	BZG04-15	SOD106
04 150 PH	BZG04-150	SOD106
04 16 PH	BZG04-16	SOD106
04 160 PH	BZG04-160	SOD106
04 18 PH	BZG04-18	SOD106
04 180 PH	BZG04-180	SOD106
04 20 PH	BZG04-20	SOD106
04 200 PH	BZG04-200	SOD106
04 22 PH	BZG04-22	SOD106
04 220 PH	BZG04-220	SOD106
04 24 PH	BZG04-24	SOD106
04 27 PH	BZG04-27	SOD106
04 30 PH	BZG04-30	SOD106
04 33 PH	BZG04-33	SOD106
04 36 PH	BZG04-36	SOD106
04 39 PH	BZG04-39	SOD106
04 43 PH	BZG04-43	SOD106
04 47 PH	BZG04-47	SOD106
04 51 PH	BZG04-51	SOD106
04 56 PH	BZG04-56	SOD106
04 62 PH	BZG04-62	SOD106
04 68 PH	BZG04-68	SOD106
04 75 PH	BZG04-75	SOD106
04 82 PH	BZG04-82	SOD106
04 8V2 PH	BZG04-8V2	SOD106
04 91 PH	BZG04-91	SOD106
04 9V1 PH	BZG04-9V1	SOD106
1 1 1 1	BYD17D	SOD87
1 1 1 1	BYD17G	SOD87
1 1 1 1	BYD17J	SOD87
1 1 1 1	BYD17K	SOD87
1 1 1 1	BYD17M	SOD87
1 1 1 1	PRLL4001	SOD87
1 1 1 1	PRLL4002	SOD87

MARKING CODE	TYPE NUMBER	PACKAGE
10 PH	BZD23-C10	SOD81
100 PH	BZD23-C100	SOD81
11 PH	BZD23-C11	SOD81
110 PH	BZD23-C110	SOD81
12 PH	BZD23-C12	SOD81
120 PH	BZD23-C120	SOD81
123 PH	BYD123	SOD81
12D PH	BYD12D	SOD120
12G PH	BYD12G	SOD120
12J PH	BYD12J	SOD120
12K PH	BYD12K	SOD120
12M PH	BYD12M	SOD120
13 PH	BZD23-C13	SOD81
130 PH	BZD23-C130	SOD81
13D PH	BYD13D	SOD81
13G PH	BYD13G	SOD81
13J PH	BYD13J	SOD81
13K PH	BYD13K	SOD81
13M PH	BYD13M	SOD81
143 PH	BYD143	SOD81
15 PH	BZD23-C15	SOD81
150 PH	BZD23-C150	SOD81
16 PH	BZD23-C16	SOD81
160 PH	BZD23-C160	SOD81
163 PH	BYD163	SOD81
18 PH	BZD23-C18	SOD81
180 PH	BZD23-C180	SOD81
1N4001	1N4001ID	SOD81
1N4001 PH	1N4001G	SOD57
1N4002	1N4002ID	SOD81
1N4002 PH	1N4002G	SOD57
1N4003	1N4003ID	SOD81
1N4003 PH	1N4003G	SOD57
1N4004	1N4004ID	SOD81
1N4004 PH	1N4004G	SOD57
1N4005	1N4005ID	SOD81
1N4005 PH	1N4005G	SOD57
1N4006	1N4006ID	SOD81
1N4006 PH	1N4006G	SOD57
1N4007	1N4007ID	SOD81
1N4007 PH	1N4007G	SOD57

MARKING CODE	TYPE NUMBER	PACKAGE
1N5059 PH	1N5059	SOD57
1N5060 PH	1N5060	SOD57
1N5061 PH	1N5061	SOD57
1N5062 PH	1N5062	SOD57
1N5817	1N5817	SOD81
1N5818	1N5818	SOD81
1N5819	1N5819	SOD81
2 2 2 2	BZD27-C10	SOD87
2 2 2 2	BZD27-C100	SOD87
2 2 2 2	BZD27-C11	SOD87
2 2 2 2	BZD27-C110	SOD87
2 2 2 2	BZD27-C12	SOD87
2 2 2 2	BZD27-C120	SOD87
2 2 2 2	BZD27-C13	SOD87
2 2 2 2	BZD27-C130	SOD87
2 2 2 2	BZD27-C15	SOD87
2 2 2 2	BZD27-C150	SOD87
2 2 2 2	BZD27-C16	SOD87
2 2 2 2	BZD27-C160	SOD87
2 2 2 2	BZD27-C18	SOD87
2 2 2 2	BZD27-C180	SOD87
2 2 2 2	BZD27-C20	SOD87
2 2 2 2	BZD27-C200	SOD87
2 2 2 2	BZD27-C22	SOD87
2 2 2 2	BZD27-C220	SOD87
2 2 2 2	BZD27-C24	SOD87
2 2 2 2	BZD27-C240	SOD87
2 2 2 2	BZD27-C27	SOD87
2 2 2 2	BZD27-C270	SOD87
2 2 2 2	BZD27-C30	SOD87
2 2 2 2	BZD27-C300	SOD87
2 2 2 2	BZD27-C33	SOD87
2 2 2 2	BZD27-C330	SOD87
2 2 2 2	BZD27-C36	SOD87
2 2 2 2	BZD27-C360	SOD87
2 2 2 2	BZD27-C39	SOD87
2 2 2 2	BZD27-C390	SOD87
2 2 2 2	BZD27-C3V6	SOD87
2 2 2 2	BZD27-C3V9	SOD87
2 2 2 2	BZD27-C43	SOD87
2 2 2 2	BZD27-C430	SOD87

MARKING CODE	TYPE NUMBER	PACKAGE
2 2 2 2	BZD27-C47	SOD87
2 2 2 2	BZD27-C470	SOD87
2 2 2 2	BZD27-C4V3	SOD87
2 2 2 2	BZD27-C4V7	SOD87
2 2 2 2	BZD27-C51	SOD87
2 2 2 2	BZD27-C510	SOD87
2 2 2 2	BZD27-C56	SOD87
2 2 2 2	BZD27-C5V1	SOD87
2 2 2 2	BZD27-C5V6	SOD87
2 2 2 2	BZD27-C62	SOD87
2 2 2 2	BZD27-C68	SOD87
2 2 2 2	BZD27-C6V2	SOD87
2 2 2 2	BZD27-C6V8	SOD87
2 2 2 2	BZD27-C75	SOD87
2 2 2 2	BZD27-C7V5	SOD87
2 2 2 2	BZD27-C82	SOD87
2 2 2 2	BZD27-C8V2	SOD87
2 2 2 2	BZD27-C91	SOD87
2 2 2 2	BZD27-C9V1	SOD87
20 PH	BZD23-C20	SOD81
200 PH	BZD23-C200	SOD81
22 PH	BZD23-C22	SOD81
220 PH	BZD23-C220	SOD81
24 PH	BZD23-C24	SOD81
240 PH	BZD23-C240	SOD81
27 PH	BZD23-C27	SOD81
270 PH	BZD23-C270	SOD81
3 3 3 3	BYD37D	SOD87
3 3 3 3	BYD37G	SOD87
3 3 3 3	BYD37J	SOD87
3 3 3 3	BYD37K	SOD87
3 3 3 3	BYD37M	SOD87
30 PH	BZD23-C30	SOD81
300 PH	BZD23-C300	SOD81
32D PH	BYD32D	SOD120
32G PH	BYD32G	SOD120
32J PH	BYD32J	SOD120
33 PH	BZD23-C33	SOD81
330 PH	BZD23-C330	SOD81
33D PH	BYD33D	SOD81
33G PH	BYD33G	SOD81

MARKING CODE	TYPE NUMBER	PACKAGE
33J PH	BYD33J	SOD81
33K PH	BYD33K	SOD81
33M PH	BYD33M	SOD81
33U PH	BYD33U	SOD81
33V PH	BYD33V	SOD81
36 PH	BZD23-C36	SOD81
360 PH	BZD23-C360	SOD81
39 PH	BZD23-C39	SOD81
390 PH	BZD23-C390	SOD81
3V6 PH	BZD23-C3V6	SOD81
3V9 PH	BZD23-C3V9	SOD81
4 4 4 4	BYD47-16	SOD87
4 4 4 4	BYD47-18	SOD87
4 4 4 4	BYD47-20	SOD87
43-16PH	BYD43-16	SOD81
43-18PH	BYD43-18	SOD81
43-20PH	BYD43-20	SOD81
43 PH	BZD23-C43	SOD81
430 PH	BZD23-C430	SOD81
43U PH	BYD43U	SOD81
43V PH	BYD43V	SOD81
47 PH	BZD23-C47	SOD81
470 PH	BZD23-C470	SOD81
4V3 PH	BZD23-C4V3	SOD81
4V7 PH	BZD23-C4V7	SOD81
5 5 5 5	BYD57D	SOD87
5 5 5 5	BYD57G	SOD87
5 5 5 5	BYD57J	SOD87
5 5 5 5	BYD57K	SOD87
5 5 5 5	BYD57M	SOD87
5 5 5 5	BYD57U	SOD87
5 5 5 5	BYD57V	SOD87
50D PH	BYG50D	SOD106
50G PH	BYG50G	SOD106
50J PH	BYG50J	SOD106
50K PH	BYG50K	SOD106
50M PH	BYG50M	SOD106
51 PH	BZD23-C51	SOD81
510 PH	BZD23-C510	SOD81
52D PH	BYD52D	SOD120
52G PH	BYD52G	SOD120

MARKING CODE	TYPE NUMBER	PACKAGE
52J PH	BYD52J	SOD120
53D PH	BYD53D	SOD81
53G PH	BYD53G	SOD81
53J PH	BYD53J	SOD81
53K PH	BYD53K	SOD81
53M PH	BYD53M	SOD81
53U PH	BYD53U	SOD81
53V PH	BYD53V	SOD81
56 PH	BZD23-C56	SOD81
5V1 PH	BZD23-C5V1	SOD81
5V6 PH	BZD23-C5V6	SOD81
6 6 6 6	BYD67	SOD87
60D PH	BYG60D	SOD106
60G PH	BYG60G	SOD106
60J PH	BYG60J	SOD106
60K PH	BYG60K	SOD106
60M PH	BYG60M	SOD106
62 PH	BZD23-C62	SOD81
63 PH	BYD63	SOD81
68 PH	BZD23-C68	SOD81
6V2 PH	BZD23-C6V2	SOD81
6V8 PH	BZD23-C6V8	SOD81
7 7 7 7	BYD77A	SOD87
7 7 7 7	BYD77B	SOD87
7 7 7 7	BYD77C	SOD87
7 7 7 7	BYD77D	SOD87
7 7 7 7	BYD77E	SOD87
7 7 7 7	BYD77F	SOD87
7 7 7 7	BYD77G	SOD87
70D PH	BYG70D	SOD106
70G PH	BYG70G	SOD106
70J PH	BYG70J	SOD106
723F PH	BYD72F	SOD120
72A PH	BYD72A	SOD120
72B PH	BYD72B	SOD120
72C PH	BYD72C	SOD120
72D PH	BYD72D	SOD120
72E PH	BYD72E	SOD120
72G PH	BYD72G	SOD120
73A PH	BYD73A	SOD81
73B PH	BYD73B	SOD81

MARKING CODE	TYPE NUMBER	PACKAGE
73C PH	BYD73C	SOD81
73D PH	BYD73D	SOD81
73E PH	BYD73E	SOD81
73F PH	BYD73F	SOD81
73G PH	BYD73G	SOD81
75 PH	BZD23-C75	SOD81
7V5 PH	BZD23-C7V5	SOD81
8 8 8 8	BYD127	SOD87
8 8 8 8	BYD147	SOD87
8 8 8 8	BYD167	SOD87
80A PH	BYG80A	SOD106
80B PH	BYG80B	SOD106
80C PH	BYG80C	SOD106
80D PH	BYG80D	SOD106
80F PH	BYG80F	SOD106
80G PH	BYG80G	SOD106
80J PH	BYG80J	SOD106
82 PH	BZD23-C82	SOD81
8V2 PH	BZD23-C8V2	SOD81
9 9 9 9	PRLL5817	SOD87
9 9 9 9	PRLL5818	SOD87
9 9 9 9	PRLL5819	SOD87
90 20 PH	BYG90-20	SOD106A
90 30 PH	BYG90-30	SOD106A
90 40 PH	BYG90-40	SOD106A
90 90 PH	BYG90-90	SOD106A
91 PH	BZD23-C91	SOD81
9V1 PH	BZD23-C9V1	SOD81
BAQ 806 PH	BAQ806	SOD106
BAQ800-PH	BAQ800	SOD81
black	BY505	SOD61A
black	BY614	SOD61H2
black	BY8424	SOD61AK
black	BYX101G	SOD88A
black	BYX105G	SOD88A
black	BYX90G	SOD83A
black+black	BY8404	SOD61AB
black+blue	BY8420	SOD61AJ
black+brown	BY8418	SOD61AI
black+green	BY8406	SOD61AC
black+grey	BY8416	SOD61AH

MARKING CODE	TYPE NUMBER	PACKAGE
black+lilac	BY8414	SOD61AG
black+orange	BY8412	SOD61AF
black+red	BY8408	SOD61AD
black+violet	BY8410	SOD61AE
blue	BYX134G	SOD61AC
brown	BYX133G	SOD61AB
brown	BYX133GL	SOD119
BY228 PH	BY228	SOD64
BY278 PH	BY278	SOD64
BY328 PH	BY328	SOD64
BY428 PH	BY428	SOD64
BY448 PH	BY448	SOD57
BY527 PH	BY527	SOD57
BYM26A PH	BYM26A	SOD64
BYM26B PH	BYM26B	SOD64
BYM26C PH	BYM26C	SOD64
BYM26D PH	BYM26D	SOD64
BYM26E PH	BYM26E	SOD64
BYM26F PH	BYM26F	SOD64
BYM26G PH	BYM26G	SOD64
BYM36A PH	BYM36A	SOD64
BYM36B PH	BYM36B	SOD64
BYM36C PH	BYM36C	SOD64
BYM36D PH	BYM36D	SOD64
BYM36E PH	BYM36E	SOD64
BYM36F PH	BYM36F	SOD64
BYM36G PH	BYM36G	SOD64
BYM56A PH	BYM56A	SOD64
BYM56B PH	BYM56B	SOD64
BYM56C PH	BYM56C	SOD64
BYM56D PH	BYM56D	SOD64
BYM56E PH	BYM56E	SOD64
BYM63 PH	BYM63	SOD64
BYM99 PH	BYM99	SOD64
BYR210	PBYR2100CT	SOT223
BYR215	PBYR2150CT	SOT223
BYR220	PBYR220CT	SOT223
BYR225	PBYR225CT	SOT223
BYR240	PBYR240CT	SOT223
BYR245	PBYR245CT	SOT223
BYR280	PBYR280CT	SOT223

MARKING CODE	TYPE NUMBER	PACKAGE
BYR290	PBYR290CT	SOT223
BYV2100 PH	BYV2100	SOD57
BYV26A PH	BYV26A	SOD57
BYV26B PH	BYV26B	SOD57
BYV26C PH	BYV26C	SOD57
BYV26D PH	BYV26D	SOD57
BYV26E PH	BYV26E	SOD57
BYV26F PH	BYV26F	SOD57
BYV26G PH	BYV26G	SOD57
BYV27-100	BYV27-100	SOD57
BYV27-150	BYV27-150	SOD57
BYV27-200	BYV27-200	SOD57
BYV27-300	BYV27-300	SOD57
BYV27-400	BYV27-400	SOD57
BYV27-50	BYV27-50	SOD57
BYV27-600	BYV27-600	SOD57
BYV28-100	BYV28-100	SOD64
BYV28-150	BYV28-150	SOD64
BYV28-200	BYV28-200	SOD64
BYV28-300	BYV28-300	SOD64
BYV28-400	BYV28-400	SOD64
BYV28-50	BYV28-50	SOD64
BYV28-600	BYV28-600	SOD64
BYV36A PH	BYV36A	SOD57
BYV36B PH	BYV36B	SOD57
BYV36C PH	BYV36C	SOD57
BYV36D PH	BYV36D	SOD57
BYV36E PH	BYV36E	SOD57
BYV36F PH	BYV36F	SOD57
BYV36G PH	BYV36G	SOD57
BYV4100 PH	BYV4100	SOD64
BYV95A PH	BYV95A	SOD57
BYV95B PH	BYV95B	SOD57
BYV95C PH	BYV95C	SOD57
BYV96D PH	BYV96D	SOD57
BYV96E PH	BYV96E	SOD57
BYV97F PH	BYV97F	SOD57
BYV97G PH	BYV97G	SOD57
BYV98 PH	BYV98	SOD57
BYV99 PH	BYV99	SOD57
BYW54 PH	BYW54	SOD57

MARKING CODE	TYPE NUMBER	PACKAGE
BYW55 PH	BYW55	SOD57
BYW56 PH	BYW56	SOD57
BYW95A PH	BYW95A	SOD64
BYW95B PH	BYW95B	SOD64
BYW95C PH	BYW95C	SOD64
BYW96D PH	BYW96D	SOD64
BYW96E PH	BYW96E	SOD64
BYW97F PH	BYW97F	SOD64
BYW97G PH	BYW97G	SOD64
BYX10G PH	BYX10G	SOD57
BYX119G PH	BYX119G	SOD57
BZA100	BZA100	SOT163-1
BZT03C10	BZT03-C10	SOD57
BZT03C100	BZT03-C100	SOD57
BZT03C11	BZT03-C11	SOD57
BZT03C110	BZT03-C110	SOD57
BZT03C12	BZT03-C12	SOD57
BZT03C120	BZT03-C120	SOD57
BZT03C13	BZT03-C13	SOD57
BZT03C130	BZT03-C130	SOD57
BZT03C15	BZT03-C15	SOD57
BZT03C150	BZT03-C150	SOD57
BZT03C16	BZT03-C16	SOD57
BZT03C160	BZT03-C160	SOD57
BZT03C18	BZT03-C18	SOD57
BZT03C180	BZT03-C180	SOD57
BZT03C20	BZT03-C20	SOD57
BZT03C200	BZT03-C200	SOD57
BZT03C22	BZT03-C22	SOD57
BZT03C220	BZT03-C220	SOD57
BZT03C24	BZT03-C24	SOD57
BZT03C240	BZT03-C240	SOD57
BZT03C27	BZT03-C27	SOD57
BZT03C270	BZT03-C270	SOD57
BZT03C30	BZT03-C30	SOD57
BZT03C300	BZT03-C300	SOD57
BZT03C33	BZT03-C33	SOD57
BZT03C330	BZT03-C330	SOD57
BZT03C36	BZT03-C36	SOD57
BZT03C360	BZT03-C360	SOD57
BZT03C39	BZT03-C39	SOD57

MARKING CODE	TYPE NUMBER	PACKAGE
BZT03C390	BZT03-C390	SOD57
BZT03C43	BZT03-C43	SOD57
BZT03C430	BZT03-C430	SOD57
BZT03C47	BZT03-C47	SOD57
BZT03C470	BZT03-C470	SOD57
BZT03C51	BZT03-C51	SOD57
BZT03C510	BZT03-C510	SOD57
BZT03C56	BZT03-C56	SOD57
BZT03C62	BZT03-C62	SOD57
BZT03C68	BZT03-C68	SOD57
BZT03C75	BZT03-C75	SOD57
BZT03C7V5	BZT03-C7V5	SOD57
BZT03C82	BZT03-C82	SOD57
BZT03C8V2	BZT03-C8V2	SOD57
BZT03C91	BZT03-C91	SOD57
BZT03C9V1	BZT03-C9V1	SOD57
BZW03C10	BZW03-C10	SOD64
BZW03C100	BZW03-C100	SOD64
BZW03C11	BZW03-C11	SOD64
BZW03C110	BZW03-C110	SOD64
BZW03C12	BZW03-C12	SOD64
BZW03C120	BZW03-C120	SOD64
BZW03C13	BZW03-C13	SOD64
BZW03C130	BZW03-C130	SOD64
BZW03C15	BZW03-C15	SOD64
BZW03C150	BZW03-C150	SOD64
BZW03C16	BZW03-C16	SOD64
BZW03C160	BZW03-C160	SOD64
BZW03C18	BZW03-C18	SOD64
BZW03C180	BZW03-C180	SOD64
BZW03C20	BZW03-C20	SOD64
BZW03C200	BZW03-C200	SOD64
BZW03C22	BZW03-C22	SOD64
BZW03C220	BZW03-C220	SOD64
BZW03C24	BZW03-C24	SOD64
BZW03C240	BZW03-C240	SOD64
BZW03C27	BZW03-C27	SOD64
BZW03C270	BZW03-C270	SOD64
BZW03C30	BZW03-C30	SOD64
BZW03C300	BZW03-C300	SOD64
BZW03C33	BZW03-C33	SOD64

MARKING CODE	TYPE NUMBER	PACKAGE
BZW03C330	BZW03-C330	SOD64
BZW03C36	BZW03-C36	SOD64
BZW03C360	BZW03-C360	SOD64
BZW03C39	BZW03-C39	SOD64
BZW03C390	BZW03-C390	SOD64
BZW03C43	BZW03-C43	SOD64
BZW03C430	BZW03-C430	SOD64
BZW03C47	BZW03-C47	SOD64
BZW03C470	BZW03-C470	SOD64
BZW03C51	BZW03-C51	SOD64
BZW03C510	BZW03-C510	SOD64
BZW03C56	BZW03-C56	SOD64
BZW03C62	BZW03-C62	SOD64
BZW03C68	BZW03-C68	SOD64
BZW03C75	BZW03-C75	SOD64
BZW03C7V5	BZW03-C7V5	SOD64
BZW03C82	BZW03-C82	SOD64
BZW03C8V2	BZW03-C8V2	SOD64
BZW03C91	BZW03-C91	SOD64
BZW03C9V1	BZW03-C9V1	SOD64
green	BYX103G	SOD88A
green	BYX107G	SOD88A
green	BYX135G	SOD61AD
green+green	BY8206	SOD118A
green+orange	BY8212	SOD118B
green+red	BY8208	SOD118A
green+violet	BY8210	SOD118B
light blue	BYX134GP	SOD107B
light blue+green	BY9206	SOD118A
light blue+orange	BY9212	SOD118B
light blue+red	BY9208	SOD118A
light blue+violet	BY9210	SOD118B
orange	BY584	SOD61A
orange	BYX120G	SOD88A
orange+black	BY8104	SOD61AC
orange+green	BY8106	SOD61AD
orange+grey	BY8116	SOD61AJ
orange+grey	BY9416	SOD107B
orange+lilac	BY8114	SOD61AI
orange+lilac	BY9414	SOD107B
orange+orange	BY8112	SOD61AH

MARKING CODE	TYPE NUMBER	PACKAGE
orange+orange	BY9412	SOD107B
orange+red	BY8108	SOD61AE
orange+violet	BY8110	SOD61AF
orange+violet	BY9410	SOD107B
red	BYX102G	SOD88A
red	BYX106G	SOD88A
red	BYX132G	SOD61AB
red	BYX132GL	SOD119
SMA 10A PH	PSMA10A	SOD106
SMA 11A PH	PSMA11A	SOD106
SMA 12A PH	PSMA12A	SOD106
SMA 13A PH	PSMA13A	SOD106
SMA 14A PH	PSMA14A	SOD106
SMA 15A PH	PSMA15A	SOD106
SMA 16A PH	PSMA16A	SOD106
SMA 17A PH	PSMA17A	SOD106
SMA 18A PH	PSMA18A	SOD106
SMA 20A PH	PSMA20A	SOD106
SMA 22A PH	PSMA22A	SOD106
SMA 24A PH	PSMA24A	SOD106
SMA 25B PH	PSMA5925B	SOD106
SMA 26A PH	PSMA26A	SOD106
SMA 26B PH	PSMA5926B	SOD106
SMA 27B PH	PSMA5927B	SOD106
SMA 28A PH	PSMA28A	SOD106
SMA 28B PH	PSMA5928B	SOD106
SMA 29B PH	PSMA5929B	SOD106
SMA 30A PH	PSMA30A	SOD106
SMA 30B PH	PSMA5930B	SOD106
SMA 31B PH	PSMA5931B	SOD106
SMA 32B PH	PSMA5932B	SOD106
SMA 33A PH	PSMA33A	SOD106
SMA 33B PH	PSMA5933B	SOD106
SMA 34B PH	PSMA5934B	SOD106
SMA 35B PH	PSMA5935B	SOD106
SMA 36A PH	PSMA36A	SOD106
SMA 36B PH	PSMA5936B	SOD106
SMA 37B PH	PSMA5937B	SOD106
SMA 38B PH	PSMA5938B	SOD106
SMA 39B PH	PSMA5939B	SOD106
SMA 40A PH	PSMA40A	SOD106

MARKING CODE	TYPE NUMBER	PACKAGE
SMA 40B PH	PSMA5940B	SOD106
SMA 41B PH	PSMA5941B	SOD106
SMA 42B PH	PSMA5942B	SOD106
SMA 43A PH	PSMA43A	SOD106
SMA 43B PH	PSMA5943B	SOD106
SMA 44B PH	PSMA5944B	SOD106
SMA 45A PH	PSMA45A	SOD106
SMA 45B PH	PSMA5945B	SOD106
SMA 48A PH	PSMA48A	SOD106
SMA 51A PH	PSMA51A	SOD106
SMA 54A PH	PSMA54A	SOD106
SMA 58A PH	PSMA58A	SOD106
SMA 60A PH	PSMA60A	SOD106
SMA 64A PH	PSMA64A	SOD106
SMA 70A PH	PSMA70A	SOD106
SMA 75A PH	PSMA75A	SOD106
SMA 78A PH	PSMA78A	SOD106
SMA 8.5 PH	PSMA8.5A	SOD106
SMA 9.5 PH	PSMA9.5A	SOD106
TM1101	PZTM1101	SOT223
TM1102	PZTM1102	SOT223
V10-20	BYV10-20	SOD81

MARKING CODE	TYPE NUMBER	PACKAGE
V10-30	BYV10-30	SOD81
V10-40	BYV10-40	SOD81
V40E15	BYV40E-150	SOT223
V40E20	BYV40E-200	SOT223
violet	BYX104G	SOD88A
violet	BYX108G	SOD88A
violet	BYX130G	SOD88B
violet+black	BY8004	SOD61AC
violet+green	BY8006	SOD61AD
violet+grey	BY8016	SOD61AJ
violet+lilac	BY8014	SOD61AI
violet+orange	BY8012	SOD61AH
violet+red	BY8008	SOD61AE
violet+violet	BY8010	SOD61AF
white	BY9304	SOD118A
white+brown	BY9318	SOD118B
white+green	BY9306	SOD118A
white+grey	BY9316	SOD118B
white+lilac	BY9314	SOD118B
white+orange	BY9312	SOD118B
white+red	BY9308	SOD118A
white+violet	BY9310	SOD118B

DEVICE DATA

in alphanumeric sequence

Rectifiers 1N4001G to 1N4007G

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Available in ammo-pack.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

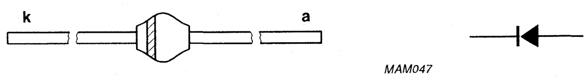


Fig.1 Simplified outline (SOD57) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	1N4001G		–	50	V
	1N4002G		–	100	V
	1N4003G		–	200	V
	1N4004G		–	400	V
	1N4005G		–	600	V
	1N4006G		–	800	V
	1N4007G		–	1000	V
V_R	continuous reverse voltage				
	1N4001G		–	50	V
	1N4002G		–	100	V
	1N4003G		–	200	V
	1N4004G		–	400	V
	1N4005G		–	600	V
	1N4006G		–	800	V
	1N4007G		–	1000	V
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; T_{amb} = 75 °C; see Fig.2	–	1.00	A
		averaged over any 20 ms period; T_{amb} = 100 °C; see Fig.2	–	0.75	A
I_F	continuous forward current	T_{amb} = 75 °C; see Fig.2	–	1.00	A
I_{FRM}	repetitive peak forward current		–	10	A
I_{FSM}	non-repetitive peak forward current	half sinewave; 60 Hz	–	30	A
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; see Fig.3	1.1	V
$V_{F(AV)}$	full-cycle average forward voltage	$I_{F(AV)}$ = 1 A	0.8	V
I_R	reverse current	$V_R = V_{Rmax}$	10	μA
		$V_R = V_{Rmax}$; T_{amb} = 100 °C	50	μA
$I_{R(AV)}$	full-cycle average reverse current	$V_R = V_{RRMmax}$; T_{amb} = 75 °C	30	μA

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	46	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

1. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.4. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA

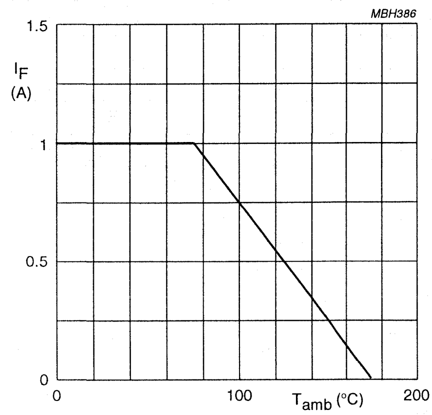
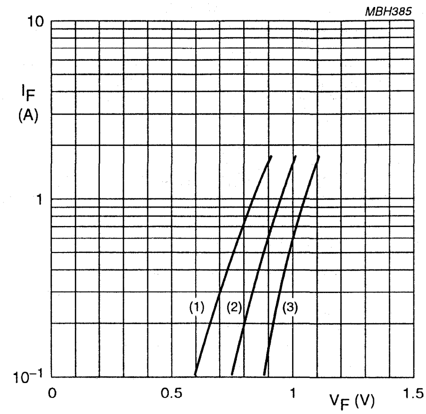
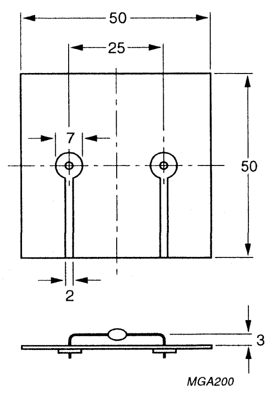


Fig.2 Maximum forward current as a function of ambient temperature.



(1) T_{amb} = 100 °C.
(2) T_{amb} = 20 °C.
(3) T_{amb} = −50 °C.

Fig.3 Forward current as a function of forward voltage; typical values.



Dimensions in mm.

Fig.4 Device mounted on a printed-circuit board.

Rectifiers

1N4001ID to 1N4007ID

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Available in ammo-pack.

DESCRIPTION

Cavity free cylindrical glass package through Implotec™[1] technology.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

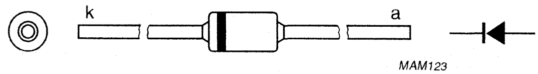


Fig.1 Simplified outline (SOD81) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	1N4001ID		–	50	V
	1N4002ID		–	100	V
	1N4003ID		–	200	V
	1N4004ID		–	400	V
	1N4005ID		–	600	V
	1N4006ID		–	800	V
	1N4007ID		–	1000	V
V_R	continuous reverse voltage				
	1N4001ID		–	50	V
	1N4002ID		–	100	V
	1N4003ID		–	200	V
	1N4004ID		–	400	V
	1N4005ID		–	600	V
	1N4006ID		–	800	V
	1N4007ID		–	1000	V
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; T_{amb} = 75 °C; see Fig.2	–	1.00	A
		averaged over any 20 ms period; T_{amb} = 100 °C; see Fig.2	–	0.75	A
I_{FRM}	repetitive peak forward current		–	10	A
I_{FSM}	non-repetitive peak forward current	half sinewave; 60 Hz	–	20	A
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature		−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; see see Fig.3	1.1	V
$V_{F(AV)}$	full-cycle average forward voltage	$I_{F(AV)}$ = 1 A	0.8	V
I_R	reverse current	$V_R = V_{Rmax}$	10	μA
		$V_R = V_{Rmax}$; T_{amb} = 100 °C	50	μA
$I_{R(AV)}$	full-cycle average reverse current	$V_R = V_{RRMmax}$; T_{amb} = 75 °C	30	μA

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	60	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	120	K/W

Note

1. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.4. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA

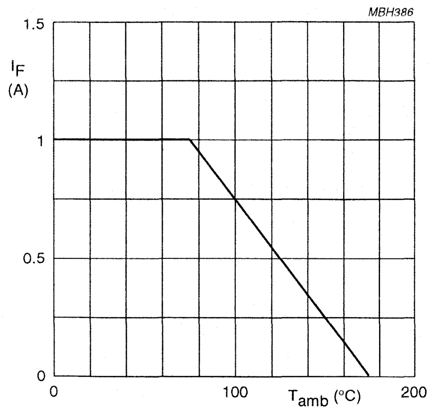
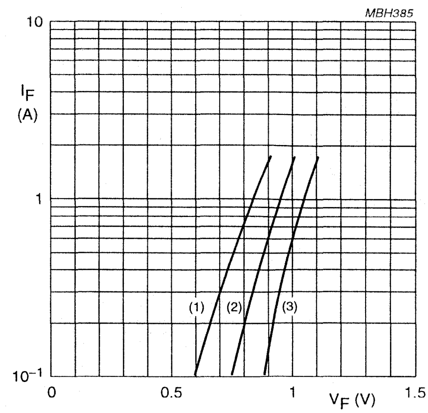
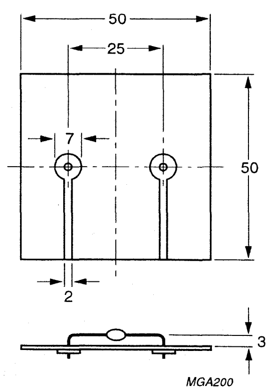


Fig.2 Maximum forward current as a function of ambient temperature.



(1) T_{amb} = 100 °C.
(2) T_{amb} = 20 °C.
(3) T_{amb} = −50 °C.

Fig.3 Forward current as a function of forward voltage; typical values.



Dimensions in mm.

Fig.4 Device mounted on a printed-circuit board.

Controlled avalanche rectifiers — 1N5059 to 1N5062

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

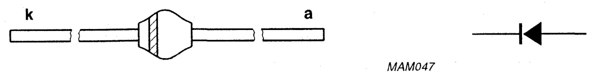


Fig.1 Simplified outline (SOD57) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	1N5059		–	200	V
	1N5060		–	400	V
	1N5061		–	600	V
	1N5062		–	800	V
V_{RWM}	crest working reverse voltage				
	1N5059		–	200	V
	1N5060		–	400	V
	1N5061		–	600	V
	1N5062		–	800	V
V_R	continuous reverse voltage				
	1N5059		–	200	V
	1N5060		–	400	V
	1N5061		–	600	V
	1N5062		–	800	V
$I_{F(AV)}$	average forward current	T_{tp} = 45 °C; lead length = 10 mm; averaged over any 20 ms period; see Figs 2 and 4	–	2.0	A
		T_{amb} = 80 °C; PCB mounting (see Fig.9); averaged over any 20 ms period; see Figs 3 and 4	–	0.8	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave	–	50	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	20	mJ
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature	see Fig.5	−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Fig.6	–	–	0.8	V
		I_F = 1 A; see Fig.6	–	–	1.0	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	1N5059		225	–	–	V
	1N5060		450	–	–	V
	1N5061		650	–	–	V
	1N5062		900	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.7	–	–	1	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.7	–	–	150	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.10	–	3	–	μs
C_d	diode capacitance	V_R = 0 V; f = 1 MHz; see Fig.8	–	50	–	pF

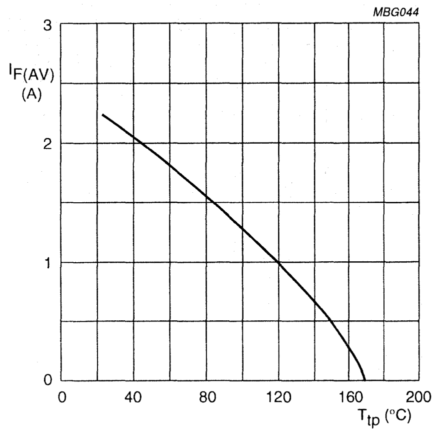
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	46	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

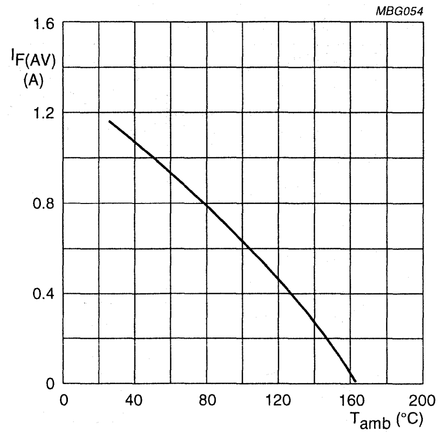
1. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.9. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA



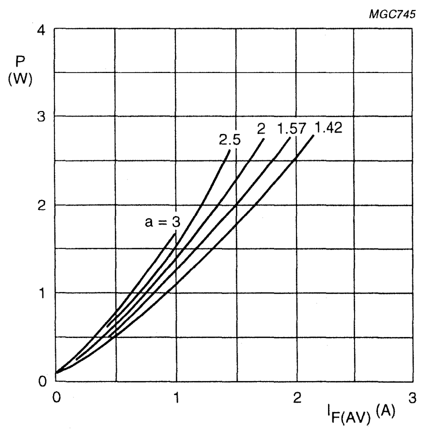
a = 1.57; $V_R = V_{RRMmax}$; $\delta = 0.5$.
Lead length 10 mm.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



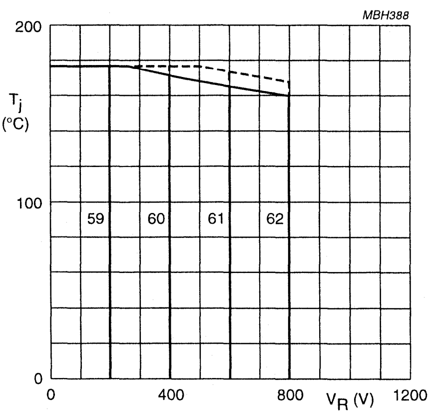
a = 1.57; $V_R = V_{RRMmax}$; $\delta = 0.5$.
Device mounted as shown in Fig.9.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



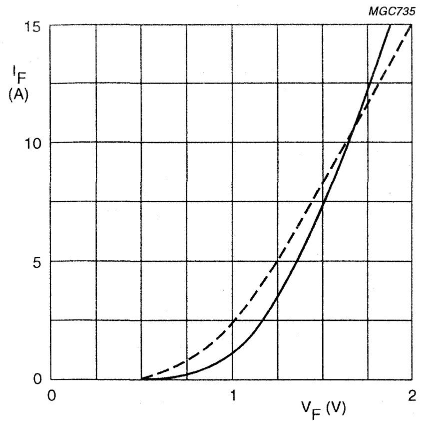
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Fig.4 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



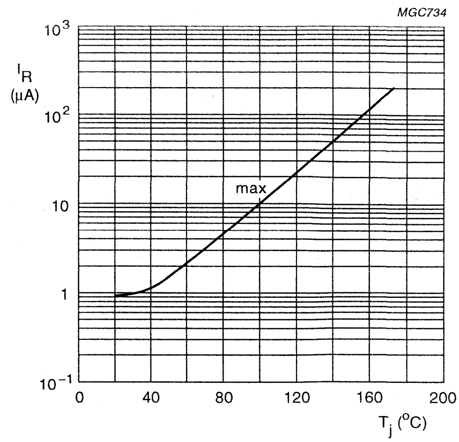
Solid line = V_R.
Dotted line = V_{RRM}; $\delta = 0.5$.

Fig.5 Maximum permissible junction temperature as a function of reverse voltage.



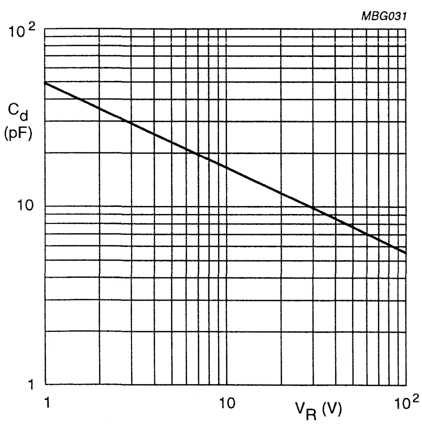
Solid line: T_j = 25 °C.
Dotted line: T_j = 175 °C.

Fig.6 Forward current as a function of forward voltage; maximum values.



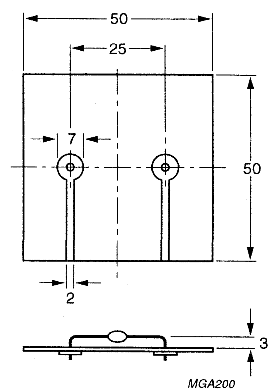
$V_R = V_{RRMmax}$.

Fig.7 Reverse current as a function of junction temperature; maximum values.



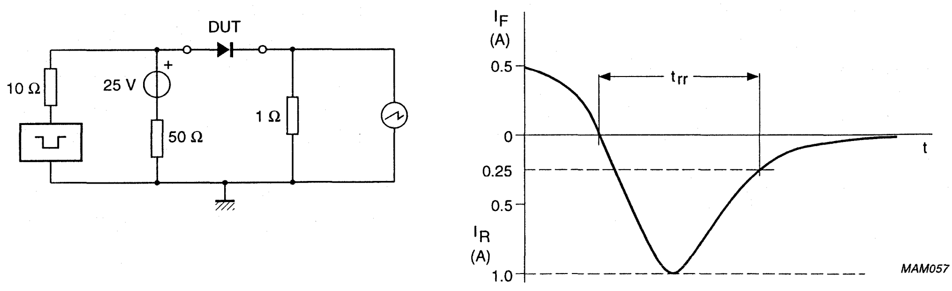
f = 1 MHz; T_j = 25 °C.

Fig.8 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.9 Device mounted on a printed-circuit board.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.10 Test circuit and reverse recovery time waveform and definition.

Schottky barrier diodes 1N5817; 1N5818; 1N5819

FEATURES

- Low switching losses
- Fast recovery time
- Guard ring protected
- Hermetically sealed leaded glass package.

APPLICATIONS

- Low power, switched-mode power supplies
- Rectifying
- Polarity protection.

DESCRIPTION

The 1N5817 to 1N5819 types are Schottky barrier diodes fabricated in planar technology, and encapsulated in SOD81 hermetically sealed glass packages incorporating Implotec$^{TM(1)}$ technology.

(1) Implotec is a trademark of Philips.

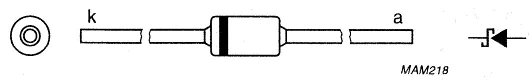


Fig.1 Simplified outline (SOD81) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_R	continuous reverse voltage				
	1N5817		–	20	V
	1N5818		–	30	V
	1N5819		–	40	V
V_{RSM}	non-repetitive peak reverse voltage				
	1N5817		–	24	V
	1N5818		–	36	V
	1N5819		–	48	V
V_{RRM}	repetitive peak reverse voltage				
	1N5817		–	20	V
	1N5818		–	30	V
	1N5819		–	40	V
V_{RWM}	crest working reverse voltage				
	1N5817		–	20	V
	1N5818		–	30	V
	1N5819		–	40	V
$I_{F(AV)}$	average forward current	T_{amb} = 55 °C; $R_{th\ j\text{-}a}$ = 100 K/W; note 1; $V_{R(equiv)}$ = 0.2 V; note 2	–	1	A
I_{FSM}	non-repetitive peak forward current	t = 8.3 ms half sine wave; JEDEC method; $T_j = T_{j\,max}$ prior to surge: $V_R = 0$	–	25	A
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–	125	°C

Notes

1. Refer to SOD81 standard mounting conditions.
2. For Schottky barrier diodes thermal run-away has to be considered, as in some applications, the reverse power losses P_R are a significant part of the total power losses. Nomograms for determination of the reverse power losses P_R and $I_{F(AV)}$ rating will be available on request.

ELECTRICAL CHARACTERISTICS

T_{amb} = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	see Fig.2				
	1N5817	I_F = 0.1 A	–	–	320	mV
		I_F = 1 A	–	–	450	mV
		I_F = 3 A	–	–	750	mV
V_F	forward voltage	see Fig.2				
	1N5818	I_F = 0.1 A	–	–	330	mV
		I_F = 1 A	–	–	550	mV
		I_F = 3 A	–	–	875	mV
V_F	forward voltage	see Fig.2				
	1N5819	I_F = 0.1 A	–	–	340	mV
		I_F = 1 A	–	–	600	mV
		I_F = 3 A	–	–	900	mV
I_R	reverse current	$V_R = V_{RRMmax}$; note 1	–	–	1	mA
		$V_R = V_{RRMmax}$; T_j = 100 °C	–	–	10	mA
C_d	diode capacitance	V_R = 4 V; f = 1 MHz				
	1N5817		–	80	–	pF
	1N5818		–	50	–	pF
	1N5819		–	50	–	pF

Note

1. Pulsed test: t_p = 300 μs; δ = 0.02.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

1. Refer to SOD81 standard mounting conditions.

GRAPHICAL DATA

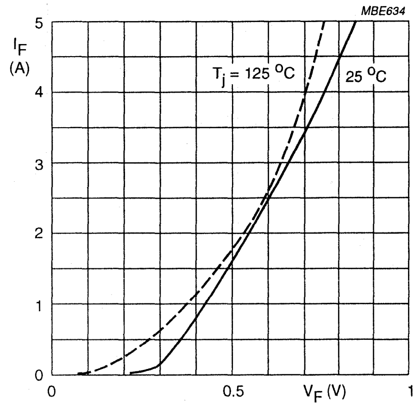


Fig.2 Typical forward voltage.

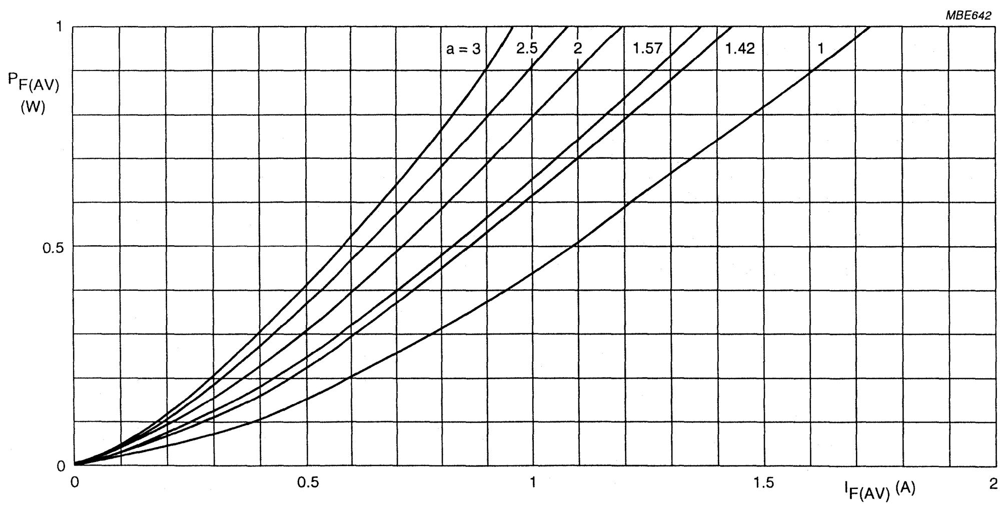


Fig.3 1N817. Maximum values steady state forward power dissipation as a function of the average forward current; $a = I_{F(RMS)}/I_{F(AV)}$.

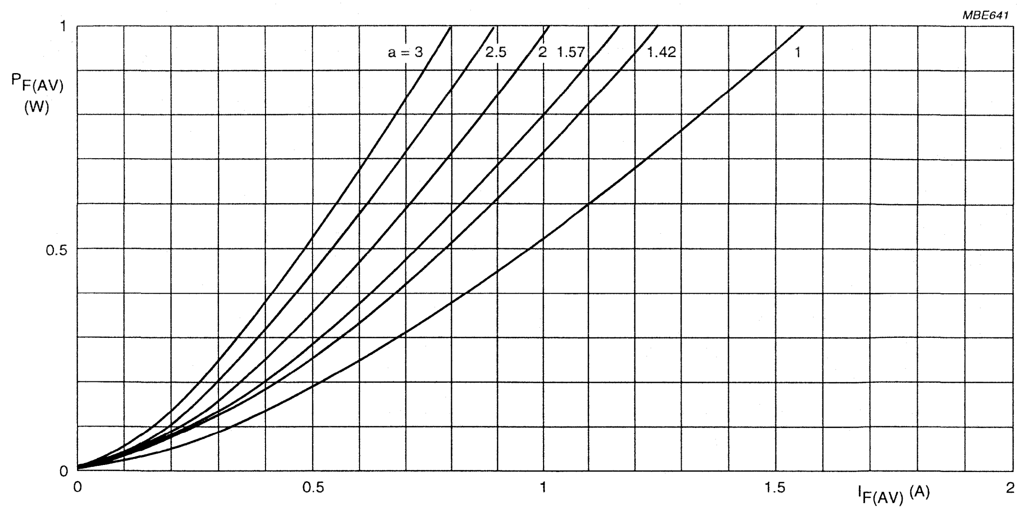


Fig.4 1N5818. Maximum values steady state forward power dissipation as a function of the average forward current; $a = I_{F(RMS)}/I_{F(AV)}$.

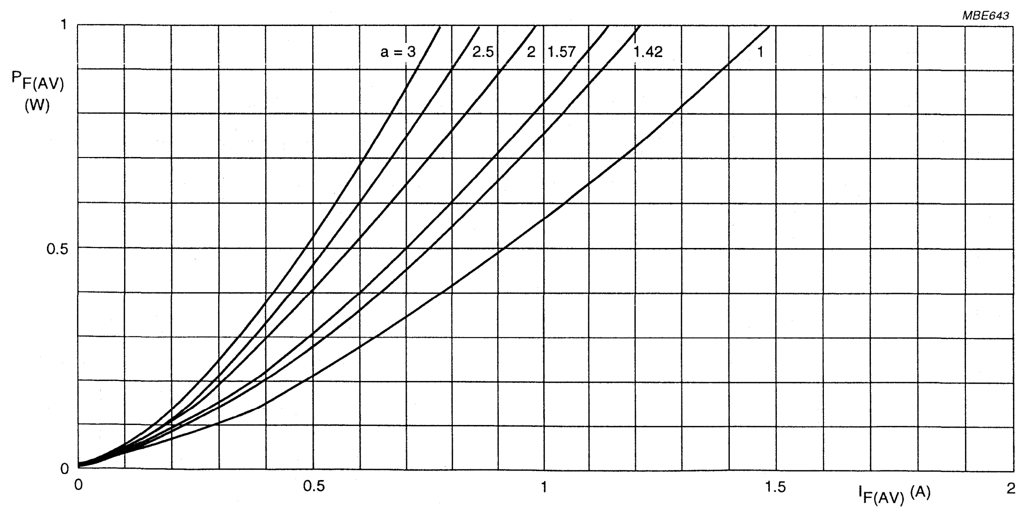


Fig.5 1N5819. Maximum values steady state forward power dissipation as a function of the average forward current; $a = I_{F(RMS)}/I_{F(AV)}$.

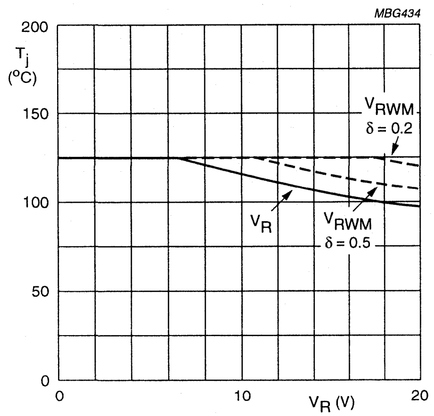


Fig.6 1N5817. Maximum permissible junction temperature as a function of reverse voltage; $R_{th\ j\text{-}a}$ = 100 K/W.

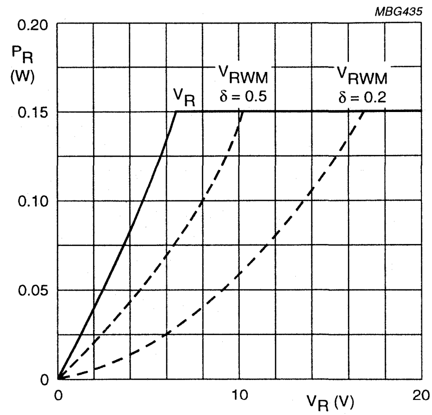


Fig.7 1N5817. Reverse power dissipation as a function of reverse voltage (max. values); $R_{th\ j\text{-}a}$ = 100 K/W.

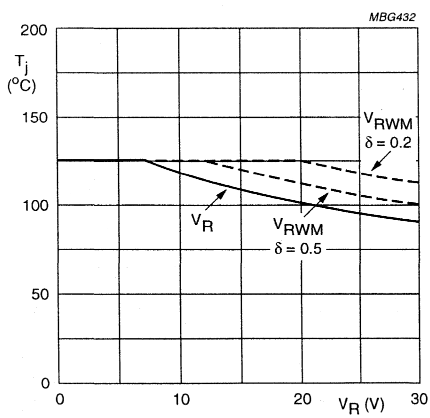


Fig.8 1N5818. Maximum permissible junction temperature as a function of reverse voltage; $R_{th\ j\text{-}a}$ = 100 K/W.

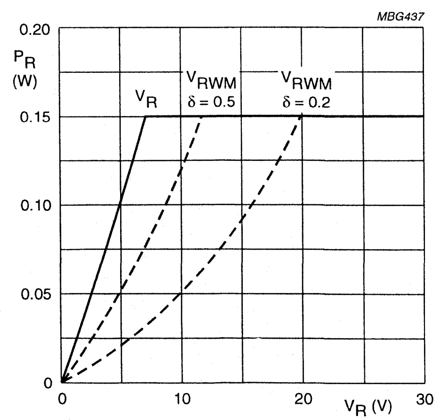


Fig.9 1N5818. Reverse power dissipation as a function of reverse voltage (max. values); $R_{th\ j\text{-}a}$ = 100 K/W.

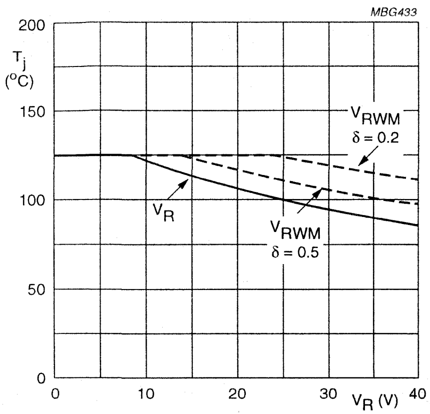


Fig.10 1N5819. Maximum permissible junction temperature as a function of reverse voltage; $R_{th\ j\text{-}a}$ = 100 K/W.

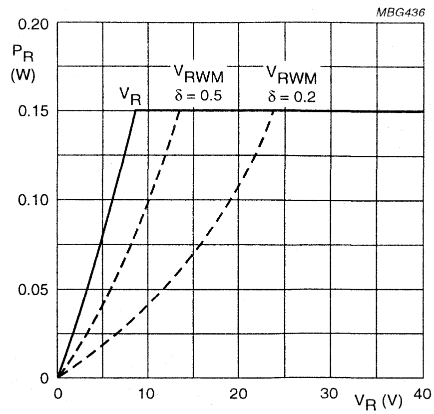


Fig.11 1N5819. Reverse power dissipation as a function of reverse voltage (max. values); $R_{th\ j\text{-}a}$ = 100 K/W.

AM PIN diode | BAQ800

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Available in ammopack.

APPLICATIONS

- RF attenuator with low distortion for frequencies above 100 kHz.

DESCRIPTION

Cavity free cylindrical glass package through Implotec™(1) technology. This package is hermetically sealed and stress free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

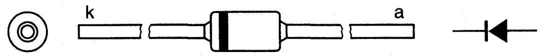


Fig.1 Simplified outline (SOD81) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	100	V
V_R	continuous reverse voltage		–	100	V
$I_{F(AV)}$	average forward current	T_{tp} = 25 °C; lead length = 10 mm; see Fig.2	–	1.25	A
		T_{amb} = 60 °C; printed-circuit board mounting (see Fig.17); see Fig.3	–	600	mA
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+150	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified; all characteristics must be tested in the dark because of the light sensitivity of this product.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 100 mA; see Figs 4 and 5	–	0.9	1.1	V
		I_F = 100 mA; $T_j = T_{j\,max}$; see Figs 4 and 5	–	0.7	0.9	V
I_R	reverse current	V_R = 100 V; see Fig.14	–	–	0.1	μA
		V_R = 100 V; T_j = 125 °C; see Fig.14	–	–	30	μA
τ	charge carrier life time	when switched from I_F = 10 mA to I_R = 6 mA; measured at 10% of I_R; see Fig.15	10	20	–	μs
C_d	diode capacitance	f = 1 MHz; see Figs 6, 7, 8 and 9				
		V_R = 0	–	10	12	pF
		V_R = 2 V	–	5	6	pF
r_D	diode forward resistance	f = 100 kHz; see Figs 10 and 16				
		I_F = 10 μA	–	3100	6000	Ω
		I_F = 100 μA	–	380	800	Ω
		I_F = 1 mA	–	42	80	Ω
		I_F = 10 mA	–	5	10	Ω
r_s	diode series resistance	f = 100 kHz; see Figs 11, 12 and 13				
		V_R = 0	1000	2200	–	kΩ
		V_R = 2 V	5000	11000	–	kΩ
		f = 1 MHz; see Figs 11, 12 and 13				
		V_R = 0	25	50	–	kΩ
		V_R = 2 V	100	220	–	kΩ

THERMAL CHARACTERISTICS

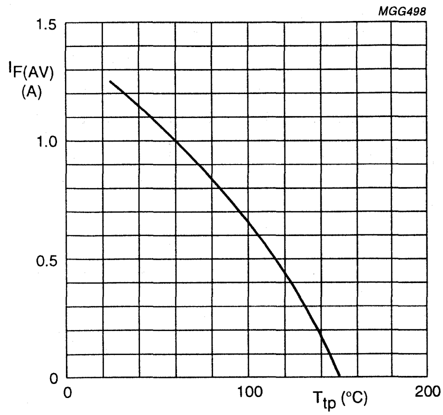
All characteristics must be tested in the dark because of the light sensitivity of this product.

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	60	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	120	K/W

Note

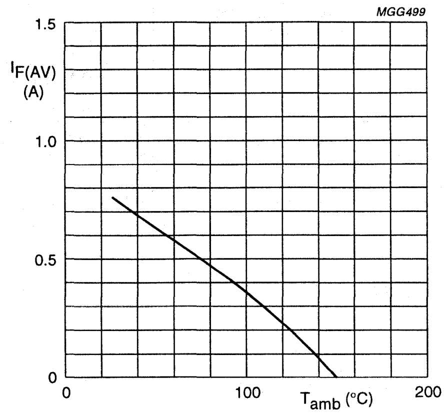
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.17. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA



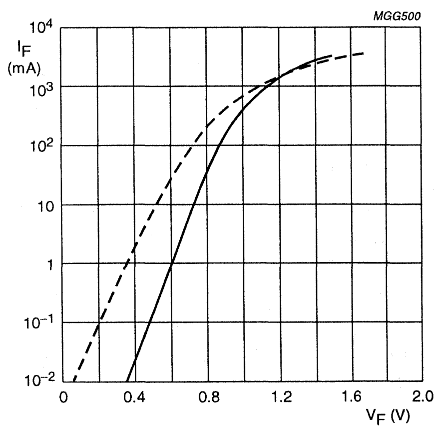
DC application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature.



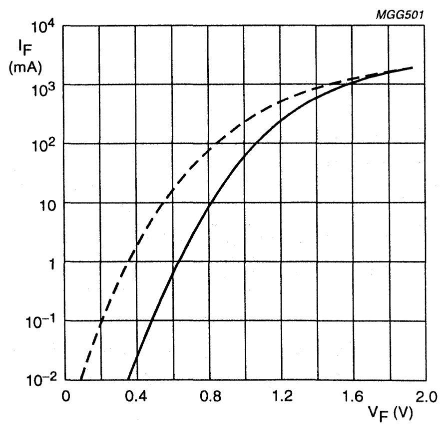
DC application.

Fig.3 Maximum permissible average forward current as a function of ambient temperature.



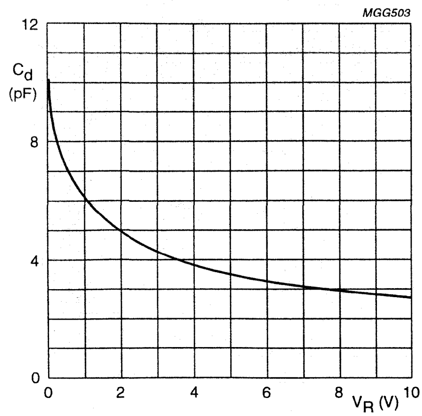
Dotted line: T_j = 150 °C.
Solid line: T_j = 25 °C.

Fig.4 Forward voltage as a function of forward current; typical values.



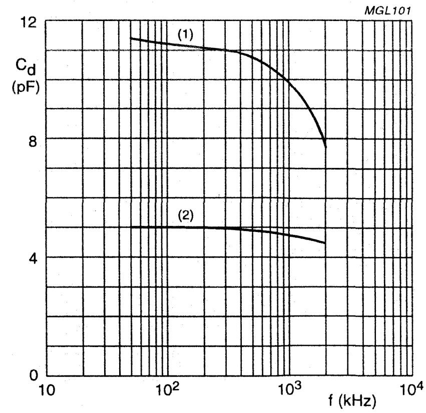
Dotted line: T_j = 150 °C.
Solid line: T_j = 25 °C.

Fig.5 Forward voltage as a function of forward current; maximum values.



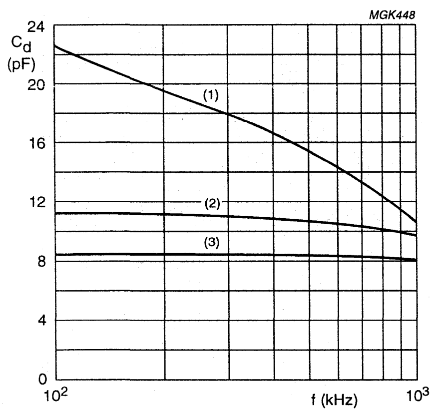
f = 1 MHz; T_j = 25 °C.

Fig.6 Diode capacitance as a function of reverse voltage; typical values.



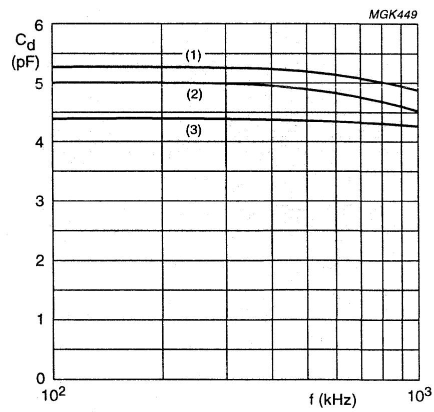
T_j = 25 °C.
(1) V_R = 0.
(2) V_R = 2 V.

Fig.7 Diode capacitance as a function of frequency; typical values.



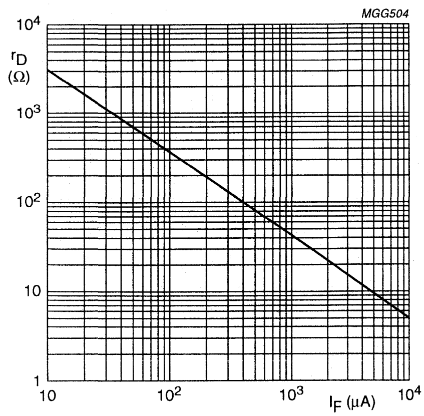
(1) T_j = 85 °C.
(2) T_j = 25 °C.
(3) T_j = −40 °C.
V_R = 0.

Fig.8 Diode capacitance as a function of frequency; typical values.



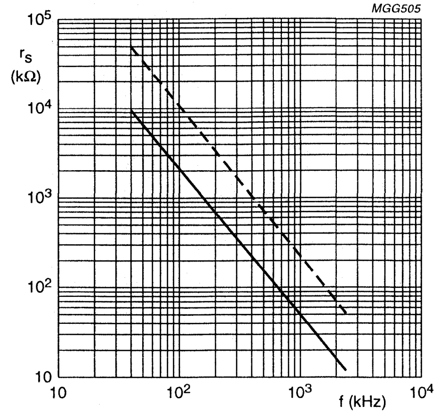
(1) T_j = 85 °C.
(2) T_j = 25 °C.
(3) T_j = −40 °C.
V_R = 2 V.

Fig.9 Diode capacitance as a function of frequency; typical values.



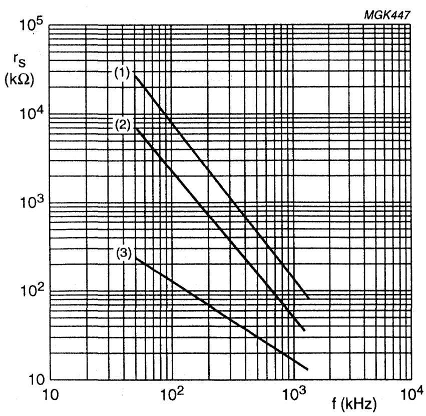
f = 100 kHz; see Fig.16.

Fig.10 Diode forward resistance as a function of forward current; typical values.



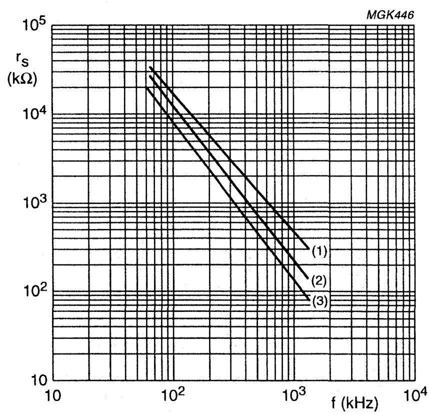
T_j = 25 °C.
Solid line: V_R = 0.
Dotted line: V_R = 2 V.

Fig.11 Diode series resistance as a function of frequency; typical values.



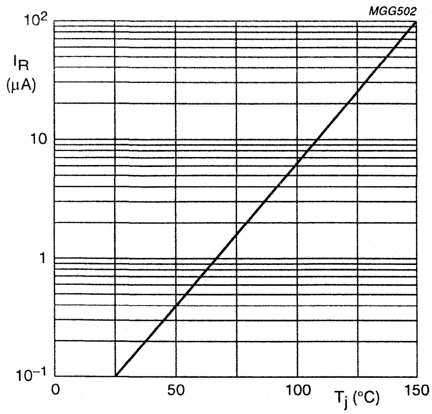
(1) T_j = −40 °C.
(2) T_j = 25 °C.
(3) T_j = 85 °C.
V_R = 0.

Fig.12 Diode series resistance as a function of frequency; typical values.



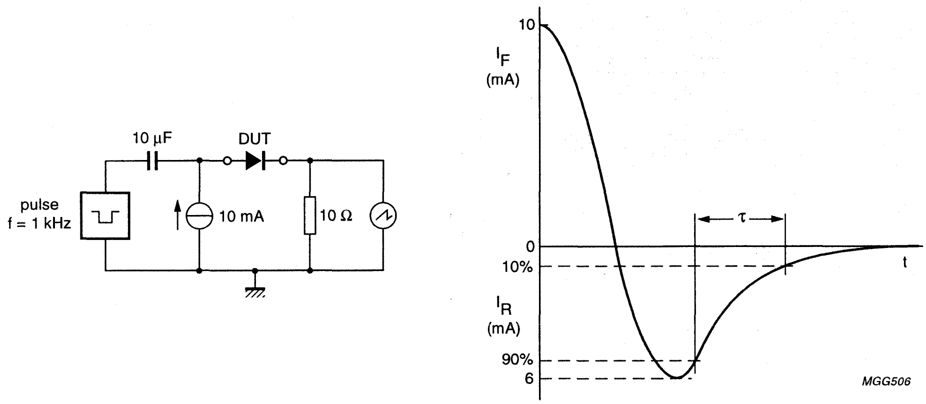
(1) T_j = −40 °C.
(2) T_j = 25 °C.
(3) T_j = 85 °C.
V_R = 2 V.

Fig.13 Diode series resistance as a function of frequency; typical values.



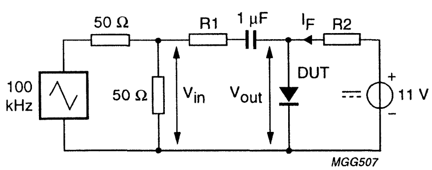
$V_R = V_{RRMmax}$.

Fig.14 Reverse current as a function of junction temperature; maximum values.



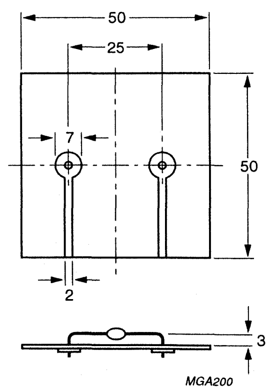
Input impedance of oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.15 Charge carrier life time test circuit and definition.



I_F (mA)	R1 (Ω)	R2 (kΩ)
0.1	3000	100
1	300	10
10	30	1

Fig.16 Diode forward resistance test circuit.



Dimensions in mm.

Fig.17 Device mounted on a printed-circuit board.

AM PIN diode | BAQ806

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- UL 94V-O classified plastic package
- Shipped in 12 mm embossed tape.

APPLICATIONS

- RF attenuator with low distortion for frequencies above 100 kHz.

DESCRIPTION

DO-214AC surface mountable package with glass passivated chip.

The well-defined void-free case is of a transfer-moulded thermo-setting plastic.

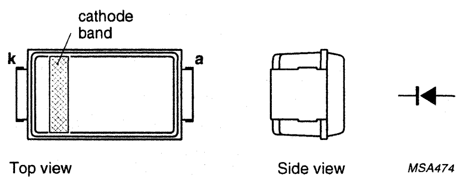


Fig.1 Simplified outline (SOD106) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage	–	100	V
V_R	continuous reverse voltage	–	100	V
T_{stg}	storage temperature	–65	+175	°C
T_j	junction temperature	–65	+150	°C

ELECTRICAL CHARACTERISTICS

$T_j = 25$ °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	$I_F = 100$ mA; see Figs 2 and 3	–	0.9	1.1	V
		$I_F = 100$ mA; $T_j = T_{j\,max}$; see Figs 2 and 3	–	0.7	0.9	V
I_R	reverse current	$V_R = 100$ V; see Fig. 4	–	–	0.1	µA
		$V_R = 100$ V; $T_j = 125$ °C; see Fig. 4	–	–	30	µA
τ	charge carrier life time	when switched from $I_F = 10$ mA to $I_R = 6$ mA; measured at 10% of I_R; see Fig. 13	15	25	–	µs
C_d	diode capacitance	f = 1 MHz; see Figs 5, 6, 7 and 8				
		$V_R = 0$ V	–	9	11	pF
		$V_R = 2$ V	–	5	6	pF
r_D	diode forward resistance	f = 100 kHz; see Figs 9 and 14				
		$I_F = 10$ µA	–	3300	6000	Ω
		$I_F = 100$ µA	–	560	900	Ω
		$I_F = 1$ mA	–	62	90	Ω
		$I_F = 10$ mA	–	7	10	Ω
r_s	diode series resistance	f = 100 kHz; see Figs 10, 11 and 12				
		$V_R = 0$ V	1000	2100	–	kΩ
		$V_R = 2$ V	5000	12000	–	kΩ
		f = 1 MHz; see Figs 10, 11 and 12				
		$V_R = 0$ V	25	50	–	kΩ
		$V_R = 2$ V	100	250	–	kΩ

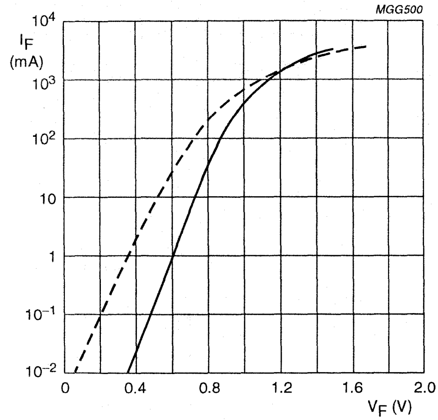
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point		25	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W
		note 2	150	K/W

Note

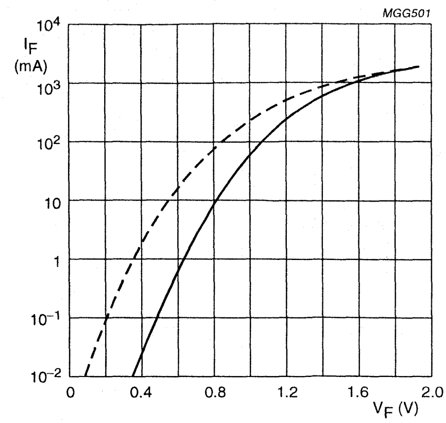
1. Device mounted on Al_2O_3 printed-circuit board, 0.7 mm thick; thickness of copper ≥35 µm, see Fig. 15
2. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 µm, see Fig. 15. For more information please refer to the *'General Part of Handbook SC10'*

GRAPHICAL DATA



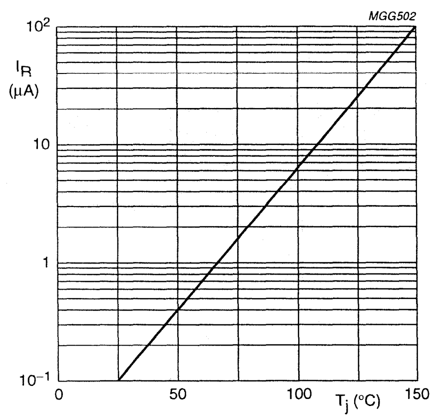
Dotted line: $T_j = T_{j\,max}$.
Solid line: T_j = 25 °C.

Fig.2 Forward current as a function of forward voltage; typical values.



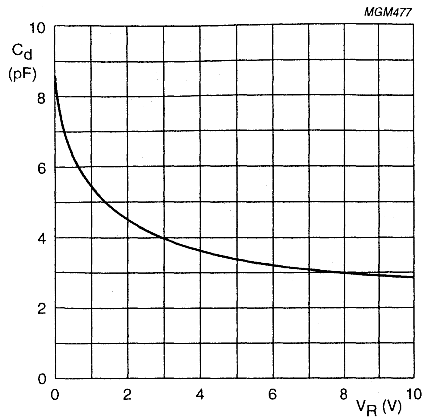
Dotted line: $T_j = T_{j\,max}$.
Solid line: T_j = 25 °C.

Fig.3 Forward current as a function of forward voltage; maximum values.



$V_R = V_{RRMmax}$.

Fig.4 Reverse current as a function of junction temperature; maximum values.



f = 1 MHz

Fig.5 Diode capacitance as a function of reverse voltage; typical values.

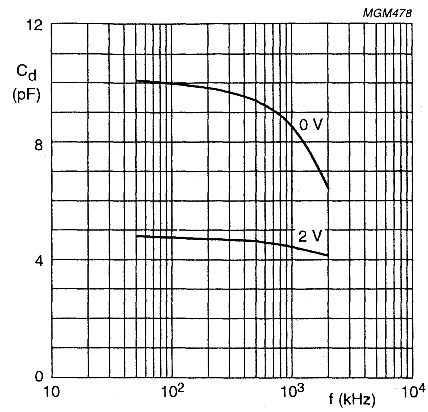
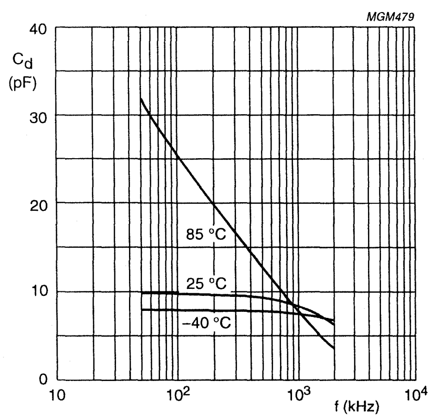
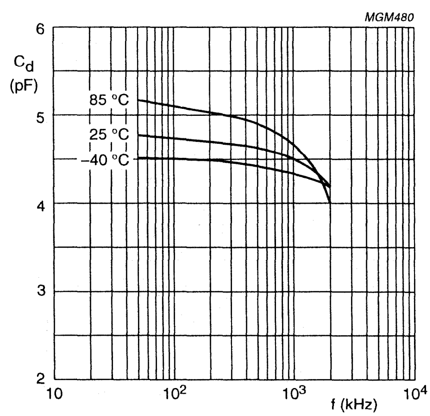


Fig.6 Diode capacitance as a function of frequency; typical values.



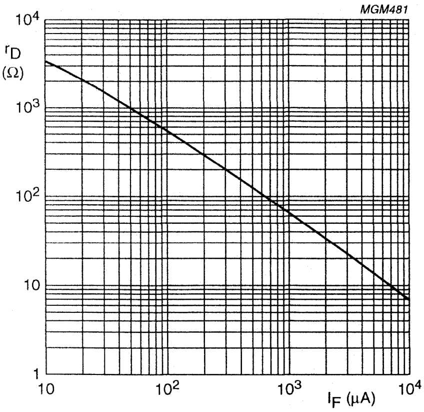
V_R = 0 V.

Fig.7 Diode capacitance as a function of frequency; typical values.



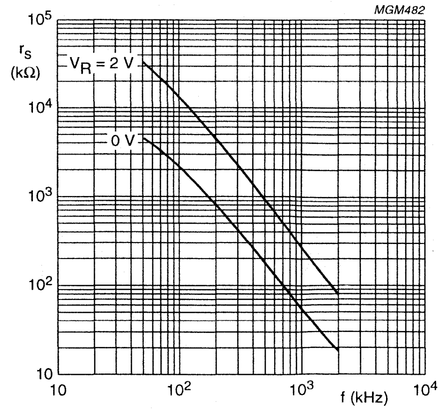
V_R = 2 V.

Fig.8 Diode capacitance as a function of frequency; typical values.



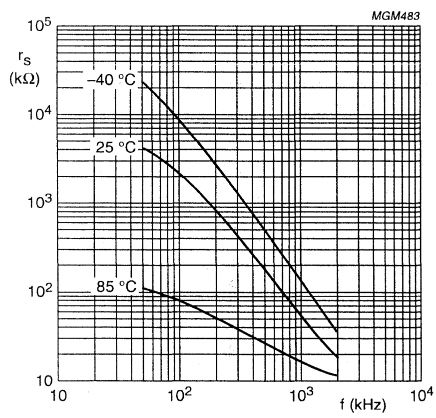
f = 100 kHz; see Fig. 14.

Fig.9 Diode forward resistance as a function of forward current; typical values.



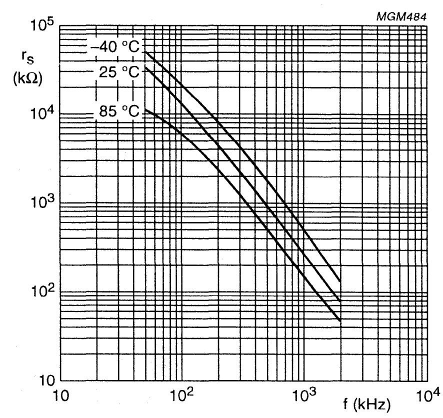
T_j = 25 °C.

Fig.10 Diode series resistance as a function of frequency; typical values.



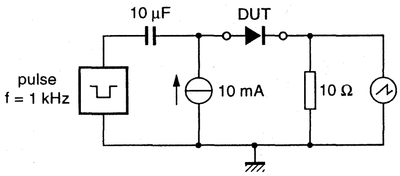
V_R = 0 V.

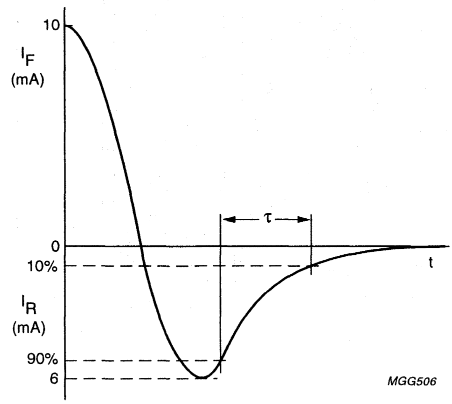
Fig.11 Diode series resistance as a function of frequency; typical values.



V_R = 2 V.

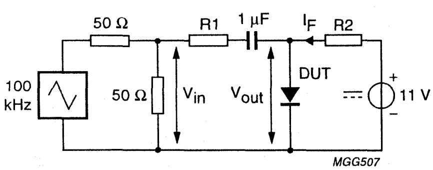
Fig.12 Diode series resistance as a function of frequency; typical values.





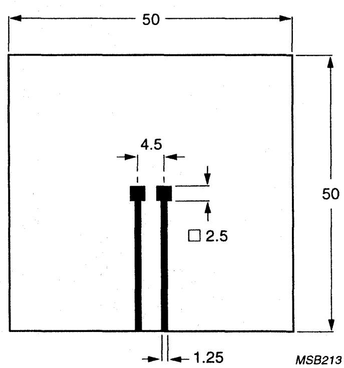
Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.13 Charge carrier life time test circuit and definition.



I_F (mA)	R_1 (Ω)	R_2 (kΩ)
0.1	3000	100
1	300	10
10	30	1

Fig.14 Diode forward resistance test circuit.



Dimensions in mm.

Fig.15 Printed-circuit board for surface mounting.

Schottky barrier double diodes BAT120 series

FEATURES

- Low switching losses
- Capability of absorbing very high surge current
- Fast recovery time
- Guard ring protected
- Plastic SMD package.

APPLICATIONS

- Low power switched-mode power supplies
- Rectification
- Polarity protection.

DESCRIPTION

Planar Schottky barrier double diodes encapsulated in a SOT223 plastic SMD package

MARKING

TYPE NUMBER	MARKING CODE
BAT120A	AT120A
BAT120C	AT120C
BAT120S	AT120S

PINNING

PIN	BAT120		
	A	C	S
1	k_1	a_1	a_1
2	n.c.	n.c.	n.c.
3	k_2	a_2	k_2
4	a_1, a_2	k_1, k_2	k_1, a_2

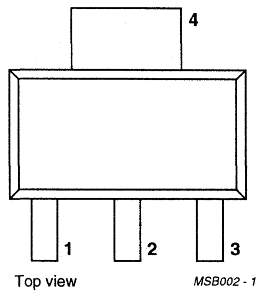


Fig.1 Simplified outline (SOT223) and pin configuration.

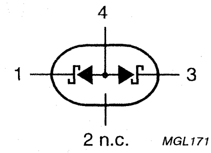


Fig.2 BAT120A diode configuration (symbol).

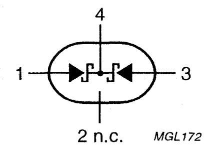


Fig.3 BAT120C diode configuration (symbol).

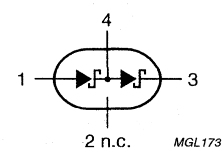


Fig.4 BAT120S diode configuration (symbol).

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per diode					
V_R	continuous reverse voltage		–	25	V
I_F	continuous forward current		–	1	A
I_{FSM}	non-repetitive peak forward current	$t_p < 10$ ms; half sinewave; JEDEC method	–	10	A
I_{RSM}	non-repetitive peak reverse current	$t_p = 100$ µs	–	0.5	A
T_{stg}	storage temperature		−65	+150	°C
T_j	junction temperature		–	125	°C
T_{amb}	operating ambient temperature		−65	+125	°C

ELECTRICAL CHARACTERISTICS

$T_{amb} = 25$ °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
Per diode					
V_F	forward voltage	see Fig.5			
		$I_F = 100$ mA	260	300	mV
		$I_F = 1$ A	400	450	mV
I_R	reverse current	$V_R = 20$ V; note 1; see Fig.6	80	500	µA
		$V_R = 25$ V; note 1; see Fig.6	–	1	mA
		$V_R = 20$ V; $T_j = 100$ °C; note 1	–	10	mA
C_d	diode capacitance	f = 1 MHz; $V_R = 4$ V; see Fig.7	100	–	pF

Note

1. Pulse test: $t_p = 300$ µs; $\delta = 0.02$.

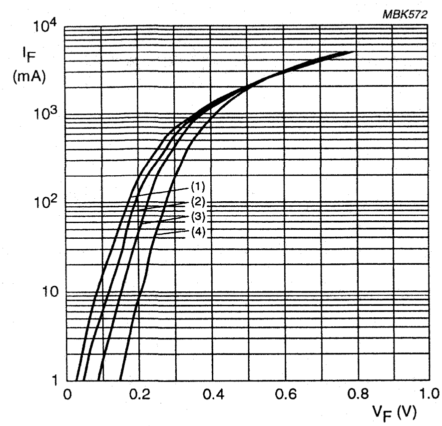
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

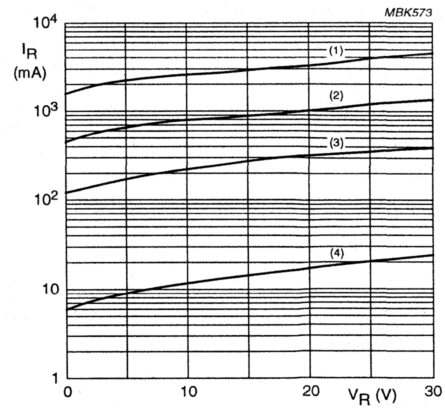
1. Refer to SOT223 standard mounting conditions.

GRAPHICAL DATA



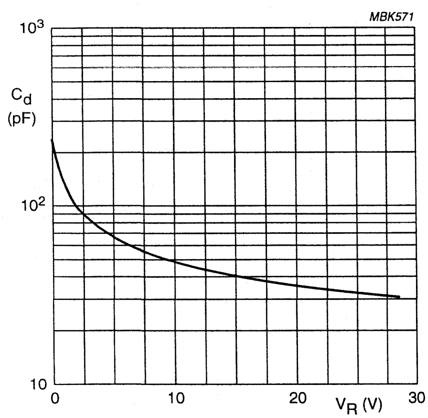
(1) T_{amb} = 125 °C.
(2) T_{amb} = 100 °C.
(3) T_{amb} = 75 °C.
(4) T_{amb} = 25 °C.

Fig.5 Forward current as a function of forward voltage; typical values.



(1) T_{amb} = 125 °C.
(2) T_{amb} = 100 °C.
(3) T_{amb} = 75 °C.
(4) T_{amb} = 25 °C.

Fig.6 Reverse current as a function of reverse voltage; typical values.



f = 1 MHz; T_{amb} = 25 °C.

Fig.7 Diode capacitance as a function of reverse voltage; typical values.

Schottky barrier double diodes | BAT140 series

FEATURES

- Low switching losses
- Capability of absorbing very high surge current
- Fast recovery time
- Guard ring protected
- Plastic SMD package.

APPLICATIONS

- Low power switched-mode power supplies
- Rectification
- Polarity protection.

DESCRIPTION

Planar Schottky barrier double diodes encapsulated in a SOT223 plastic SMD package.

MARKING

TYPE NUMBER	MARKING CODE
BAT140A	AT140A
BAT140C	AT140C
BAT140S	AT140S

PINNING

PIN	BAT140		
	A	C	S
1	k_1	a_1	a_1
2	n.c.	n.c.	n.c.
3	k_2	a_2	k_2
4	a_1, a_2	k_1, k_2	k_1, a_2

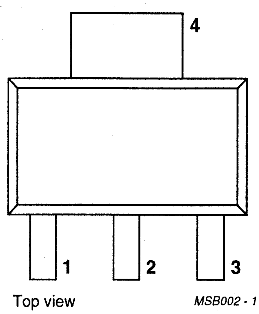


Fig.1 Simplified outline (SOT223) and pin configuration.

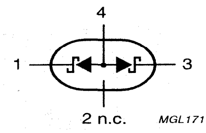


Fig.2 BAT140A diode configuration (symbol).

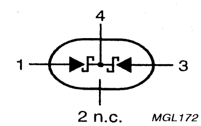


Fig.3 BAT140C diode configuration (symbol).

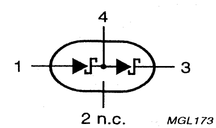


Fig.4 BAT140S diode configuration (symbol).

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per diode					
V_R	continuous reverse voltage		–	40	V
I_F	continuous forward current		–	1	A
$I_{F(AV)}$	average forward current	T_{amb} = 65 °C; $R_{th\ j\text{-}a}$ = 80 K/W; note 1; $V_{R(equiv)}$ = 0.2 V; note 2	–	1	A
I_{FSM}	non-repetitive peak forward current	t = 8.3 μs half sinewave; JEDEC method	–	10	A
I_{RSM}	non-repetitive peak reverse current	t_p = 100 μs	–	0.5	A
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	125	°C

Notes

1. Refer to SOT223 standard mounting conditions.
2. For Schottky barrier diodes thermal run-away has to be considered, as in some applications, the reverse power losses P_R are a significant part of the total power losses. Nomograms for determination of the reverse power losses P_R and $I_{F(AV)}$ rating will be available on request.

ELECTRICAL CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
Per diode					
V_F	forward voltage	see Fig.5			
		I_F = 100 mA; note 1	280	330	mV
		I_F = 1 A; note 1	460	500	mV
I_R	reverse current	V_R = 10 V; note 1; see Fig.6	15	40	μA
		V_R = 40 V; note 1; see Fig.6	60	300	μA
C_d	diode capacitance	V_R = 4 V; f = 1 MHz; see Fig.7	65	80	pF

Note

1. Pulsed test: t_p = 300 μs; δ = 0.02.

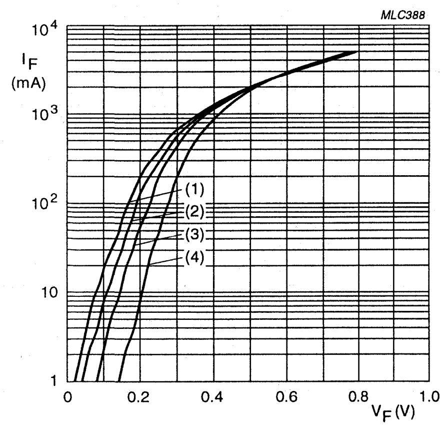
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

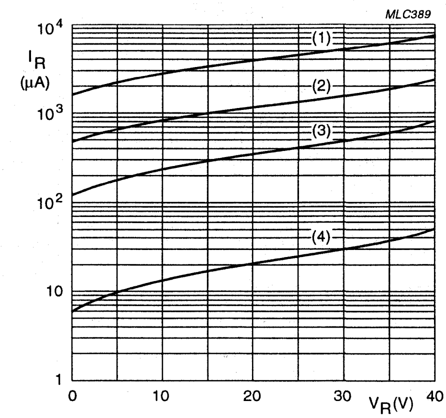
1. Refer to SOT223 standard mounting conditions.

GRAPHICAL DATA



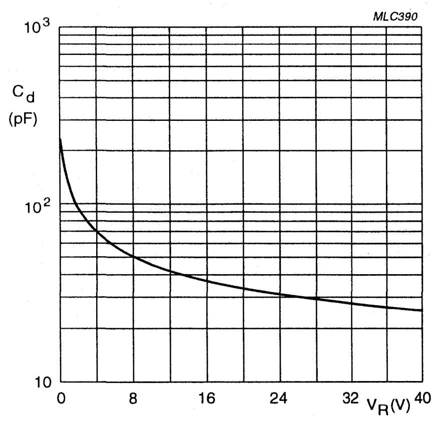
(1) T_{amb} = 125 °C.
(2) T_{amb} = 100 °C.
(3) T_{amb} = 75 °C.
(4) T_{amb} = 25 °C.

Fig.5 Forward current as a function of forward voltage; typical values.



(1) T_{amb} = 125 °C.
(2) T_{amb} = 100 °C.
(3) T_{amb} = 75 °C.
(4) T_{amb} = 25 °C.

Fig.6 Reverse current as a function of reverse voltage; typical values.



f = 1 MHz.

Fig.7 Diode capacitance as a function of reverse voltage; typical values.

Schottky barrier double diodes BAT160 series

FEATURES

- Low switching losses
- Capability of absorbing very high surge current
- Fast recovery time
- Guard ring protected
- Plastic SMD package.

APPLICATIONS

- Low power switched-mode power supplies
- Rectification
- Polarity protection.

DESCRIPTION

Planar Schottky barrier double diodes encapsulated in a SOT223 plastic SMD package

MARKING

TYPE NUMBER	MARKING CODE
BAT160A	AT160A
BAT160C	AT160C
BAT160S	AT160S

PINNING

PIN	BAT160		
	A	C	S
1	k_1	a_1	a_1
2	n.c.	n.c.	n.c.
3	k_2	a_2	k_2
4	a_1, a_2	k_1, k_2	k_1, a_2

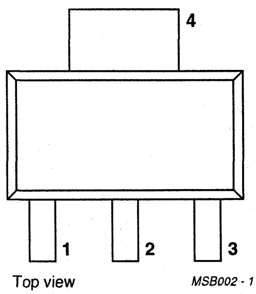


Fig.1 Simplified outline (SOT223) and pin configuration.

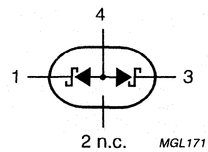


Fig.2 BAT160A diode configuration (symbol).

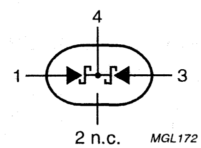


Fig.3 BAT160C diode configuration (symbol).

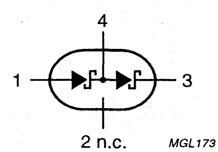


Fig.4 BAT160S diode configuration (symbol).

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per diode					
V_R	continuous reverse voltage		–	60	V
I_F	continuous forward current		–	1	A
I_{FSM}	non-repetitive peak forward current	t_p = 8.3 ms; half sinewave; JEDEC method	–	10	A
I_{RSM}	non-repetitive peak reverse current	t_p = 100 μs	–	0.5	A
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C

ELECTRICAL CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
Per diode				
V_F	forward voltage	see Fig.5		
		I_F = 100 mA	400	mV
		I_F = 1 A	650	mV
		I_F = 2 A	850	mV
I_R	reverse current	V_R = 60 V; note 1; see Fig.6	350	μA
		V_R = 60 V; T_j = 100 °C; note 1; see Fig.6	8	mA
C_d	diode capacitance	f = 1 MHz; V_R = 4 V; see Fig.7	60	pF

Note

1. Pulse test: t_p = 300 μs; δ = 0.02.

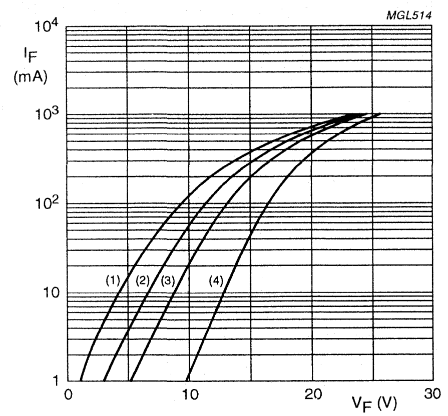
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

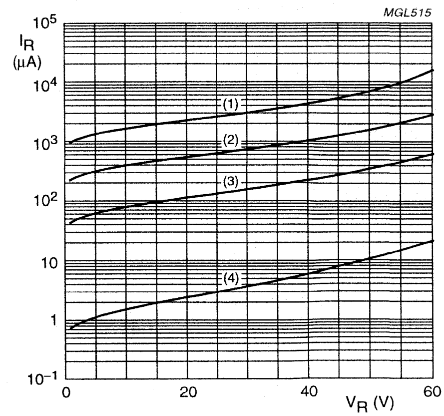
1. Refer to SOT223 standard mounting conditions.

GRAPHICAL DATA



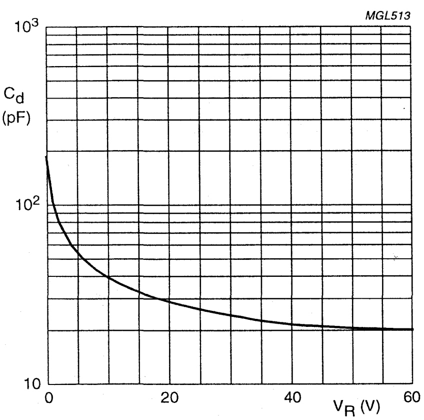
(1) T_{amb} = 125 °C.
(2) T_{amb} = 100 °C.
(3) T_{amb} = 75 °C.
(4) T_{amb} = 25 °C.

Fig.5 Forward current as a function of forward voltage; typical values.



(1) T_{amb} = 125 °C.
(2) T_{amb} = 100 °C.
(3) T_{amb} = 75 °C.
(4) T_{amb} = 25 °C.

Fig.6 Reverse current as a function of reverse voltage; typical values.



f = 1 MHz; T_{amb} = 25 °C.

Fig.7 Diode capacitance as a function of reverse voltage; typical values.

Damper diode BY228

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Available in ammo-pack
- Also available with preformed leads for easy insertion.

APPLICATIONS

- Damper diode in high frequency horizontal deflection circuits up to 16 kHz.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

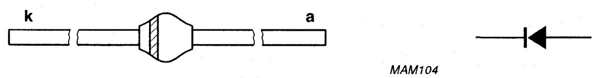


Fig.1 Simplified outline (SOD64) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RSM}	non-repetitive peak reverse voltage		–	1650	V
V_{RRM}	repetitive peak reverse voltage		–	1650	V
V_R	continuous reverse voltage		–	1500	V
I_{FWM}	working peak forward current	T_{amb} = 75 °C; PCB mounting (see Fig.4); see Fig.2	–	5	A
I_{FRM}	repetitive peak forward current		–	10	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	50	A
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+150	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 5 A; $T_j = T_{j\,max}$; see Fig.3	1.4	V
		I_F = 5 A; see Fig.3	1.5	V
I_R	reverse current	$V_R = V_{Rmax}$; T_j = 150 °C	150	µA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.6	1	µs
t_{fr}	forward recovery time	when switched to I_F = 5 A in 50 ns; $T_j = T_{j\,max}$; Fig.7	1	µs

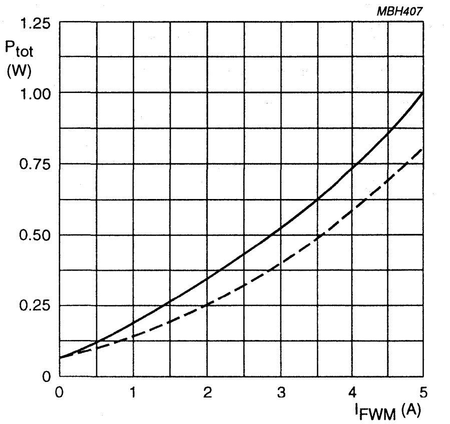
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	25	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	75	K/W
		mounted as shown in Fig.5	40	K/W

Note

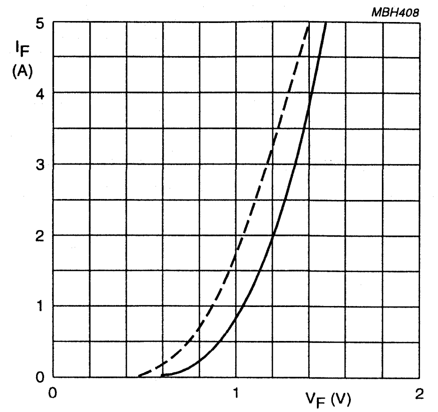
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.4. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA



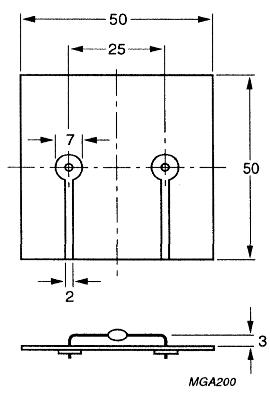
Solid line: basic high-voltage E/W modulator circuit; see Fig.8.
Dotted line: basic conventional horizontal deflection circuit; see Fig.9.
Curves include power dissipation due to switching losses.

Fig.2 Maximum total power dissipation as a function of working peak forward current.



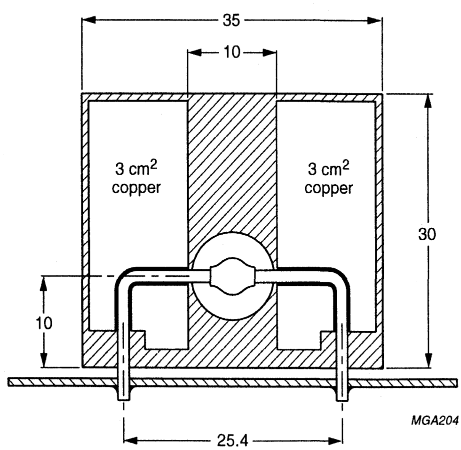
Dotted line: $T_j = 150$ °C.
Solid line: $T_j = 25$ °C.

Fig.3 Forward current as a function of forward voltage; maximum values.



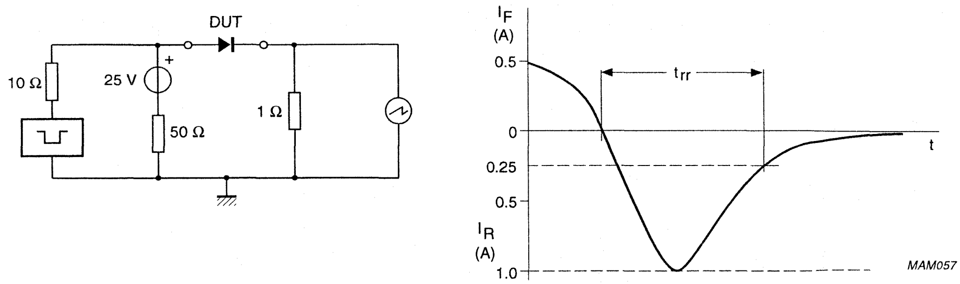
Dimensions in mm.

Fig.4 Device mounted on a printed-circuit board.



Dimensions in mm.

Fig.5 Mounting with additional printed circuit board for heat sink purposes.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.6 Test circuit and reverse recovery time waveform and definition.

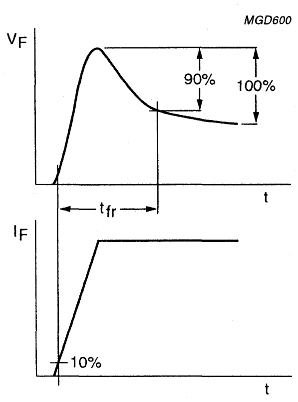


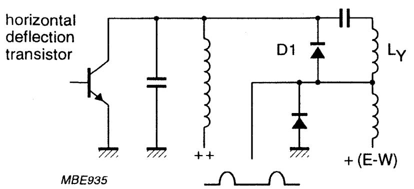
Fig.7 Forward recovery time definition.

APPLICATION INFORMATION

For horizontal deflection circuits, two basic applications are shown in Figs 8 and 9.

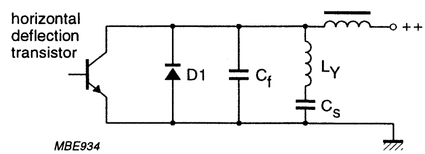
The maximum allowable total power dissipation for the diode can be calculated from the thermal resistance $R_{th\ j\text{-}a}$ and the difference between $T_{j\ max}$ and $T_{amb\ max}$ in the application. The maximum I_{FWM} can then be taken from Fig.2.

The basic application waveforms in Fig.10 relate to the circuit in Fig.8. In the circuit in Fig.9 the forward conduction time of the diode is shorter, allowing a higher I_{FWM} (see Fig.2).



D1 = BY228.

Fig.8 Application in basic high-voltage E/W modulator circuit.



D1 = BY228.

Fig.9 Application in basic horizontal deflection circuit.

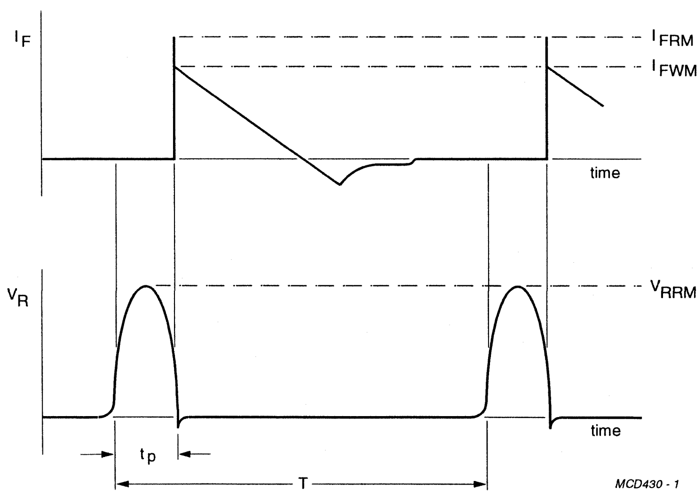


Fig.10 Basic application waveforms.

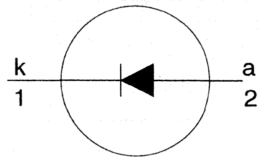
Rectifier diodes fast, soft-recovery

BY229 series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 200 V/ 400 V/ 600 V/800 V

$I_{F(AV)}$ = 8 A

$I_{FSM} \leq 60$ A

$t_{rr} \leq 135$ ns

GENERAL DESCRIPTION

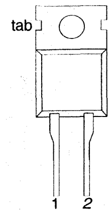
Glass-passivated double diffused rectifier diodes featuring low forward voltage drop, fast reverse recovery and soft recovery characteristic. The devices are intended for use in TV receivers, monitors and switched mode power supplies.

The BY229 series is supplied in the conventional leaded SOD59 (TO220AC) package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.				UNIT
		BY229		-200	-400	-600	-800	
V_{RSM}	Peak non-repetitive reverse voltage		-	200	400	600	800	V
V_{RRM}	Peak repetitive reverse voltage		-	200	400	600	800	V
V_{RWM}	Crest working reverse voltage		-	150	300	500	600	V
V_R	Continuous reverse voltage		-	150	300	500	600	V
$I_{F(AV)}$	Average forward current[1]	square wave; $\delta = 0.5$; $T_{mb} \leq 122$ °C	-	8				A
		sinusoidal; a = 1.57; $T_{mb} \leq 125$ °C	-	7				A
$I_{F(RMS)}$	RMS forward current		-	11				A
I_{FRM}	Repetitive peak forward current	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 122$ °C	-	16				A
I_{FSM}	Non-repetitive peak forward current.	t = 10 ms	-	60				A
		t = 8.3 ms sinusoidal; $T_j = 150$ °C prior to surge; with reapplied $V_{RWM(max)}$	-	66				A
I^2t	I^2t for fusing	t = 10 ms	-	18				A^2s
T_{stg}	Storage temperature		-40	150				°C
T_j	Operating junction temperature		-	150				°C

1 Neglecting switching and reverse current losses.

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2.0	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	60	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 20 A	-	1.5	1.85	V
I_R	Reverse current	$V_R = V_{RWM}$; T_j = 125 ˚C	-	0.1	0.4	mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
t_{rr}	Reverse recovery time	I_F = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 50 A/µs	-	100	135	ns
Q_s	Reverse recovery charge	I_F = 2 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 20 A/µs	-	0.5	0.7	µC
dI_R/dt	Maximum slope of the reverse recovery current	I_F = 2 A; $-dI_F/dt$ = 20 A/µs	-	50	60	A/µs

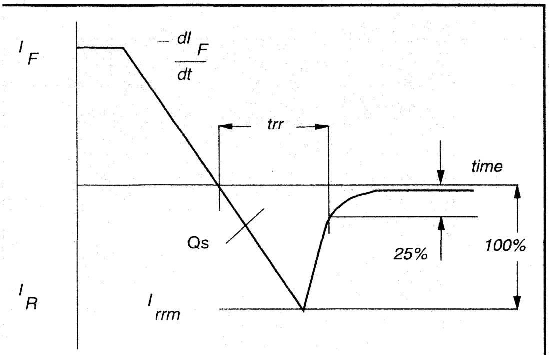


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

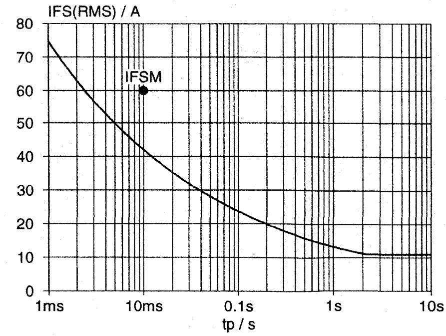


Fig.4. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j = 150˚C$ prior to surge with reapplied V_{RWM}.

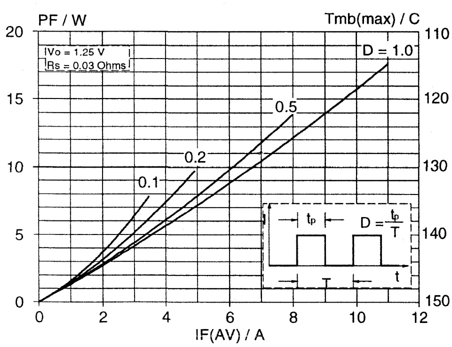


Fig.2. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; square wave current waveform; parameter D = duty cycle = t_p/T.

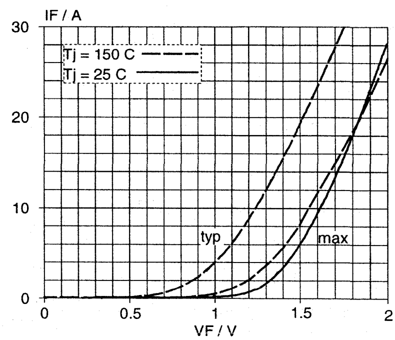


Fig.5. Typical and maximum forward characteristic; $I_F = f(V_F)$; parameter T_j

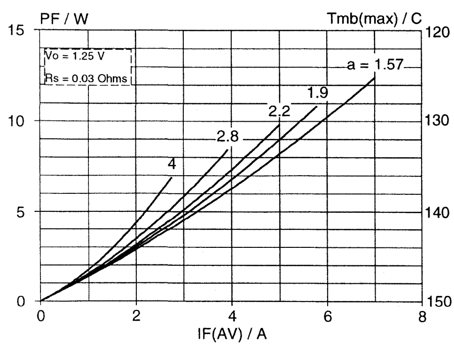


Fig.3. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; sinusoidal current waveform; parameter a = form factor = $I_{F(RMS)}/I_{F(AV)}$.

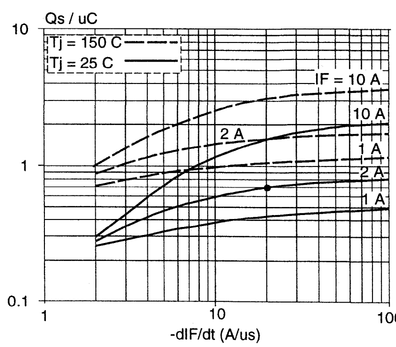


Fig.6. Maximum Q_s at $T_j = 25˚C$ and $150˚C$

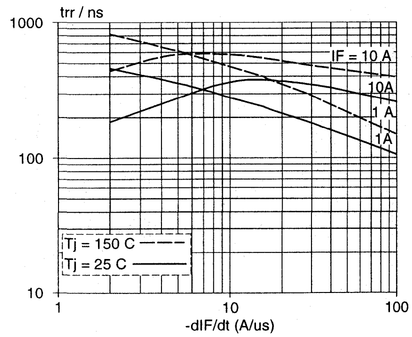


Fig.7. Maximum t_{rr} measured to 25% of I_{rrm}; $T_j = 25^\circ C$ and $150^\circ C$

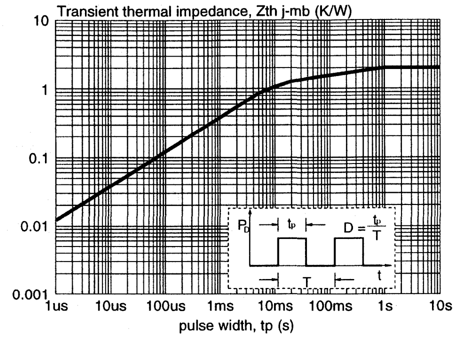


Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$

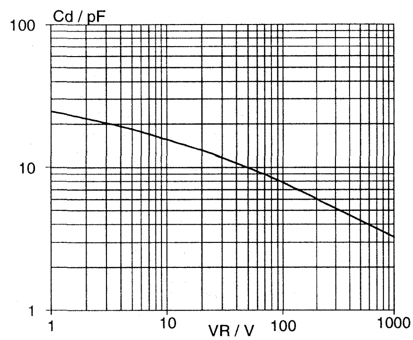


Fig.8. Typical junction capacitance C_d at $f = 1$ MHz; $T_j = 25^\circ C$

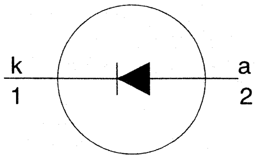
Rectifier diodes fast, soft-recovery

BY229F, BY229X series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

V_R = 200 V/ 400 V/ 600 V/800 V

$I_{F(AV)}$ = 8 A

$I_{FSM} \leq$ 60 A

$t_{rr} \leq$ 135 ns

GENERAL DESCRIPTION

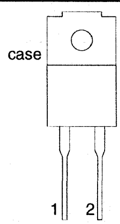
Glass-passivated double diffused rectifier diodes featuring low forward voltage drop, fast reverse recovery and soft recovery characteristic. The devices are intended for use in TV receivers, monitors and switched mode power supplies.

The BY229F series is supplied in the conventional leaded SOD100 package.
The BY229X series is supplied in the conventional leaded SOD113 package.

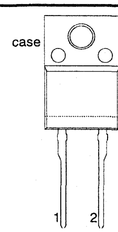
PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	isolated

SOD100



SOD113



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.				UNIT
		BY229F- / BY229X-		**200**	**400**	**600**	**800**	
V_{RSM}	Peak non-repetitive reverse voltage		-	200	400	600	800	V
V_{RRM}	Peak repetitive reverse voltage		-	200	400	600	800	V
V_{RWM}	Crest working reverse voltage		-	150	300	500	600	V
V_R	Continuous reverse voltage		-	150	300	500	600	V
$I_{F(AV)}$	Average forward current[1]	square wave; δ = 0.5; $T_{hs} \leq$ 83 ˚C	-	8				A
		sinusoidal; a = 1.57; $T_{hs} \leq$ 90 ˚C	-	7				A
$I_{F(RMS)}$	RMS forward current		-	11				A
I_{FRM}	Peak repetitive forward current	t = 25 µs; δ = 0.5; $T_{hs} \leq$ 83 ˚C	-	16				A
I_{FSM}	Peak non-repetitive forward current	t = 10 ms	-	60				A
		t = 8.3 ms sinusoidal; T_j = 150 ˚C prior to surge; with reapplied $V_{RWM(max)}$	-	66				A
I^2t	I^2t for fusing	t = 10 ms	-	18				A^2s
T_{stg}	Storage temperature		-40	150				˚C
T_j	Operating junction temperature		-	150				˚C

1. Neglecting switching and reverse current losses.

ISOLATION LIMITING VALUE & CHARACTERISTIC

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Peak isolation voltage from both terminals to external heatsink	SOD100 package; R.H. ≤ 65%; clean and dustfree	-	-	1500	V
V_{isol}	R.M.S. isolation voltage from both terminals to external heatsink	SOD113 package; f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65%; clean and dustfree	-	-	2500	V
C_{isol}	Capacitance from pin 1 to external heatsink	f = 1 MHz	-	10	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	4.8	K/W
		without heatsink compound	-	-	7.2	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	55	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 20 A	-	1.5	1.85	V
I_R	Reverse current	$V_R = V_{RWM}$; T_j = 125 ˚C	-	0.1	0.4	mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
t_{rr}	Reverse recovery time	I_F = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 50 A/µs	-	100	135	ns
Q_s	Reverse recovery charge	I_F = 2 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 20 A/µs	-	0.5	0.7	µC
dI_R/dt	Maximum slope of the reverse recovery current	I_F = 2 A; $-dI_F/dt$ = 20 A/µs	-	50	60	A/µs

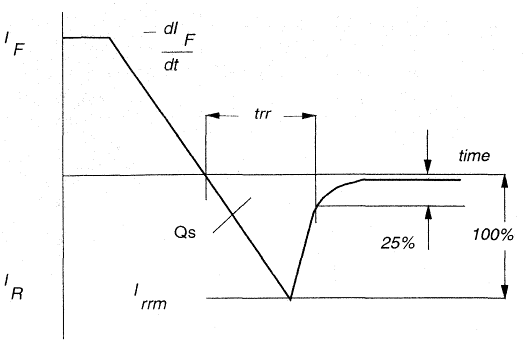


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

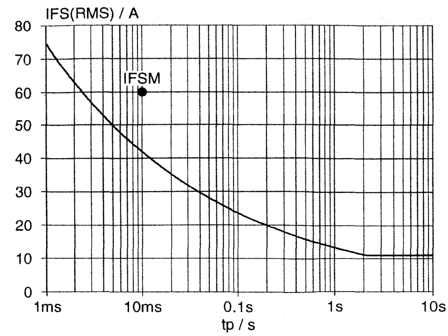


Fig.4. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j = 150^\circ C$ prior to surge with reapplied V_{RWM}.

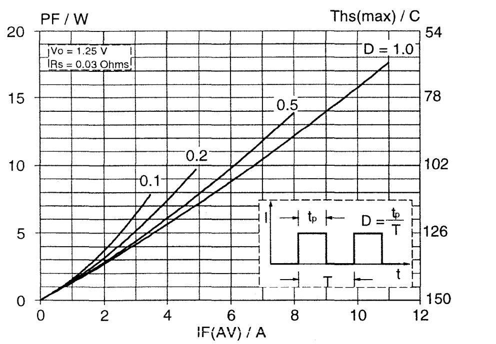


Fig.2. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; square wave current waveform; parameter D = duty cycle = t_p/T.

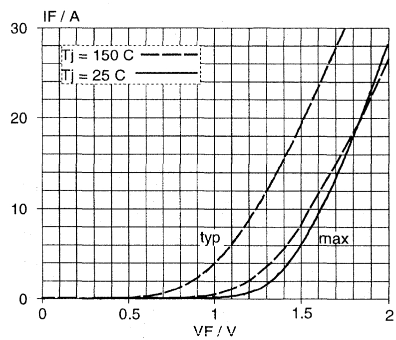


Fig.5. Typical and maximum forward characteristic; $I_F = f(V_F)$; parameter T_j

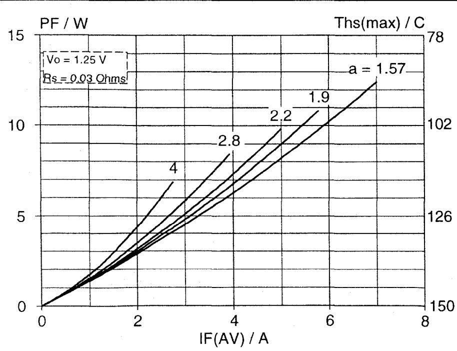


Fig.3. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; sinusoidal current waveform; parameter a = form factor = $I_{F(RMS)}/I_{F(AV)}$.

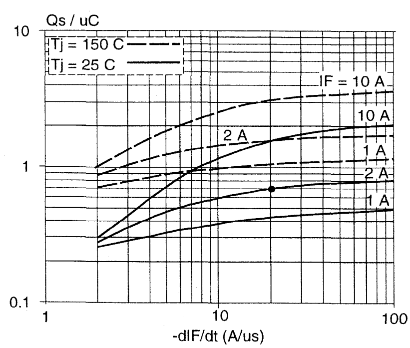


Fig.6. Maximum Q_s at $T_j = 25^\circ C$ and $150^\circ C$

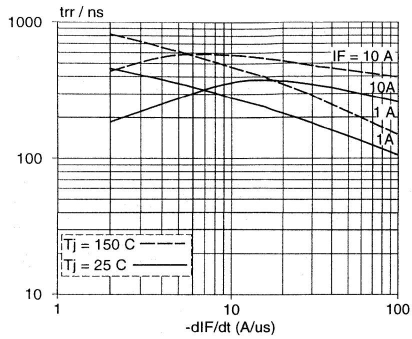


Fig.7. Maximum t_{rr} measured to 25% of I_{rrm}; $T_j = 25˚C$ and 150˚C

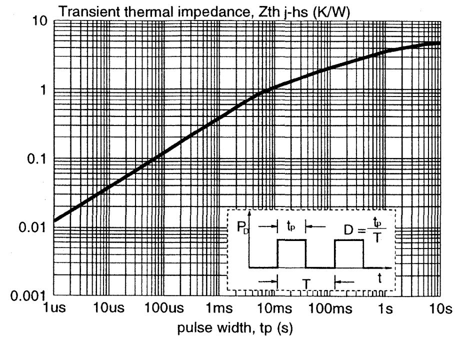


Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$

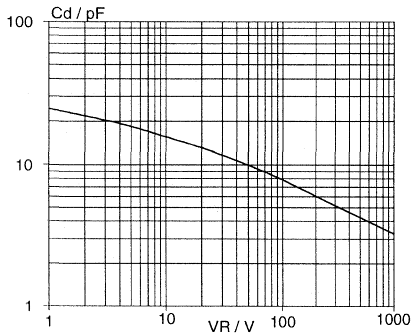


Fig.8. Typical junction capacitance C_d at f = 1 MHz; $T_j = 25˚C$

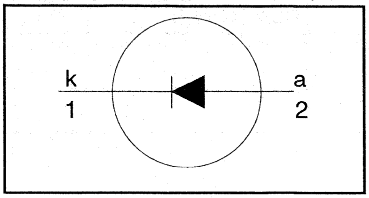
ectifier diodes
eneral purpose

BY249 series

ATURES

ɔw forward volt drop
igh thermal cycling performance
ɔw thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 300 V / 600 V / 800 V

$V_F \leq 1.05$ V

$I_{F(AV)} = 7$ A

$I_{FSM} \leq 60$ A

ENERAL DESCRIPTION

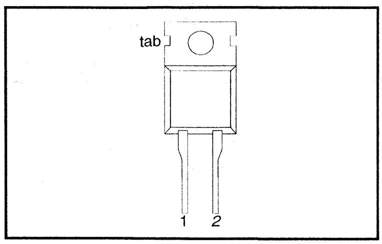
ıss-passivated double diffused tifier diodes. The devices are ɜnded for low frequency power tifier applications.

ɜ BY249 series is supplied in the ıventional leaded SOD59 ⟩220AC) package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



ЛITING VALUES

ıiting values in accordance with the Absolute Maximum System (IEC 134).

YMBOL	PARAMETER	CONDITIONS	MIN.	MAX.UNIT			UNIT
		BY249		-300	-600	-800	
ɜSM	Peak non-repetitive reverse voltage		-	300	600	800	V
ɜRM	Peak repetitive reverse voltage		-	300	600	800	V
ɜWM	Crest working reverse voltage		-	200	500	700	V
ɜ	Continuous reverse voltage		-	200	500	700	V
AV)	Average forward current[1]	sinusoidal; a = 1.57; $T_{mb} \leq 131$ ˚C	-	7			A
RMS)	RMS forward current		-	11			A
ɜM	Peak repetitive forward current	sinusoidal; a = 1.57;	-	60			A
ɜM	Peak non-repetitive forward current.	t = 10 ms t = 8.3 ms sinusoidal; T_j = 150 ˚C prior to surge; with reapplied $V_{RWM(max)}$	- -	60 66			A A
t	I^2t for fusing	t = 10 ms	-	18			A^2s
ɜtg	Storage temperature		-40	150			˚C
	Operating junction temperature		-	150			˚C

ɿeglecting switching and reverse current losses.

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2.0	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	60	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 20 A	-	1.2	1.6	V
		I_F = 5 A; T_j = 100 ˚C	-	0.9	1.05	V
I_R	Reverse current	V_R = V_{RWM}; T_j = 125 ˚C	-	0.1	0.4	mA

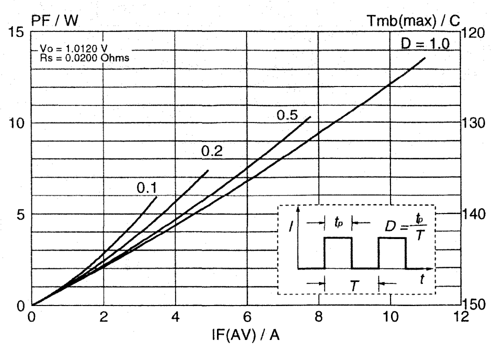


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

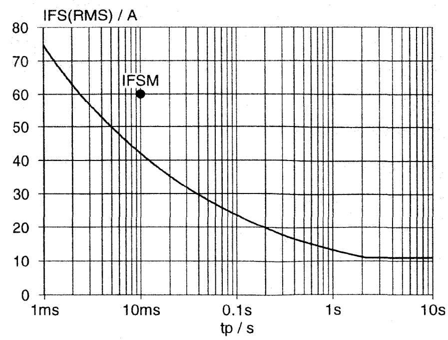


Fig.3. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j = 150˚C$ prior to surge with reapplied V_{RWM}.

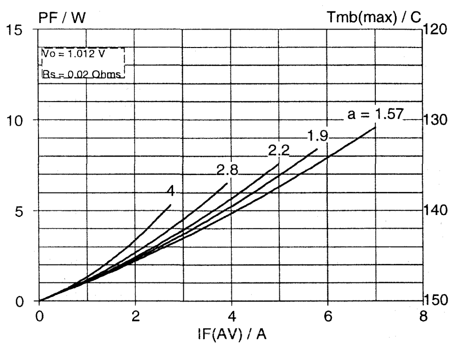


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

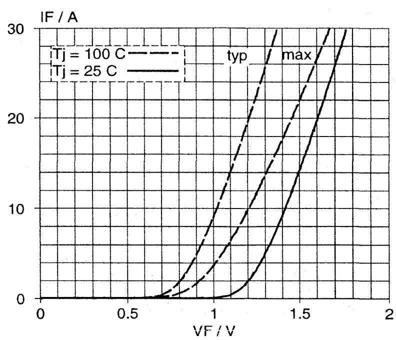


Fig.4. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

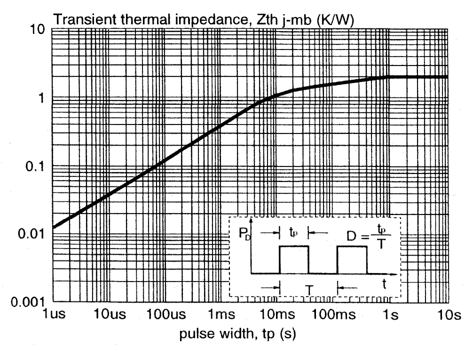


Fig.5. Transient thermal impedance $Z_{th} = f(t_p)$

Damper diode | BY278

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Available in ammo-pack
- Also available with preformed leads for easy insertion.

APPLICATIONS

- Damper diode in high frequency horizontal deflection circuits up to 16 kHz.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

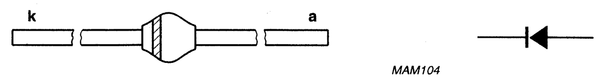


Fig.1 Simplified outline (SOD64) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RSM}	non-repetitive peak reverse voltage		–	1700	V
V_{RRM}	repetitive peak reverse voltage		–	1700	V
V_R	continuous reverse voltage		–	1650	V
I_{FWM}	working peak forward current	T_{amb} = 75 °C; PCB mounting (see Fig.4); see Fig.2	–	5	A
I_{FRM}	repetitive peak forward current		–	10	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	50	A
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+150	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 5 A; $T_j = T_{j\,max}$; see Fig.3	1.4	V
		I_F = 5 A; see Fig.3	1.5	V
I_R	reverse current	$V_R = V_{Rmax}$; T_j = 150 °C	150	µA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.6	1	µs
t_{fr}	forward recovery time	when switched to I_F = 5 A in 50 ns; $T_j = T_{j\,max}$; Fig.7	1	µs

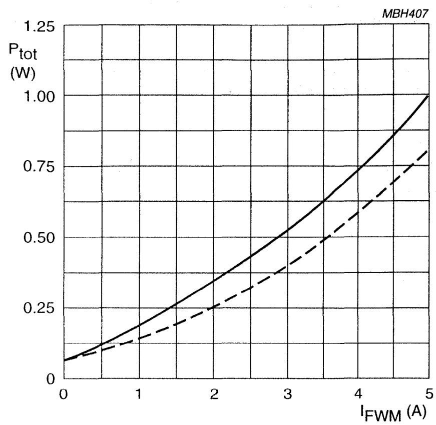
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	25	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	75	K/W
		mounted as shown in Fig.5	40	K/W

Note

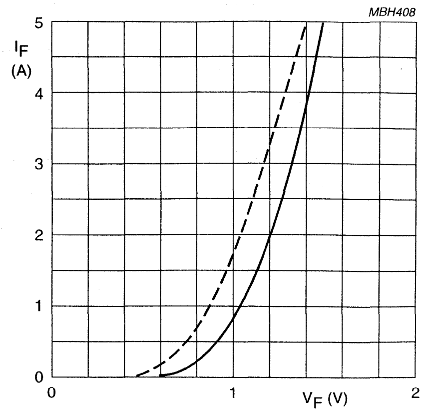
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.4. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA



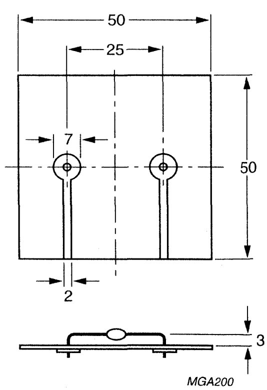
Solid line: basic high-voltage E/W modulator circuit; see Fig.8.
Dotted line: basic conventional horizontal deflection circuit; see Fig.9.
Curves include power dissipation due to switching losses.

Fig.2 Maximum total power dissipation as a function of working peak forward current.



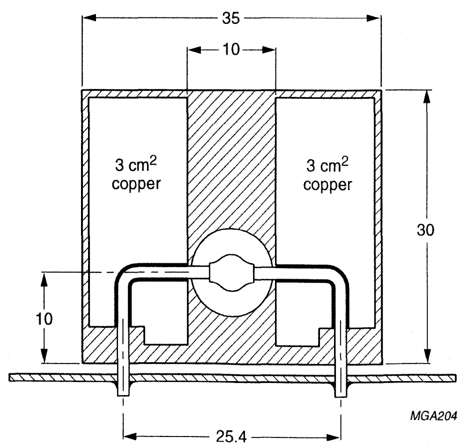
Dotted line: T_j = 150 °C.
Solid line: T_j = 25 °C.

Fig.3 Forward current as a function of forward voltage; maximum values.



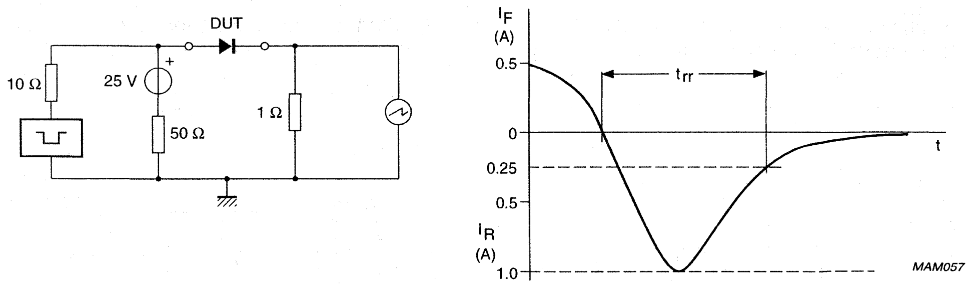
Dimensions in mm.

Fig.4 Device mounted on a printed-circuit board.



Dimensions in mm.

Fig.5 Mounting with additional printed-circuit board for heat sink purposes.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.6 Test circuit and reverse recovery time waveform and definition.

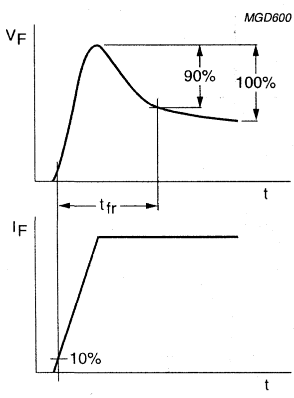


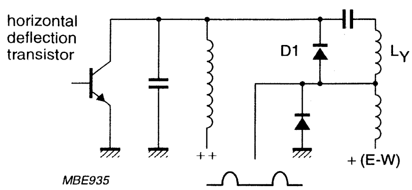
Fig.7 Forward recovery time definition.

APPLICATION INFORMATION

For horizontal deflection circuits, two basic applications are shown in Figs 8 and 9.

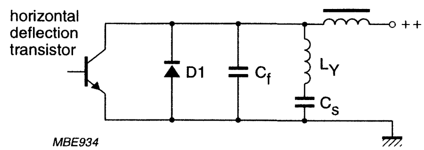
The maximum allowable total power dissipation for the diode can be calculated from the thermal resistance $R_{th\ j\text{-}a}$ and the difference between $T_{j\ max}$ and $T_{amb\ max}$ in the application. The maximum I_{FWM} can then be taken from Fig.2.

The basic application waveforms in Fig.10 relate to the circuit in Fig.8. In the circuit in Fig.9 the forward conduction time of the diode is shorter, allowing a higher I_{FWM} (see Fig.2).



D1 = BY278.

Fig.8 Application in basic high-voltage E/W modulator circuit.



D1 = BY278.

Fig.9 Application in basic horizontal deflection circuit.

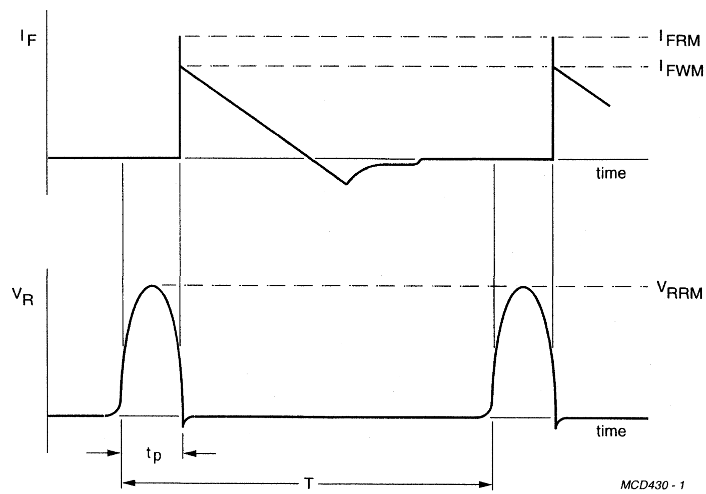


Fig.10 Basic application waveforms.

Damper diode | BY328

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Available in ammo-pack
- Also available with preformed leads for easy insertion.

APPLICATIONS

- Damper diode in high frequency horizontal deflection circuits up to 38 kHz.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

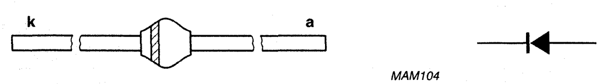


Fig.1 Simplified outline (SOD64) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RSM}	non-repetitive peak reverse voltage		–	1500	V
V_{RRM}	repetitive peak reverse voltage		–	1500	V
V_R	continuous reverse voltage		–	1400	V
I_{FWM}	working peak forward current	T_{tp} = 55 °C; lead length = 10 mm see Fig.2	–	6.0	A
		T_{amb} = 55 °C; PCB mounting (see Fig.5); see Fig.2	–	4.7	A
		T_{amb} = 55 °C; PCB mounting (see Fig.4); see Fig 2	–	3.0	A
I_{FRM}	repetitive peak forward current		–	10	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	60	A
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+150	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 5 A; $T_j = T_{j\,max}$; see Fig.3	1.35	V
		I_F = 5 A; see Fig.3	1.45	V
I_R	reverse current	$V_R = V_{Rmax}$; T_j = 150 °C	150	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.6	500	ns
t_{fr}	forward recovery time	when switched to I_F = 5 A in 50 ns; $T_j = T_{j\,max}$; see Fig.7	500	ns

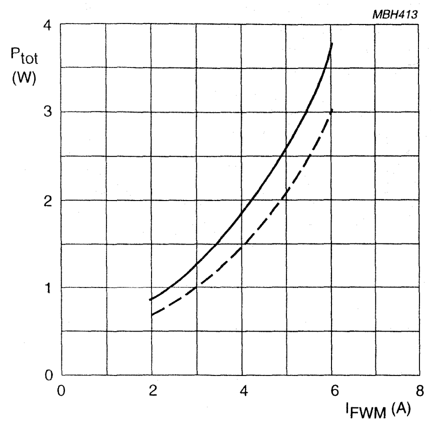
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	25	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	75	K/W
		mounted as shown in Fig.5	40	K/W

Note

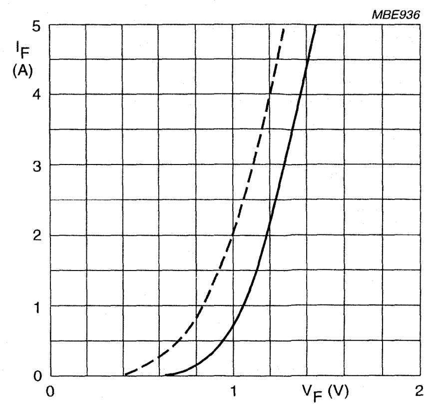
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.4. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA



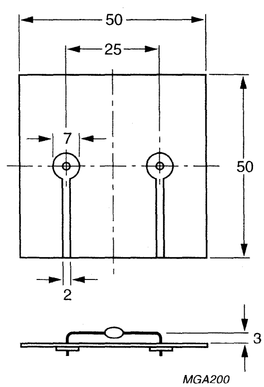
Solid line: basic high-voltage E/W modulator circuit; see Fig.8.
Dotted line: basic conventional horizontal deflection circuit; see Fig.9.
Curves include power dissipation due to switching losses.

Fig.2 Maximum total power dissipation as a function of working peak forward current.



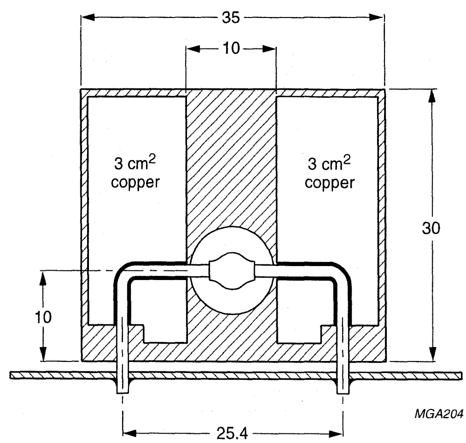
Dotted line: T_j = 150 °C; solid line: T_j = 25 °C.

Fig.3 Forward current as a function of forward voltage; maximum values.



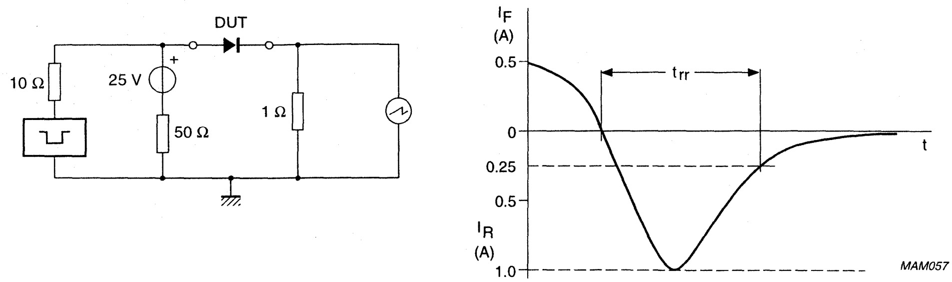
Dimensions in mm.

Fig.4 Device mounted on a printed-circuit board.



Dimensions in mm.

Fig.5 Mounting with additional printed circuit board for heat sink purposes.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.6 Test circuit and reverse recovery time waveform and definition.

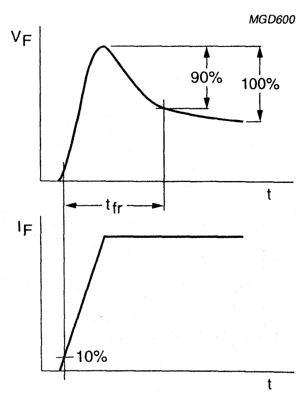


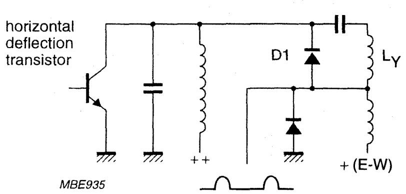
Fig.7 Forward recovery time definition.

APPLICATION INFORMATION

For horizontal deflection circuits, two basic applications are shown in Figs 8 and 9.

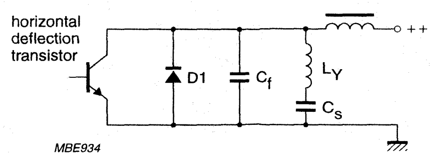
The maximum allowable total power dissipation for the diode can be calculated from the thermal resistance $R_{th\ j\text{-}a}$ and the difference between $T_{j\ max}$ and $T_{amb\ max}$ in the application. The maximum I_{FWM} can then be taken from Fig.2.

The basic application waveforms in Fig.10 relate to the circuit in Fig.8. In the circuit in Fig.9 the forward conduction time of the diode is shorter, allowing a higher I_{FWM} (see Fig.2).



D1 = BY328.

Fig.8 Application in basic high-voltage E/W modulator circuit.



D1 = BY328.

Fig.9 Application in basic horizontal deflection circuit.

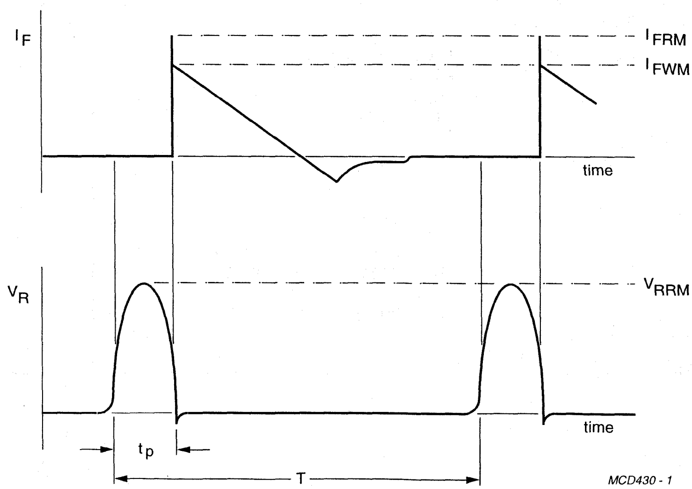


Fig.10 Basic application waveforms.

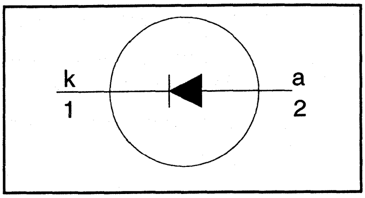
Rectifier diodes fast, soft-recovery

BY329 series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 800 V/ 1000 V/ 1200 V

$I_{F(AV)} = 8$ A

$I_{FSM} \leq 75$ A

$t_{rr} \leq 135$ ns

GENERAL DESCRIPTION

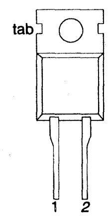
Glass-passivated double diffused rectifier diodes featuring low forward voltage drop, fast reverse recovery and soft recovery characteristic. The devices are intended for use in TV receivers, monitors and switched mode power supplies.

The BY329 series is supplied in the conventional leaded SOD59 (TO220AC) package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
		BY329		**-800**	**-1000**	**-1200**	
V_{RSM}	Peak non-repetitive reverse voltage		-	800	1000	1200	V
V_{RRM}	Peak repetitive reverse voltage		-	800	1000	1200	V
V_{RWM}	Crest working reverse voltage		-	600	800	1000	V
$I_{F(AV)}$	Average forward current[1]	square wave; $\delta = 0.5$; $T_{mb} \leq 122$ ˚C	-		8		A
		sinusoidal; a = 1.57; $T_{mb} \leq 125$ ˚C	-		7		A
$I_{F(RMS)}$	RMS forward current		-		11		A
I_{FRM}	Repetitive peak forward current	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 122$ ˚C	-		16		A
I_{FSM}	Non-repetitive peak forward current.	t = 10 ms	-		75		A
		t = 8.3 ms	-		82		A
		sinusoidal; $T_j = 150$ ˚C prior to surge; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-		28		A^2s
T_{stg}	Storage temperature		-40		150		˚C
T_j	Operating junction temperature		-		150		˚C

1 Neglecting switching and reverse current losses.

'HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2.0	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	60	-	K/W

'TATIC CHARACTERISTICS

= 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 20 A	-	1.5	1.85	V
$_R$	Reverse current	$V_R = V_{RWM}$; T_j = 125 ˚C	-	0.1	1.0	mA

YNAMIC CHARACTERISTICS

= 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$_{rr}$	Reverse recovery time	I_F = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 50 A/µs	-	100	135	ns
Q_s	Reverse recovery charge	I_F = 2 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 20 A/µs	-	0.5	0.7	µC
dI_R/dt	Maximum slope of the reverse recovery current	I_F = 2 A; $-dI_F/dt$ = 20 A/µs	-	50	60	A/µs

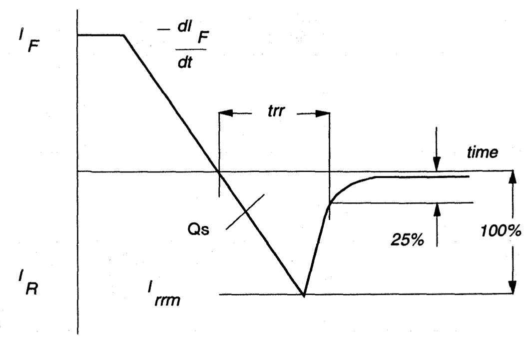


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

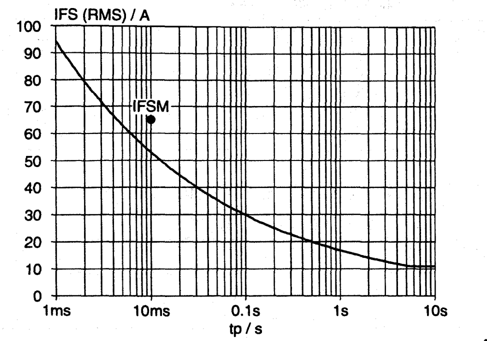


Fig.4. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j = 150˚C$ prior to surge with reapplied V_{RWM}.

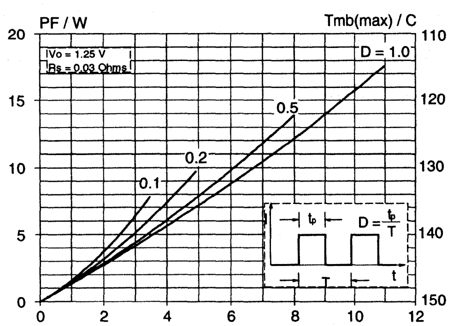


Fig.2. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; square wave current waveform; parameter D = duty cycle = t_p/T.

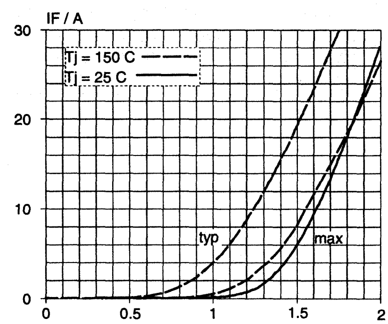


Fig.5. Typical and maximum forward characteristic; $I_F = f(V_F)$; parameter T_j

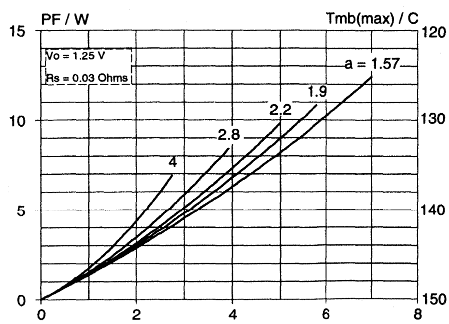


Fig.3. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; sinusoidal current waveform; parameter a = form factor = $I_{F(RMS)}/I_{F(AV)}$.

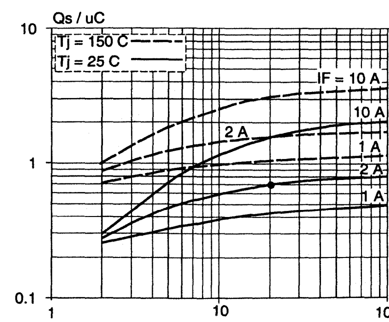
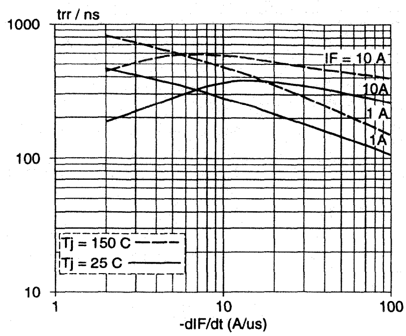


Fig.6. Maximum Q_s at T_j = 25˚C and 150˚C



ig.7. Maximum t_{rr} measured to 25% of I_{rrm}; $T_j = 25^\circ C$ and $150^\circ C$

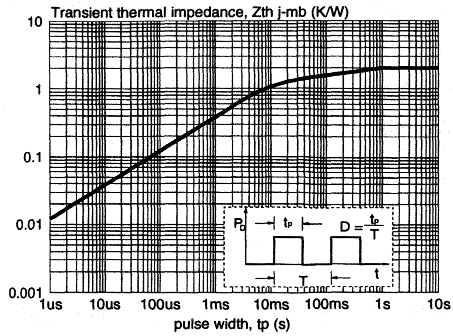
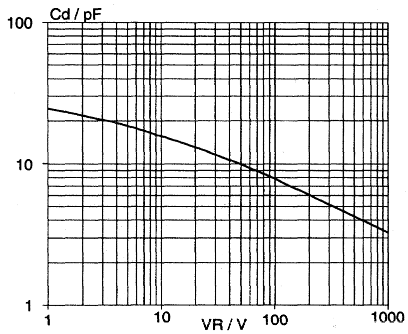


Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$



ᆿig.8. Typical junction capacitance C_d at f = 1 MHz; $T_j = 25^\circ C$

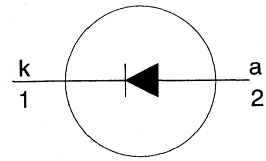
Damper diode fast, high-voltage

BY329-1500, BY329-1500S

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

$V_R = 1500$ V

$V_F \leq 1.35$ V / 1.5 V

$I_{F(peak)} = 6$ A (f = 16 kHz)

$I_{F(peak)} = 6$ A (f = 70 kHz)

$I_{FSM} \leq 75$ A

$t_{rr} \leq 230$ ns / 160 ns

GENERAL DESCRIPTION

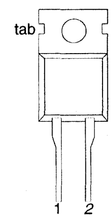
Glass-passivated double diffused rectifier diode featuring low forward voltage drop, fast reverse recovery and soft recovery characteristic. The device is intended for use in TV receivers and PC monitors.

The BY329 series is supplied in the conventional leaded SOD59 (TO220AC) package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



LIMITING VALUES

Limiting values accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
V_{RSM}	Peak non-repetitive peak reverse voltage		-	1500		V
V_{RRM}	Peak repetitive reverse voltage		-	1500		V
V_{RWM}	Crest working reverse voltage		-	1300		V
		BY329		**-1500**	**-1500S**	
$I_{F(peak)}$	Peak working forward current	f = 16 kHz f = 70 kHz	- -	6 -	- 6	A A
I_{FRM}	Peak repetitive forward current	t = 25 µs; δ = 0.5; $T_{mb} \leq 123$ ˚C	-	14		A
$I_{F(RMS)}$	RMS forward current		-	11		A
I_{FSM}	Peak non-repetitive forward current	t = 10 ms sinusoidal; $T_j = 150$ ˚C prior to surge; with reapplied $V_{RWM(max)}$	-	75		A
T_{stg}	Storage temperature		-40	150		˚C
T_j	Operating junction temperature		-	150		˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2.0	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	60	-	K/W

Damper diode
fast, high-voltage
BY329-1500, BY329-1500S

¡TATIC CHARACTERISTICS

$_j$ = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	TYP.		MAX.		UNIT
		BY329	1500	1500S	1500	1500S	
V_F	Forward voltage	I_F = 6.5 A	1.1	1.3	1.45	1.6	V
		I_F = 6.5 A; T_j = 125 ˚C	1.05	1.2	1.35	1.5	V
$_R$	Reverse current	V_R = 1300 V	-	250	-	250	µA
		V_R = 1300 V; T_j = 125 ˚C	-	1	-	1	mA

'YNAMIC CHARACTERISTICS

= 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	TYP.		MAX.		UNIT
		BY329	1500	1500S	1500	1500S	
$_{rr}$	Reverse recovery time	I_F = 1 A; $V_R \geq$ 30 V; dI_F/dt = 50A/µs	0.18	0.13	0.23	0.16	µs
Q_s	Reverse recovery charge	I_F = 2 A; $-dI_F/dt$ = 20 A/µs	1.6	0.7	2.0	0.95	µC
V_{fr}	Peak forward recovery voltage	I_F = 6.5A; dI_F/dt = 50A/µs	17	23	30	40	V
$_r$	Forward recovery time	I_F = 6.5A; dI_F/dt = 50A/µs	210	220	300	320	ns

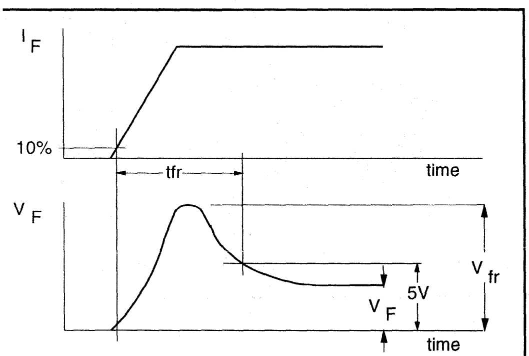


Fig.1. Definition of Vfr and tfr

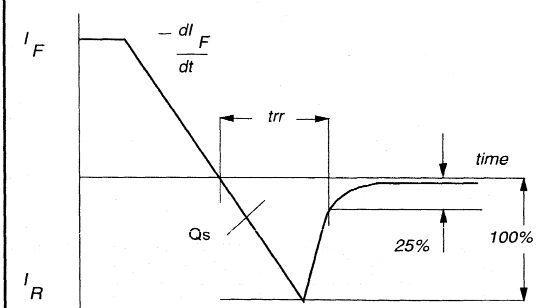


Fig.2. Definition of t_{rr} and Q_s

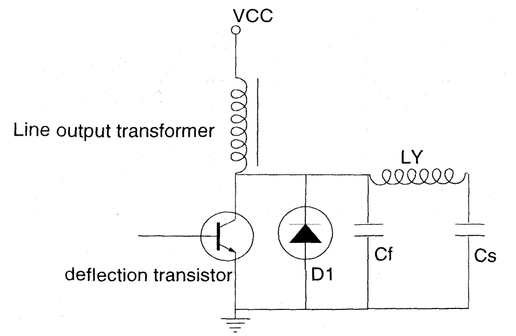


Fig.3. Basic horizontal deflection circuit.

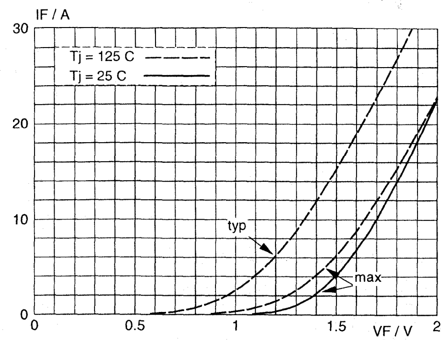


Fig.6. BY329-1500S Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

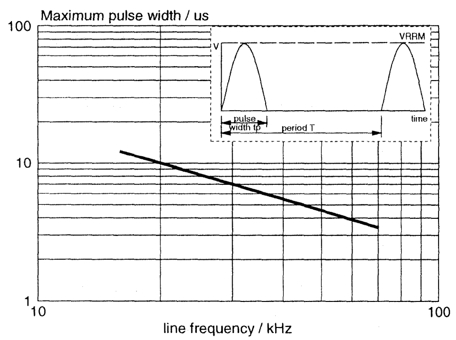


Fig.4. Maximum allowable pulse width t_p versus line frequency; Basic horizontal deflection circuit.

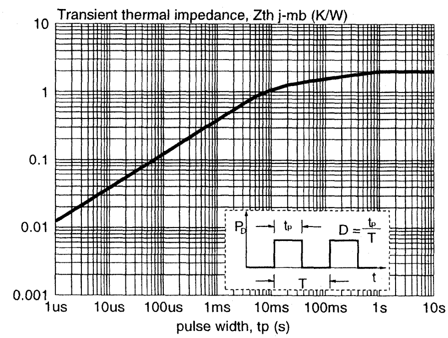


Fig.7. Transient thermal impedance $Z_{th} = f(t_p)$

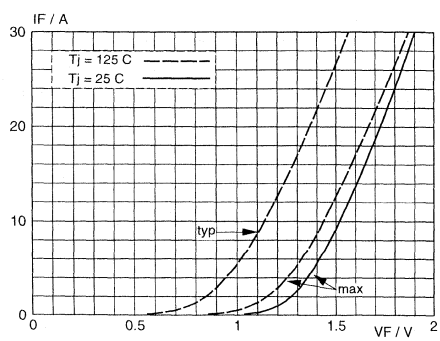


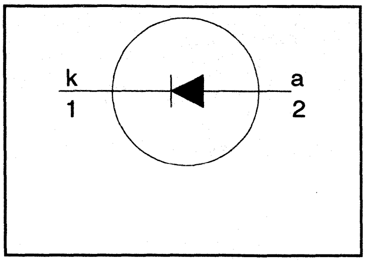
Fig.5. BY329-1500 Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

Damper diode fast, high-voltage | BY329-1700S

'EATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 1700 V

$V_F \leq 1.5$ V

$I_{F(peak)}$ = 6 A (f = 16 kHz)

$I_{F(peak)}$ = 6 A (f = 64 kHz)

$I_{FSM} \leq 60$ A

$t_{rr} \leq 170$ ns

;ENERAL DESCRIPTION

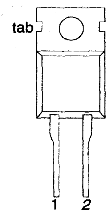
ılass-passivated double diffused ɛctifier diode featuring low forward ɔltage drop, fast reverse recovery nd soft recovery characteristic. he device is intended for use in TV ɛceivers and PC monitors.

he BY329 series is supplied in the ɔnventional leaded SOD59 'O220AC) package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



IMITING VALUES

miting values in accordance with the Absolute Maximum System (IEC 134).

ƷYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$/_{RSM}$	Peak non repetitive reverse voltage		-	1700	V
$/_{RRM}$	Peak repetitive reverse voltage		-	1700	V
$/_{RWM}$	Crest working reverse voltage		-	1300	V
$_{F(peak)}$	Peak working forward current	f = 16 kHz	-	6	A
		f = 64 kHz	-	6	A
$_{FRM}$	Peak repetitive forward current	t = 25 µs; δ = 0.5; $T_{mb} \leq 125$ ˚C	-	14	A
$_{F(RMS)}$	RMS forward current		-	10	A
$_{FSM}$	Peak non-repetitive forward current	t = 10 ms sinusoidal; T_j = 150 ˚C prior to surge; with reapplied $V_{RWM(max)}$	-	60	A
$_{stg}$	Storage temperature		-40	150	˚C
$_{j}$	Operating junction temperature		-	150	˚C

ⅎERMAL RESISTANCES

;YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2.0	K/W
$_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	60	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 6.5 A	-	1.35	1.65	V
		I_F = 6.5 A; T_j = 125 ˚C	-	1.2	1.5	V
I_R	Reverse current	$V_R = V_{RWMmax}$	-	-	250	µA
		$V_R = V_{RWMmax}$; T_j = 125 ˚C	-	-	1.0	mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{fr}	Forward recovery voltage	I_F = 6.5 A; dI_F/dt = 50 A/µs	-	30	40	V
t_{fr}	Forward recovery time	I_F = 6.5 A; dI_F/dt = 50 A/µs; V_F = 5 V	-	300	320	ns
t_{rr}	Reverse recovery time	I_F = 1 A; $-dI_F/dt$ = 50 A/µs; $V_R \geq$ 30 V	-	130	170	ns
Q_s	Reverse recovery charge	I_F = 2 A; $-dI_F/dt$ = 20 A/µs; $V_R \geq$ 30 V	-	0.7	1.0	µC

Damper diode fast, high-voltage

BY329-1700S

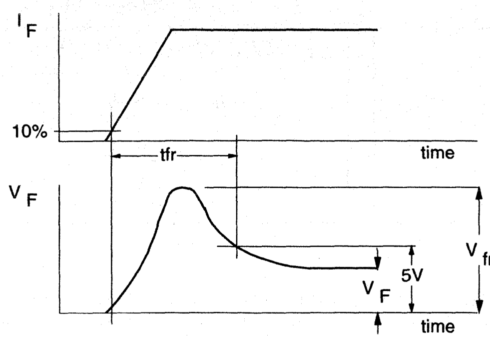


Fig.1. Definition of Vfr and tfr

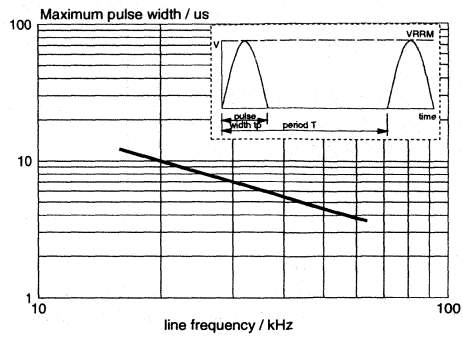


Fig.4. Maximum allowable pulse width t_p versus line frequency; Basic horizontal deflection circuit.

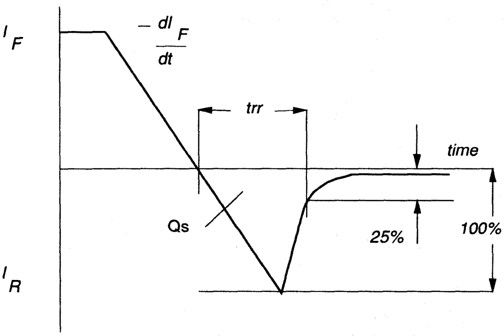


Fig.2. Definition of t_{rr} and Q_s

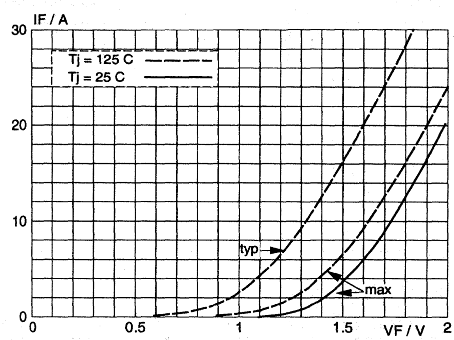


Fig.5. BY329-1700S Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

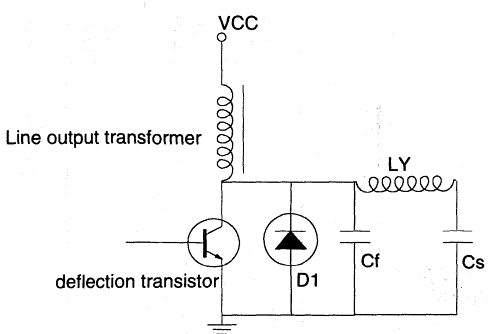


Fig.3. Basic horizontal deflection circuit.

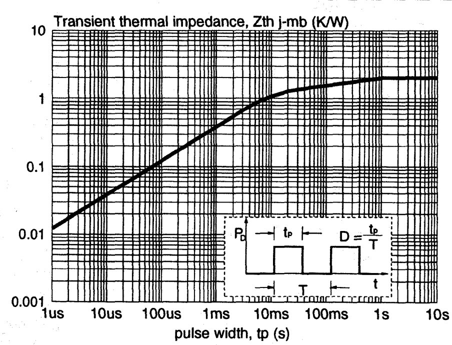


Fig.6. Transient thermal impedance $Z_{th} = f(t_p)$

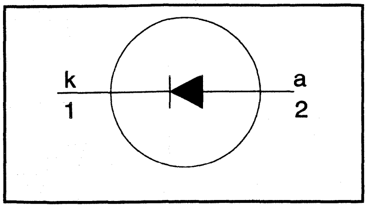
Rectifier diodes fast, soft-recovery

BY329F, BY329X series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

V_R = 800 V/ 1000 V/ 1200 V

$I_{F(AV)}$ = 8 A

$I_{FSM} \leq$ 65 A

$t_{rr} \leq$ 145 ns

GENERAL DESCRIPTION

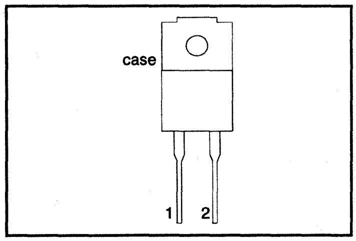
Glass-passivated double diffused rectifier diodes featuring low forward voltage drop, fast reverse recovery and so recovery characteristic. The devices are intended for use in TV receivers, monitors and switched mode power supplie

The BY329F series is supplied in the conventional leaded SOD100 package.
The BY329X series is supplied in the conventional leaded SOD113 package.

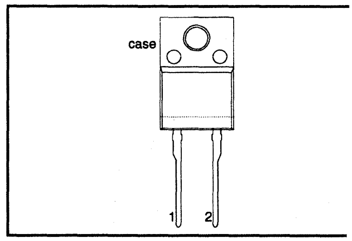
PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	isolated

SOD100



SOD113



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
		BY329F / BY329X		**-800**	**-1000**	**-1200**	
V_{RSM}	Peak non-repetitive reverse voltage		-	800	1000	1200	V
V_{RRM}	Peak repetitive reverse voltage		-	800	1000	1200	V
V_{RWM}	Crest working reverse voltage		-	600	800	1000	V
$I_{F(AV)}$	Average forward current[1]	square wave; δ = 0.5; $T_{hs} \leq$ 83 ˚C	-	8			A
		sinusoidal; a = 1.57; $T_{hs} \leq$ 90 ˚C	-	7			A
$I_{F(RMS)}$	RMS forward current		-	11			A
I_{FRM}	Peak repetitive forward current	t = 25 µs; δ = 0.5; $T_{hs} \leq$ 83 ˚C	-	16			A
I_{FSM}	Peak non-repetitive forward current.	t = 10 ms	-	65			A
		t = 8.3 ms	-	71			A
		sinusoidal; T_j = 150 ˚C prior to surge; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-	28			A^2s
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

1. Neglecting switching and reverse current losses.

SOLATION LIMITING VALUE & CHARACTERISTIC

$_{hs}$ = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Peak isolation voltage from both terminals to external heatsink	SOD100 package; R.H. ≤ 65%; clean and dustfree	-	-	1500	V
V_{isol}	R.M.S. isolation voltage from both terminals to external heatsink	SOD113 package; f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65%; clean and dustfree	-	-	2500	V
C_{isol}	Capacitance from pin 1 to external heatsink	f = 1 MHz	-	10	-	pF

'HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-hs}$	Thermal resistance junction to heatsink	with heatsink compound without heatsink compound	- -	- -	4.8 5.9	K/W K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	in free air.	-	55	-	K/W

TATIC CHARACTERISTICS

= 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 20 A	-	1.5	1.85	V
$_R$	Reverse current	$V_R = V_{RWM}$; T_j = 125 ˚C	-	0.1	1.0	mA

YNAMIC CHARACTERISTICS

= 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$_{rr}$	Reverse recovery time	I_F = 1 A; V_R ≥ 30 V; -dI_F/dt = 50 A/µs	-	125	145	ns
Q_s	Reverse recovery charge	I_F = 2 A; V_R ≥ 30 V; -dI_F/dt = 20 A/µs	-	0.5	0.7	µC
dI_R/dt	Maximum slope of the reverse recovery current	I_F = 2 A; -dI_F/dt = 20 A/µs	-	50	60	A/µs

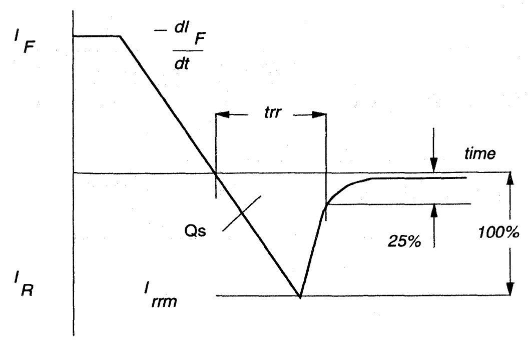


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

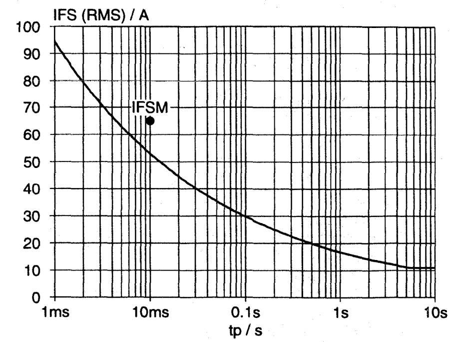


Fig.4. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j = 150^\circ C$ prior to surge with reapplied V_{RWM}.

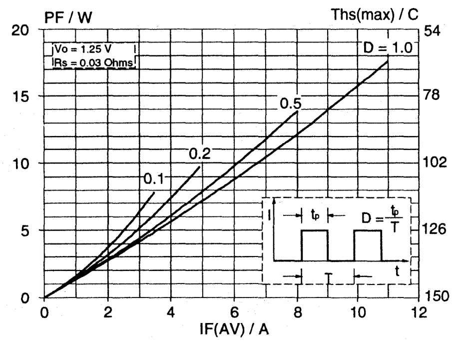


Fig.2. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; square wave current waveform; parameter D = duty cycle = t_p/T.

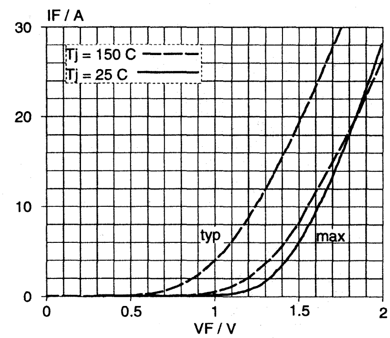


Fig.5. Typical and maximum forward characteristic; $I_F = f(V_F)$; parameter T_j

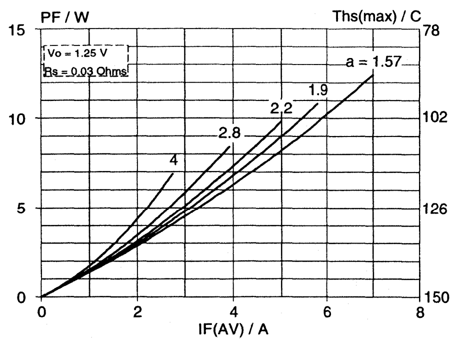


Fig.3. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; sinusoidal current waveform; parameter a = form factor = $I_{F(RMS)}/I_{F(AV)}$.

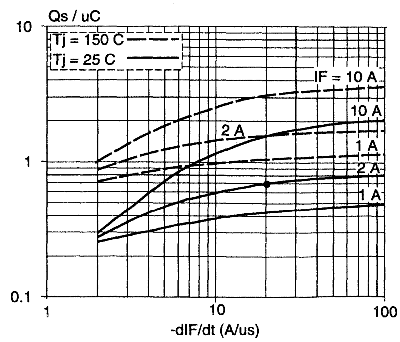


Fig.6. Maximum Q_s at T_j = 25˚C and 150˚C

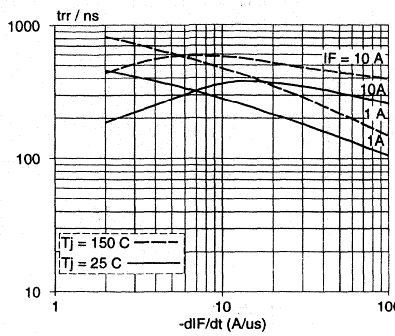


Fig.7. Maximum t_{rr} measured to 25% of I_{rrm}; $T_j = 25˚C$ and 150˚C

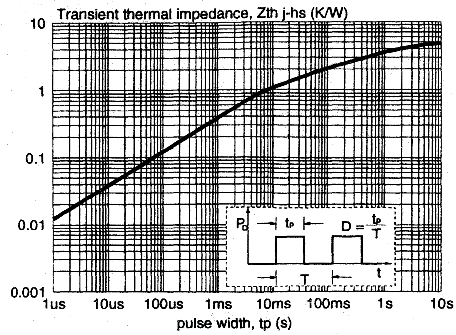


Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$

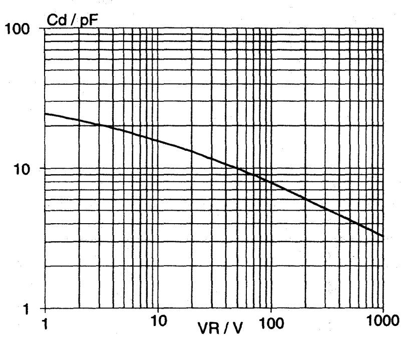


Fig.8. Typical junction capacitance C_d at f = 1 MHz; $T_j = 25˚C$

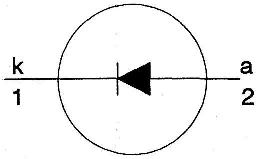
Damper diode fast, high-voltage

BY329X-1500, BY329X-1500S

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

$V_R = 1500$ V

$V_F \leq 1.35$ V / 1.5 V

$I_{F(peak)} = 6$ A (f = 16 kHz)

$I_{F(peak)} = 6$ A (f = 70 kHz)

$I_{FSM} \leq 75$ A

$t_{rr} \leq 230$ ns / 160 ns

GENERAL DESCRIPTION

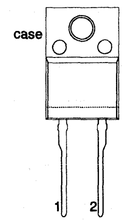
Glass-passivated double diffused rectifier diode featuring low forward voltage drop, fast reverse recovery and soft recovery characteristic. The device is intended for use in TV receivers and PC monitors.

The BY329X series is supplied in the conventional leaded SOD113 package.

PINNING

PIN	DESCRIPTION
1	anode
2	cathode
tab	isolated

SOD113



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
V_{RSM}	Peak non-repetitive reverse voltage		-	1500		V
V_{RRM}	Peak repetitive reverse voltage		-	1500		V
V_{RWM}	Crest working reverse voltage		-	1300		V
		BY329X		**-1500**	**-1500S**	
$I_{F(peak)}$	Peak working forward current	f = 16 kHz	-	6	-	A
		f = 70 kHz	-	-	6	A
I_{FRM}	Peak repetitive forward current	t = 25 µs; δ = 0.5; $T_{hs} \leq 86$ ˚C	-	14		A
$I_{F(RMS)}$	RMS forward current		-	11		A
I_{FSM}	Peak non-repetitive forward current	t = 10 ms sinusoidal; $T_j = 150$ ˚C prior to surge; with reapplied $V_{RWM(max)}$	-	75		A
T_{stg}	Storage temperature		-40	150		˚C
T_j	Operating junction temperature		-	150		˚C

;OLATION LIMITING VALUE & CHARACTERISTIC

$_{is}$ = 25 ˚C unless otherwise specified

;YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$/_{isol}$	R.M.S. isolation voltage from both terminals to external heatsink	f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree	-		2500	V
C_{isol}	Capacitance from both terminals to external heatsink	f = 1 MHz	-	10	-	pF

HERMAL RESISTANCES

;YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-hs}$	Thermal resistance junction to heatsink	with heatsink compound without heatsink compound	- -	- -	4.8 5.9	K/W K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	in free air.	-	55	-	K/W

TATIC CHARACTERISTICS

= 25 ˚C unless otherwise stated

YMBOL	PARAMETER	CONDITIONS	TYP.		MAX.		UNIT
		BY329X-	1500	1500S	1500	1500S	
F	Forward voltage	I_F = 6.5 A	1.1	1.3	1.45	1.6	V
		I_F = 6.5 A; T_j = 125 ˚C	1.05	1.2	1.35	1.5	V
	Reverse current	V_R = 1300 V	-	250	-	250	µA
		V_R = 1300 V; T_j = 125 ˚C	-	1	-	1	mA

YNAMIC CHARACTERISTICS

= 25 ˚C unless otherwise stated

YMBOL	PARAMETER	CONDITIONS	TYP.		MAX.		UNIT
		BY329X	1500	1500S	1500	1500S	
	Reverse recovery time	I_F = 1 A; V_R ≥ 30 V; dI_F/dt = 50A/µs	0.18	0.13	0.23	0.16	µs
s	Reverse recovery charge	I_F = 2 A; $-dI_F/dt$ = 20 A/µs	1.6	0.7	2.0	0.95	µC
r	Peak forward recovery voltage	I_F = 6.5A; dI_F/dt = 50A/µs	17	23	30	40	V
	Forward recovery time	I_F = 6.5A; dI_F/dt = 50A/µs	210	220	300	320	ns

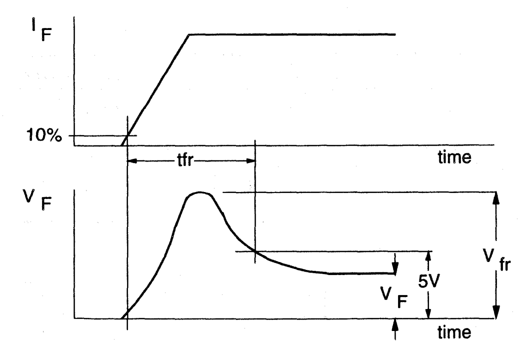


Fig.1. Definition of Vfr and tfr

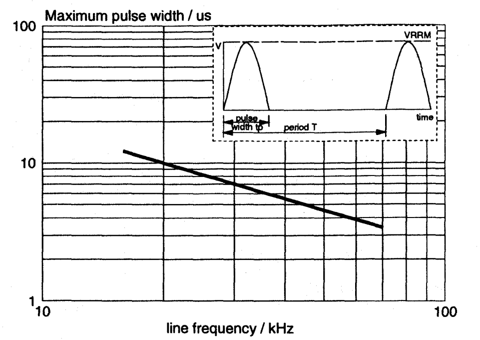


Fig.4. Maximum allowable pulse width t_p versus line frequency; Basic horizontal deflection circuit.

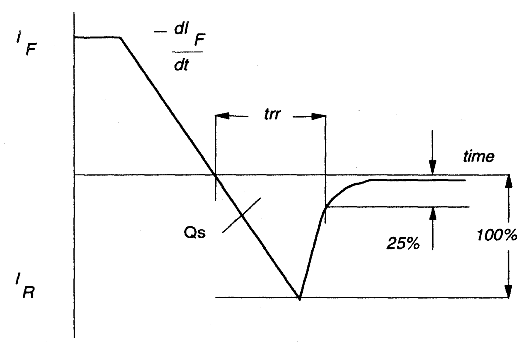


Fig.2. Definition of t_{rr} and Q_s

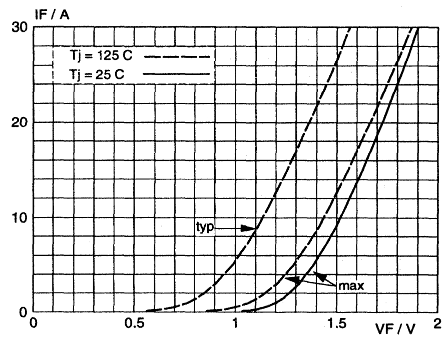


Fig.5. BY329-1500 Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

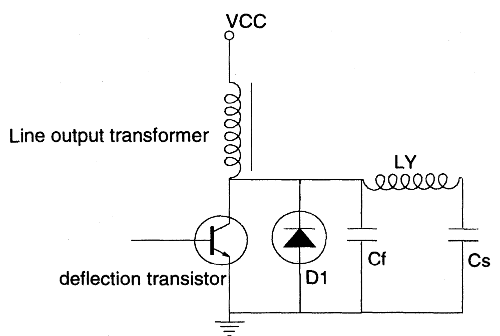


Fig.3. Basic horizontal deflection circuit.

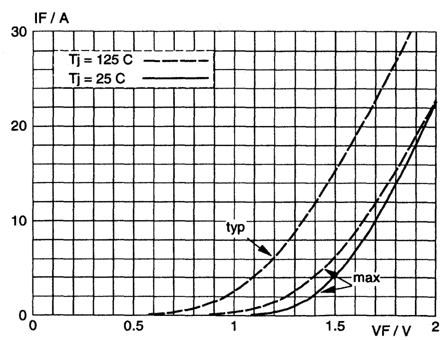


Fig.6. BY329-1500S Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

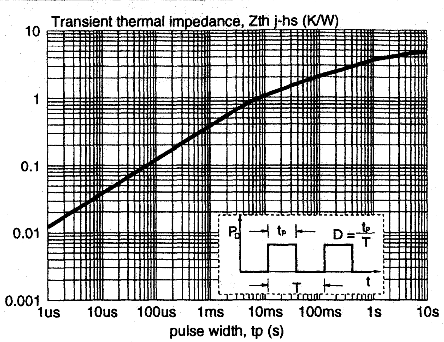


Fig.7. Transient thermal impedance $Z_{th} = f(t_p)$

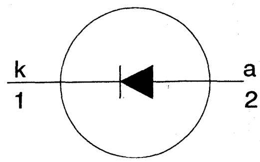
Damper diode fast, high-voltage

BY329X-1700S

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

$V_R = 1700$ V

$V_F \leq 1.5$ V

$I_{F(PEAK)} = 6$ A

$I_{FSM} \leq 60$ A

$t_{rr} \leq 170$ ns

GENERAL DESCRIPTION

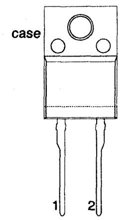
Glass-passivated double diffused rectifier diode featuring low forward voltage drop, fast reverse recovery and soft recovery characteristic. The device is intended for use in TV receivers and PC monitors.

The BY329X series is supplied in the conventional leaded SOD113 package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	isolated

SOD113



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RSM}	Peak non repetitive reverse voltage		-	1700	V
V_{RRM}	Peak repetitive reverse voltage		-	1700	V
V_{RWM}	Crest working reverse voltage		-	1300	V
$I_{F(peak)}$	Peak working forward current	f = 16 kHz	-	6	A
		f = 64 kHz	-	6	A
I_{FRM}	Peak repetitive forward current	t = 25 μs; δ = 0.5; $T_{hs} \leq 91$ ˚C	-	14	A
$I_{F(RMS)}$	RMS forward current		-	10	A
I_{FSM}	Peak non-repetitive forward current	t = 10 ms sinusoidal; $T_j = 150$ ˚C prior to surge; with reapplied $V_{RWM(max)}$	-	60	A
T_{stg}	Storage temperature		-40	150	˚C
T_j	Operating junction temperature		-	150	˚C

ISOLATION LIMITING VALUE & CHARACTERISTIC

$T_{hs} = 25$ ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	R.M.S. isolation voltage from both terminals to external heatsink	f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree	-		2500	V
C_{isol}	Capacitance from both terminals to external heatsink	f = 1 MHz	-	10	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	4.8	K/W
		without heatsink compound	-	-	5.9	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	55	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	$I_F = 6.5$ A	-	1.35	1.65	V
		$I_F = 6.5$ A; $T_j = 125$ ˚C	-	1.2	1.5	V
I_R	Reverse current	$V_R = V_{RWMmax}$	-	-	250	µA
		$V_R = V_{RWMmax}$; $T_j = 125$ ˚C	-	-	1.0	mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{fr}	Forward recovery voltage	$I_F = 6.5$; $dI_F/dt = 50$ A/µs	-	30	40	V
t_{fr}	Forward recovery time	$I_F = 6.5$ A; $dI_F/dt = 50$ A/µs; $V_F = 5$ V	-	300	320	ns
t_{rr}	Reverse recovery time	$I_F = 1$ A; $-dI_F/dt = 50$ A/µs; $V_R \geq 30$ V	-	130	170	ns
Q_s	Reverse recovery charge	$I_F = 2$ A; $-dI_F/dt = 20$ A/µs; $V_R \geq 30$ V	-	0.7	1.0	µC

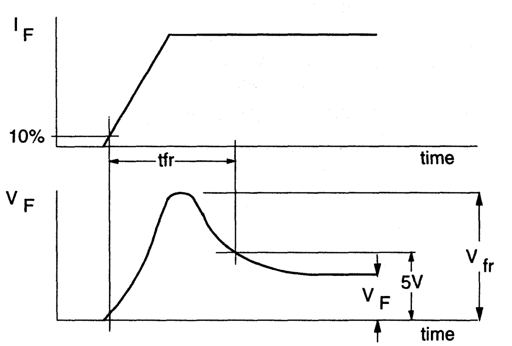


Fig.1. Definition of Vfr and tfr

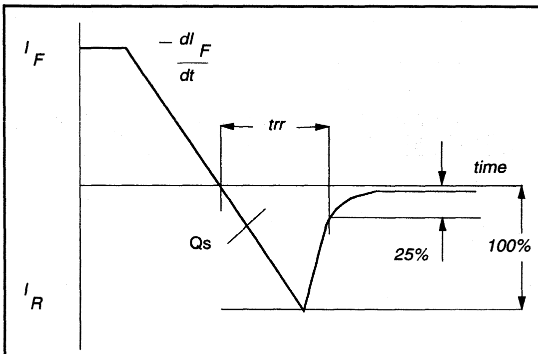


Fig.2. Definition of t_{rr} and Q_s

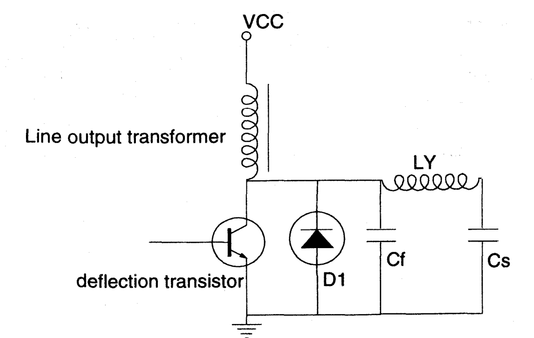


Fig.3. Basic horizontal deflection circuit.

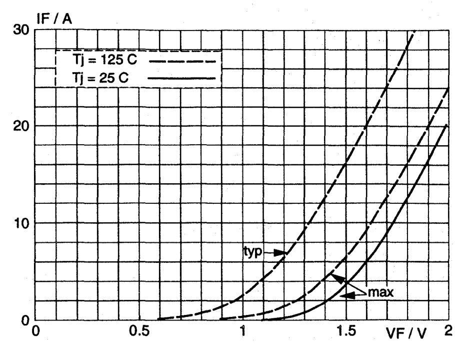


Fig.5. BY329-1500S Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

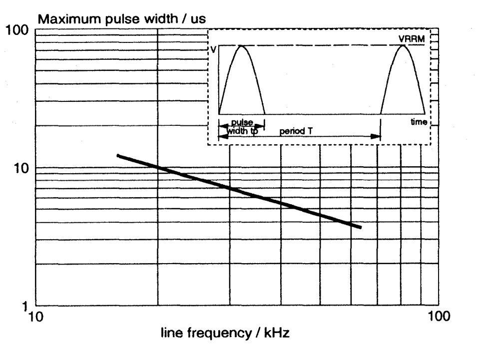


Fig.4. Maximum allowable pulse width t_p versus line frequency; Basic horizontal deflection circuit.

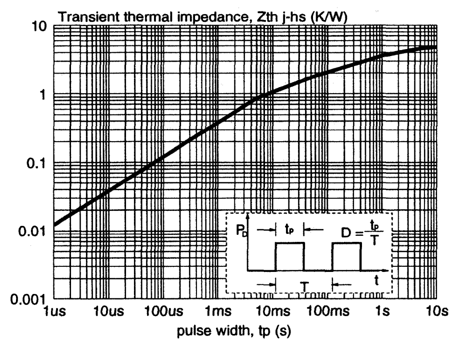


Fig.6. Transient thermal impedance $Z_{th} = f(t_p)$

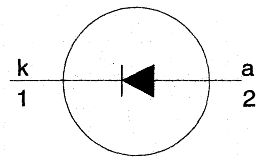
Damper diode fast, high-voltage

BY359-1500, BY359-1500S

EATURES

Low forward volt drop
Fast switching
Soft recovery characteristic
High thermal cycling performance
Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 1500 V

$V_F \leq$ 1.8 V / 2 V

$I_{F(RMS)}$ = 15.7 A

$I_{FSM} \leq$ 60 A

$t_{rr} \leq$ 600 ns / 350 ns

ENERAL DESCRIPTION

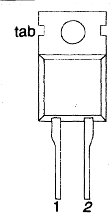
ilass-passivated double diffused ectifier diode featuring low forward oltage drop, fast reverse recovery nd soft recovery characteristic. he device is intended for use in TV eceivers and PC monitors.

he BY359 series is supplied in the onventional leaded SOD59 O220AC) package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



IMITING VALUES

miting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS		MIN.	MAX.	UNIT
V_{RSM}	Peak non-repetitive reverse voltage			-	1500	V
V_{RRM}	Peak repetitive reverse voltage			-	1500	V
V_{RWM}	Crest working reverse voltage			-	1300	V
F(peak)	Peak forward current	16-32kHz TV	BY359-1500	-	10	A
		31-70kHz monitor	BY359-1500S	-	7	A
F(RMS)	RMS forward current			-	15.7	A
FRM	Peak repetitive forward current	sinusoidal; a = 1.57		-	60	A
FSM	Peak non-repetitive forward current	t = 10 ms		-	60	A
		t = 8.3 ms		-	66	A
		sinusoidal; T_j = 150 ˚C prior to surge; with reapplied $V_{RWM(max)}$				
stg	Storage temperature			-40	150	˚C
j	Operating junction temperature			-	150	˚C

HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
th j-mb	Thermal resistance junction to mounting base		-	-	2.0	K/W
th j-a	Thermal resistance junction to ambient	in free air.	-	60	-	K/W

Damper diode fast, high-voltage

BY359-1500, BY359-1500S

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	BY359-1500 TYP.	BY359-1500 MAX.	BY359-1500S TYP.	BY359-1500S MAX.	UNIT
V_F	Forward voltage	I_F = 20 A	1.3	1.8	1.5	2.0	V
		I_F = 10 A; T_j = 150˚C	1.00	1.5	1.25	1.75	V
I_R	Reverse current	V_R = 1300 V	10	100	10	100	µA
		V_R = 1300 V; T_j = 100 ˚C	50	300	100	600	µA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	BY359-1500 TYP.	BY359-1500 MAX.	BY359-1500S TYP.	BY359-1500S MAX.	UNIT
t_{rr}	Reverse recovery time	I_F = 2 A; $V_R \geq$ 30 V;	0.47	0.60	0.28	0.35	µs
Q_s	Reverse recovery charge	$-dI_F/dt$ = 20 A/µs	1.6	2.0	0.70	0.95	µC
V_{fr}	Peak forward recovery voltage	I_F = 10 A; dI_F/dt = 30 A/µs	11.0	-	17.0	-	V

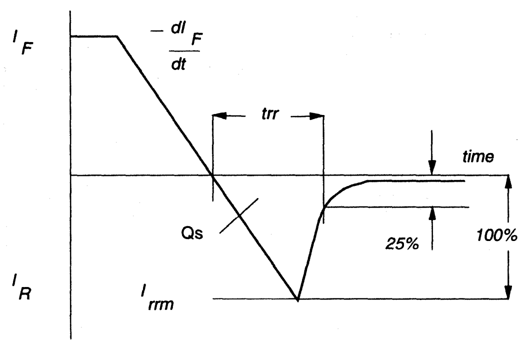


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

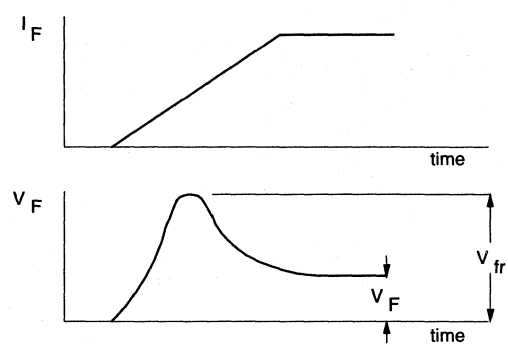


Fig.2. Definition of V_{fr}

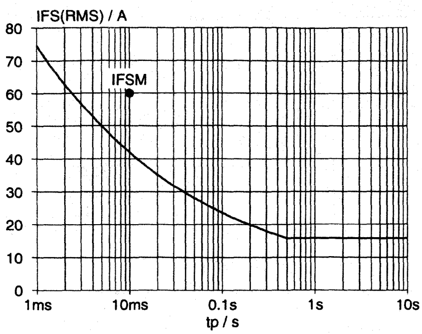


Fig.3. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j = 150^\circ C$ prior to surge with reapplied V_{RWM}.

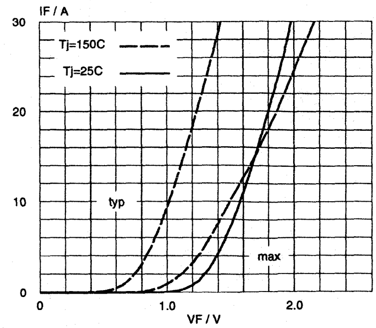


Fig.5. BY359-1500 forward characteristic $I_F = f(V_F)$; parameter T_j

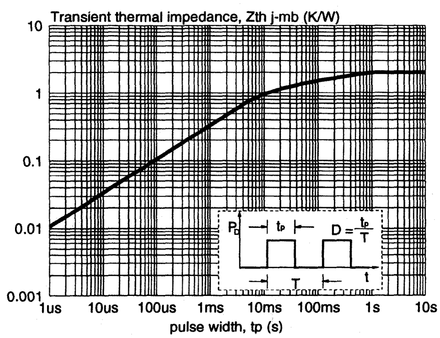


Fig.4. Transient thermal impedance $Z_{th} = f(t_p)$

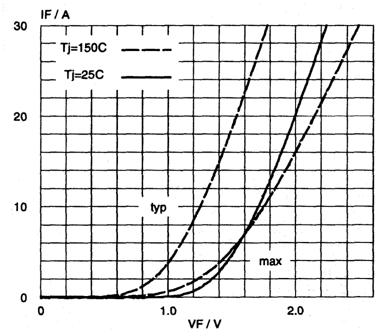


Fig.6. BY359-1500S forward characteristic $I_F = f(V_F)$; parameter T_j

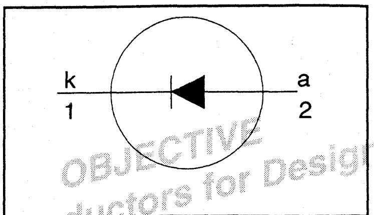
Rectifier diode fast, high-voltage

BY359DX-1500

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

V_R = 1500 V

$V_F \leq$ 1.5 V

$I_{F(AV)}$ = 10 A

$I_{FSM} \leq$ 60 A

$t_{rr} \leq$ 600 ns

GENERAL DESCRIPTION

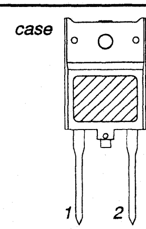
Glass-passivated double diffused rectifier diode featuring low forward voltage drop, fast reverse recovery and soft recovery characteristic. The device is intended for use in TV receivers, series resonant switched mode power supplies and other high voltage circuits.

The BY359DX series is supplied in the conventional leaded SOD117 package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	isolated

SOD117



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RSM}	Peak non-repetitive reverse voltage		-	1500	V
V_{RRM}	Peak repetitive reverse voltage		-	1500	V
V_{RWM}	Crest working reverse voltage		-	1300	V
$I_{F(AV)}$	Average forward current	sinusoidal; a = 1.57; T_{hs} = tbf	-	10	A
$I_{F(RMS)}$	RMS forward current		-	20	A
I_{FRM}	Peak repetitive forward current	sinusoidal; a = 1.57	-	60	A
I_{FSM}	Peak non-repetitive forward current	t = 10 ms	-	60	A
		t = 8.3 ms	-	66	A
		half sine wave; T_j = 150 ˚C prior to surge; with reapplied $V_{RWM(max)}$			
I^2t	I^2t for fusing	t = 10 ms	-	18	A^2s
T_{stg}	Storage temperature		-40	150	˚C
T_j	Operating junction temperature		-	150	˚C

ISOLATION LIMITING VALUE & CHARACTERISTIC

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	R.M.S. isolation voltage from both terminals to external heatsink	f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree	-		2500	V
C_{isol}	Capacitance from both terminals to external heatsink	f = 1 MHz	-	10	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	tbf	K/W
		without heatsink compound	-	-	tbf	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	tbf	-	K/W

STATIC CHARACTERISTICS

$T_j = 25$ ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	$I_F = 20$ A	-	1.3	1.8	V
		$I_F = 10$ A; $T_j = 150$˚C	-	1.00	1.5	V
I_R	Reverse current	$V_R = 1300$ V	-	10	100	µA
		$V_R = 1300$ V; $T_j = 100$ ˚C	-	50	300	µA

DYNAMIC CHARACTERISTICS

$T_j = 25$ ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
t_{rr}	Reverse recovery time	$I_F = 2$ A; $V_R \geq 30$ V; $-dI_F/dt = 20$ A/µs	-	0.47	0.6	µs
Q_s	Reverse recovery charge	$I_F = 2$ A; $V_R \geq 30$ V; $-dI_F/dt = 20$ A/µs	-	1.6	2.0	µC
V_{fr}	Peak forward recovery voltage	$I_F = 10$ A; $dI_F/dt = 30$ A/µs	-	11.0	-	V

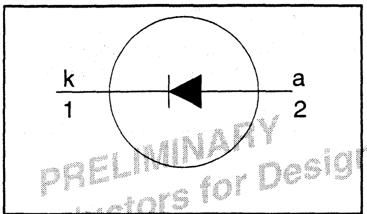
Damper diode fast, high-voltage

BY359F-1500, BY359F-1500S

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

V_R = 1500 V

$V_F \leq 1.8$ V / 2 V

$I_{F(RMS)}$ = 15.7 A

$I_{FSM} \leq 60$ A

$t_{rr} \leq 600$ ns / 350 ns

GENERAL DESCRIPTION

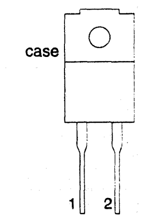
Glass-passivated double diffused rectifier diode featuring low forward voltage drop, fast reverse recovery and soft recovery characteristic. The device is intended for use in TV receivers and PC monitors.

The BY359F series is supplied in the conventional leaded SOD100 package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	isolated

SOD100



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS		MIN.	MAX.	UNIT
V_{RSM}	Peak non-repetitive reverse voltage			-	1500	V
V_{RRM}	Peak repetitive reverse voltage			-	1500	V
V_{RWM}	Crest working reverse voltage			-	1300	V
$I_{F(peak)}$	Peak forward current	16-32kHz TV	BY359F-1500	-	10	A
		31-70kHz monitor	BY359F-1500S	-	7	A
$I_{F(RMS)}$	RMS forward current			-	15.7	A
I_{FRM}	Peak repetitive forward current	sinusoidal; a = 1.57		-	60	A
I_{FSM}	Peak non-repetitive forward current	t = 10 ms		-	60	A
		t = 8.3 ms		-	66	A
		sinusoidal; T_j = 150 ˚C prior to surge; with reapplied $V_{RWM(max)}$				
T_{stg}	Storage temperature			-40	150	˚C
T_j	Operating junction temperature			-	150	˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	4.8	K/W
		without heatsink compound	-	-	5.9	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	55	-	K/W

TATIC CHARACTERISTICS

= 25 ˚C unless otherwise stated

			BY359F-1500		BY359F-1500S		
YMBOL	**PARAMETER**	**CONDITIONS**	**TYP.**	**MAX.**	**TYP.**	**MAX.**	**UNIT**
V_F	Forward voltage	I_F = 20 A	1.3	1.8	1.5	2.0	V
		I_F = 10 A; T_j = 150˚C	1.00	1.5	1.25	1.75	V
I_R	Reverse current	V_R = 1300 V	10	100	10	100	µA
		V_R = 1300 V; T_j = 100 ˚C	50	300	100	600	µA

YNAMIC CHARACTERISTICS

= 25 ˚C unless otherwise stated

			BY359F-1500		BY359F-1500S		
YMBOL	**PARAMETER**	**CONDITIONS**	**TYP.**	**MAX.**	**TYP.**	**MAX.**	**UNIT**
t_{rr}	Reverse recovery time	I_F = 2 A; $V_R \geq$ 30 V;	0.47	0.60	0.28	0.35	µs
Q_s	Reverse recovery charge	$-dI_F/dt$ = 20 A/µs	1.6	2.0	0.70	0.95	µC
V_{fr}	Peak forward recovery voltage	I_F = 10 A; dI_F/dt = 30 A/µs	11.0	-	17.0	-	V

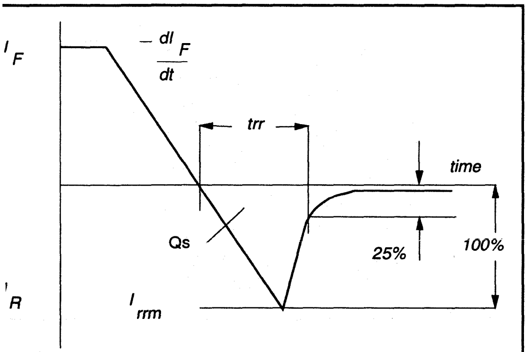


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

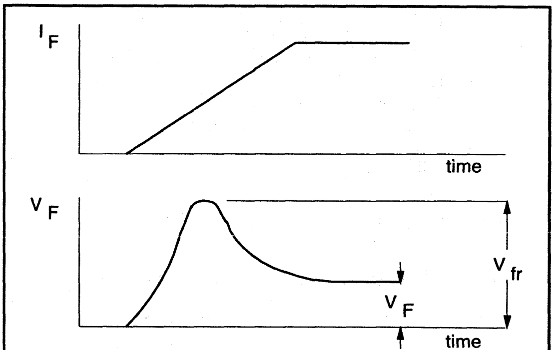


Fig.2. Definition of V_{fr}

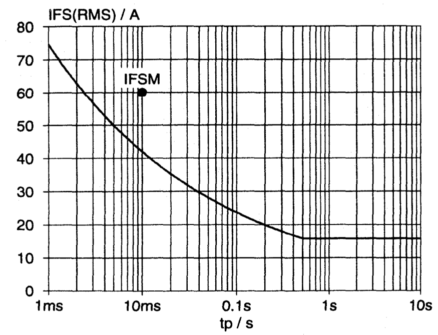


Fig.3. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j = 150˚C$ prior to surge with reapplied V_{RWM}.

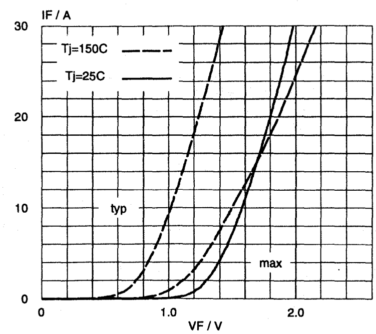


Fig.5. BY359F-1500 forward characteristic $I_F = f(V_F)$; parameter T_j

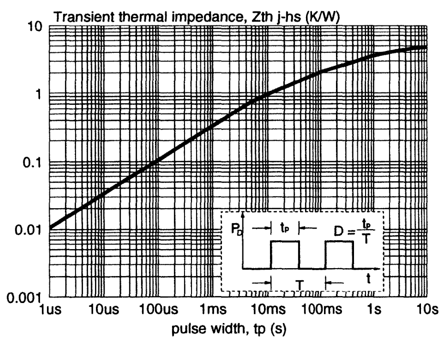


Fig.4. Transient thermal impedance $Z_{th} = f(t_p)$

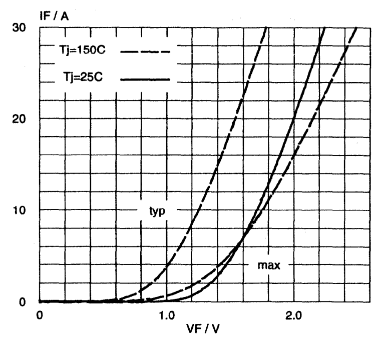


Fig.6. BY359F-1500S forward characteristic $I_F = f(V_F)$; parameter T_j

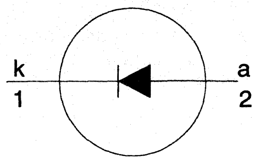
Damper diode fast, high-voltage

BY359X-1500, BY359X-1500S

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

$V_R = 1500$ V

$V_F \leq 1.8$ V / 2 V

$I_{F(RMS)} = 15.7$ A

$I_{FSM} \leq 60$ A

$t_{rr} \leq 600$ ns / 350 ns

;ENERAL DESCRIPTION

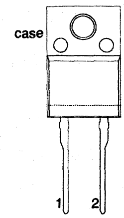
;lass-passivated double diffused ectifier diode in a plastic envelope eaturing low forward voltage drop, ast reverse recovery and soft ecovery characteristic. The device ; intended for use in TV receivers nd PC monitors.

he BY359X series is supplied in ie conventional leaded SOD113 ackage.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	isolated

SOD113



.IMITING VALUES

imiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS		MIN.	MAX.	UNIT
V_{RSM}	Peak non-repetitive reverse voltage			-	1500	V
V_{RRM}	Peak repetitive reverse voltage			-	1500	V
V_{RWM}	Crest working reverse voltage			-	1300	V
$_{F(peak)}$	Peak forward current	16-32kHz TV	BY359X-1500	-	10	A
		31-70kHz monitor	BY359X-1500S	-	7	A
$_{F(RMS)}$	RMS forward current			-	15.7	A
$_{FRM}$	Peak repetitive forward current	sinusoidal; a = 1.57		-	60	A
$_{FSM}$	Peak non-repetitive forward current	t = 10 ms		-	60	A
		t = 8.3 ms		-	66	A
		sinusoidal; $T_j = 150$ ˚C prior to surge; with reapplied $V_{RWM(max)}$				
T_{stg}	Storage temperature			-40	150	˚C
T_j	Operating junction temperature			-	150	˚C

;OLATION LIMITING VALUE & CHARACTERISTIC

$_s = 25$ ˚C unless otherwise specified

;YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	R.M.S. isolation voltage from both terminals to external heatsink	f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree	-		2500	V
C_{isol}	Capacitance from both terminals to external heatsink	f = 1 MHz	-	10	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-hs}$	Thermal resistance junction to heatsink	with heatsink compound without heatsink compound	- -	- -	4.8 5.9	K/W K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	in free air.	-	55	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

			BY359X-1500		BY359X-1500S		
SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 20 A	1.3	1.8	1.5	2.0	V
		I_F = 10 A; T_j = 150˚C	1.00	1.5	1.25	1.75	V
I_R	Reverse current	V_R = 1300 V	10	100	10	100	µA
		V_R = 1300 V; T_j = 100 ˚C	50	300	100	600	µA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

			BY359X-1500		BY359X-1500S		
SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	TYP.	MAX.	UNIT
t_{rr}	Reverse recovery time	I_F = 2 A; $V_R \geq$ 30 V;	0.47	0.60	0.28	0.35	µs
Q_s	Reverse recovery charge	$-dI_F/dt$ = 20 A/µs	1.6	2.0	0.70	0.95	µC
V_{fr}	Peak forward recovery voltage	I_F = 10 A; dI_F/dt = 30 A/µs	11.0	-	17.0	-	V

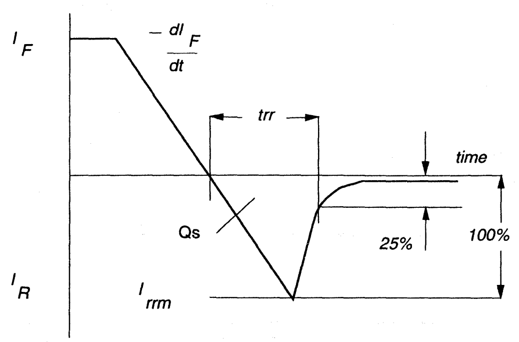


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

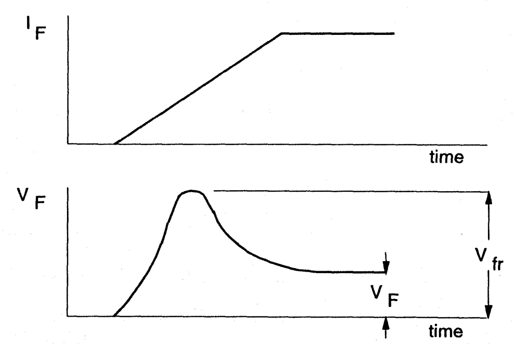


Fig.2. Definition of V_{fr}

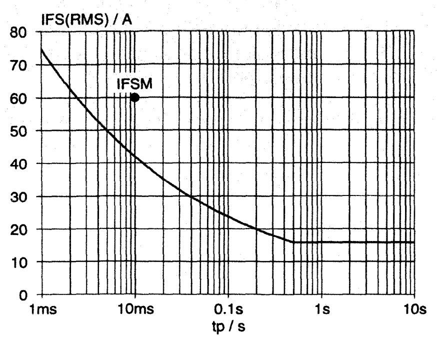


Fig.3. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j = 150˚C$ prior to surge with reapplied V_{RWM}.

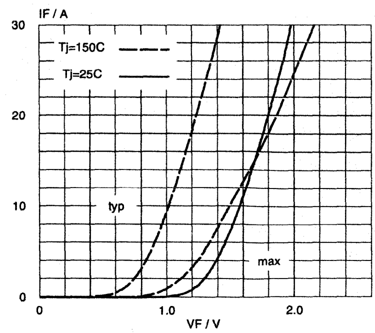


Fig.5. BY359X-1500 forward characteristic $I_F = f(V_F)$; parameter T_j

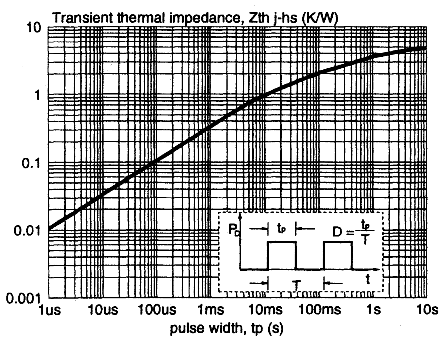


Fig.4. Transient thermal impedance $Z_{th} = f(t_p)$

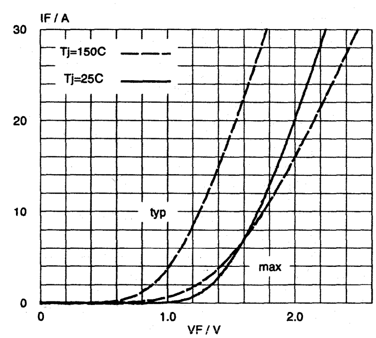


Fig.6. BY359X-1500S forward characteristic $I_F = f(V_F)$; parameter T_j

Damper diode BY428

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Available in ammo-pack
- Also available with preformed leads for easy insertion.

APPLICATIONS

- Damper diode in high frequency horizontal deflection circuits up to 64 kHz.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

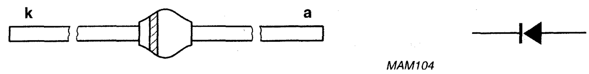


Fig.1 Simplified outline (SOD64) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RSM}	non-repetitive peak reverse voltage		–	1500	V
V_{RRM}	repetitive peak reverse voltage		–	1500	V
V_R	continuous reverse voltage		–	1400	V
I_{FWM}	working peak forward current	T_{tp} = 80 °C; lead length = 10 mm; see Fig.2	–	4	A
I_{FRM}	repetitive peak forward current		–	8	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	50	A
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+150	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 4 A; $T_j = T_{j\,max}$; see Fig.3	1.60	V
		I_F = 4 A; see Fig.3	1.95	V
I_R	reverse current	$V_R = V_{Rmax}$; T_j = 150 °C	150	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.6	250	ns
t_{fr}	forward recovery time	when switched to I_F = 5 A in 50 ns; $T_j = T_{j\,max}$; see Fig.7	250	ns

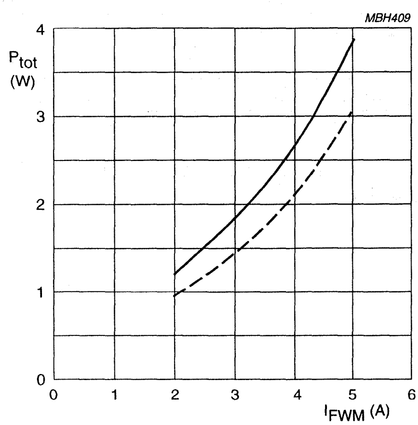
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	25	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	75	K/W
		mounted as shown in Fig.5	40	K/W

Note

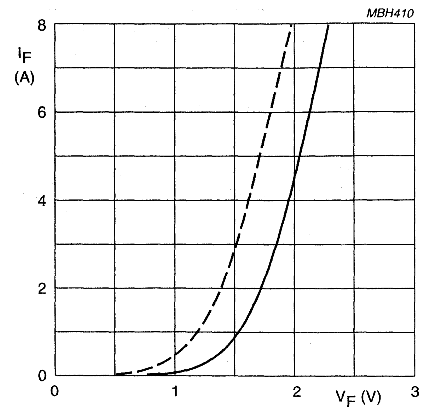
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.4. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA



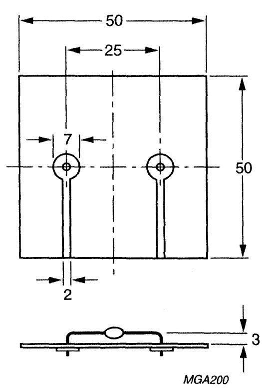
Solid line: basic high-voltage E/W modulator circuit; see Fig.8.
Dotted line: basic conventional horizontal deflection circuit; see Fig.9.
Curves include power dissipation due to switching losses.

Fig.2 Maximum total power dissipation as a function of working peak forward current.



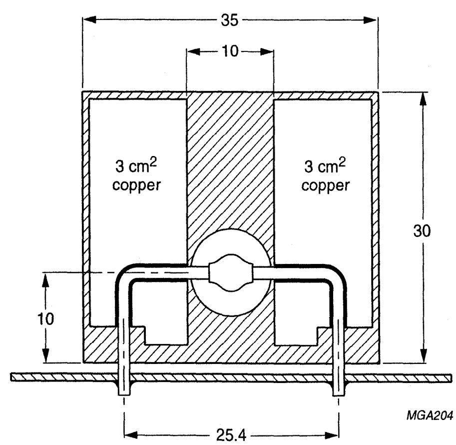
Dotted line: T_j = 150 °C.
Solid line: T_j = 25 °C.

Fig.3 Forward current as a function of forward voltage; maximum values.



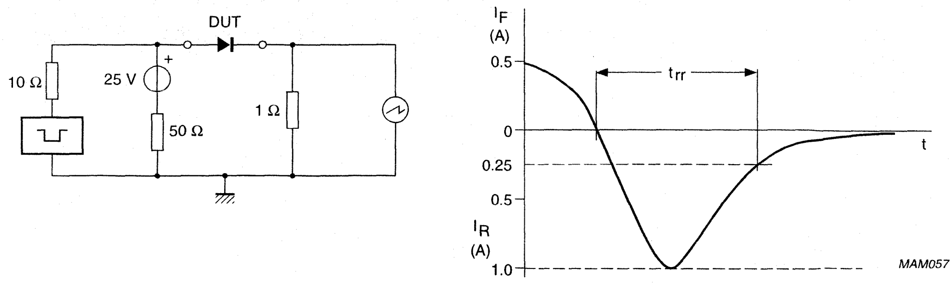
Dimensions in mm.

Fig.4 Device mounted on a printed-circuit board.



Dimensions in mm.

Fig.5 Mounting with additional printed-circuit board for heat sink purposes.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.6 Test circuit and reverse recovery time waveform and definition.

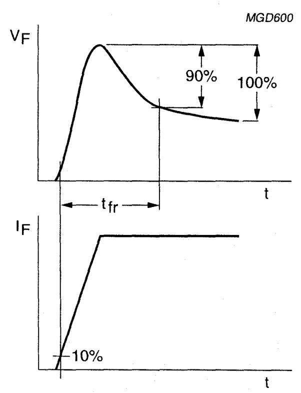


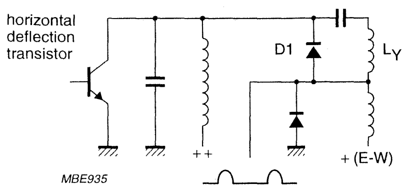
Fig.7 Forward recovery time definition.

APPLICATION INFORMATION

For horizontal deflection circuits, two basic applications are shown in Figs 8 and 9.

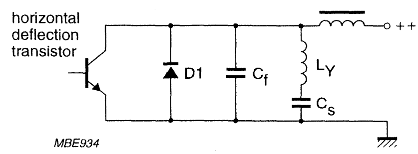
The maximum allowable total power dissipation for the diode can be calculated from the thermal resistance $R_{th\ j\text{-}a}$ and the difference between $T_{j\ max}$ and $T_{amb\ max}$ in the application. The maximum I_{FWM} can then be taken from Fig.2.

The basic application waveforms in Fig.10 relate to the circuit in Fig.8. In the circuit in Fig.9 the forward conduction time of the diode is shorter, allowing a higher I_{FWM} (see Fig.2).



D1 = BY428.

Fig.8 Application in basic high-voltage E/W modulator circuit.



D1 = BY428.

Fig.9 Application in basic horizontal deflection circuit.

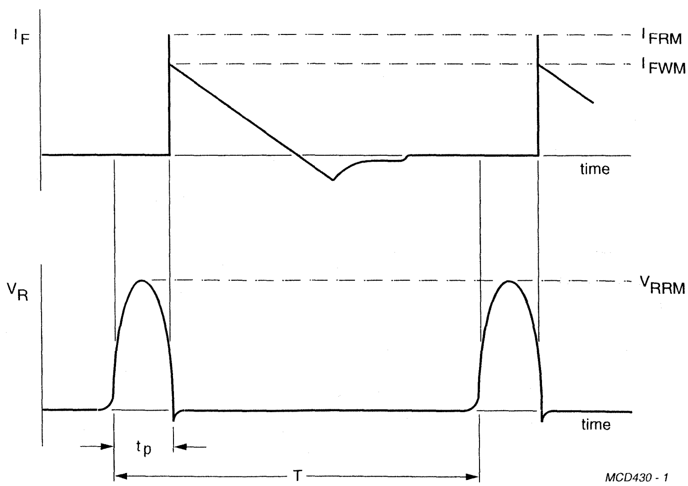


Fig.10 Basic application waveforms.

Damper diode — BY448

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Available in ammo-pack.

APPLICATIONS

- Damper diode in high frequency horizontal deflection circuits up to 16 kHz.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

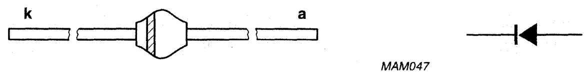


Fig.1 Simplified outline (SOD57) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RSM}	non-repetitive peak reverse voltage		–	1650	V
V_{RRM}	repetitive peak reverse voltage		–	1650	V
V_R	continuous reverse voltage		–	1500	V
I_{FWM}	working peak forward current	T_{amb} = 50 °C; PCB mounting (see Fig 4); see Fig.2	–	4	A
I_{FRM}	repetitive peak forward current		–	8	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	30	A
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature		−65	+150	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 3 A; $T_j = T_{j\,max}$; see Fig.3	1.45	V
		I_F = 3 A; see Fig.3	1.60	V
I_R	reverse current	$V_R = V_{Rmax}$; T_j = 150 °C	150	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.6	1	μs
t_{fr}	forward recovery time	when switched to I_F = 4 A in 50 ns; $T_j = T_{j\,max}$; see Fig.7	1	μs

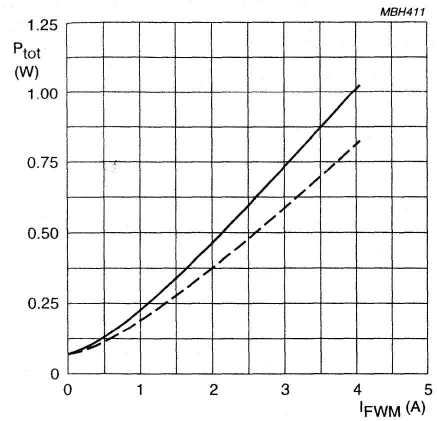
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	46	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W
		mounted as shown in Fig.5	55	K/W

Note

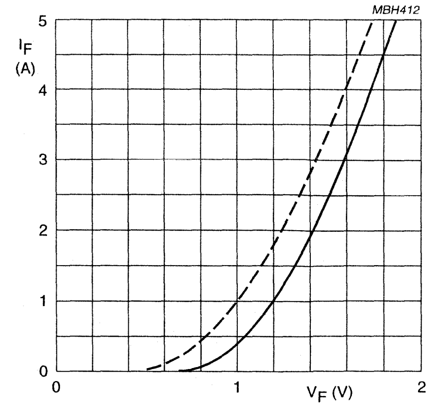
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.4. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA



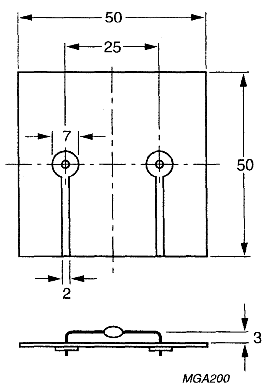
Solid line: basic high-voltage E/W modulator circuit; see Fig.8.
Dotted line: basic conventional horizontal deflection circuit; see Fig.9.
Curves include power dissipation due to switching losses.

Fig.2 Maximum total power dissipation as a function of the working peak forward current.



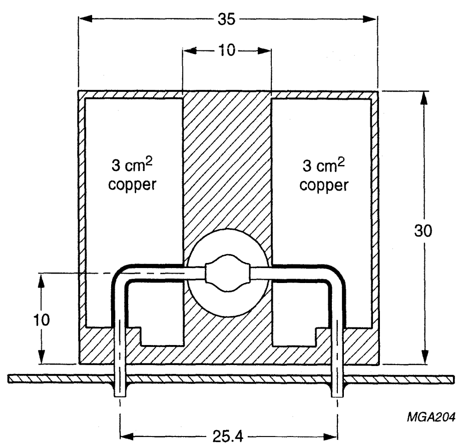
Dotted line: $T_j = 150$ °C.
Solid line: $T_j = 25$ °C.

Fig.3 Forward current as a function of forward voltage; maximum values.



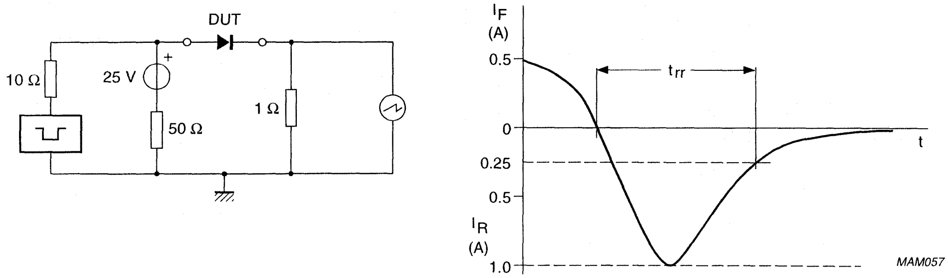
Dimensions in mm.

Fig.4 Device mounted on a printed-circuit board.



Dimensions in mm.

Fig.5 Mounting with additional printed circuit board for heat sink purposes.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.6 Test circuit and reverse recovery time waveform and definition.

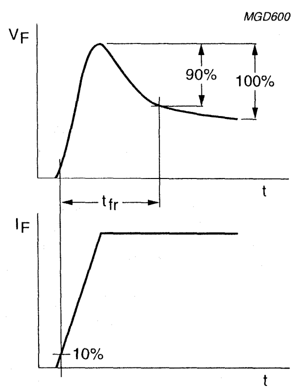


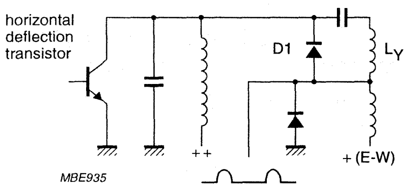
Fig.7 Forward recovery time definition.

APPLICATION INFORMATION

For horizontal deflection circuits, two basic applications are shown in Figs 8 and 9.

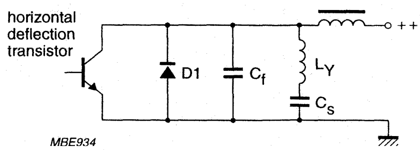
The maximum allowable total power dissipation for the diode can be calculated from the thermal resistance $R_{th\ j\text{-}a}$ and the difference between $T_{j\ max}$ and $T_{amb\ max}$ in the application. The maximum I_{FWM} can then be taken from Fig.2.

The basic application waveforms in Fig.10 relate to the circuit in Fig.8. In the circuit in Fig.9 the forward conduction time of the diode is shorter, allowing a higher I_{FWM} (see Fig.2).



D1 = BY448.

Fig.8 Application in basic high-voltage E/W modulator circuit.



D1 = BY448.

Fig.9 Application in basic horizontal deflection circuit.

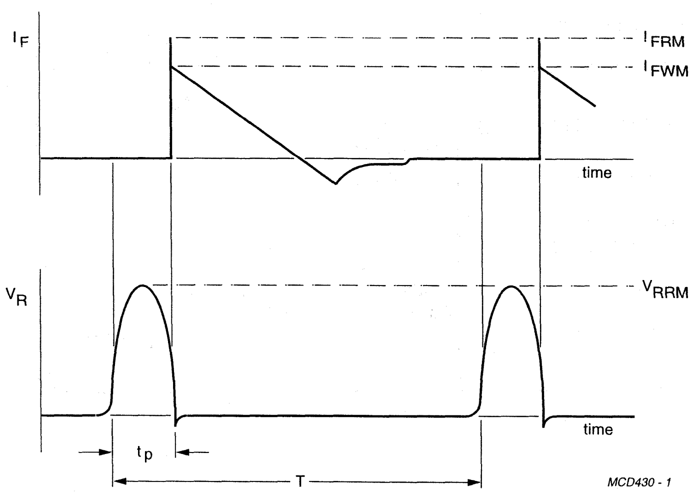


Fig.10 Basic application waveforms.

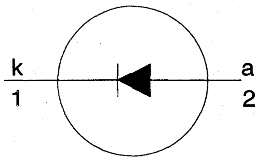
Damper diode fast, high-voltage

BY459-1500, BY459-1500S

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 1500 V

$V_F \leq$ 1.2 V / 1.25 V

$I_{F(peak)}$ = 12 A (f = 48 kHz)

$I_{F(peak)}$ = 10 A (f = 82 kHz)

$I_{FSM} \leq$ 100 A

$t_{rr} \leq$ 350 ns / 220 ns

GENERAL DESCRIPTION

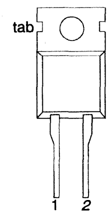
Glass-passivated double diffused rectifier diode featuring fast forward recovery and low forward recovery voltage. The device is intended for use in HDTV receivers and multi-sync monitor horizontal deflection circuits.

The BY459 series is supplied in the conventional leaded SOD59 (TO220AC) package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
V_{RSM}	Peak non-repetitive reverse voltage		-	1500		V
V_{RRM}	Peak repetitive reverse voltage		-	1500		V
V_{RWM}	Crest working reverse voltage		-	1300		V
		BY459		-1500	-1500S	
$I_{F(peak)}$	Peak working forward current	f = 48 kHz; f = 82 kHz;	- -	12 -	- 10	A A
I_{FRM}	Peak repetitive forward current	t = 100 µs	-	100		A
$I_{F(RMS)}$	RMS forward current		-	30		A
I_{FSM}	Peak non-repetitive forward current	t = 10 ms t = 8.3 ms sinusoidal; T_j = 150 ˚C prior to surge; with reapplied $V_{RWM(max)}$	- -	100 110		A A
T_{stg}	Storage temperature		-40	150		˚C
T_j	Operating junction temperature		-	150		˚C

Damper diode fast, high-voltage

BY459-1500, BY459-1500S

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	1.5	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	60	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	TYP.		MAX.		UNIT
		BY459	1500	1500S	1500	1500S	
V_F	Forward voltage	I_F = 6.5 A	0.95	1.05	1.30	1.35	V
		I_F = 6.5 A; T_j = 125 ˚C	0.85	0.95	1.20	1.25	V
I_R	Reverse current	V_R = 1300 V	-	250	-	250	µA
		V_R = 1300 V; T_j = 125 ˚C	-	1	-	1	mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	TYP.		MAX.		UNIT
		BY459	1500	1500S	1500	1500S	
t_{rr}	Reverse recovery time	I_F = 1 A, $V_R \geq$ 30 V;	0.25	0.17	0.35	0.22	µs
Q_s	Reverse recovery charge	I_F = 2 A, $-dI_F/dt$ = 20 A/µs	2.0	0.70	3.0	0.95	µC
V_{fr}	Peak forward recovery voltage	I_F = 6.5A, dI_F/dt = 50A/µs	8.0	11.0	14.0	19.0	V
t_{fr}	Forward recovery time	I_F = 6.5A, dI_F/dt = 50A/µs	170	200	250	300	ns

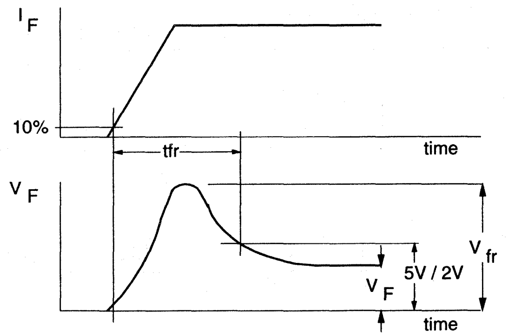


Fig.1. Definition of Vfr and tfr

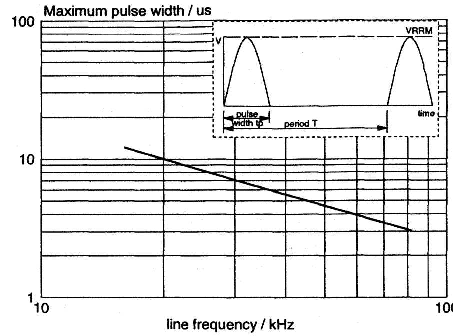


Fig.4. Maximum allowable pulse width t_p versus line frequency; Basic horizontal deflection circuit.

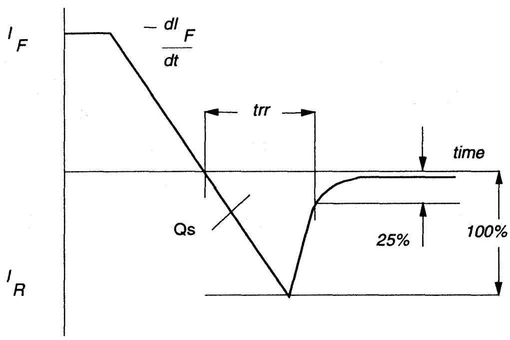


Fig.2. Definition of t_{rr} and Q_s

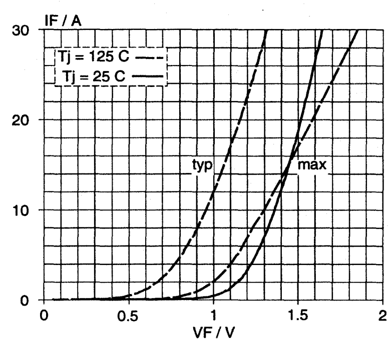


Fig.5. BY459-1500 Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

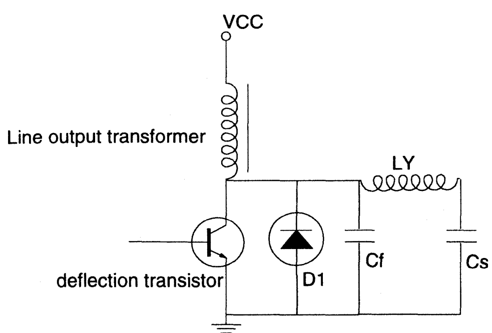


Fig.3. Basic horizontal deflection circuit.

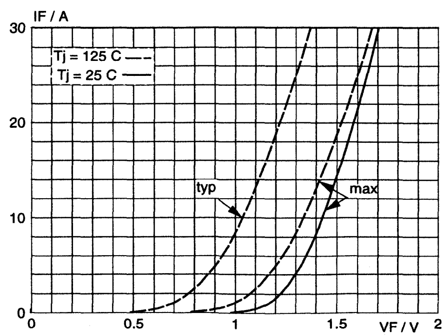


Fig.6. BY459-1500S Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

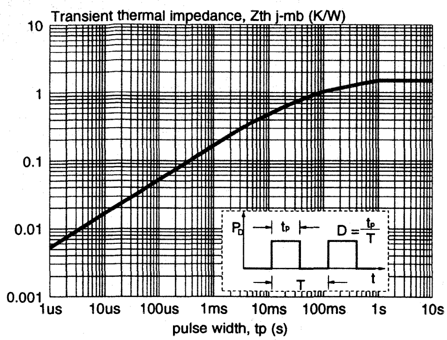


Fig.7. Transient thermal impedance $Z_{th} = f(t_p)$

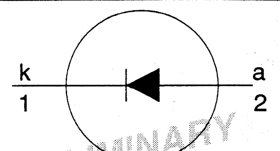
Damper diode fast, high-voltage

BY459DX-1500, BY459DX-1500S

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

V_R = 1500 V

$V_F \leq$ 1.2 V / 1.25 V

$I_{F(peak)}$ = 12 A (f = 48 kHz)

$I_{F(peak)}$ = 10 A (f = 82 kHz)

$I_{FSM} \leq$ 100 A

$t_{rr} \leq$ 350 ns / 220 ns

GENERAL DESCRIPTION

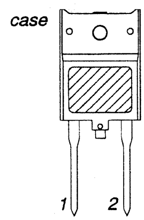
Glass-passivated double diffused rectifier diode featuring fast forward recovery and low forward recovery voltage. The device is intended for use in HDTV receivers and multi-sync monitor horizontal deflection circuits.

The BY459DX series is supplied in the conventional leaded SOD117 package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	isolated

SOD117



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
V_{RSM}	Peak non repetitive reverse voltage		-	1500		V
V_{RRM}	Peak repetitive reverse voltage		-	1500		V
V_{RWM}	Crest working reverse voltage		-	1300		V
				-1500	**-1500S**	
$I_{F(peak)}$	Peak working forward current	f = 48 kHz;	-	12	-	A
		f = 82 kHz;	-	-	10	A
I_{FRM}	Peak repetitive forward current	t = 100 µs	-	100		A
$I_{F(RMS)}$	RMS forward current		-	30		A
I_{FSM}	Peak non-repetitive forward current	t = 10 ms	-	100		A
		t = 8.3 ms	-	110		A
		sinusoidal; T_j = 150 ˚C prior to surge; with reapplied $V_{RWM(max)}$				
T_{stg}	Storage temperature		-40	150		˚C
T_j	Operating junction temperature		-	150		˚C

ISOLATION LIMITING VALUE & CHARACTERISTIC

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	R.M.S. isolation voltage from both terminals to external heatsink	f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree	-		2500	V
C_{isol}	Capacitance from both terminals to external heatsink	f = 1 MHz	-	10	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	3.6	K/W
		without heatsink compound	-	-	4.5	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	35	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	TYP.		MAX.		UNIT
		BY459DX-	1500	1500S	1500	1500S	
V_F	Forward voltage	I_F = 6.5 A	0.95	1.05	1.30	1.35	V
		I_F = 6.5 A; T_j = 125 ˚C	0.85	0.95	1.20	1.25	V
I_R	Reverse current	V_R = 1300 V	-	250	-	250	µA
		V_R = 1300 V; T_j = 125 ˚C	-	1	-	1	mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	TYP.		MAX.		UNIT
		BY459DX-	1500	1500S	1500	1500S	
t_{rr}	Reverse recovery time	I_F = 1 A, V_R ≥ 30 V;	0.25	0.17	0.35	0.22	µs
Q_s	Reverse recovery charge	I_F = 2 A, -dI_F/dt = 20 A/µs	2.0	0.70	3.0	0.95	µC
V_{fr}	Peak forward recovery voltage	I_F = 6.5A, dI_F/dt = 50A/µs	8.0	11.0	14.0	19.0	V
t_{fr}	Forward recovery time	I_F = 6.5A, dI_F/dt = 50A/µs	170	200	250	300	ns

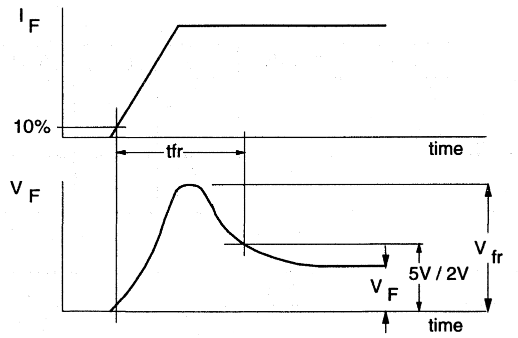


Fig.1. Definition of Vfr and tfr

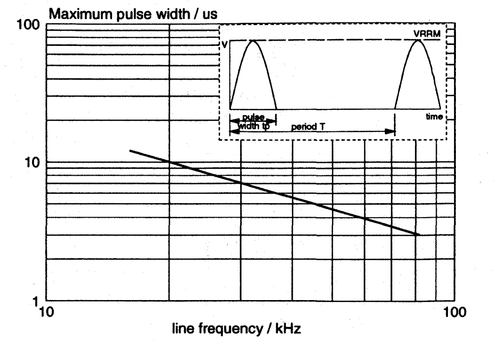


Fig.4. Maximum allowable pulse width t_p versus line frequency; Basic horizontal deflection circuit.

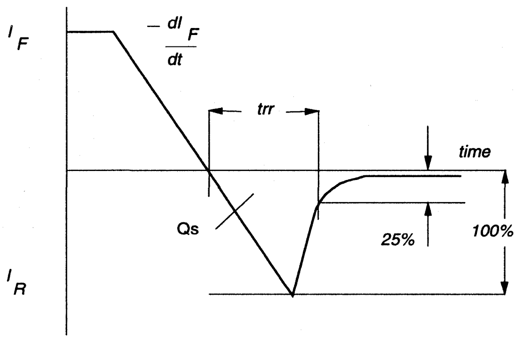


Fig.2. Definition of t_{rr} and Q_s

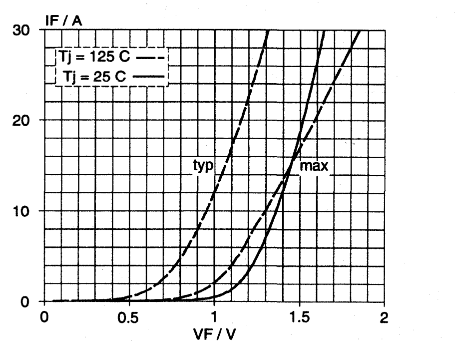


Fig.5. BY459DX-1500 Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

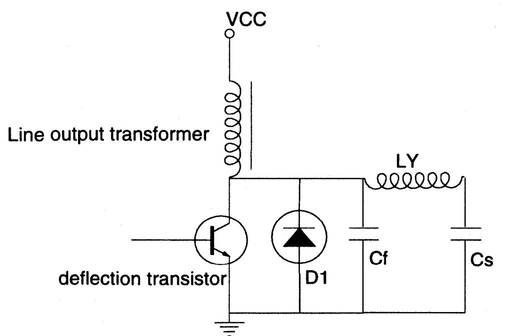


Fig.3. Basic horizontal deflection circuit.

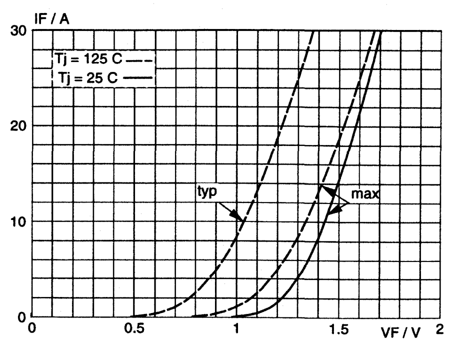


Fig.6. BY459DX-1500S Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

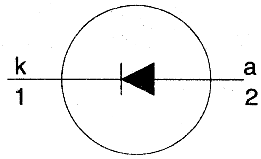
Damper diode fast, high-voltage

BY459X-1500, BY459X-1500S

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

$V_R = 1500$ V

$V_F \leq 1.2$ V / 1.25 V

$I_{F(peak)} = 12$ A (f = 48 kHz)

$I_{F(peak)} = 10$ A (f = 82 kHz)

$I_{FSM} \leq 100$ A

$t_{rr} \leq 350$ ns / 220 ns

GENERAL DESCRIPTION

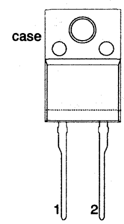
Glass-passivated double diffused rectifier diode featuring fast forward recovery and low forward recovery voltage. The device is intended for use in HDTV receivers and multi-sync monitor horizontal deflection circuits.

The BY459X series is supplied in the conventional leaded SOD113 package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	isolated

SOD113



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
V_{RSM}	Peak non repetitive reverse voltage		-	1500		V
V_{RRM}	Peak repetitive reverse voltage		-	1500		V
V_{RWM}	Crest working reverse voltage		-	1300		V
				-1500	-1500S	
$I_{F(peak)}$	Peak working forward current	f = 48 kHz;	-	12	-	A
		f = 82 kHz;	-	-	10	A
I_{FRM}	Peak repetitive forward current	t = 100 µs	-	100		A
$I_{F(RMS)}$	RMS forward current		-	30		A
I_{FSM}	Peak non-repetitive forward current	t = 10 ms	-	100		A
		t = 8.3 ms	-	110		A
		sinusoidal; $T_j = 150$ ˚C prior to surge; with reapplied $V_{RWM(max)}$				
T_{stg}	Storage temperature		-40	150		˚C
T_j	Operating junction temperature		-	150		˚C

ISOLATION LIMITING VALUE & CHARACTERISTIC

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	R.M.S. isolation voltage from both terminals to external heatsink	f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree	-		2500	V
C_{isol}	Capacitance from both terminals to external heatsink	f = 1 MHz	-	10	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	4.8	K/W
		without heatsink compound	-	-	5.9	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	55	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	TYP.		MAX.		UNIT
		BY459X-	1500	1500S	1500	1500S	
V_F	Forward voltage	I_F = 6.5 A	0.95	1.05	1.30	1.35	V
		I_F = 6.5 A; T_j = 125 ˚C	0.85	0.95	1.20	1.25	V
I_R	Reverse current	V_R = 1300 V	-	250	-	250	µA
		V_R = 1300 V; T_j = 125 ˚C	-	1	-	1	mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	TYP.		MAX.		UNIT
		BY459X-	1500	1500S	1500	1500S	
t_{rr}	Reverse recovery time	I_F = 1 A, V_R ≥ 30 V;	0.25	0.17	0.35	0.22	µs
Q_s	Reverse recovery charge	I_F = 2 A, -dI_F/dt = 20 A/µs	2.0	0.70	3.0	0.95	µC
V_{fr}	Peak forward recovery voltage	I_F = 6.5A, dI_F/dt = 50A/µs	8.0	11.0	14.0	19.0	V
t_{fr}	Forward recovery time	I_F = 6.5A, dI_F/dt = 50A/µs	170	200	250	300	ns

Damper diode fast, high-voltage

BY459X-1500, BY459X-1500S

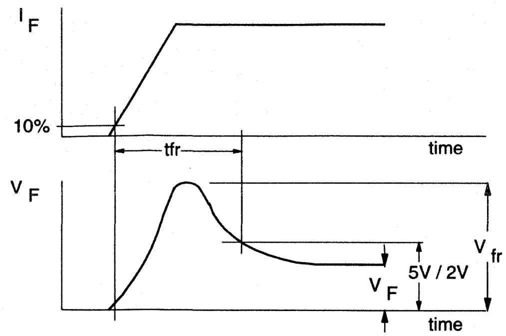


Fig.1. Definition of Vfr and tfr

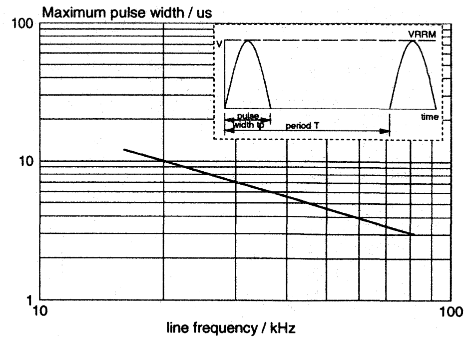


Fig.4. Maximum allowable pulse width t_p versus line frequency; Basic horizontal deflection circuit.

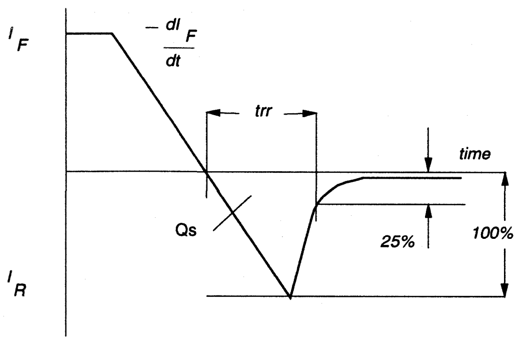


Fig.2. Definition of t_{rr} and Q_s

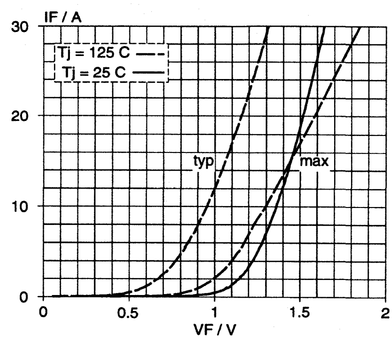


Fig.5. BY459X-1500 Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

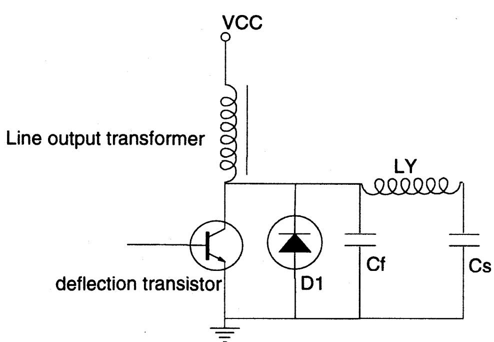


Fig.3. Basic horizontal deflection circuit.

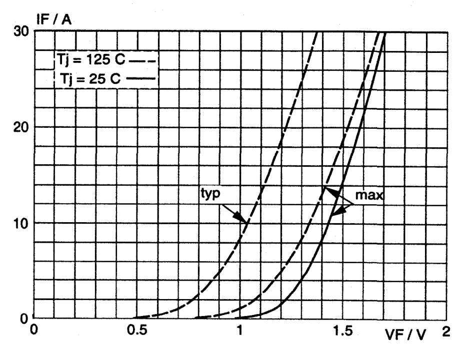


Fig.6. BY459X-1500S Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

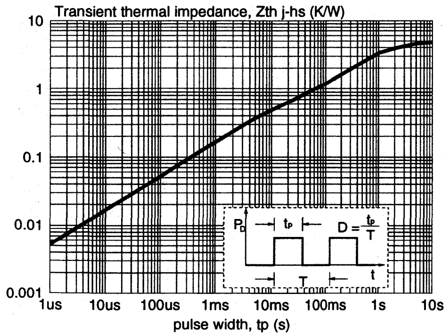


Fig.7. Transient thermal impedance $Z_{th} = f(t_p)$

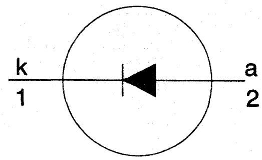
Damper diode fast, high-voltage

BY479X-1700

FEATURES

- Low forward volt drop
- Low Forward recovery voltage
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

V_R = 1700 V

$V_F \leq$ 1.2 V

$V_{fr} \leq$ 19 V

I_{FWM} = 10 A

$I_{FRM} \leq$ 100 A

$t_{fr} \leq$ 300 ns

GENERAL DESCRIPTION

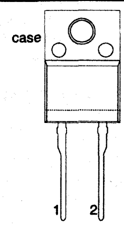
Glass-passivated double diffused rectifier diode featuring fast forward recovery and low forward recovery voltage. The device is intended for use in multi-sync monitor deflection circuits up to 64kHz. The device is designed to withstand transient reverse voltages up to 1700V.

The BY479X series is supplied in the conventional leaded SOD113 package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	isolated

SOD113



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RSM}	Peak non-repetitive reverse voltage during flash-over of picture tube		-	1700	V
V_{RRM}	Peak repetitive reverse voltage	t = 3.5 µs; f = 64kHz	-	1700	V
V_{RWM}	Crest working reverse voltage		-	1300	V
I_{FWM}	Peak working forward current[1]	f = 64kHz; $T_{hs} \leq$ 126 ˚C	-	10	A
I_{FRM}	Peak repetitive forward current	t = 100 µs	-	100	A
I_{FSM}	Peak non-repetitive forward current	t = 10 ms	-	100	A
		t = 8.3 ms	-	110	A
		sinusoidal; T_j = 150 ˚C prior to surge; with reapplied $V_{RWM(max)}$			
T_{stg}	Storage temperature		-40	150	˚C
T_j	Operating junction temperature		-	150	˚C

1 Including worst case forward recovery losses, see fig:5.

ISOLATION LIMITING VALUE & CHARACTERISTIC

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	R.M.S. isolation voltage from both terminals to external heatsink	f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree	-		2500	V
C_{isol}	Capacitance from both terminals to external heatsink	f = 1 MHz	-	10	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	4.8	K/W
		without heatsink compound	-	-	5.9	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	55	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 6.5 A	-	0.95	1.3	V
		I_F = 6.5 A; T_j = 125 ˚C	-	0.85	1.2	V
I_R	Reverse current	$V_R = V_{RWMmax}$	-	-	0.25	mA
		$V_R = V_{RWMmax}$; T_j = 125 ˚C	-	-	1.0	mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{fr}	Forward recovery voltage	I_F = 6.5 A; dI_F/dt = 50 A/µs	-	12	19	V
t_{fr}	Forward recovery time	I_F = 6.5 A; dI_F/dt = 50 A/µs; V_F = 5 V	-	200	300	ns
		I_F = 6.5 A; dI_F/dt = 50 A/µs; V_F = 2 V	-	400	-	ns
t_{rr}	Reverse recovery time	I_F = 1 A; $-dI_F/dt$ = 50 A/µs; $V_R \geq$ 30 V	-	250	350	ns
Q_s	Reverse recovery charge	I_F = 2 A; $-dI_F/dt$ = 20 A/µs; $V_R \geq$ 30 V	-	2.0	3.0	µC

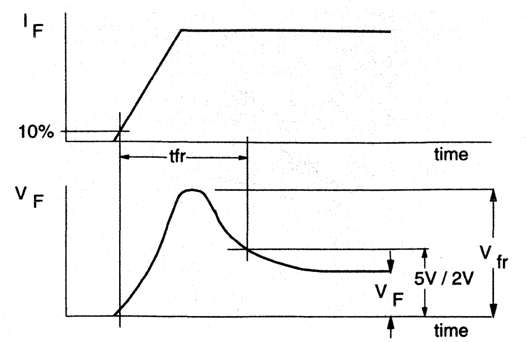


Fig.1. Definition of Vfr and tfr

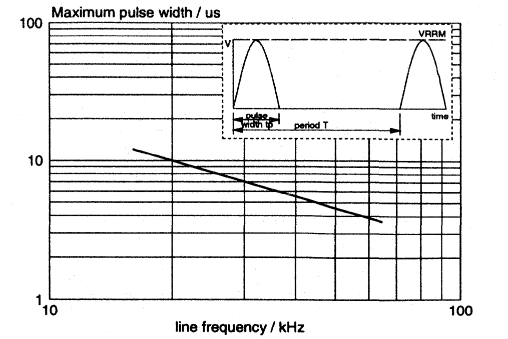


Fig.4. Maximum allowable pulse width t_p versus line frequency; Basic horizontal deflection circuit.

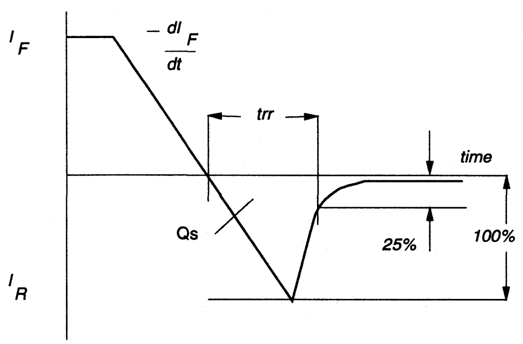


Fig.2. Definition of t_{rr} and Q_s

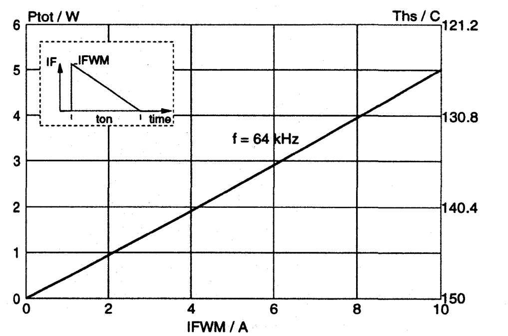


Fig.5. Total dissipation $P_{tot} = f(I_{FWM})$; including forward recovery losses; Basic horizontal deflection circuit.

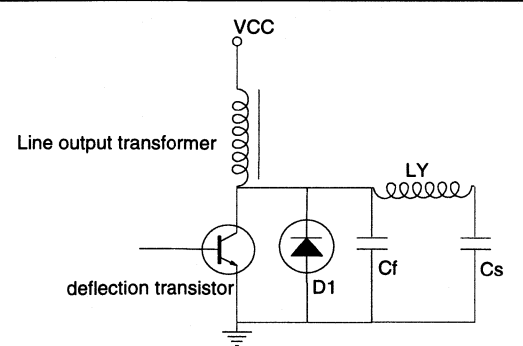


Fig.3. Basic horizontal deflection circuit.

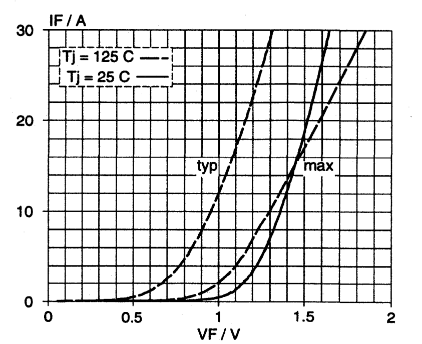


Fig.6. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

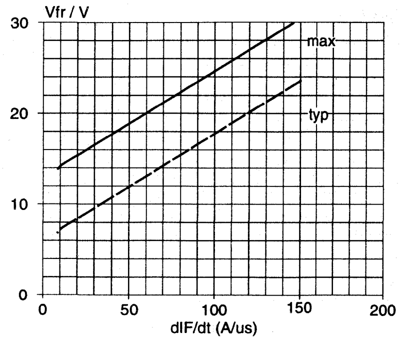


Fig.7. Typical and maximum $V_{fr} = f(dI_F/dt)$; $I_F = 6.5A$; $T_j = 25^{\circ}C$

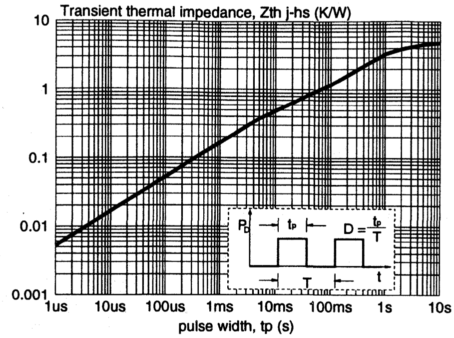


Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$

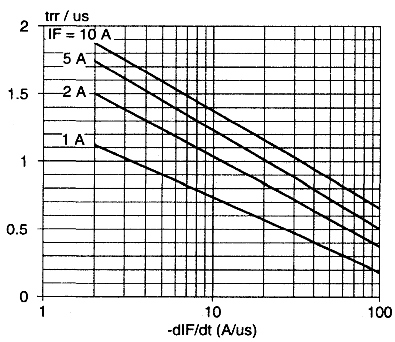


Fig.8. Maximum reverse recovery time $t_{rr} = f(dI_F/dt)$; parameter T_j; $V_R \geq 30V$

High-voltage soft-recovery rectifier — BY505

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Soft-recovery switching characteristics
- Compact construction.

APPLICATIONS

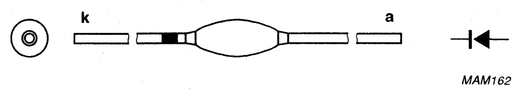
- High-voltage applications for:
  - High frequencies
  - Switching applications.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

The package is designed to be used in an insulating medium such as resin, oil or SF6 gas.



The cathode lead is marked by a black band.

Fig.1 Simplified outline (SOD61A) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RSM}	non-repetitive peak reverse voltage		–	2200	V
V_{RRM}	repetitive peak reverse voltage		–	2200	V
V_{RW}	working reverse voltage		–	2000	V
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; T_{tp} = 25 °C; lead length = 10 mm; see Fig.2; see also Fig.4	–	85	mA
		averaged over any 20 ms period; T_{amb} = 60 °C; PCB mounting (see Fig.6); see Fig.3; see also Fig.4	–	50	mA
I_{FRM}	repetitive peak forward current		–	800	mA
I_{FSM}	non-repetitive peak forward current	$t \leq 10$ ms; half sinewave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RWmax}$	–	5	A
T_{stg}	storage temperature		−65	+120	°C
T_j	junction temperature		−65	+120	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 100 mA; $T_j = T_{j\,max}$; see Fig.5	–	–	8.5	V
I_R	reverse current	$V_R = V_{RWmax}$; $T_j = T_{j\,max}$	–	–	3	μA
Q_r	recovery charge	when switched from I_F = 100 mA to $V_R \geq$ 100 V and dI_F/dt = –200 mA/μs; see Fig.7	–	–	1	nC
t_f	fall time	when switched from I_F = 100 mA to $V_R \geq$ 100 V and dI_F/dt = –200 mA/μs; see Fig.7	100	–	–	ns
t_{rr}	reverse recovery time	when switched from I_F = 100 mA to $V_R \geq$ 100 V and dI_F/dt = –200 mA/μs; see Fig.7	–	200	–	ns
C_d	diode capacitance	V_R = 0 V; f = 1 MHz	–	2	–	pF

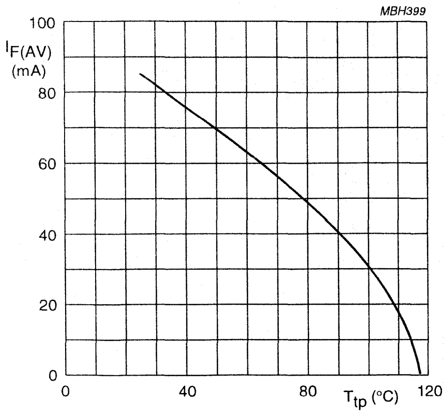
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	100	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	155	K/W

Note

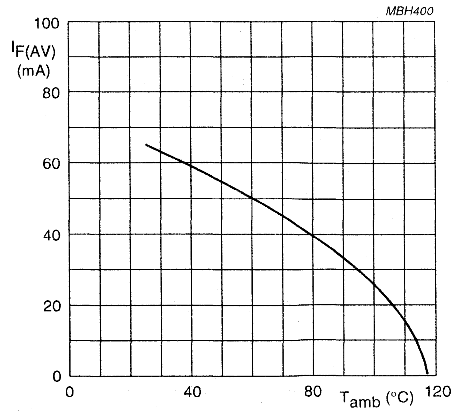
1. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.6. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA



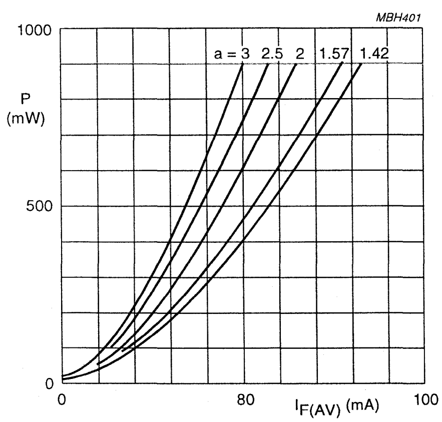
Switched mode application.
a = 1.42; δ = 0.5; $V_R = V_{RWmax}$; lead length = 10 mm.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



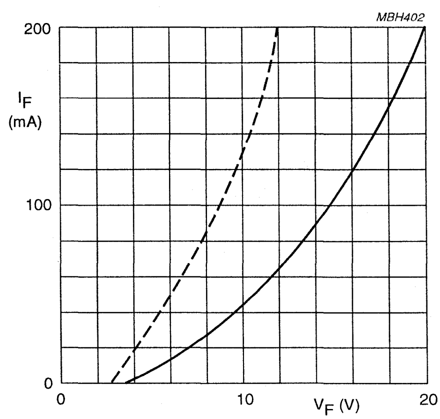
Switched mode application.
a = 1.42; δ = 0.5; $V_R = V_{RWmax}$; device mounted as shown in Fig.6.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



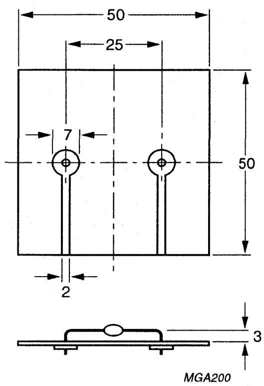
a = $I_{F(RMS)}/I_{F(AV)}$; δ = 0.5; $V_R = V_{RWmax}$.

Fig.4 Maximum steady state power dissipation (forward plus leakage losses) as a function of average forward current.



Dotted line: T_j = 120 °C.
Solid line: T_j = 25 °C.

Fig.5 Forward current as a function of maximum forward voltage.



Dimensions in mm.

Fig.6 Device mounted on a printed-circuit board.

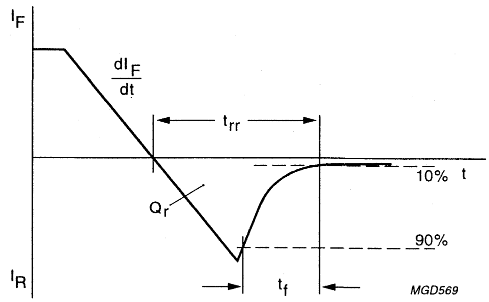


Fig.7 Reverse recovery definitions.

Controlled avalanche rectifier BY527

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

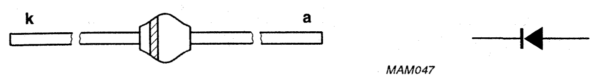


Fig.1 Simplified outline (SOD57) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	1250	V
V_{RWM}	crest working reverse voltage		–	800	V
V_R	continuous reverse voltage		–	800	V
$I_{F(AV)}$	average forward current	T_{tp} = 45 °C; lead length = 10 mm; averaged over any 20 ms period; see Figs 2 and 4	–	2.0	A
		T_{amb} = 80 °C; PCB mounting (see Fig.9); averaged over any 20 ms period; see Figs 3 and 4	–	0.8	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave	–	50	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	20	mJ
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature	see Fig.5	−65	+175	°C

ELECTRICAL CHARACTERISTICS

$T_j = 25$ °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	$I_F = 1$ A; $T_j = T_{j\,max}$; see Fig.6	–	–	0.8	V
		$I_F = 1$ A; see Fig.6	–	–	1.0	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	$I_R = 0.1$ mA	1250	–	–	V
I_R	reverse current	$V_R = V_{RWMmax}$; see Fig.7	–	–	1	µA
		$V_R = V_{RWMmax}$; $T_j = 165$ °C; see Fig.7	–	–	150	µA
t_{rr}	reverse recovery time	when switched from $I_F = 0.5$ A to $I_R = 1$ A; measured at $I_R = 0.25$ A; see Fig.10	–	3	–	µs
C_d	diode capacitance	$V_R = 0$ V; f = 1 MHz; see Fig.8	–	50	–	pF

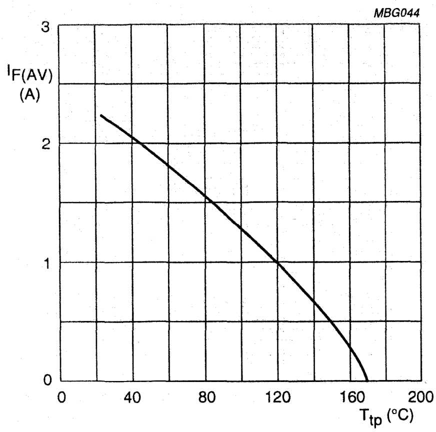
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	46	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

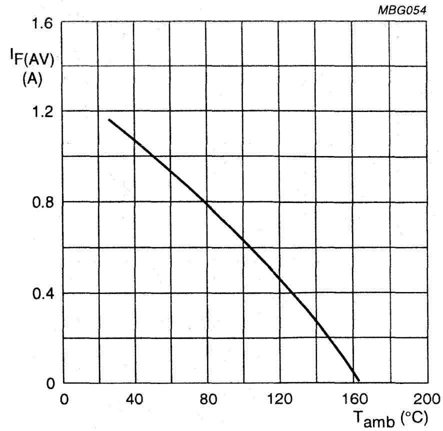
1. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 µm, see Fig.9. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA



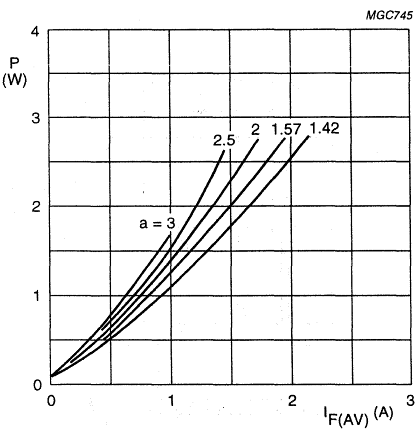
a = 1.57; $V_R = V_{RWMmax}$; $\delta = 0.5$.
Lead length 10 mm.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



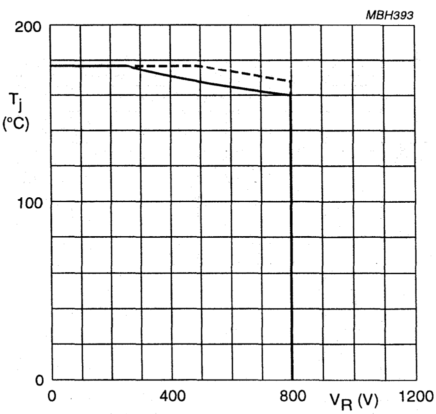
a = 1.57; $V_R = V_{RWMmax}$; $\delta = 0.5$.
Device mounted as shown in Fig.9.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



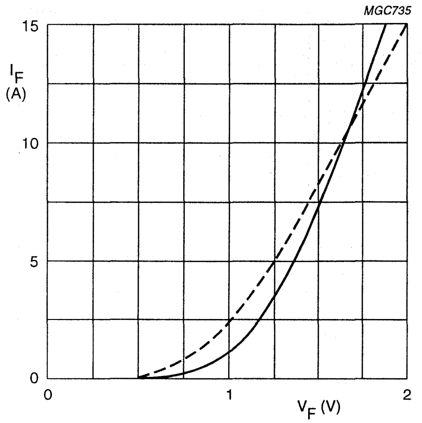
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWMmax}$; $\delta = 0.5$.

Fig.4 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



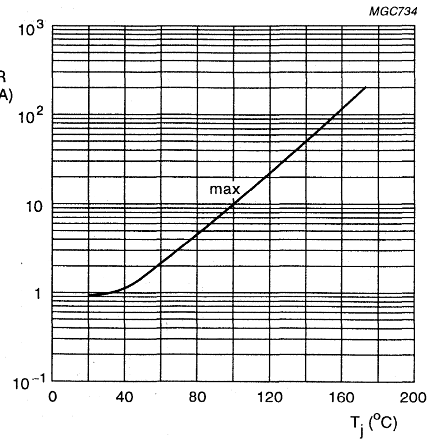
Solid line = V_R.
Dotted line = V_{RWM}; $\delta = 0.5$.

Fig.5 Maximum permissible junction temperature as a function of reverse voltage.



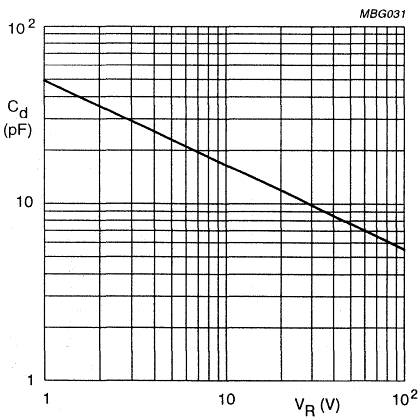
Solid line: T_j = 25 °C.
Dotted line: T_j = 175 °C.

Fig.6 Forward current as a function of forward voltage; maximum values.



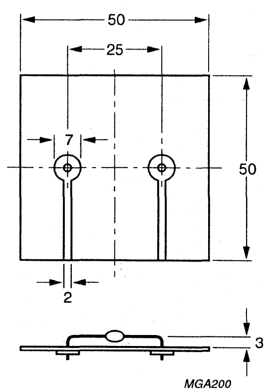
$V_R = V_{RWMmax}$.

Fig.7 Reverse current as a function of junction temperature; maximum values.



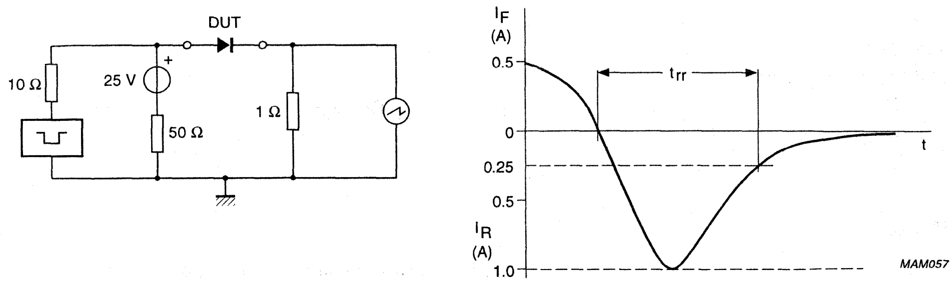
f = 1 MHz; T_j = 25 °C.

Fig.8 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.9 Device mounted on a printed-circuit board.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.10 Test circuit and reverse recovery time waveform and definition.

Damper diodes | BY558; BY578

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Also available with preformed leads for easy insertion
- Designed to withstand transients up to 1700 V.

APPLICATIONS

- For use in multi-sync monitor horizontal deflection circuits

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

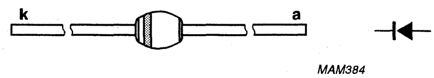


Fig.1 Simplified outline (SOD115) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RSM}	non-repetitive peak reverse voltage				
	BY558		–	1500	V
	BY578		–	1700	V
V_{RRM}	repetitive peak reverse voltage				
	BY558		–	1500	V
	BY578		–	1700	V
V_R	continuous reverse voltage		–	1400	V
$I_{F(AV)}$	average forward current	T_{tp} = 65 °C; see Fig.2; PCB mounting; averaged over any 20 ms period; see Fig.4	–	2.5	A
I_{FRM}	repetitive peak forward current		–	12	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	80	A
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+150	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 5 A; $T_j = T_{j\,max}$; see Fig.3	–	1.3	V
		I_F = 5 A; see Fig.3	–	1.7	V
I_R	reverse current	$V_R = V_{RRMmax}$; T_j = 150 °C	–	175	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.6	–	250	ns
V_{FRM}	forward recovery voltage	I_F = 5 A; dI_F/dt = 50 A/μs; see Fig.5	15	20	V
t_{fr}	forward recovery time	I_F = 5 A; dI_F/dt = 50 A/μs; V_F = 5 V; see Fig.5	260	350	ns
		I_F = 5 A; dI_F/dt = 50 A/μs; V_F = 2 V; see Fig.5	700	–	ns

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	20	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	70	K/W

Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.4. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA

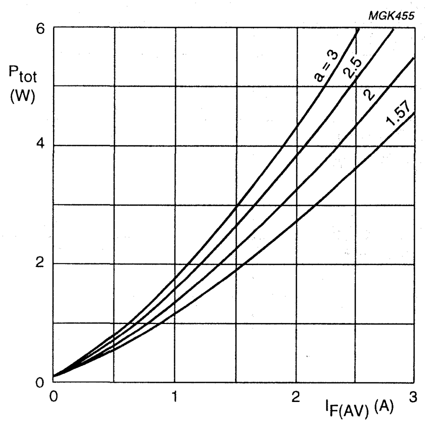
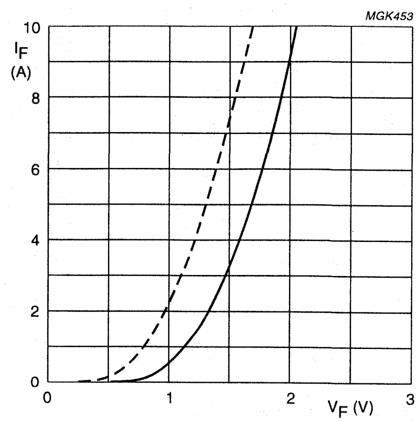
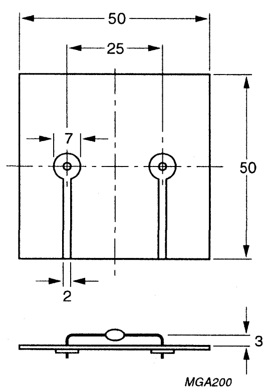


Fig.2 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



Dotted line: T_j = 150 °C.
Solid line: T_j = 25 °C.

Fig.3 Forward current as a function of forward voltage; maximum values.



Dimensions in mm.

Fig.4 Device mounted on a printed-circuit board.

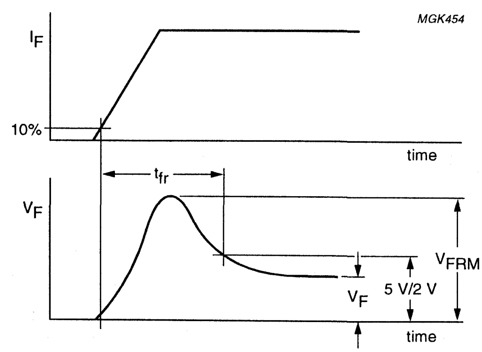
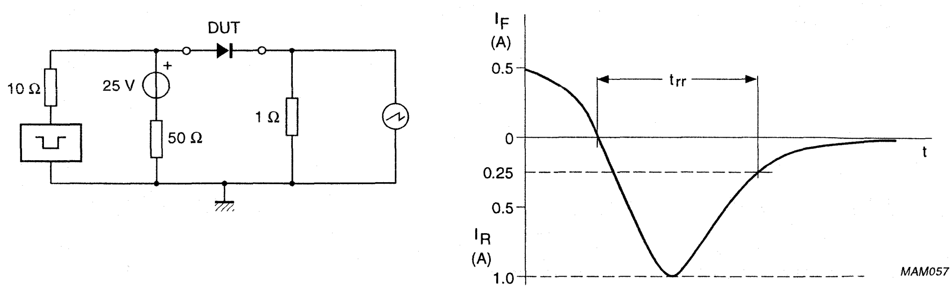


Fig.5 Forward recovery time and voltage definition.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.6 Test circuit and reverse recovery time waveform and definition.

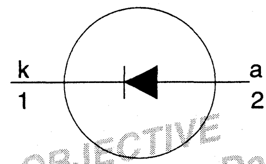
Rectifier diode fast, high-voltage

BY559-1500

FEATURES

- Low forward volt drop
- Low forward recovery voltage
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

$V_R = 1500$ V

$V_F \leq 1.2$ V

$V_{fr} \leq 14$ V

$t_{fr} \leq 250$ ns

$I_{F(AV)} = 10$ A

$I_{FSM} \leq 100$ A

GENERAL DESCRIPTION

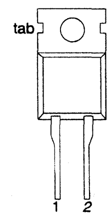
Glass-passivated double diffused rectifier diode featuring fast forward recovery and low forward recovery voltage. The device is intended for use in multi-sync monitor horizontal deflection circuits with maximum scan rates from 82 kHz to 120 kHz.

The BY559 series is supplied in the conventional leaded SOD59 (TO220AC) package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	Peak repetitive reverse voltage		-	1500	V
V_{RWM}	Crest working reverse voltage		-	1300	V
I_{FWM}	Peak working forward current	f = 120 kHz;	-	10	A
I_{FRM}	Peak repetitive forward current	t = 100 µs	-	150	A
I_{FSM}	Peak non-repetitive forward current	t = 10 ms	-	180	A
		t = 8.3 ms	-	200	A
		sinusoidal; T_j = 150 ˚C prior to surge; with reapplied $V_{RWM(max)}$			
T_{stg}	Storage temperature		-40	150	˚C
T_j	Operating junction temperature		-	150	˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	1.0	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	60	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 10 A	-	1.0	1.25	V
		I_F = 10 A; T_j = 125 ˚C	-	0.79	0.9	V
I_R	Reverse current	$V_R = V_{RWMmax}$	-	-	0.5	mA
		$V_R = V_{RWMmax}$; T_j = 125 ˚C	-	-	2.0	mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{fr}	Forward recovery voltage	I_F = 10 A; dI_F/dt = 50 A/µs	-	7	11	V
t_{fr}	Forward recovery time	I_F = 10 A; dI_F/dt = 50 A/µs; V_F = 5 V	-	250	350	ns
		I_F = 10 A; dI_F/dt = 50 A/µs; V_F = 2 V	-	450	600	ns
t_{rr}	Reverse recovery time	I_F = 1 A; $-dI_F/dt$ = 50 A/µs; $V_R \geq 30$ V	-	0.75	1.0	µs
Q_s	Reverse recovery charge	I_F = 2 A; $-dI_F/dt$ = 20 A/µs; $V_R \geq 30$ V	-	4.0	5.0	µC

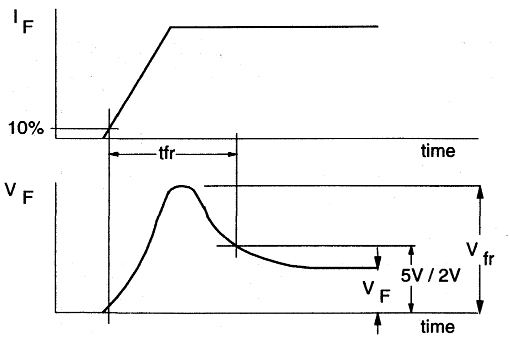


Fig.1. Definition of Vfr and tfr

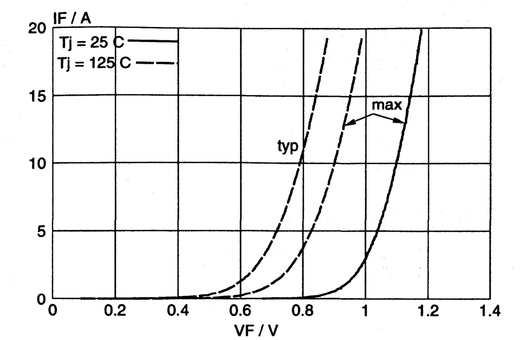


Fig.4. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

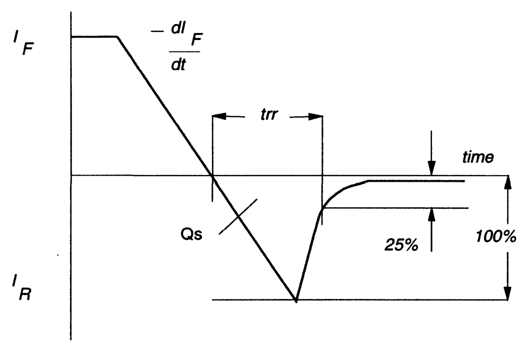


Fig.2. Definition of t_{rr} and Q_s

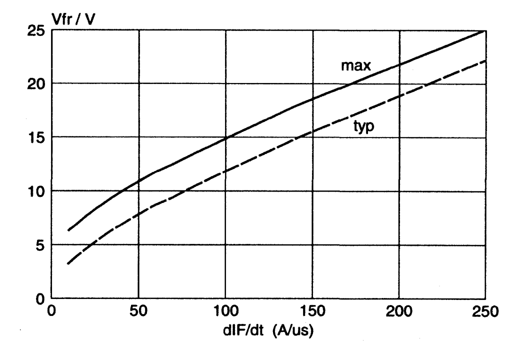


Fig.5. Typical and maximum $V_{fr} = f(dI_F/dt)$; $I_F = 10$ A; $T_j = 25$˚C

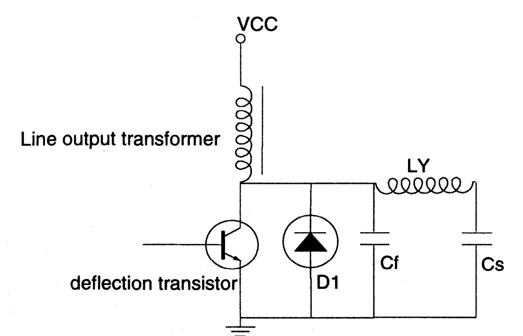


Fig.3. Basic horizontal deflection circuit.

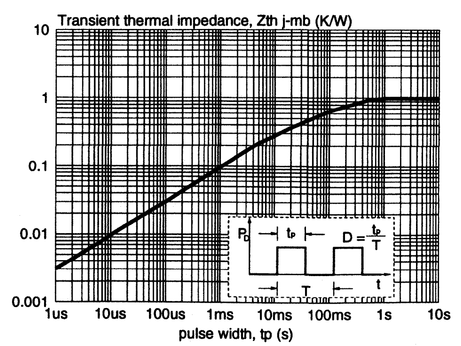


Fig.6. Transient thermal impedance $Z_{th} = f(t_p)$

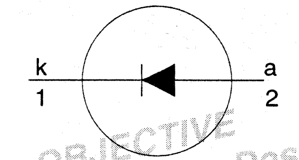
Damper diode fast, high-voltage

BY559-1500U

FEATURES

- Low forward volt drop
- Low forward recovery voltage
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 1500 V

$V_F \leq$ 1.4 V

$V_{fr} \leq$ 10 V

$t_{rr} \leq$ 120 ns

$I_{F(peak)}$ = 10 A

$I_{FSM} \leq$ 150 A

GENERAL DESCRIPTION

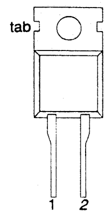
A double diffused rectifier diode in a plastic envelope, featuring fast forward and reverse recovery and low forward voltage. The device is intended for use as a damper diode in horizontal deflection circuits of large screen monitors and workstations .

The BY559 series is supplied in the conventional leaded SOD59 (TO220AC) package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	Peak repetitive reverse voltage		-	1500	V
V_{RWM}	Crest working reverse voltage		-	1300	V
$I_{F(PEAK)}$	Peak working forward current	f = 130 kHz;	-	10	A
I_{FRM}	Peak repetitive forward current	t = 100 µs	-	150	A
I_{FSM}	Peak non-repetitive forward current	t = 10 ms sinusoidal; T_j = 150 ˚C prior to surge; with reapplied $V_{RWM(max)}$	-	160	A
T_{stg}	Storage temperature		-40	150	˚C
T_j	Operating junction temperature		-	150	˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	1.0	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	60	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 6.5 A	-	1.5	1.8	V
		I_F = 6.5 A; T_j = 125 ˚C	-	1.2	1.4	V
I_R	Reverse current	$V_R = V_{RWMmax}$	-	-	0.5	mA
		$V_R = V_{RWMmax}$; T_j = 125 ˚C	-	-	2.0	mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{fr}	Forward recovery voltage	I_F = 6.5 ; dI_F/dt = 50 A/µs	-	6	10	V
t_{fr}	Forward recovery time	I_F = 6.5 A; dI_F/dt = 50 A/µs; V_F = 5 V	-	130	180	ns
t_{rr}	Reverse recovery time	I_F = 1 A; $-dI_F/dt$ = 50 A/µs; $V_R \geq$ 30 V	-	90	120	ns
Q_s	Reverse recovery charge	I_F = 2 A; $-dI_F/dt$ = 20 A/µs; $V_R \geq$ 30 V	-	0.2	0.25	µC

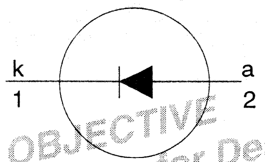
Damper diode fast, high-voltage

BY559X-1500U

FEATURES

- Low forward volt drop
- Low forward recovery voltage
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

$V_R = 1500$ V

$V_F \leq 1.4$ V

$V_{fr} \leq 10$ V

$t_{rr} \leq 120$ ns

$I_{F(PEAK)} = 10$ A

$I_{FSM} \leq 150$ A

GENERAL DESCRIPTION

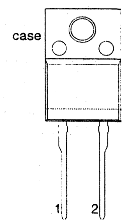
A double diffused rectifier diode in a plastic envelope, featuring fast forward and reverse recovery and low forward voltage. The device is intended for use as a damper diode in horizontal deflection circuits of large screen monitors and workstations .

The BY559X series is supplied in the conventional leaded SOD113 package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	isolated

SOD113



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	Peak repetitive reverse voltage		-	1500	V
V_{RWM}	Crest working reverse voltage		-	1300	V
$I_{F(PEAK)}$	Peak working forward current	f = 130 kHz;	-	10	A
I_{FRM}	Peak repetitive forward current	t = 100 µs	-	150	A
I_{FSM}	Peak non repetitive forward current	t = 10 ms sinusoidal; T_j = 150 ˚C prior to surge; with reapplied $V_{RWM(max)}$	-	160	A
T_{stg}	Storage temperature		-40	150	˚C
T_j	Operating junction temperature		-	150	˚C

ISOLATION LIMITING VALUE & CHARACTERISTIC

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	R.M.S. isolation voltage from both terminals to external heatsink	f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree	-		2500	V
C_{isol}	Capacitance from both terminals to external heatsink	f = 1 MHz	-	10	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	3.6	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	55	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 6.5 A	-	1.5	1.8	V
		I_F = 6.5 A; T_j = 125 ˚C	-	1.2	1.4	V
I_R	Reverse current	$V_R = V_{RWMmax}$	-	-	0.5	mA
		$V_R = V_{RWMmax}$; T_j = 125 ˚C	-	-	2.0	mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{fr}	Forward recovery voltage	I_F = 6.5 ; dI_F/dt = 50 A/µs	-	6	10	V
t_{fr}	Forward recovery time	I_F = 6.5 A; dI_F/dt = 50 A/µs; V_F = 5 V	-	130	180	ns
t_{rr}	Reverse recovery time	I_F = 1 A; $-dI_F/dt$ = 50 A/µs; $V_R \geq 30$ V	-	90	120	ns
Q_s	Reverse recovery charge	I_F = 2 A; $-dI_F/dt$ = 20 A/µs; $V_R \geq 30$ V	-	0.2	0.25	µC

High-voltage soft-recovery rectifier — BY584

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Soft-recovery switching characteristics
- Compact construction.

APPLICATIONS

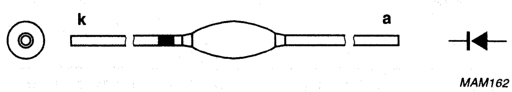
- Grid 2 supply in colour television picture tubes
- High-voltage applications for:
  - High frequencies
  - Switching applications.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

The package is designed to be used in an insulating medium such as resin, oil or SF6 gas.



The cathode lead is marked with an orange band.

Fig.1 Simplified outline (SOD61A) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RSM}	non-repetitive peak reverse voltage		–	1800	V
V_{RRM}	repetitive peak reverse voltage		–	1800	V
V_{RW}	working reverse voltage		–	1500	V
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; T_{tp} = 25 °C; lead length = 10 mm; see Fig.2; see also Fig.4	–	85	mA
		averaged over any 20 ms period; T_{amb} = 60 °C; PCB mounting (see Fig.6); see Fig.3; see also Fig.4	–	50	mA
I_{FRM}	repetitive peak forward current		–	800	mA
I_{FSM}	non-repetitive peak forward current	t ≤ 10 ms; half sinewave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RWmax}$	–	5	A
T_{stg}	storage temperature		–65	+120	°C
T_j	junction temperature		–65	+120	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 100 mA; $T_j = T_{j\,max}$; see Fig.5	–	–	8.5	V
I_R	reverse current	$V_R = V_{RWmax}$; $T_j = T_{j\,max}$	–	–	3	µA
Q_r	recovery charge	when switched from I_F = 100 mA to $V_R \geq$ 100 V and dI_F/dt = –200 mA/µs; see Fig.7	–	–	1	nC
t_f	fall time	when switched from I_F = 100 mA to $V_R \geq$ 100 V and dI_F/dt = –200 mA/µs; see Fig.7	100	–	–	ns
t_{rr}	reverse recovery time	when switched from I_F = 100 mA to $V_R \geq$ 100 V and dI_F/dt = –200 mA/µs; see Fig.7	–	200	–	ns
C_d	diode capacitance	V_R = 0 V; f = 1 MHz	–	2	–	pF

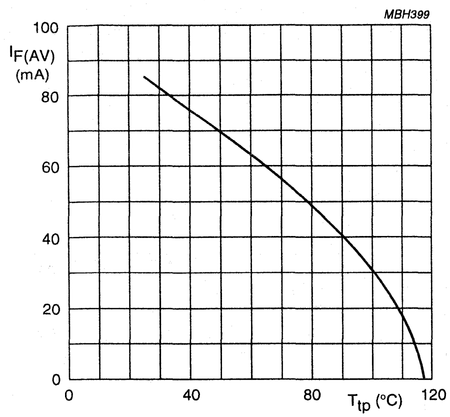
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	100	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	155	K/W

Note

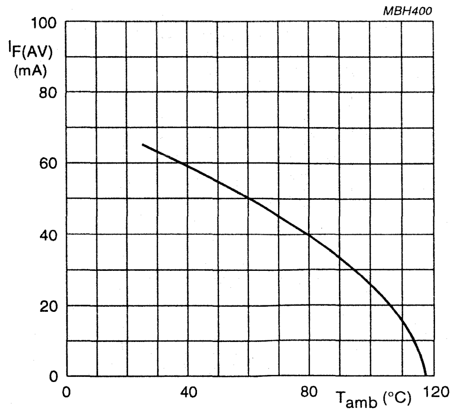
1. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 µm, see Fig.6. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA



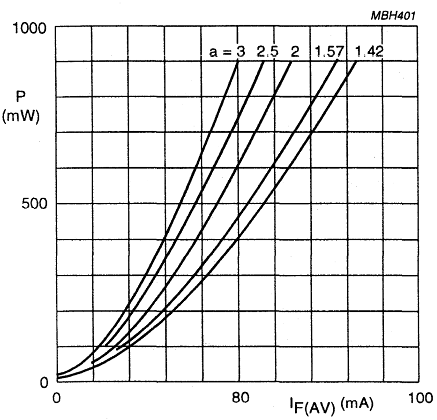
Switched mode application.
a = 1.42; δ = 0.5; $V_R = V_{RWmax}$; lead length = 10 mm.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



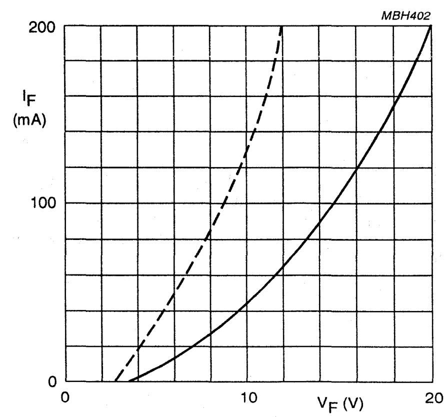
Switched mode application.
a = 1.42; δ = 0.5; $V_R = V_{RWmax}$; device mounted as shown in Fig.6.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



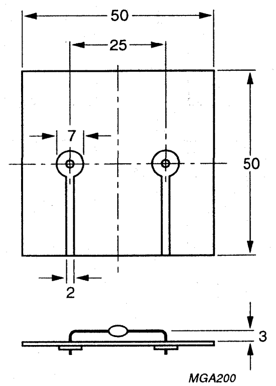
a = $I_{F(RMS)}/I_{F(AV)}$; δ = 0.5; $V_R = V_{RWmax}$.

Fig.4 Maximum steady state power dissipation (forward plus leakage losses) as a function of average forward current.



Dotted line: T_j = 120 °C.
Solid line: T_j = 25 °C.

Fig.5 Forward current as a function of maximum forward voltage.



Dimensions in mm.

Fig.6 Device mounted on a printed-circuit board.

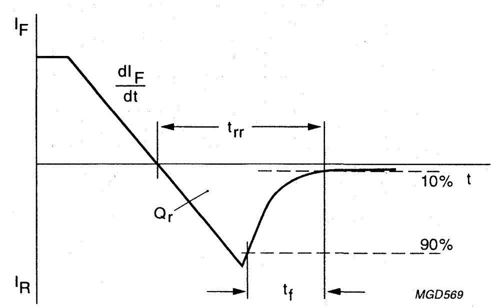
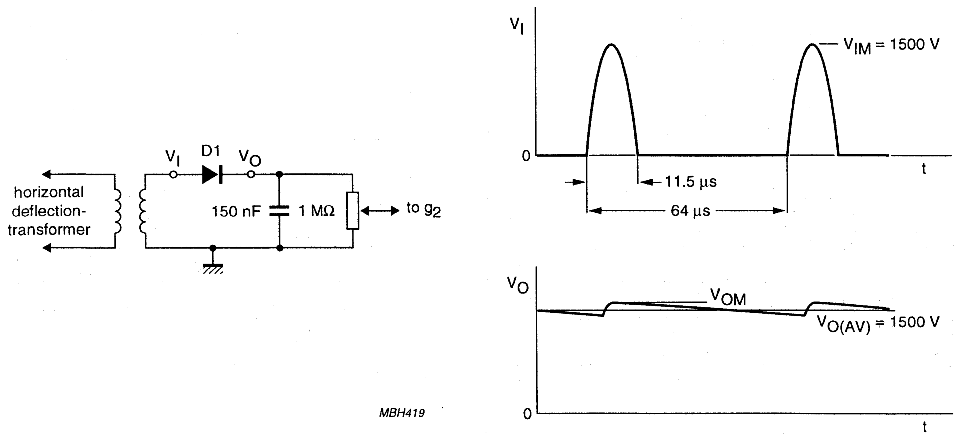


Fig.7 Reverse recovery definitions.

APPLICATION INFORMATION



D1 = BY584.

Stable continuous operation is ensured at ambient temperatures up to 70 °C.

Fig.8 Basic circuit and waveforms for grid 2 voltage supply in colour television picture tubes.

Miniature high-voltage soft-recovery rectifier

BY614

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Soft-recovery switching characteristics
- Very compact construction.

APPLICATIONS

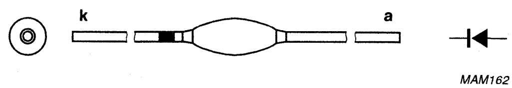
- Miniature high-voltage assemblies such as voltage multipliers.

DESCRIPTION

Miniature glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

The package is designed to be used in an insulating medium such as resin, oil or SF6 gas.



The cathode lead is marked with a black band.

Fig.1 Simplified outline (SOD61H2) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RSM}	non-repetitive peak reverse voltage		–	2200	V
V_{RRM}	repetitive peak reverse voltage		–	2200	V
V_{RW}	working reverse voltage		–	2000	V
V_R	continuous reverse voltage		–	2000	V
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; PCB mounting (see Fig.5); T_{amb} = 65 °C; see Fig.2; see also Fig.3	–	50	mA
I_{FRM}	repetitive peak forward current		–	500	mA
I_{FSM}	non-repetitive peak forward current	$t \leq 10$ ms; half sinewave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RWmax}$	–	1	A
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–65	+150	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 50 mA; $T_j = T_{j\,max}$; see Fig.4	–	–	6	V
I_R	reverse current	$V_R = V_{RWmax}$; T_j = 120 °C	–	–	3	μA
Q_r	recovery charge	when switched from I_F = 100 mA to $V_R \geq$ 100 V and dI_F/dt = –200 mA/μs; see Fig.6	–	–	1	nC
t_f	fall time	when switched from I_F = 100 mA to $V_R \geq$ 100 V and dI_F/dt = –200 mA/μs; see Fig.6	100	–	–	ns
t_{rr}	reverse recovery time	when switched from I_F = 100 mA to $V_R \geq$ 100 V and dI_F/dt = –200 mA/μs; see Fig.6	–	–	300	ns
C_d	diode capacitance	V_R = 0 V; f = 1 MHz	–	2	–	pF

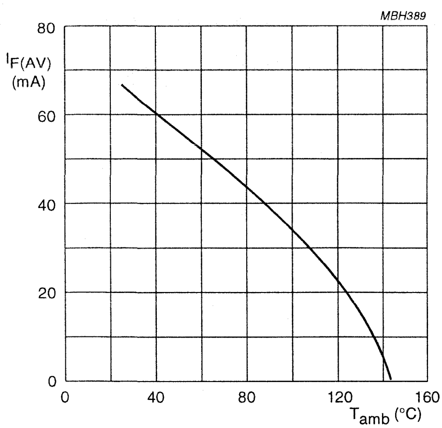
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	100	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	155	K/W

Note

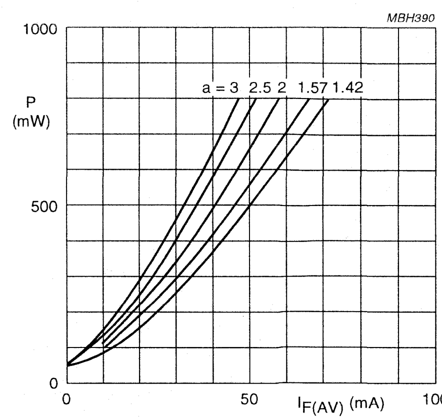
1. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.5. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA



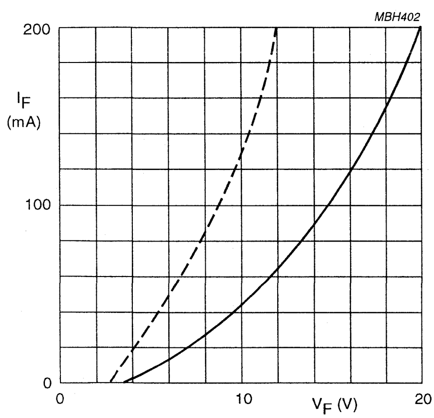
a = 1.57; δ = 0.5; $V_R = V_{RWmax}$; device mounted as shown in Fig.5.

Fig.2 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



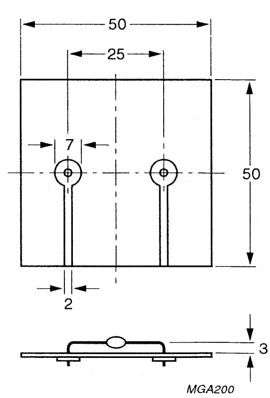
$a = I_{F(RMS)}/I_{F(AV)}$; δ = 0.5; $V_R = V_{RWmax}$.

Fig.3 Maximum steady state power dissipation (forward plus leakage losses) as a function of average forward current.



Dotted line: T_j = 150 °C.
Solid line: T_j = 25 °C.

Fig.4 Forward current as a function of maximum forward voltage.



Dimensions in mm.

Fig.5 Device mounted on a printed-circuit board.

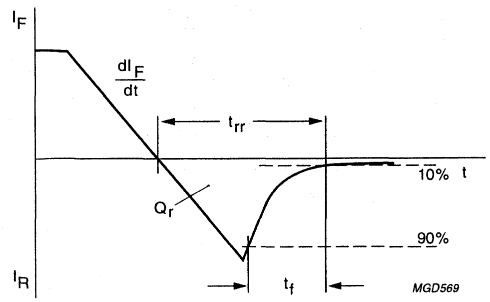


Fig.6 Reverse recovery definitions.

Fast high-voltage soft-recovery controlled avalanche rectifiers

BY8000 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Soft-recovery switching characteristics
- Compact construction.

APPLICATIONS

- For colour television and monitors up to 25 kHz
- High-voltage applications for:
  - Multipliers
  - Layer-wound diode-split-transformers where controlled avalanche is required.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

The package is designed to be used in an insulating medium such as resin, oil or SF6 gas.

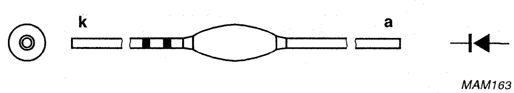


Fig.1 Simplified outline (SOD61) and symbol.

MARKING

Cathode band colour codes

TYPE NUMBER	PACKAGE CODE	INNER BAND	OUTER BAND
BY8004	SOD61AC	violet	black
BY8006	SOD61AD	violet	green
BY8008	SOD61AE	violet	red
BY8010	SOD61AF	violet	violet
BY8012	SOD61AH	violet	orange
BY8014	SOD61AI	violet	lilac
BY8016	SOD61AJ	violet	grey

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BY8004		–	5	kV
	BY8006		–	8	kV
	BY8008		–	10	kV
	BY8010		–	12	kV
	BY8012		–	14	kV
	BY8014		–	17	kV
	BY8016		–	19	kV
V_{RW}	working reverse voltage				
	BY8004		–	4	kV
	BY8006		–	6	kV
	BY8008		–	8	kV
	BY8010		–	10	kV
	BY8012		–	12	kV
	BY8014		–	14	kV
	BY8016		–	16	kV
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; see Figs 2 to 8			
	BY8004		–	20	mA
	BY8006		–	10	mA
	BY8008		–	5	mA
	BY8010		–	5	mA
	BY8012		–	5	mA
	BY8014		–	5	mA
	BY8016		–	3	mA
I_{FRM}	repetitive peak forward current	note 1	–	500	mA
P_{RSM}	non-repetitive peak reverse power dissipation	t = 20 μs half sinewave; $T_j = T_{j\,max}$ prior to surge			
	BY8004		–	2.5	kW
	BY8006		–	3.5	kW
	BY8008		–	4.2	kW
	BY8010		–	5.2	kW
	BY8012		–	7.0	kW
	BY8014		–	7.8	kW
	BY8016		–	9.1	kW
T_{stg}	storage temperature		−65	+120	°C
T_j	junction temperature		−65	+120	°C

Note

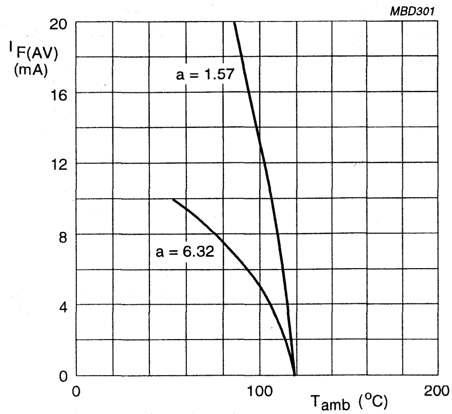
1. Withstands peak currents during flash-over in a picture tube.

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 100 mA; $T_j = T_{j\,max}$; see Figs 9 to 15				
	BY8004		–	–	20	V
	BY8006		–	–	25	V
	BY8008		–	–	30	V
	BY8010		–	–	38	V
	BY8012		–	–	50	V
	BY8014		–	–	55	V
	BY8016		–	–	63	V
I_R	reverse current	$V_R = V_{RWmax}$; T_j = 120 °C	–	–	3	μA
Q_r	recovery charge	when switched from I_F = 100 mA to V_R ≥ 100 V and dI_F/dt = –200 mA/μs; see Fig.16	–	–	1	nC
t_f	fall time	when switched from I_F = 100 mA to V_R ≥ 100 V and dI_F/dt = –200 mA/μs; see Fig.16	80	–	–	ns
t_{rr}	reverse recovery time	when switched from I_F = 2 mA to I_R = 4 mA; measured at I_R = 1 mA; see Fig.17	–	–	100	ns
C_d	diode capacitance	V_R = 0 V; f = 1 MHz				
	BY8004		–	0.90	–	pF
	BY8006		–	0.65	–	pF
	BY8008		–	0.55	–	pF
	BY8010		–	0.45	–	pF
	BY8012		–	0.35	–	pF
	BY8014		–	0.30	–	pF
	BY8016		–	0.25	–	pF

GRAPHICAL DATA



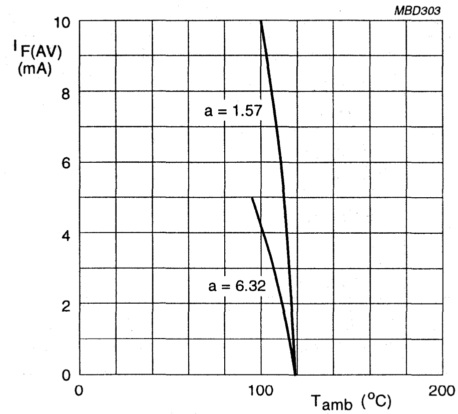
BY8004.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.

a = 1.57: half sinewave.

a = 6.32: line output transformer application; see Fig.18.

Fig.2 Maximum permissible average forward current as a function of ambient temperature.



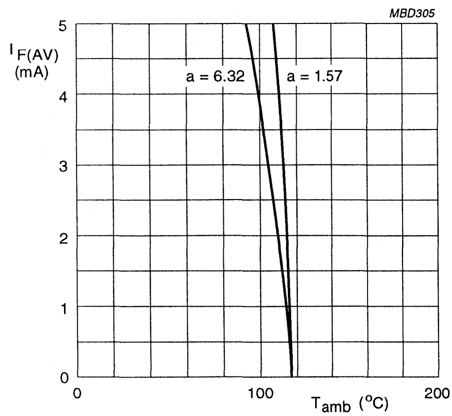
BY8006.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.

a = 1.57: half sinewave.

a = 6.32: line output transformer application; see Fig.18.

Fig.3 Maximum permissible average forward current as a function of ambient temperature.



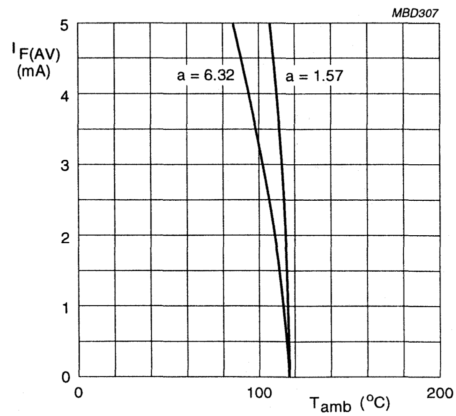
BY8008.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.

a = 1.57: half sinewave.

a = 6.32: line output transformer application; see Fig.18.

Fig.4 Maximum permissible average forward current as a function of ambient temperature.



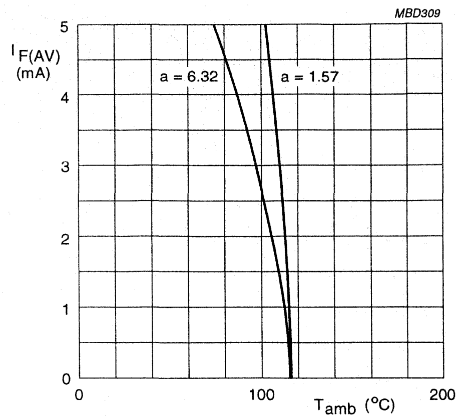
BY8010.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.

a = 1.57: half sinewave.

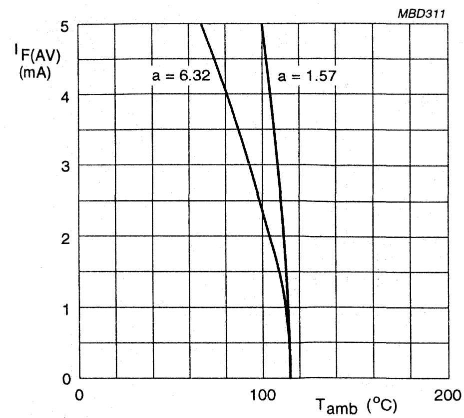
a = 6.32: line output transformer application; see Fig.18.

Fig.5 Maximum permissible average forward current as a function of ambient temperature.



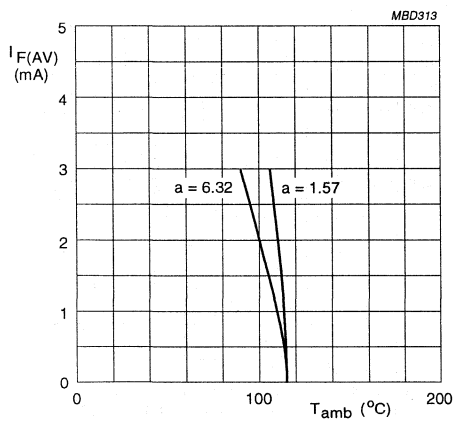
BY8012.
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.
a = 1.57: half sinewave.
a = 6.32: line output transformer application; see see Fig.18.

Fig.6 Maximum permissible average forward current as a function of ambient temperature.



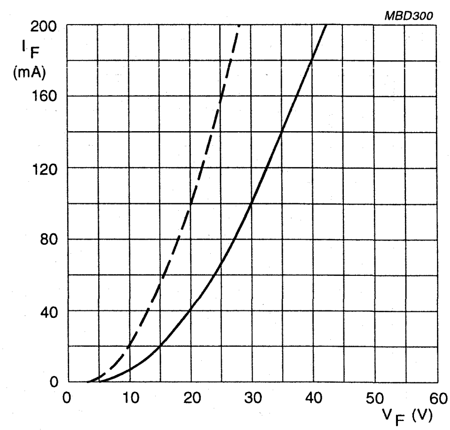
BY8014.
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.
a = 1.57: half sinewave.
a = 6.32: line output transformer application; see Fig.18.

Fig.7 Maximum permissible average forward current as a function of ambient temperature.



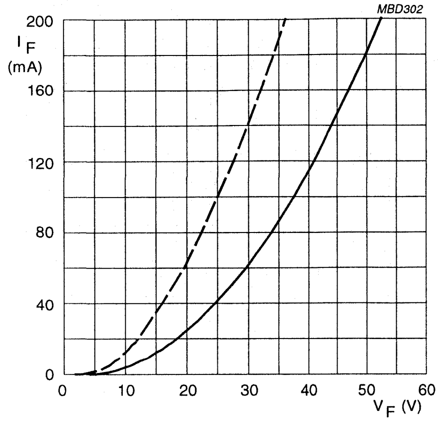
BY8016.
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.
a = 1.57: half sinewave.
a = 6.32: line output transformer application; see Fig.18.

Fig.8 Maximum permissible average forward current as a function of ambient temperature.



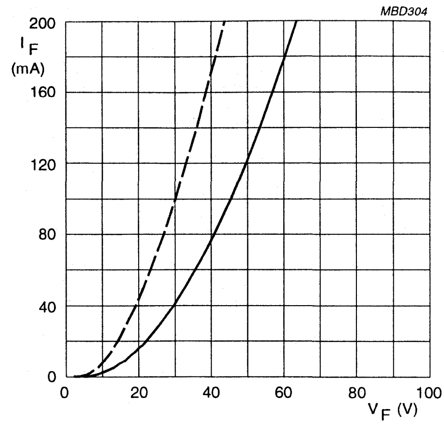
BY8004.
Dotted line: $T_j = 120$ °C.
Solid line: $T_j = 25$ °C.

Fig.9 Forward current as a function of maximum forward voltage.



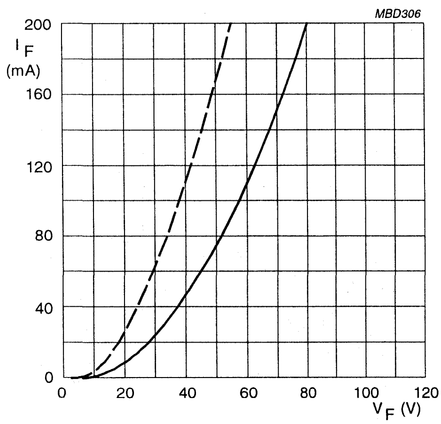
BY8006.
Dotted line: T_j = 120 °C.
Solid line: T_j = 25 °C.

Fig.10 Forward current as a function of maximum forward voltage.



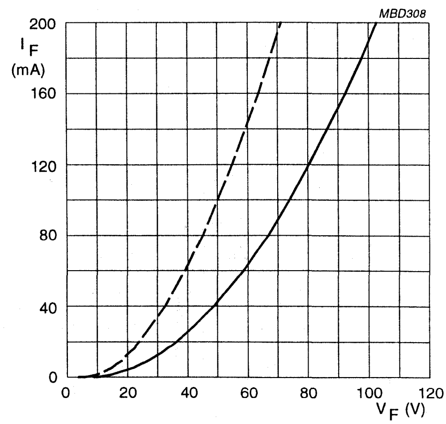
BY8008.
Dotted line: T_j = 120 °C.
Solid line: T_j = 25 °C.

Fig.11 Forward current as a function of maximum forward voltage.



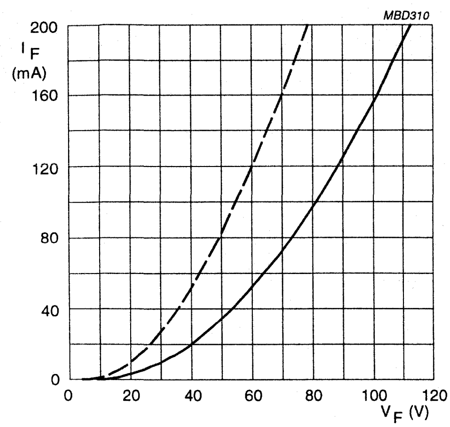
BY8010.
Dotted line: T_j = 120 °C.
Solid line: T_j = 25 °C.

Fig.12 Forward current as a function of maximum forward voltage.



BY8012.
Dotted line: T_j = 120 °C.
Solid line: T_j = 25 °C.

Fig.13 Forward current as a function of maximum forward voltage.

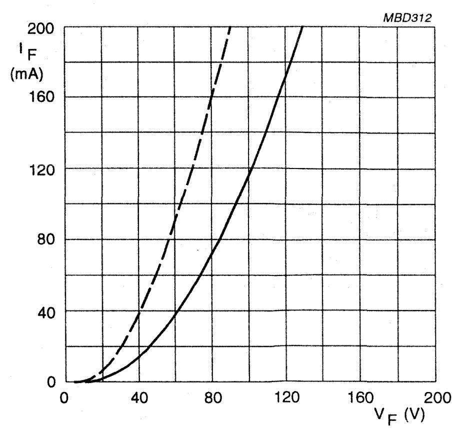


BY8014.

Dotted line: T_j = 120 °C.

Solid line: T_j = 25 °C.

Fig.14 Forward current as a function of maximum forward voltage.



BY8016.

Dotted line: T_j = 120 °C.

Solid line: T_j = 25 °C.

Fig.15 Forward current as a function of maximum forward voltage.

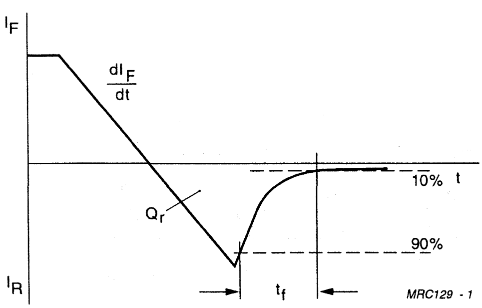
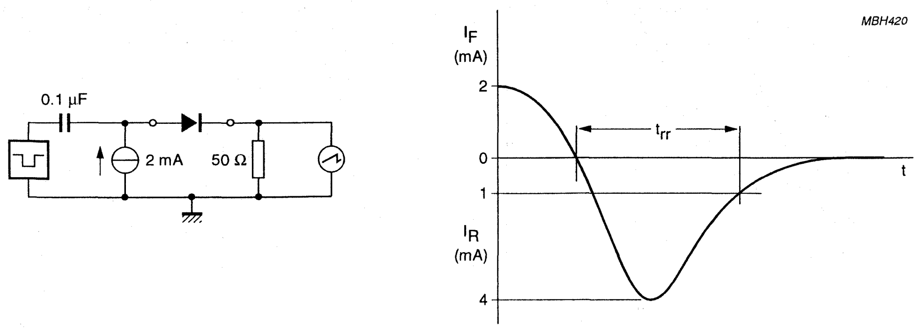


Fig.16 Reverse recovery definitions.



Rise time oscilloscope: t_r < 7 ns.
Generator pulse width: 1.0 µs.

Fig.17 Test circuit and reverse recovery time waveform and definition.

APPLICATION INFORMATION

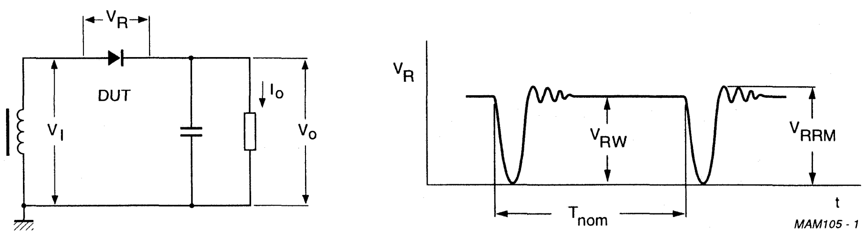


Fig.18 Typical operation circuit and voltage waveform.

Very fast high-voltage soft-recovery controlled avalanche rectifiers

BY8100 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Soft-recovery switching characteristics
- Compact construction.

APPLICATIONS

- For colour television and monitors up to 128 kHz
- High-voltage applications for:
  - Multipliers
  - Layer-wound diode-split-transformers where controlled avalanche is required.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

The package is designed to be used in an insulating medium such as resin, oil or SF6 gas.

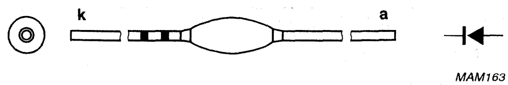


Fig.1 Simplified outline (SOD61) and symbol.

MARKING

Cathode band colour codes

TYPE NUMBER	PACKAGE CODE	INNER BAND	OUTER BAND
BY8104	SOD61AC	orange	black
BY8106	SOD61AD	orange	green
BY8108	SOD61AE	orange	red
BY8110	SOD61AF	orange	violet
BY8112	SOD61AH	orange	orange
BY8114	SOD61AI	orange	lilac
BY8116	SOD61AJ	orange	grey

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BY8104		–	5	kV
	BY8106		–	8	kV
	BY8108		–	10	kV
	BY8110		–	12	kV
	BY8112		–	14	kV
	BY8114		–	17	kV
	BY8116		–	19	kV
V_{RW}	working reverse voltage				
	BY8104		–	4	kV
	BY8106		–	6	kV
	BY8108		–	8	kV
	BY8110		–	10	kV
	BY8112		–	12	kV
	BY8114		–	14	kV
	BY8116		–	16	kV
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; see Figs 2 to 8			
	BY8104		–	20	mA
	BY8106		–	10	mA
	BY8108		–	5	mA
	BY8110		–	5	mA
	BY8112		–	5	mA
	BY8114		–	5	mA
	BY8116		–	3	mA
I_{FRM}	repetitive peak forward current	note 1	–	500	mA
P_{RSM}	non-repetitive peak reverse power dissipation	t = 20 µs half sinewave; $T_j = T_{j\,max}$ prior to surge			
	BY8104		–	1.7	kW
	BY8106		–	2.5	kW
	BY8108		–	3.0	kW
	BY8110		–	3.8	kW
	BY8112		–	5.0	kW
	BY8114		–	5.5	kW
	BY8116		–	6.5	kW
T_{stg}	storage temperature		−65	+120	°C
T_j	junction temperature		−65	+120	°C

Note

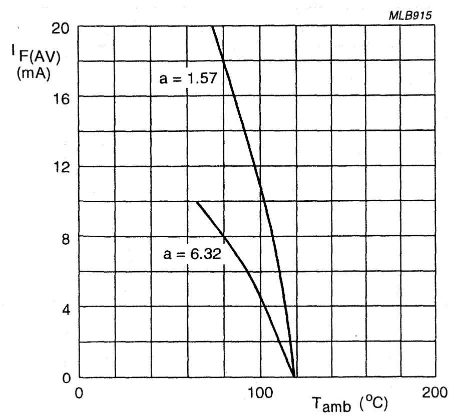
1. Withstands peak currents during flash-over in a picture tube.

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 100 mA; $T_j = T_{j\,max}$; see Figs 9 to 15				
	BY8104		–	–	26	V
	BY8106		–	–	36	V
	BY8108		–	–	44.5	V
	BY8110		–	–	54.5	V
	BY8112		–	–	75	V
	BY8114		–	–	82.5	V
	BY8116		–	–	94	V
I_R	reverse current	$V_R = V_{RWmax}$; T_j = 120 °C	–	–	3	μA
Q_r	recovery charge	when switched from I_F = 100 mA to $V_R \geq 100$ V and $dI_F/dt = -200$ mA/μs; see Fig.16	–	–	0.4	nC
t_f	fall time	when switched from I_F = 100 mA to $V_R \geq 100$ V and $dI_F/dt = -200$ mA/μs; see Fig.16	40	–	–	ns
t_{rr}	reverse recovery time	when switched from I_F = 2 mA to I_R = 4 mA; measured at I_R = 1 mA; see Fig.17	–	–	60	ns
C_d	diode capacitance	V_R = 0 V; f = 1 MHz				
	BY8104		–	0.90	–	pF
	BY8106		–	0.65	–	pF
	BY8108		–	0.55	–	pF
	BY8110		–	0.45	–	pF
	BY8112		–	0.35	–	pF
	BY8114		–	0.30	–	pF
	BY8116		–	0.25	–	pF

GRAPHICAL DATA



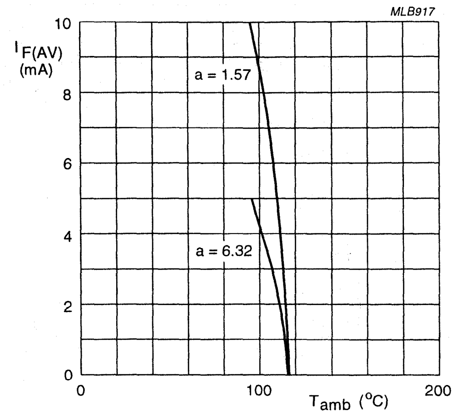
BY8104.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.

a = 1.57: half sinewave.

a = 6.32: line output transformer application; see Fig.18.

Fig.2 Maximum permissible average forward current as a function of ambient temperature.



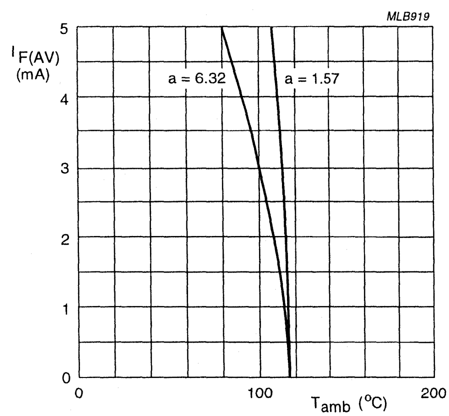
BY8106.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.

a = 1.57: half sinewave.

a = 6.32: line output transformer application; see Fig.18.

Fig.3 Maximum permissible average forward current as a function of ambient temperature.



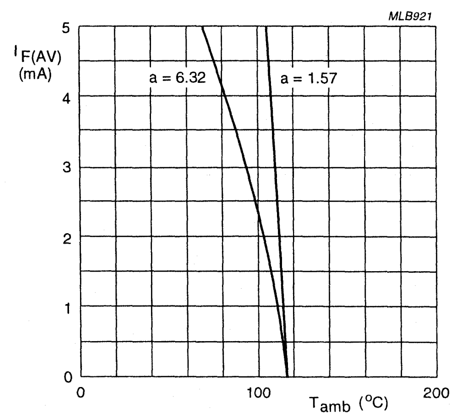
BY8108.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.

a = 1.57: half sinewave.

a = 6.32: line output transformer application; see Fig.18.

Fig.4 Maximum permissible average forward current as a function of ambient temperature.



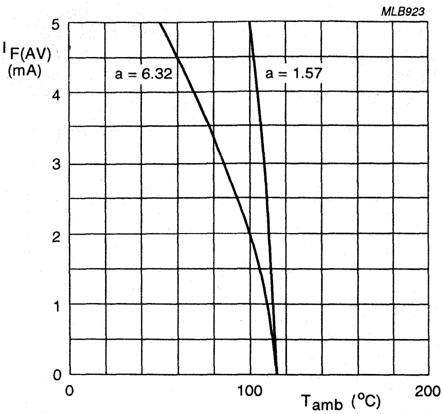
BY8110.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.

a = 1.57: half sinewave.

a = 6.32: line output transformer application; see Fig.18.

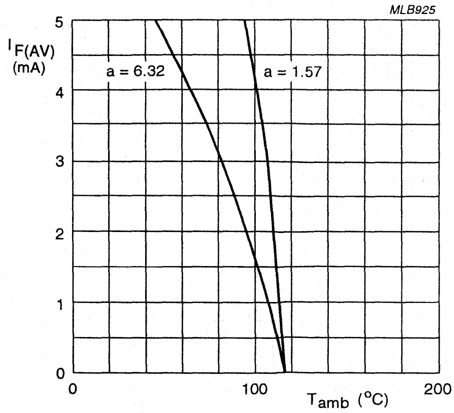
Fig.5 Maximum permissible average forward current as a function of ambient temperature.



BY8112.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.
a = 1.57: half sinewave.
a = 6.32: line output transformer application; see Fig.18.

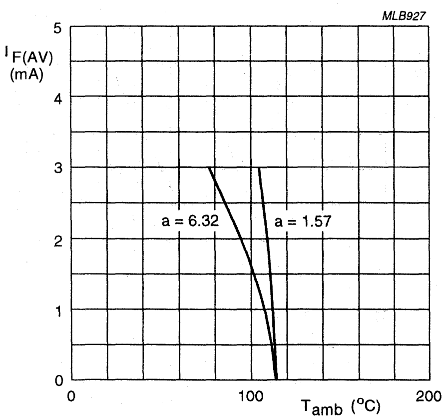
Fig.6 Maximum permissible average forward current as a function of ambient temperature.



BY8114.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.
a = 1.57: half sinewave.
a = 6.32: line output transformer application; see Fig.18.

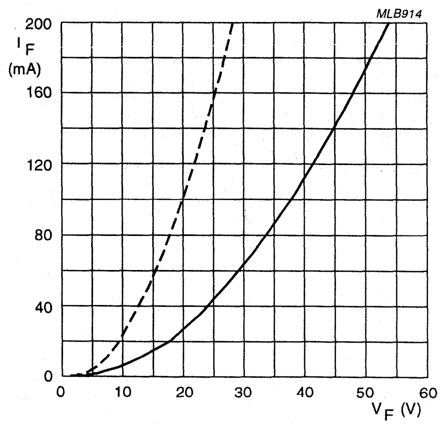
Fig.7 Maximum permissible average forward current as a function of ambient temperature.



BY8116.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.
a = 1.57: half sinewave.
a = 6.32: line output transformer application; see Fig.18.

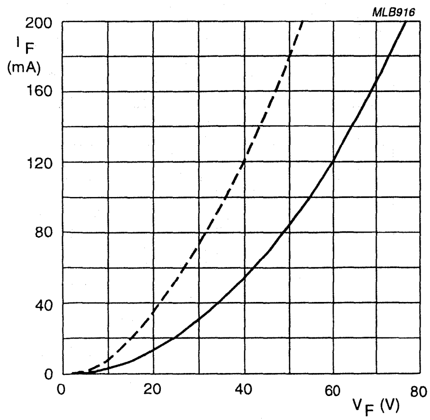
Fig.8 Maximum permissible average forward current as a function of ambient temperature.



BY8104.

Dotted line: T_j = 120 °C.
Solid line: T_j = 25 °C.

Fig.9 Forward current as a function of maximum forward voltage.

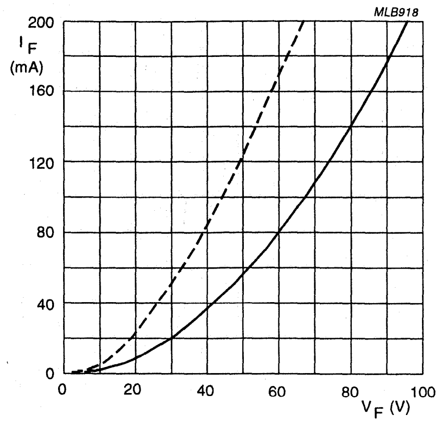


BY8106.

Dotted line: T_j = 120 °C.

Solid line: T_j = 25 °C.

Fig.10 Forward current as a function of maximum forward voltage.

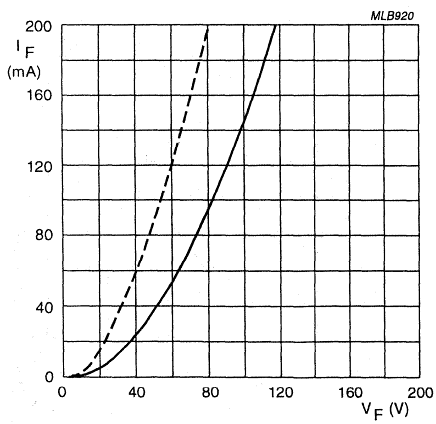


BY8108.

Dotted line: T_j = 120 °C.

Solid line: T_j = 25 °C.

Fig.11 Forward current as a function of maximum forward voltage.

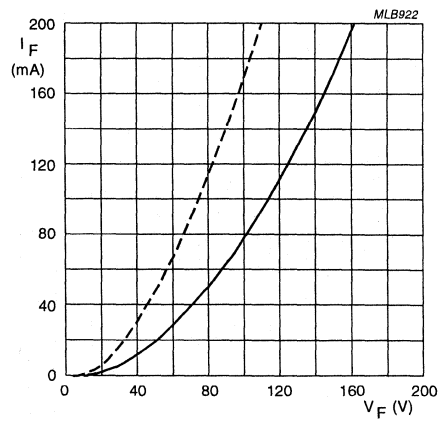


BY8110.

Dotted line: T_j = 120 °C.

Solid line: T_j = 25 °C.

Fig.12 Forward current as a function of maximum forward voltage.



BY8112.

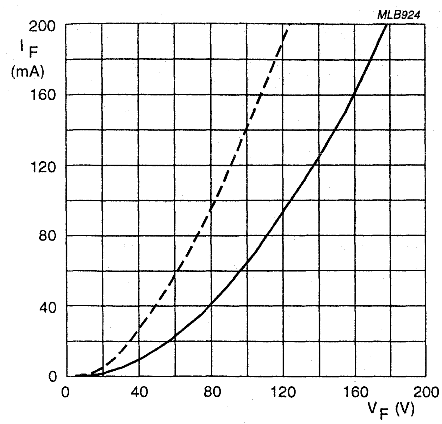
Dotted line: T_j = 120 °C.

Solid line: T_j = 25 °C.

Fig.13 Forward current as a function of maximum forward voltage.

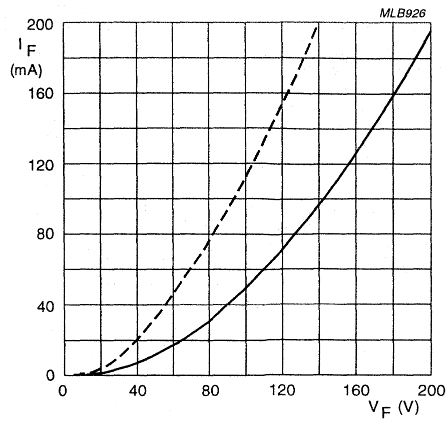
Very fast high-voltage soft-recovery controlled avalanche rectifiers

BY8100 series



BY8114.
Dotted line: T_j = 120 °C.
Solid line: T_j = 25 °C.

Fig.14 Forward current as a function of maximum forward voltage.



BY8116.
Dotted line: T_j = 120 °C.
Solid line: T_j = 25 °C.

Fig.15 Forward current as a function of maximum forward voltage.

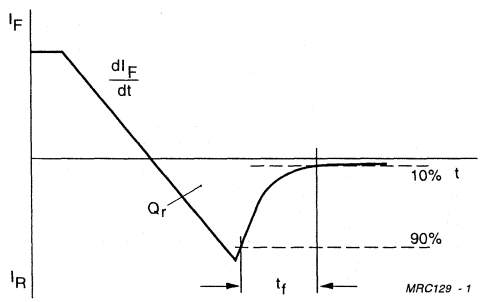
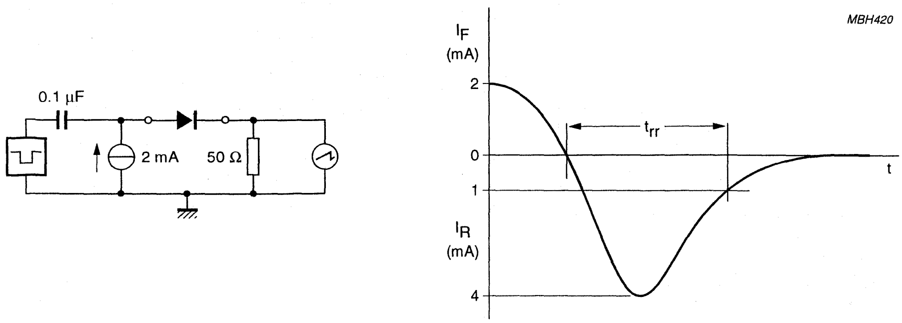


Fig.16 Reverse recovery definitions.



Rise time oscilloscope: t_r < 7 ns.
Generator pulse width: 1.0 μs.

Fig.17 Test circuit and reverse recovery time waveform and definition.

APPLICATION INFORMATION

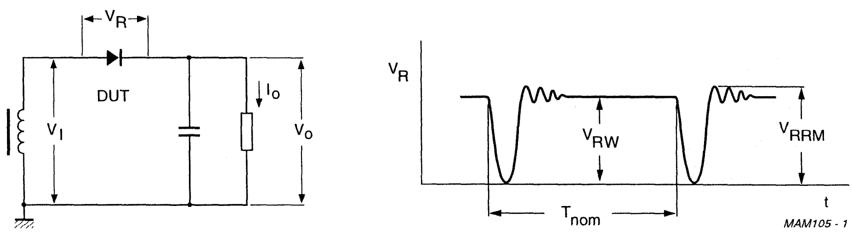


Fig.18 Typical operation circuit and voltage waveform.

Ultra fast high-voltage soft-recovery controlled avalanche rectifiers

BY8200 series

FEATURES

- Plastic package
- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- 40% overvoltage allowed during 5 sec
- Guaranteed avalanche energy absorption capability
- Very low reverse recovery time
- Soft-recovery switching characteristics
- Compact construction.

APPLICATIONS

- For colour television and monitors up to 90 kHz (indication)
- High-voltage applications for:
  - multipliers
  - diode-split-transformers (FBT's).

DESCRIPTION

Plastic package, using glass passivation and a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

The package should be used in an insulating medium such as resin, oil or SF6 gas.

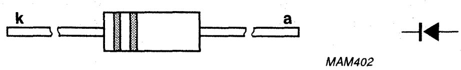


Fig.1 Simplified outline (SOD118A/B) and symbol.

MARKING

Cathode band colour codes

TYPE NUMBER	PACKAGE CODE	INNER BAND	OUTER BAND
BY8206	SOD118A	green	green
BY8208	SOD118A	red	green
BY8210	SOD118B	violet	green
BY8212	SOD118B	orange	green

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM1}	repetitive peak reverse voltage				
	BY8206		–	6	kV
	BY8208		–	8	kV
	BY8210		–	10	kV
	BY8212		–	12	kV
V_{RRM2}	repetitive peak reverse voltage	max. 5 seconds			
	BY8206		–	8.4	kV
	BY8208		–	11.2	kV
	BY8210		–	14.0	kV
	BY8212		–	16.8	kV

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; see Figs 2 to 5			
	BY8206		–	10	mA
	BY8208		–	5	mA
	BY8210		–	5	mA
	BY8212		–	5	mA
I_{FRM}	repetitive peak forward current	note 1	–	500	mA
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature				
	BY8206		–65	+160	°C
	BY8208		–65	+155	°C
	BY8210		–65	+150	°C
	BY8212		–65	+145	°C

Note

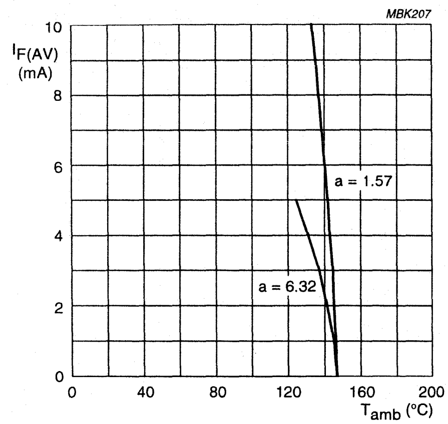
1. Withstands peak currents during flash-over in a picture tube.

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 10 mA; see Figs 6 to 9				
	BY8206		–	–	19	V
	BY8208		–	–	23	V
	BY8210		–	–	29	V
	BY8212		–	–	35	V
I_R	reverse current	$V_R = V_{RRM1}$; T_j = 120 °C	–	–	3	μA
Q_r	recovery charge	when switched from I_F = 100 mA to $V_R \geq$ 100 V and dI_F/dt = –200 mA/μs; see Fig 10	–	0.2	–	nC
t_{rr}	reverse recovery time	when switched from I_F = 2 mA to I_R = 4 mA; measured at I_R = 1 mA; see Fig 11	–	–	< 45	ns
C_d	diode capacitance	V_R = 0 V; f = 1 MHz				
	BY8206		–	0.50	–	pF
	BY8208		–	0.42	–	pF
	BY8210		–	0.35	–	pF
	BY8212		–	0.30	–	pF

GRAPHICAL DATA



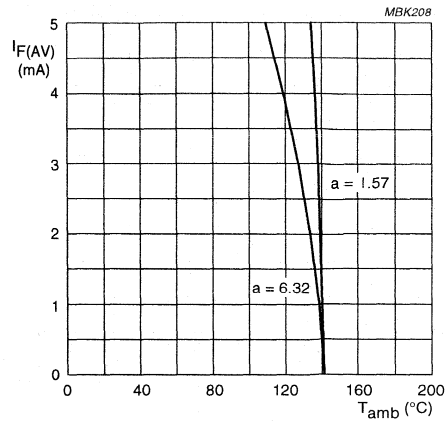
BY8206.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.

a = 6.32: line output transformer application; see Fig 12.

a = 1.57: half-sinewave.

Fig.2 Maximum permissible average forward current as a function of ambient temperature.



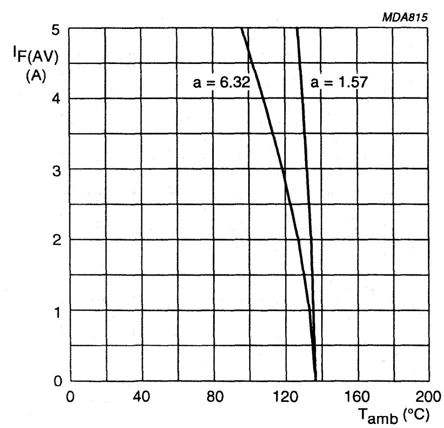
BY8208.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.

a = 6.32: line output transformer application; see Fig 12.

a = 1.57: half-sinewave.

Fig.3 Maximum permissible average forward current as a function of ambient temperature.



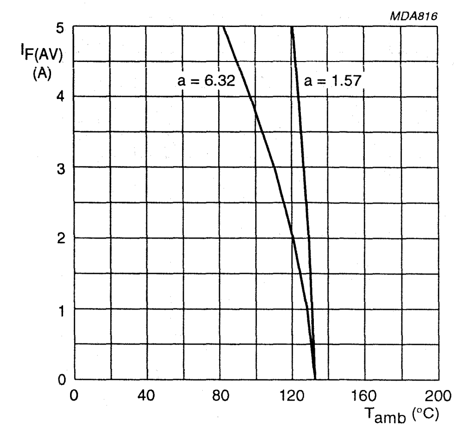
BY8210.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.

a = 6.32: line output transformer application; see Fig 12.

a = 1.57: half-sinewave.

Fig.4 Maximum permissible average forward current as a function of ambient temperature.



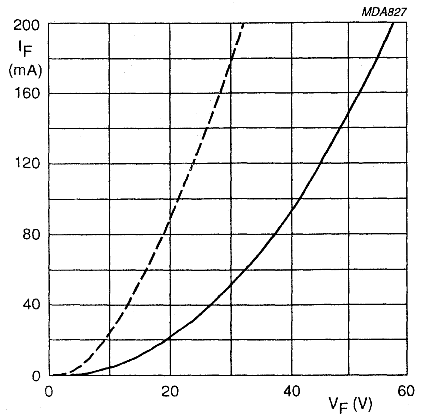
BY8212.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.

a = 6.32: line output transformer application; see Fig 12.

a = 1.57: half-sinewave.

Fig.5 Maximum permissible average forward current as a function of ambient temperature.

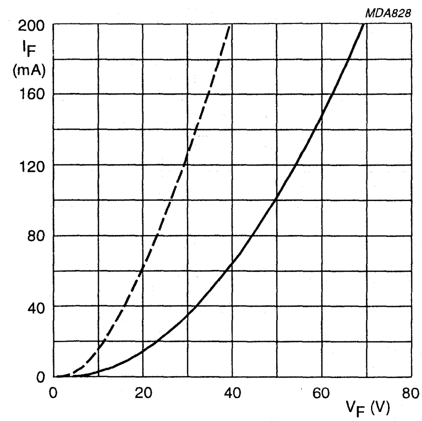


BY8206.

Dotted line: $T_j = T_{j\,max}$.

Solid line: T_j = 25 °C.

Fig.6 Forward current as a function of forward voltage; typical values.

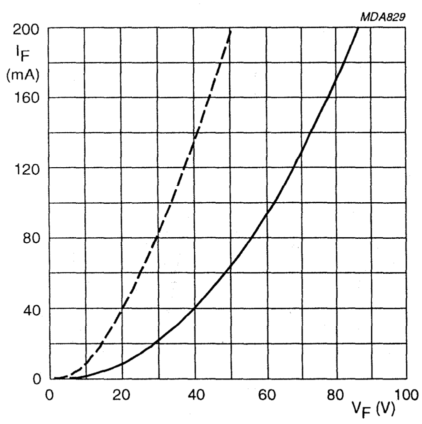


BY8208.

Dotted line: $T_j = T_{j\,max}$.

Solid line: T_j = 25 °C.

Fig.7 Forward current as a function of forward voltage; typical values.

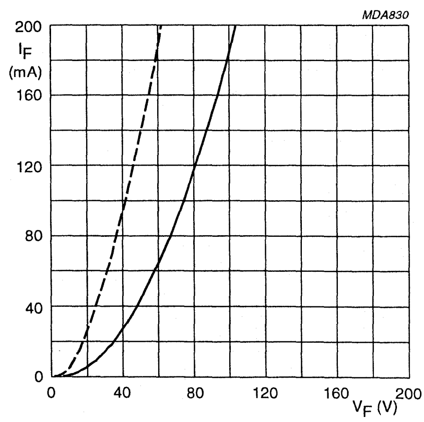


BY8210.

Dotted line: $T_j = T_{j\,max}$.

Solid line: T_j = 25 °C.

Fig.8 Forward current as a function of forward voltage; typical values.



BY8212.

Dotted line: $T_j = T_{j\,max}$.

Solid line: T_j = 25 °C.

Fig.9 Forward current as a function of forward voltage; typical values.

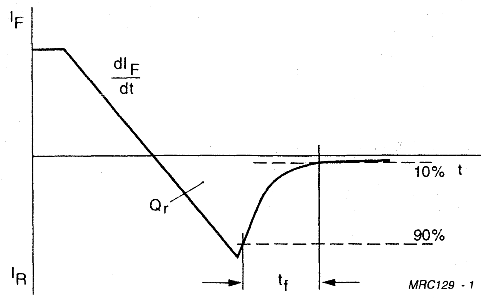
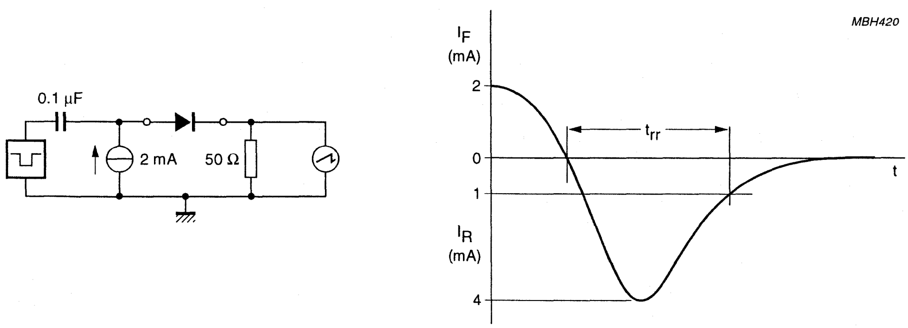


Fig.10 Reverse recovery definitions.



Rise time oscilloscope: t_r < 7 ns.
Generator pulse width: 1.0 μs.

Fig.11 Test circuit and reverse recovery time waveform and definition.

APPLICATION INFORMATION

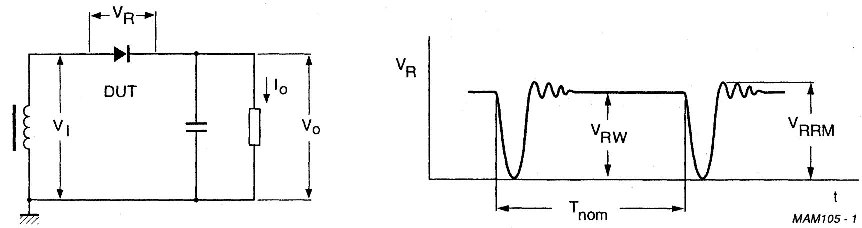


Fig.12 Typical operation circuit and voltage waveform.

Fast high-voltage soft-recovery rectifiers — BY8400 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Soft-recovery switching characteristics
- Compact construction.

APPLICATIONS

- For colour television and monitors up to 25 kHz
- High-voltage applications for:
  - Multipliers
  - Slot-wound diode-split-transformers.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

The package is designed to be used in an insulating medium such as resin, oil or SF6 gas.

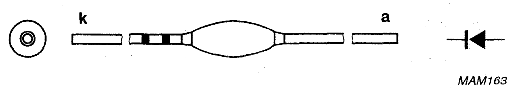


Fig.1 Simplified outline (SOD61) and symbol.

MARKING

Cathode band colour codes

TYPE NUMBER	PACKAGE CODE	INNER BAND	OUTER BAND
BY8404	SOD61AB	black	black
BY8406	SOD61AC	black	green
BY8408	SOD61AD	black	red
BY8410	SOD61AE	black	violet
BY8412	SOD61AF	black	orange
BY8414	SOD61AG	black	lilac
BY8416	SOD61AH	black	grey
BY8418	SOD61AI	black	brown
BY8420	SOD61AJ	black	dark blue
BY8424	SOD61AK	black	no band

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RSM}	non-repetitive peak reverse voltage				
	BY8404		–	5	kV
	BY8406		–	8	kV
	BY8408		–	10	kV
	BY8410		–	12	kV
	BY8412		–	14	kV
	BY8414		–	17	kV
	BY8416		–	19	kV
	BY8418		–	22	kV
	BY8420		–	24	kV
	BY8424		–	30	kV
V_{RRM}	repetitive peak reverse voltage				
	BY8404		–	5	kV
	BY8406		–	8	kV
	BY8408		–	10	kV
	BY8410		–	12	kV
	BY8412		–	14	kV
	BY8414		–	17	kV
	BY8416		–	19	kV
	BY8418		–	22	kV
	BY8420		–	24	kV
	BY8424		–	30	kV
V_{RW}	working reverse voltage				
	BY8404		–	4	kV
	BY8406		–	6	kV
	BY8408		–	8	kV
	BY8410		–	10	kV
	BY8412		–	12	kV
	BY8414		–	14	kV
	BY8416		–	16	kV
	BY8418		–	18	kV
	BY8420		–	20	kV
	BY8424		–	24	kV

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; see Figs 2 to 11			
	BY8404		–	20	mA
	BY8406		–	10	mA
	BY8408		–	5	mA
	BY8410		–	5	mA
	BY8412		–	5	mA
	BY8414		–	5	mA
	BY8416		–	3	mA
	BY8418		–	3	mA
	BY8420		–	3	mA
	BY8424		–	3	mA
I_{FRM}	repetitive peak forward current	note 1	–	500	mA
T_{stg}	storage temperature		–65	+120	°C
T_j	junction temperature		–65	+120	°C

Note

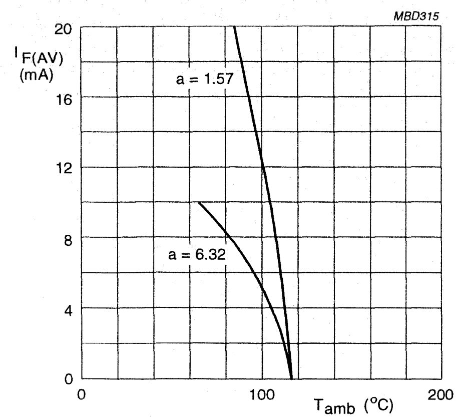
1. Withstands peak currents during flash-over in a picture tube.

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 100 mA; $T_j = T_{j\,max}$; see Figs 12 to 21				
	BY8404		–	–	20	V
	BY8406		–	–	25	V
	BY8408		–	–	35	V
	BY8410		–	–	42	V
	BY8412		–	–	52	V
	BY8414		–	–	60	V
	BY8416		–	–	70	V
	BY8418		–	–	77	V
	BY8420		–	–	88	V
	BY8424		–	–	98	V
I_R	reverse current	$V_R = V_{RWmax}$; T_j = 120 °C	–	–	3	μA
Q_r	recovery charge	when switched from I_F = 100 mA to $V_R \geq$ 100 V and dI_F/dt = −200 mA/μs; see Fig.22	–	–	1	nC
t_f	fall time	when switched from I_F = 100 mA to $V_R \geq$ 100 V and dI_F/dt = −200 mA/μs; see Fig.22	100	–	–	ns
t_{rr}	reverse recovery time	when switched from I_F = 2 mA to I_R = 4 mA; measured at I_R = 1 mA; see Fig.23	–	–	100	ns
C_d	diode capacitance	V_R = 0 V; f = 1 MHz				
	BY8404		–	1.20	–	pF
	BY8406		–	0.80	–	pF
	BY8408		–	0.60	–	pF
	BY8410		–	0.50	–	pF
	BY8412		–	0.40	–	pF
	BY8414		–	0.35	–	pF
	BY8416		–	0.30	–	pF
	BY8418		–	0.28	–	pF
	BY8420		–	0.28	–	pF
	BY8424		–	0.28	–	pF

GRAPHICAL DATA



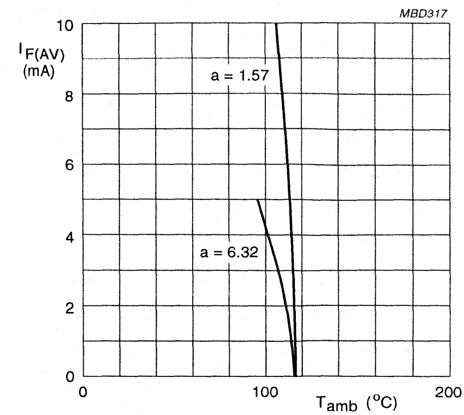
BY8404.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.

a = 1.57: half sinewave.

a = 6.32: line output transformer application; see Fig.24.

Fig.2 Maximum permissible average forward current as a function of ambient temperature.



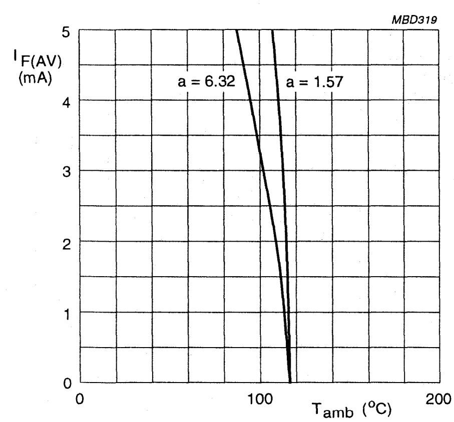
BY8406.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.

a = 1.57: half sinewave.

a = 6.32: line output transformer application; see see Fig.24.

Fig.3 Maximum permissible average forward current as a function of ambient temperature.



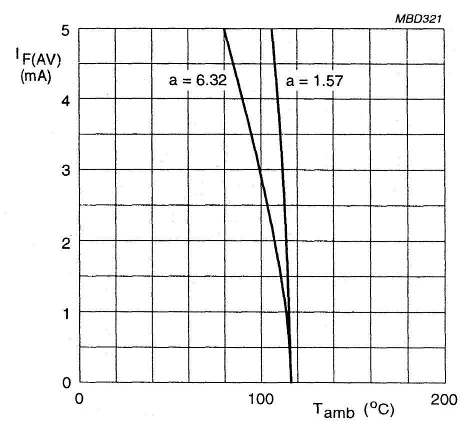
BY8408.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.

a = 1.57: half sinewave.

a = 6.32: line output transformer application; see Fig.24.

Fig.4 Maximum permissible average forward current as a function of ambient temperature.



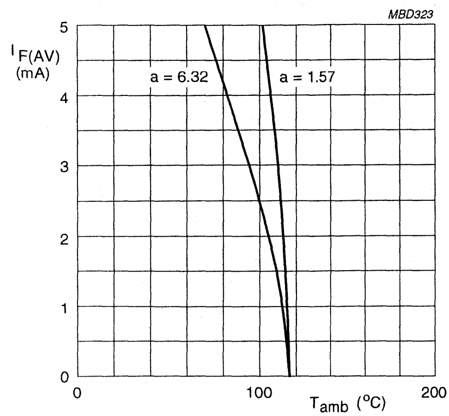
BY8410.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.

a = 1.57: half sinewave.

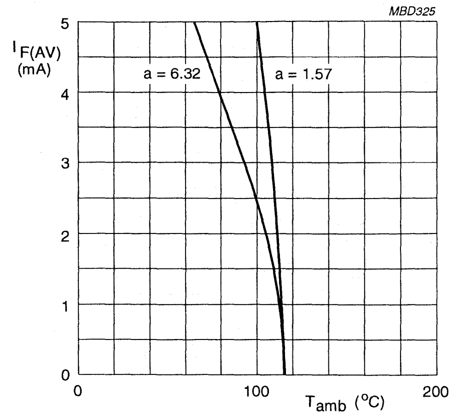
a = 6.32: line output transformer application; see see Fig.24.

Fig.5 Maximum permissible average forward current as a function of ambient temperature.



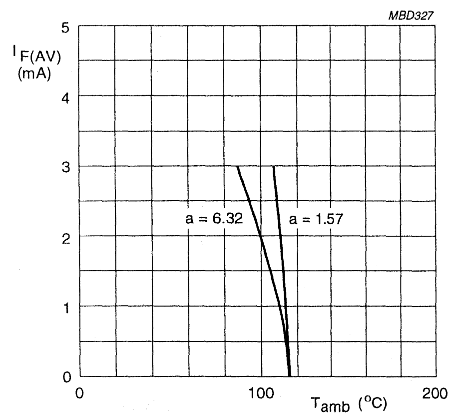
BY8412.
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.
a = 1.57: half sinewave.
a = 6.32: line output transformer application; see Fig.24.

Fig.6 Maximum permissible average forward current as a function of ambient temperature.



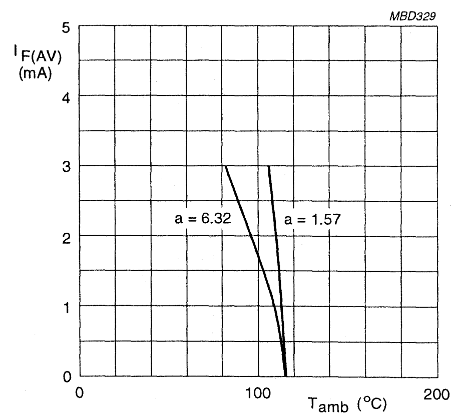
BY8414.
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.
a = 1.57: half sinewave.
a = 6.32: line output transformer application; see Fig.24.

Fig.7 Maximum permissible average forward current as a function of ambient temperature.



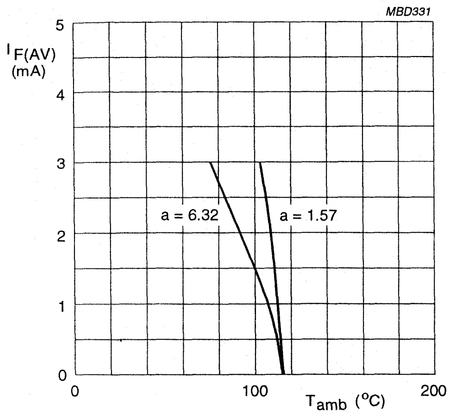
BY8416.
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.
a = 1.57: half sinewave.
a = 6.32: line output transformer application; see Fig.24.

Fig.8 Maximum permissible average forward current as a function of ambient temperature.



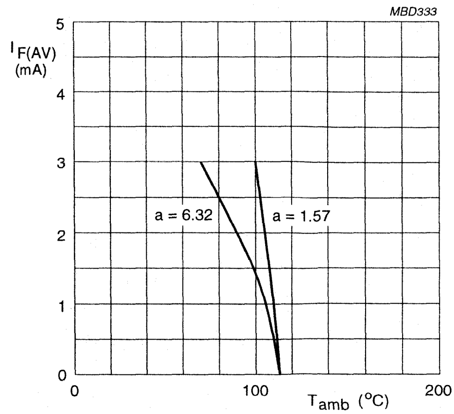
BY8418.
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.
a = 1.57: half sinewave.
a = 6.32: line output transformer application; see Fig.24.

Fig.9 Maximum permissible average forward current as a function of ambient temperature.



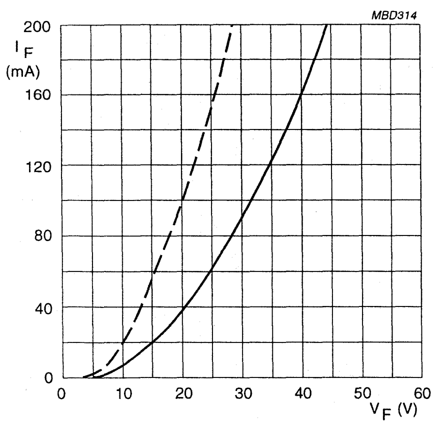
BY8420.
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.
a = 1.57: half sinewave.
a = 6.32: line output transformer application; see Fig.24.

Fig.10 Maximum permissible average forward current as a function of ambient temperature.



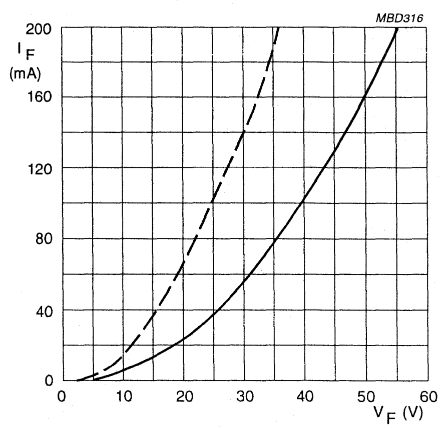
BY8424.
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.
a = 1.57: half sinewave.
a = 6.32: line output transformer application; see Fig.24.

Fig.11 Maximum permissible average forward current as a function of ambient temperature.



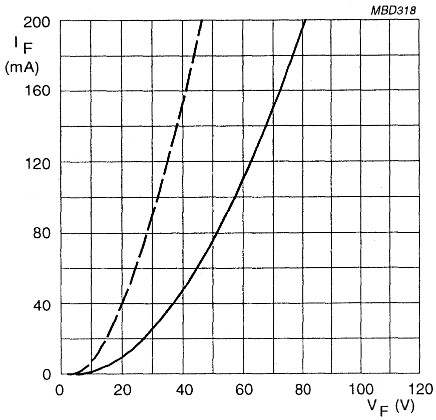
BY8404.
Dotted line: T_j = 120 °C.
Solid line: T_j = 25 °C.

Fig.12 Forward current as a function of maximum forward voltage.



BY8406.
Dotted line: T_j = 120 °C.
Solid line: T_j = 25 °C.

Fig.13 Forward current as a function of maximum forward voltage.

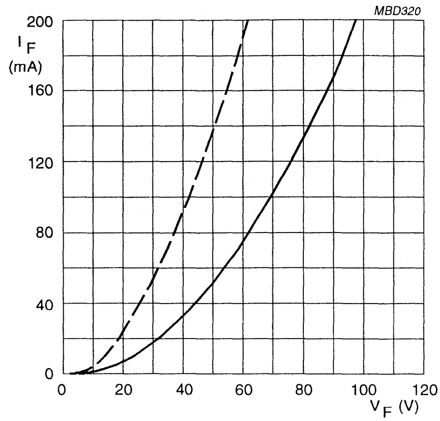


BY8408.

Dotted line: T_j = 120 °C.

Solid line: T_j = 25 °C.

Fig.14 Forward current as a function of maximum forward voltage.

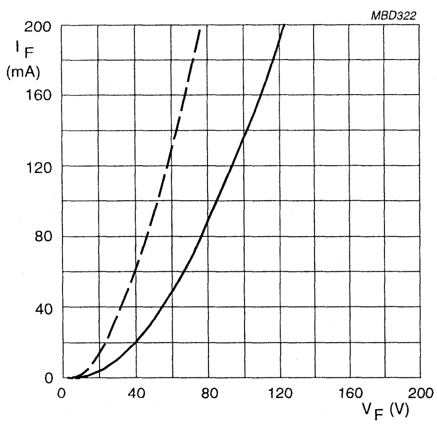


BY8410.

Dotted line: T_j = 120 °C.

Solid line: T_j = 25 °C.

Fig.15 Forward current as a function of maximum forward voltage.

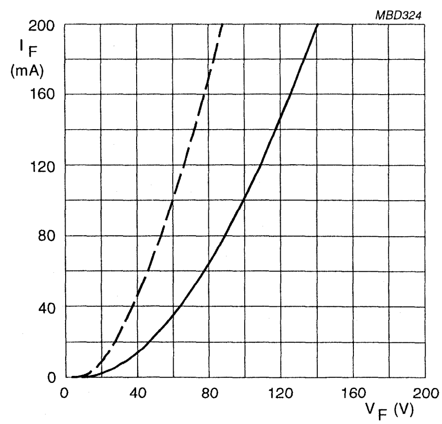


BY8412.

Dotted line: T_j = 120 °C.

Solid line: T_j = 25 °C.

Fig.16 Forward current as a function of maximum forward voltage.

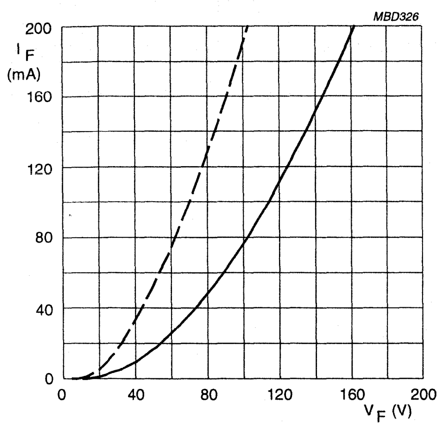


BY8414.

Dotted line: T_j = 120 °C.

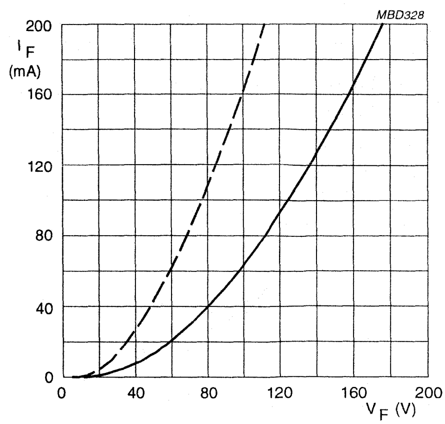
Solid line: T_j = 25 °C.

Fig.17 Forward current as a function of maximum forward voltage.



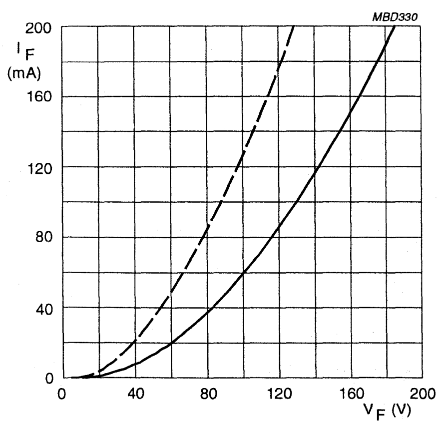
BY8416.
Dotted line: T_j = 120 °C.
Solid line: T_j = 25 °C.

Fig.18 Forward current as a function of maximum forward voltage.



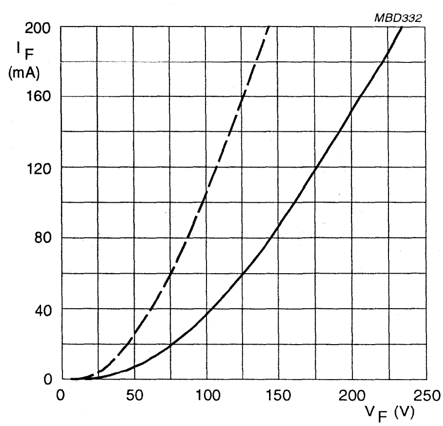
BY8418.
Dotted line: T_j = 120 °C.
Solid line: T_j = 25 °C.

Fig.19 Forward current as a function of maximum forward voltage.



BY8420.
Dotted line: T_j = 120 °C.
Solid line: T_j = 25 °C.

Fig.20 Forward current as a function of maximum forward voltage.



BY8424.
Dotted line: T_j = 120 °C.
Solid line: T_j = 25 °C.

Fig.21 Forward current as a function of maximum forward voltage.

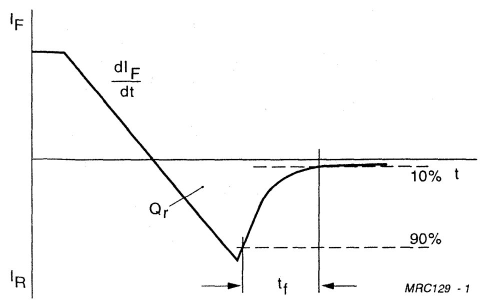
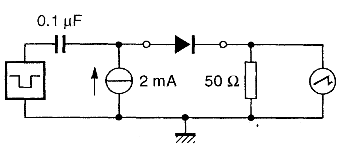
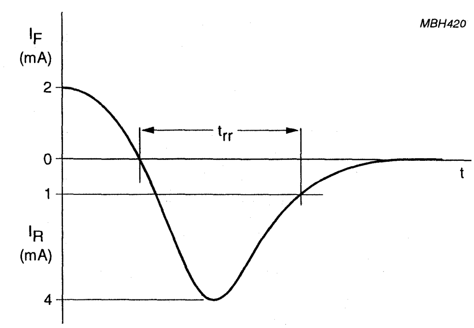


Fig.22 Reverse recovery definitions.





Rise time oscilloscope: t_r < 7 ns.
Generator pulse width: 1.0 μs.

Fig.23 Test circuit and reverse recovery time waveform and definition.

APPLICATION INFORMATION

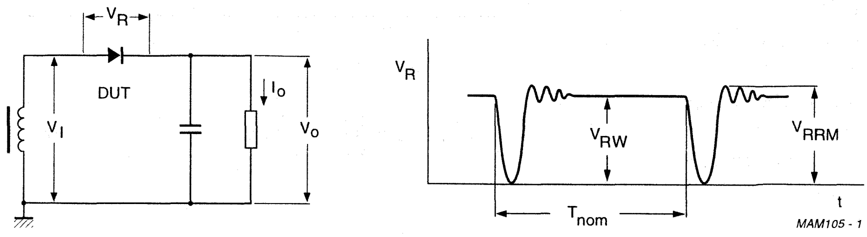


Fig.24 Typical operation circuit and voltage waveform.

Ultra fast high-voltage soft-recovery controlled avalanche rectifier

BY9200 series

FEATURES

- Plastic package
- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- 40% overvoltage allowed during 5 sec
- Guaranteed avalanche energy absorption capability
- Very low reverse recovery time
- Soft-recovery switching characteristics
- Compact construction.

APPLICATIONS

- Colour television and monitors up to 130 kHz (indication)
- High-voltage applications for:
  - multipliers
  - diode-split-transformers (FBT's)

DESCRIPTION

Plastic package, using glass passivation and a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

The package should be used in an insulating medium such as resin, oil or SF6 gas.

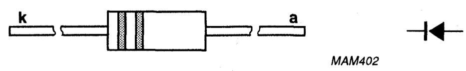


Fig.1 Simplified outline (SOD118A; SOD118B) and symbol.

MARKING

Cathode band colour codes

TYPE NUMBER	PACKAGE CODE	INNER BAND	OUTER BAND
BY9206	SOD118A	green	light blue
BY9208	SOD118A	red	light blue
BY9210	SOD118B	violet	light blue
BY9212	SOD118B	orange	light blue

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM1}	repetitive peak reverse voltage				
	BY9206		–	6	kV
	BY9208		–	8	kV
	BY9210		–	10	kV
	BY9212		–	12	kV
V_{RRM2}	repetitive peak reverse voltage	max. 5 sec.			
	BY9206		–	8.4	kV
	BY9208		–	11.2	kV
	BY9210		–	14.0	kV
	BY9212		–	16.8	kV

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; see Figs 2, 3, 4 and 5			
	BY9206		–	10	mA
	BY9208		–	5	mA
	BY9210		–	5	mA
	BY9212		–	5	mA
I_{FRM}	repetitive peak forward current	note 1	–	500	mA
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature				
	BY9206		−65	+160	°C
	BY9208		−65	+155	°C
	BY9210		−65	+150	°C
	BY9212		−65	+145	°C

Note

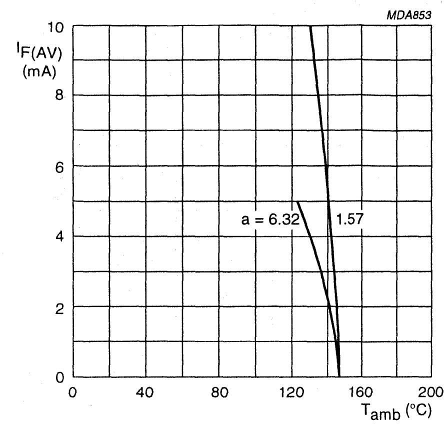
1. Withstands peak currents during flash-over in a picture tube.

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 10 mA; see Figs 6, 7, 8 and 9			
	BY9206		–	18	V
	BY9208		–	22	V
	BY9210		–	28	V
	BY9212		–	36	V
I_R	reverse current	$V_R = V_{RRM1}$; T_j = 120 °C	–	3	μA
t_{rr}	reverse recovery time	when switched from I_F = 2 mA to I_R = 4 mA; measured at I_R = 1 mA; see Fig 10	–	< 35	ns
C_d	diode capacitance	V_R = 0 ; f = 1 MHz			
	BY9206		0.34	–	pF
	BY9208		0.29	–	pF
	BY9210		0.27	–	pF
	BY9212		0.23	–	pF

GRAPHICAL DATA



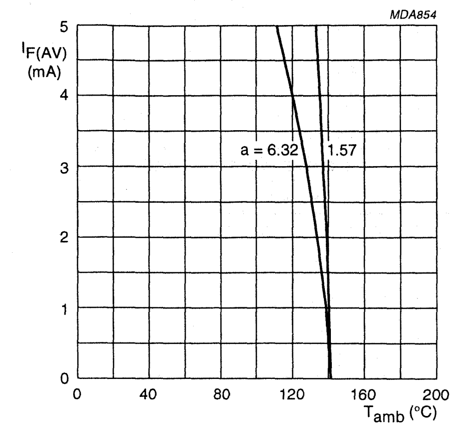
BY9206.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.

a = 6.32: line output transformer application; see Fig 11.

a = 1.57: half-sinewave.

Fig.2 Maximum permissible average forward current as a function of ambient temperature.



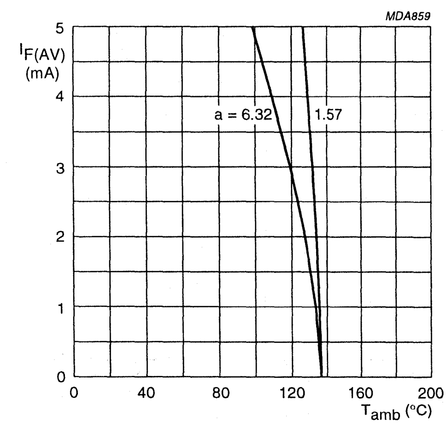
BY9208.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.

a = 6.32: line output transformer application; see Fig 11.

a = 1.57: half-sinewave.

Fig.3 Maximum permissible average forward current as a function of ambient temperature.



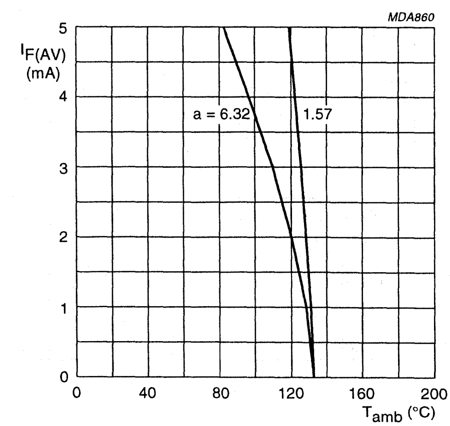
BY9210.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.

(1) a = 6.32; line output transformer application; see Fig 11.

(2) a = 1.57; half-sinewave.

Fig.4 Maximum permissible average forward current as a function of ambient temperature.



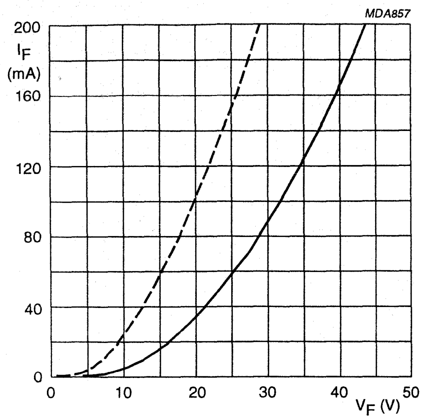
BY9212.

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWmax}$; $R_{th\ j\text{-}a} \leq 120$ K/W.

a = 6.32: line output transformer application; see Fig 11.

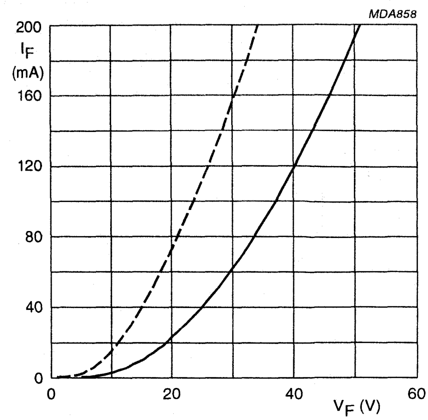
a = 1.57: half-sinewave.

Fig.5 Maximum permissible average forward current as a function of ambient temperature.



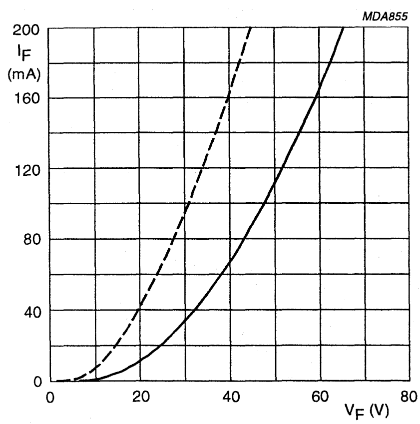
BY9206.
Dotted line: $T_j = T_{j\,max}$.
Solid line: $T_j = 25$ °C.

Fig.6 Forward current as a function of forward voltage; typical values.



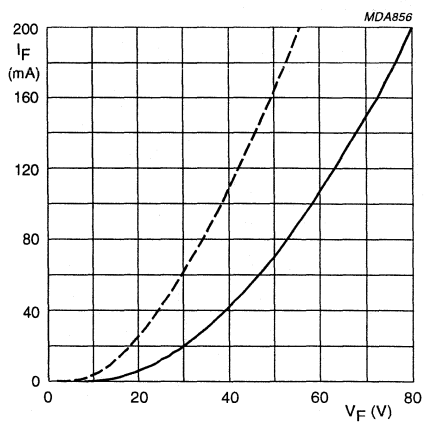
BY9208.
Dotted line: $T_j = T_{j\,max}$.
Solid line: $T_j = 25$ °C.

Fig.7 Forward current as a function of forward voltage; typical values.



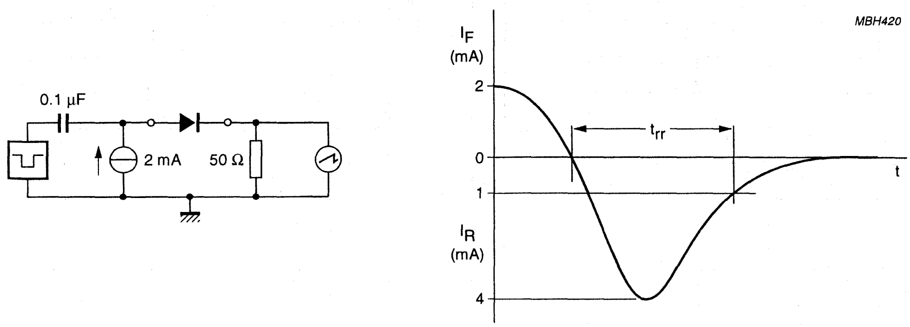
BY9210.
Dotted line: $T_j = T_{j\,max}$.
Solid line: $T_j = 25$ °C.

Fig.8 Forward current as a function of forward voltage; typical values.



BY9212.
Dotted line: $T_j = T_{j\,max}$.
Solid line: $T_j = 25$ °C.

Fig.9 Forward current as a function of forward voltage; typical values.



Rise time oscilloscope: t_r < 7 ns.
Generator pulse width: 1 μs.

Fig.10 Test circuit and reverse recovery time waveform and definition.

APPLICATION INFORMATION

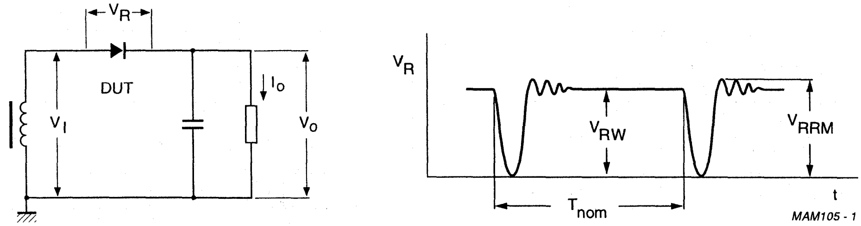


Fig.11 Typical operation circuit and voltage waveform.

Fast high-voltage soft-recovery controlled avalanche rectifiers

BY9300 series

FEATURES

- Plastic package
- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- 40% overvoltage allowed during 5 sec
- Guaranteed avalanche energy absorption capability
- Very low reverse recovery time
- Soft-recovery switching characteristics
- Compact construction.

DESCRIPTION

Plastic package, using glass passivation and a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

The package should be used in an insulating medium such as resin, oil or SF6 gas.

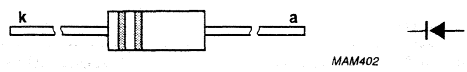


Fig.1 Simplified outline (SOD118A/B) and symbol.

APPLICATIONS

- For colour television and monitors up to 32 kHz (indication)
- High-voltage applications for:
  - multipliers
  - diode-split-transformers (FBT's).

MARKING

Cathode band colour codes

TYPE NUMBER	PACKAGE CODE	INNER BAND	OUTER BAND
BY9304	SOD118A	-	white
BY9306	SOD118A	green	white
BY9308	SOD118A	red	white
BY9310	SOD118B	violet	white
BY9312	SOD118B	orange	white
BY9314	SOD118B	lilac	white
BY9316	SOD118B	grey	white
BY9318	SOD118B	brown	white

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM1}	repetitive peak reverse voltage				
	BY9304		–	4	kV
	BY9306		–	6	kV
	BY9308		–	8	kV
	BY9310		–	10	kV
	BY9312		–	12	kV
	BY9314		–	14	kV
	BY9316		–	16	kV
	BY9318		–	18	kV

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM2}	repetitive peak reverse voltage	max. 5 seconds			
	BY9304		–	5.6	kV
	BY9306		–	8.4	kV
	BY9308		–	11.2	kV
	BY9310		–	14.0	kV
	BY9312		–	16.8	kV
	BY9314		–	19.6	kV
	BY9316		–	22.4	kV
	BY9318		–	25.2	kV
$I_{F(AV)}$	average forward current	averaged over any 20 ms period			
	BY9304		–	10	mA
	BY9306		–	10	mA
	BY9308		–	5	mA
	BY9310		–	5	mA
	BY9312		–	5	mA
	BY9314		–	5	mA
	BY9316		–	3	mA
	BY9318		–	3	mA
I_{FRM}	repetitive peak forward current	note 1	–	500	mA
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature				
	BY9304		–65	+160	°C
	BY9306		–65	+160	°C
	BY9308		–65	+155	°C
	BY9310		–65	+150	°C
	BY9312		–65	+145	°C
	BY9314		–65	+140	°C
	BY9316		–65	+140	°C
	BY9318		–65	+135	°C

Note

1. Withstands peak currents during flash-over in a picture tube.

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 10 mA			
	BY9304		–	10	V
	BY9306		–	14	V
	BY9308		–	20	V
	BY9310		–	24	V
	BY9312		–	30	V
	BY9314		–	34	V
	BY9316		–	40	V
	BY9318		–	44	V
I_R	reverse current	$V_R = V_{RRM1}$; T_j = 120 °C	–	3	μA
Q_r	recovery charge	when switched from I_F = 100 mA to $V_R \geq$ 100 V and dI_F/dt = –200 mA/μs	0.7	–	nC
t_{rr}	reverse recovery time	when switched from I_F = 2 mA to I_R = 4 mA; measured at I_R = 1 mA	–	< 100	ns
C_d	diode capacitance	V_R = 0 V; f = 1 MHz			
	BY9304		1.20	–	pF
	BY9306		0.80	–	pF
	BY9308		0.60	–	pF
	BY9310		0.50	–	pF
	BY9312		0.40	–	pF
	BY9314		0.35	–	pF
	BY9316		0.30	–	pF
	BY9318		0.25	–	pF

Fast high-voltage soft-recovery controlled avalanche rectifiers

BY9400 series

FEATURES

- Plastic package
- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- 40% overvoltage allowed during 5 sec
- Guaranteed avalanche energy absorption capability
- Very low reverse recovery time
- Soft-recovery switching characteristics
- Compact construction.

DESCRIPTION

Plastic package, using glass passivation and a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

The package should be used in an insulating medium such as resin, oil or SF6 gas.

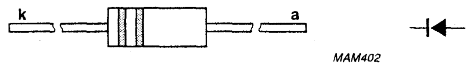


Fig.1 Simplified outline (SOD107B) and symbol.

APPLICATIONS

- For colour television and monitors up to 32 kHz (indication)
- High-voltage applications for:
  - multipliers
  - diode-split-transformers (FBT's).

MARKING

Cathode band colour codes

TYPE NUMBER	PACKAGE CODE	INNER BAND	OUTER BAND
BY9410	SOD107B	violet	orange
BY9412	SOD107B	orange	orange
BY9414	SOD107B	lilac	orange
BY9416	SOD107B	grey	orange

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM1}	repetitive peak reverse voltage				
	BY9410		–	10	kV
	BY9412		–	12	kV
	BY9414		–	14	kV
	BY9416		–	16	kV
V_{RRM2}	repetitive peak reverse voltage	max. 5 seconds			
	BY9410		–	14.0	kV
	BY9412		–	16.8	kV
	BY9414		–	19.6	kV
	BY9416		–	22.4	kV

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{F(AV)}$	average forward current	averaged over any 20 ms period			
	BY9410		–	5	mA
	BY9412		–	5	mA
	BY9414		–	5	mA
	BY9416		–	3	mA
I_{FRM}	repetitive peak forward current	note 1	–	500	mA
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature				
	BY9410		−65	+150	°C
	BY9412		−65	+145	°C
	BY9414		−65	+140	°C
	BY9416		−65	+140	°C

Note

1. Withstands peak currents during flash-over in a picture tube.

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 10 mA				
	BY9410		–	–	24	V
	BY9412		–	–	30	V
	BY9414		–	–	34	V
	BY9416		–	–	40	V
I_R	reverse current	$V_R = V_{RRM1}$; T_j = 120 °C	–	–	3	μA
Q_r	recovery charge	when switched from I_F = 100 mA to $V_R \geq$ 100 V and dI_F/dt = −200 mA/μs	–	0.7	–	nC
t_{rr}	reverse recovery time	when switched from I_F = 2 mA to I_R = 4 mA; measured at I_R = 1 mA	–	–	<100	ns
C_d	diode capacitance	V_R = 0 V; f = 1 MHz				
	BY9410		–	0.50	–	pF
	BY9412		–	0.40	–	pF
	BY9414		–	0.35	–	pF
	BY9416		–	0.30	–	pF

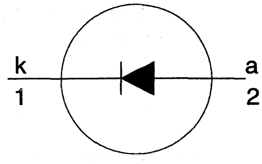
Rectifier diode ultrafast, low switching loss

BYC5-600

FEATURES

- Extremely fast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching losses in associated MOSFET

SYMBOL



QUICK REFERENCE DATA

$V_R = 600$ V

$V_F \leq 1.75$ V

$I_{F(AV)} = 5$ A

$t_{rr} = 19$ ns (typ)

APPLICATIONS

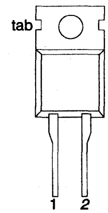
- Active power factor correction
- Half-bridge lighting ballasts
- Half-bridge/ full-bridge switched mode power supplies.

The BYC5-600 is supplied in the SOD59 (TO220AC) conventional leaded package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	Peak repetitive reverse voltage		-	600	V
V_{RWM}	Crest working reverse voltage		-	600	V
V_R	Continuous reverse voltage	$T_{mb} \leq 110$ ˚C	-	500	V
$I_{F(AV)}$	Average forward current	$\delta = 0.5$; with reapplied $V_{RRM(max)}$; $T_{mb} \leq 89$ ˚C[1]	-	5	A
I_{FRM}	Repetitive peak forward current	$\delta = 0.5$; with reapplied $V_{RRM(max)}$; $T_{mb} \leq 89$ ˚C[1]	-	10	A
I_{FSM}	Non-repetitive peak forward current.	t = 10 ms	-	40	A
		t = 8.3 ms	-	44	A
		sinusoidal; $T_j = 150$˚C prior to surge with reapplied $V_{RWM(max)}$			
T_{stg}	Storage temperature		-40	150	˚C
T_j	Operating junction temperature		-	150	˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2.5	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	60	-	K/W

Rectifier diode ultrafast, low switching loss

BYC5-600

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 5 A; T_j = 150˚C	-	1.4	1.75	V
		I_F = 10 A; T_j = 150˚C	-	1.75	2.2	V
		I_F = 5 A;	-	2.0	2.8	V
I_R	Reverse current	V_R = 600 V	-	9	100	µA
		V_R = 500 V; T_j = 100 ˚C	-	0.9	3.0	mA
t_{rr}	Reverse recovery time	I_F = 5 A to V_R = 400 V; dI_F/dt = 500 A/µs	-	19	-	ns
t_{rr}	Reverse recovery time	I_F = 5 A to V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 125˚C	-	25	30	ns
I_{rrm}	Peak reverse recovery current	I_F = 5 A to V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 125˚C	-	8	11	A
V_{fr}	Forward recovery voltage	I_F = 10 A; dI_F/dt = 100 A/µs	-	9	11	V

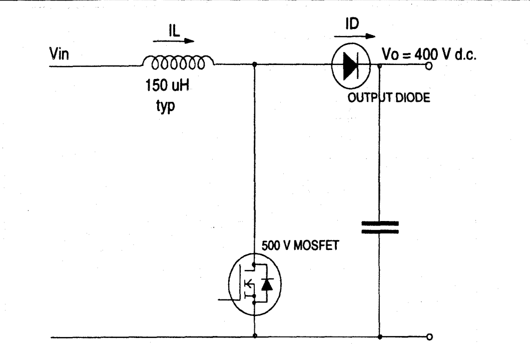


Fig.1. Typical application, output rectifier in boost converter power factor correction circuit. Continuous conduction mode, where the transistor turns on whilst forward current is still flowing in the diode.

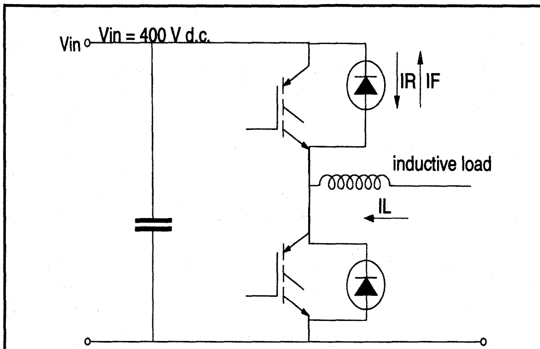


Fig.2. Typical application, freewheeling diode in half bridge converter. Continuous conduction mode, where each transistor turns on whilst forward current is still flowing in the other bridge leg diode.

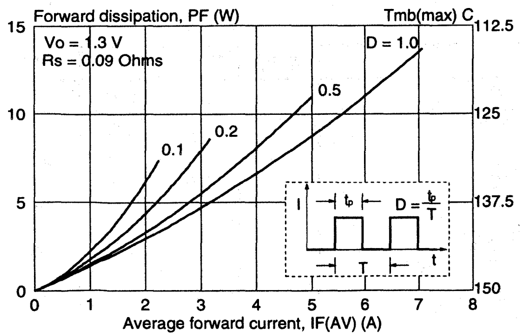


Fig.3. Maximum forward dissipation as a function of average forward current; rectangular current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

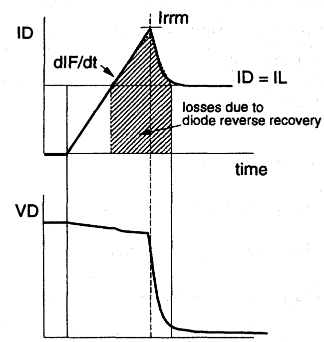


Fig.6. Origin of switching losses in transistor due to diode reverse recovery.

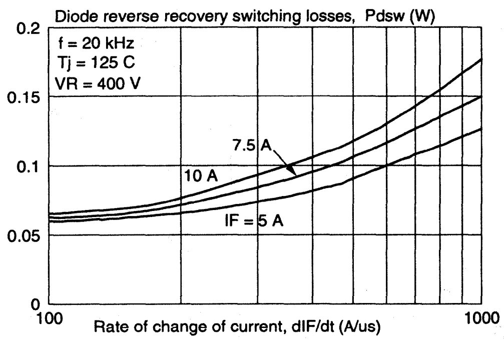


Fig.4. Typical reverse recovery switching losses in diode, as a function of rate of change of current dI_F/dt.

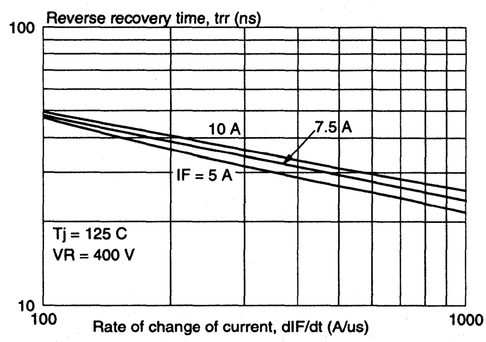


Fig.7. Typical reverse recovery time t_{rr}, as a function of rate of change of current dI_F/dt.

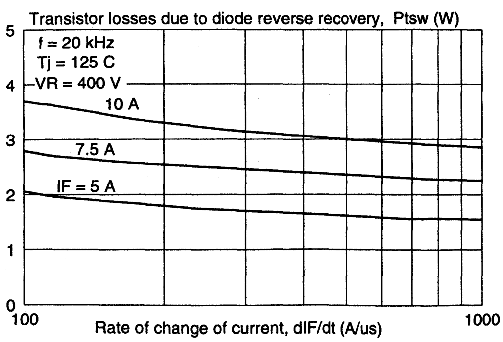


Fig.5. Typical switching losses in transistor due to reverse recovery of diode, as a function of of change of current dI_F/dt.

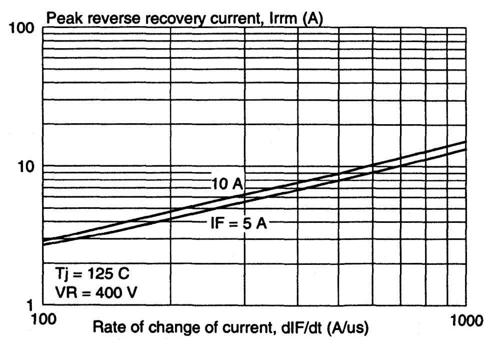


Fig.8. Typical peak reverse recovery current, I_{rrm} as a function of rate of change of current dI_F/dt.

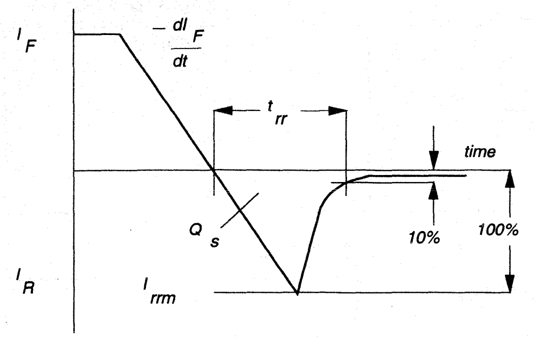


Fig.9. Definition of reverse recovery parameters t_{rr}, I_{rrm}

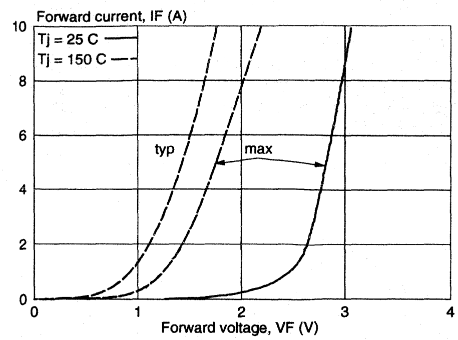


Fig.12. Typical and maximum forward characteristic $I_F = f(V_F)$; $T_j = 25˚C$ and $150˚C$.

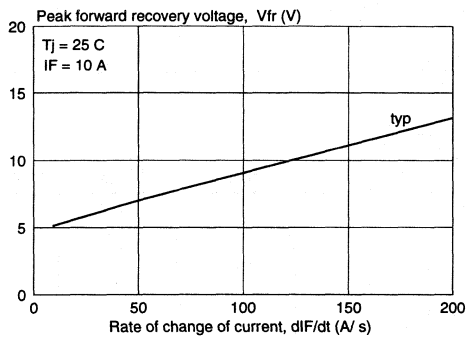


Fig.10. Typical forward recovery voltage, V_{fr} as a function of rate of change of current dI_F/dt.

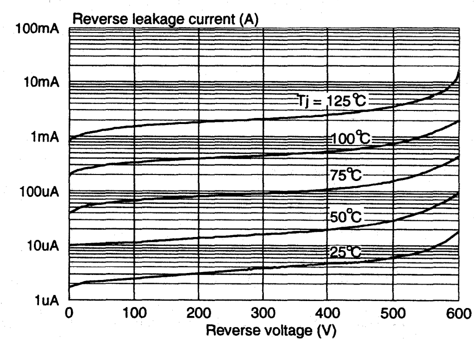


Fig.13. Typical reverse leakage current as a function of reverse voltage. $I_R = f(V_R)$; parameter T_j

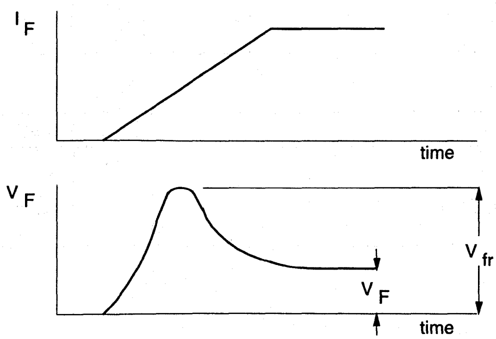


Fig.11. Definition of forward recovery voltage V_{fr}

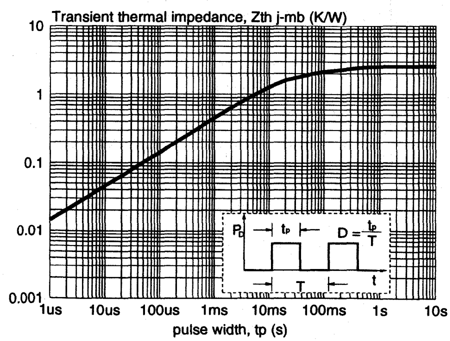


Fig.14. Maximum thermal impedance $Z_{th\ j\text{-}mb}$ as a function of pulse width.

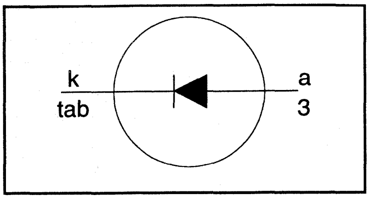
Rectifier diode ultrafast, low switching loss

BYC5B-600

FEATURES

- Extremely fast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching losses in associated MOSFET

SYMBOL



QUICK REFERENCE DATA

$V_R = 600$ V

$V_F \leq 1.75$ V

$I_{F(AV)} = 5$ A

$t_{rr} = 19$ ns (typ)

APPLICATIONS

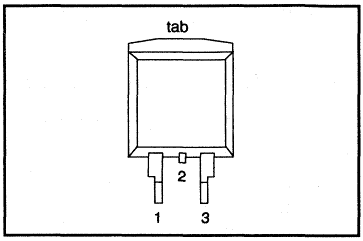
- Active power factor correction
- Half-bridge lighting ballasts
- Half-bridge/ full-bridge switched mode power supplies.

The BYC5B-600 is supplied in the SOT404 surface mounting package.

PINNING

PIN	DESCRIPTION
1	no connection
2	cathode[1]
3	anode
tab	cathode

SOT404



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	Peak repetitive reverse voltage		-	600	V
V_{RWM}	Crest working reverse voltage		-	600	V
V_R	Continuous reverse voltage	$T_{mb} \leq 110$ ˚C	-	500	V
$I_{F(AV)}$	Average forward current	$\delta = 0.5$; with reapplied $V_{RRM(max)}$; $T_{mb} \leq 89$ ˚C[1]	-	5	A
I_{FRM}	Repetitive peak forward current	$\delta = 0.5$; with reapplied $V_{RRM(max)}$; $T_{mb} \leq 89$ ˚C[1]	-	10	A
I_{FSM}	Non-repetitive peak forward current.	t = 10 ms	-	40	A
		t = 8.3 ms	-	44	A
		sinusoidal; $T_j = 150$˚C prior to surge with reapplied $V_{RWM(max)}$			
T_{stg}	Storage temperature		-40	150	˚C
T_j	Operating junction temperature		-	150	˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2.5	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	minimum footprint, FR4 board	-	50	-	K/W

1 it is not possible to make connection to pin 2 of the SOT404 package

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 5 A; T_j = 150˚C	-	1.4	1.75	V
		I_F = 10 A; T_j = 150˚C	-	1.75	2.2	V
		I_F = 5 A;	-	2.0	2.8	V
I_R	Reverse current	V_R = 600 V	-	9	100	µA
		V_R = 500 V; T_j = 100 ˚C	-	0.9	3.0	mA
t_{rr}	Reverse recovery time	I_F = 5 A; dI_F/dt = 500 A/µs; V_R = 400 V	-	19	-	ns
t_{rr}	Reverse recovery time	I_F = 5 A; dI_F/dt = 500 A/µs; V_R = 400 V; T_j = 125˚C	-	25	30	ns
I_{rrm}	Peak reverse recovery current	I_F = 5 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 125˚C	-	8	11	A
V_{fr}	Forward recovery voltage	I_F = 10 A; dI_F/dt = 100 A/µs	-	9	11	V

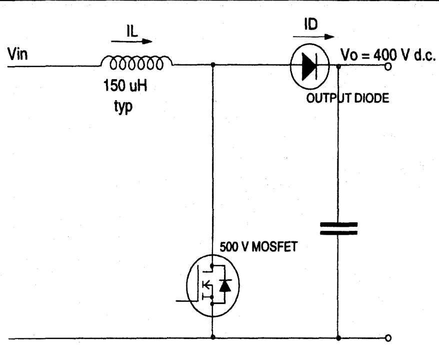


Fig.1. Typical application, output rectifier in boost converter power factor correction circuit. Continuous conduction mode, where the transistor turns on whilst forward current is still flowing in the diode.

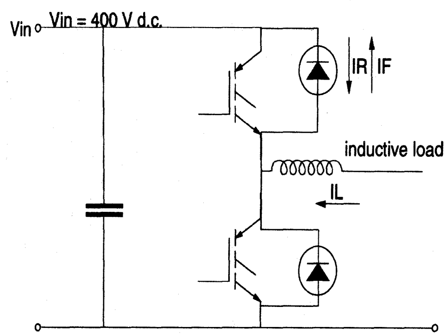


Fig.2. Typical application, freewheeling diode in half bridge converter. Continuous conduction mode, where each transistor turns on whilst forward current is still flowing in the other bridge leg diode.

Rectifier diode
ultrafast, low switching loss | BYC5B-600

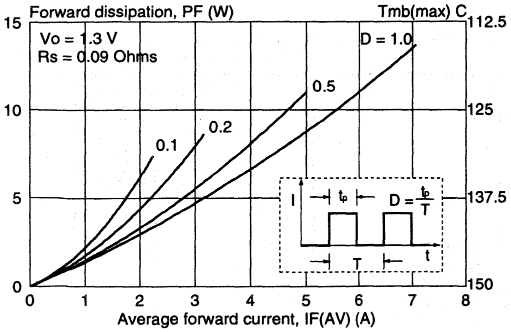


Fig.3. Maximum forward dissipation as a function of average forward current; rectangular current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

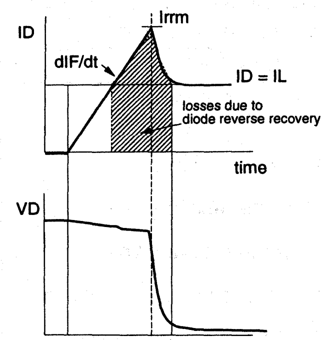


Fig.6. Origin of switching losses in transistor due to diode reverse recovery.

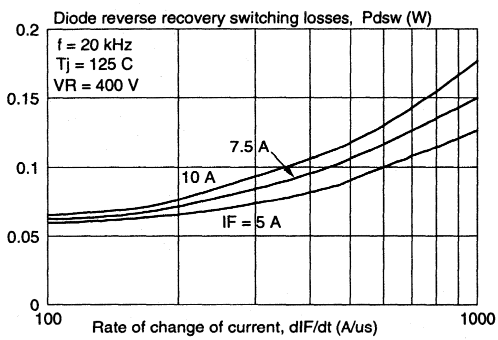


Fig.4. Typical reverse recovery switching losses in diode, as a function of rate of change of current dI_F/dt.

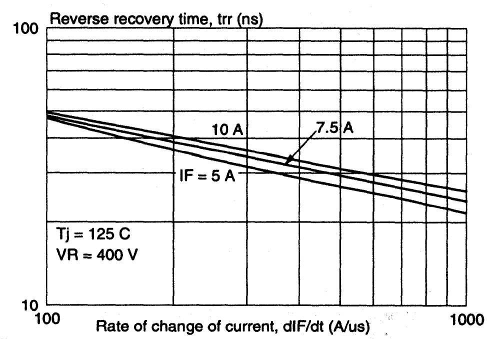


Fig.7. Typical reverse recovery time t_{rr}, as a function of rate of change of current dI_F/dt.

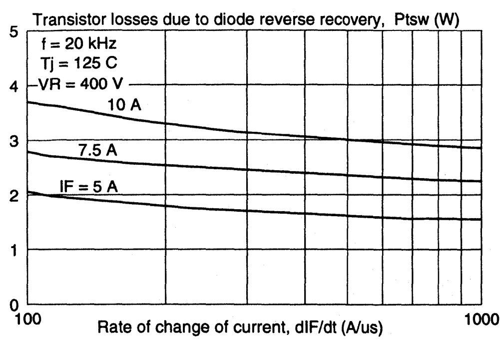


Fig.5. Typical switching losses in transistor due to reverse recovery of diode, as a function of of change of current dI_F/dt.

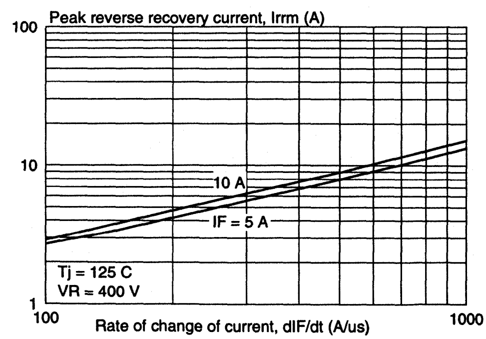


Fig.8. Typical peak reverse recovery current, I_{rrm} as a function of rate of change of current dI_F/dt.

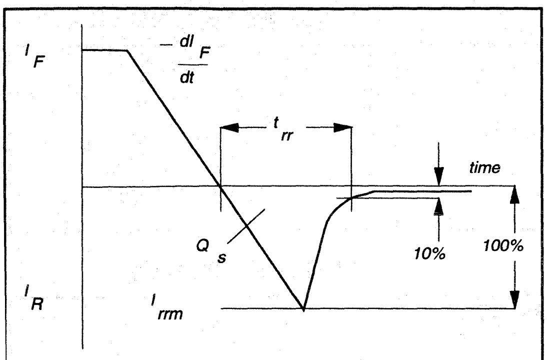


Fig.9. Definition of reverse recovery parameters t_{rr}, I_{rrm}

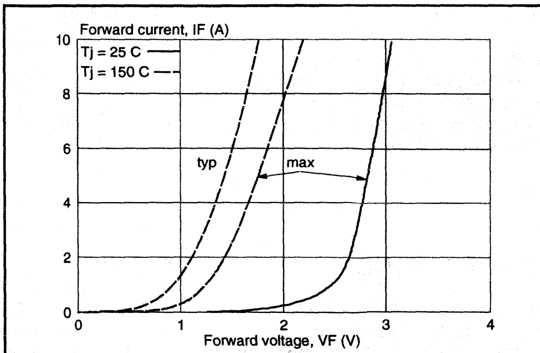


Fig.12. Typical and maximum forward characteristic $I_F = f(V_F)$; $T_j = 25^\circ C$ and $150^\circ C$.

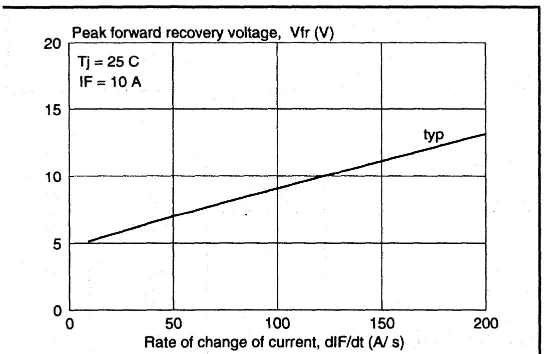


Fig.10. Typical forward recovery voltage, V_{fr} as a function of rate of change of current dI_F/dt.

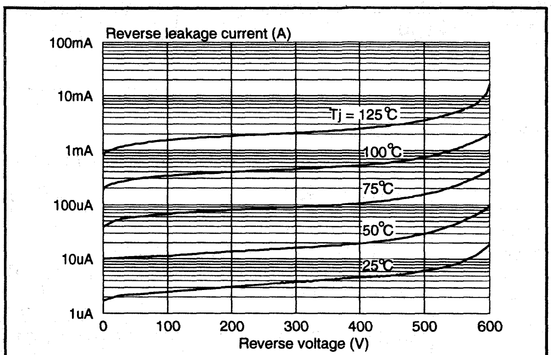


Fig.13. Typical reverse leakage current as a function of reverse voltage. $I_R = f(V_R)$; parameter T_j

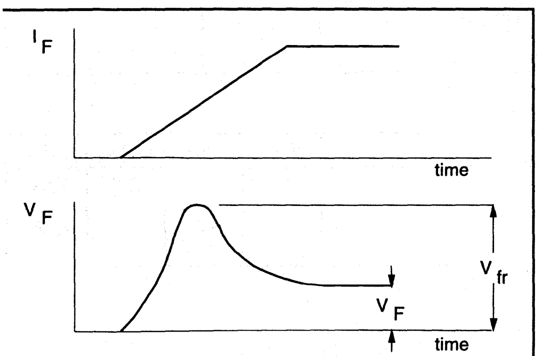


Fig.11. Definition of forward recovery voltage V_{fr}

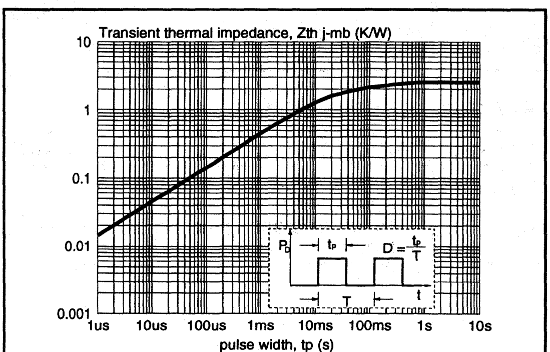


Fig.14. Maximum thermal impedance $Z_{th\,j\text{-}mb}$ as a function of pulse width.

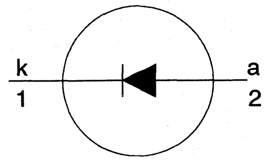
Rectifier diode ultrafast, low switching loss

BYC8-600

FEATURES

- Extremely fast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching losses in associated MOSFET

SYMBOL



QUICK REFERENCE DATA

V_R = 600 V

V_F ≤ 1.85 V

$I_{F(AV)}$ = 8 A

t_{rr} = 19 ns (typ)

APPLICATIONS

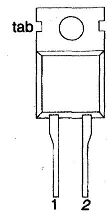
- Active power factor correction
- Half-bridge lighting ballasts
- Half-bridge/ full-bridge switched mode power supplies.

The BYC8-600 is supplied in the SOD59 (TO220AC) conventional leaded package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	Peak repetitive reverse voltage		-	600	V
V_{RWM}	Crest working reverse voltage		-	600	V
V_R	Continuous reverse voltage	T_{mb} ≤ 110 ˚C	-	500	V
$I_{F(AV)}$	Average forward current	δ = 0.5; with reapplied $V_{RRM(max)}$; T_{mb} ≤ 82 ˚C[1]	-	8	A
I_{FRM}	Repetitive peak forward current	δ = 0.5; with reapplied $V_{RRM(max)}$; T_{mb} ≤ 82 ˚C[1]	-	16	A
I_{FSM}	Non-repetitive peak forward current.	t = 10 ms	-	55	A
		t = 8.3 ms	-	60	A
		sinusoidal; T_j = 150˚C prior to surge with reapplied $V_{RWM(max)}$			
T_{stg}	Storage temperature		-40	150	˚C
T_j	Operating junction temperature		-	150	˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2.2	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	60	-	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 8 A; T_j = 150˚C	-	1.4	1.85	V
		I_F = 16 A; T_j = 150˚C	-	1.7	2.3	V
		I_F = 8 A;	-	2.0	2.8	V
I_R	Reverse current	V_R = 600 V	-	9	150	µA
		V_R = 500 V; T_j = 100 ˚C	-	1.1	3.0	mA
t_{rr}	Reverse recovery time	I_F = 8 A to V_R = 400 V; dI_F/dt = 500 A/µs	-	19	-	ns
t_{rr}	Reverse recovery time	I_F = 8 A to V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 125˚C	-	32	40	ns
I_{rrm}	Peak reverse recovery current	I_F = 8 A to V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 125˚C	-	9.5	12	A
V_{fr}	Forward recovery voltage	I_F = 10 A; dI_F/dt = 100 A/µs	-	8	10	V

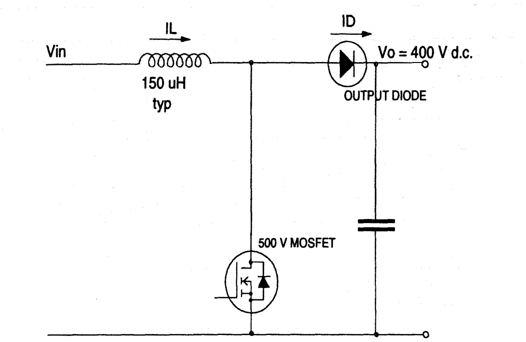


Fig.1. Typical application, output rectifier in boost converter power factor correction circuit. Continuous conduction, mode where the transistor turns on whilst forward current is still flowing in the diode.

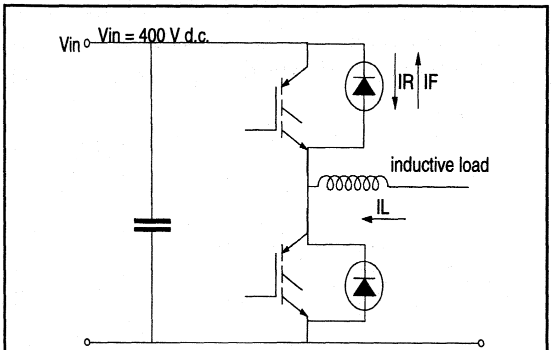


Fig.2. Typical application, freewheeling diode in half bridge converter. Continuous conduction mode, where each transistor turns on whilst forward current is still flowing in the other bridge leg diode.

Rectifier diode ultrafast, low switching loss BYC8-600

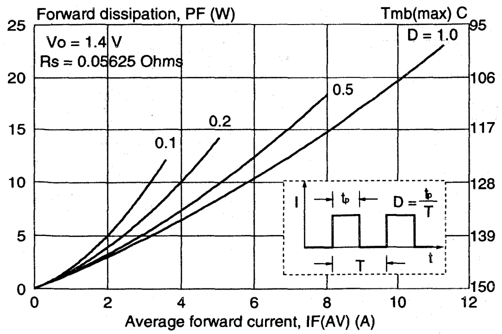


Fig.3. Maximum forward dissipation as a function of average forward current; rectangular current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

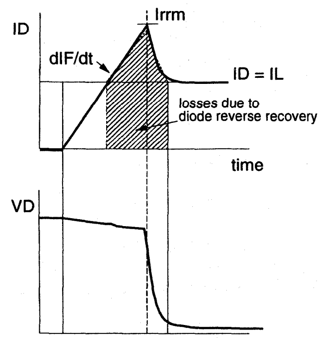


Fig.6. Origin of switching losses in transistor due to diode reverse recovery.

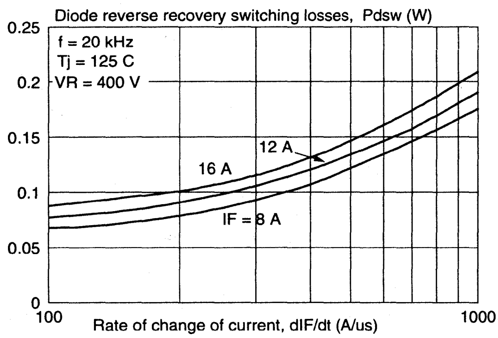


Fig.4. Typical reverse recovery switching losses in diode, as a function of rate of change of current dI_F/dt.

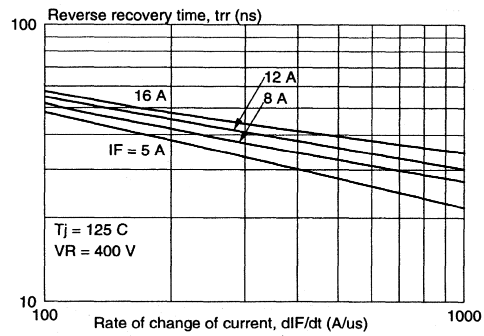


Fig.7. Typical reverse recovery time t_{rr}, as a function of rate of change of current dI_F/dt.

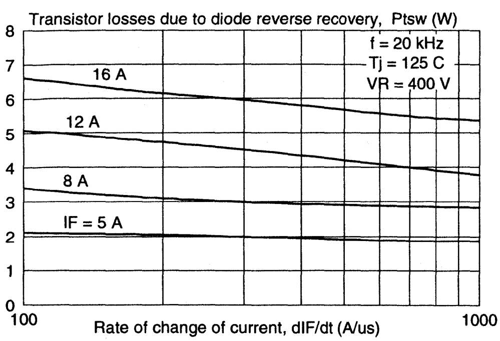


Fig.5. Typical switching losses in transistor due to reverse recovery of diode, as a function of of change of current dI_F/dt.

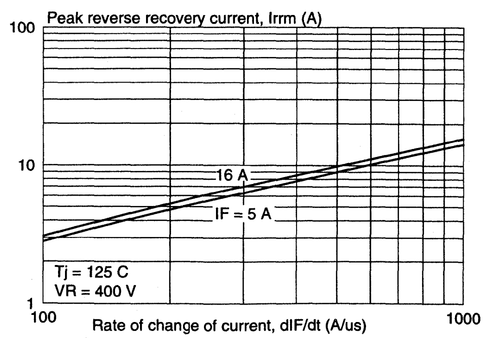


Fig.8. Typical peak reverse recovery current, I_{rrm} as a function of rate of change of current dI_F/dt.

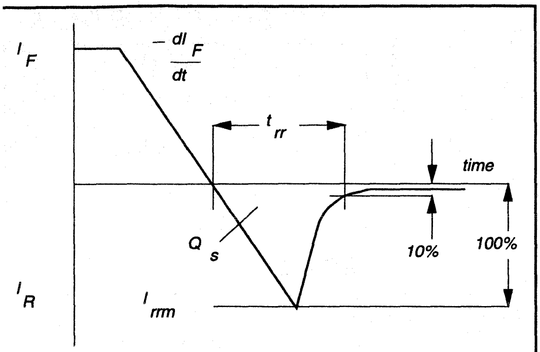


Fig.9. Definition of reverse recovery parameters t_{rr}, I_{rrm}

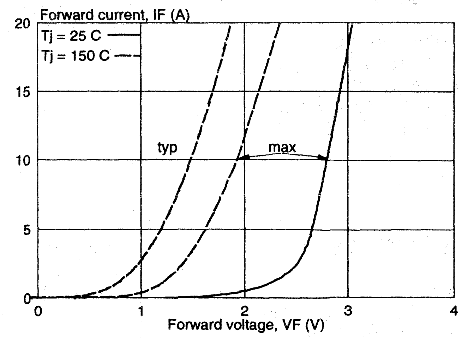


Fig.12. Typical and maximum forward characteristic $I_F = f(V_F)$; $T_j = 25^\circ C$ and $150^\circ C$.

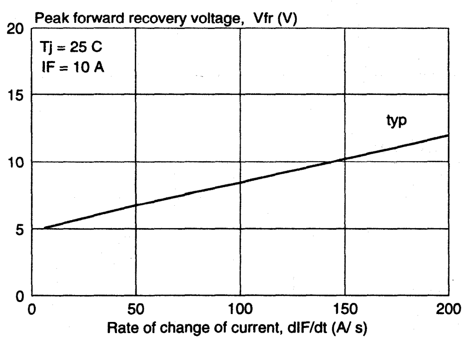


Fig.10. Typical forward recovery voltage, V_{fr} as a function of rate of change of current dI_F/dt.

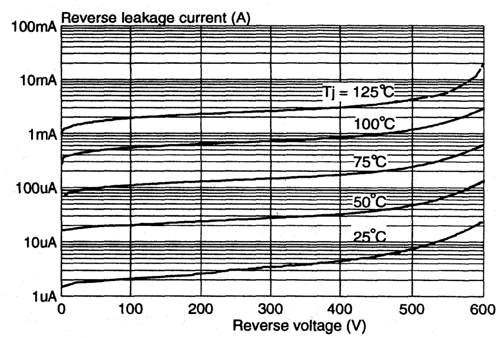


Fig.13. Typical reverse leakage current as a function of reverse voltage. $I_R = f(V_R)$; parameter T_j

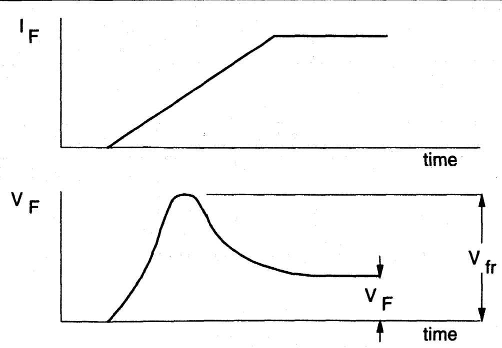


Fig.11. Definition of forward recovery voltage V_{fr}

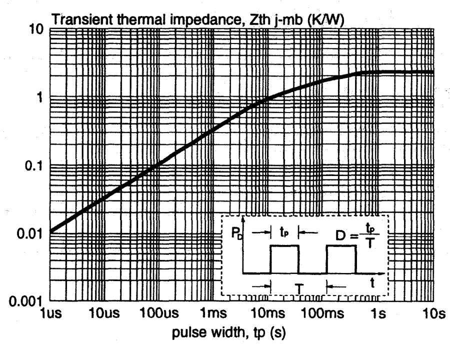


Fig.14. Maximum thermal impedance $Z_{th\,j\text{-}mb}$ as a function of pulse width.

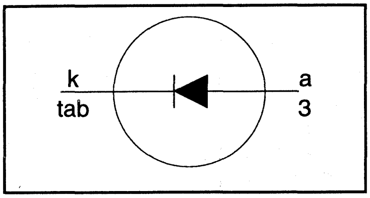
Rectifier diode ultrafast, low switching loss

BYC8B-600

FEATURES

- Extremely fast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching losses in associated MOSFET

SYMBOL



QUICK REFERENCE DATA

V_R = 600 V
$V_F \leq$ 1.85 V
$I_{F(AV)}$ = 8 A
t_{rr} = 19 ns (typ)

APPLICATIONS

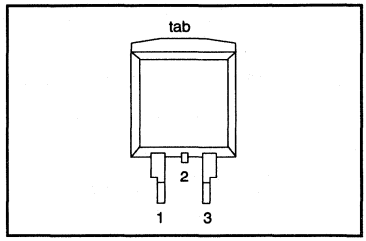
- Active power factor correction
- Half-bridge lighting ballasts
- Half-bridge/ full-bridge switched mode power supplies.

The BYC8B-600 is supplied in the SOT404 surface mounting package.

PINNING

PIN	DESCRIPTION
1	no connection
2	cathode[1]
3	anode
tab	cathode

SOT404



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	Peak repetitive reverse voltage		-	600	V
V_{RWM}	Crest working reverse voltage		-	600	V
V_R	Continuous reverse voltage	$T_{mb} \leq$ 110 ˚C	-	500	V
$I_{F(AV)}$	Average forward current	δ = 0.5; with reapplied $V_{RRM(max)}$; $T_{mb} \leq$ 82 ˚C[1]	-	8	A
I_{FRM}	Repetitive peak forward current	δ = 0.5; with reapplied $V_{RRM(max)}$; $T_{mb} \leq$ 82 ˚C[1]	-	16	A
I_{FSM}	Non-repetitive peak forward current.	t = 10 ms	-	55	A
		t = 8.3 ms	-	60	A
		sinusoidal; T_j = 150˚C prior to surge with reapplied $V_{RWM(max)}$			
T_{stg}	Storage temperature		-40	150	˚C
T_j	Operating junction temperature		-	150	˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2.2	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	minimum footprint, FR4 board	-	50	-	K/W

1 it is not possible to make connection to pin 2 of the SOT404 package

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 8 A; T_j = 150˚C	-	1.4	1.85	V
		I_F = 16 A; T_j = 150˚C	-	1.7	2.3	V
		I_F = 8 A;	-	2.0	2.8	V
I_R	Reverse current	V_R = 600 V	-	9	150	µA
		V_R = 500 V; T_j = 100 ˚C	-	1.1	3.0	mA
t_{rr}	Reverse recovery time	I_F = 8 A to V_R = 400 V; dI_F/dt = 500 A/µs	-	19	-	ns
t_{rr}	Reverse recovery time	I_F = 8 A to V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 125˚C	-	32	40	ns
I_{rrm}	Peak reverse recovery current	I_F = 8 A to V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 125˚C	-	9.5	12	A
V_{fr}	Forward recovery voltage	I_F = 10 A; dI_F/dt = 100 A/µs	-	8	10	V

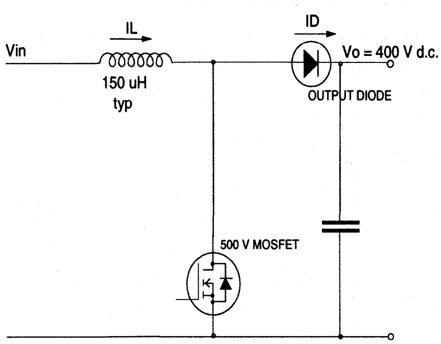


Fig.1. Typical application, output rectifier in boost converter power factor correction circuit. Continuous conduction, mode where the transistor turns on whilst forward current is still flowing in the diode.

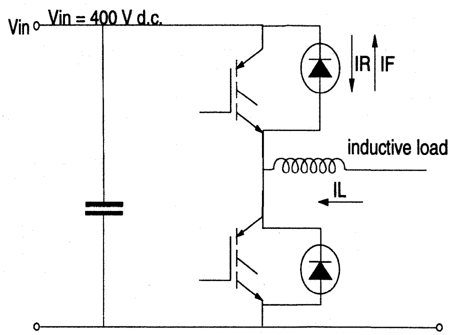


Fig.2. Typical application, freewheeling diode in half bridge converter. Continuous conduction mode, where each transistor turns on whilst forward current is still flowing in the other bridge leg diode.

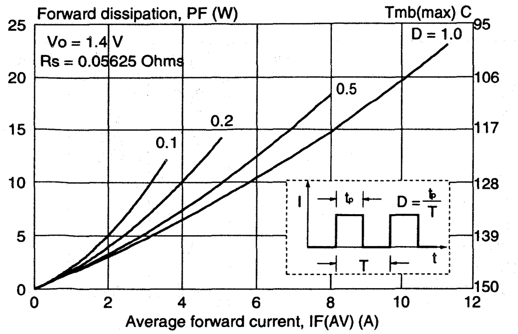


Fig.3. Maximum forward dissipation as a function of average forward current; rectangular current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

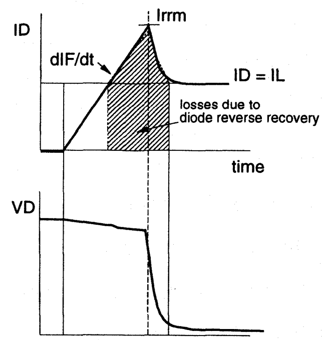


Fig.6. Origin of switching losses in transistor due to diode reverse recovery.

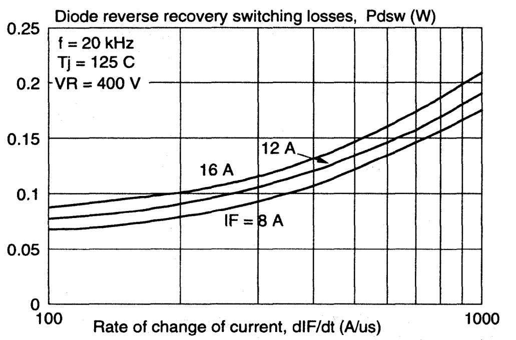


Fig.4. Typical reverse recovery switching losses in diode, as a function of rate of change of current dI_F/dt.

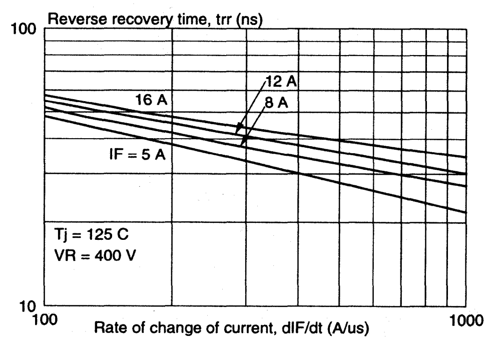


Fig.7. Typical reverse recovery time t_{rr}, as a function of rate of change of current dI_F/dt.

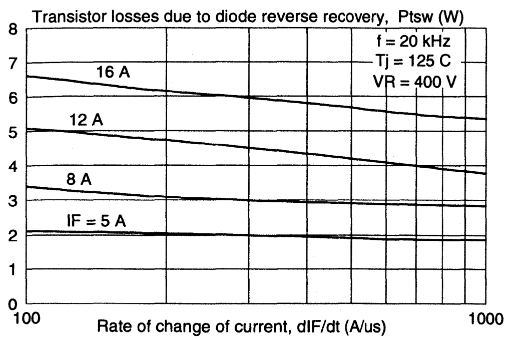


Fig.5. Typical switching losses in transistor due to reverse recovery of diode, as a function of of change of current dI_F/dt.

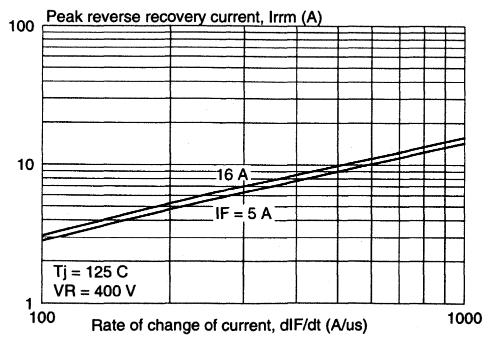


Fig.8. Typical peak reverse recovery current, I_{rrm} as a function of rate of change of current dI_F/dt.

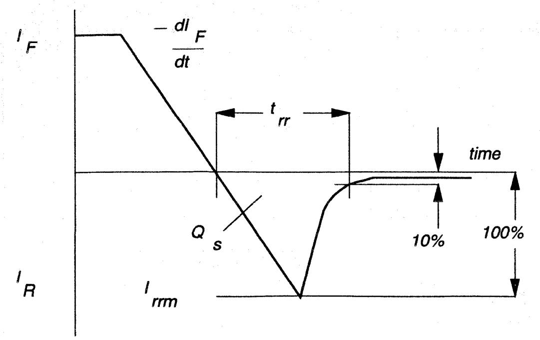


Fig.9. Definition of reverse recovery parameters t_{rr}, I_{rrm}

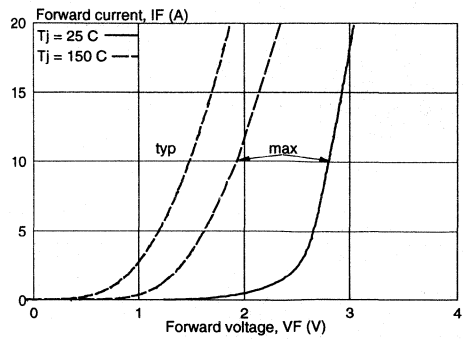


Fig.12. Typical and maximum forward characteristic $I_F = f(V_F)$; $T_j = 25˚C$ and $150˚C$.

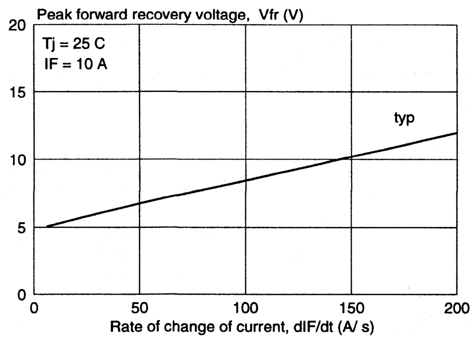


Fig.10. Typical forward recovery voltage, V_{fr} as a function of rate of change of current dI_F/dt.

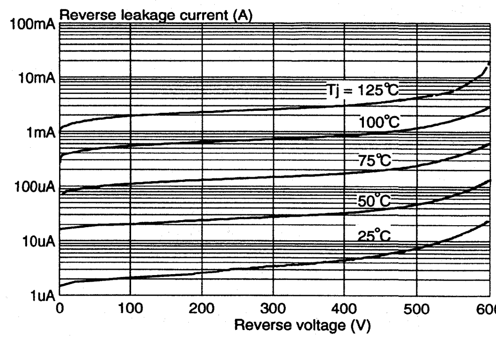


Fig.13. Typical reverse leakage current as a function of reverse voltage. $I_R = f(V_R)$; parameter T_j

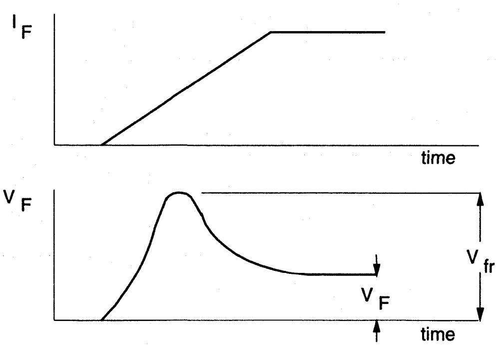


Fig.11. Definition of forward recovery voltage V_{fr}

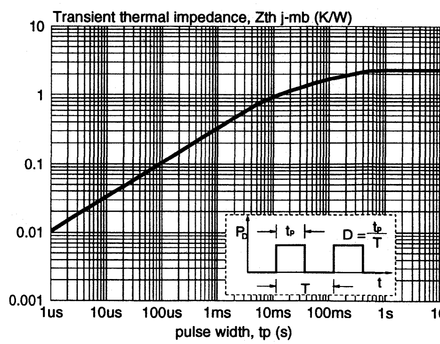


Fig.14. Maximum thermal impedance $Z_{th\ j\text{-}mb}$ as a function of pulse width.

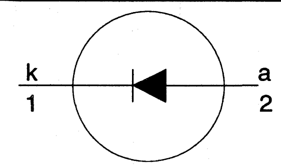
Rectifier diode ultrafast, low switching loss

BYC10-600

FEATURES

- Extremely fast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching losses in associated MOSFET

SYMBOL



QUICK REFERENCE DATA

V_R = 600 V

$V_F \leq$ 1.8 V

$I_{F(AV)}$ = 10 A

t_{rr} = 19 ns (typ)

APPLICATIONS

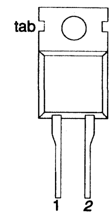
- Active power factor correction
- Half-bridge lighting ballasts
- Half-bridge/ full-bridge switched mode power supplies.

The BYC10-600 is supplied in the SOD59 (TO220AC) conventional leaded package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	Peak repetitive reverse voltage		-	600	V
V_{RWM}	Crest working reverse voltage		-	600	V
V_R	Continuous reverse voltage	$T_{mb} \leq$ 114 ˚C	-	500	V
$I_{F(AV)}$	Average forward current	δ = 0.5; with reapplied $V_{RRM(max)}$; $T_{mb} \leq$ 78 ˚C[1]	-	10	A
I_{FRM}	Repetitive peak forward current	δ = 0.5; with reapplied $V_{RRM(max)}$; $T_{mb} \leq$ 78 ˚C[1]	-	20	A
I_{FSM}	Non-repetitive peak forward current.	t = 10 ms	-	65	A
		t = 8.3 ms	-	71	A
		sinusoidal; T_j = 150˚C prior to surge with reapplied $V_{RWM(max)}$			
T_{stg}	Storage temperature		-40	150	˚C
T_j	Operating junction temperature		-	150	˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	60	-	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 10 A; T_j = 150˚C	-	1.4	1.8	V
		I_F = 20 A; T_j = 150˚C	-	1.7	2.3	V
		I_F = 10 A;	-	2.0	2.8	V
I_R	Reverse current	V_R = 600 V	-	9	200	µA
		V_R = 500 V; T_j = 100 ˚C	-	1.1	3.0	mA
t_{rr}	Reverse recovery time	I_F = 10 A to V_R = 400 V; dI_F/dt = 500 A/µs	-	19	-	ns
t_{rr}	Reverse recovery time	I_F = 10 A to V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 125˚C	-	32	40	ns
I_{rrm}	Peak reverse recovery current	I_F = 10 A to V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 125˚C	-	9.5	12	A
V_{fr}	Forward recovery voltage	I_F = 10 A; dI_F/dt = 100 A/µs	-	8	11	V

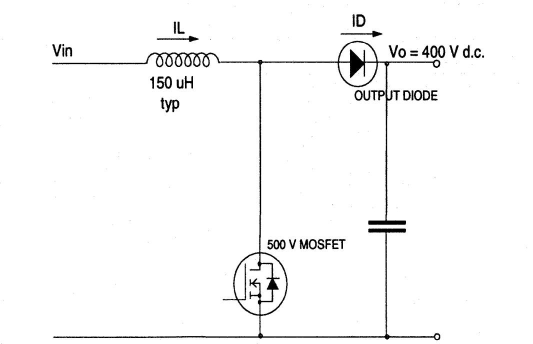


Fig.1. Typical application, output rectifier in boost converter power factor correction circuit. Continuous conduction, mode where the transistor turns on whilst forward current is still flowing in the diode.

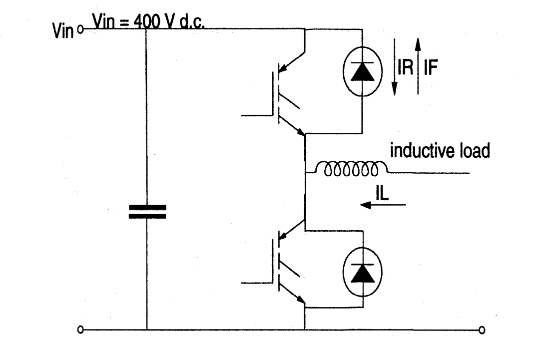


Fig.2. Typical application, freewheeling diode in half bridge converter. Continuous conduction mode, where each transistor turns on whilst forward current is still flowing in the other bridge leg diode.

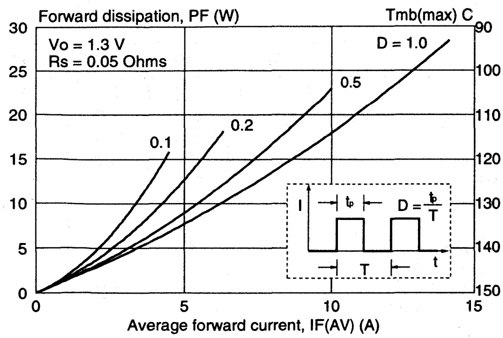


Fig.3. Maximum forward dissipation as a function of average forward current; rectangular current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

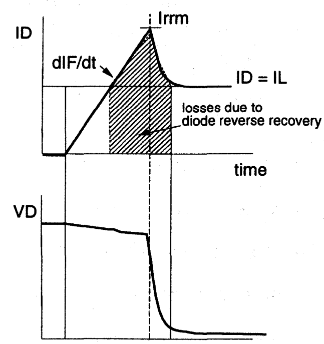


Fig.6. Origin of switching losses in transistor due to diode reverse recovery.

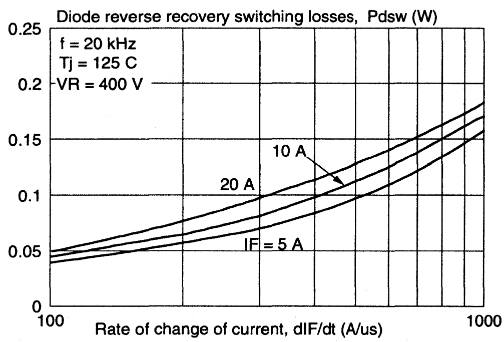


Fig.4. Typical reverse recovery switching losses in diode, as a function of rate of change of current dI_F/dt.

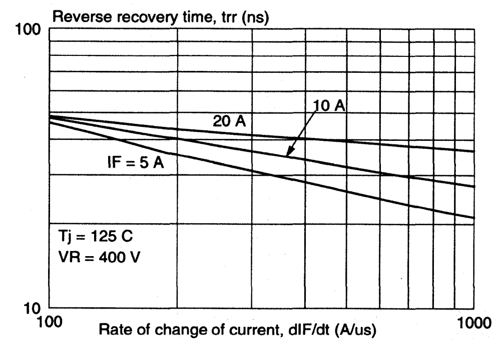


Fig.7. Typical reverse recovery time t_{rr}, as a function of rate of change of current dI_F/dt.

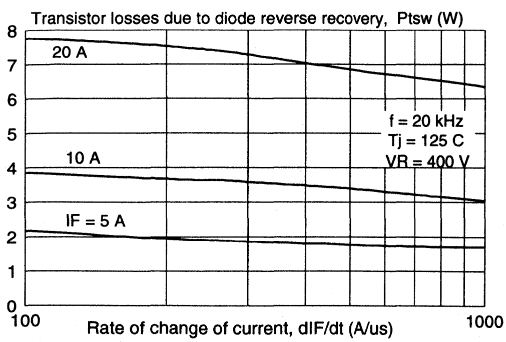


Fig.5. Typical switching losses in transistor due to reverse recovery of diode, as a function of of change of current dI_F/dt.

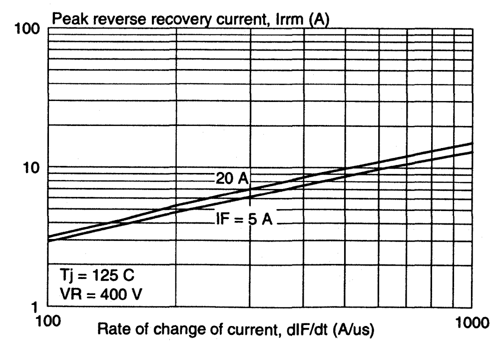


Fig.8. Typical peak reverse recovery current, I_{rrm} as a function of rate of change of current dI_F/dt.

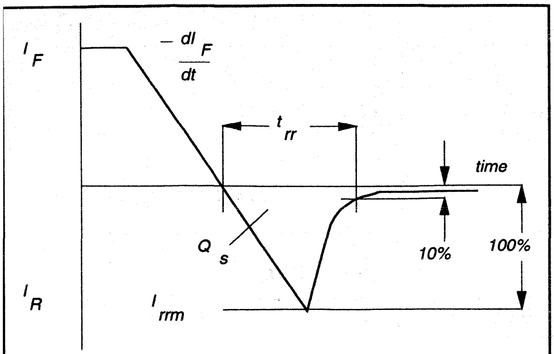


Fig.9. Definition of reverse recovery parameters t_{rr}, I_{rrm}

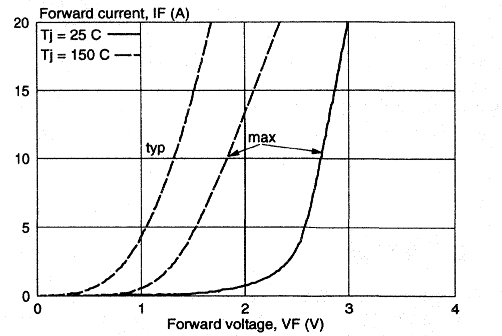


Fig.12. Typical and maximum forward characteristic $I_F = f(V_F)$; $T_j = 25˚C$ and $150˚C$.

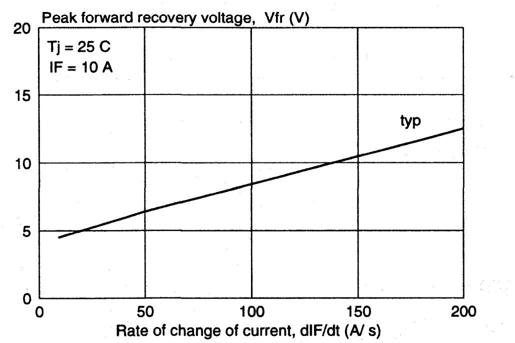


Fig.10. Typical forward recovery voltage, V_{fr} as a function of rate of change of current dI_F/dt.

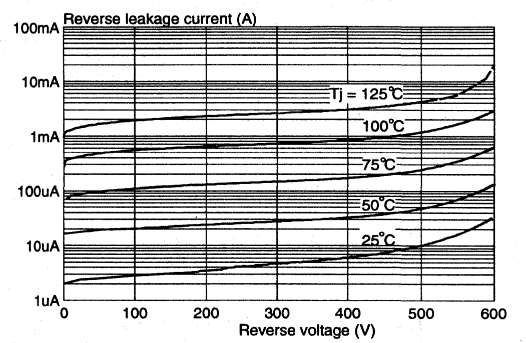


Fig.13. Typical reverse leakage current as a function of reverse voltage. $I_R = f(V_R)$; parameter T_j

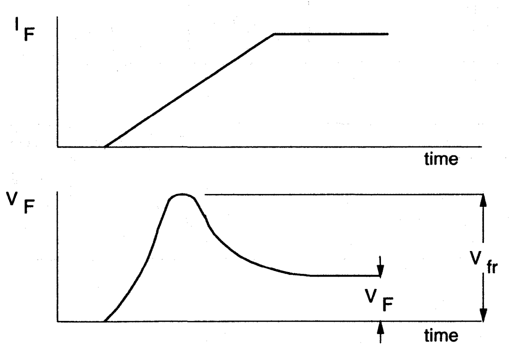


Fig.11. Definition of forward recovery voltage V_{fr}

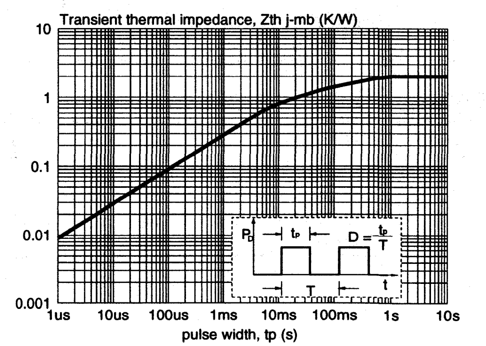


Fig.14. Maximum thermal impedance $Z_{th\ j\text{-}mb}$ as a function of pulse width.

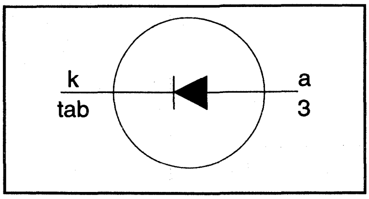
Rectifier diode ultrafast, low switching loss

BYC10B-600

FEATURES

- Extremely fast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching losses in associated MOSFET

SYMBOL



QUICK REFERENCE DATA

V_R = 600 V

$V_F \leq$ 1.8 V

$I_{F(AV)}$ = 10 A

t_{rr} = 19 ns (typ)

APPLICATIONS

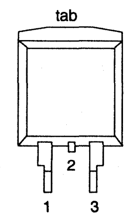
- Active power factor correction
- Half-bridge lighting ballasts
- Half-bridge/ full-bridge switched mode power supplies.

The BYC10B-600 is supplied in the SOT404 surface mounting package.

PINNING

PIN	DESCRIPTION
1	no connection
2	cathode[1]
3	anode
tab	cathode

SOT404



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	Peak repetitive reverse voltage		-	600	V
V_{RWM}	Crest working reverse voltage		-	600	V
V_R	Continuous reverse voltage	$T_{mb} \leq$ 114 ˚C	-	500	V
$I_{F(AV)}$	Average forward current	δ = 0.5; with reapplied $V_{RRM(max)}$; $T_{mb} \leq$ 78 ˚C[1]	-	10	A
I_{FRM}	Repetitive peak forward current	δ = 0.5; with reapplied $V_{RRM(max)}$; $T_{mb} \leq$ 78 ˚C[1]	-	20	A
I_{FSM}	Non-repetitive peak forward current.	t = 10 ms	-	65	A
		t = 8.3 ms	-	71	A
		sinusoidal; T_j = 150˚C prior to surge with reapplied $V_{RWM(max)}$			
T_{stg}	Storage temperature		-40	150	˚C
T_j	Operating junction temperature		-	150	˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	minimum footprint, FR4 board	-	50	-	K/W

1 it is not possible to make connection to pin 2 of the SOT404 package

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 10 A; T_j = 150˚C	-	1.4	1.8	V
		I_F = 20 A; T_j = 150˚C	-	1.7	2.3	V
		I_F = 10 A;	-	2.0	2.8	V
I_R	Reverse current	V_R = 600 V	-	9	200	µA
		V_R = 500 V; T_j = 100 ˚C	-	1.1	3.0	mA
t_{rr}	Reverse recovery time	I_F = 10 A to V_R = 400 V; dI_F/dt = 500 A/µs	-	19	-	ns
t_{rr}	Reverse recovery time	I_F = 10 A to V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 125˚C	-	32	40	ns
I_{rrm}	Peak reverse recovery current	I_F = 10 A to V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 125˚C	-	9.5	12	A
V_{fr}	Forward recovery voltage	I_F = 10 A; dI_F/dt = 100 A/µs	-	8	11	V

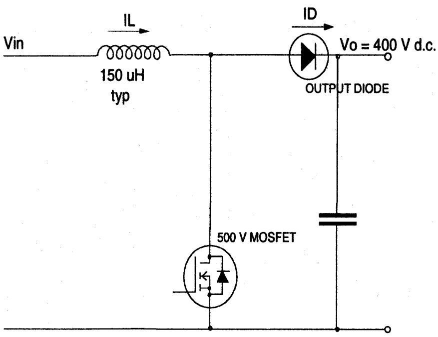


Fig.1. Typical application, output rectifier in boost converter power factor correction circuit. Continuous conduction, mode where the transistor turns on whilst forward current is still flowing in the diode.

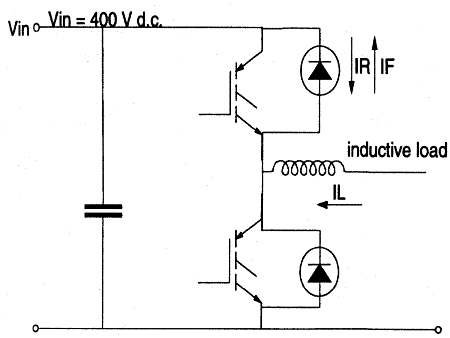


Fig.2. Typical application, freewheeling diode in half bridge converter. Continuous conduction mode, where each transistor turns on whilst forward current is still flowing in the other bridge leg diode.

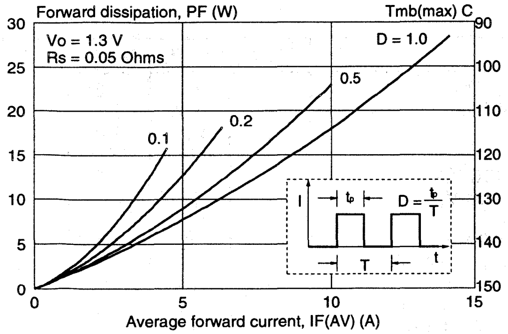


Fig.3. Maximum forward dissipation as a function of average forward current; rectangular current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

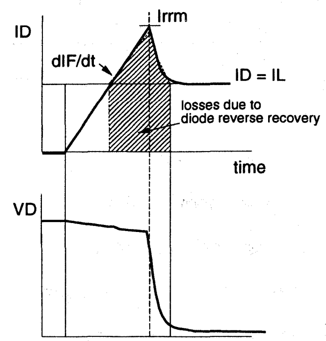


Fig.6. Origin of switching losses in transistor due to diode reverse recovery.

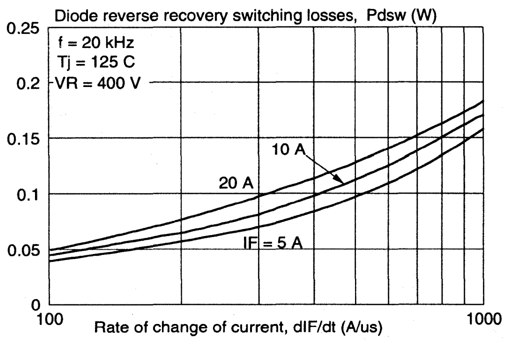


Fig.4. Typical reverse recovery switching losses in diode, as a function of rate of change of current dI_F/dt.

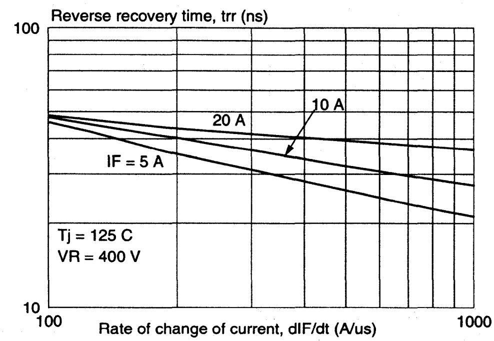


Fig.7. Typical reverse recovery time t_{rr}, as a function of rate of change of current dI_F/dt.

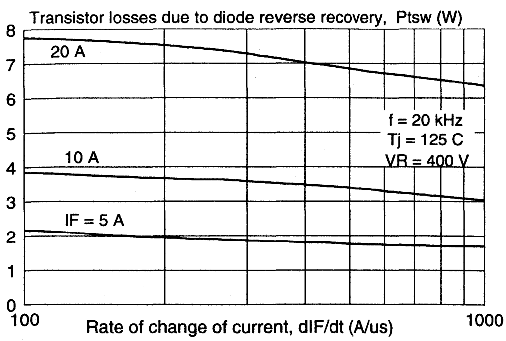


Fig.5. Typical switching losses in transistor due to reverse recovery of diode, as a function of of change of current dI_F/dt.

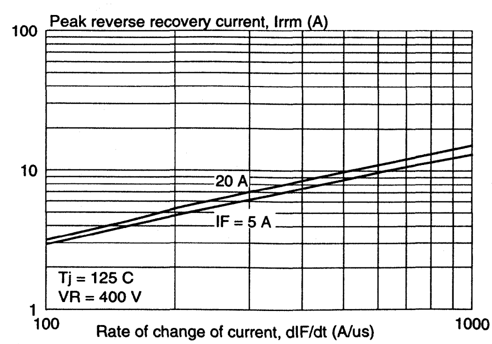


Fig.8. Typical peak reverse recovery current, I_{rrm} as a function of rate of change of current dI_F/dt.

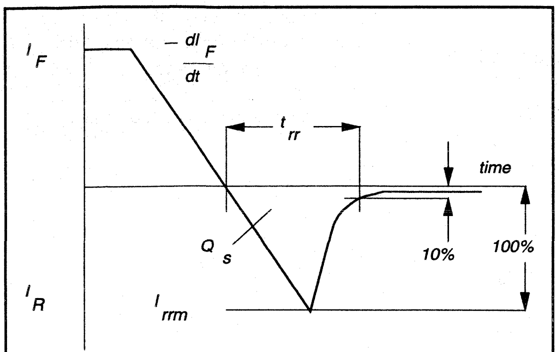


Fig.9. Definition of reverse recovery parameters t_{rr}, I_{rrm}

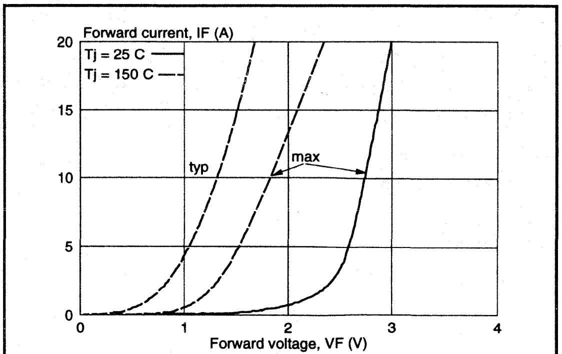


Fig.12. Typical and maximum forward characteristic $I_F = f(V_F)$; $T_j = 25°C$ and $150°C$.

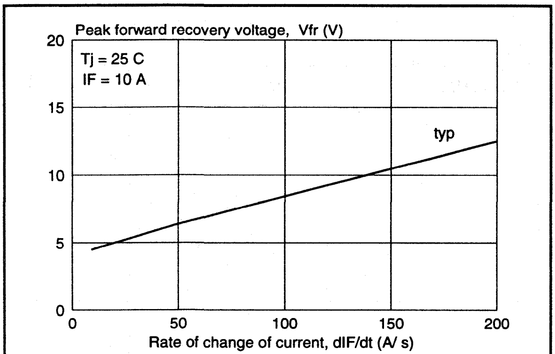


Fig.10. Typical forward recovery voltage, V_{fr} as a function of rate of change of current dI_F/dt.

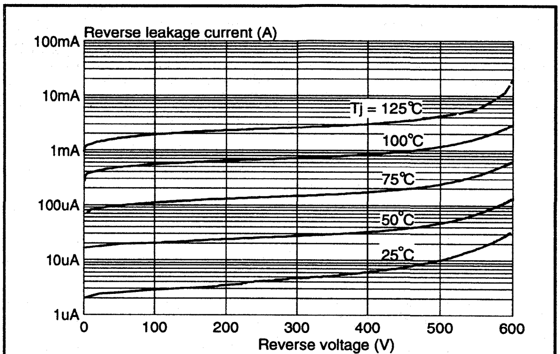


Fig.13. Typical reverse leakage current as a function of reverse voltage. $I_R = f(V_R)$; parameter T_j

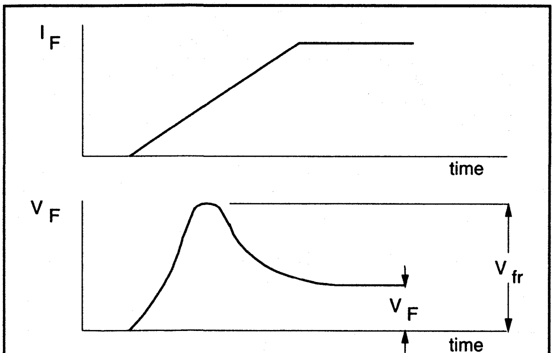


Fig.11. Definition of forward recovery voltage V_{fr}

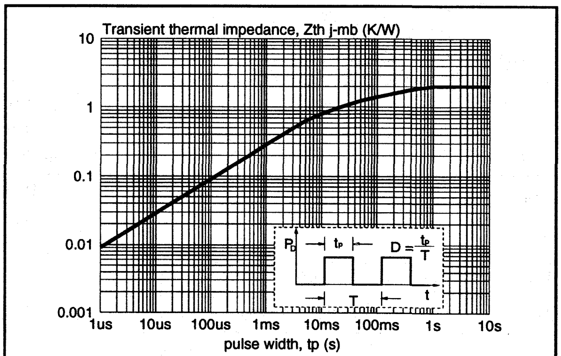


Fig.14. Maximum thermal impedance $Z_{th\ j\text{-}mb}$ as a function of pulse width.

Controlled avalanche rectifiers | BYD12 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack.

DESCRIPTION

Cavity free cylindrical glass SOD120 package through Implotec™(1) technology. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

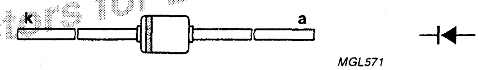


Fig.1 Simplified outline (SOD120) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYD12D		–	200	V
	BYD12G		–	400	V
	BYD12J		–	600	V
	BYD12K		–	800	V
	BYD12M		–	1000	V
V_R	continuous reverse voltage				
	BYD12D		–	200	V
	BYD12G		–	400	V
	BYD12J		–	600	V
	BYD12K		–	800	V
	BYD12M		–	1000	V
$I_{F(AV)}$	average forward current	T_{amb} = 25 °C; printed-circuit board mounting, pitch 5 mm, see Fig.6; averaged over any 20 ms period, see Fig.2	–	0.82	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; T_j = 25 °C prior to surge; $V_R = V_{RRMmax}$	–	15	A
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature	see Fig.3	–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; see Fig.4	1.05	V
I_R	reverse current	$V_R = V_{RRMmax}$	1	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.5	100	μA

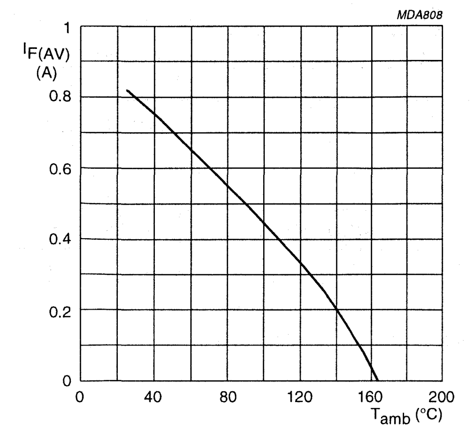
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	150	K/W

Note

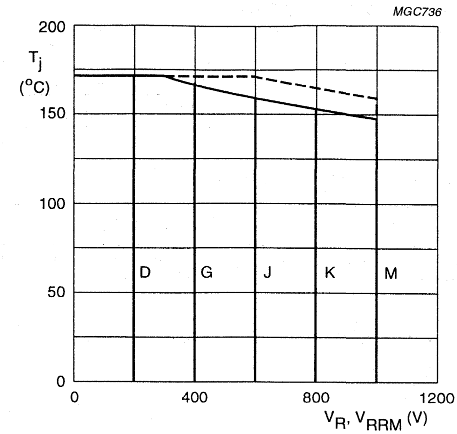
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper layer ≥40 μm, pitch 5 mm; see Fig.6.

GRAPHICAL DATA



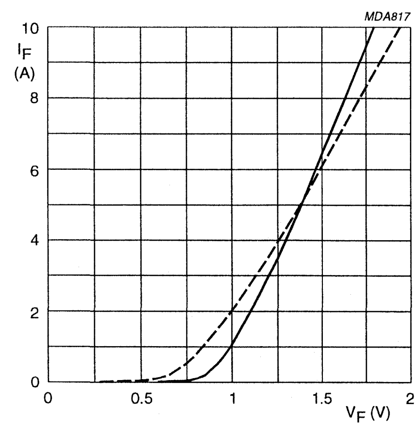
a = 1.57; $V_R = V_{RRMmax}$; $\delta = 0.5$.
Device mounted as shown in Fig.6.

Fig.2 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



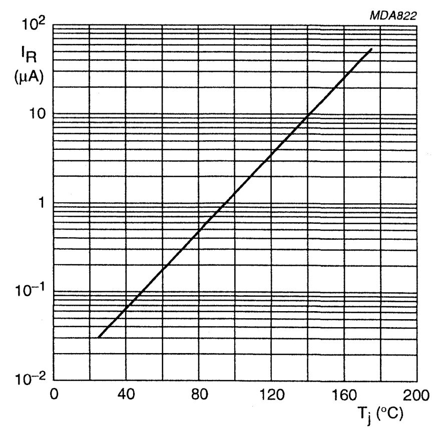
Solid line = V_R.
Dotted line = V_{RRM}; $\delta = 0.5$.

Fig.3 Maximum permissible junction temperature as a function of reverse voltage.



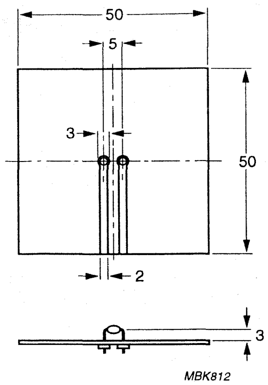
Solid line: $T_j = 25$ °C.
Dotted line: $T_j = 175$ °C.

Fig.4 Forward current as a function of forward voltage; typical values.



$V_R = V_{RRMmax}$.

Fig.5 Reverse current as a function of junction temperature; typical values.



Dimensions in mm.

Fig.6 Device mounted on a printed-circuit board.

Controlled avalanche rectifiers — BYD13 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack.

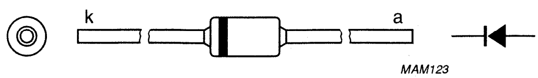


Fig.1 Simplified outline (SOD81) and symbol.

DESCRIPTION

Cavity free cylindrical glass package through Implotec™[1] technology.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

MARKING

TYPE NUMBER	MARKING CODE
BYD13D	13D PH
BYD13G	13G PH
BYD13J	13J PH
BYD13K	13K PH
BYD13M	13M PH

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYD13D		–	200	V
	BYD13G		–	400	V
	BYD13J		–	600	V
	BYD13K		–	800	V
	BYD13M		–	1000	V
V_{RWM}	crest working reverse voltage				
	BYD13D		–	200	V
	BYD13G		–	400	V
	BYD13J		–	600	V
	BYD13K		–	800	V
	BYD13M		–	1000	V
V_R	continuous reverse voltage				
	BYD13D		–	200	V
	BYD13G		–	400	V
	BYD13J		–	600	V
	BYD13K		–	800	V
	BYD13M		–	1000	V

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{F(AV)}$	average forward current	T_{tp} = 55 °C; lead length = 10 mm; averaged over any 20 ms period; see Figs 2 and 4	–	1.40	A
		T_{amb} = 65 °C; PCB mounting (see Fig.9); averaged over any 20 ms period; see Figs 3 and 4	–	0.75	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	20	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	7	mJ
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature	see Fig.5	–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Fig.6	–	–	0.93	V
		I_F = 1 A; see Fig.6	–	–	1.05	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYD13D		225	–	–	V
	BYD13G		450	–	–	V
	BYD13J		650	–	–	V
	BYD13K		900	–	–	V
	BYD13M		1100	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.7	–	–	1	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.7	–	–	100	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.10	–	3	–	μs
C_d	diode capacitance	V_R = 0 V; f = 1 MHz; see Fig.8	–	21	–	pF

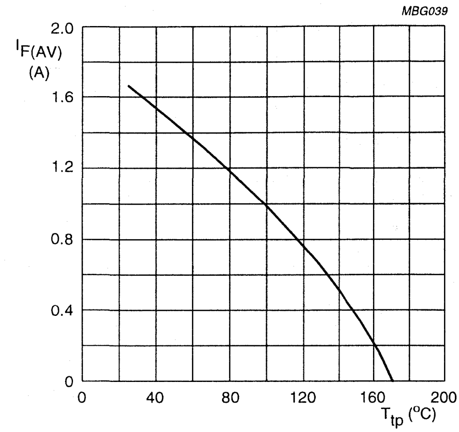
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	60	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	120	K/W

Note

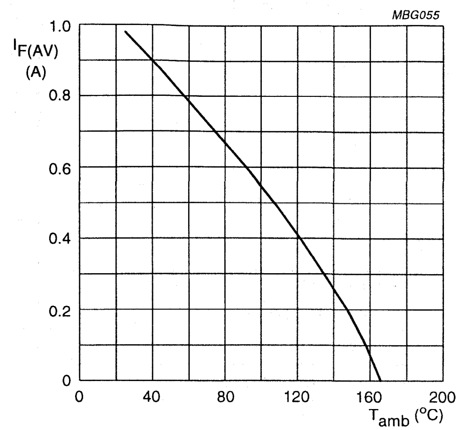
1. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.9. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA



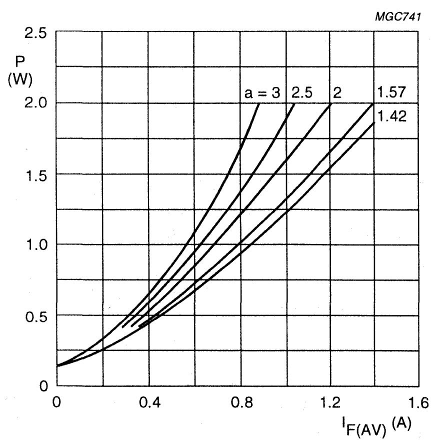
a = 1.57; $V_R = V_{RRMmax}$; $\delta = 0.5$.
Lead length 10 mm.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



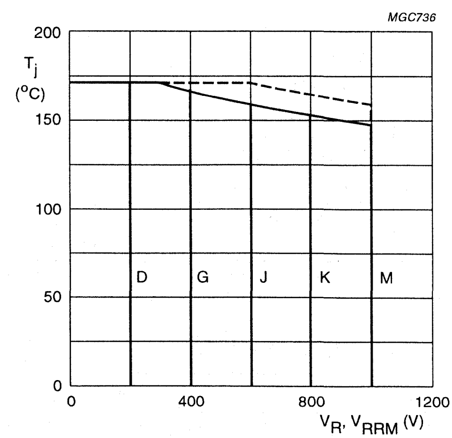
a = 1.57; $V_R = V_{RRMmax}$; $\delta = 0.5$.
Device mounted as shown in Fig.9.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



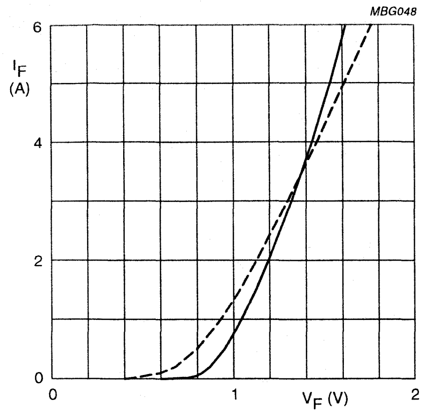
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Fig.4 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



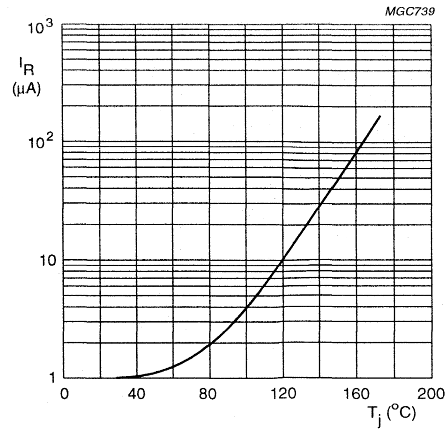
Solid line = V_R.
Dotted line = V_{RRM}; $\delta = 0.5$.

Fig.5 Maximum permissible junction temperature as a function of reverse voltage.



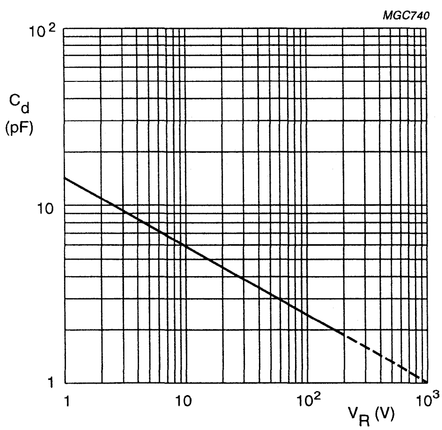
Solid line: $T_j = 25$ °C.
Dotted line: $T_j = 175$ °C.

Fig.6 Forward current as a function of forward voltage; maximum values.



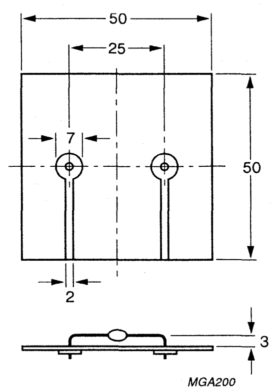
$V_R = V_{RRMmax}$.

Fig.7 Reverse current as a function of junction temperature; maximum values.



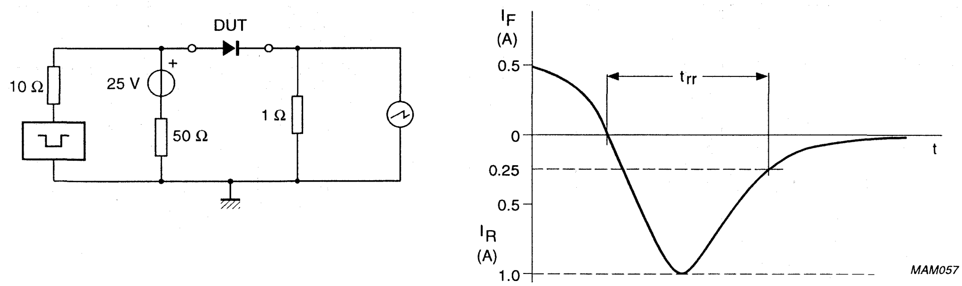
f = 1 MHz; $T_j = 25$ °C.

Fig.8 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.9 Device mounted on a printed-circuit board.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.10 Test circuit and reverse recovery time waveform and definition.

Controlled avalanche rectifiers | BYD17 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Shipped in 8 mm embossed tape
- Smallest surface mount rectifier outline.

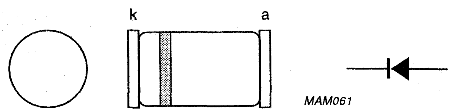


Fig.1 Simplified outline (SOD87) and symbol.

DESCRIPTION

Cavity free cylindrical glass package through Implotec™(1) technology.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

MARKING

TYPE NUMBER	MARKING CODE
BYD17D	17D PH
BYD17G	17G PH
BYD17J	17J PH
BYD17K	17K PH
BYD17M	17M PH

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYD17D		–	200	V
	BYD17G		–	400	V
	BYD17J		–	600	V
	BYD17K		–	800	V
	BYD17M		–	1000	V
V_{RWM}	crest working reverse voltage				
	BYD17D		–	200	V
	BYD17G		–	400	V
	BYD17J		–	600	V
	BYD17K		–	800	V
	BYD17M		–	1000	V
V_R	continuous reverse voltage				
	BYD17D		–	200	V
	BYD17G		–	400	V
	BYD17J		–	600	V
	BYD17K		–	800	V
	BYD17M		–	1000	V

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{F(AV)}$	average forward current	T_{tp} = 105 °C; averaged over any 20 ms period; see Figs 2 and 4	–	1.5	A
		T_{amb} = 65 °C; PCB mounting (see Fig.9); averaged over any 20 ms period; see Figs 3 and 4	–	0.6	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	20	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	7	mJ
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature	see Fig.5	−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Fig.6	–	–	0.93	V
		I_F = 1 A; see Fig.6	–	–	1.05	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYD17D		225	–	–	V
	BYD17G		450	–	–	V
	BYD17J		650	–	–	V
	BYD17K		900	–	–	V
	BYD17M		1100	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.7	–	–	1	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.7	–	–	100	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.10	–	3	–	μs
C_d	diode capacitance	V_R = 0 V; f = 1 MHz; see Fig.8	–	21	–	pF

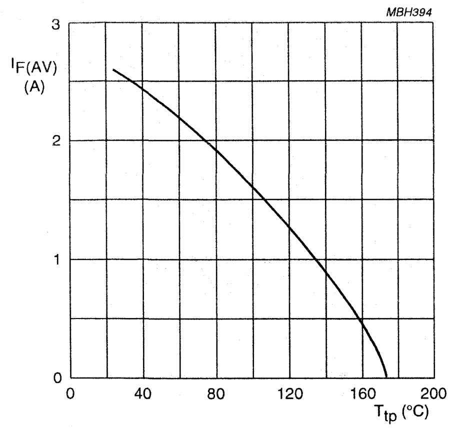
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point		30	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	150	K/W

Note

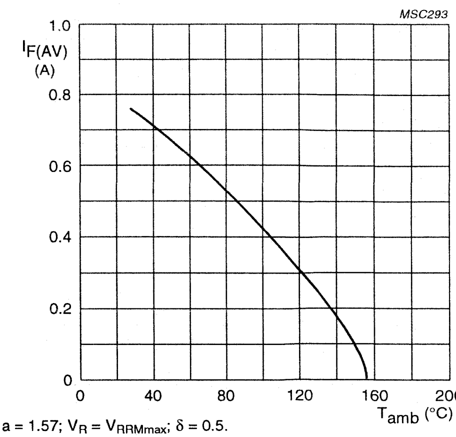
1. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.9. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA



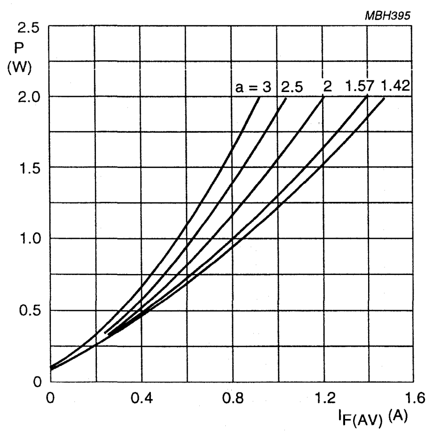
a = 1.57; $V_R = V_{RRMmax}$; δ = 0.5.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



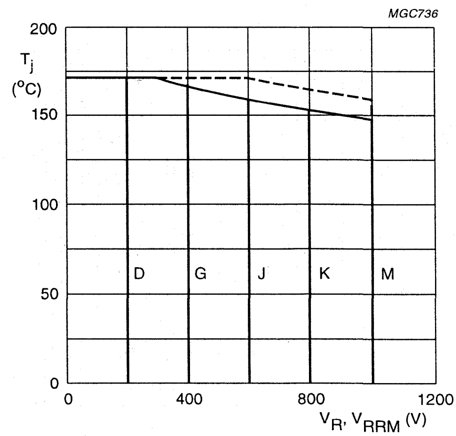
a = 1.57; $V_R = V_{RRMmax}$; δ = 0.5.
Device mounted as shown in Fig.9.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



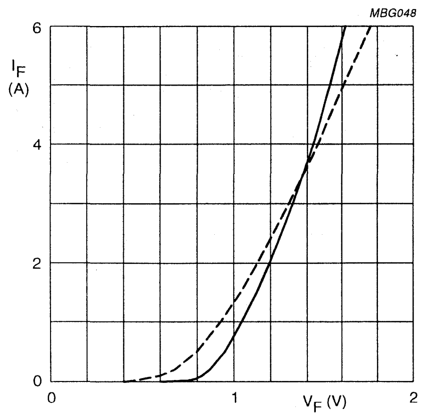
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; δ = 0.5.

Fig.4 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



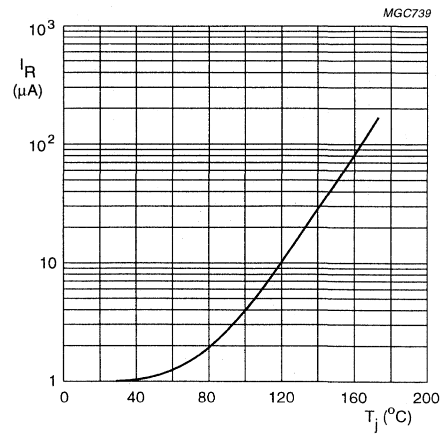
Solid line = V_R.
Dotted line = V_{RRM}; δ = 0.5.

Fig.5 Maximum permissible junction temperature as a function of reverse voltage.



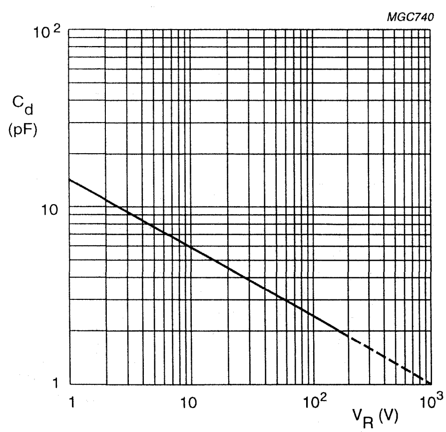
Solid line: $T_j = 25$ °C.
Dotted line: $T_j = 175$ °C.

Fig.6 Forward current as a function of forward voltage; maximum values.



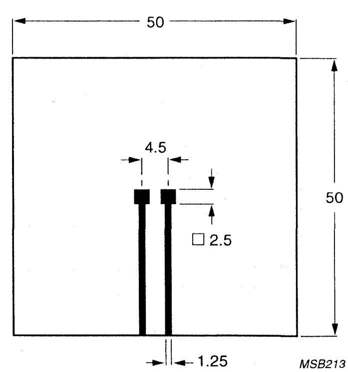
$V_R = V_{RRMmax}$.

Fig.7 Reverse current as a function of junction temperature; maximum values.



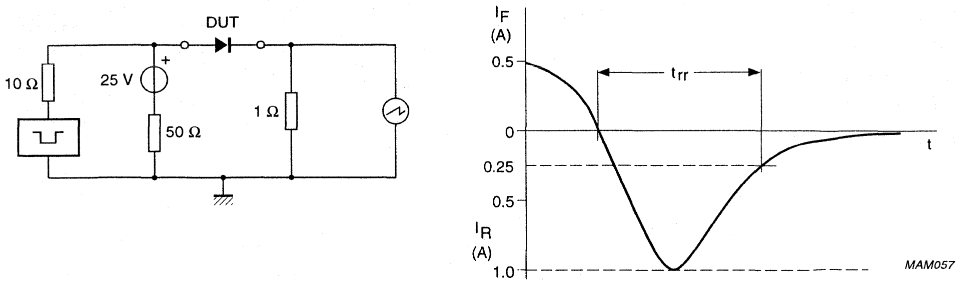
f = 1 MHz; $T_j = 25$ °C.

Fig.8 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.9 Printed-circuit board for surface mounting.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.10 Test circuit and reverse recovery time waveform and definition.

Fast soft-recovery controlled avalanche rectifiers

BYD32 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack.

DESCRIPTION

Cavity free cylindrical glass SOD 120 package through Implotec™(1) technology. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

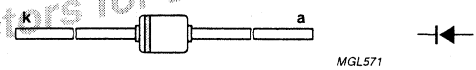


Fig.1 Simplified outline (SOD120) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYD32D		–	200	V
	BYD32G		–	400	V
	BYD32J		–	600	V
V_R	continuous reverse voltage				
	BYD32D		–	200	V
	BYD32G		–	400	V
	BYD32J		–	600	V
$I_{F(AV)}$	average forward current	T_{amb} = 25 °C; printed-circuit board mounting, pitch 5 mm, see Fig.6; averaged over any 20 ms period; see Fig.2	–	0.76	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; T_j = 25 °C; $V_R = V_{RRMmax}$	–	15	A
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature	see Fig.3	–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; see Fig.4	1.3	V
I_R	reverse current	$V_R = V_{RRMmax}$	1	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.5	100	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.7	250	ns

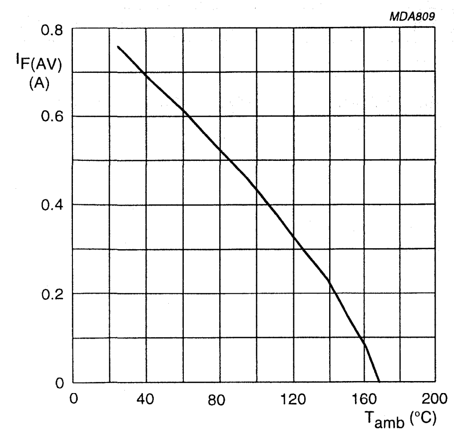
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	150	K/W

Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper layer ≥40 μm, pitch 5 mm; see Fig.6.

GRAPHICAL DATA



a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.
Device mounted as shown in Fig.6.

Fig.2 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).

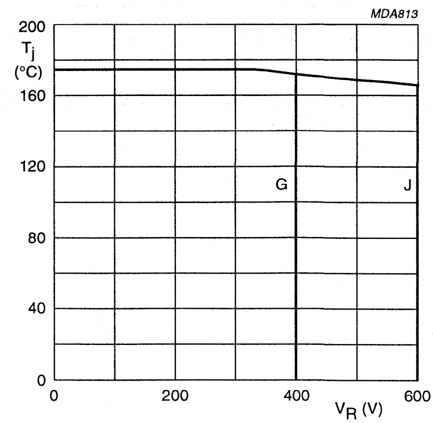
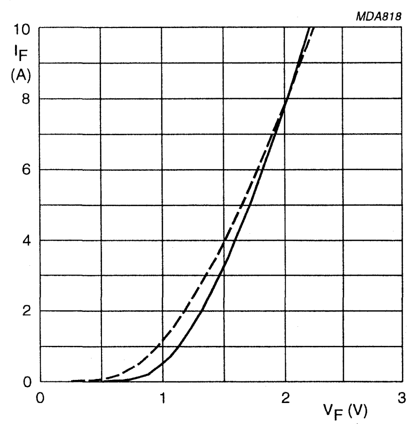
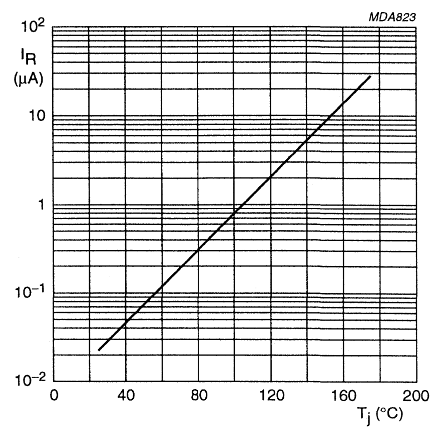


Fig.3 Maximum permissible junction temperature as a function of reverse voltage.



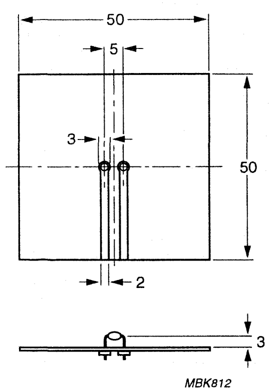
Solid line: $T_j = 25$ °C.
Dotted line: $T_j = 175$ °C.

Fig.4 Forward current as a function of forward voltage; typical values.



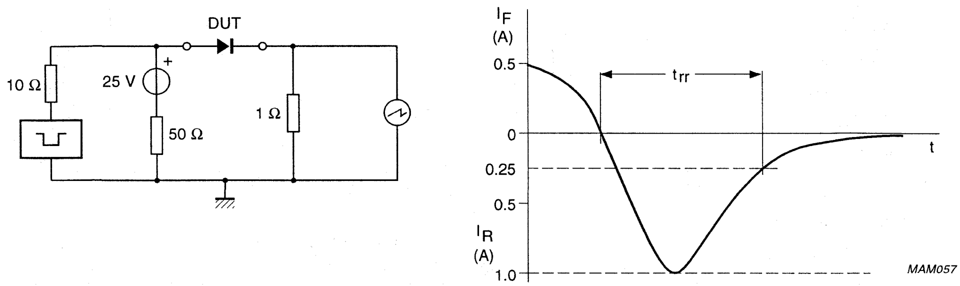
$V_R = V_{RRMmax}$.

Fig.5 Reverse current as a function of junction temperature; typical values.



Dimensions in mm.

Fig.6 Device mounted on a printed-circuit board.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.7 Test circuit and reverse recovery time waveform and definition.

Fast soft-recovery controlled avalanche rectifiers

BYD33 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack.

DESCRIPTION

Cavity free cylindrical glass package through Implotec™(1) technology. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

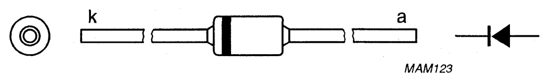


Fig.1 Simplified outline (SOD81) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYD33D		–	200	V
	BYD33G		–	400	V
	BYD33J		–	600	V
	BYD33K		–	800	V
	BYD33M		–	1000	V
	BYD33U		–	1200	V
	BYD33V		–	1400	V
V_R	continuous reverse voltage				
	BYD33D		–	200	V
	BYD33G		–	400	V
	BYD33J		–	600	V
	BYD33K		–	800	V
	BYD33M		–	1000	V
	BYD33U		–	1200	V
	BYD33V		–	1400	V
$I_{F(AV)}$	average forward current	T_{tp} = 55 °C; lead length = 10 mm; see Figs 2 and 3; averaged over any 20 ms period; see also Figs 10 and 11			
	BYD33D to M		–	1.30	A
	BYD33U and V		–	1.26	A
$I_{F(AV)}$	average forward current	T_{amb} = 65 °C; PCB mounting (see Fig.19); see Figs 4 and 5; averaged over any 20 ms period; see also Figs 10 and 11			
	BYD33D to M		–	0.70	A
	BYD33U and V		–	0.67	A
I_{FRM}	repetitive peak forward current	T_{tp} = 55 °C; see Figs 6 and 7			
	BYD33D to M		–	12	A
	BYD33U and V		–	11	A

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{FRM}	repetitive peak forward current	T_{amb} = 65 °C; see Figs 8 and 9			
	BYD33D to M		–	7	A
	BYD33U and V		–	6	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	20	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off			
	BYD33D to J		–	10	mJ
	BYD33K to V		–	7	mJ
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature	see Figs 12 and 13	–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Figs 14 and 15	–	–	1.1	V
		I_F = 1 A; see Figs 14 and 15	–	–	1.3	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYD33D		300	–	–	V
	BYD33G		500	–	–	V
	BYD33J		700	–	–	V
	BYD33K		900	–	–	V
	BYD33M		1100	–	–	V
	BYD33U		1300	–	–	V
	BYD33V		1500	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.16	–	–	1	µA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.16	–	–	100	µA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A see Fig.21				
	BYD33D to J		–	–	250	ns
	BYD33K and M		–	–	300	ns
	BYD33U and V		–	–	500	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Figs 17 and 18	–	20	–	pF

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$\left\lvert\frac{dI_R}{dt}\right\rvert$	maximum slope of reverse recovery current	when switched from $I_F = 1$ A to $V_R \geq 30$ V and $dI_F/dt = -1$ A/μs; see Fig.20				
	BYD33D to J		–	–	6	A/μs
	BYD33K to V		–	–	5	A/μs

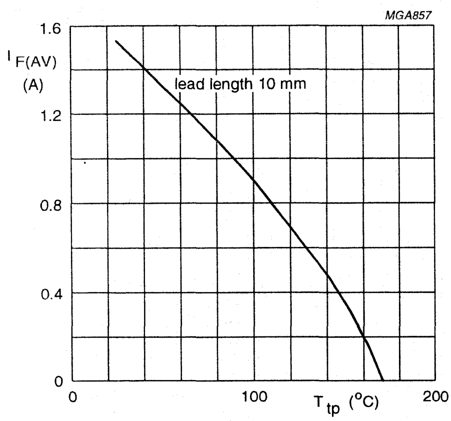
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	60	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	120	K/W

Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.19. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA

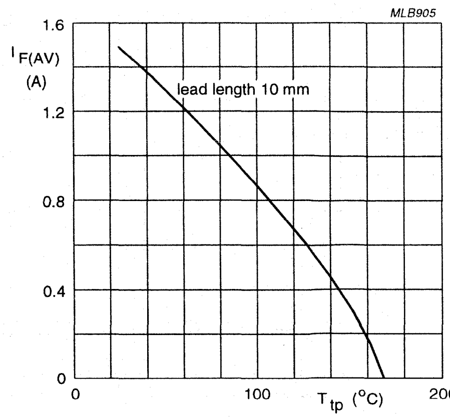


BYD33D to M

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Switched mode application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).

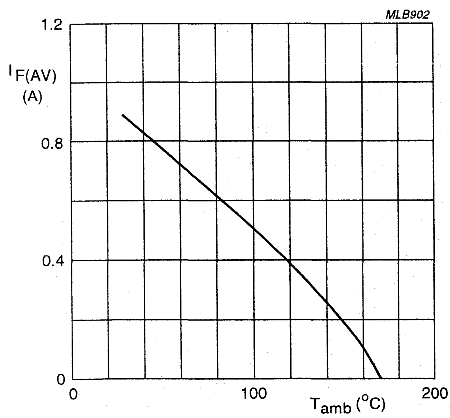


BYD33U and V

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Switched mode application.

Fig.3 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



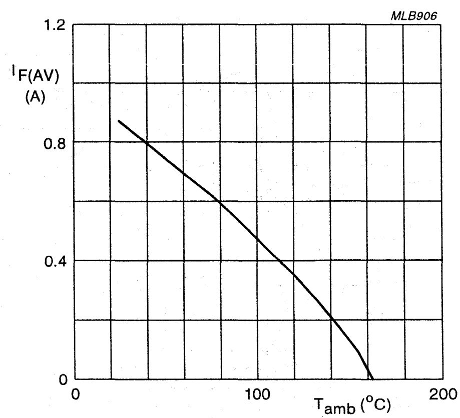
BYD33D to M

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Device mounted as shown in Fig.19.

Switched mode application.

Fig.4 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



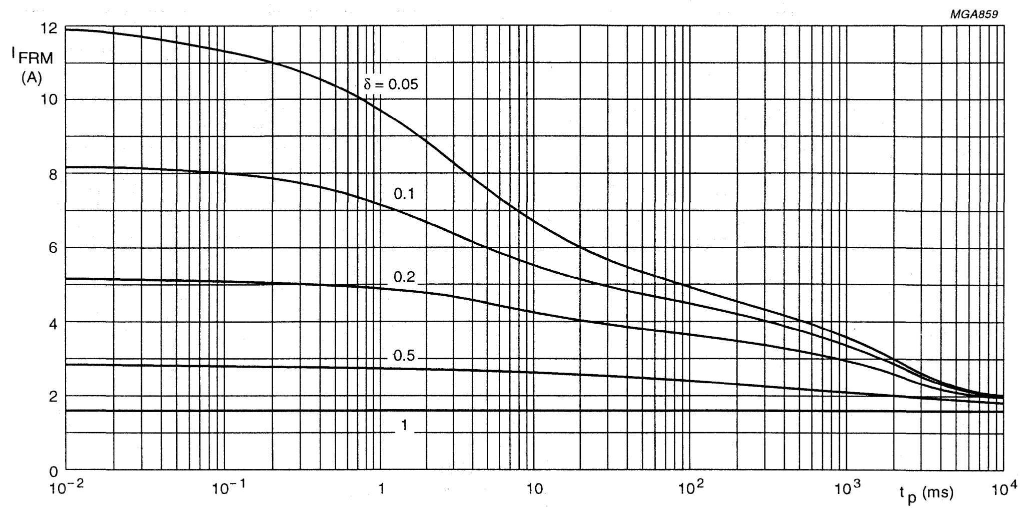
BYD33U and V

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Device mounted as shown in Fig.19.

Switched mode application.

Fig.5 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).

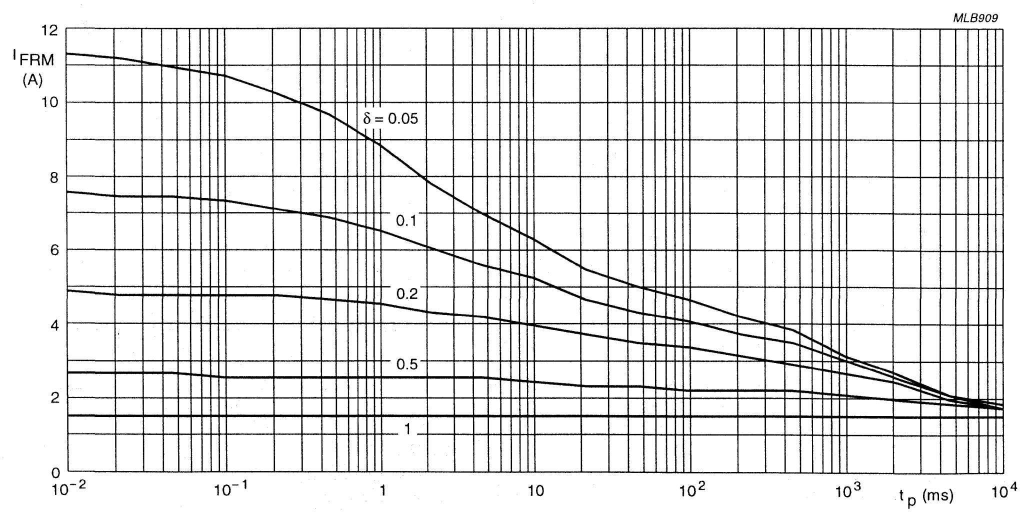


BYD33D to M

T_{tp} = 55 °C; $R_{th\ j\text{-}tp}$ = 60 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1000 V.

Fig.6 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

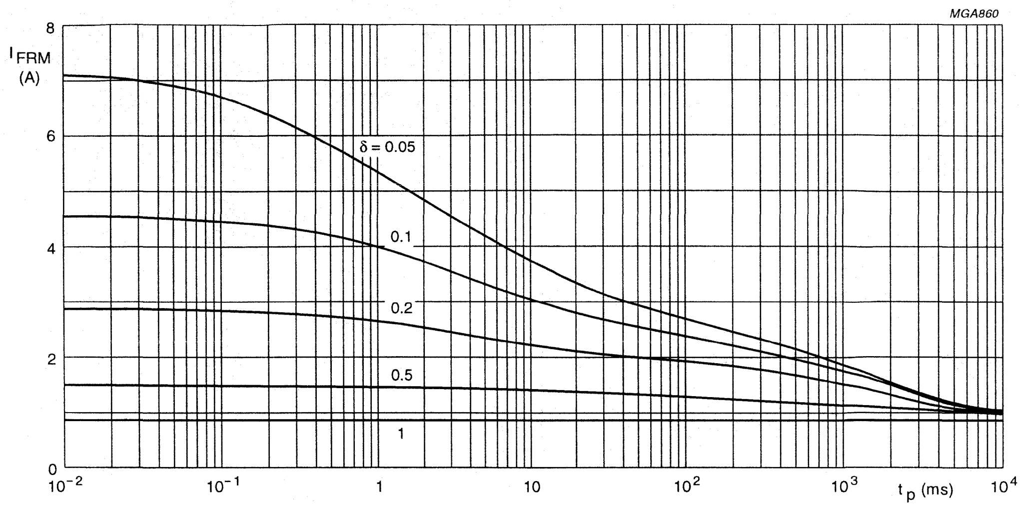


BYD33U and V

T_{tp} = 55°C; $R_{th\ j\text{-}tp}$ = 60 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1400 V.

Fig.7 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

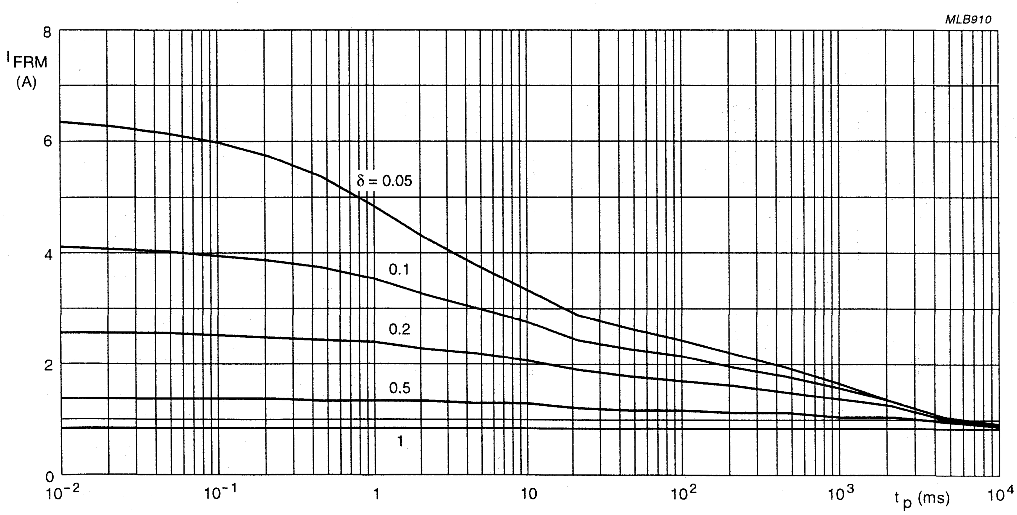


BYD33D to M

T_{amb} = 65 °C; $R_{th\ j\text{-}a}$ = 120 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1000 V.

Fig.8 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



BYD33U and V

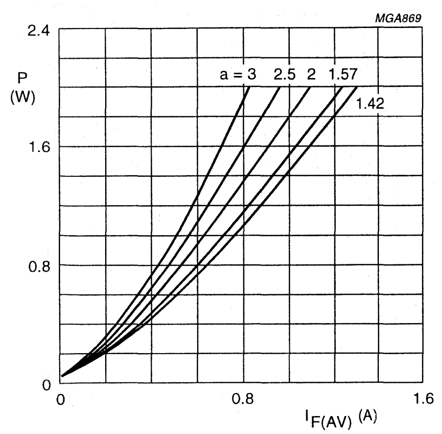
T_{amb} = 65 °C; $R_{th\ j\text{-}a}$ = 120 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1400 V.

Fig.9 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

Fast soft-recovery controlled avalanche rectifiers

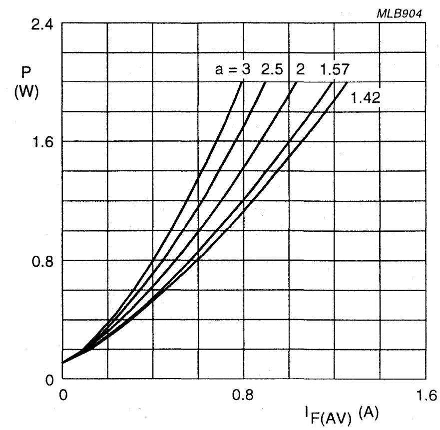
BYD33 series



BYD33D to M

$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

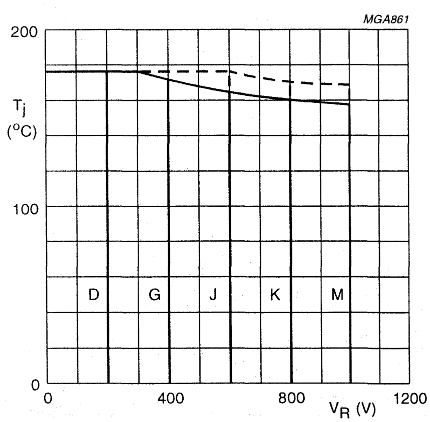
Fig.10 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



BYD33U and V

$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Fig.11 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.

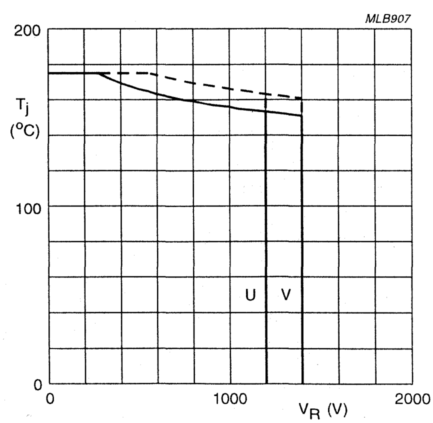


BYD33D to M

Solid line = V_R.

Dotted line = V_{RRM}; $\delta = 0.5$.

Fig.12 Maximum permissible junction temperature as a function of reverse voltage.

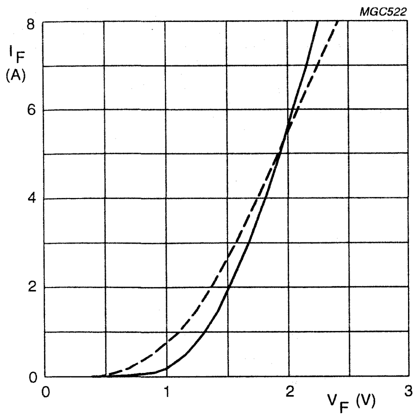


BYD33U and V

Solid line = V_R.

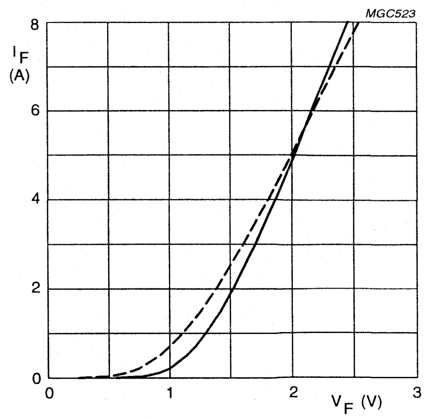
Dotted line = V_{RRM}; $\delta = 0.5$.

Fig.13 Maximum permissible junction temperature as a function of reverse voltage.



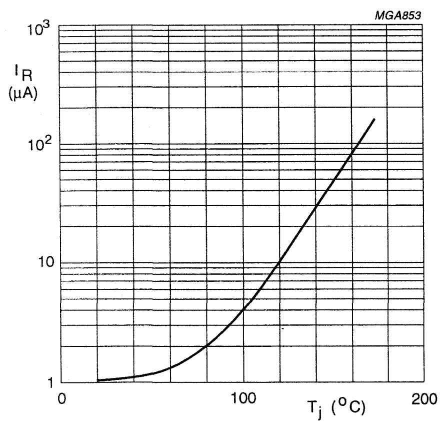
BYD33D to M
Solid line: $T_j = 25\ °C$.
Dotted line: $T_j = 175\ °C$.

Fig.14 Forward current as a function of forward voltage; maximum values.



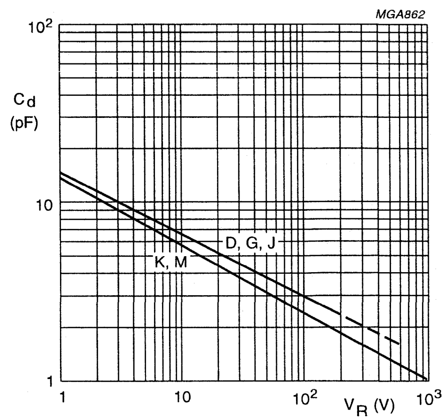
BYD33U and V
Solid line: $T_j = 25\ °C$.
Dotted line: $T_j = 175\ °C$.

Fig.15 Forward current as a function of forward voltage; maximum values.



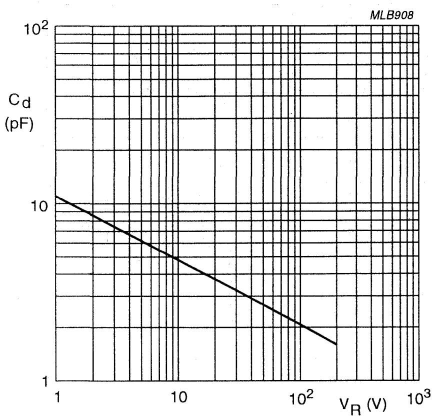
$V_R = V_{RRMmax}$.

Fig.16 Reverse current as a function of junction temperature; maximum values.



BYD33D to M
f = 1 MHz; $T_j = 25\ °C$.

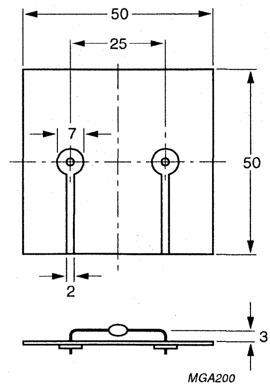
Fig.17 Diode capacitance as a function of reverse voltage; typical values.



BYD33U and V

f = 1 MHz; T_j = 25 °C.

Fig.18 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.19 Device mounted on a printed-circuit board.

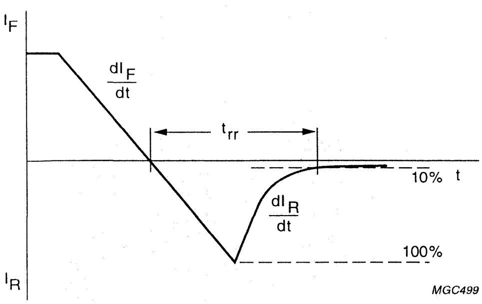
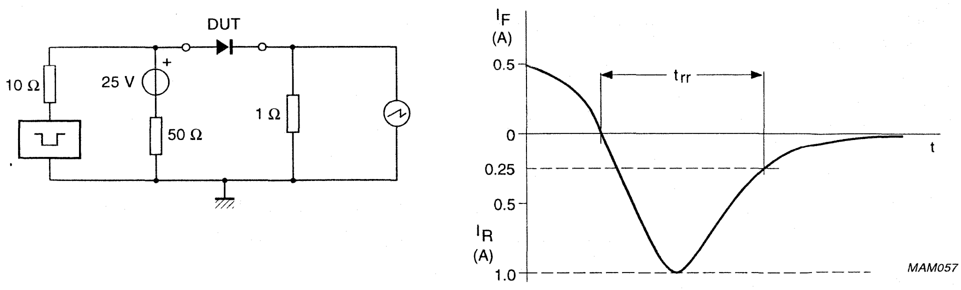


Fig.20 Reverse recovery definitions.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.21 Test circuit and reverse recovery time waveform and definition.

Fast soft-recovery controlled avalanche rectifiers

BYD37 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Smallest surface mount rectifier outline
- Shipped in 8 mm embossed tape.

DESCRIPTION

Cavity free cylindrical glass package through Implotec™(1) technology. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

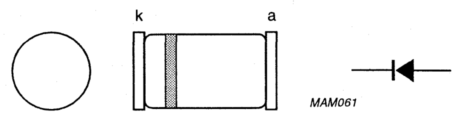


Fig.1 Simplified outline (SOD87) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYD37D		–	200	V
	BYD37G		–	400	V
	BYD37J		–	600	V
	BYD37K		–	800	V
	BYD37M		–	1 000	V
V_R	continuous reverse voltage				
	BYD37D		–	200	V
	BYD37G		–	400	V
	BYD37J		–	600	V
	BYD37K		–	800	V
	BYD37M		–	1 000	V
$I_{F(AV)}$	average forward current	T_{tp} = 105 °C; see Fig.2; averaged over any 20 ms period; see also Fig.6	–	1.5	A
$I_{F(AV)}$	average forward current	T_{amb} = 60 °C; PCB mounting (see Fig.11); see Fig.3; averaged over any 20 ms period; see also Fig.6	–	0.6	A
I_{FRM}	repetitive peak forward current	T_{tp} = 105 °C; see Fig.4	–	13	A
		T_{amb} = 60 °C; see Fig.5	–	5.5	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	20	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off			
	BYD37D to J		–	10	mJ
	BYD37K and M		–	7	mJ

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature	see Fig.7	−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Fig.8	−	−	1.1	V
		I_F = 1 A; see Fig.8	−	−	1.3	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYD37D		300	−	−	V
	BYD37G		500	−	−	V
	BYD37J		700	−	−	V
	BYD37K		900	−	−	V
	BYD37M		1100	−	−	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.9	−	−	1	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.9	−	−	100	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25A; see Fig.12				
	BYD37D to J		−	−	250	ns
	BYD37K and M		−	−	300	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Fig.10	−	20	−	pF
$\left\lvert\frac{dI_R}{dt}\right\rvert$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq$ 30 V and dI_F/dt = −1 A/μs; see Fig.13				
	BYD37D to J		−	−	6	A/μs
	BYD37K and M		−	−	5	A/μs

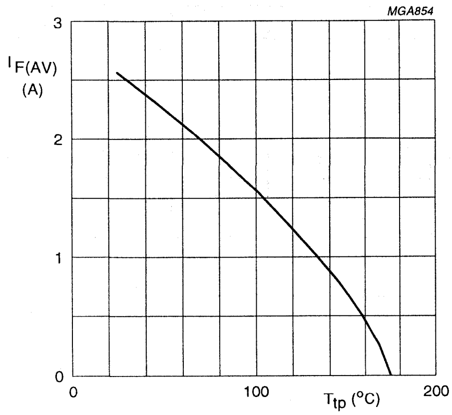
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point		30	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	150	K/W

Note

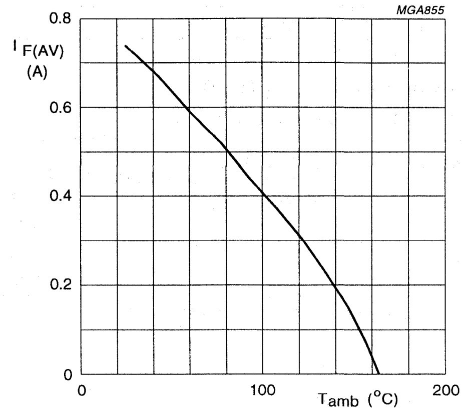
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.11. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA



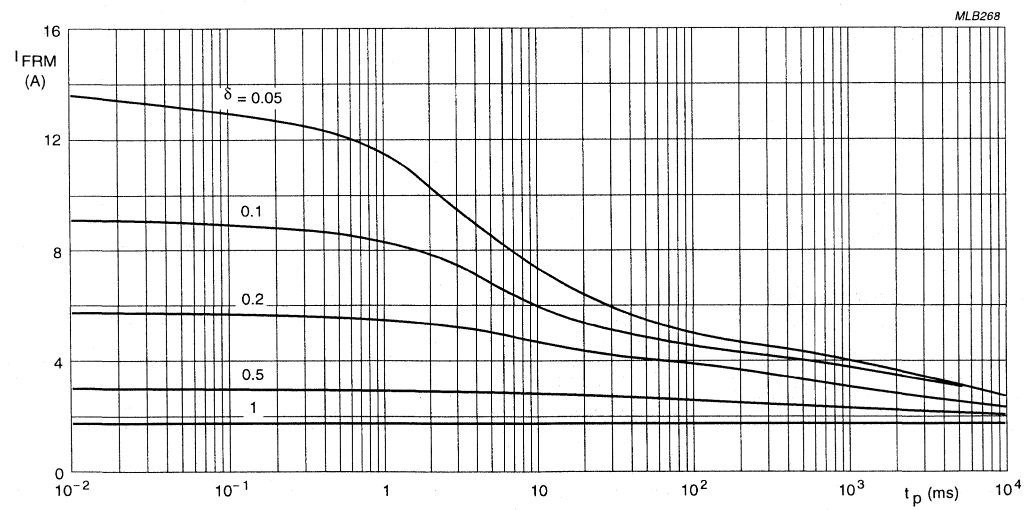
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Switched mode application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



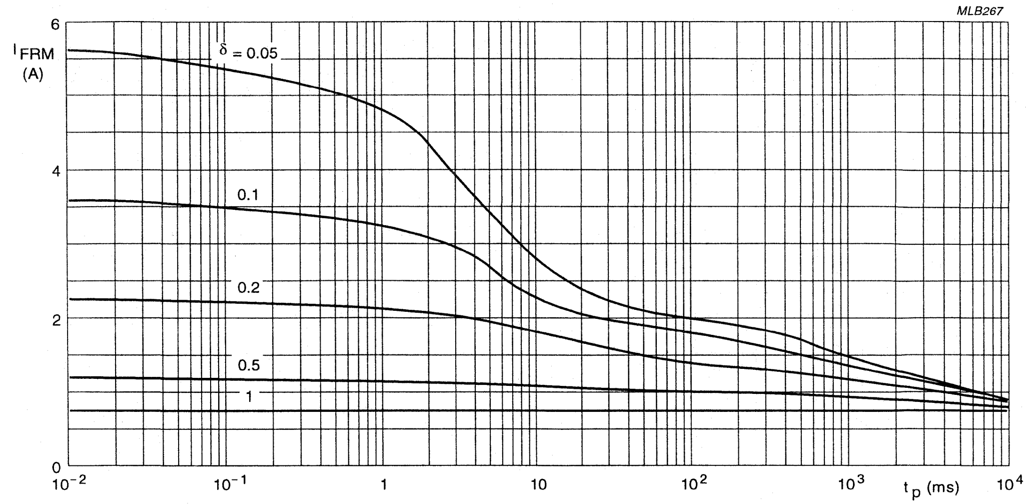
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Device mounted as shown in Fig.11.
Switched mode application.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



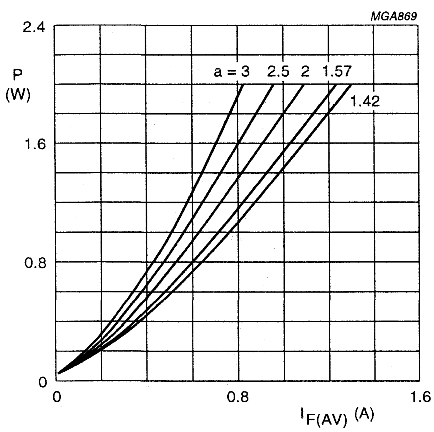
T_{tp} = 105 °C; $R_{th\ j\text{-}tp}$ = 30 K/W.
V_{RRMmax} during 1 − δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1000 V.

Fig.4 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



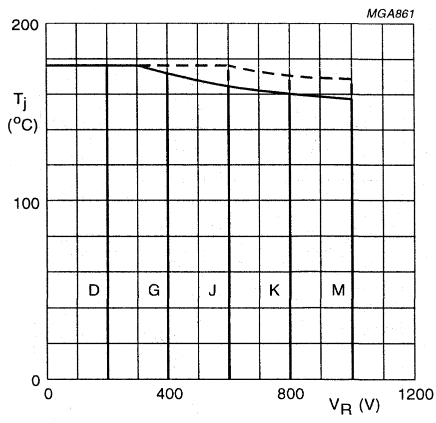
T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 150 K/W.
V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1000 V.

Fig.5 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



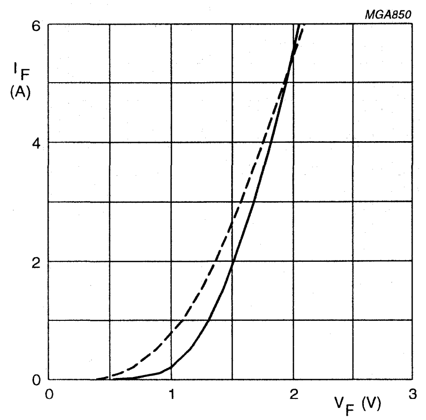
a = $I_{F(RMS)}/I_{F(AV)}$; V_R = V_{RRMmax}; δ = 0.5.

Fig.6 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



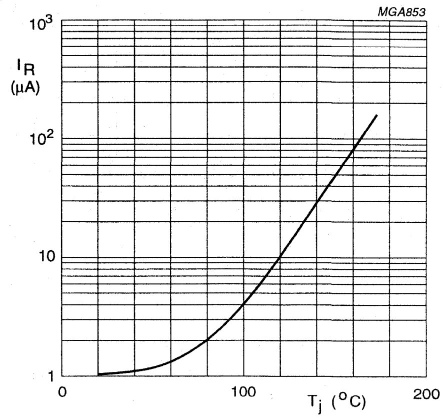
Solid line = V_R.
Dotted line = V_{RRM}; δ = 0.5.

Fig.7 Maximum permissible junction temperature as a function of reverse voltage.



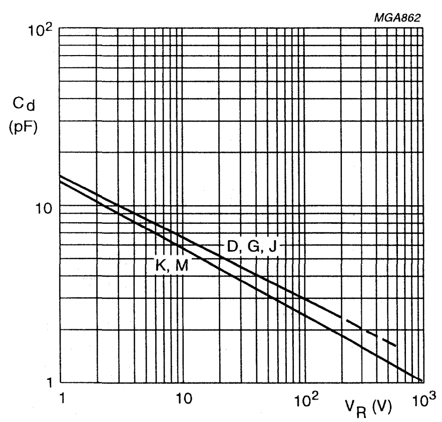
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.8 Forward current as a function of forward voltage; maximum values.



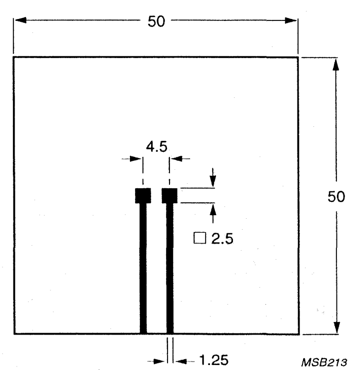
$V_R = V_{RRMmax}$.

Fig.9 Reverse current as a function of junction temperature; maximum values.



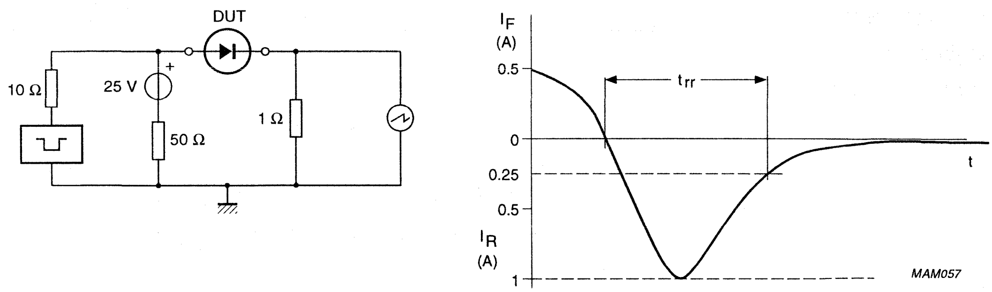
f = 1 MHz; T_j = 25 °C.

Fig.10 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.11 Printed-circuit board for surface mounting.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.12 Test circuit and reverse recovery time waveform and definition.

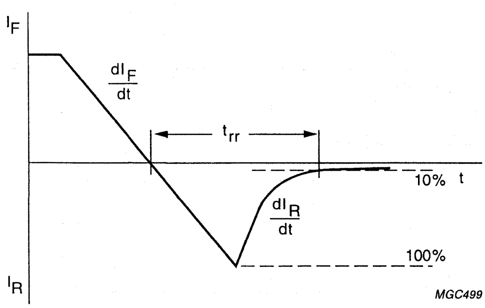


Fig.13 Reverse recovery definitions.

Fast soft-recovery rectifiers BYD43 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Available in ammo-pack.

DESCRIPTION

Cavity free cylindrical glass package through Implotec™(1) technology. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

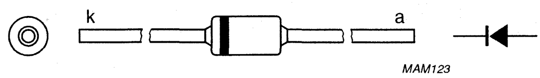


Fig.1 Simplified outline (SOD81) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RSM}	non-repetitive peak reverse voltage				
	BYD43U		–	1300	V
	BYD43V		–	1500	V
	BYD43-16		–	1700	V
	BYD43-18		–	1900	V
	BYD43-20		–	2100	V
V_{RRM}	repetitive peak reverse voltage				
	BYD43U		–	1200	V
	BYD43V		–	1400	V
	BYD43-16		–	1600	V
	BYD43-18		–	1800	V
	BYD43-20		–	2000	V
$I_{F(AV)}$	average forward current	T_{tp} = 55 °C; lead length = 10 mm; see Figs 2 and 3; averaged over any 20 ms period; see also Figs 10 and 11			
	BYD43U and V		–	1.20	A
	BYD43-16 to 20		–	0.68	A
$I_{F(AV)}$	average forward current	T_{amb} = 65 °C; PCB mounting (see Fig.20); see Figs 4 and 5; averaged over any 20 ms period; see also Figs 10 and 11			
	BYD43U and V		–	0.65	A
	BYD43-16 to 20		–	0.30	A
I_{FRM}	repetitive peak forward current	T_{tp} = 55 °C; see Figs 6 and 7			
	BYD43U and V		–	11	A
	BYD43-16 to 20		–	6	A
I_{FRM}	repetitive peak forward current	T_{amb} = 65 °C; see Figs 8 and 9			
	BYD43U and V		–	6.0	A
	BYD43-16 to 20		–	3.2	A

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$			
	BYD43U and V		–	6	A
	BYD43-16 to 20		–	6	A
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature	see Figs 12 and 13	−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	$I_F = 1$ A; $T_j = T_{j\,max}$; see Figs 14 and 15				
	BYD43U and V		–	–	1.20	V
	BYD43-16 to 20		–	–	2.05	V
V_F	forward voltage	$I_F = 1$ A; see Figs 14 and 15				
	BYD43U and V		–	–	1.5	V
	BYD43-16 to 20		–	–	2.4	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Figs 16 and 17				
	BYD43U and V		–	–	1	μA
	BYD43-16 to 20		–	–	5	μA
I_R	reverse current	$V_R = V_{RRMmax}$				
	BYD43U and V	T_j = 165 °C; see Fig 16	–	–	100	μA
	BYD43-16 to 20	T_j = 125 °C; see Fig 17	–	–	50	μA
t_{rr}	reverse recovery time	when switched from $I_F = 0.5$ A to $I_R = 1$ A; measured at $I_R = 0.25$ A; see Fig 22				
	BYD43U and V		–	–	250	ns
	BYD43-16 to 20		–	–	300	ns
C_d	diode capacitance	f = 1 MHz; $V_R = 0$ V; see Figs 18 and 19				
	BYD43U and V		–	20	–	pF
	BYD43-16 to 20		–	15	–	pF
$\left\lvert \frac{dI_R}{dt} \right\rvert$	maximum slope of reverse recovery current	when switched from $I_F = 1$ A to $V_R \geq 30$ V and $dI_F/dt = -1$ A/μs; see Fig.21				
	BYD43U and V		–	–	5	A/μs
	BYD43-16 to 20		–	–	5	A/μs

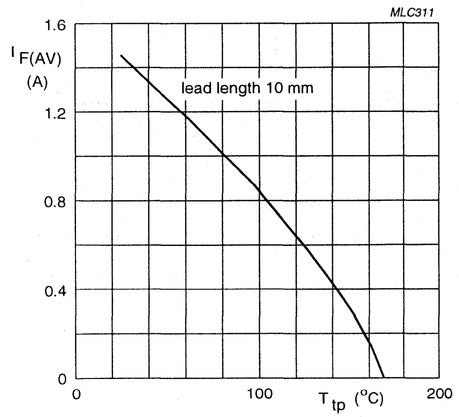
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	60	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	120	K/W

Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.20. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA

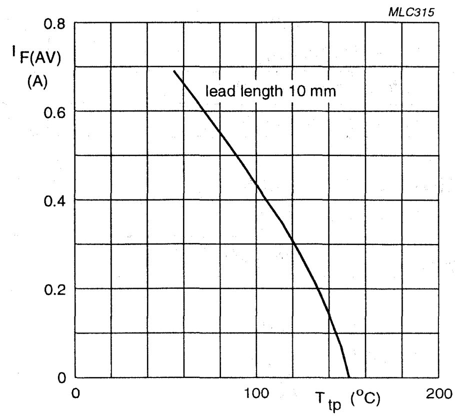


BYD43U and V

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Switched mode application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).

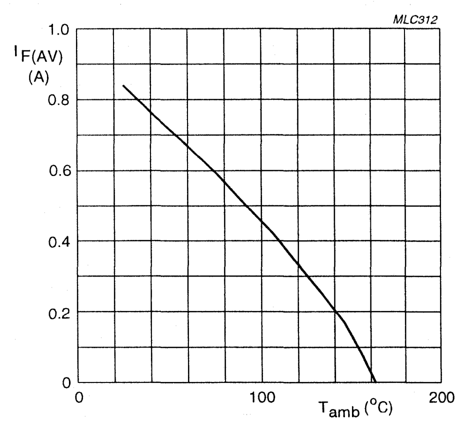


BYD43-16 to 20

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Switched mode application.

Fig.3 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



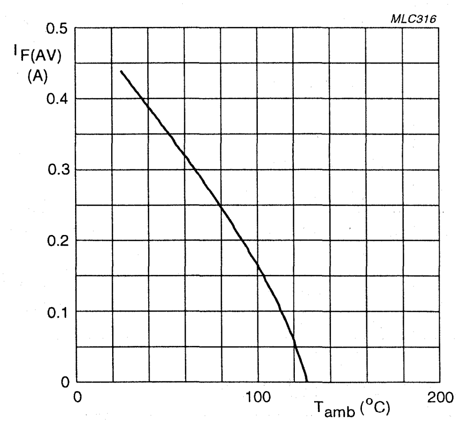
BYD43U and V

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Device mounted as shown in Fig.20.

Switched mode application.

Fig.4 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



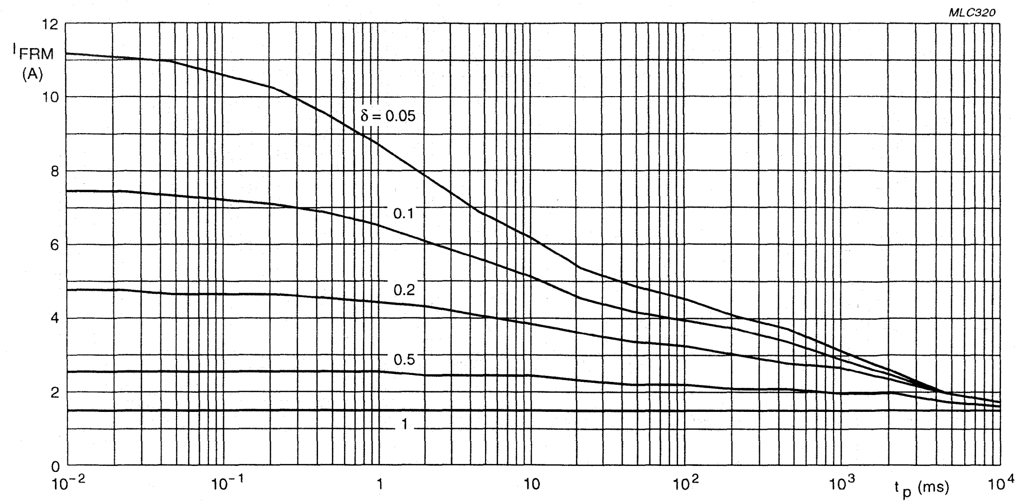
BYD43-16 to 20

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Device mounted as shown in Fig.20.

Switched mode application.

Fig.5 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).

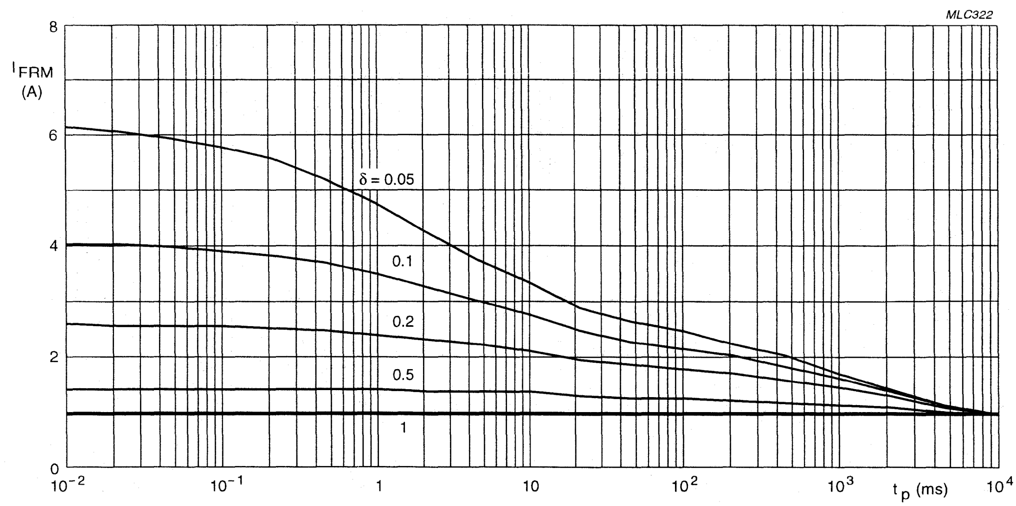


BYD43U and V

T_{tp} = 55 °C; $R_{th\ j\text{-}tp}$ = 60 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1 400 V.

Fig.6 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

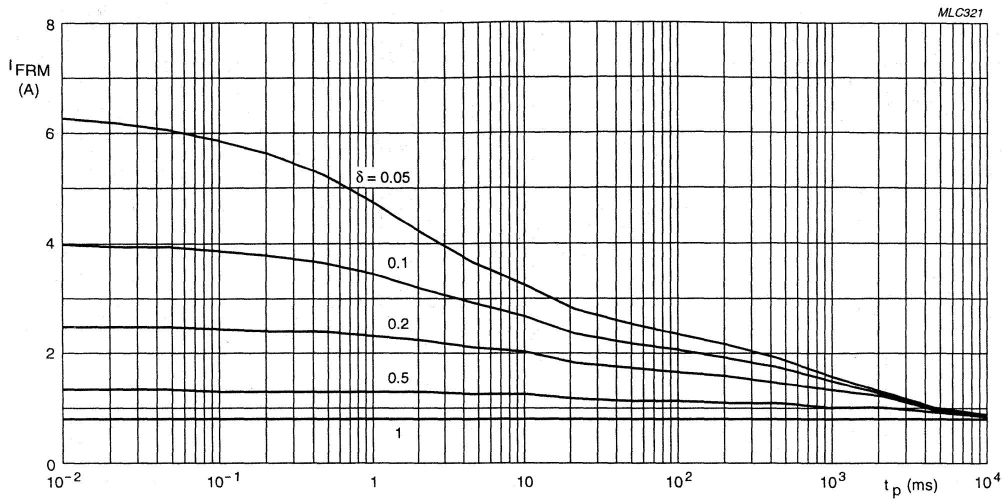


BYD43-16 to 20

T_{tp} = 55 °C; $R_{th\ j\text{-}tp}$ = 60 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 2000 V.

Fig.7 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

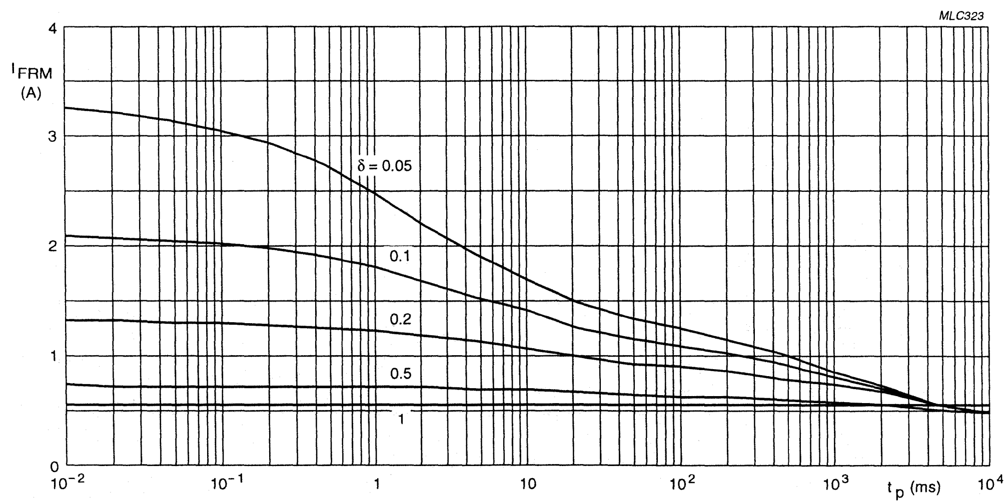


BYD43U and V

T_{amb} = 65 °C; $R_{th\ j\text{-}a}$ = 120 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1400 V.

Fig.8 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

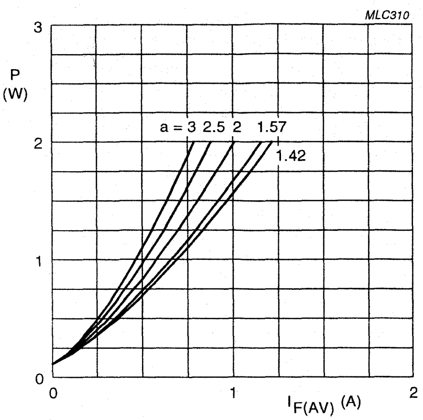


BYD43-16 to 20

T_{amb} = 65 °C; $R_{th\ j\text{-}a}$ = 120 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 2000 V.

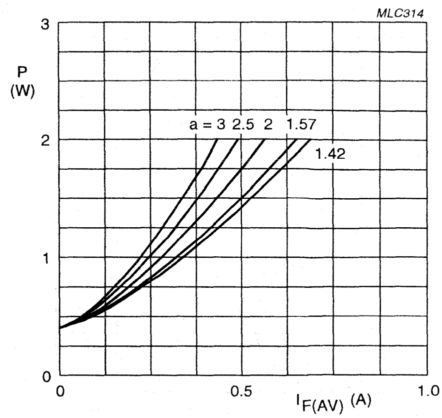
Fig.9 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



BYD43U and V

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

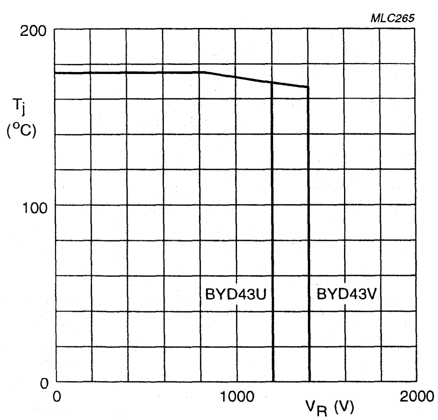
Fig.10 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



BYD43-16 to 20

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

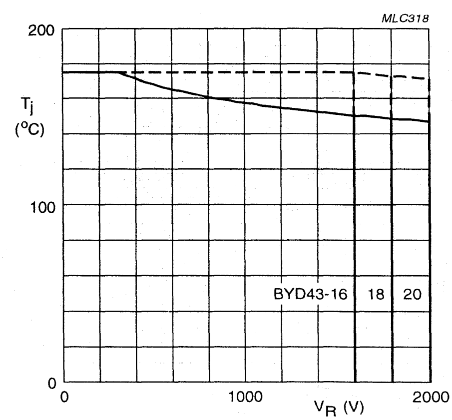
Fig.11 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



BYD43U and V

V_{RRM}; $\delta = 0.5$.

Fig.12 Maximum permissible junction temperature as a function of reverse voltage.

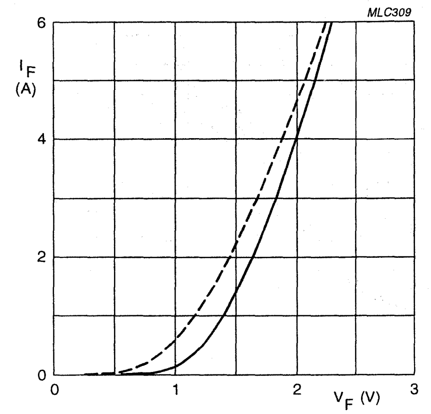


BYD43-16 to 20

Dotted line = V_{RRM}; $\delta = 0.1$.

Solid line = V_{RRM}; $\delta = 0.5$.

Fig.13 Maximum permissible junction temperature as a function of reverse voltage.

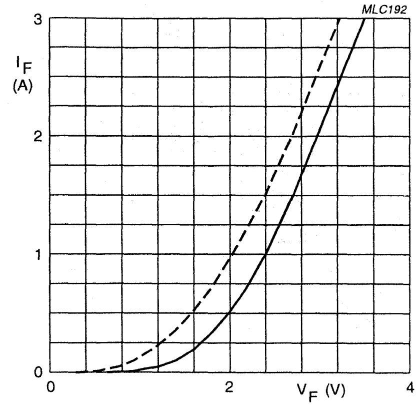


BYD43U and V

Dotted line: $T_j = 175$ °C.

Solid line: $T_j = 25$ °C.

Fig.14 Forward current as a function of forward voltage; maximum values.

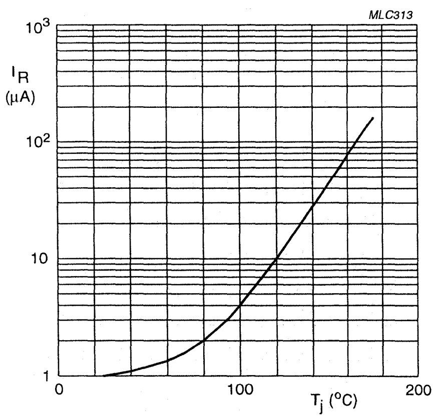


BYD43-16 to 20

Dotted line: $T_j = 175$ °C.

Solid line: $T_j = 25$ °C.

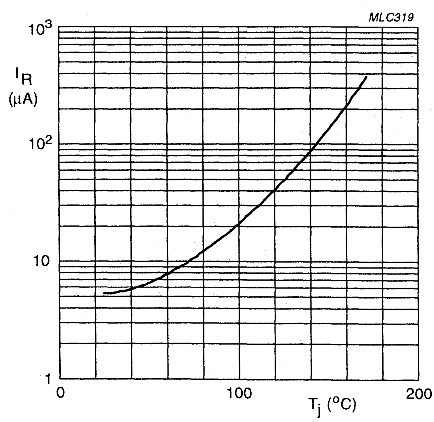
Fig.15 Forward current as a function of forward voltage; maximum values.



BYD43U and V

$V_R = V_{RRMmax}$.

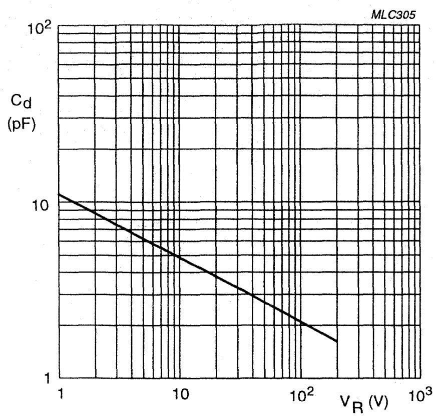
Fig.16 Reverse current as a function of junction temperature; maximum values.



BYD43-16 to 20

$V_R = V_{RRMmax}$.

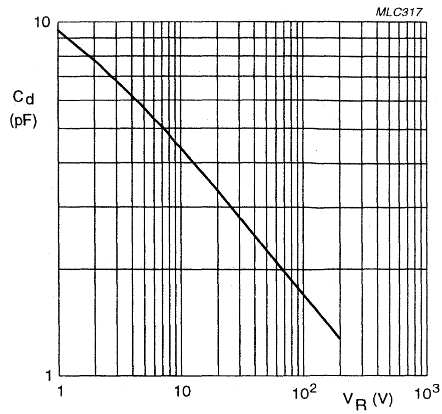
Fig.17 Reverse current as a function of junction temperature; maximum values.



BYD43U and V

f = 1 MHz; T_j = 25 °C.

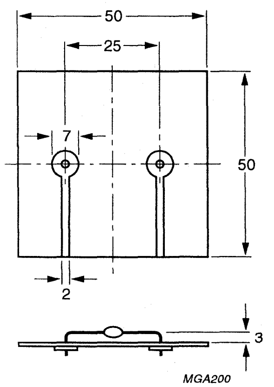
Fig.18 Diode capacitance as a function of reverse voltage; typical values.



BYD43-16 to 20

f = 1 MHz; T_j = 25 °C.

Fig.19 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.20 Device mounted on a printed-circuit board.

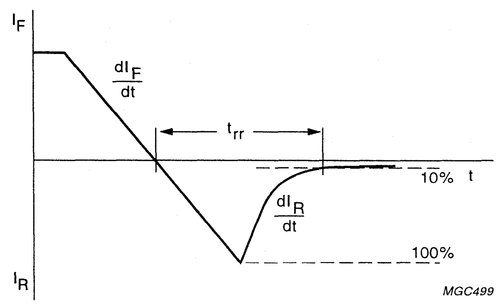
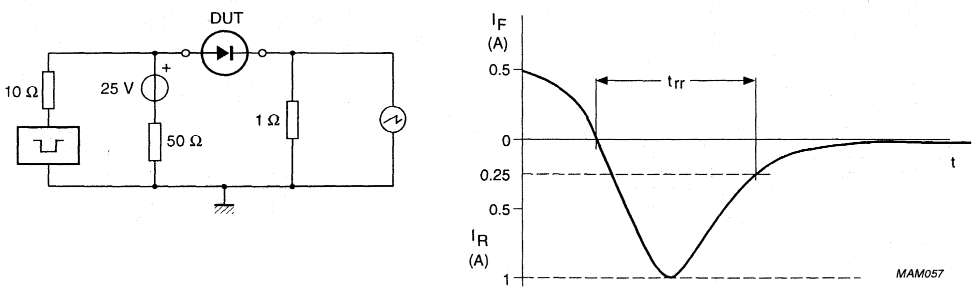


Fig.21 Reverse recovery definitions.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.22 Test circuit and reverse recovery time waveform and definition.

Fast soft-recovery rectifiers BYD47 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Shipped in 8 mm embossed tape
- Smallest surface mount rectifier outline.

DESCRIPTION

Cavity free cylindrical glass SOD87 package through Implotec™(1) technology. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

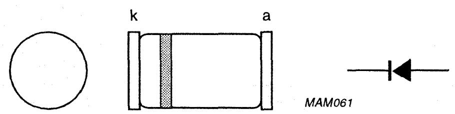


Fig.1 Simplified outline (SOD87) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RSM}	non-repetitive peak reverse voltage				
	BYD47-16		–	1700	V
	BYD47-18		–	1900	V
	BYD47-20		–	2100	V
V_{RRM}	repetitive peak reverse voltage				
	BYD47-16		–	1600	V
	BYD47-18		–	1800	V
	BYD47-20		–	2000	V
$I_{F(AV)}$	average forward current	T_{tp} = 105 °C; see Fig. 2; averaged over any 20 ms period; see also Fig. 6	–	0.80	A
$I_{F(AV)}$	average forward current	T_{amb} = 25 °C; PCB mounting (see Fig.11); see Fig. 3; averaged over any 20 ms period; see also Fig. 6	–	0.34	A
I_{FRM}	repetitive peak forward current	T_{tp} = 85 °C; see Fig. 4	–	8.0	A
		T_{amb} = 65 °C; see Fig. 5	–	2.8	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	10	A
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature	see Fig. 7	–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Fig. 8	–	2.05	V
		I_F = 1 A; see Fig. 8	–	2.40	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig. 9	–	5	μA
		$V_R = V_{RRMmax}$; T_j = 125 °C; see Fig. 9	–	50	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig. 12	–	300	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Fig. 10	15	–	pF
$\left\lvert \frac{dI_R}{dt} \right\rvert$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq$ 30 V and dI_F/dt = −1 A/μs; see Fig.13	–	5	A/μs

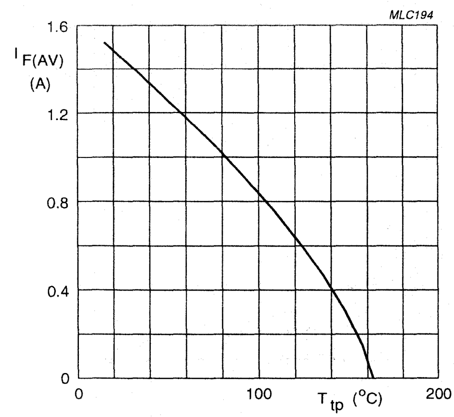
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point		30	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	150	K/W

Note

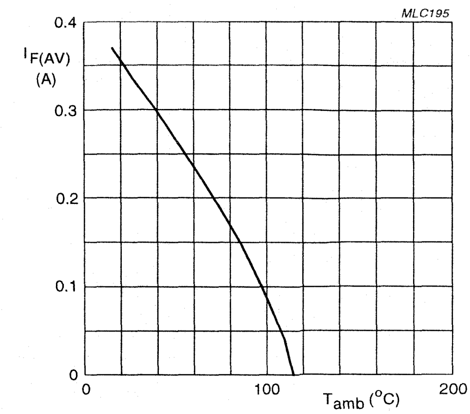
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.11. For more information please refer to the *'General Part of Handbook SC01.'*

GRAPHICAL DATA



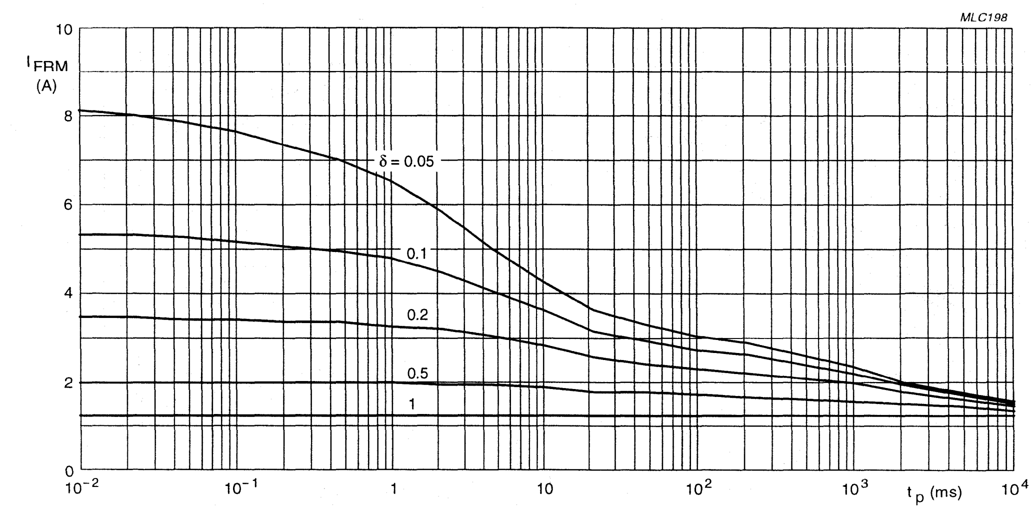
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Switched mode application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



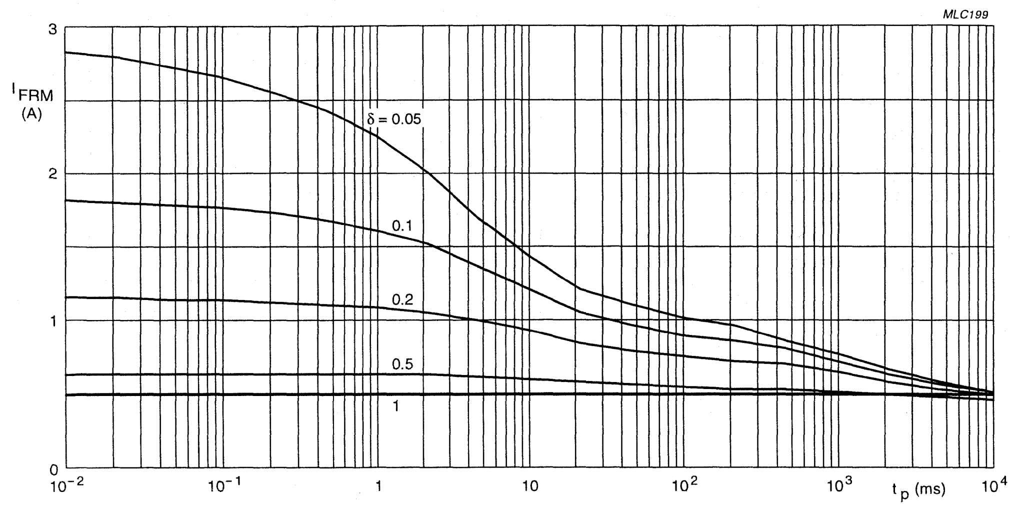
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Device mounted as shown in Fig.11.
Switched mode application.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



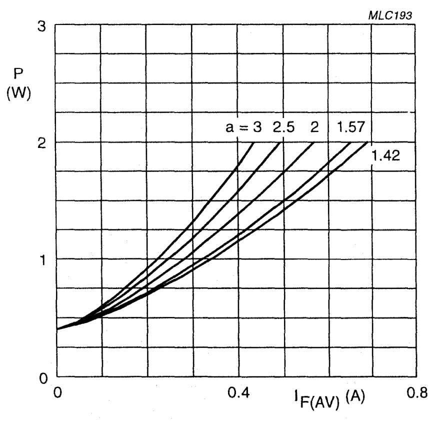
T_{tp} = 85 °C; $R_{th\,j\text{-}tp}$ = 30 K/W.
V_{RRMmax} during 1 − δ; curves include derating for $T_{j\,max}$ at V_{RRM} = 2000 V.

Fig.4 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



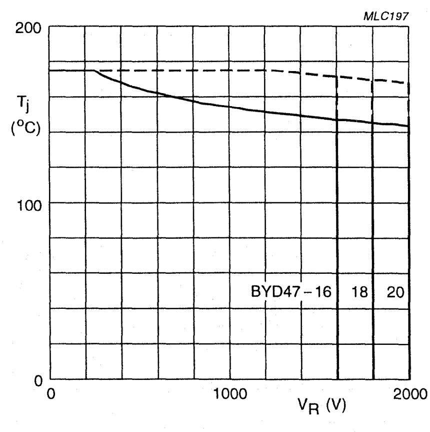
T_{amb} = 65 °C; $R_{th\ j\text{-}a}$ = 150 K/W.
V_{RRMmax} during 1 − δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 2000 V.

Fig.5 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



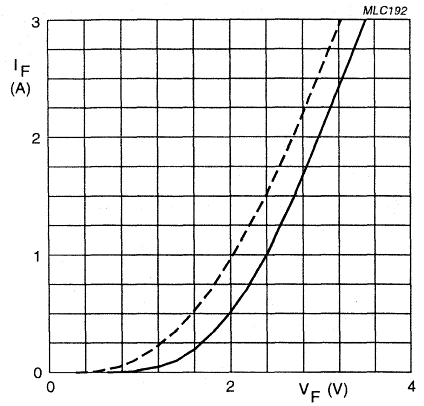
a = $I_{F(RMS)}/I_{F(AV)}$; V_R = V_{RRMmax}; δ = 0.5.

Fig.6 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



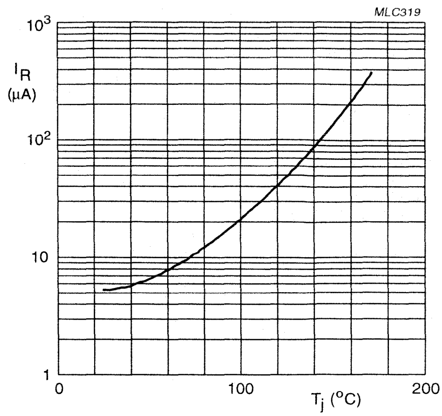
Solid line = V_{RRM}; δ = 0.5.
Dotted line = V_{RRM}; δ = 0.1.

Fig.7 Maximum permissible junction temperature as a function of reverse voltage.



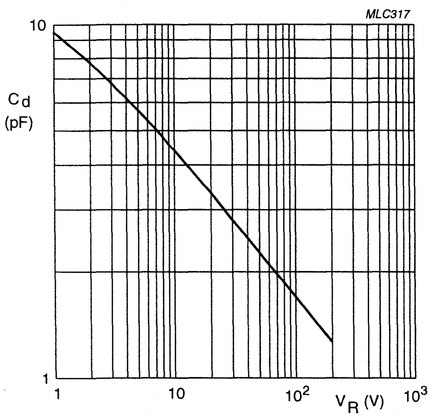
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.8 Forward current as a function of forward voltage; maximum values.



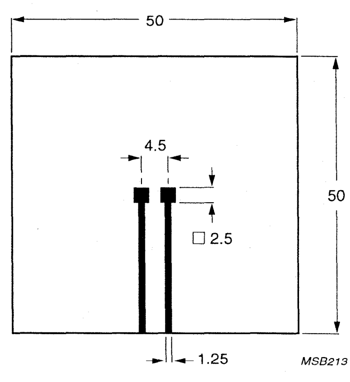
$V_R = V_{RRMmax}$.

Fig.9 Reverse current as a function of junction temperature; maximum values.



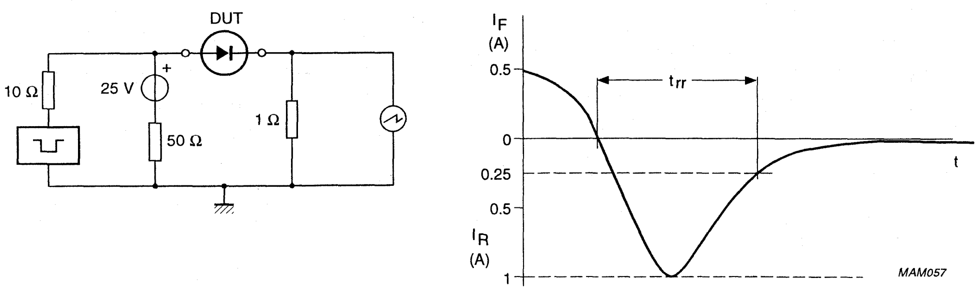
f = 1 MHz; T_j = 25 °C.

Fig.10 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.11 Printed-circuit board for surface mounting.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.12 Test circuit and reverse recovery time waveform and definition.

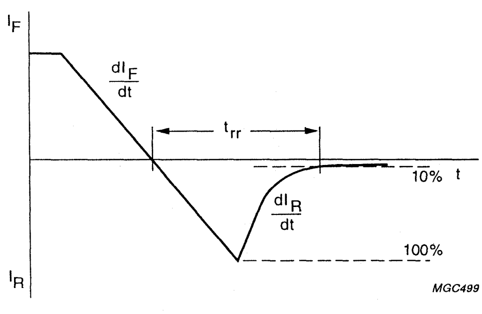


Fig.13 Reverse recovery definitions.

Fast soft-recovery controlled avalanche rectifiers

BYD52 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack.

DESCRIPTION

Cavity free cylindrical glass SOD120 package through Implotec™(1) technology. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

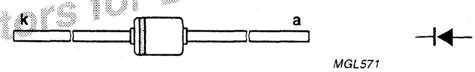


Fig.1 Simplified outline (SOD120) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYD52D		–	200	V
	BYD52G		–	400	V
	BYD52J		–	600	V
V_R	continuous reverse voltage				
	BYD52D		–	200	V
	BYD52G		–	400	V
	BYD52J		–	600	V
$I_{F(AV)}$	average forward current	T_{amb} = 25 °C; printed-circuit board mounting, pitch 5 mm, see Fig.6; averaged over any 20 ms period; see Fig.2	–	0.47	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; T_j = 25 °C; $V_R = V_{RRMmax}$	–	5	A
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature	see fig.3	–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; see Fig.4	3.6	V
I_R	reverse current	$V_R = V_{RRMmax}$	1	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.5	100	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.7	30	ns

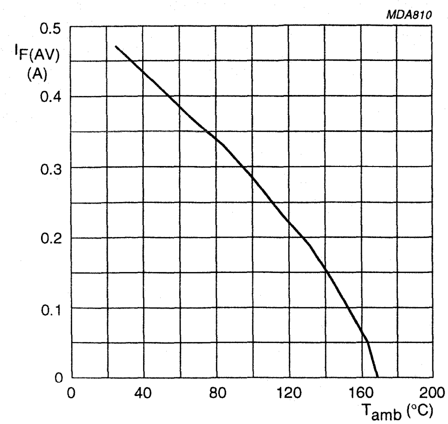
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	150	K/W

Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper layer ≥40 μm, pitch 5 mm; see Fig.6.

GRAPHICAL DATA



a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.
Device mounted as shown in Fig.6.

Fig.2 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).

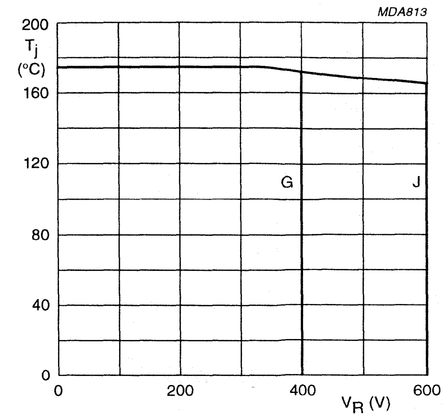
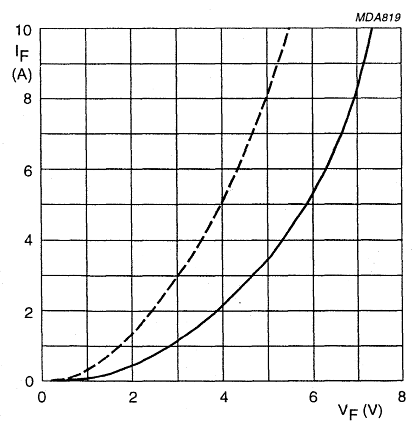
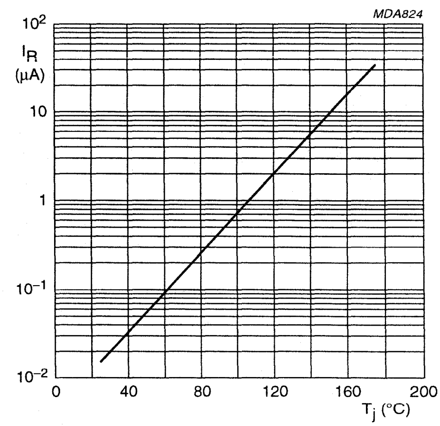


Fig.3 Maximum permissible junction temperature as a function of reverse voltage.



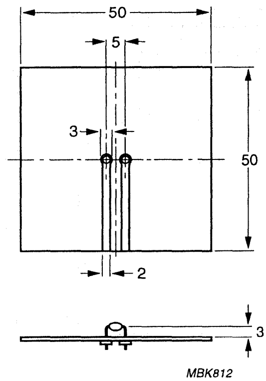
Solid line: T_j = 25 °C.
Dotted line: T_j = 175 °C.

Fig.4 Forward current as a function of forward voltage; typical values.



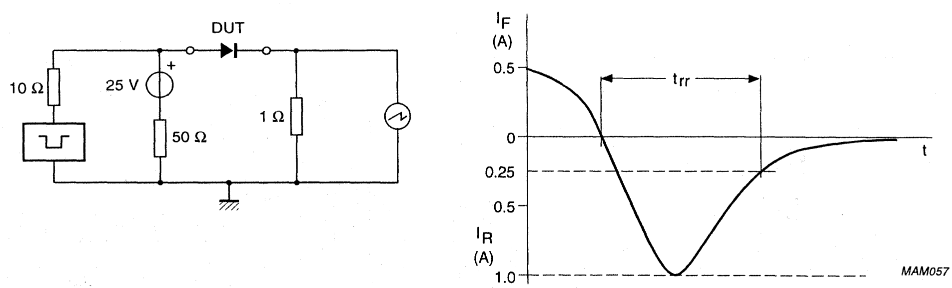
$V_R = V_{RRMmax}$.

Fig.5 Reverse current as a function of junction temperature; typical values.



Dimensions in mm.

Fig.6 Device mounted on a printed-circuit board.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.7 Test circuit and reverse recovery time waveform and definition.

Fast soft-recovery controlled avalanche rectifiers

BYD53 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack.

DESCRIPTION

Cavity free cylindrical glass SOD81 package through Implotec™[(1)] technology. The SOD81 package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

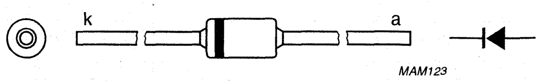


Fig.1 Simplified outline (SOD81) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYD53D		–	200	V
	BYD53G		–	400	V
	BYD53J		–	600	V
	BYD53K		–	800	V
	BYD53M		–	1000	V
	BYD53U		–	1200	V
	BYD53V		–	1400	V
V_R	continuous reverse voltage				
	BYD53D		–	200	V
	BYD53G		–	400	V
	BYD53J		–	600	V
	BYD53K		–	800	V
	BYD53M		–	1000	V
	BYD53U		–	1200	V
	BYD53V		–	1400	V
$I_{F(AV)}$	average forward current	T_{tp} = 55 °C; lead length = 10 mm see Figs 2 and 3; averaged over any 20 ms period; see also Figs 10 and 11			
	BYD53D to M		–	0.75	A
	BYD53U and V		–	0.85	A
$I_{F(AV)}$	average forward current	T_{amb} = 65 °C; PCB mounting (see Fig.17); see Figs 4 and 5; averaged over any 20 ms period; see also Figs 10 and 11			
	BYD53D to M		–	0.40	A
	BYD53U and V		–	0.45	A
I_{FRM}	repetitive peak forward current	T_{tp} = 55 °C; see Figs 6 and 7			
	BYD53D to M		–	6.5	A
	BYD53U and V		–	8.25	A

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{FRM}	repetitive peak forward current	T_{amb} = 65 °C; see Figs 8 and 9			
	BYD53D to M		–	3.6	A
	BYD53U and V		–	4.45	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	5	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	10	mJ
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature	see Fig.12	−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Figs 13 and 14				
	BYD53D to M		–	–	2.1	V
	BYD53U and V		–	–	1.7	V
V_F	forward voltage	I_F = 1 A; see Figs 13 and 14				
	BYD53D to M		–	–	3.6	V
	BYD53U and V		–	–	2.3	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYD53D		300	–	–	V
	BYD53G		500	–	–	V
	BYD53J		700	–	–	V
	BYD53K		900	–	–	V
	BYD53M		1100	–	–	V
	BYD53U		1300	–	–	V
	BYD53V		1500	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.15	–	–	1	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.15	–	–	100	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.18				
	BYD53D to J		–	–	30	ns
	BYD53K and M		–	–	75	ns
	BYD53U and V		–	–	150	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0; see Fig.16	–	20	–	pF

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$\left\lvert\frac{dI_R}{dt}\right\rvert$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq$ 30 V and dI_F/dt = −1 A/µs; see Fig.19				
	BYD53D to J		−	−	7	A/µs
	BYD53K and M		−	−	6	A/µs
	BYD53U and V		−	−	5	A/µs

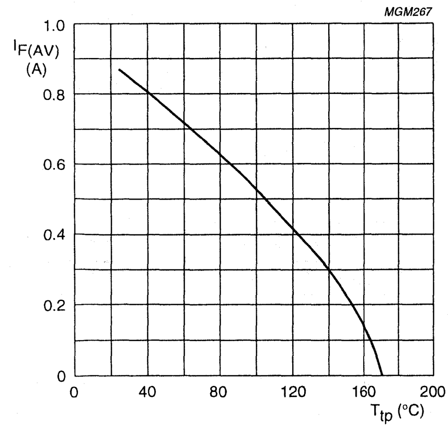
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	60	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	120	K/W

Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm, see Fig.17. For more information please refer to the *'General Part of associated Handbook'*.

GRAPHICAL DATA

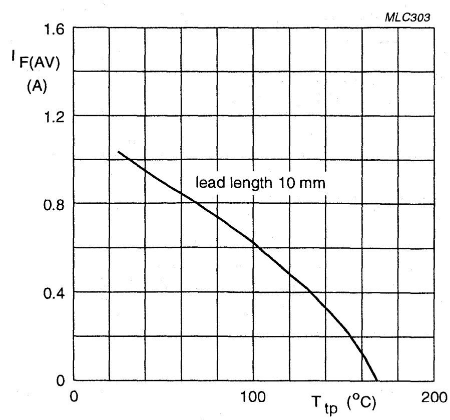


BYD53D to M

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Switched mode application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).

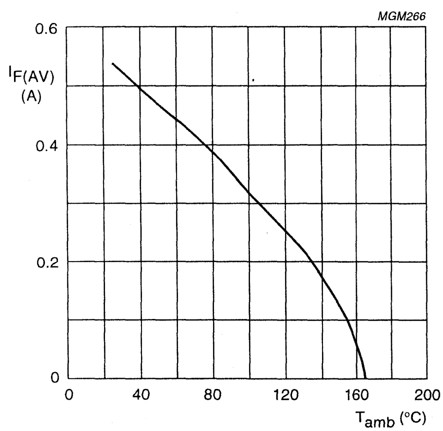


BYD53U and V

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Switched mode application.

Fig.3 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



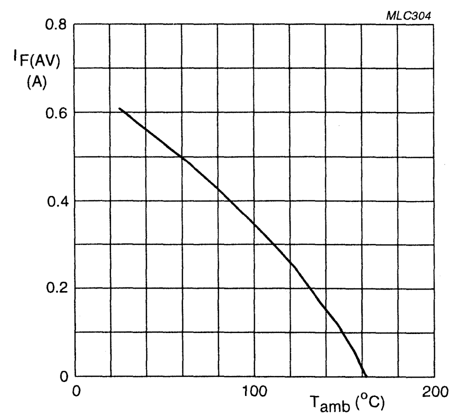
BYD53D to M

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Device mounted as shown in Fig. 17.

Switched mode application.

Fig.4 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



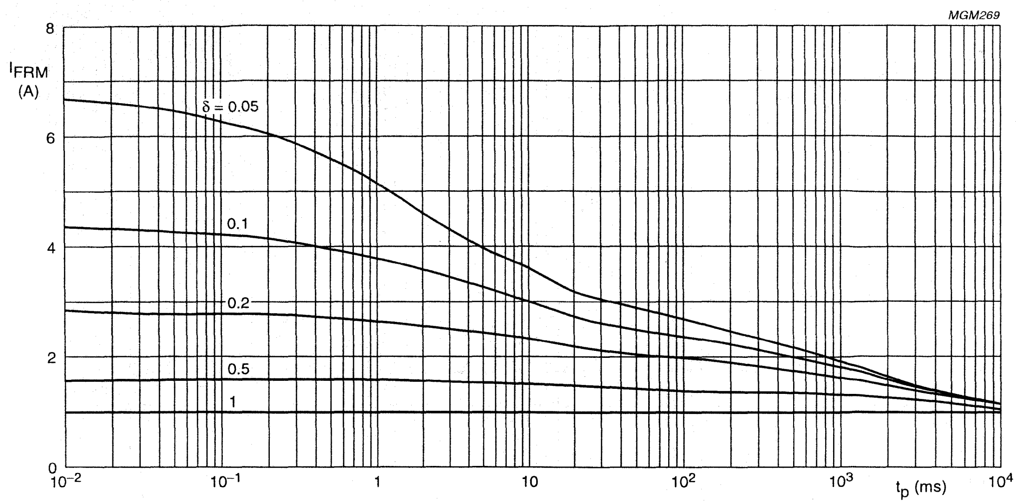
BYD53U and V

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Device mounted as shown in Fig. 17.

Switched mode application.

Fig.5 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).

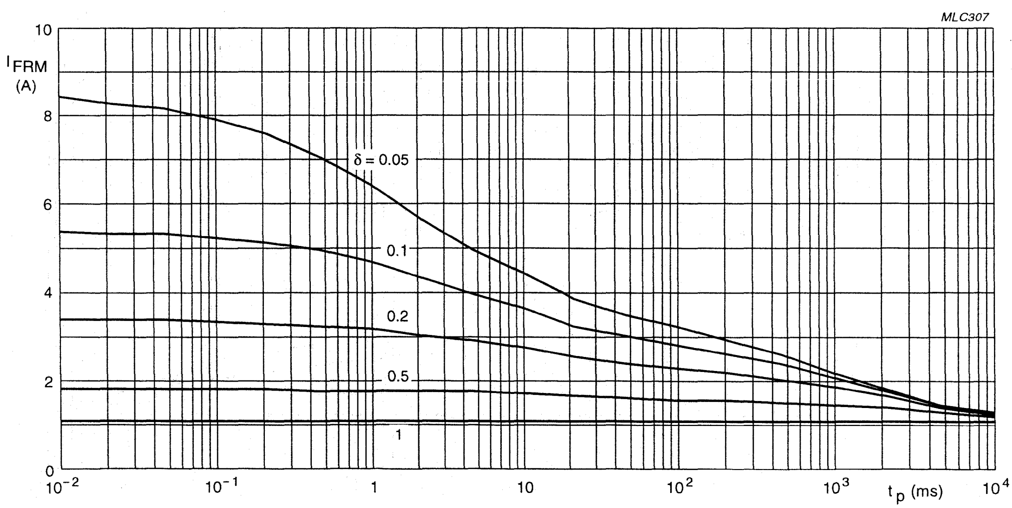


BYD53D to M

$T_{tp} = 55°C$; $R_{th\ j\text{-}tp} = 60$ K/W.

V_{RRMmax} during $1 - \delta$; curves include derating for $T_{j\ max}$ at $V_{RRM} = 1400$ V.

Fig.6 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

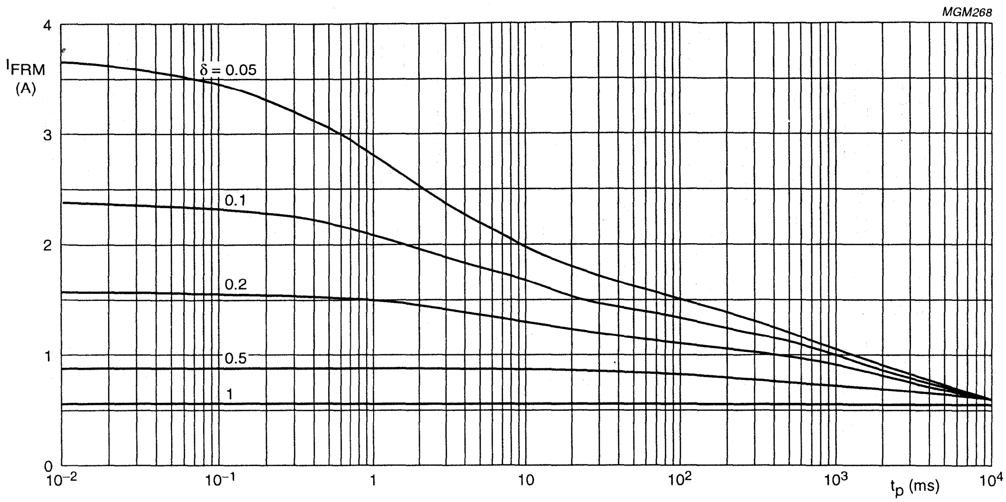


BYD53U and V

$T_{tp} = 55°C$; $R_{th\ j\text{-}tp} = 60$ K/W.

V_{RRMmax} during $1 - \delta$; curves include derating for $T_{j\ max}$ at $V_{RRM} = 1400$ V.

Fig.7 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

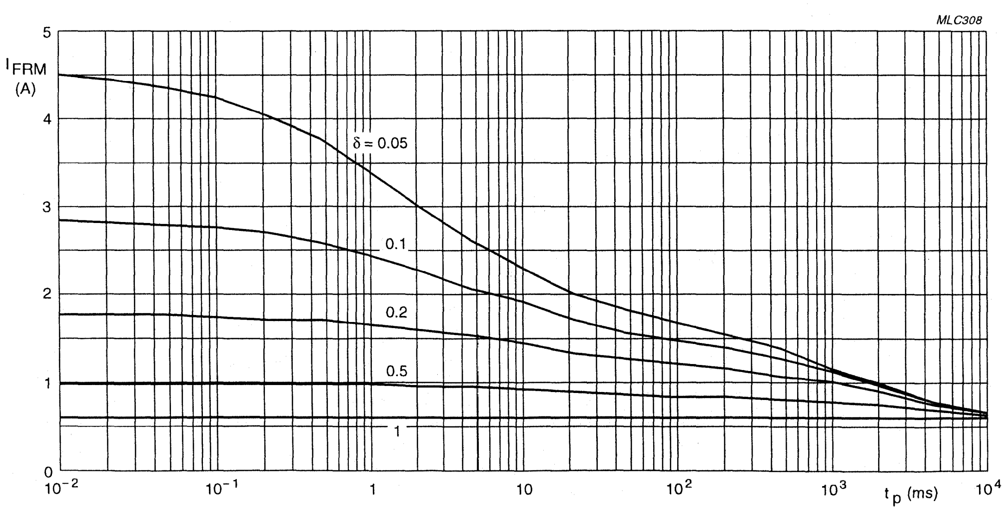


BYD53D to M

T_{amb} = 65 °C; $R_{th\ j\text{-}a}$ = 120 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1400 V.

Fig.8 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

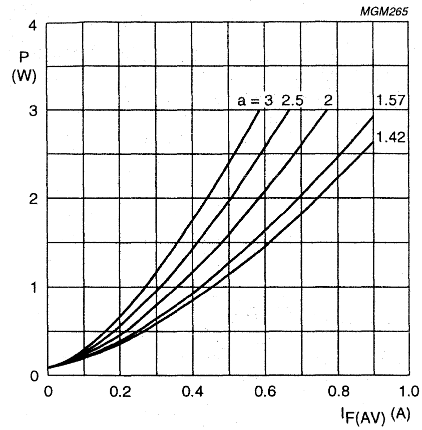


BYD53U and V

T_{amb} = 65 °C; $R_{th\ j\text{-}a}$ = 120 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1400 V.

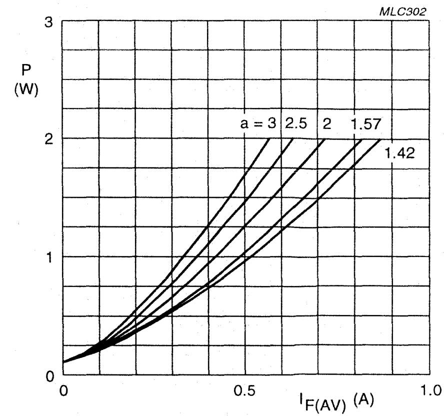
Fig.9 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



BYD53D to M

$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

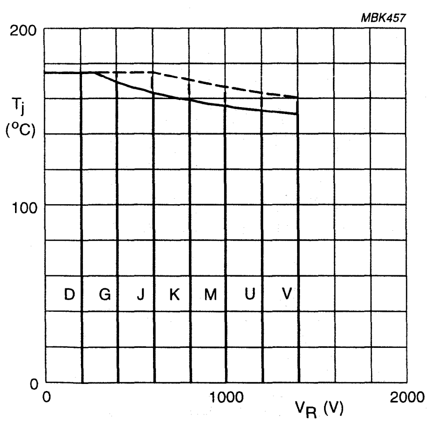
Fig.10 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



BYD53U and V

$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

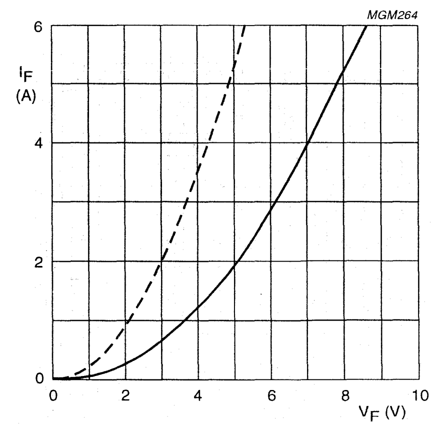
Fig.11 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



Solid line = V_R.

Dotted line = V_{RRM}; $\delta = 0.5$.

Fig.12 Maximum permissible junction temperature as a function of reverse voltage.

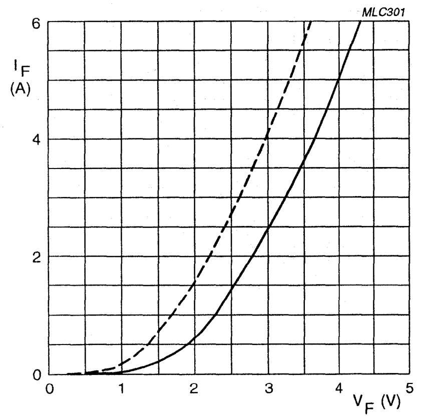


BYD53D to M

Dotted line: $T_j = 175$ °C.

Solid line: $T_j = 25$ °C.

Fig.13 Forward current as a function of forward voltage; maximum values.

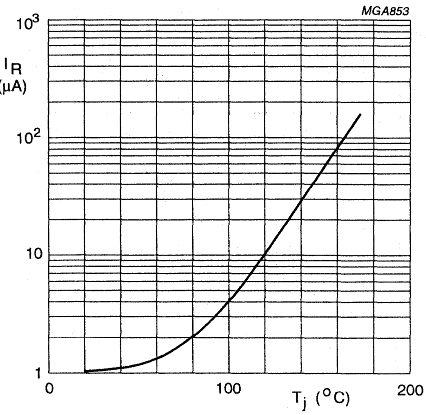


BYD53U and V

Dotted line: T_j = 175 °C.

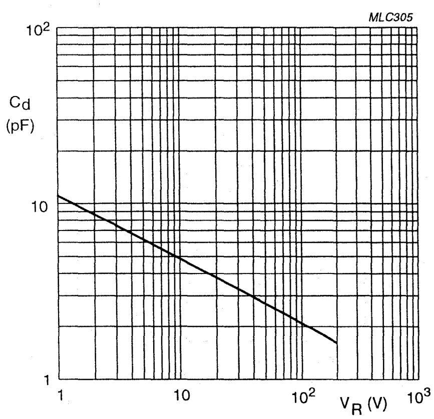
Solid line: T_j = 25 °C.

Fig.14 Forward current as a function of forward voltage; maximum values.



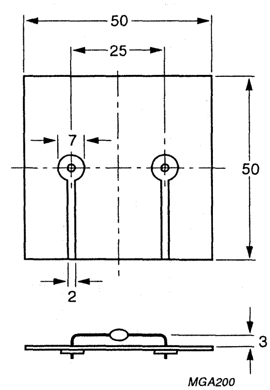
$V_R = V_{RRMmax}$.

Fig.15 Reverse current as a function of junction temperature; maximum values.



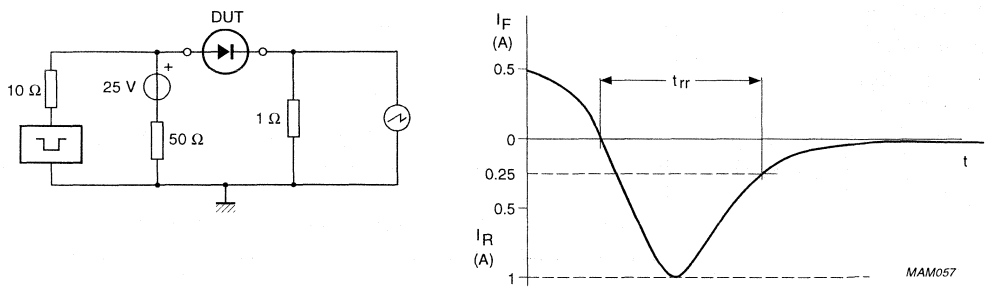
f = 1 MHz; T_j = 25 °C.

Fig.16 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.17 Device mounted on a printed-circuit board.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.18 Test circuit and reverse recovery time waveform and definition.

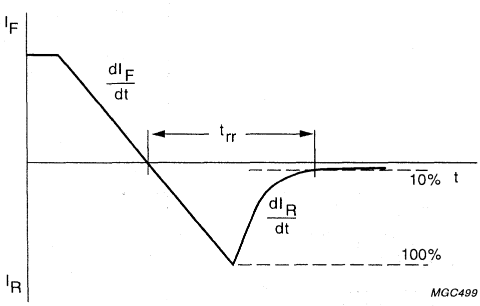


Fig.19 Reverse recovery definitions.

Fast soft-recovery controlled avalanche rectifiers

BYD57 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Shipped in 8 mm embossed tape
- Smallest surface mount rectifier outline.

DESCRIPTION

Cavity free cylindrical glass SOD87 package through Implotec™(1) technology. The SOD87 is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

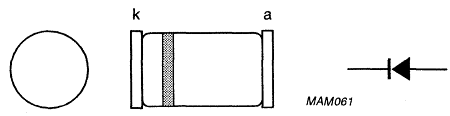


Fig.1 Simplified outline (SOD87) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYD57D		–	200	V
	BYD57G		–	400	V
	BYD57J		–	600	V
	BYD57K		–	800	V
	BYD57M		–	1000	V
	BYD57U		–	1200	V
	BYD57V		–	1400	V
V_R	continuous reverse voltage				
	BYD57D		–	200	V
	BYD57G		–	400	V
	BYD57J		–	600	V
	BYD57K		–	800	V
	BYD57M		–	1000	V
	BYD57U		–	1200	V
	BYD57V		–	1400	V
$I_{F(AV)}$	average forward current	T_{tp} = 85 °C; see Figs 2 and 3; averaged over any 20 ms period; see also Figs 10 and 11			
	BYD57D to M		–	1.0	A
	BYD57U and V		–	1.2	A
$I_{F(AV)}$	average forward current	T_{amb} = 60 °C; PCB mounting (see Fig.17); see Figs 4 and 5; averaged over any 20 ms period; see also Figs 10 and 11			
	BYD57D to M		–	0.4	A
	BYD57U and V		–	0.4	A
I_{FRM}	repetitive peak forward current	T_{tp} = 85 °C; see Figs 6 and 7			
	BYD57D to M		–	8.5	A
	BYD57U and V		–	11	A

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{FRM}	repetitive peak forward current	T_{amb} = 60 °C; see Figs 8 and 9			
	BYD57D to M		–	3.0	A
	BYD57U and V		–	3.7	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; T_j = 25 °C prior to surge; $V_R = V_{RRMmax}$	–	5.0	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	10	mJ
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature	see Fig.12	–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Figs 13 and 14				
	BYD57D to M		–	–	2.1	V
	BYD57U and V		–	–	1.7	V
V_F	forward voltage	I_F = 1 A; see Figs 13 and 14				
	BYD57D to M		–	–	3.6	V
	BYD57U and V		–	–	2.3	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYD57D		300	–	–	V
	BYD57G		500	–	–	V
	BYD57J		700	–	–	V
	BYD57K		900	–	–	V
	BYD57M		1100	–	–	V
	BYD57U		1300	–	–	V
	BYD57V		1500	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.15	–	–	5	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.15	–	–	100	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.18				
	BYD57D to J		–	–	30	ns
	BYD57K and M		–	–	75	ns
	BYD57U and V		–	–	150	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0; see Fig.16	–	20	–	pF

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$\left\lvert\frac{dI_R}{dt}\right\rvert$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq$ 30 V and dI_F/dt = −1 A/μs; see Fig.19				
	BYD57D to J		–	–	7	A/μs
	BYD57K and M		–	–	6	A/μs
	BYD57U and V		–	–	5	A/μs

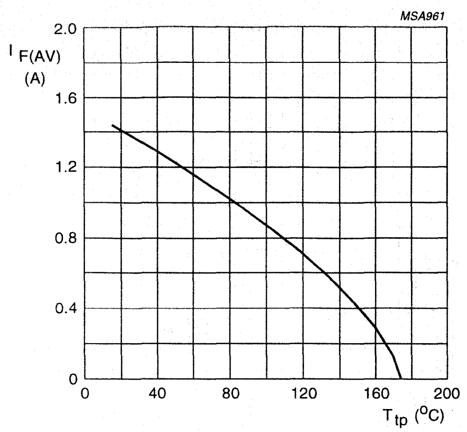
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point		30	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	150	K/W

Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.17. For more information please refer to the *'General Part of associated Handbook'*.

GRAPHICAL DATA

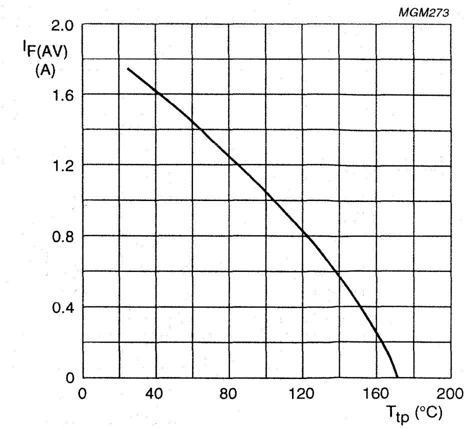


BYD57D to M

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Switched mode application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).

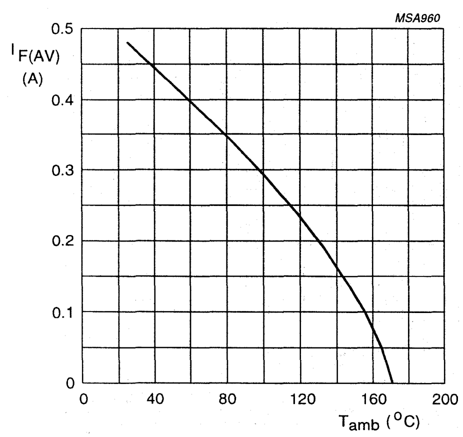


BYDU and V

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Switched mode application.

Fig.3 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



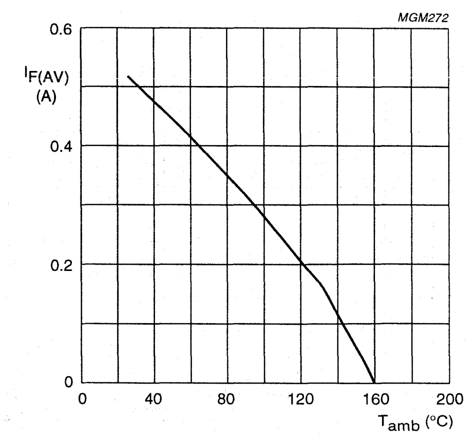
BYD57D to M

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Device mounted as shown in Fig.17.

Switched mode application.

Fig.4 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



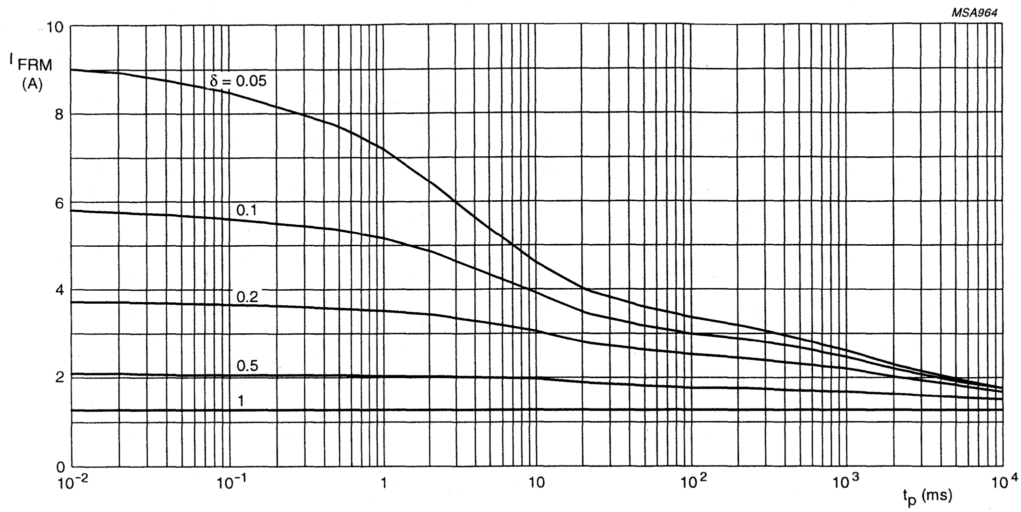
BYD57U and V

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Device mounted as shown in Fig.17.

Switched mode application.

Fig.5 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).

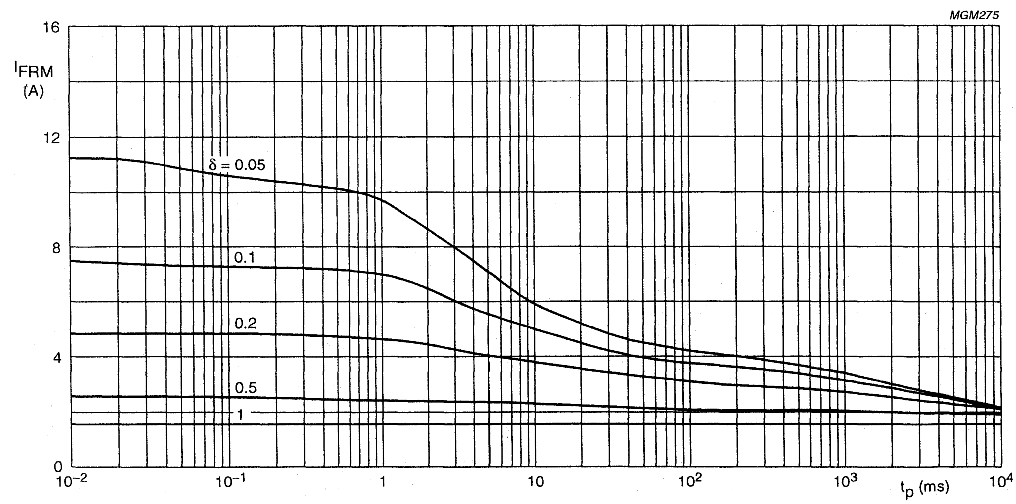


BYD57D to M

T_{tp} = 85 °C; $R_{th\ j\text{-}tp}$ = 30 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1000 V.

Fig.6 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

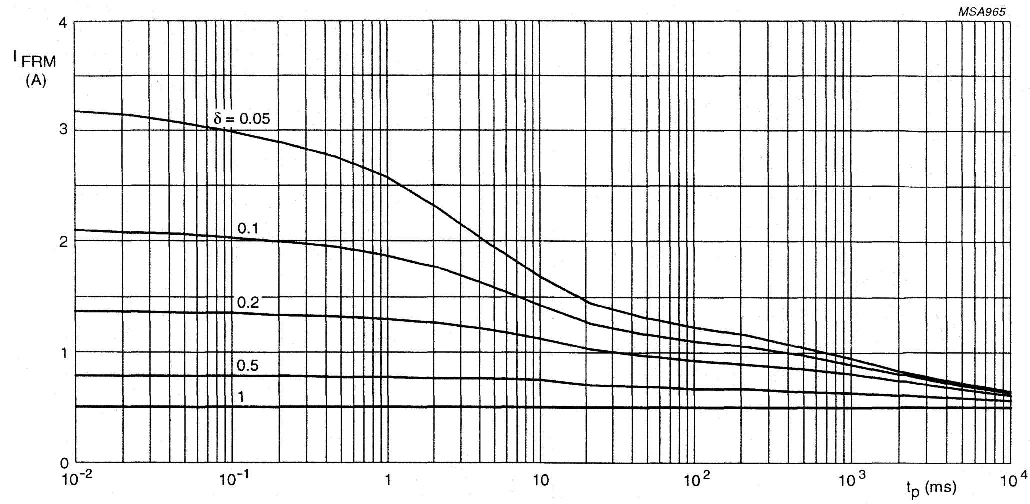


BYD57U and V

T_{tp} = 85 °C; $R_{th\ j\text{-}tp}$ = 30 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1000 V.

Fig.7 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

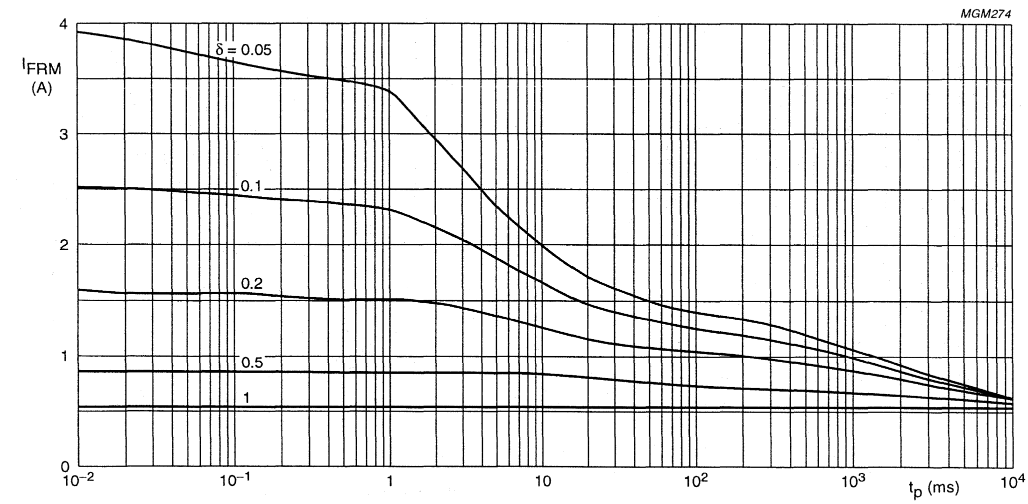


BYD57D to M

T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 150K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1000 V.

Fig.8 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

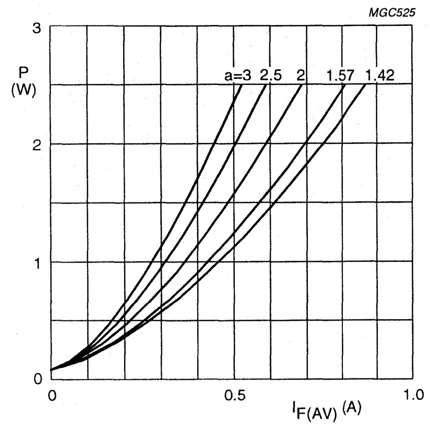


BYD57U and V

T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 150K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1000 V.

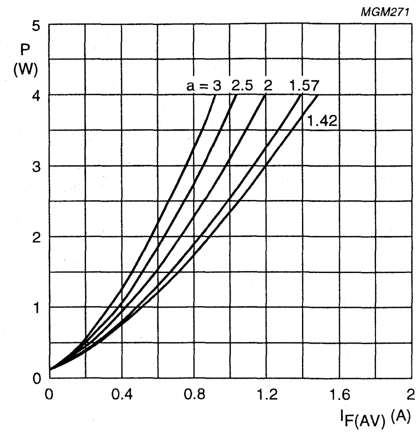
Fig.9 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



BYD57D to M

$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

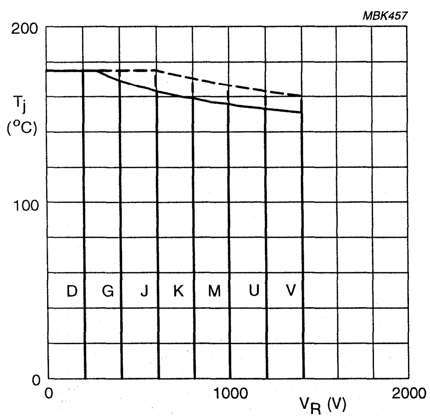
Fig.10 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



BYD57U and V

$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

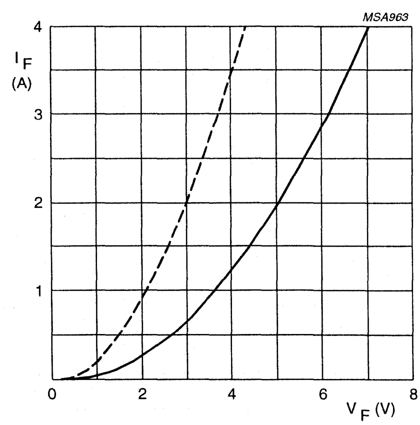
Fig.11 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



Solid line = V_R.

Dotted line = V_{RRM}; $\delta = 0.5$.

Fig.12 Maximum permissible junction temperature as a function of reverse voltage.

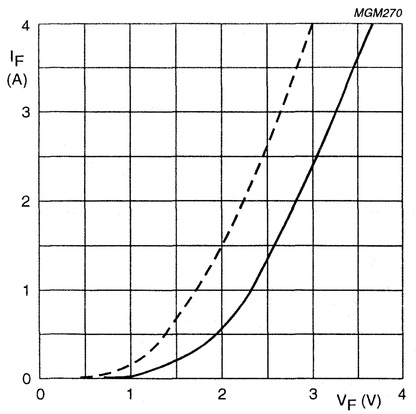


BYD57D to M

Dotted line: $T_j = 175$ °C.

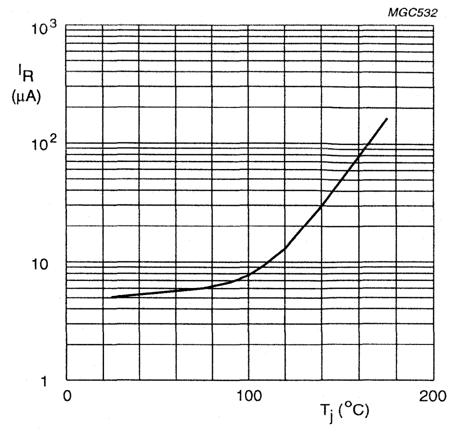
Solid line: $T_j = 25$ °C.

Fig.13 Forward current as a function of forward voltage; maximum values.



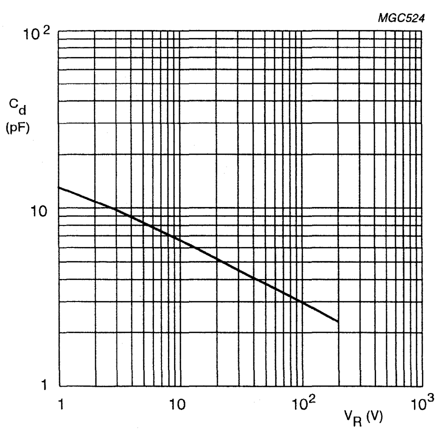
BYD57U and V
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.14 Forward current as a function of forward voltage; maximum values.



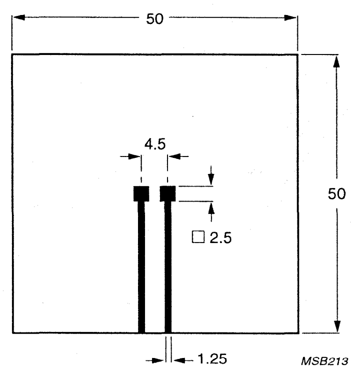
$V_R = V_{RRMmax}$.

Fig.15 Reverse current as a function of junction temperature; maximum values.



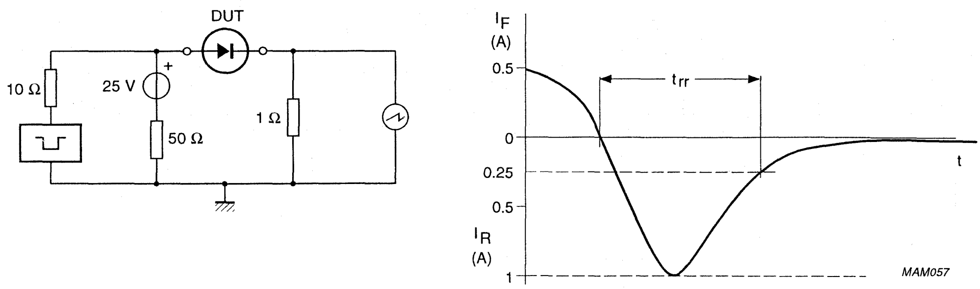
f = 1 MHz; T_j = 25 °C.

Fig.16 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.17 Printed-circuit board for surface mounting.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.18 Test circuit and reverse recovery time waveform and definition.

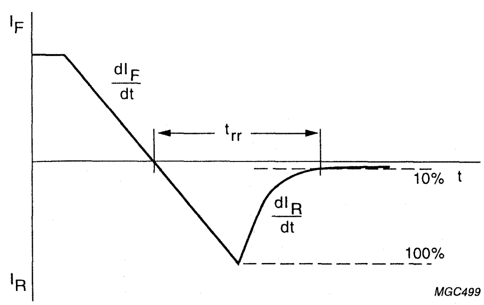


Fig.19 Reverse recovery definitions.

Ripple blocking diode — BYD63

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed minimum turn-on time for absorbing forward current transients and oscillations
- Specially designed as rectifier in the auxiliary power supply in e.g. switched mode power supplies
- Available in ammo-pack.

DESCRIPTION

Cavity free cylindrical glass package through Implotec™(1) technology. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

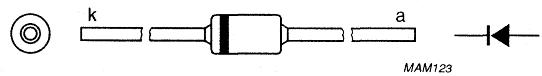


Fig.1 Simplified outline (SOD81) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	300	V
V_R	continuous reverse voltage		–	300	V
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; T_{tp} = 55 °C; lead length = 10 mm; see Fig.2; see also Fig.4	–	0.85	A
		averaged over any 20 ms period; T_{amb} = 65 °C; PCB mounting (Fig.8); see Fig.3; see also Fig.4	–	0.45	A
I_{FRM}	repetitive peak forward current	T_{tp} = 55 °C	–	8.25	A
		T_{amb} = 65 °C	–	4.45	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	5	A
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Fig.5	–	–	1.7	V
		I_F = 1 A; see Fig.5	–	–	2.3	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.6	–	–	1	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.6	–	–	100	μA
t_{fr}	forward recovery time	when switched to I_F = 1 A in 50 ns; see Fig.9	–	–	350	ns
t_{on}	turn-on time	when switched from V_F = 0 V to V_F = 3 V; measured between 10% and 90% of $I_{F\,max}$; see Fig.11	500	–	–	ns
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.11	–	–	150	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Fig.7	–	17	–	pF

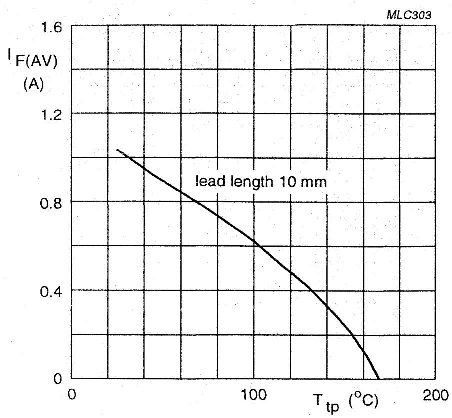
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	60	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	120	K/W

Note

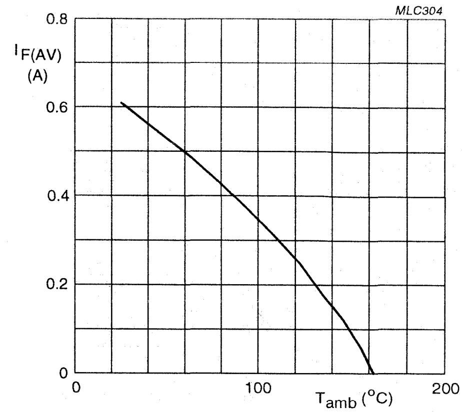
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.8. For more information please refer to the *'General Part of Handbook SC01.'*

GRAPHICAL DATA



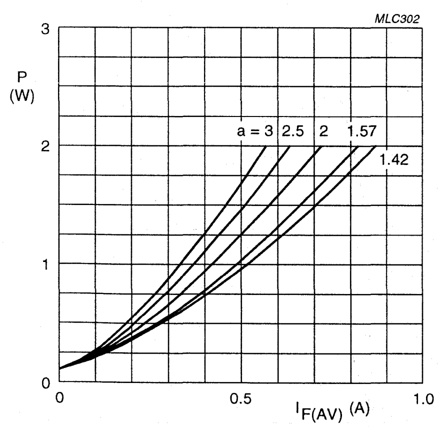
a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.
Switched mode application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



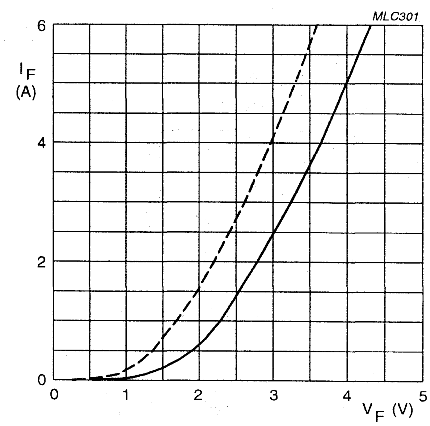
a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.
Device mounted as shown in Fig.8.
Switched mode application.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



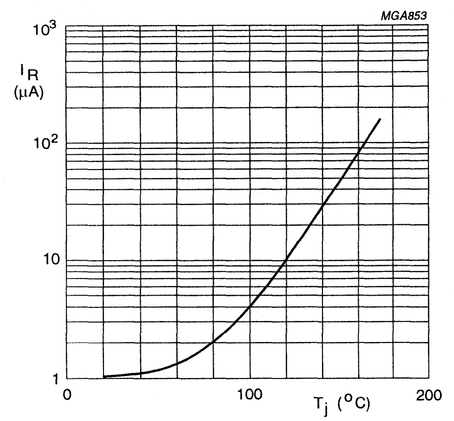
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Fig.4 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



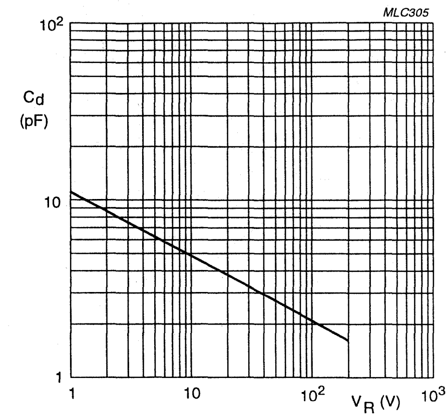
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.5 Forward current as a function of forward voltage; maximum values.



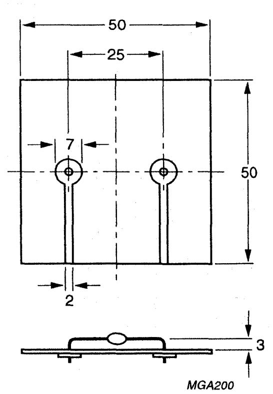
$V_R = V_{RRMmax}$.

Fig.6 Reverse current as a function of junction temperature; maximum values.



f = 1 MHz; T_j = 25 °C.

Fig.7 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.8 Device mounted on a printed-circuit board.

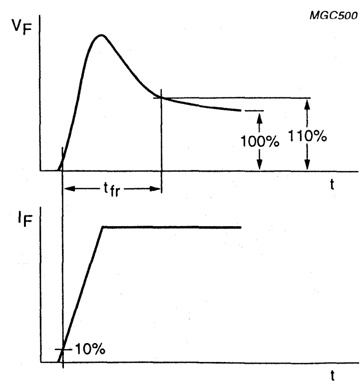
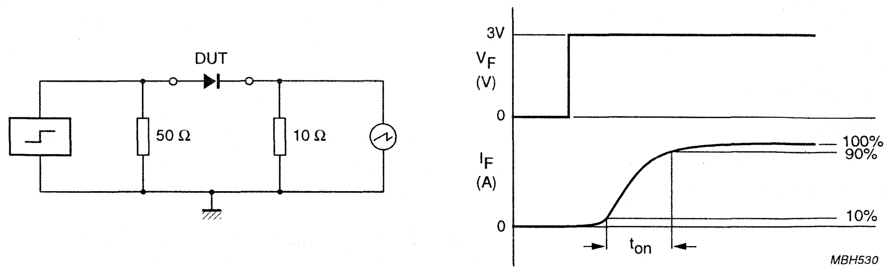
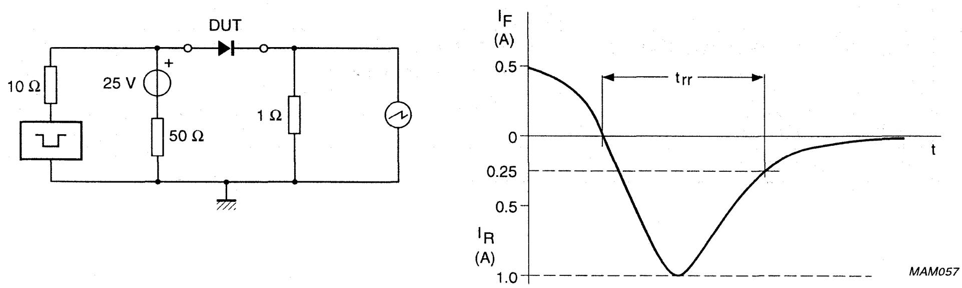


Fig.9 Forward recovery time definition.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 10$ ns.

Fig.10 Test circuit and turn-on time waveform and definition.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.11 Test circuit and reverse recovery time waveform and definition.

Ripple blocking diode BYD67

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Shipped in 8 mm embossed tape
- Smallest surface mount rectifier package.

DESCRIPTION

Cavity free cylindrical glass SOD87 package through Implotec™(1) technology. The SOD87 is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

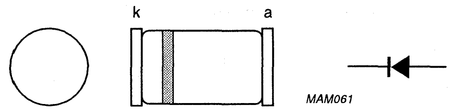


Fig.1 Simplified outline (SOD87) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	300	V
V_R	continuous reverse voltage		–	300	V
$I_{F(AV)}$	average forward current	T_{tp} = 85 °C; see Fig.2; averaged over any 20 ms period; see also Fig.4	–	1.2	A
		T_{amb} = 60 °C; PCB mounting (see Fig.8); see Fig.3; averaged over any 20 ms period; see also Fig.4	–	0.4	A
I_{FRM}	repetitive peak forward current	T_{tp} = 85 °C	–	11	A
		T_{amb} = 60 °C	–	3.7	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; T_j = 25 °C prior to surge; $V_R = V_{RRMmax}$	–	5.0	A
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature		−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Fig.5	–	–	1.7	V
		I_F = 1 A; see Fig.5	–	–	2.3	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.6	–	–	1	µA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.6	–	–	100	µA
t_{fr}	forward recovery time	when switched to I_F = 1 A in 50 ns; see Fig.9	–	–	350	ns
t_{on}	turn-on time	when switched from V_F = 0 to V_F = 3 V; measured between 10% and 90% of I_{Fmax}; see Fig.11	500	–	–	ns
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.11	–	–	150	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0; see Fig.7	–	17	–	pF

THERMAL CHARACTERISTICS

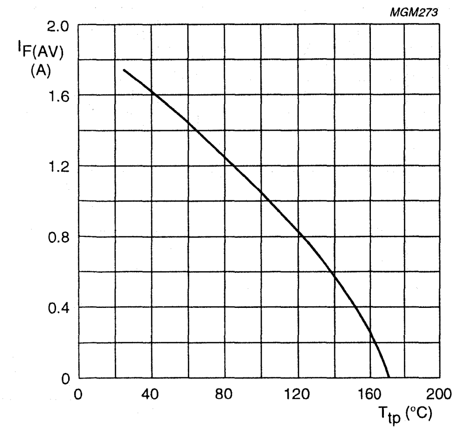
SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point		30	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	150	K/W

Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm, see Fig.8. For more information please refer to the *'General Part of associated Handbook.'*

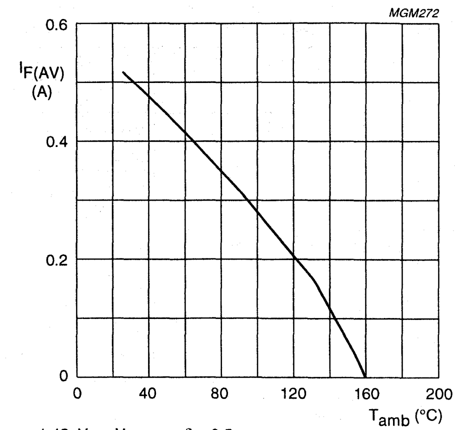
Ripple blocking diode BYD67

GRAPHICAL DATA



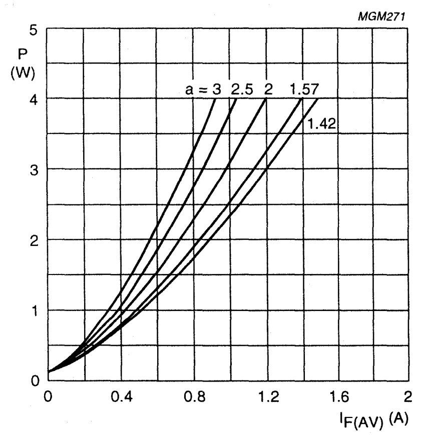
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Switched mode application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



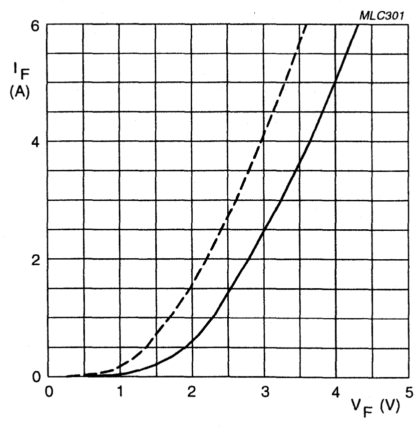
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Device mounted as shown in Fig.8.
Switched mode application.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



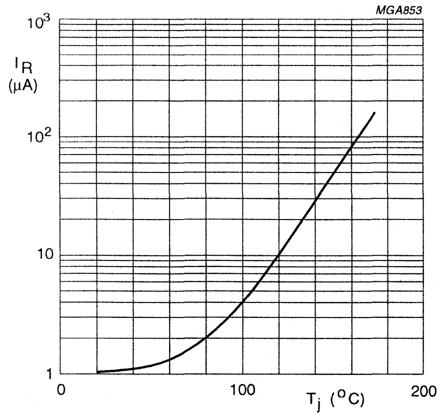
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; δ = 0.5.

Fig.4 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



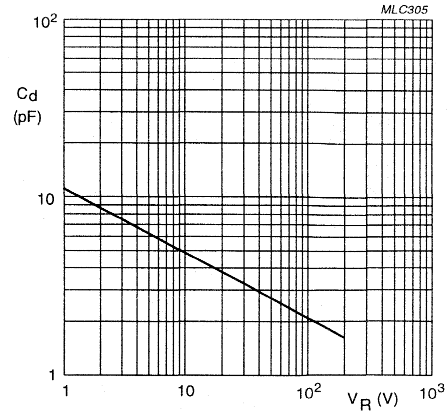
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.5 Forward current as a function of forward voltage; maximum values.



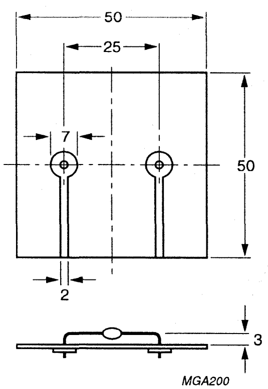
$V_R = V_{RRMmax}$.

Fig.6 Reverse current as a function of junction temperature; maximum values.



f = 1 MHz; T_j = 25 °C.

Fig.7 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.8 Device mounted on a printed-circuit board.

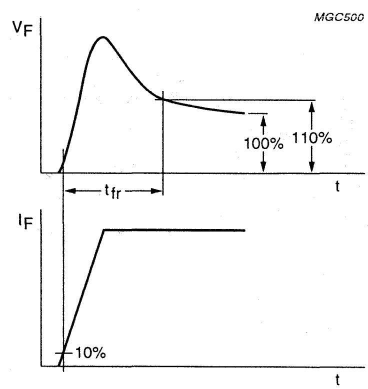
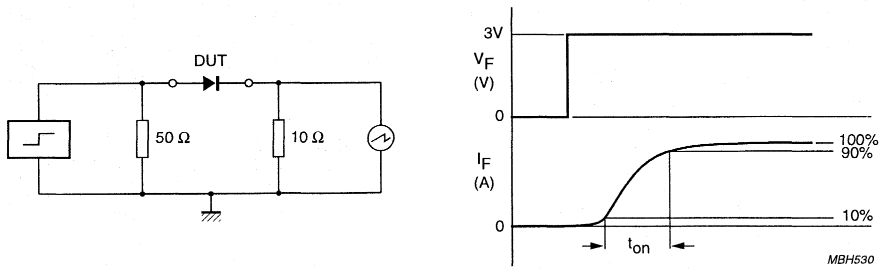
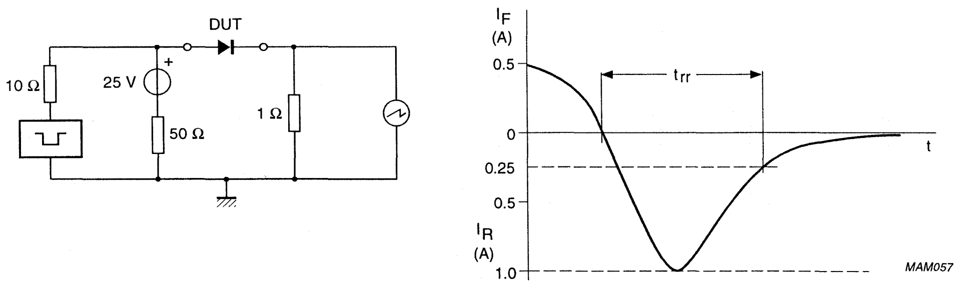


Fig.9 Forward recovery time definition.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 10$ ns.

Fig.10 Test circuit and turn-on time waveform and definition.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.11 Test circuit and reverse recovery time waveform and definition.

Ultra fast low-loss controlled avalanche rectifiers

BYD72 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack.

DESCRIPTION

Cavity free cylindrical glass SOD120 package through Implotec™(1) technology. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

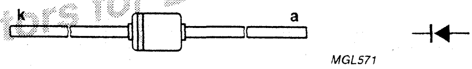


Fig.1 Simplified outline (SOD120) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYD72A		–	50	V
	BYD72B		–	100	V
	BYD72C		–	150	V
	BYD72D		–	200	V
	BYD72E		–	250	V
	BYD72F		–	300	V
	BYD72G		–	400	V
V_R	continuous reverse voltage				
	BYD72A		–	50	V
	BYD72B		–	100	V
	BYD72C		–	150	V
	BYD72D		–	200	V
	BYD72E		–	250	V
	BYD72F		–	300	V
	BYD72G		–	400	V
$I_{F(AV)}$	average forward current	T_{amb} = 25 °C; printed-circuit board mounting, pitch 5 mm, see Fig.8; averaged over any 20 ms period; see Figs 2 and 3			
	BYD72A to D		–	1.02	A
	BYD72E to G		–	0.95	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; T_j = 25 °C; $V_R = V_{RRMmax}$	–	15	A
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature	see Fig.7	−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; see Figs 4 and 5		
	BYD72A to D		0.98	V
	BYD72E to G		1.05	V
I_R	reverse current	$V_R = V_{RRMmax}$	1	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.6	100	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.9		
	BYD72A to D		25	ns
	BYD72E to G		50	ns
V_{FRM}	forward recovery voltage	when switched to I_F = 1 A in 50 ns		
	BYD72A to D		1.55	V
	BYD72E to G		3.40	V

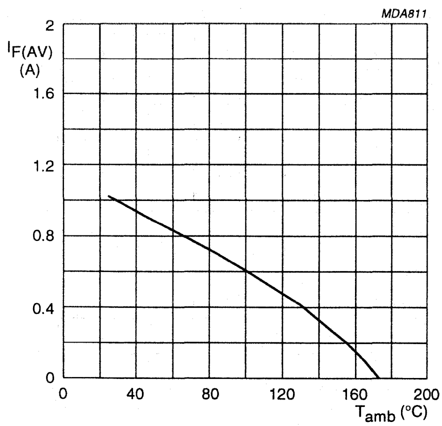
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	150	K/W

Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper layer ≥40 μm, pitch 5 mm; see Fig.8.

GRAPHICAL DATA

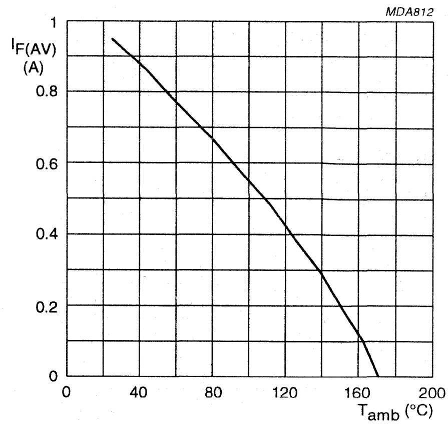


BYD72A to D

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Device mounted as shown in Fig.8.

Fig.2 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).

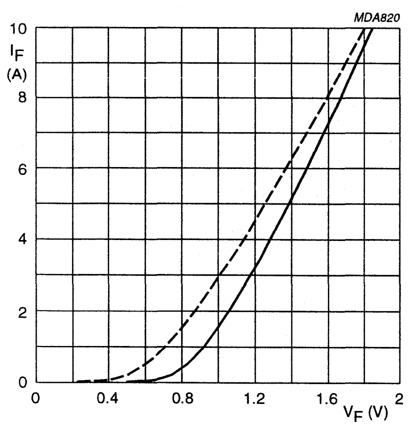


BYD72E to G

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Device mounted as shown in Fig.8.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).

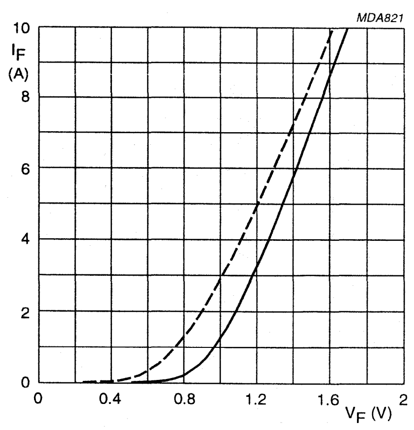


BYD72A to D

Dotted line: T_j = 175 °C.

Solid line: T_j = 25 °C.

Fig.4 Forward current as a function of forward voltage; typical values.



BYD72E to G

Dotted line: T_j = 175 °C.

Solid line: T_j = 25 °C.

Fig.5 Forward current as a function of forward voltage; typical values.

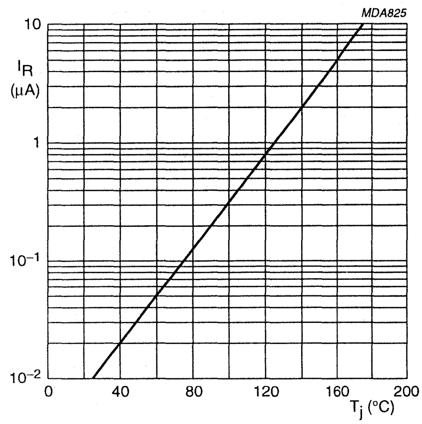


Fig.6 Reverse current as a function of junction temperature; typical values.

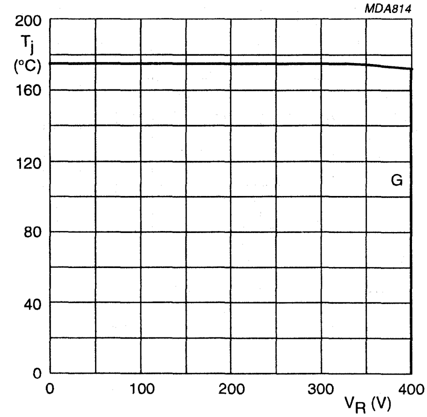
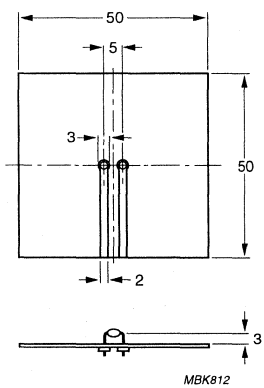
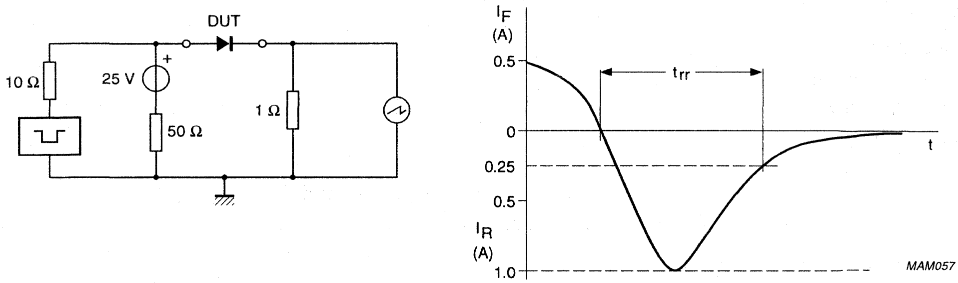


Fig.7 Maximum permissible junction temperature as a function of reverse voltage.



Dimensions in mm.

Fig.8 Device mounted on a printed-circuit board.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.9 Test circuit and reverse recovery time waveform and definition.

Ultra fast low-loss controlled avalanche rectifiers

BYD73 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack.

DESCRIPTION

Cavity free cylindrical glass SOD81 package through Implotec™(1) technology. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

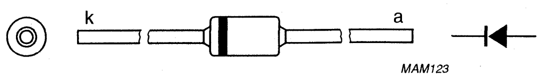


Fig.1 Simplified outline (SOD81) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYD73A		–	50	V
	BYD73B		–	100	V
	BYD73C		–	150	V
	BYD73D		–	200	V
	BYD73E		–	250	V
	BYD73F		–	300	V
	BYD73G		–	400	V
V_R	continuous reverse voltage				
	BYD73A		–	50	V
	BYD73B		–	100	V
	BYD73C		–	150	V
	BYD73D		–	200	V
	BYD73E		–	250	V
	BYD73F		–	300	V
	BYD73G		–	400	V
$I_{F(AV)}$	average forward current	T_{tp} = 55 °C; lead length = 10 mm; see Figs 2 and 3; averaged over any 20 ms period; see also Figs 10 and 11			
	BYD73A to D		–	1.75	A
	BYD73E to G		–	1.70	A
$I_{F(AV)}$	average forward current	T_{amb} = 60 °C; PCB mounting (see Fig.16); see Figs 4 and 5; averaged over any 20 ms period; see also Figs 10 and 11			
	BYD73A to D		–	1.00	A
	BYD73E to G		–	0.95	A

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{FRM}	repetitive peak forward current	T_{tp} = 55 °C; see Figs 6 and 7			
	BYD73A to D		–	14	A
	BYD73E to G		–	15	A
I_{FRM}	repetitive peak forward current	T_{amb} = 60 °C; see Figs 8 and 9			
	BYD73A to D		–	8.5	A
	BYD73E to G		–	9.5	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	25	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	10	mJ
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature		−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Figs 12 and 13				
	BYD73A to D		–	–	0.75	V
	BYD73E to G		–	–	0.83	V
V_F	forward voltage	I_F = 1 A; see Figs 12 and 13				
	BYD73A to D		–	–	0.98	V
	BYD73E to G		–	–	1.05	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYD73A		55	–	–	V
	BYD73B		110	–	–	V
	BYD73C		165	–	–	V
	BYD73D		220	–	–	V
	BYD73E		275	–	–	V
	BYD73F		330	–	–	V
	BYD73G		440	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.14	–	–	1	µA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.14	–	–	100	µA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.18				
	BYD73A to D		–	–	25	ns
	BYD73E to G		–	–	50	ns

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
C_d	diode capacitance	$f = 1$ MHz; $V_R = 0$ V; see Fig.15				
	BYD73A to D		–	50	–	pF
	BYD73E to G		–	40	–	pF
$\left\|\frac{dI_R}{dt}\right\|$	maximum slope of reverse recovery current	when switched from $I_F = 1$ A to $V_R \geq 30$ V and $dI_F/dt = -1$ A/µs; see Fig.17				
	BYD73A to D		–	–	4	A/µs
	BYD73E to G		–	–	5	A/µs

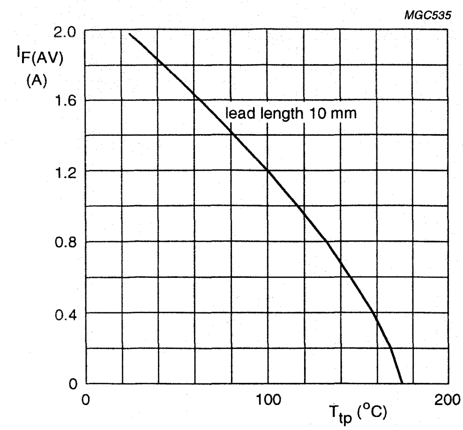
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	60	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	120	K/W

Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm, see Fig.16. For more information please refer to the *'General Part of Handbook SC01.'*

GRAPHICAL DATA

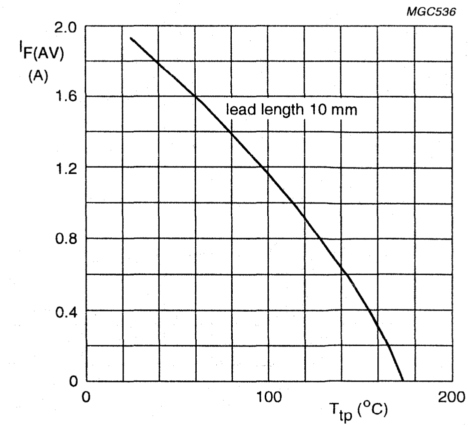


BYD73A to D

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Switched mode application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).

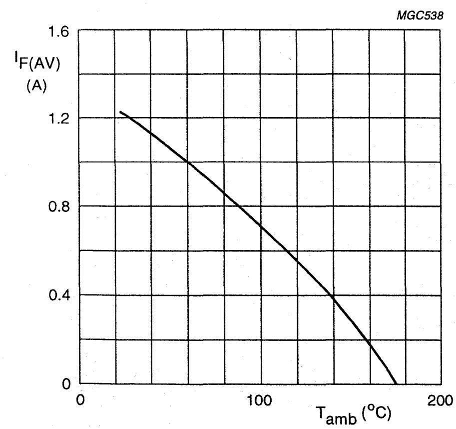


BYD73E to G

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Switched mode application.

Fig.3 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



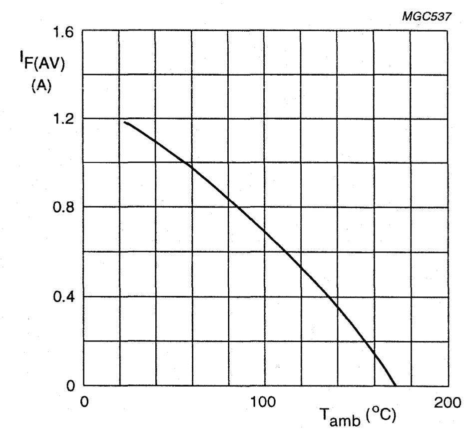
BYD73A to D

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Device mounted as shown in Fig.16.

Switched mode application.

Fig.4 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



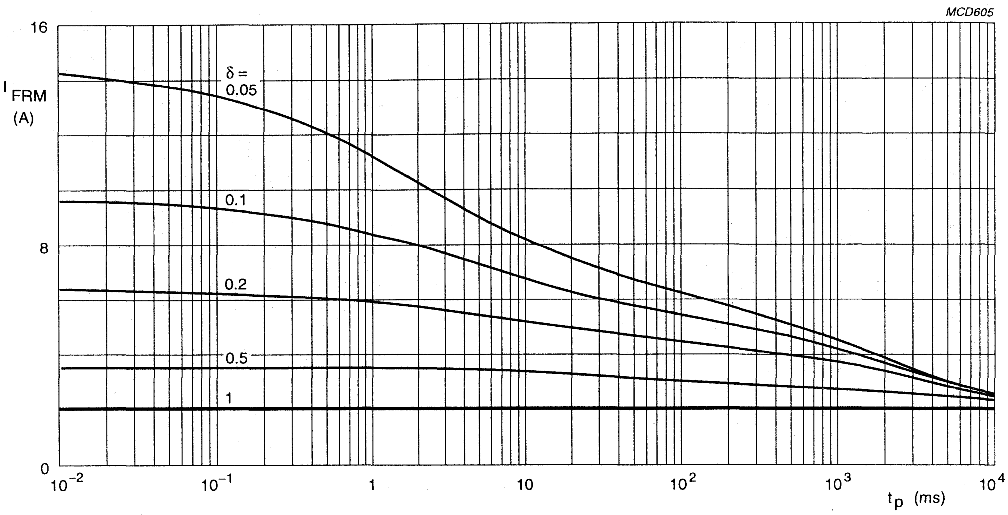
BYD73E to G

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Device mounted as shown in Fig.16.

Switched mode application.

Fig.5 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).

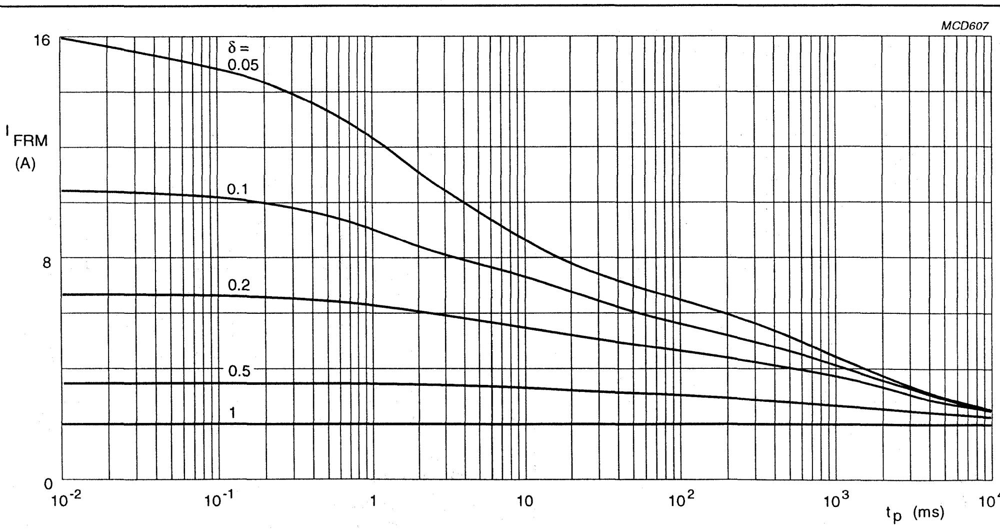


BYD73A to D

T_{tp} = 55 °C; $R_{th\ j\text{-}tp}$ = 60 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 200 V.

Fig.6 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

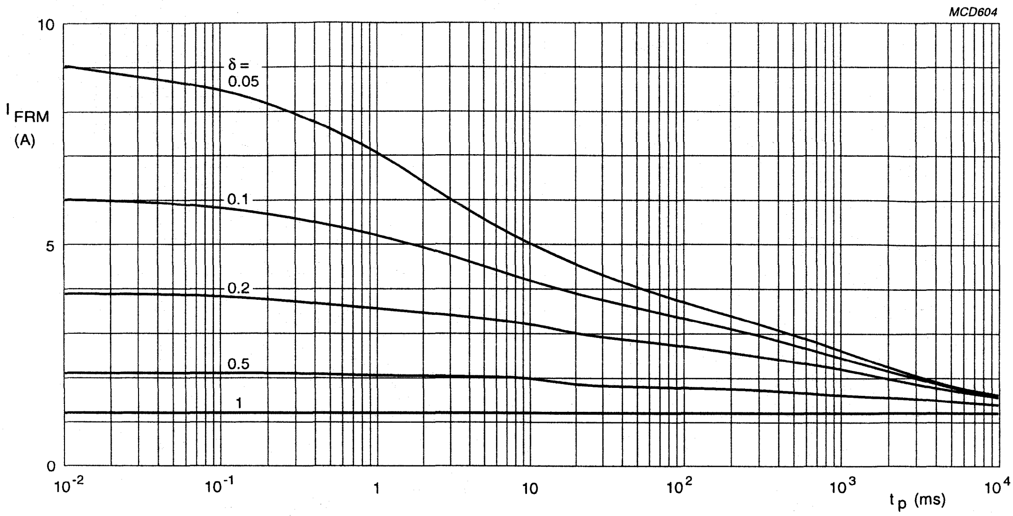


BYD73E to G

T_{tp} = 55°C; $R_{th\ j\text{-}tp}$ = 60 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 400 V.

Fig.7 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

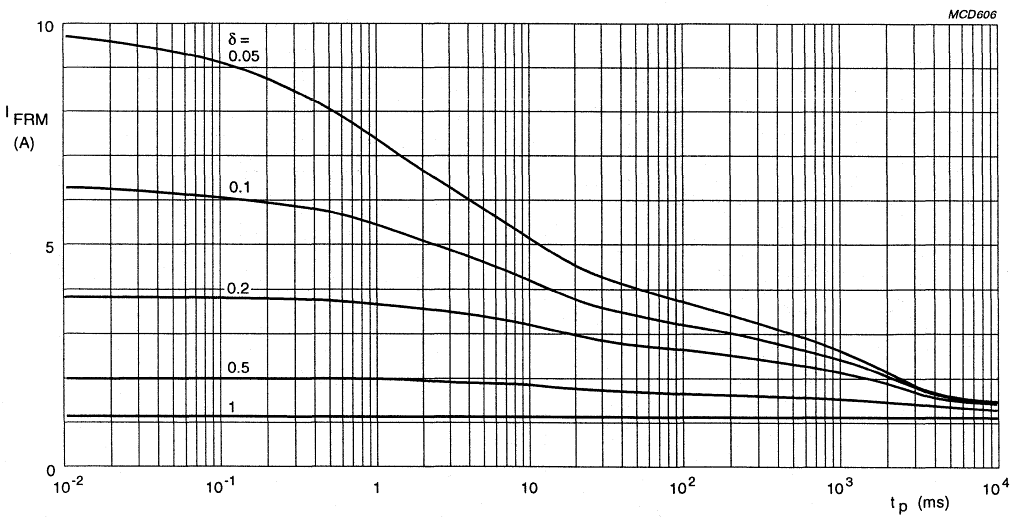


BYD73A to D

T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 120 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 200 V.

Fig.8 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

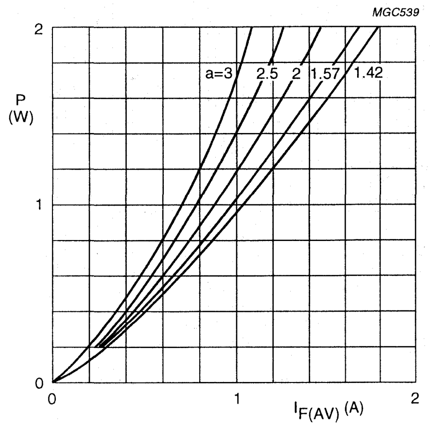


BYD73E to G

T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 120 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 400 V.

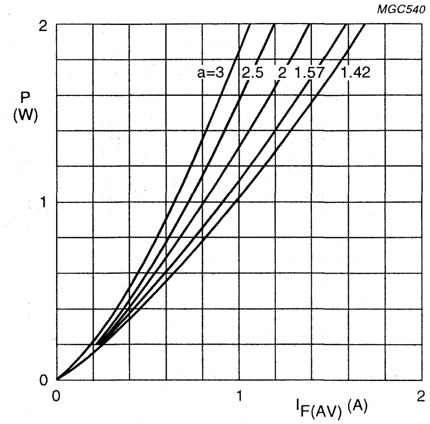
Fig.9 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



BYD73A to D

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

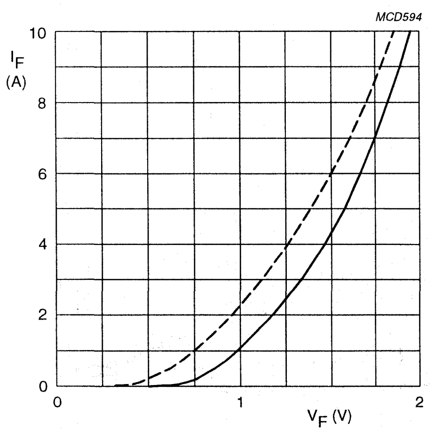
Fig.10 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



BYD73E to G

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Fig.11 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.

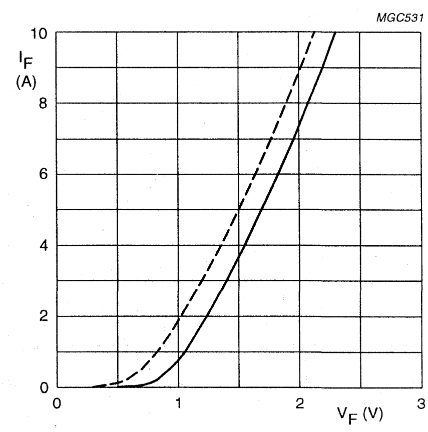


BYD73A to D

Dotted line: $T_j = 175$ °C.

Solid line: $T_j = 25$ °C.

Fig.12 Forward current as a function of forward voltage; maximum values.

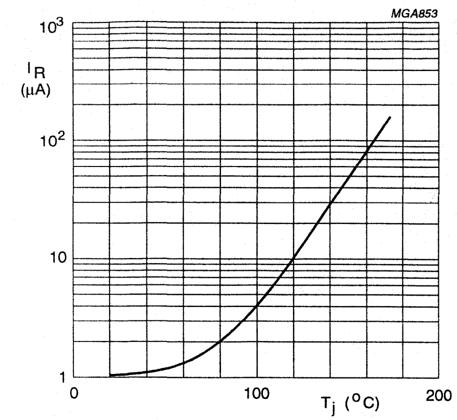


BYD73E to G

Dotted line: $T_j = 175$ °C.

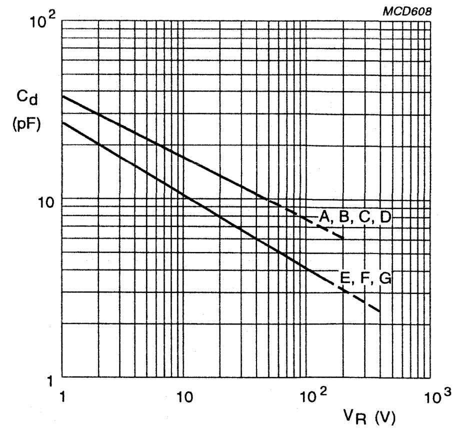
Solid line: $T_j = 25$ °C.

Fig.13 Forward current as a function of forward voltage; maximum values.



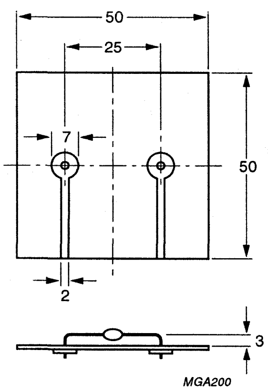
$V_R = V_{RRMmax}$.

Fig.14 Reverse current as a function of junction temperature; maximum values.



f = 1 MHz; T_j = 25 °C.

Fig.15 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.16 Device mounted on a printed-circuit board.

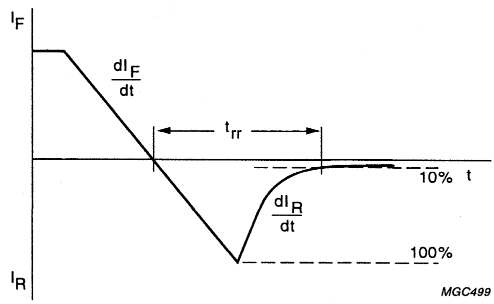
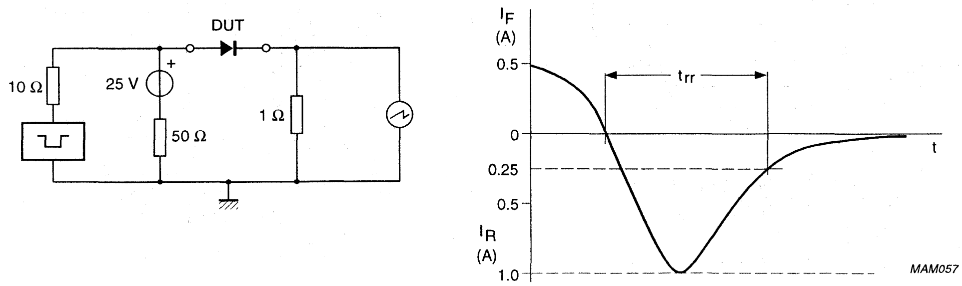


Fig.17 Reverse recovery definitions.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.18 Test circuit and reverse recovery time waveform and definition.

Ultra fast low-loss controlled avalanche rectifiers

BYD77 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Shipped in 8 mm embossed tape
- Smallest surface mount rectifier outline.

DESCRIPTION

Cavity free cylindrical glass SOD87 package through Implotec™(1) technology. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

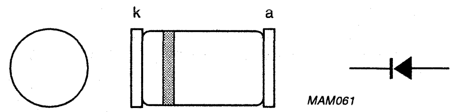


Fig.1 Simplified outline (SOD87) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYD77A		–	50	V
	BYD77B		–	100	V
	BYD77C		–	150	V
	BYD77D		–	200	V
	BYD77E		–	250	V
	BYD77F		–	300	V
	BYD77G		–	400	V
V_R	continuous reverse voltage				
	BYD77A		–	50	V
	BYD77B		–	100	V
	BYD77C		–	150	V
	BYD77D		–	200	V
	BYD77E		–	250	V
	BYD77F		–	300	V
	BYD77G		–	400	V
$I_{F(AV)}$	average forward current	T_{tp} = 105 °C; see Figs 2 and 3; averaged over any 20 ms period; see also Figs 10 and 11			
	BYD77A to D		–	2.00	A
	BYD77E to G		–	1.85	A
$I_{F(AV)}$	average forward current	T_{amb} = 60 °C; PCB mounting (see Fig.16); see Figs 4 and 5; averaged over any 20 ms period; see also Figs 10 and 11			
	BYD77A to D		–	0.85	A
	BYD77E to G		–	0.80	A

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{FRM}	repetitive peak forward current	T_{tp} = 105 °C; see Figs 6 and 7			
	BYD77A to D		–	15	A
	BYD77E to G		–	13	A
I_{FRM}	repetitive peak forward current	T_{amb} = 60 °C; see Figs 8 and 9			
	BYD77A to D		–	8.5	A
	BYD77E to G		–	8.0	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	25	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; T_j = 25 °C prior to surge; inductive load switched off	–	10	mJ
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature		−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Figs 12 and 13				
	BYD77A to D		–	–	0.75	V
	BYD77E to G		–	–	0.83	V
V_F	forward voltage	I_F = 1 A; see Figs 12 and 13				
	BYD77A to D		–	–	0.98	V
	BYD77E to G		–	–	1.05	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYD77A		55	–	–	V
	BYD77B		110	–	–	V
	BYD77C		165	–	–	V
	BYD77D		220	–	–	V
	BYD77E		275	–	–	V
	BYD77F		330	–	–	V
	BYD77G		440	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.14	–	–	1	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.14	–	–	100	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.18				
	BYD77A to D		–	–	25	ns
	BYD77E to G		–	–	50	ns

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Fig.15				
	BYD77A to D		–	50	–	pF
	BYD77E to G		–	40	–	pF
$\left\lvert\frac{dI_R}{dt}\right\rvert$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq 30$ V and $dI_F/dt = -1$ A/µs; see Fig.17				
	BYD77A to D		–	–	4	A/µs
	BYD77E to G		–	–	5	A/µs

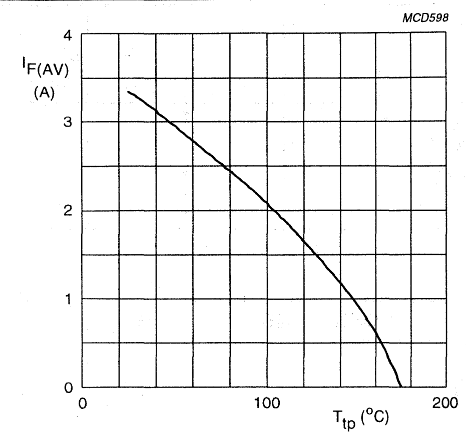
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point		30	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	150	K/W

Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm, see Fig.16. For more information please refer to the *'General Part of Handbook SC01'*.

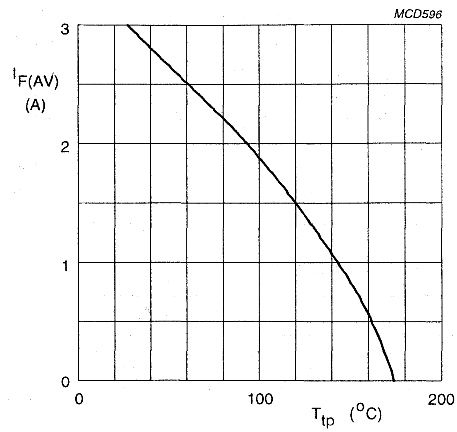
GRAPHICAL DATA



BYD77A to D

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Switched mode application.

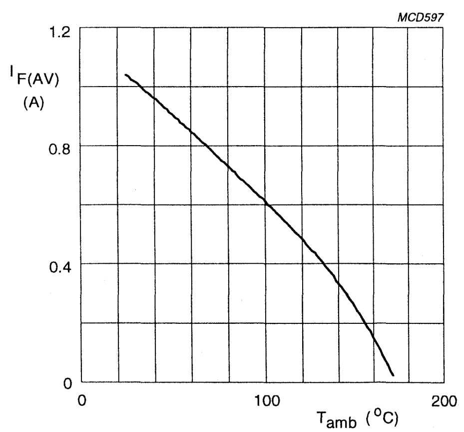
Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



BYD77E to G

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Switched mode application.

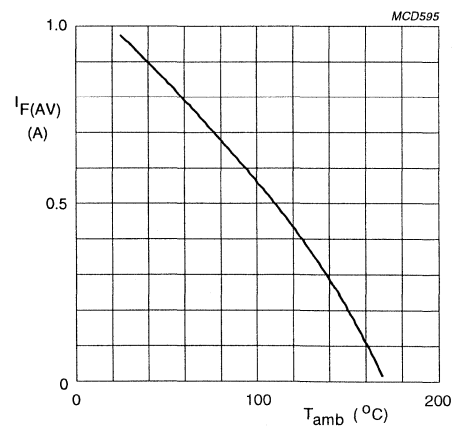
Fig.3 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



BYD77A to D

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Device mounted as shown in Fig.16.
Switched mode application.

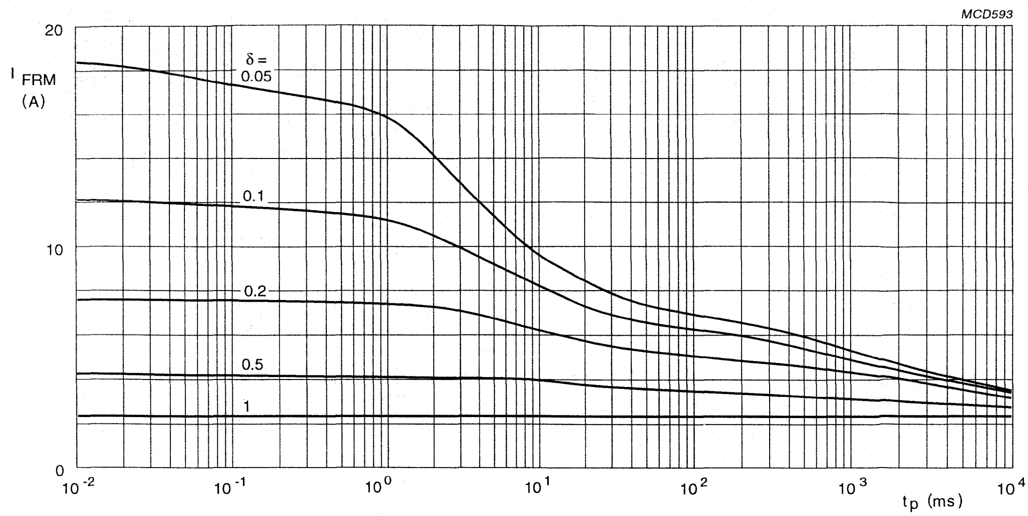
Fig.4 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



BYD77E to G

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Device mounted as shown in Fig.16.
Switched mode application.

Fig.5 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).

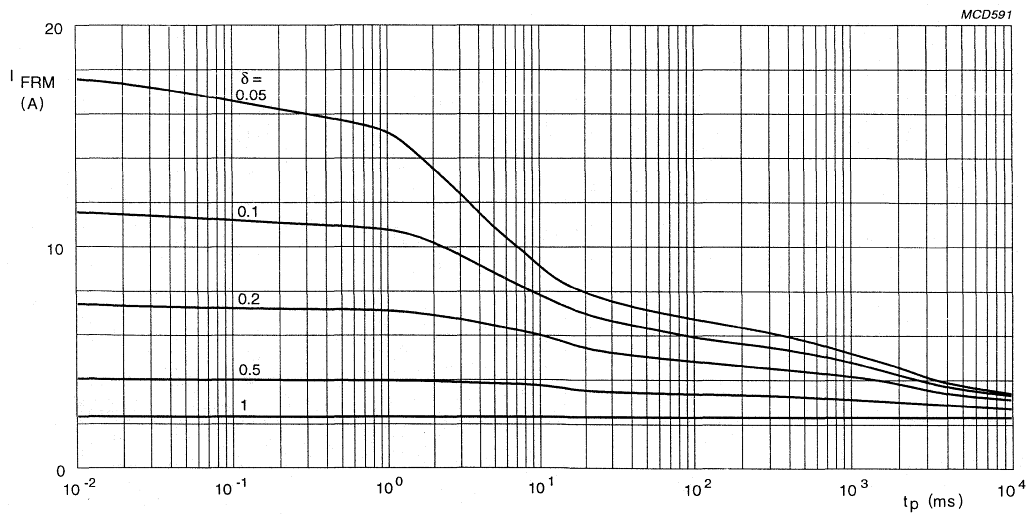


BYD77A to D

T_{tp} = 105 °C; $R_{th\ j\text{-}tp}$ = 30 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 200 V.

Fig.6 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

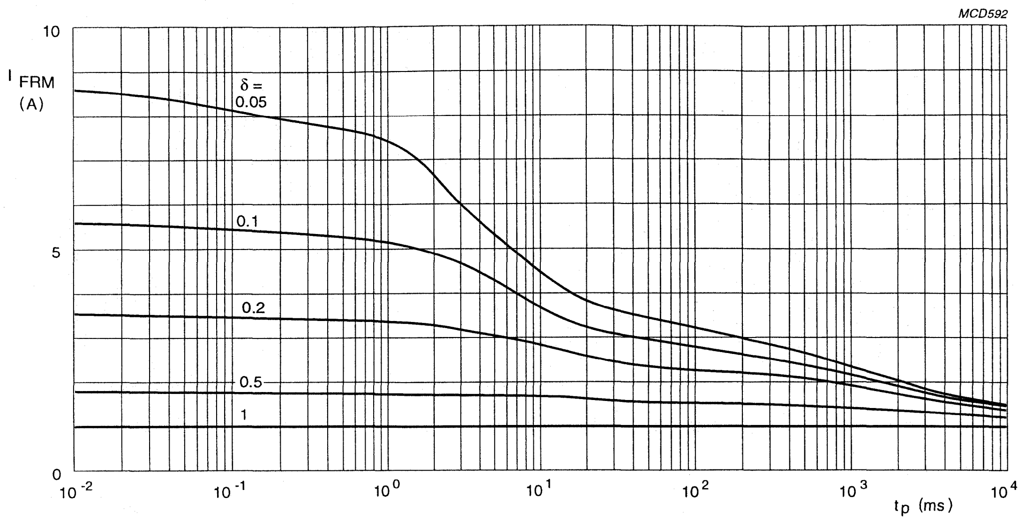


BYD77E to G

T_{tp} = 105°C; $R_{th\ j\text{-}tp}$ = 30 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 400 V.

Fig.7 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

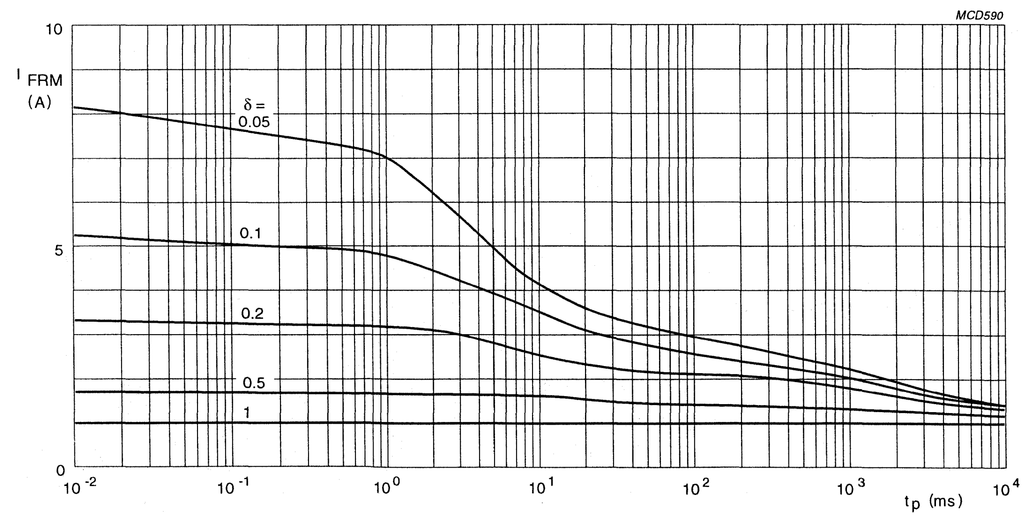


BYD77A to D

T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 150 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 200 V.

Fig.8 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

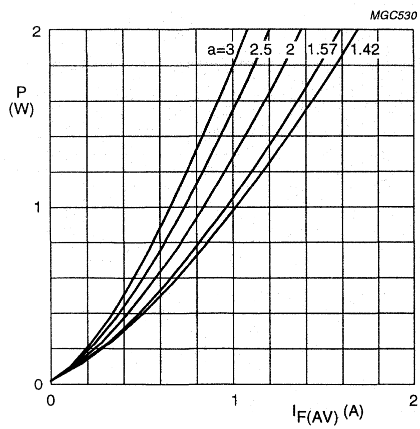


BYD77E to G

T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 150 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 400 V.

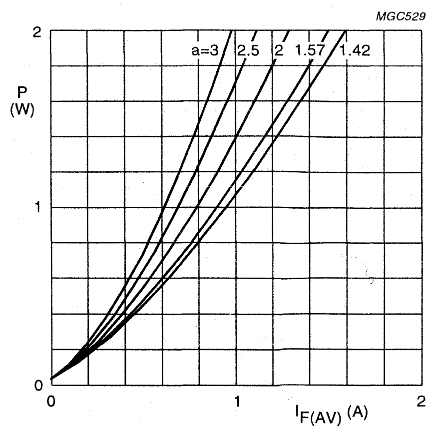
Fig.9 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



BYD77A to D

$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

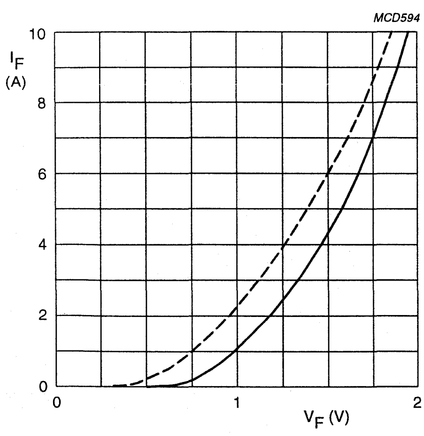
Fig.10 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



BYD77E to G

$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Fig.11 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.

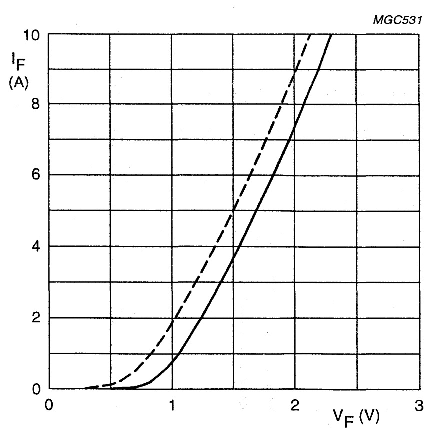


BYD77A to D

Dotted line: T_j = 175 °C.

Solid line: T_j = 25 °C.

Fig.12 Forward current as a function of forward voltage; maximum values.

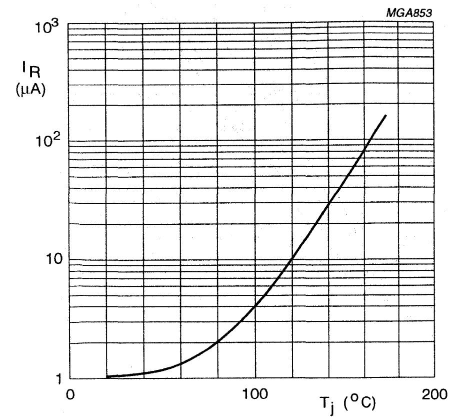


BYD77E to G

Dotted line: T_j = 175 °C.

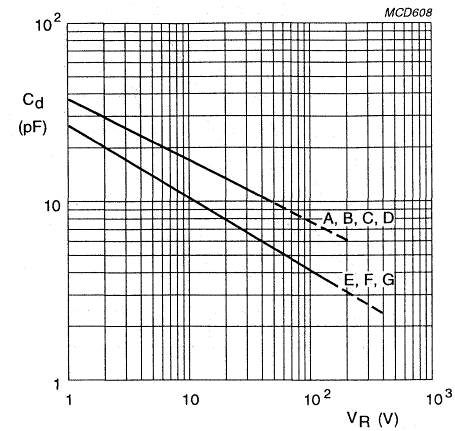
Solid line: T_j = 25 °C.

Fig.13 Forward current as a function of forward voltage; maximum values.



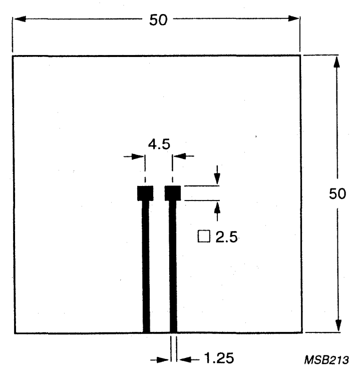
$V_R = V_{RRMmax}$.

Fig.14 Reverse current as a function of junction temperature; maximum values.



f = 1 MHz; T_j = 25 °C.

Fig.15 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.16 Printed-circuit board for surface mounting.

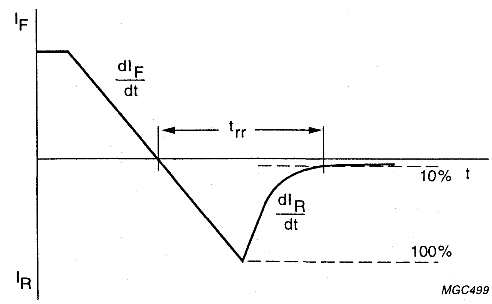
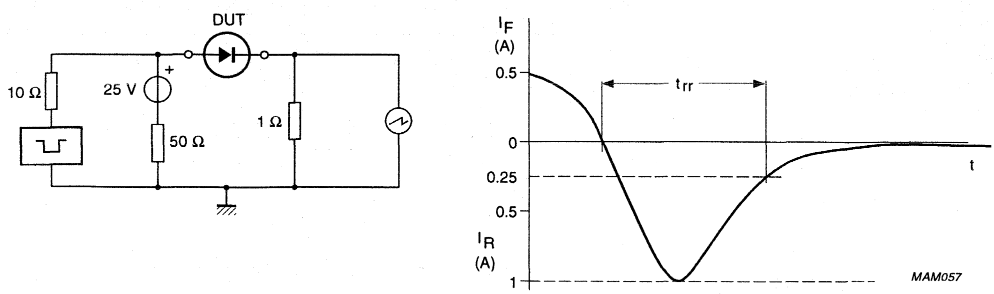


Fig.17 Reverse recovery definitions.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \le 7$ ns.
Source impedance: 50 Ω; $t_r \le 15$ ns.

Fig.18 Test circuit and reverse recovery time waveform and definition.

Ultra fast low-loss rectifiers BYD123

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Available in ammo-pack.

DESCRIPTION

Cavity free cylindrical glass SOD81 package through Implotec™[(1)] technology. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

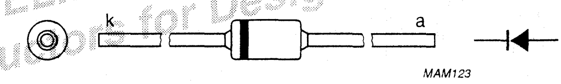


Fig.1 Simplified outline (SOD81) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	200	V
V_R	continuous reverse voltage		–	200	V
$I_{F(AV)}$	average forward current	T_{tp} = 115 °C; lead length = 10 mm; averaged over any 20 ms period; see Figs 5 and 6	–	1	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; $V_R = V_{RRMmax}$	–	25	A
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature		−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; see Fig.2 T_j = 150 °C	0.8	V
		I_F = 1 A; see Fig.2	0.93	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.3	2	μA
		$V_R = V_{RRMmax}$; T_j = 150 °C; see Fig.3	50	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A	25	ns

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	60	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	120	K/W

Note

1. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.7. For more information please refer to the *"General part of the associated handbook"*.

GRAPHICAL DATA

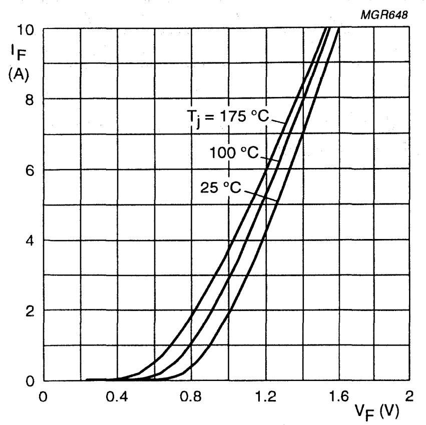


Fig.2 Forward current as a function of forward voltage; typical values.

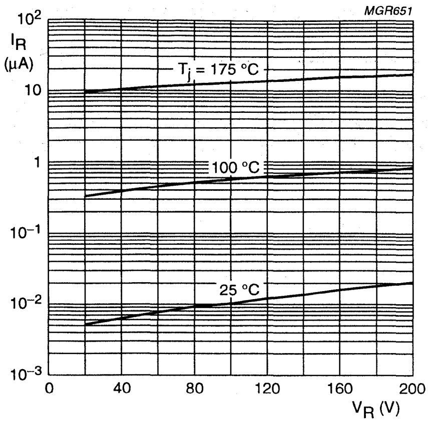


Fig.3 Reverse current as a function of reverse voltage; typical values.

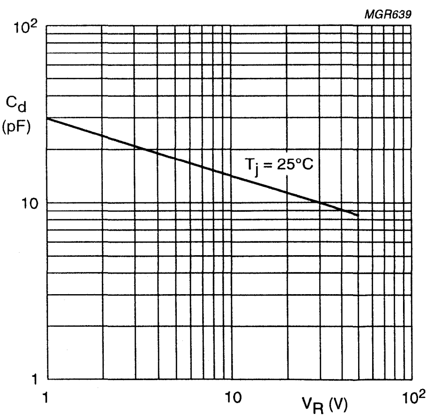


Fig.4 Diode capacitance as a function of reverse voltage; typical values.

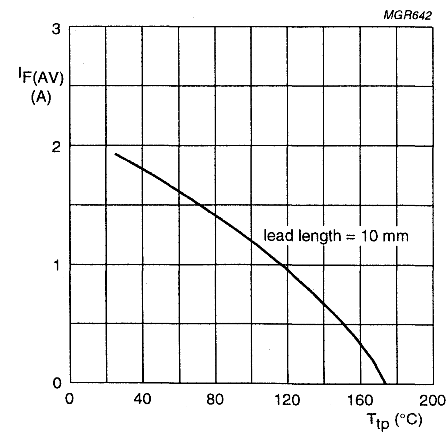


Fig.5 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).

Ultra fast low-loss rectifiers BYD123

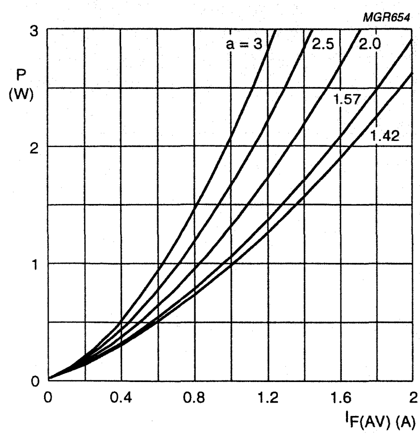
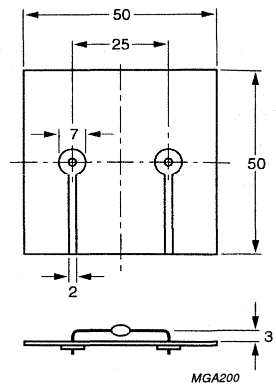


Fig.6 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



Dimensions in mm.

Fig.7 Device mounted on a printed-circuit board

Ultra fast low-loss rectifiers

BYD127

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Available in ammo-pack.
- Smallest surface mount rectifier outline.

DESCRIPTION

Cavity free cylindrical glass SOD87 package through Implotec™(1) technology. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

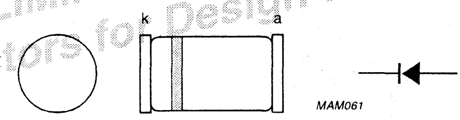


Fig.1 Simplified outline (SOD87) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	200	V
V_R	continuous reverse voltage		–	200	V
$I_{F(AV)}$	average forward current	T_{tp} = 145 °C; averaged over any 20 ms period; see Figs 5 and 6	–	1	A
		T_{tp} = 95 °C; averaged over any 20 ms period; see Figs 5 and 6	–	2	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; $V_R = V_{RRMmax}$	–	25	A
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature		−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; see Fig.2; T_j = 150 °C;	0.8	V
		I_F = 1 A; see Fig.2	0.93	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.3	2	μA
		$V_R = V_{RRMmax}$; T_j = 150 °C; see Fig.3	50	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A	25	ns

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point		30	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	150	K/W

Note

1. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.7. For more information please refer to the *"General part of the associated handbook"*.

GRAPHICAL DATA

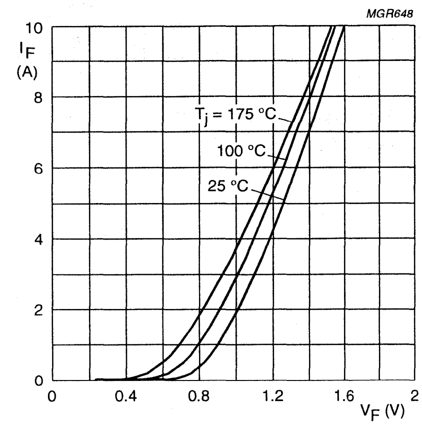


Fig.2 Forward current as a function of forward voltage; typical values.

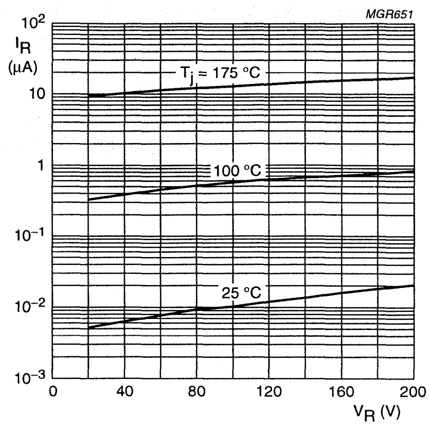


Fig.3 Reverse current as a function of reverse voltage; typical values.

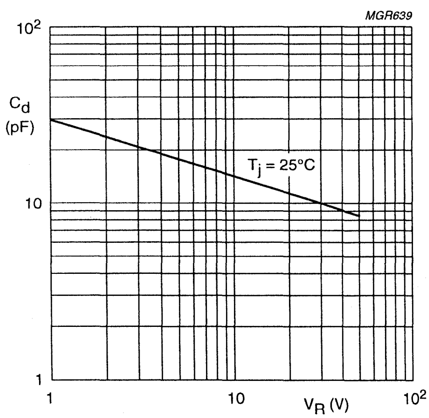


Fig.4 Diode capacitance as a function of reverse voltage; typical values.

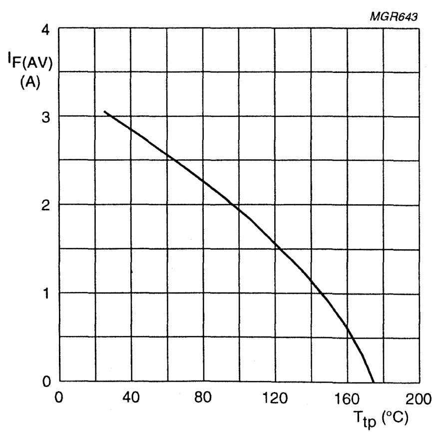


Fig.5 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).

Ultra fast low-loss rectifiers BYD127

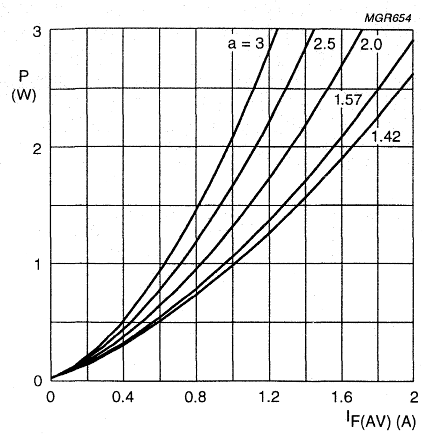
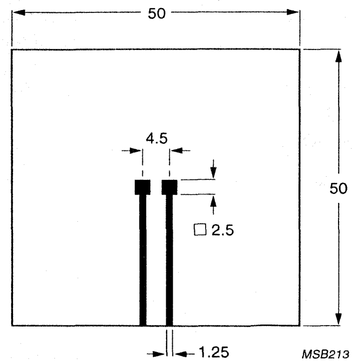


Fig.6 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



Dimensions in mm.

Fig.7 Printed-circuit board for surface mounting.

Ultra fast low-loss rectifiers

BYD143

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Available in ammo-pack.

DESCRIPTION

Cavity free cylindrical glass SOD81 package through Implotec™(1) technology. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

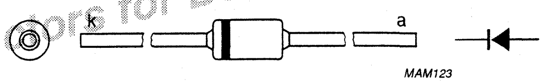


Fig.1 Simplified outline (SOD81) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	400	V
V_R	continuous reverse voltage		–	400	V
$I_{F(AV)}$	average forward current	T_{tp} = 105 °C; lead length = 10 mm; averaged over any 20 ms period; see Figs 5 and 6	–	1	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; $V_R = V_{RRMmax}$	–	25	A
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature		−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; see Fig.2 T_j = 150 °C	0.95	V
		I_F = 1 A; see Fig.2	1.15	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.3	5	µA
		$V_R = V_{RRMmax}$; T_j = 150 °C; see Fig.3	150	µA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A	50	ns

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	60	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	120	K/W

Note

1. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.7. For more information please refer to the *"General part of the associated handbook"*.

GRAPHICAL DATA

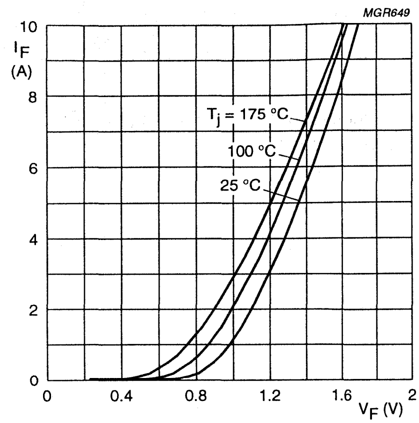


Fig.2 Forward current as a function of forward voltage; typical values.

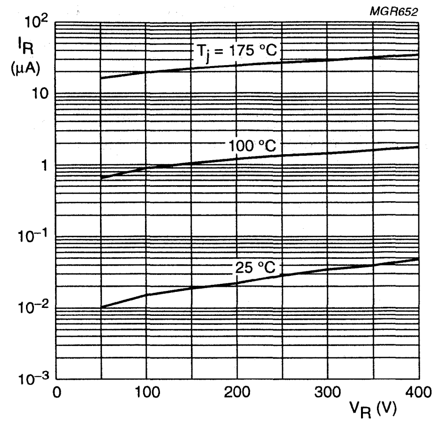


Fig.3 Reverse current as a function of reverse voltage; typical values.

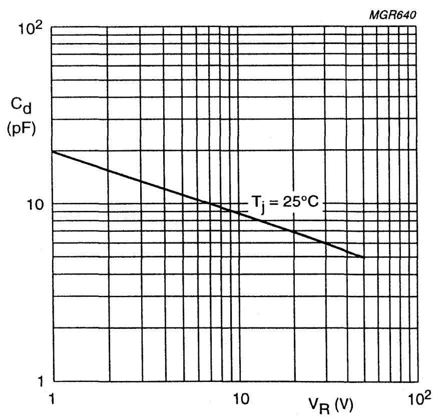


Fig.4 Diode capacitance as a function of reverse voltage; typical values.

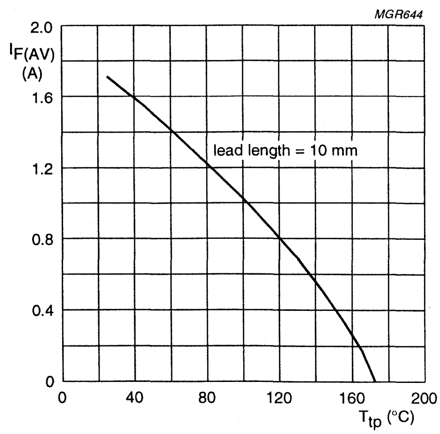


Fig.5 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).

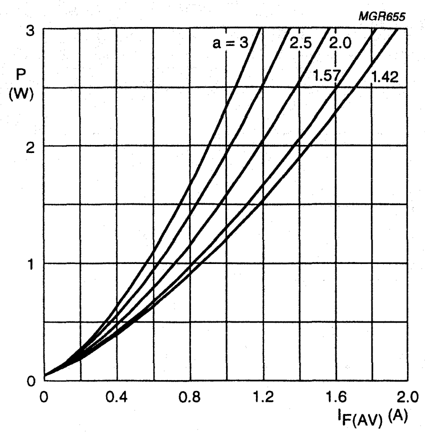
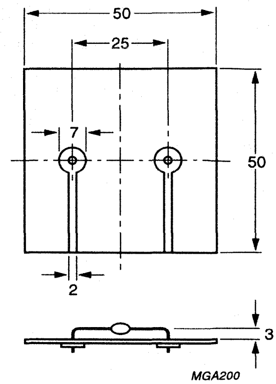


Fig.6 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



Dimensions in mm.

Fig.7 Device mounted on a printed-circuit board

Ultra fast low-loss rectifiers | BYD147

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Available in ammo-pack.
- Smallest surface mount rectifier outline.

DESCRIPTION

Cavity free cylindrical glass SOD87 package through Implotec™(1) technology. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

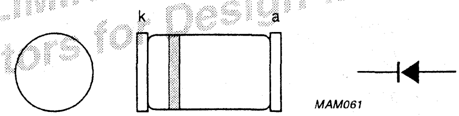


Fig.1 Simplified outline (SOD87) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	400	V
V_R	continuous reverse voltage		–	400	V
$I_{F(AV)}$	average forward current	T_{tp} = 135 °C; averaged over any 20 ms period; see Figs 5 and 6	–	1	A
		T_{tp} = 80 °C; averaged over any 20 ms period; see Figs 5 and 6	–	2	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; $V_R = V_{RRMmax}$	–	25	A
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature		−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; see Fig.2; T_j = 150 °C	0.95	V
		I_F = 1 A; see Fig.2	1.15	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.3	5	μA
		$V_R = V_{RRMmax}$; T_j = 150 °C; see Fig.3	150	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A	50	ns

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point		30	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	150	K/W

Note

1. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.7. For more information please refer to the *"General part of the associated handbook"*.

GRAPHICAL DATA

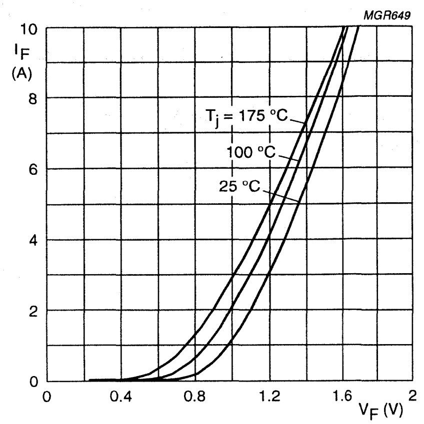


Fig.2 Forward current as a function of forward voltage; typical values.

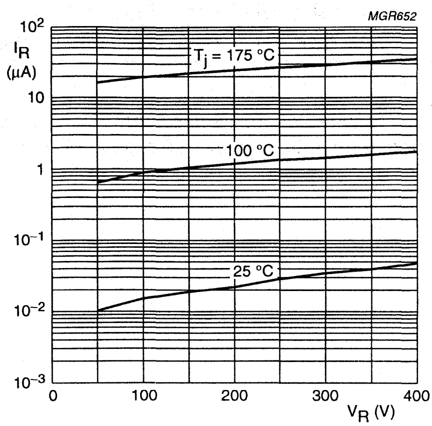


Fig.3 Reverse current as a function of reverse voltage; typical values.

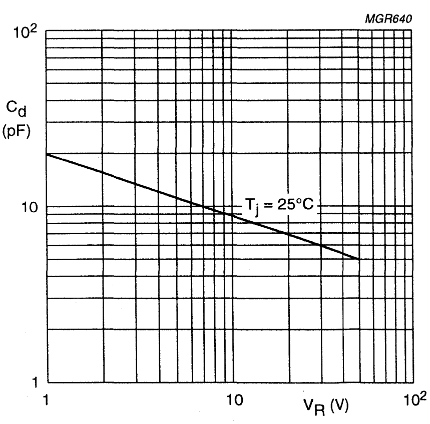


Fig.4 Diode capacitance as a function of reverse voltage; typical values.

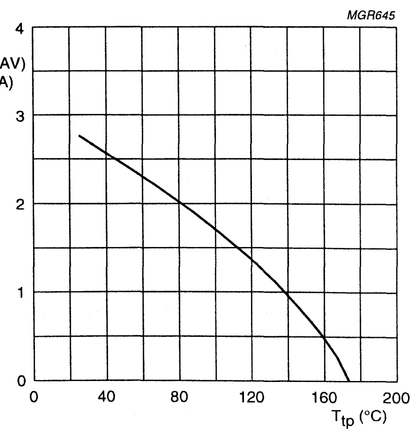


Fig.5 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).

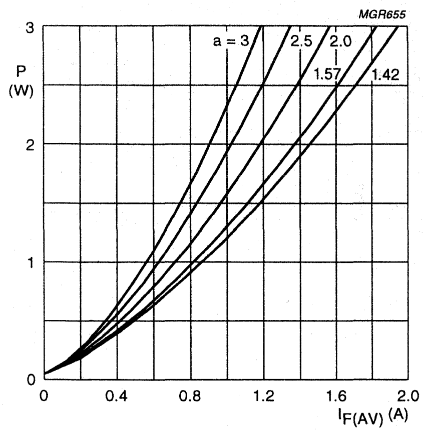
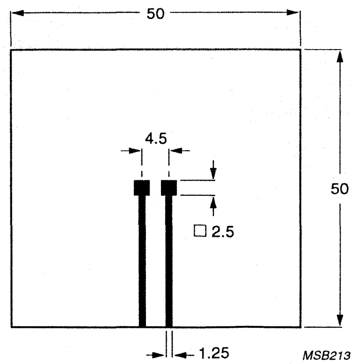


Fig.6 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



Dimensions in mm.

Fig.7 Printed-circuit board for surface mounting.

Ultra fast low-loss rectifier BYD163

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Available in ammo-pack.

DESCRIPTION

Cavity free cylindrical glass SOD81 package through Implotec™(1) technology. The SOD81 package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

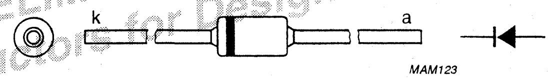


Fig.1 Simplified outline (SOD81) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage			600	V
V_R	continuous reverse voltage			600	V
$I_{F(AV)}$	average forward current	T_{tp} = 95 °C; lead length = 10 mm; see Fig.5; averaged over any 20 ms period; see also Fig.6		1	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; $V_R = V_{RRMmax}$		25	A
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature		−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; T_j = 150 °C; see Fig.2	1.05	V
		I_F = 1 A; see Fig.2	1.25	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.3	5	μA
		$V_R = V_{RRMmax}$; T_j = 150 °C; see Fig.3	150	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A	50	ns

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	60	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	120	K/W

Note

1. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.7. For more information please refer to the *"General Part of associated Handbook"*.

GRAPHICAL DATA

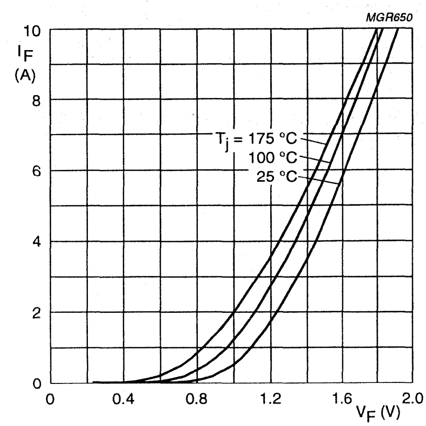


Fig.2 Forward current as a function of forward voltage; typical values.

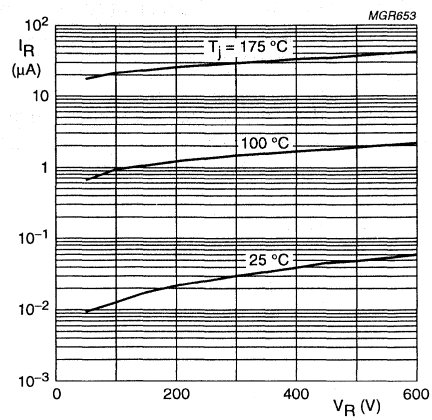


Fig.3 Reverse current as a function of reverse voltage; typical values.

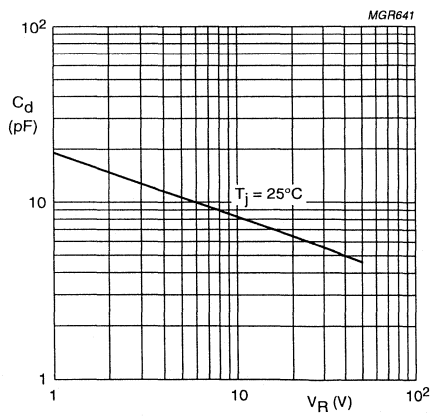


Fig.4 Diode capacitance as a function of reverse voltage; typical values.

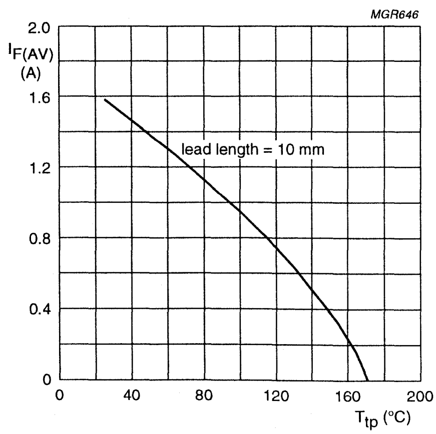


Fig.5 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).

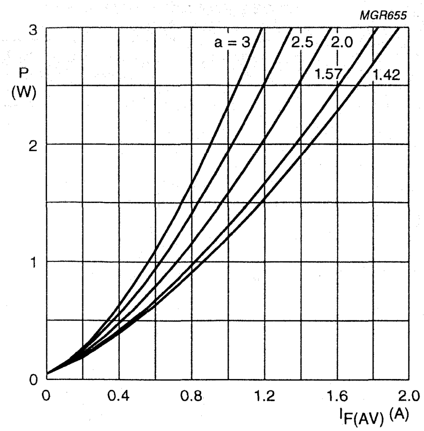
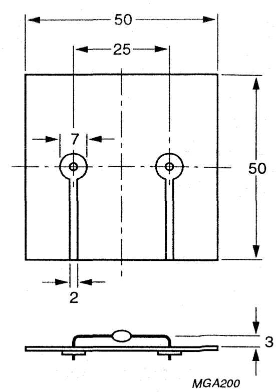


Fig.6 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



Dimensions in mm.

Fig.7 Device mounted on a printed-circuit board.

Ultra fast low-loss rectifiers — BYD167

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Available in ammo-pack
- Smallest surface mount rectifier package.

DESCRIPTION

Cavity free cylindrical glass SOD87 package through Implotec™(1) technology. The SOD87 package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

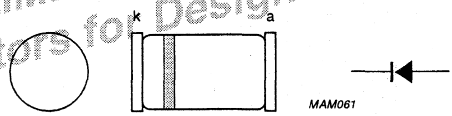


Fig.1 Simplified outline (SOD87) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage			600	V
V_R	continuous reverse voltage			600	V
$I_{F(AV)}$	average forward current	T_{tp} = 135 °C; averaged over any 20 ms period; see Figs 5 and 6		1	A
		T_{tp} = 70 °C; averaged over any 20 ms period; see Figs 5 and 6		2	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; $V_R = V_{RRMmax}$		25	A
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature		−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; T_j = 150 °C; see Fig.2	1.05	V
		I_F = 1 A; see Fig.2	1.25	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.3	5	μA
		$V_R = V_{RRMmax}$; T_j = 150 °C; see Fig.3	150	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A	50	ns

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point		30	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	150	K/W

Note

1. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.7. For more information please refer to the *"General Part of associated Handbook"*.

GRAPHICAL DATA

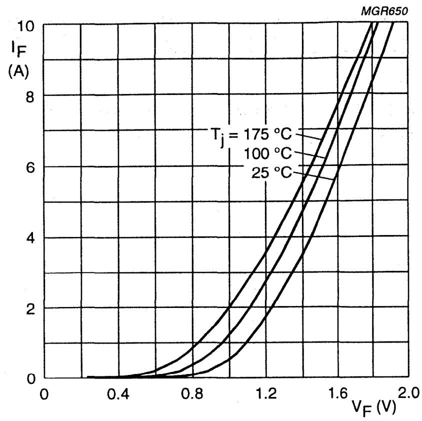


Fig.2 Forward current as a function of forward voltage; typical values.

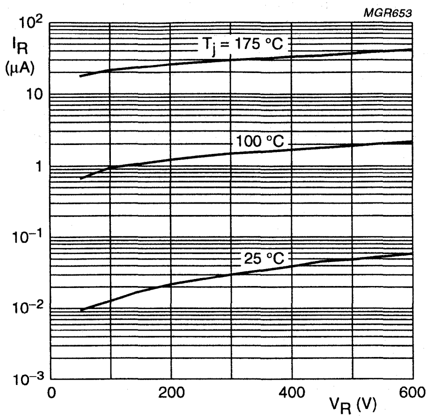


Fig.3 Reverse current as a function of reverse voltage; typical values.

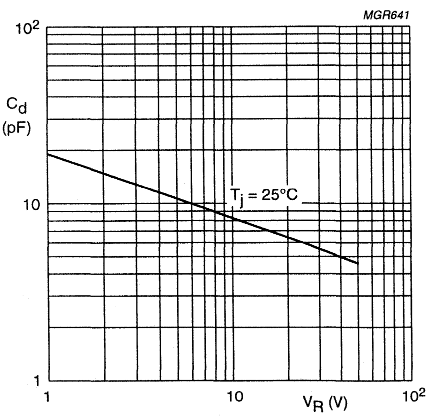


Fig.4 Diode capacitance as a function of reverse voltage; typical values.

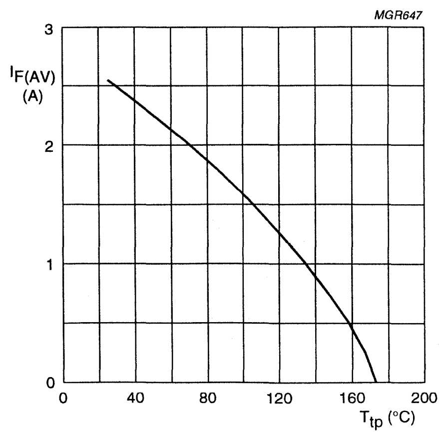


Fig.5 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).

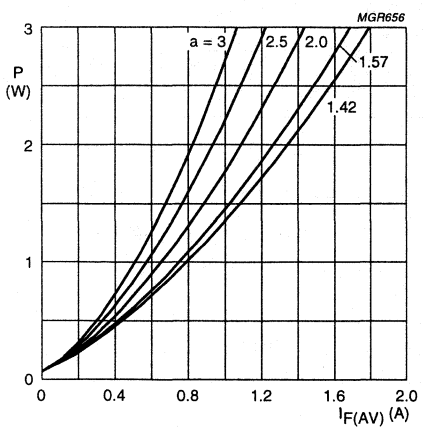
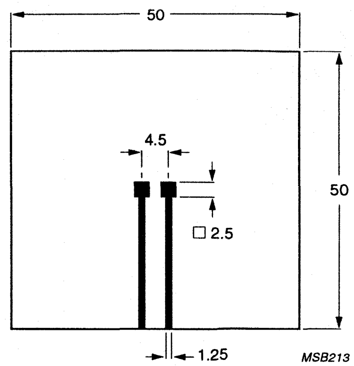


Fig.6 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



Dimensions in mm.

Fig.7 Printed-circuit board for surface mounting.

Fast soft-recovery rectifier BYD1100

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Smallest surface mount rectifier outline
- Shipped in 8 mm embossed tape.

DESCRIPTION

Cavity free cylindrical glass package through Implotec™(1) technology. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

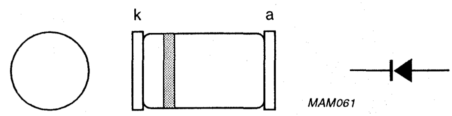


Fig.1 Simplified outline (SOD87) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	100	V
V_R	continuous reverse voltage		–	100	V
$I_{F(AV)}$	average forward current	T_{tp} = 55 °C; averaged over any 20 ms period; see Figs.2 and 4	–	2.7	A
		T_{tp} = 110 °C; averaged over any 20 ms period; see Figs.2 and 4	–	1.7	A
		T_{amb} = 60 °C; printed-circuit board mounting, see Fig.12; averaged over any 20 ms period; see Figs.3 and 4	–	0.85	A
I_{FRM}	repetitive peak forward current	T_{tp} = 105 °C; see Fig.6	–	16	A
		T_{amb} = 60 °C; see Fig.7	–	8	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	15	A
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Fig.5	–	–	0.735	V
		I_F = 1 A; see Fig.5	–	–	0.96	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA	120	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.8	–	–	5	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.8	–	–	150	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.10	–	–	10	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0; see Fig.9	–	70	–	pF
$\left\|\frac{dI_R}{dt}\right\|$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq 30$ V and $dI_F/dt = -1$ A/μs; see Fig.11	–	–	2	A/μs

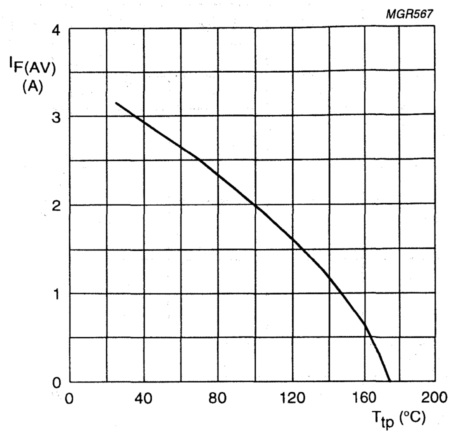
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point		30	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	150	K/W

Note

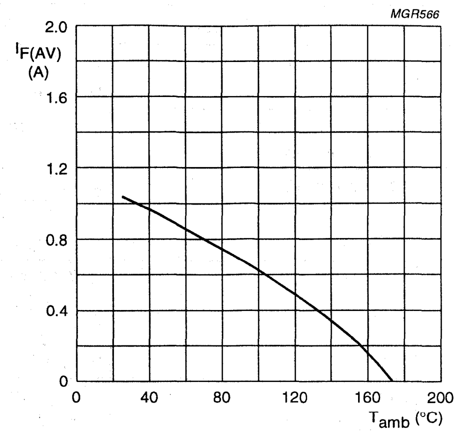
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.12. For more information please refer to the *'General Part of associated Handbook'*.

GRAPHICAL DATA



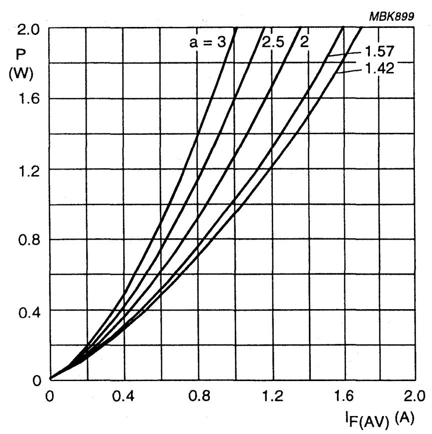
Switched mode application.
a = 1.42; δ = 0.5; $V_R = V_{RRMmax}$.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



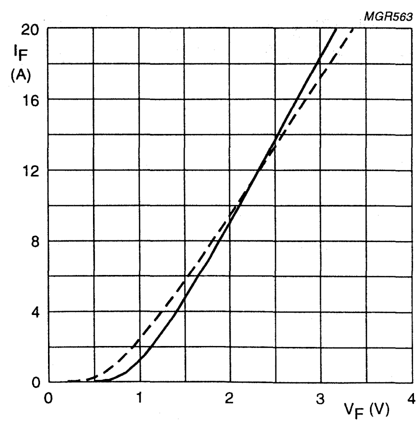
Switched mode application.
a = 1.42; δ = 0.5; $V_R = V_{RRMmax}$.
Device mounted as shown in Fig.12.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



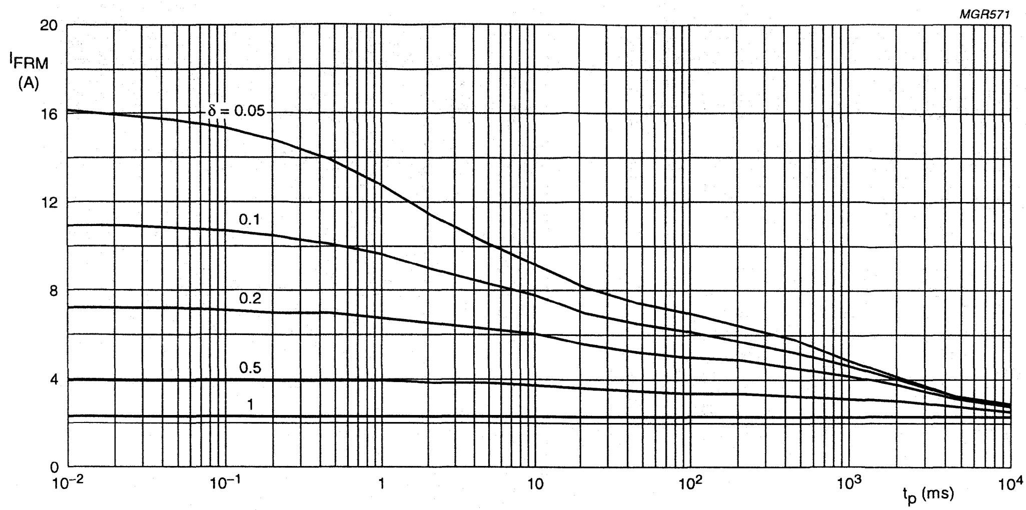
a = $I_{F(RMS)}/I_{F(AV)}$; δ = 0.5; $V_R = V_{RRMmax}$.

Fig.4 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



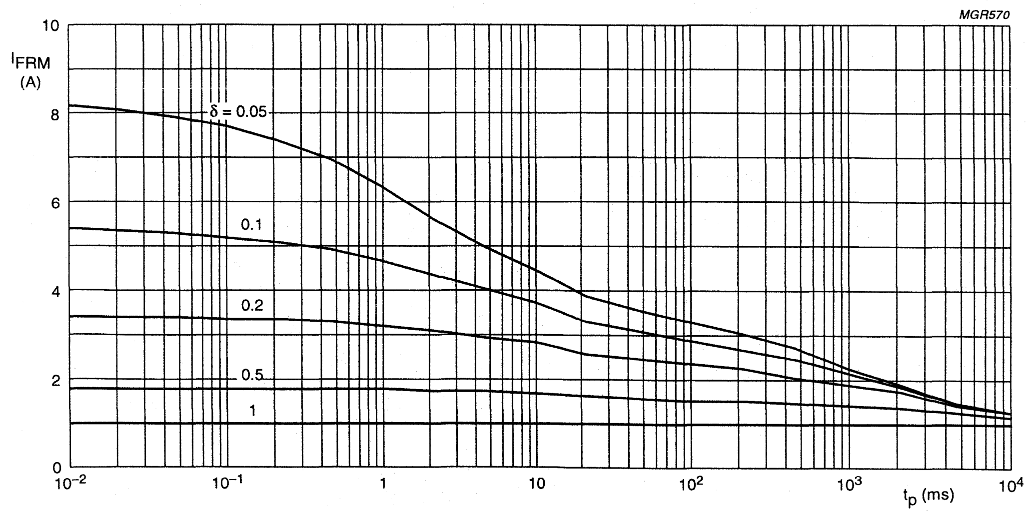
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.5 Maximum forward voltage as a function of forward current.



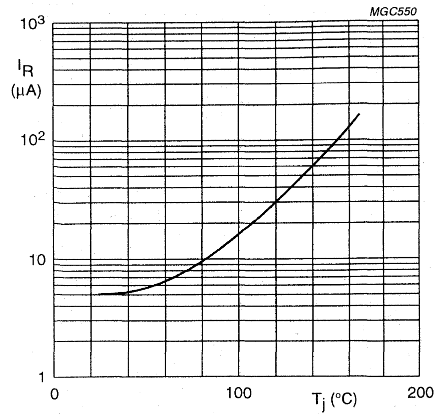
T_{tp} = 105 °C; $R_{th\ j\text{-}tp}$ = 30 K/W; $V_R = V_{RRMmax}$ during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 100 V.

Fig.6 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



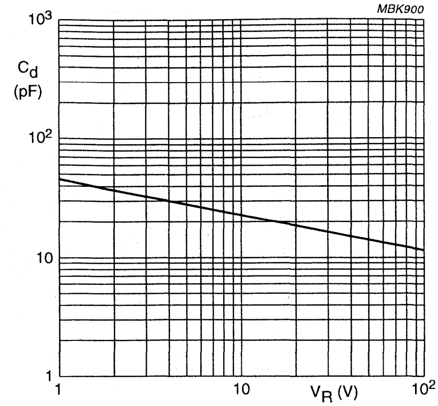
T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 150 K/W; $V_R = V_{RRMmax}$ during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 100 V.

Fig.7 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



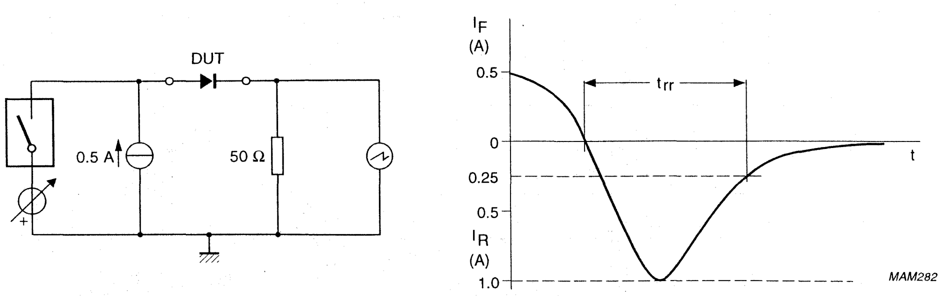
$V_R = V_{RRMmax}$.

Fig.8 Reverse current as a function of junction temperature; maximum values.



f = 1 MHz; T_j = 25 °C.

Fig.9 Diode capacitance as a function of reverse voltage; typical values.



Rise time oscilloscope: $t_r \leq 2$ ns.
Turn-on time switch: $t \leq 3$ ns.

Fig.10 Test circuit and reverse recovery time waveform and definition.

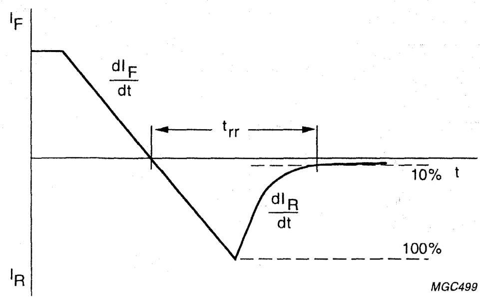
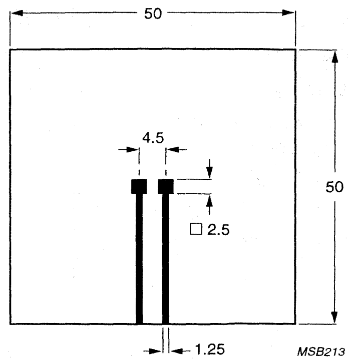


Fig.11 Reverse recovery definitions.



Dimensions in mm.

Fig.12 Device mounted on a printed-circuit board.

Controlled avalanche rectifiers BYG50 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- UL 94V-O classified plastic package
- Shipped in 12 mm embossed tape.

DESCRIPTION

DO-214AC; SOD106 surface mountable package with glass passivated chip.

The well-defined void-free case is of a transfer-moulded thermo-setting plastic.

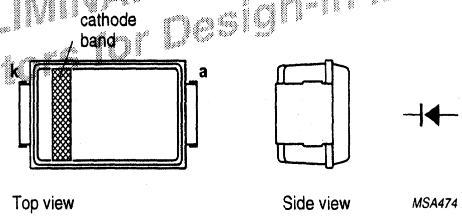


Fig.1 Simplified outline (DO-214AC; SOD106) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYG50D		–	200	V
	BYG50G		–	400	V
	BYG50J		–	600	V
	BYG50K		–	800	V
	BYG50M		–	1 000	V
V_R	continuous reverse voltage				
	BYG50D		–	200	V
	BYG50G		–	400	V
	BYG50J		–	600	V
	BYG50K		–	800	V
	BYG50M		–	1 000	V
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; T_{tp} = 100 °C; see Fig.2	–	2.1	A
		averaged over any 20 ms period; Al_2O_3 PCB mounting (see Fig.7); T_{amb} = 60 °C; see Fig.3	–	1.0	A
		averaged over any 20 ms period; epoxy PCB mounting (see Fig.7); T_{amb} = 60 °C; see Fig.3	–	0.7	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	30	A

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off			
	BYG50D to J		–	10	mJ
	BYG50K and M		–	7	mJ
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature	see Fig.4	−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Fig.5	–	–	0.85	V
		I_F = 1 A; see Fig.5	–	–	1.00	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYG50D		300	–	–	V
	BYG50G		500	–	–	V
	BYG50J		700	–	–	V
	BYG50K		900	–	–	V
	BYG50M		1100	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.6	–	–	1	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.6	–	–	100	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.8	–	2	–	μs

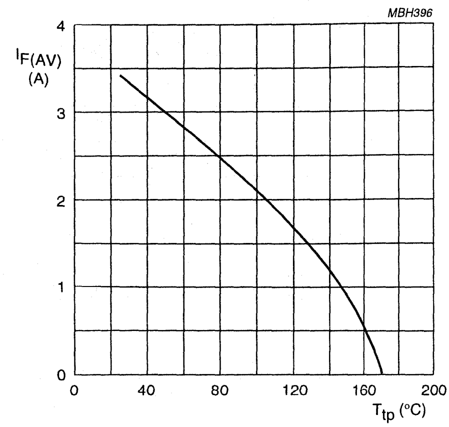
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point		25	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W
		note 2	150	K/W

Notes

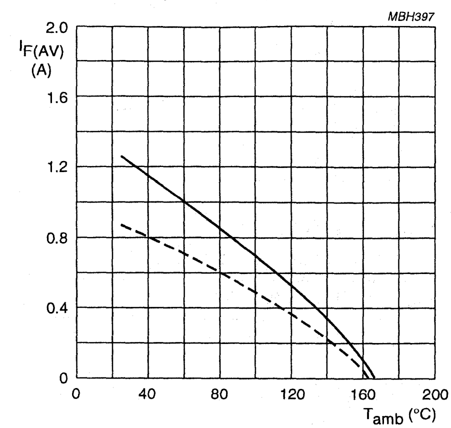
1. Device mounted on Al_2O_3 printed-circuit board, 0.7 mm thick; thickness of copper ≥35 μm, see Fig.7.
2. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.7. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA



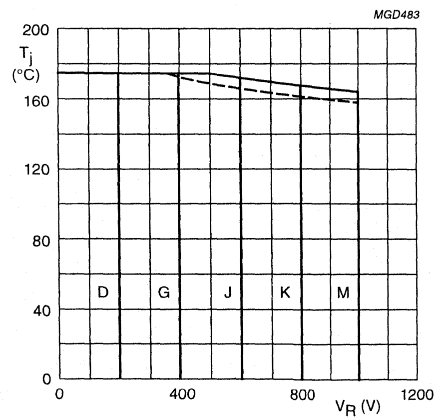
$V_R = V_{RRMmax}$; $\delta = 0.5$; a = 1.57.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



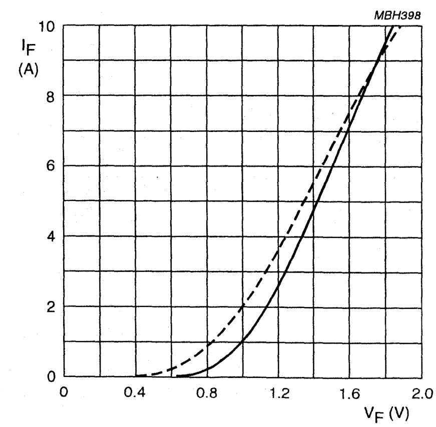
$V_R = V_{RRMmax}$; $\delta = 0.5$; a = 1.57.
Device mounted as shown in Fig.7
Solid line: Al_2O_3 PCB; dotted line: epoxy PCB.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



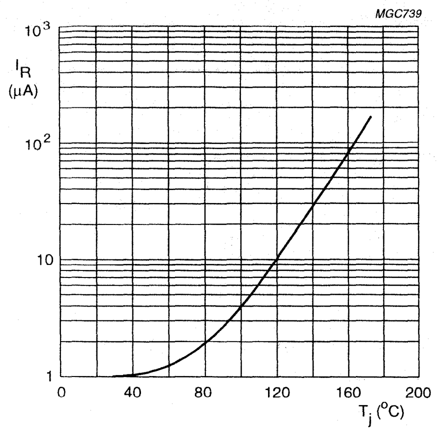
Device mounted as shown in Fig.7.
Solid line: Al_2O_3 PCB.
Dotted line: epoxy PCB.

Fig.4 Maximum permissible junction temperature as a function of reverse voltage.



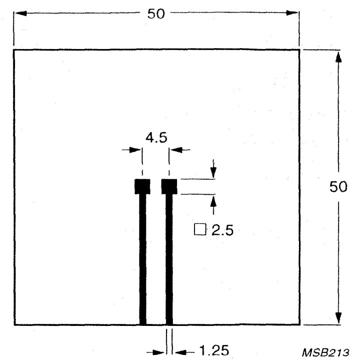
Solid line: T_j = 25 °C.
Dotted line: T_j = 175 °C.

Fig.5 Forward current as a function of forward voltage; maximum values.



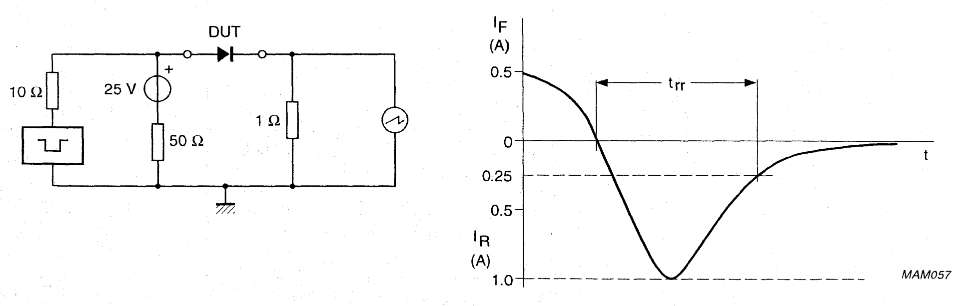
$V_R = V_{RMMmax}$.

Fig.6 Reverse current as a function of junction temperature; maximum values.



Dimensions in mm.

Fig.7 Printed-circuit board for surface mounting.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.8 Test circuit and reverse recovery time waveform and definition.

Fast soft-recovery controlled avalanche rectifiers

BYG60 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- UL 94V-O classified plastic package
- Shipped in 12 mm embossed tape.

DESCRIPTION

DO-214AC surface mountable package with glass passivated chip.

The well-defined void-free case is of a transfer-moulded thermo-setting plastic.

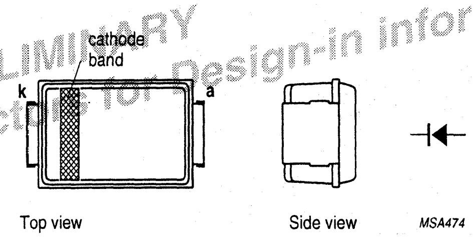


Fig.1 Simplified outline (DO-214AC; SOD106) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYG60D		–	200	V
	BYG60G		–	400	V
	BYG60J		–	600	V
	BYG60K		–	800	V
	BYG60M		–	1 000	V
V_R	continuous reverse voltage				
	BYG60D		–	200	V
	BYG60G		–	400	V
	BYG60J		–	600	V
	BYG60K		–	800	V
	BYG60M		–	1 000	V
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; T_{tp} = 100 °C; see Fig.2	–	1.90	A
		averaged over any 20 ms period; Al_2O_3 PCB mounting (see Fig.7); T_{amb} = 60 °C; see Fig.3	–	0.90	A
		averaged over any 20 ms period; epoxy PCB mounting (see Fig.7); T_{amb} = 60 °C; see Fig.3	–	0.65	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	25	A

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off			
	BYG60D to J		–	10	mJ
	BYG60K and M		–	7	mJ
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature	see Fig.4	−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Fig.5	–	–	0.98	V
		I_F = 1 A; see Fig.5	–	–	1.20	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYG60D		300	–	–	V
	BYG60G		500	–	–	V
	BYG60J		700	–	–	V
	BYG60K		900	–	–	V
	BYG60M		1100	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.6	–	–	5	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.6	–	–	100	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.8				
	BYG60D to J		–	–	250	ns
	BYG60K and M		–	–	300	ns
C_d	diode capacitance	V_R = 0 V; f = 1 MHz				
	BYG60D to J		–	30	–	pF
	BYG60K and M		–	25	–	pF

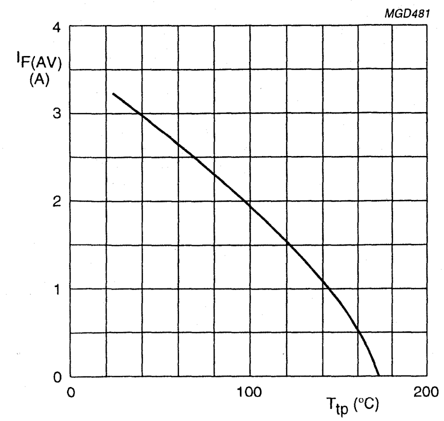
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point		25	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W
		note 2	150	K/W

Notes

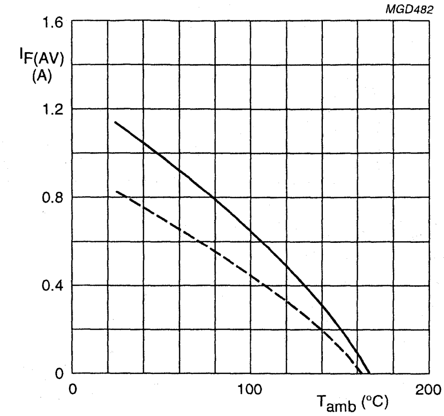
1. Device mounted on Al_2O_3 printed-circuit board, 0.7 mm thick; thickness of copper ≥35 μm, see Fig.7.
2. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.7. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA



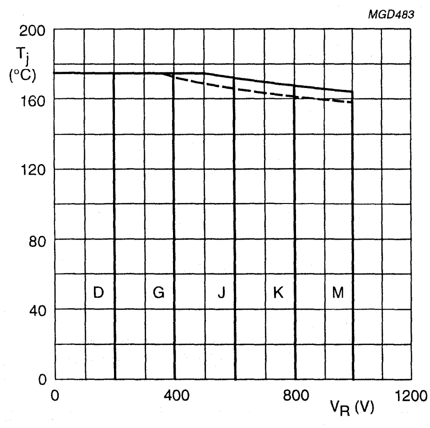
$V_R = V_{RRMmax}$; $\delta = 0.5$; a = 1.57.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



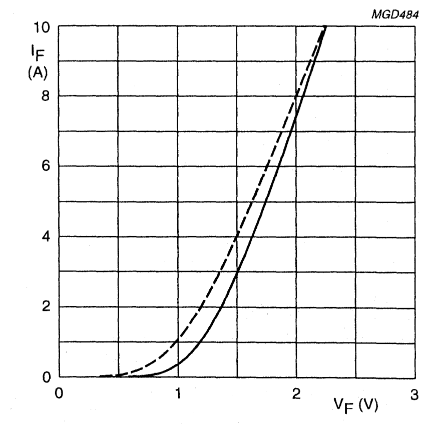
$V_R = V_{RRMmax}$; $\delta = 0.5$; a = 1.57
Device mounted as shown in Fig.7;
solid line: Al_2O_3 PCB; dotted line: epoxy PCB.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



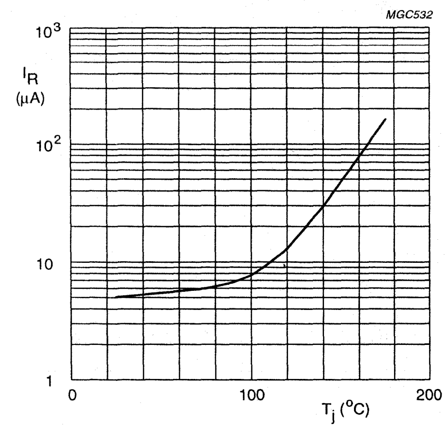
Device mounted as shown in Fig.7
Solid line: Al_2O_3 PCB
Dotted line: epoxy PCB.

Fig.4 Maximum permissible junction temperature as a function of reverse voltage.



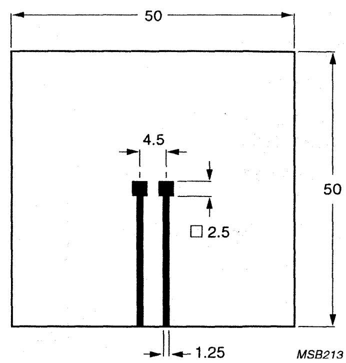
Solid line: T_j = 25 °C.
Dotted line: T_j = 175 °C.

Fig.5 Forward current as a function of forward voltage; maximum values.



$V_R = V_{RMMmax}$.

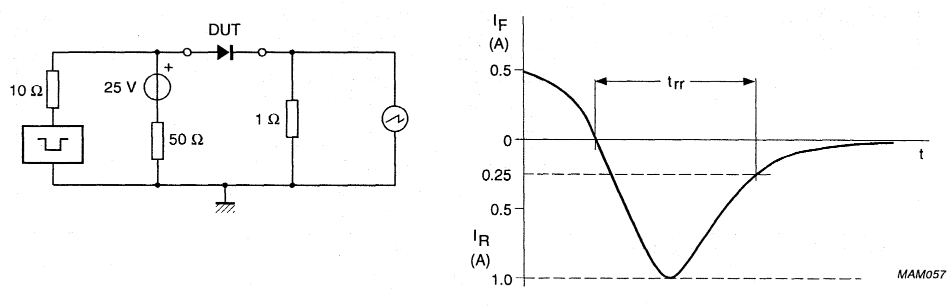
Fig.6 Reverse current as a function of junction temperature; maximum values.



Dimensions in mm.

Material: AL_2O_3 or epoxy-glass.

Fig.7 Printed-circuit board for surface mounting.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.

Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.8 Test circuit and reverse recovery time waveform and definition.

Fast soft-recovery controlled avalanche rectifiers

BYG70 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- UL 94V-O classified plastic package
- Shipped in 12 mm embossed tape.

DESCRIPTION

DO-214AC surface mountable package with glass passivated chip.

The well-defined void-free case is of a transfer-moulded thermo-setting plastic.

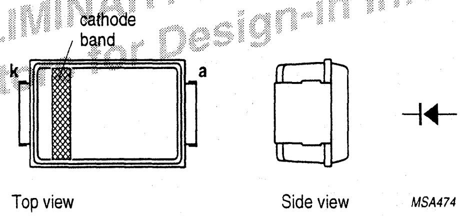


Fig.1 Simplified outline (DO-214AC; SOD106) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYG70D		–	200	V
	BYG70G		–	400	V
	BYG70J		–	600	V
V_R	continuous reverse voltage				
	BYG70D		–	200	V
	BYG70G		–	400	V
	BYG70J		–	600	V
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; T_{tp} = 100 °C; see Fig.2	–	1.00	A
		averaged over any 20 ms period; Al_2O_3 PCB mounting (see Fig.7); T_{amb} = 60 °C; see Fig.3	–	0.53	A
		averaged over any 20 ms period; epoxy PCB mounting (see Fig.7); T_{amb} = 60 °C; see Fig.3	–	0.39	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	20	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	10	mJ
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature	see Fig.4	–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Fig.5	–	–	2.1	V
		I_F = 1 A; see Fig.5	–	–	3.6	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYG70D		300	–	–	V
	BYG70G		500	–	–	V
	BYG70J		700	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.6	–	–	5	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.6	–	–	100	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.8	–	–	30	ns
C_d	diode capacitance	V_R = 0 V; f = 1 MHz	–	30	–	pF

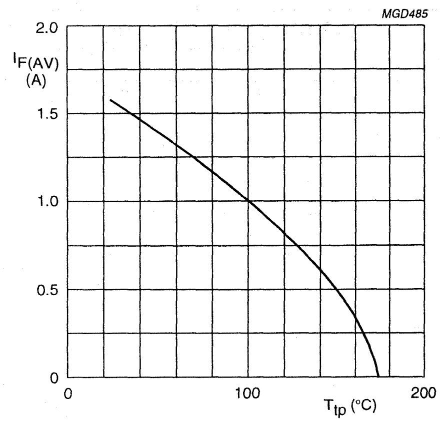
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point		25	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W
		note 2	150	K/W

Notes

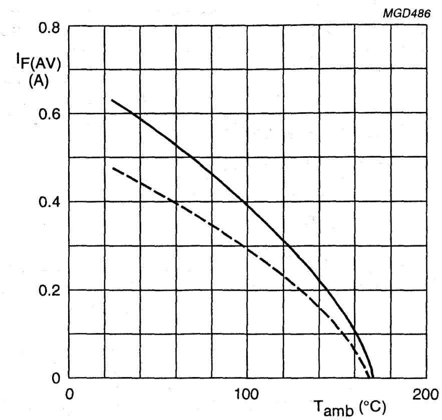
1. Device mounted on Al_2O_3 printed-circuit board, 0.7 mm thick; thickness of copper ≥35 μm, see Fig.7.
2. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.7. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA



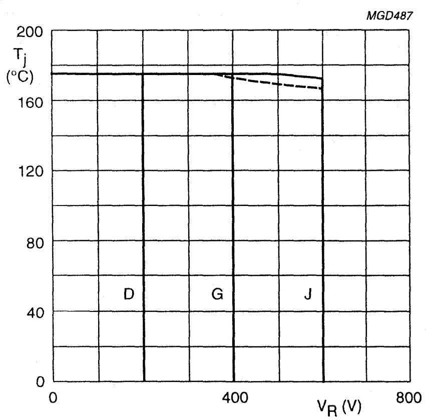
$V_R = V_{RRMmax}$; $\delta = 0.5$; a = 1.57.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



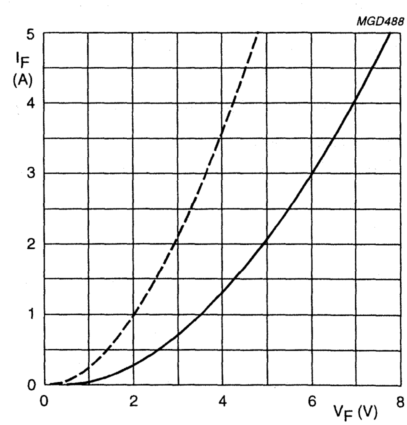
$V_R = V_{RRMmax}$; $\delta = 0.5$; a = 1.57.
Device mounted as shown in Fig.7;
solid line: Al_2O_3 PCB; dotted line: epoxy PCB.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



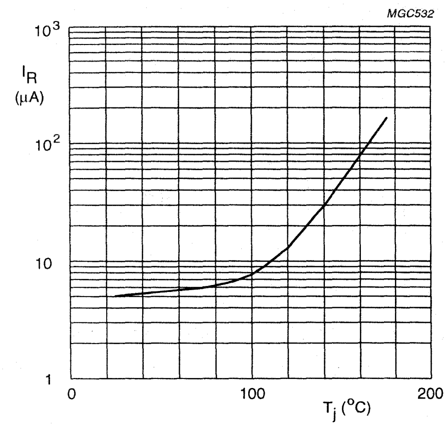
Device mounted as shown in Fig.7.
Solid line: Al_2O_3 PCB.
Dotted line: epoxy PCB.

Fig.4 Maximum permissible junction temperature as a function of reverse voltage.



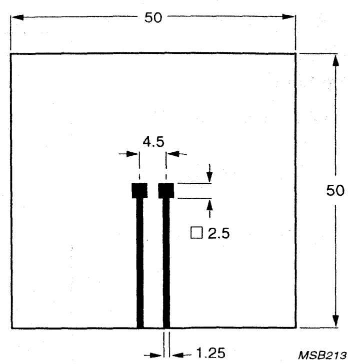
Solid line: $T_j = 25$ °C.
Dotted line: $T_j = 175$ °C.

Fig.5 Forward current as a function of forward voltage; maximum values.



$V_R = V_{RMMmax}$.

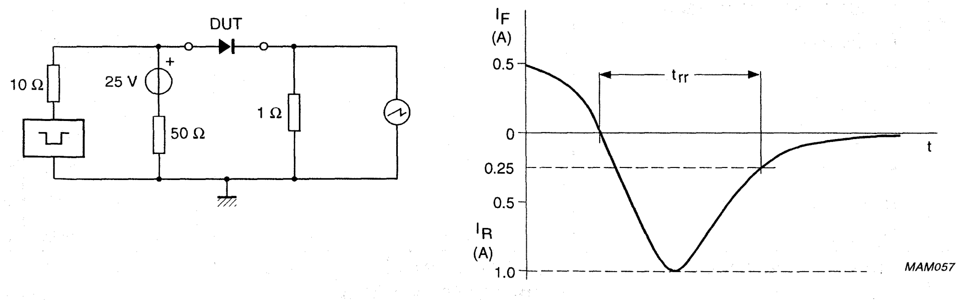
Fig.6 Reverse current as a function of junction temperature; maximum values.



Dimensions in mm.

Material: AL_2O_3 or epoxy-glass.

Fig.7 Printed-circuit board for surface mounting.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.

Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.8 Test circuit and reverse recovery time waveform and definition.

Ultra fast low-loss controlled avalanche rectifiers

BYG80 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- UL 94V-O classified plastic package
- Shipped in 12 mm embossed tape.

DESCRIPTION

DO-214AC surface mountable package with glass passivated chip.

The well-defined void-free case is of a transfer-moulded thermo-setting plastic.

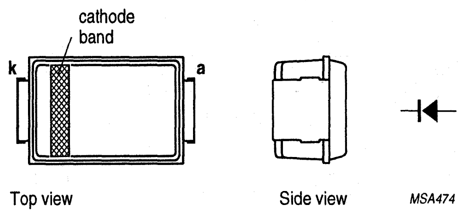


Fig.1 Simplified outline (DO-214AC; SOD106) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYG80A		–	50	V
	BYG80B		–	100	V
	BYG80C		–	150	V
	BYG80D		–	200	V
	BYG80F		–	300	V
	BYG80G		–	400	V
	BYG80J		–	600	V
V_R	continuous reverse voltage				
	BYG80A		–	50	V
	BYG80B		–	100	V
	BYG80C		–	150	V
	BYG80D		–	200	V
	BYG80F		–	300	V
	BYG80G		–	400	V
	BYG80J		–	600	V
$I_{F(AV)}$	average forward current	T_{tp} = 100 °C; see Figs 2, 3 and 4 averaged over any 20 ms period; see also Figs 17, 18 and 19			
	BYG80A to D		–	2.4	A
	BYG80F; BYG80G		–	2.3	A
	BYG80J		–	2.0	A
$I_{F(AV)}$	average forward current	T_{amb} = 60 °C; AL_2O_3 PCB mounting (see Fig.27); see Figs 5, 6 and 7 averaged over any 20 ms period; see also Figs 17, 18 and 19			
	BYG80A to D		–	1.25	A
	BYG80F; BYG80G		–	1.15	A
	BYG80J		–	0.95	A

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{F(AV)}$	average forward current	T_{amb} = 60 °C; epoxy PCB mounting (see Fig.27); see Figs 5, 6 and 7 averaged over any 20 ms period; see also Figs 17, 18 and 19			
	BYG80A to D		–	0.95	A
	BYG80F; BYG80G		–	0.85	A
	BYG80J		–	0.65	A
I_{FRM}	repetitive peak forward current	T_{tp} = 100 °C; see Figs 8, 9 and 10			
	BYG80A to D		–	21	A
	BYG80F; BYG80G		–	21	A
	BYG80J		–	18	A
I_{FRM}	repetitive peak forward current	T_{amb} = 60 °C; AL_2O_3 PCB mounting; see Figs 11, 12 and 13			
	BYG80A to D		–	11	A
	BYG80F; BYG80G		–	11	A
	BYG80J		–	9	A
I_{FRM}	repetitive peak forward current	T_{amb} = 60 °C; epoxy PCB mounting; see Figs 14, 15 and 16			
	BYG80A to D		–	8	A
	BYG80F; BYG80G		–	8	A
	BYG80J		–	6	A
I_{FSM}	non-repetitive peak forward current	t = 8.3 ms half sine wave; T_j = 25 °C prior to surge; $V_R = V_{RRMmax}$			
	BYG80A to D		–	36	A
	BYG80F; BYG80G; BYG80J		–	32	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	10	mJ
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature	see Fig.20	−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Figs 21, 22 and 23				
	BYG80A to D		–	–	0.67	V
	BYG80F; BYG80G		–	–	0.73	V
	BYG80J		–	–	0.96	V
V_F	forward voltage	I_F = 1 A; see Figs 21, 22 and 23				
	BYG80A to D		–	–	0.93	V
	BYG80F; BYG80G		–	–	0.98	V
	BYG80J		–	–	1.20	V

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYG80A		55	–	–	V
	BYG80B		110	–	–	V
	BYG80C		165	–	–	V
	BYG80D		220	–	–	V
	BYG80F		330	–	–	V
	BYG80G		440	–	–	V
	BYG80J		675	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Figs 24 and 25	–	–	10	μA
I_R	reverse current	$V_R = V_{RRMmax}$; T_j = 165 °C; see Figs 24 and 25				
	BYG80A to D		–	–	100	μA
	BYG80F; BYG80G and J		–	–	150	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.29				
	BYG80A to D		–	–	25	ns
	BYG80F; BYG80G and J		–	–	50	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0; see Fig.26				
	BYG80A to D		–	90	–	pF
	BYG80F; BYG80G		–	70	–	pF
	BYG80J		–	65	–	pF
$\left\lvert\frac{dI_R}{dt}\right\rvert$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq 30$ V and dI_F/dt = −1 A/μs; see Fig.28				
	BYG80A to D		–	–	3	A/μs
	BYG80F; BYG80G and J		–	–	4	A/μs

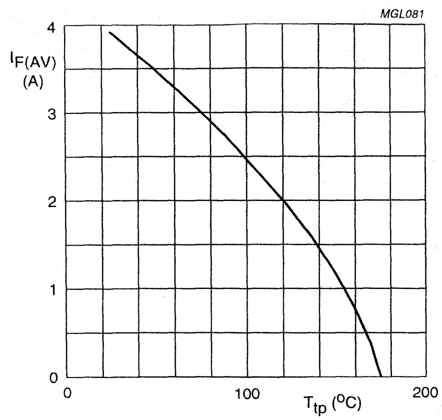
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point		25	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W
		note 2	150	K/W

Notes

1. Device mounted on Al_2O_3 printed-circuit board, 0.7 mm thick; thickness of copper ≥35 μm, see Fig.27.
2. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.27. For more information please refer to the *'General Part of Handbook SC01'*.

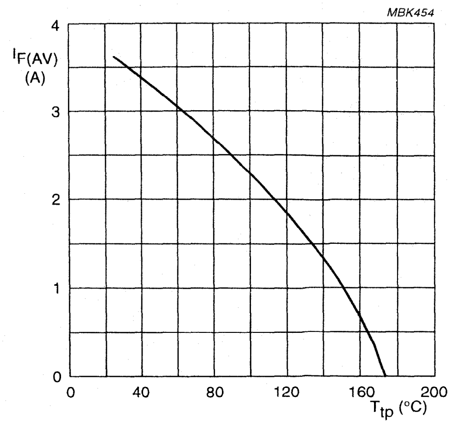
GRAPHICAL DATA



BYG80A to D

Switched mode application; $V_R = V_{RRMmax}$; $\delta = 0.5$; a = 1.42.

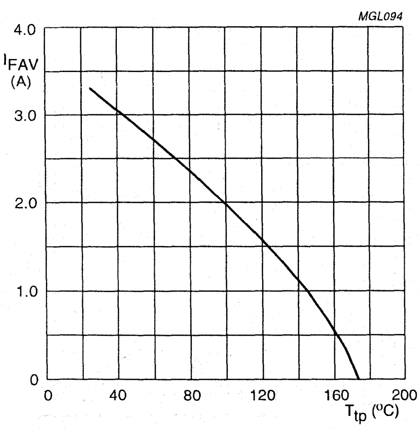
Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



BYG80F and G

Switched mode application; $V_R = V_{RRMmax}$; $\delta = 0.5$; a = 1.42.

Fig.3 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).

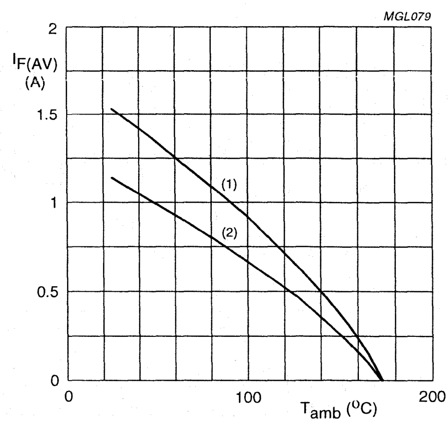


BYG80J

Switched mode application.

$V_R = V_{RRMmax}$; $\delta = 0.5$; a = 1.42.

Fig.4 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



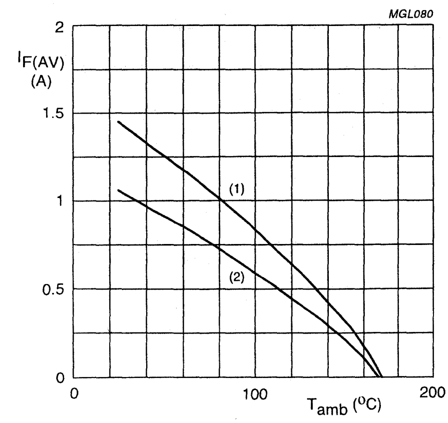
BYG80A to D

Switched mode application; $V_R = V_{RRMmax}$; $\delta = 0.5$; a = 1.42

Device mounted as shown in Fig.27;

1: Al_2O_3 PCB; 2: epoxy PCB.

Fig.5 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



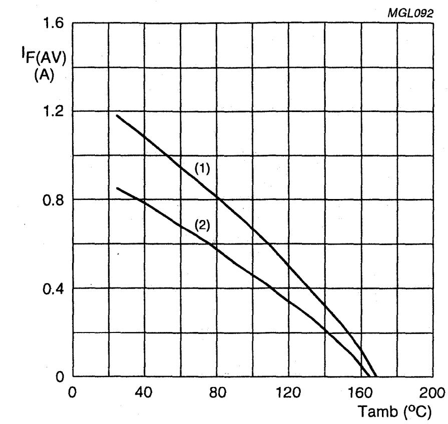
BYG80F and G

Switched mode application; $V_R = V_{RRMmax}$; $\delta = 0.5$; a = 1.42

Device mounted as shown in Fig.27;

1: Al_2O_3 PCB; 2: epoxy PCB.

Fig.6 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



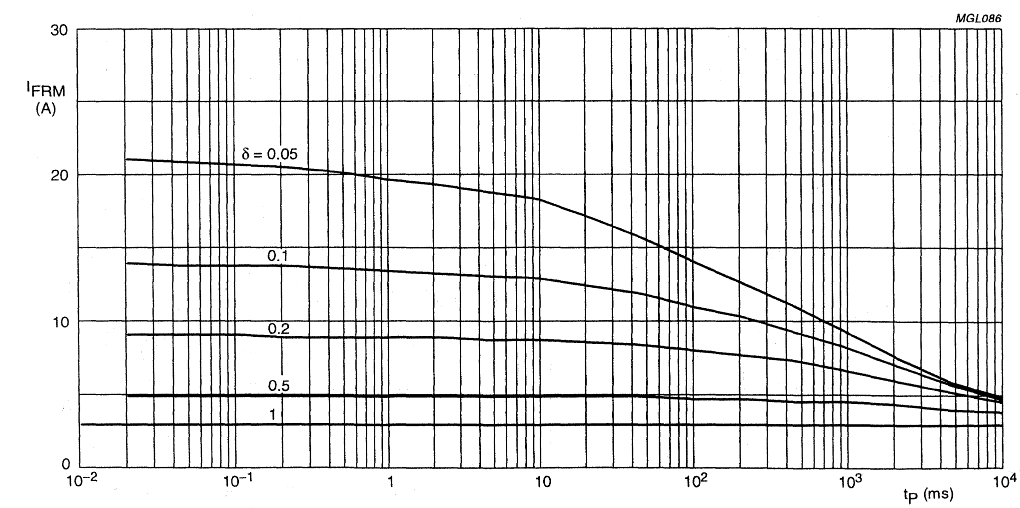
BYG80J

Switched mode application; $V_R = V_{RRMmax}$; $\delta = 0.5$; a = 1.42

Device mounted as shown in Fig.27;

1: Al_2O_3 PCB; 2: epoxy PCB.

Fig.7 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).

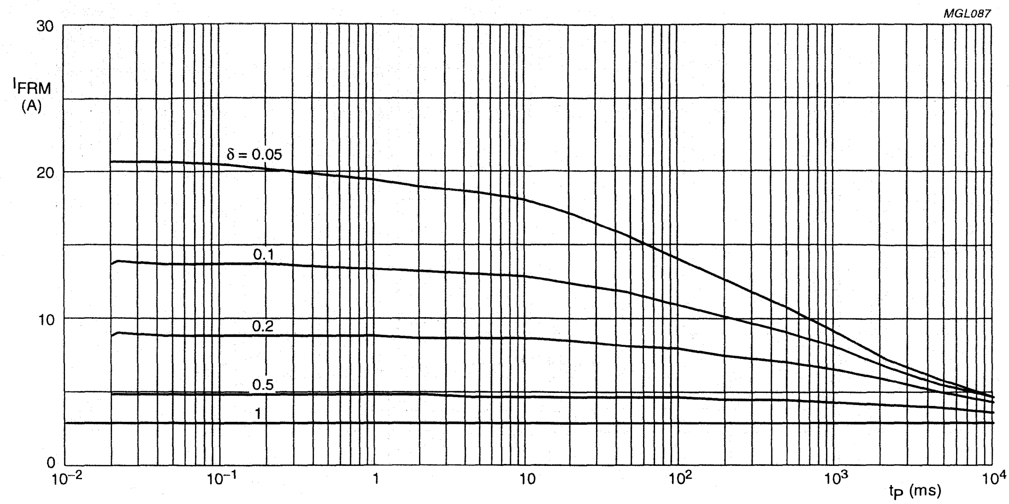


BYG80A to D

T_{tp} = 100 °C; $R_{th\ j\text{-}tp}$ = 25 K/W.

V_{RRMmax} during 1 - δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 200 V.

Fig.8 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

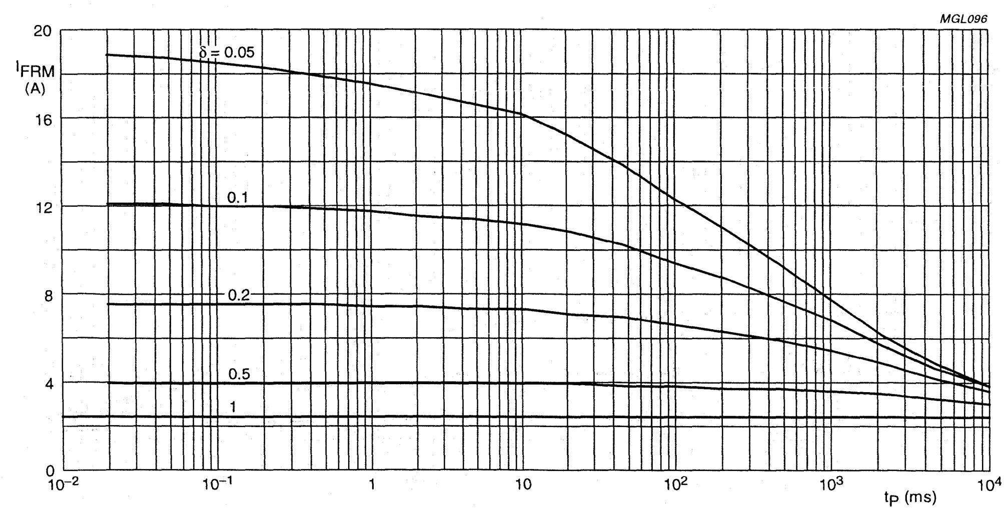


BYGF and G

T_{tp} = 100 °C; $R_{th\ j\text{-}tp}$ = 25 K/W.

V_{RRMmax} during 1 - δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 400 V.

Fig.9 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

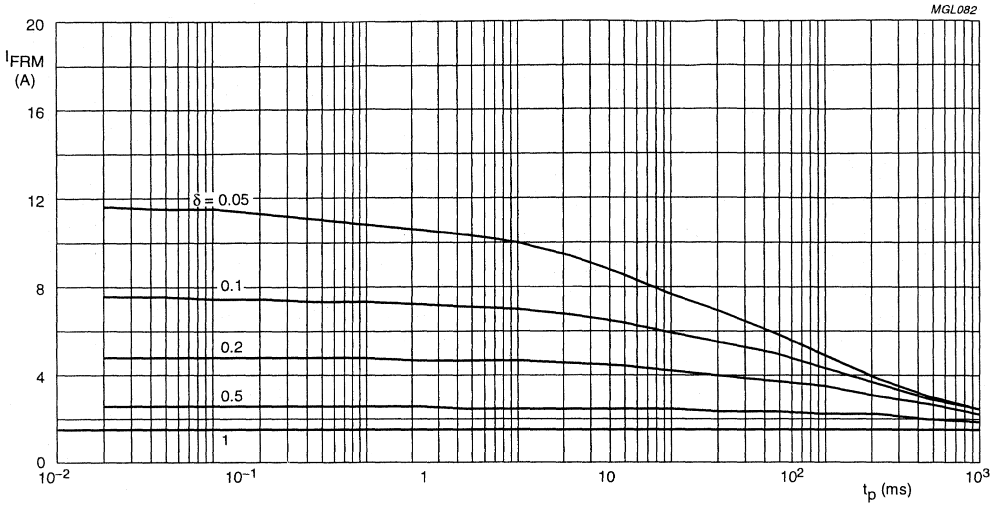


BYG80J

T_{tp} = 100 °C; $R_{th\ j\text{-}tp}$ = 25 K/W.

V_{RRMmax} during 1 - δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 600 V.

Fig.10 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

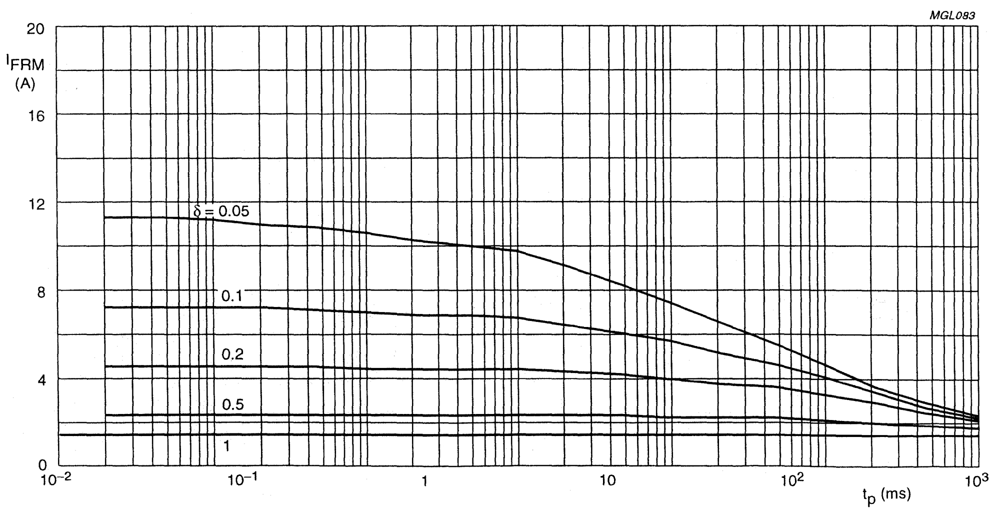


BYG80A to D

T_{amb} = 60 °C; $R_{th\,j\text{-}a}$ = 100 K/W.

V_{RRMmax} during 1 - δ; curves include derating for $T_{j\,max}$ at V_{RRM} = 200 V.

Fig.11 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

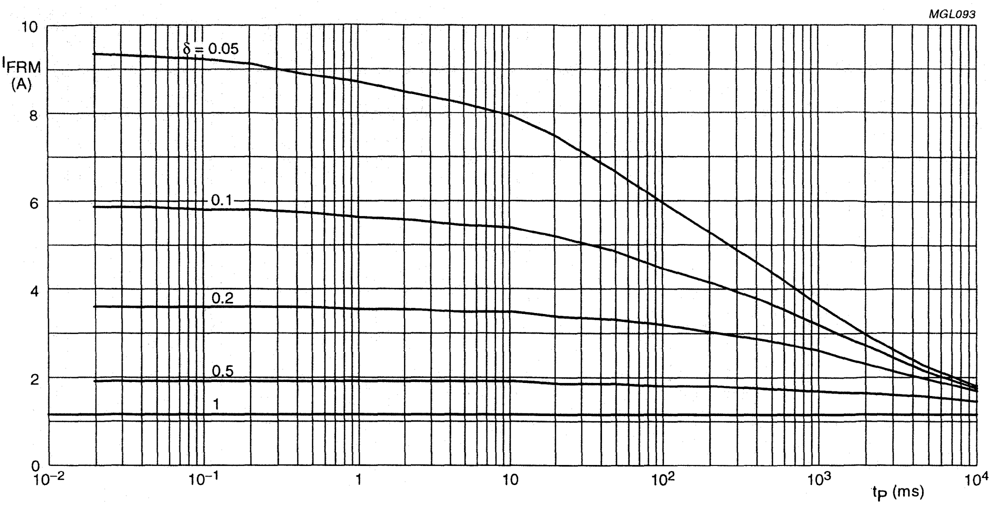


BYG80F and G

T_{amb} = 60 °C; $R_{th\,j\text{-}a}$ = 100 K/W.

V_{RRMmax} during 1 - δ; curves include derating for $T_{j\,max}$ at V_{RRM} = 400 V.

Fig.12 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

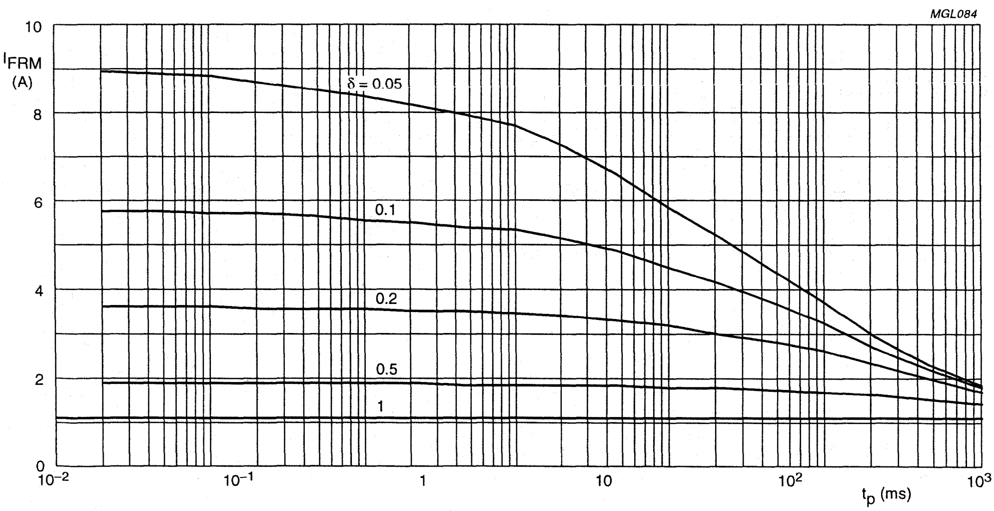


BYG80J

T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 100 K/W.

V_{RRMmax} during 1 - δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 600 V.

Fig.13 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

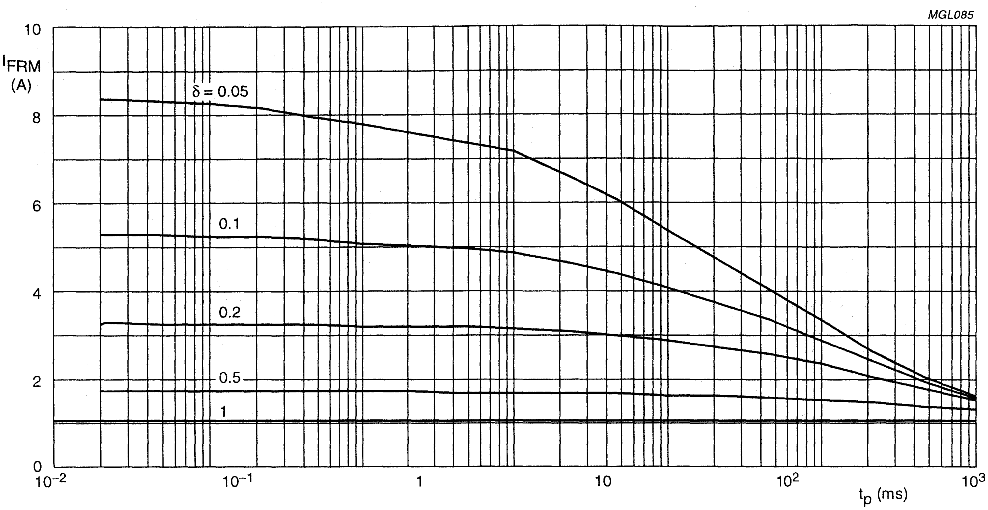


BYG80A to D

T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 150 K/W.

V_{RRMmax} during 1 - δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 200 V.

Fig.14 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

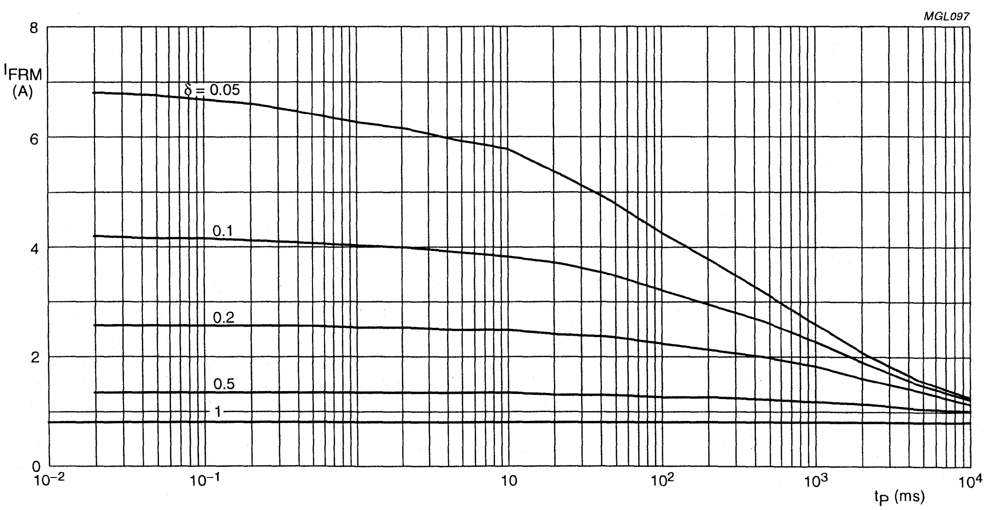


BYG80F and G

T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 150 K/W.

V_{RRMmax} during 1 - δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 400 V.

Fig.15 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



BYG80J

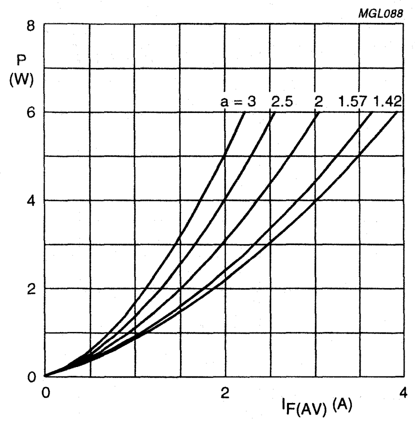
T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 150 K/W.

V_{RRMmax} during 1 - δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 600 V.

Fig.16 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

Ultra fast low-loss controlled avalanche rectifiers

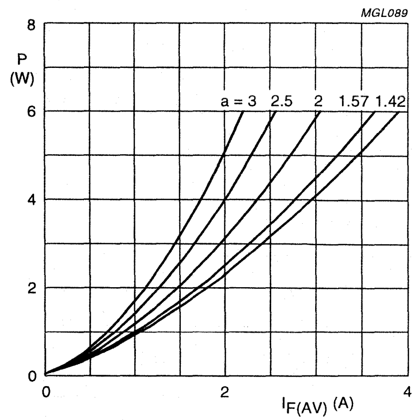
BYG80 series



BYG80A to D

a = $I_{F(RMS)}/I_{F(AV)}$; V_{RRMmax}.

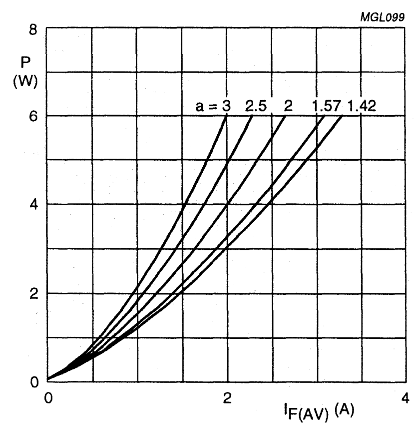
Fig.17 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



BYG80F and G

a = $I_{F(RMS)}/I_{F(AV)}$; V_{RRMmax}.

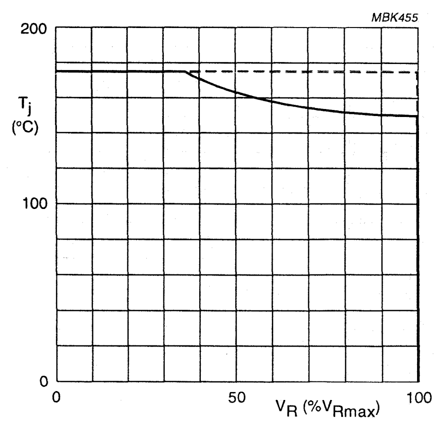
Fig.18 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



BYG80J

a = $I_{F(RMS)}/I_{F(AV)}$; V_{RRMmax}.

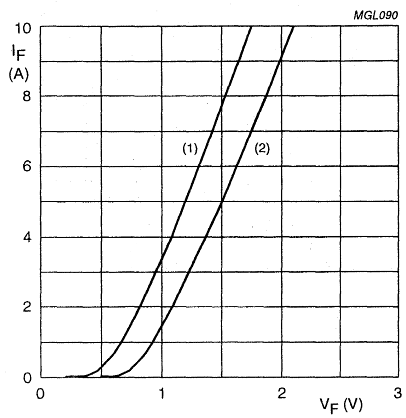
Fig.19 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



Solid line = V_R.

Dotted line = V_{RRM}; δ = 0.5.

Fig.20 Maximum permissible junction temperature as a function of maximum reverse voltage percentage.

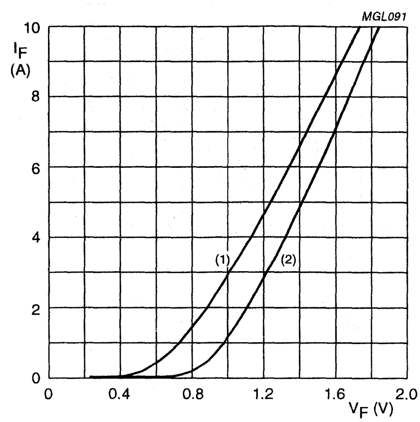


BYG80A to D

(1) $T_j = 175\ °C$.

(2) $T_j = 25\ °C$.

Fig.21 Forward current as a function of forward voltage; maximum values.

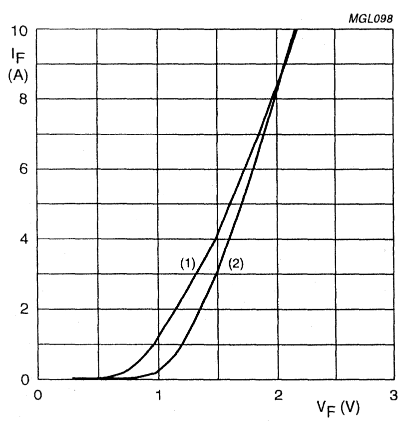


BYG80F and G

(1) $T_j = 175\ °C$.

(2) $T_j = 25\ °C$.

Fig.22 Forward current as a function of forward voltage; maximum values.

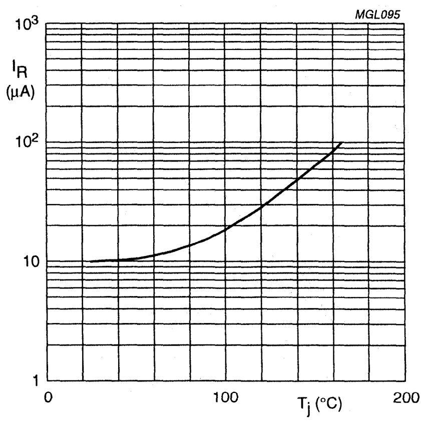


BYG80J

(1) $T_j = 175\ °C$.

(2) $T_j = 25\ °C$.

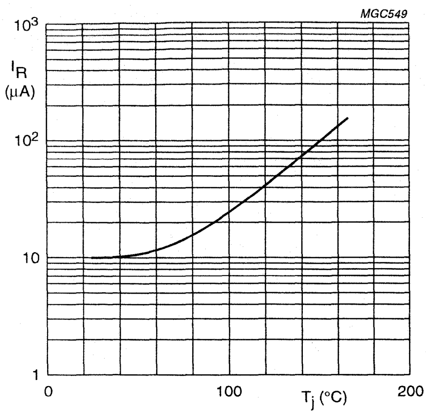
Fig.23 Forward current as a function of forward voltage; maximum values.



BYG80A to D

$V_R = V_{RMMmax}$.

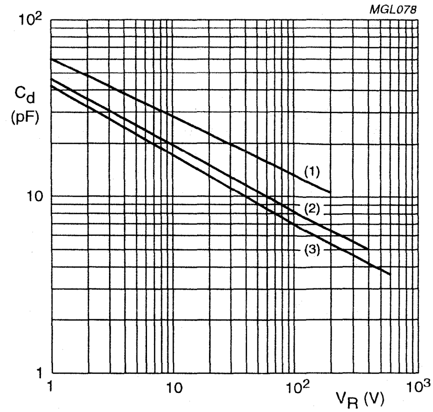
Fig.24 Reverse current as a function of junction temperature; maximum values.



BYG80F to J

$V_R = V_{RMMmax}$.

Fig.25 Reverse current as a function of junction temperature; maximum values.



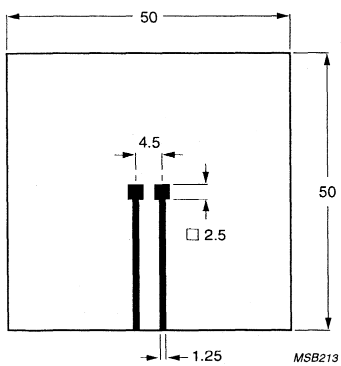
f = 1 MHz; T_j = 25 °C.

(1) **BYG80A to D**

(2) **BYG80F and G**

(3) **BYG80J**

Fig.26 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.27 Printed-circuit board for surface mounting.

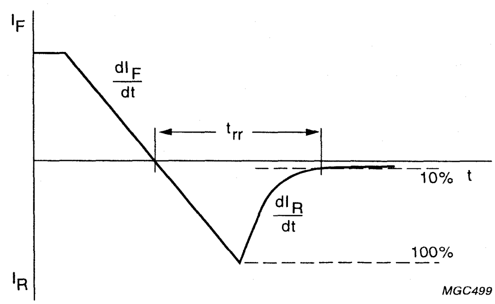
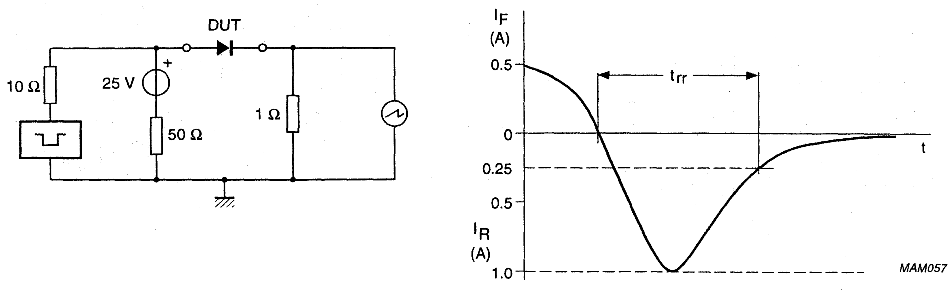


Fig.28 Reverse recovery definitions.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.29 Test circuit and reverse recovery time waveform and definition.

Fast soft-recovery rectifier BYG85B

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- UL 94V-O classified plastic package
- Shipped in 12 mm embossed tape.

DESCRIPTION

DO-214AC surface mountable package with glass passivated chip.

The well-defined void-free case is of a transfer-moulded thermo-setting plastic.

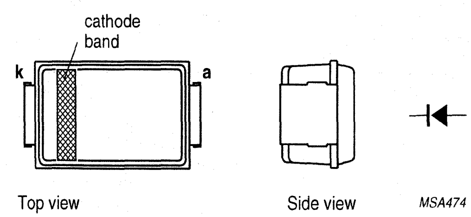


Fig.1 Simplified outline (DO-214AC; SOD106) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	100	V
V_R	continuous reverse voltage		–	100	V
$I_{F(AV)}$	average forward current	T_{tp} = 100 °C; averaged over any 20 ms period; see Figs 2 and 7	–	2.5	A
$I_{F(AV)}$	average forward current	T_{amb} = 60 °C; AL_2O_3 PCB mounting (see Fig.11); averaged over any 20 ms period; see Fig.3	–	1.3	A
$I_{F(AV)}$	average forward current	T_{amb} = 60 °C; epoxy PCB mounting (see Fig.11); averaged over any 20 ms period; see Fig.3	–	0.98	A
I_{FRM}	repetitive peak forward current	T_{tp} = 100 °C; see Fig.3	–	23	A
I_{FRM}	repetitive peak forward current	T_{amb} = 60 °C; AL_2O_3 PCB mounting; see Fig.5	–	12	A
I_{FRM}	repetitive peak forward current	T_{amb} = 60 °C; epoxy PCB mounting; see Fig.6	–	8.5	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	35	A
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature		−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 2 A; $T_j = T_{j\,max}$; see Fig.8	–	–	0.78	V
		I_F = 2 A; see Fig.8	–	–	0.98	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA	120	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.9	–	–	5	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.9	–	–	150	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.13	–	–	12.5	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0; see Fig.10	–	110	–	pF
$\left\|\frac{dI_R}{dt}\right\|$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq$ 30 V and dI_F/dt = −1 A/μs; see Fig.12	–	–	2	A/μs

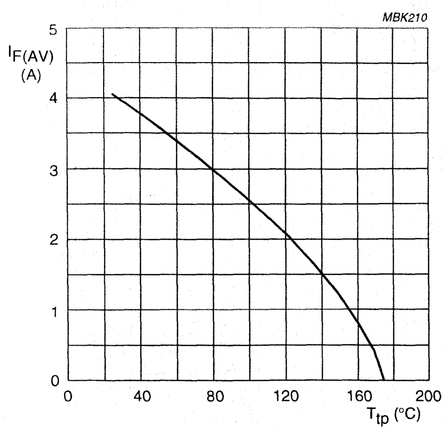
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point		25	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W
		note 2	150	K/W

Notes

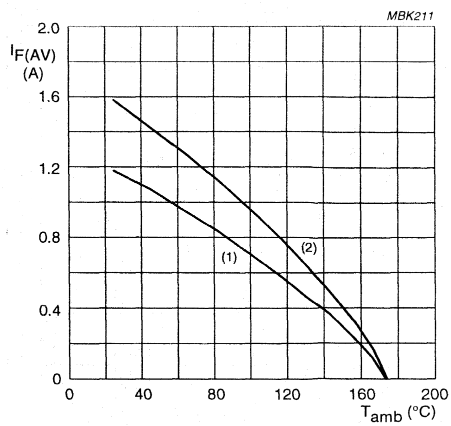
1. Device mounted on Al_2O_3 printed-circuit board, 0.7 mm thick; thickness of copper ≥35 μm, see Fig.11.
2. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.11. For more information please refer to the *'General Part of associated Handbook'*.

GRAPHICAL DATA



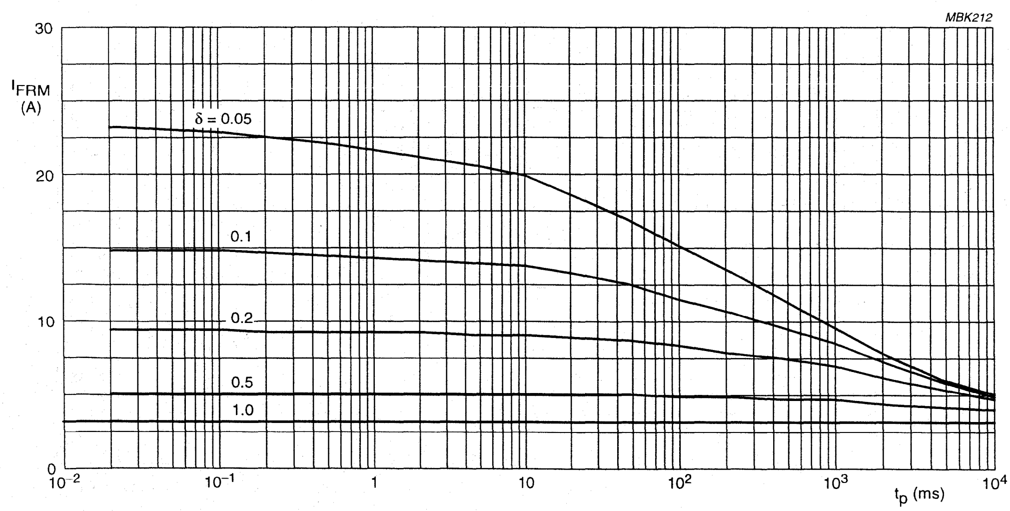
a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.
Switched mode application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



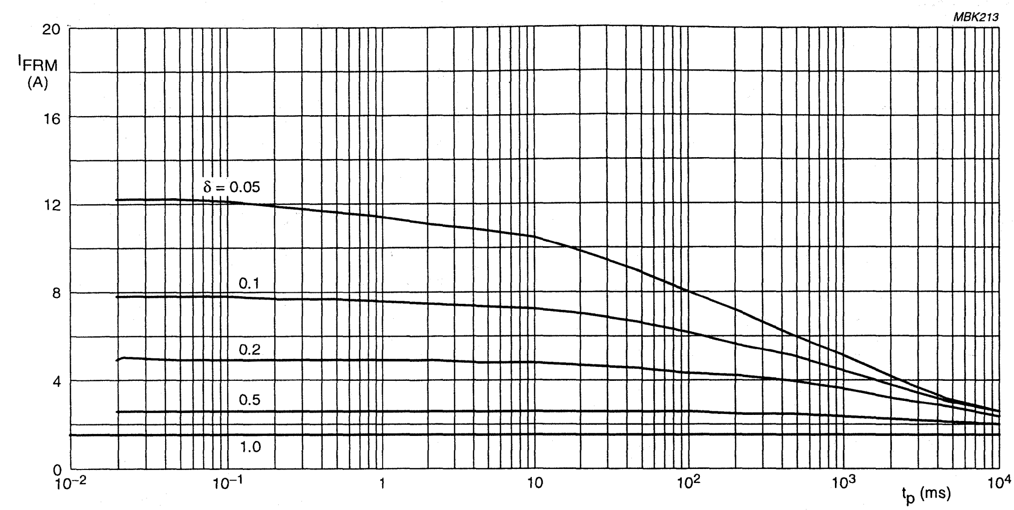
a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$; Switched mode application;
Device mounted as shown in Fig.11.
1: epoxy PCB 2: Al_2O_3 PCB.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



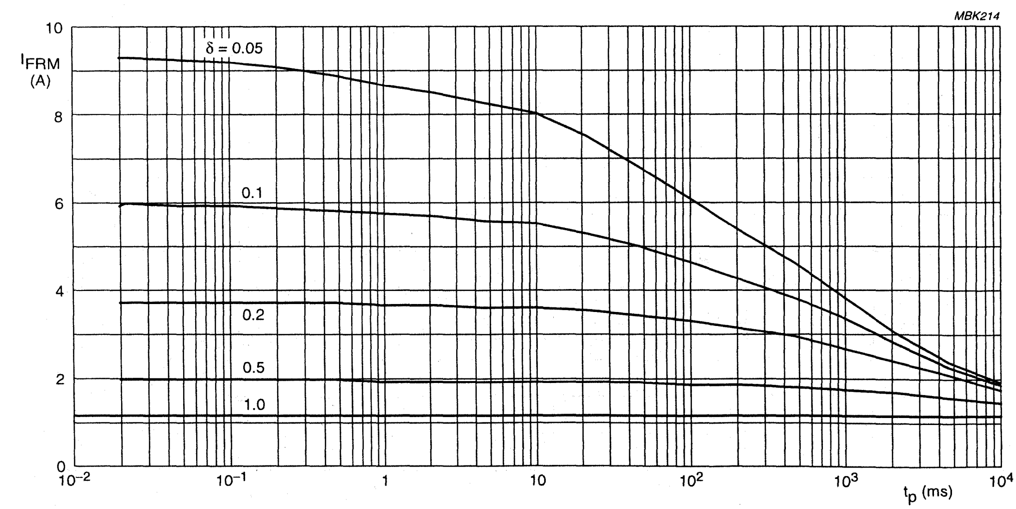
$T_{tp} = 100$ °C; $R_{th\ j\text{-}tp} = 25$ K/W.
V_{RRMmax} during 1 - δ; curves include derating for $T_{j\ max}$ at $V_{RRM} = 100$ V.

Fig.4 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



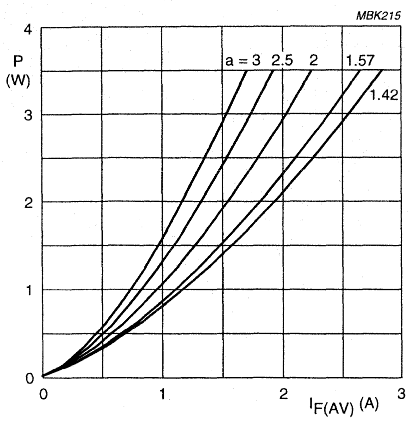
T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 100 K/W.
V_{RRMmax} during 1 - δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 100 V.

Fig.5 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



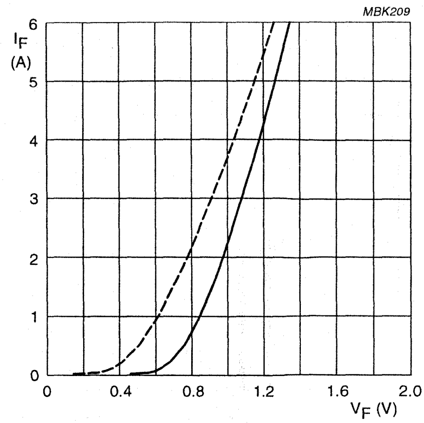
T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 150 K/W.
V_{RRMmax} during 1 - δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 100 V.

Fig.6 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



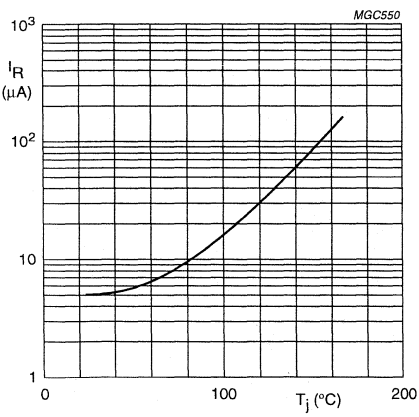
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Fig.7 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



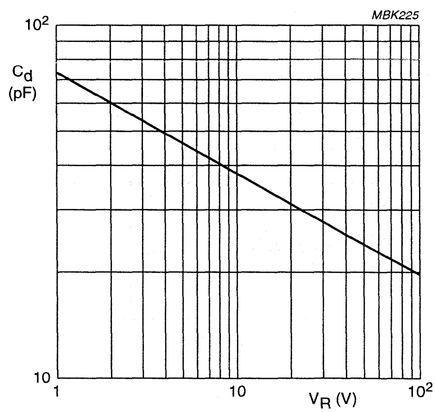
Dotted line: $T_j = 175$ °C.
Solid line: $T_j = 25$ °C.

Fig.8 Forward current as a function of forward voltage; maximum values.



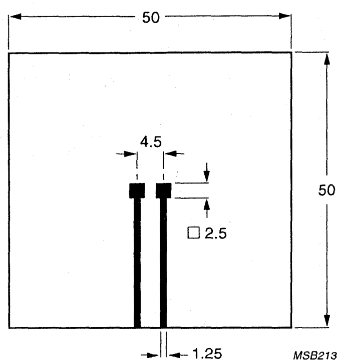
$V_R = V_{RMMmax}$.

Fig.9 Reverse current as a function of junction temperature; maximum values.



f = 1 MHz; $T_j = 25$ °C.

Fig.10 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.11 Printed-circuit board for surface mounting.

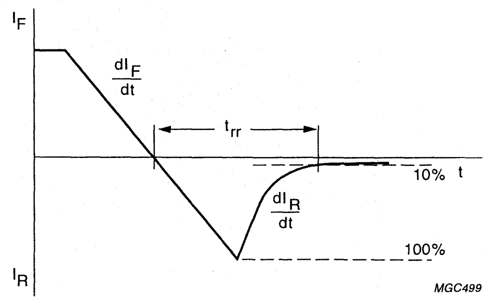
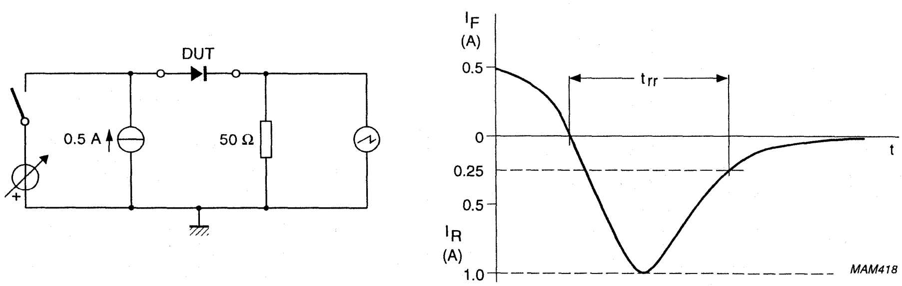


Fig.12 Reverse recovery definitions.



Rise time oscilloscope: $t_r \leq 2$ ns.
Turn-on time switch: $t \leq 3$ ns.

Fig.13 Test circuit and reverse recovery time waveform and definition.

Schottky barrier rectifier diodes | BYG90-40 series

FEATURES

- Low switching losses
- Capability of absorbing very high surge current
- Fast recovery time
- Guard ring protected
- Plastic SMD package.

APPLICATIONS

- Low power switched-mode power supplies
- Rectifying
- Polarity protection.

DESCRIPTION

The BYG 90-40 series consists of Schottky barrier rectifier diodes, fabricated in planar technology, and encapsulated in rectangular SOD106A plastic SMD packages.

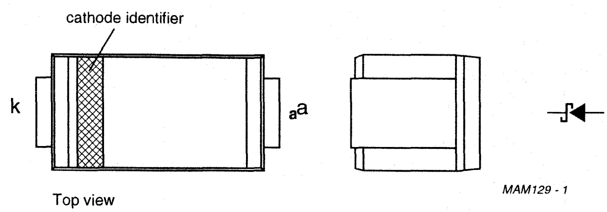


Fig.1 Simplified outline (SOD106A), pin configuration and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per diode					
V_R	continuous reverse voltage				
	BYG90-20		–	20	V
	BYG90-30		–	30	V
	BYG90-40		–	40	V
V_{RRM}	repetitive peak reverse voltage				
	BYG90-20		–	20	V
	BYG90-30		–	30	V
	BYG90-40		–	40	V
V_{RWM}	crest working reverse voltage				
	BYG90-20		–	20	V
	BYG90-30		–	30	V
	BYG90-40		–	40	V
$I_{F(AV)}$	average forward current	T_{amb} = 65 °C; see Fig.2; $R_{th\ j\text{-}a}$ = 80 K/W; note 1; $V_{R(equiv)}$ = 0.2 V; note 2	–	1	A
I_{FSM}	non-repetitive peak forward current	t = 8.3 μs half sine wave; JEDEC method	–	30	A
I_{RSM}	non-repetitive peak reverse current	t_p = 100 μs	–	0.5	A
T_{stg}	storage temperature		−65	+125	°C
T_j	junction temperature		–	125	°C

Notes

1. Refer to SOD106A standard mounting conditions.
2. For Schottky barrier diodes thermal run-away has to be considered, as in some applications, the reverse power losses P_R are a significant part of the total power losses. Nomograms for determination of the reverse power losses P_R and $I_{F(AV)}$ rating will be available on request.

ELECTRICAL CHARACTERISTICS

T_{amb} = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Per diode						
V_F	forward voltage	see Fig.2; note 1				
		I_F = 1 A	–	–	550	mV
		I_F = 3 A	–	–	850	mV
		I_F = 1 A; T_j = 100 °C	–	–	450	mV
I_R	reverse current	$V_R = V_{RRMmax}$; note 1; see Fig.3	–	–	1	mA
		$V_R = V_{RRMmax}$; T_j = 100 °C; note 1; see Fig.3	–	–	10	mA
C_d	diode capacitance	V_R = 4 V; f = 1 MHz; see Fig.4	–	–	75	pF

Note

1. Pulsed test: t_p = 300 μs; δ = 0.02.

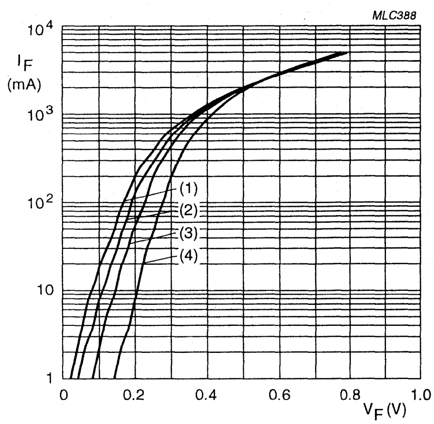
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	80	K/W

Note

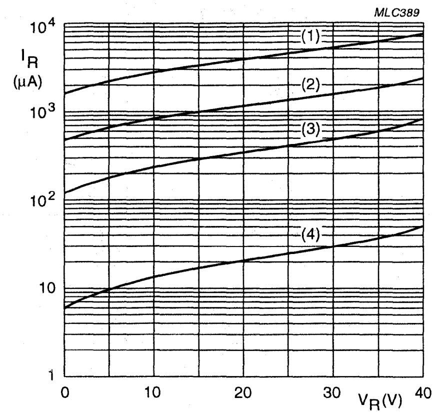
1. Refer to SOD106A standard mounting conditions.

GRAPHICAL DATA



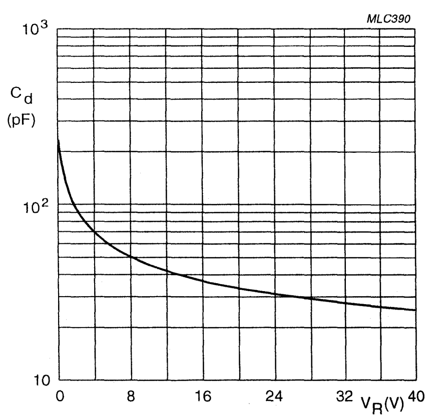
(1) T_{amb} = 125 °C.
(2) T_{amb} = 100 °C.
(3) T_{amb} = 75 °C.
(4) T_{amb} = 25 °C.

Fig.2 Forward current as a function of forward voltage; typical values.



(1) T_{amb} = 125 °C.
(2) T_{amb} = 100 °C.
(3) T_{amb} = 75 °C.
(4) T_{amb} = 25 °C.

Fig.3 Reverse current as a function of reverse voltage; typical values.



f = 1 MHz.

Fig.4 Diode capacitance as a function of reverse voltage; typical values.

Schottky barrier rectifier diode — BYG90-90

FEATURES

- Low switching losses
- High breakdown voltage
- Capability of absorbing very high surge current
- Fast recovery time
- Guard ring protected
- Plastic SMD package.

APPLICATIONS

- Low power switched-mode power supplies
- Rectifying
- Polarity protection.

DESCRIPTION

The BYG 90-90 is a Schottky barrier rectifier diode, fabricated in planar technology, and encapsulated in the rectangular SOD106A plastic SMD package.

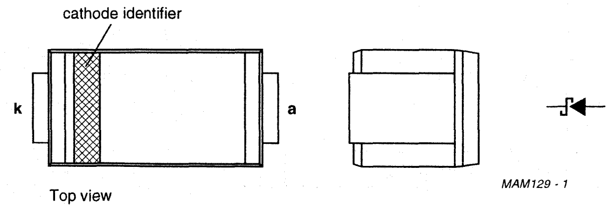


Fig.1 Simplified outline (SOD106A) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_R	continuous reverse voltage			90	V
V_{RRM}	repetitive peak reverse voltage			90	V
V_{RWM}	crest working reverse voltage			90	V
$I_{F(AV)}$	average forward current	T_{amb} = 100 °C; see Fig.2; $R_{th\ j\text{-}a}$ = 13.5 K/W; note 1; $V_{R(equiv)}$ = 0.2 V; note 2	–	1	A
I_{FSM}	non-repetitive peak forward current	t = 8.3 ms half sine wave; JEDEC method	–	30	A
I_{RSM}	non-repetitive peak reverse current	t_p = 100 µs	–	0.5	A
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C

Notes

1. Refer to SOD106A standard mounting conditions.
2. For Schottky barrier diodes thermal run-away has to be considered, as in some applications, the reverse power losses P_R are a significant part of the total power losses. Nomograms for determination of the reverse power losses P_R and $I_{F(AV)}$ rating will be available on request.

ELECTRICAL CHARACTERISTICS

T_{amb} = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	see Fig.2; note 1				
		I_F = 0.06 A	–	–	360	mV
		I_F = 1 A	–	–	790	mV
		I_F = 1 A; T_j = 100 °C	–	–	690	mV
I_R	reverse current	$V_R = V_{RRMmax}$; note 1; see Fig.3	–	–	0.5	mA
		$V_R = V_{RRMmax}$; T_j = 100 °C; note 1; see Fig.3	–	–	5	mA
C_d	diode capacitance	V_R = 4 V; f = 1 MHz; see Fig.4	–	–	100	pF

Note

1. Pulsed test: t_p = 300 μs; δ = 0.02.

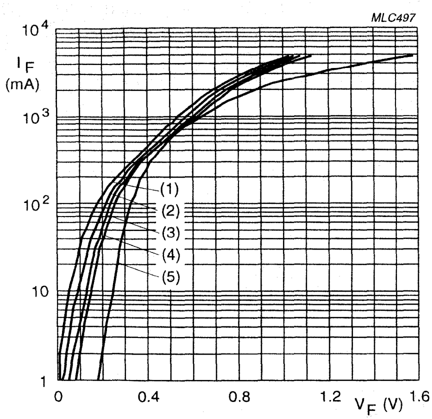
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	80	K/W

Note

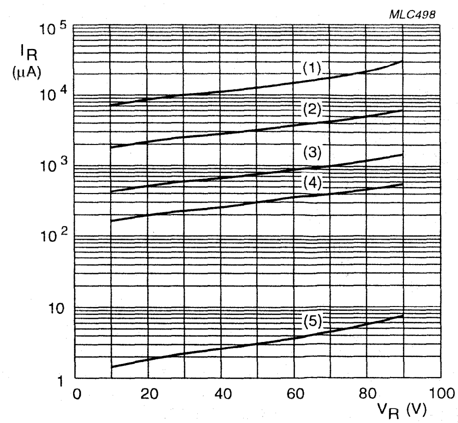
1. Refer to SOD106A standard mounting conditions.

GRAPHICAL DATA



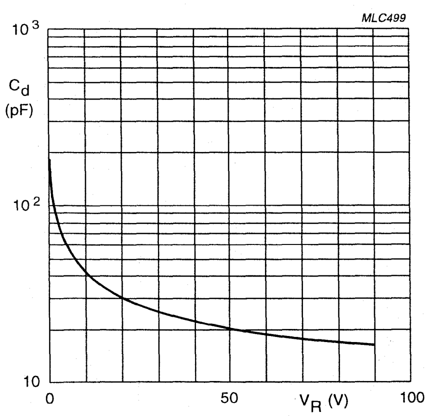
(1) T_{amb} = 150 °C.
(2) T_{amb} = 125 °C.
(3) T_{amb} = 100 °C.
(4) T_{amb} = 85 °C.
(5) T_{amb} = 25 °C.

Fig.2 Forward current as a function of forward voltage; typical values.



(1) T_{amb} = 150 °C.
(2) T_{amb} = 125 °C.
(3) T_{amb} = 100 °C.
(4) T_{amb} = 85 °C.
(5) T_{amb} = 25 °C.

Fig.3 Reverse current as a function of reverse voltage; typical values.



f = 1 MHz.

Fig.4 Diode capacitance as a function of reverse voltage; typical values.

Fast soft-recovery controlled avalanche rectifiers

BYM26 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack
- Also available with preformed leads for easy insertion.

DESCRIPTION

Rugged glass SOD64 package, using a high temperature alloyed construction. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

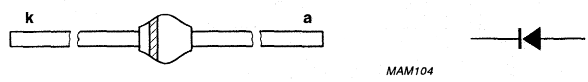


Fig.1 Simplified outline (SOD64) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYM26A		–	200	V
	BYM26B		–	400	V
	BYM26C		–	600	V
	BYM26D		–	800	V
	BYM26E		–	1000	V
	BYM26F		–	1200	V
	BYM26G		–	1400	V
V_R	continuous reverse voltage				
	BYM26A		–	200	V
	BYM26B		–	400	V
	BYM26C		–	600	V
	BYM26D		–	800	V
	BYM26E		–	1000	V
	BYM26F		–	1200	V
	BYM26G		–	1400	V
$I_{F(AV)}$	average forward current	T_{tp} = 55 °C; lead length = 10 mm; see Figs 2 and 3; averaged over any 20 ms period; see also Figs 10 and 11			
	BYM26A to E		–	2.30	A
	BYM26F and G		–	2.40	A
$I_{F(AV)}$	average forward current	T_{amb} = 65 °C; PCB mounting (see Fig.19); see Figs 4 and 5; averaged over any 20 ms period; see also Figs 10 and 11			
	BYM26A to E		–	1.05	A
	BYM26F and G		–	1.00	A

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{FRM}	repetitive peak forward current	T_{tp} = 55 °C; see Figs 6 and 7			
	BYM26A to E		–	19	A
	BYM26F and G		–	21	A
I_{FRM}	repetitive peak forward current	T_{amb} = 65 °C; see Figs 8 and 9			
	BYM26A to E		–	8.0	A
	BYM26F and G		–	8.5	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	45	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	10	mJ
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature	see Figs 12 and 13	−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 2 A; $T_j = T_{j\,max}$; see Figs 14 and 15				
	BYM26A to E		–	–	1.34	V
	BYM26F and G		–	–	1.34	V
V_F	forward voltage	I_F = 2 A; see Figs 14 and 15				
	BYM26A to E		–	–	2.65	V
	BYM26F and G		–	–	2.30	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYM26A		300	–	–	V
	BYM26B		500	–	–	V
	BYM26C		700	–	–	V
	BYM26D		900	–	–	V
	BYM26E		1100	–	–	V
	BYM26F		1300	–	–	V
	BYM26G		1500	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.16	–	–	10	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.16	–	–	150	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.20				
	BYM26A to C		–	–	30	ns
	BYM26D and E		–	–	75	ns
	BYM26F and G		–	–	150	ns

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Figs 17 and 18				
	BYM26A to C		–	85	–	pF
	BYM26D and E		–	75	–	pF
	BYM26F and G		–	65	–	pF
$\left\|\frac{dI_R}{dt}\right\|$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq$ 30 V and dI_F/dt = −1 A/µs; see Fig.21				
	BYM26A to C		–	–	7	A/µs
	BYM26D and E		–	–	6	A/µs
	BYM26F and G		–	–	5	A/µs

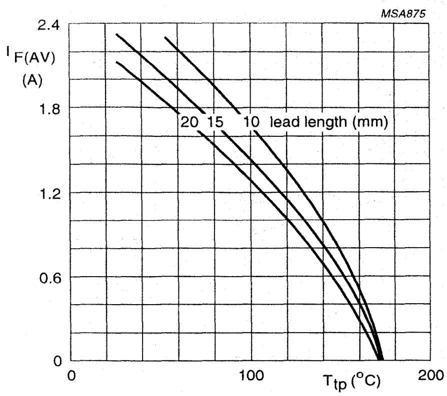
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	25	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	75	K/W

Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm, see Fig.19. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA

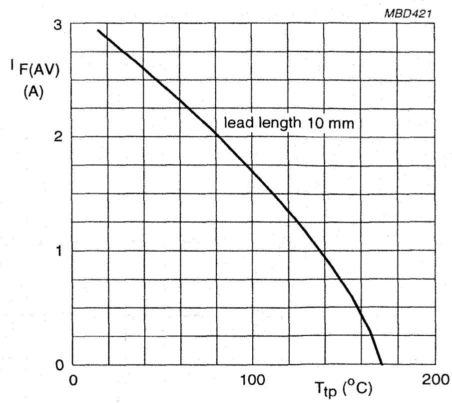


BYM26A to E

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Switched mode application.

Fig.2 Maximum average forward current as a function of tie-point temperature (including losses due to reverse leakage).

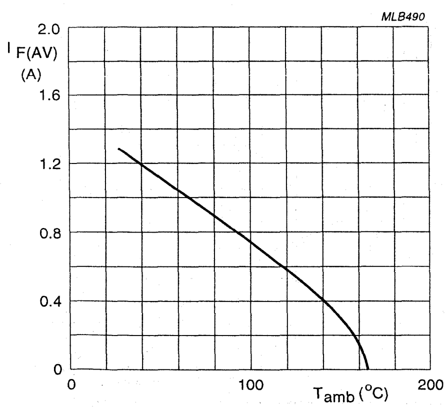


BYM26F and G

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Switched mode application.

Fig.3 Maximum average forward current as a function of tie-point temperature (including losses due to reverse leakage).



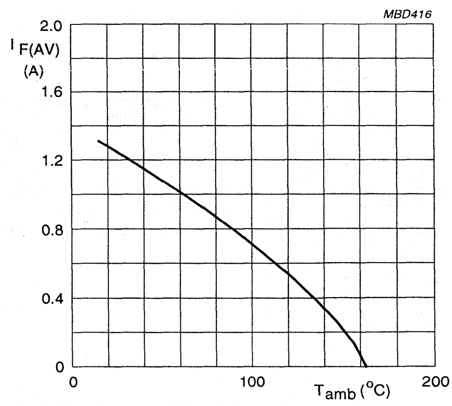
BYM26A to E

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Device mounted as shown in Fig.19.

Switched mode application.

Fig.4 Maximum average forward current as a function of ambient temperature (including losses due to reverse leakage).



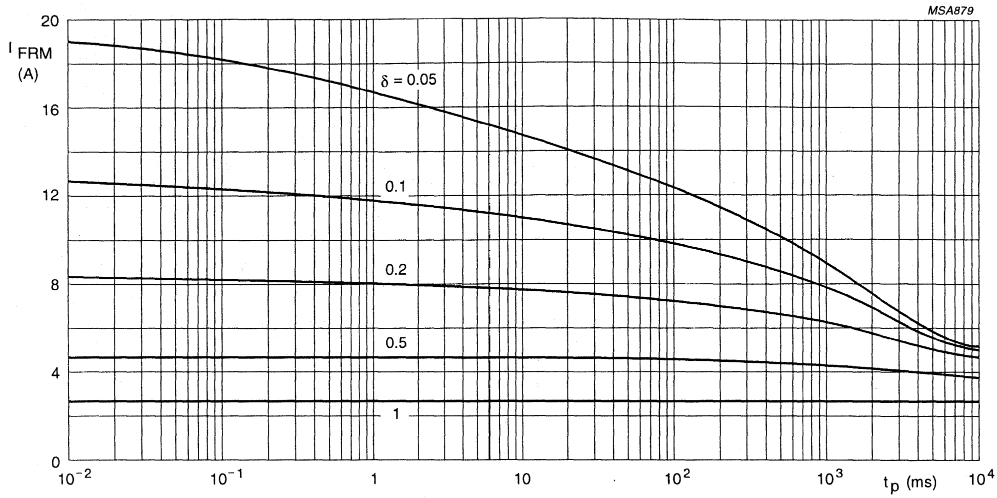
BYM26F and G

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Device mounted as shown in Fig.19.

Switched mode application.

Fig.5 Maximum average forward current as a function of ambient temperature (including losses due to reverse leakage).

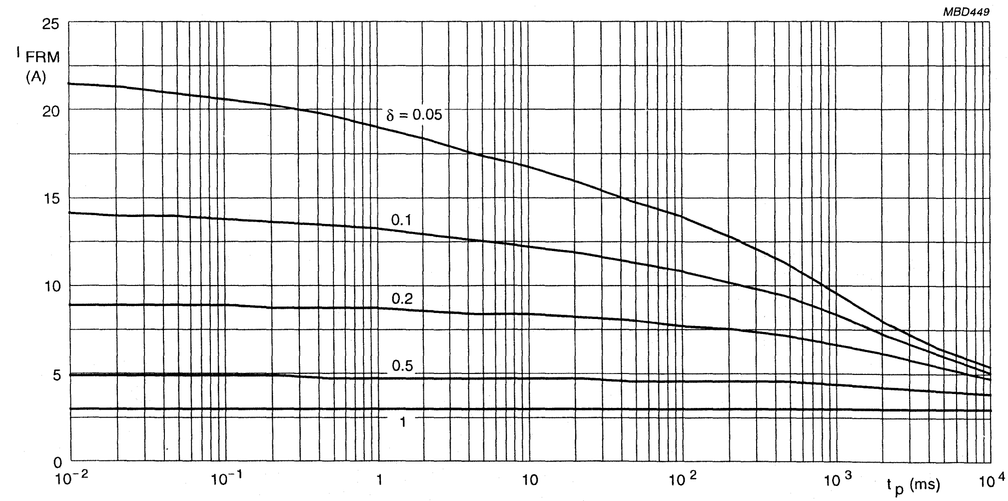


BYM26A to E

T_{tp} = 55°C; $R_{th\ j\text{-}tp}$ = 25 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1000 V.

Fig.6 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

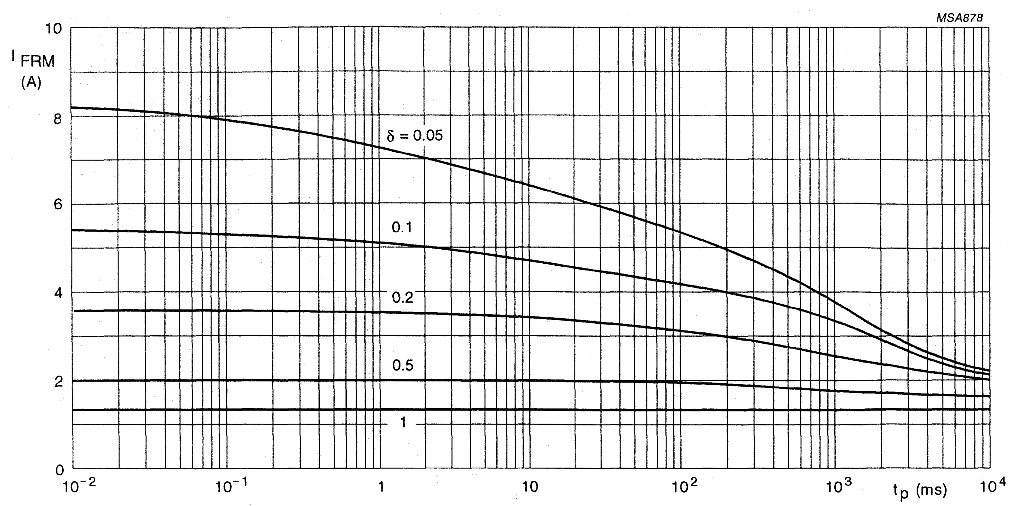


BYM26F and G

T_{tp} = 55°C; $R_{th\ j\text{-}tp}$ = 25 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1400 V.

Fig.7 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

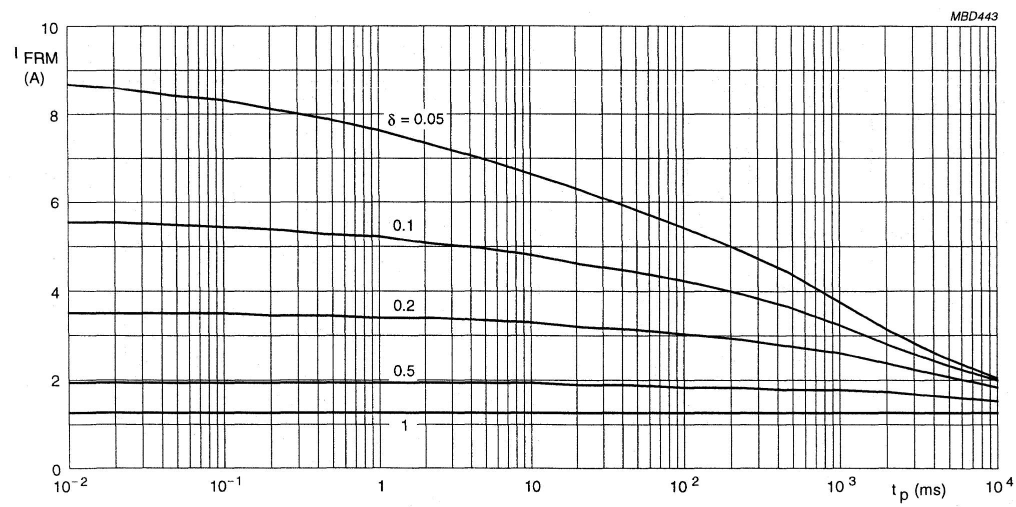


BYM26A to E

T_{amb} = 65 °C; $R_{th\ j\text{-}a}$ = 75 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1000 V.

Fig.8 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

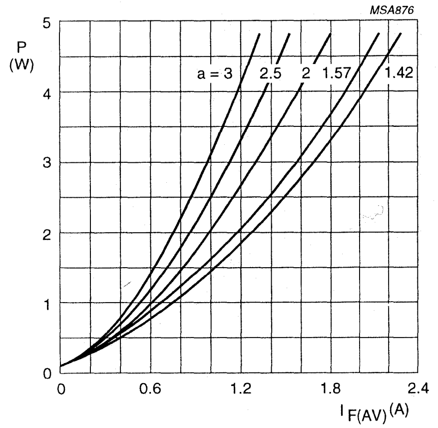


BYM26F and G

T_{amb} = 65 °C; $R_{th\ j\text{-}a}$ = 75 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1400 V.

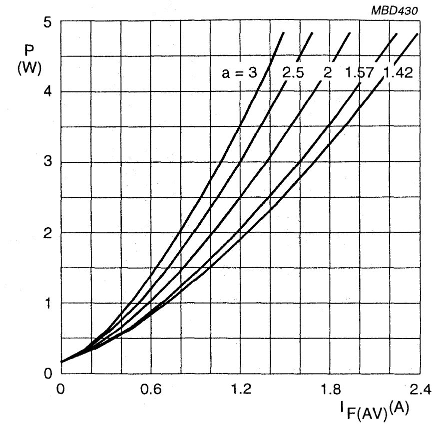
Fig.9 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



BYM26A to E

$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

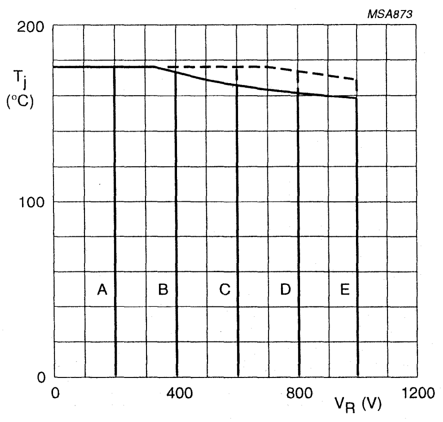
Fig.10 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



BYM26F and G

$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Fig.11 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.

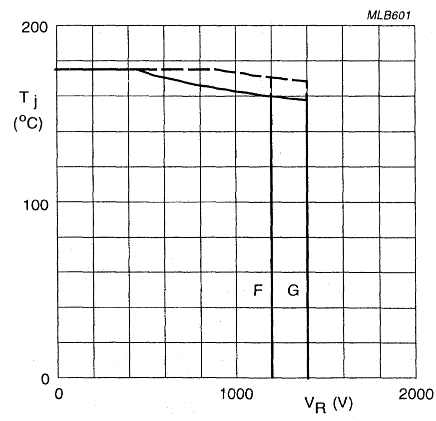


BYM26A to E

Solid line = V_R.

Dotted line = V_{RRM}; $\delta = 0.5$.

Fig.12 Maximum permissible junction temperature as a function of reverse voltage.

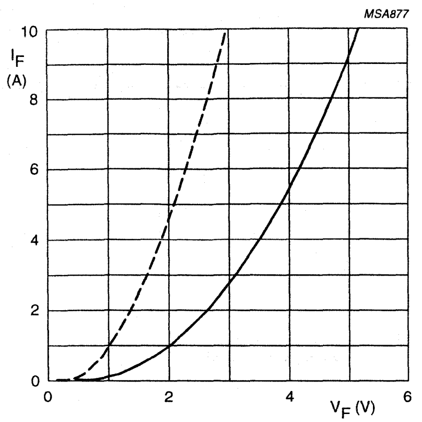


BYM26F and G

Solid line = V_R.

Dotted line = V_{RRM}; $\delta = 0.5$.

Fig.13 Maximum permissible junction temperature as a function of reverse voltage.

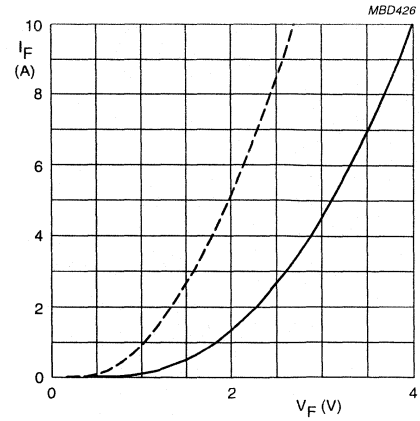


BYM26A to E

Dotted line: T_j = 175 °C.

Solid line: T_j = 25 °C.

Fig.14 Forward current as a function of forward voltage; maximum values.

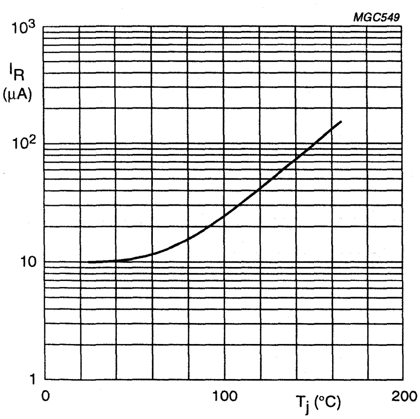


BYM26F and G

Dotted line: T_j = 175 °C.

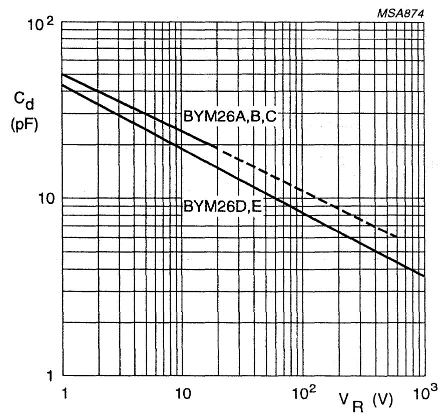
Solid line: T_j = 25 °C.

Fig.15 Forward current as a function of forward voltage; maximum values.



$V_R = V_{RRMmax}$.

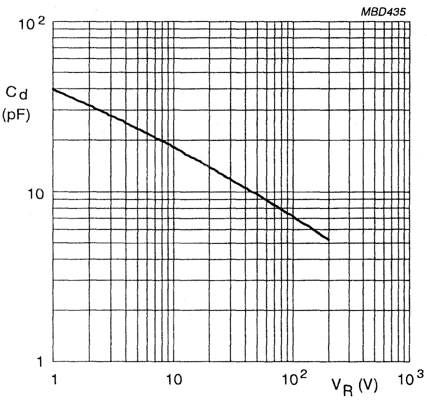
Fig.16 Reverse current as a function of junction temperature; maximum values.



BYM26A to E

f = 1 MHz; T_j = 25 °C.

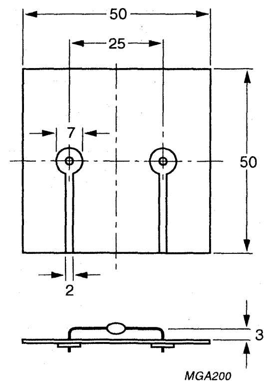
Fig.17 Diode capacitance as a function of reverse voltage; typical values.



BYM26F and G

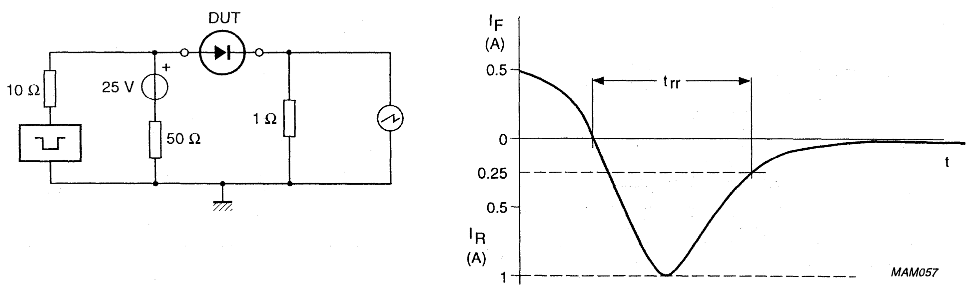
f = 1 MHz; T_j = 25 °C.

Fig.18 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.19 Device mounted on a printed-circuit board.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.

Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.20 Test circuit and reverse recovery time waveform and definition.

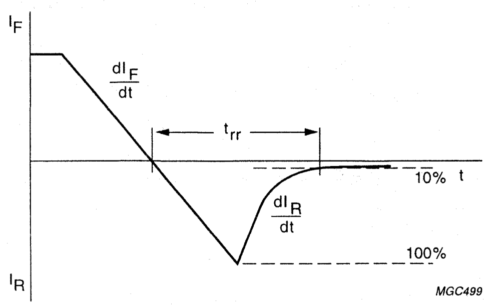


Fig.21 Reverse recovery definitions.

Fast soft-recovery controlled avalanche rectifiers

BYM36 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack
- Also available with preformed leads for easy insertion.

DESCRIPTION

Rugged glass SOD64 package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

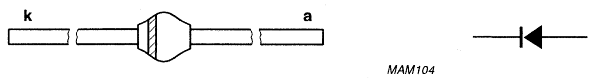


Fig.1 Simplified outline (SOD64) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYM36A		–	200	V
	BYM36B		–	400	V
	BYM36C		–	600	V
	BYM36D		–	800	V
	BYM36E		–	1000	V
	BYM36F		–	1200	V
	BYM36G		–	1400	V
V_R	continuous reverse voltage				
	BYM36A		–	200	V
	BYM36B		–	400	V
	BYM36C		–	600	V
	BYM36D		–	800	V
	BYM36E		–	1000	V
	BYM36F		–	1200	V
	BYM36G		–	1400	V
$I_{F(AV)}$	average forward current	T_{tp} = 55 °C; lead length = 10 mm; see Figs 2; 3 and 4 averaged over any 20 ms period; see also Figs 14; 15 and 16			
	BYM36A to C		–	3.0	A
	BYM36D and E		–	2.9	A
	BYM36F and G		–	2.9	A
$I_{F(AV)}$	average forward current	T_{amb} = 65 °C; PCB mounting (see Fig.25); see Figs 5; 6 and 7 averaged over any 20 ms period; see also Figs 14; 15 and 16			
	BYM36A to C		–	1.25	A
	BYM36D and E		–	1.20	A
	BYM36F and G		–	1.15	A

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{FRM}	repetitive peak forward current	T_{tp} = 55 °C; see Figs 8; 9 and 10			
	BYM36A to C		–	37	A
	BYM36D and E		–	33	A
	BYM36F and G		–	27	A
I_{FRM}	repetitive peak forward current	T_{amb} = 65 °C; see Figs 11; 12 and 13			
	BYM36A to C		–	13	A
	BYM36D and E		–	11	A
	BYM36F and G		–	10	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	65	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	10	mJ
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature	see Figs 17 and 18	–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 3 A; $T_j = T_{j\,max}$; see Figs 19; 20 and 21				
	BYM36A to C		–	–	1.22	V
	BYM36D and E		–	–	1.28	V
	BYM36F and G		–	–	1.24	V
V_F	forward voltage	I_F = 3 A; see Figs 19; 20 and 21				
	BYM36A to C		–	–	1.60	V
	BYM36D and E		–	–	1.78	V
	BYM36F and G		–	–	1.57	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYM36A		300	–	–	V
	BYM36B		500	–	–	V
	BYM36C		700	–	–	V
	BYM36D		900	–	–	V
	BYM36E		1100	–	–	V
	BYM36F		1300	–	–	V
	BYM36G		1500	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.22	–	–	5	µA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.22	–	–	150	µA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
t_{rr}	reverse recovery time	when switched from $I_F = 0.5$ A to $I_R = 1$ A; measured at $I_R = 0.25$ A; see Fig. 26				
	BYM36A to C		–	–	100	ns
	BYM36D and E		–	–	150	ns
	BYM36F and G		–	–	250	ns
C_d	diode capacitance	f = 1 MHz; $V_R = 0$ V; see Figs 23 and 24				
	BYM36A to C		–	85	–	pF
	BYM36D and E		–	75	–	pF
	BYM36F and G		–	65	–	pF
$\left\|\frac{dI_R}{dt}\right\|$	maximum slope of reverse recovery current	when switched from $I_F = 1$ A to $V_R \geq 30$ V and $dI_F/dt = -1$ A/μs; see Fig.27				
	BYM36A to C		–	–	7	A/μs
	BYM36D and E		–	–	6	A/μs
	BYM36F and G		–	–	5	A/μs

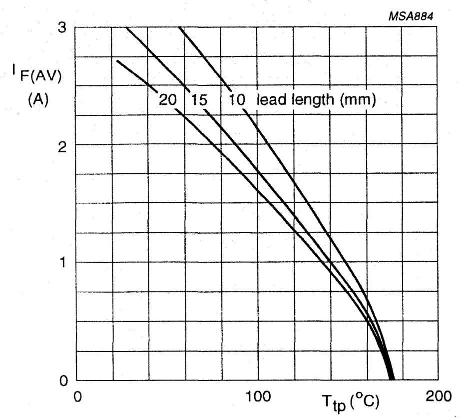
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	25	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	75	K/W

Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.25. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA

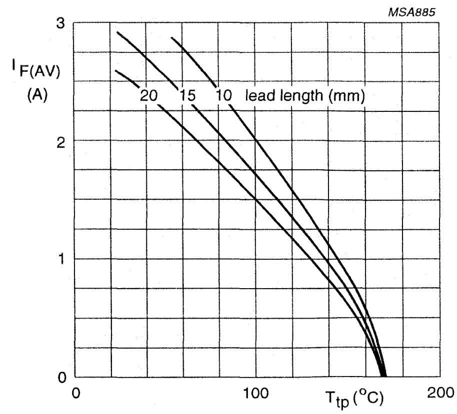


BYM36A to C

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Switched mode application.

Fig.2 Maximum average forward current as a function of tie-point temperature (including losses due to reverse leakage).

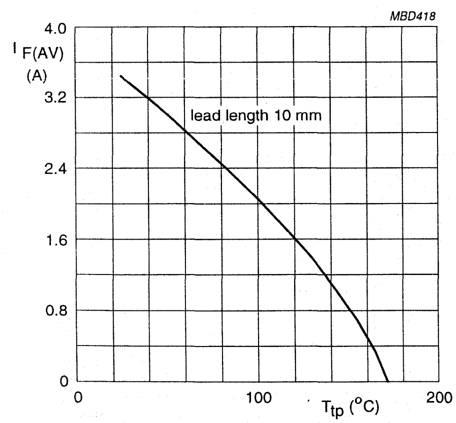


BYM36D and E

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Switched mode application.

Fig.3 Maximum average forward current as a function of tie-point temperature (including losses due to reverse leakage).

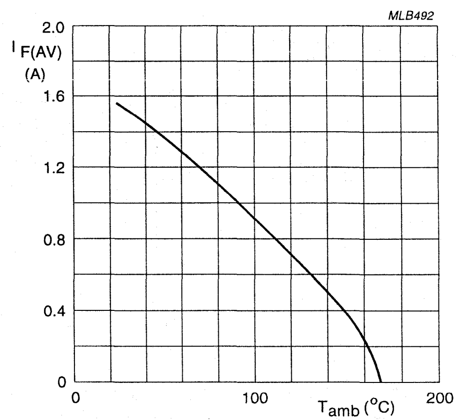


BYM36F and G

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Switched mode application.

Fig.4 Maximum average forward current as a function of tie-point temperature (including losses due to reverse leakage).



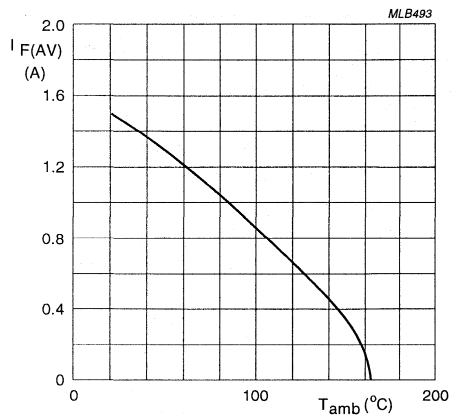
BYM36A to C

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Device mounted as shown in Fig.25.

Switched mode application.

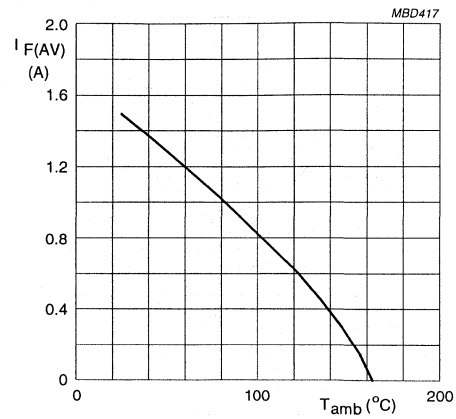
Fig.5 Maximum average forward current as a function of ambient temperature (including losses due to reverse leakage).



BYM36D and E

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.
Device mounted as shown in Fig.25.
Switched mode application.

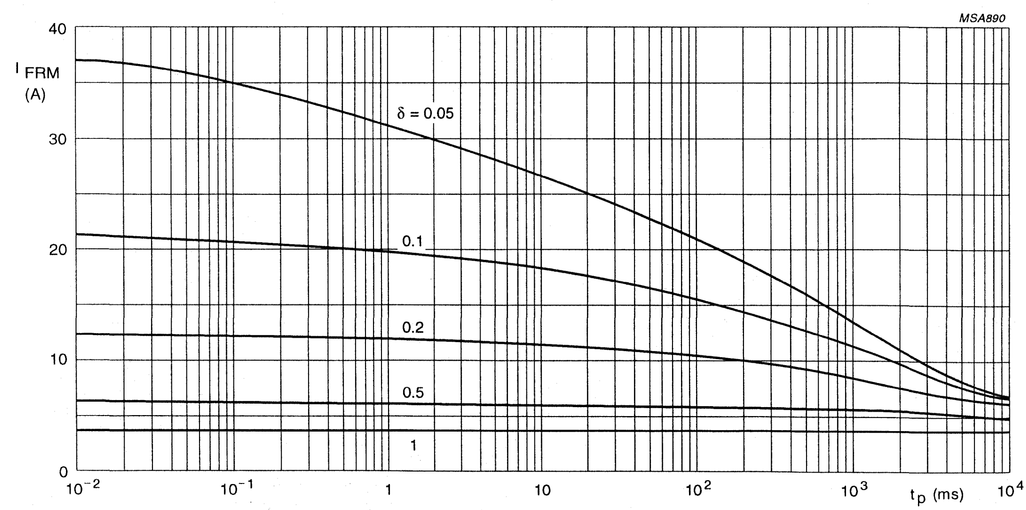
Fig.6 Maximum average forward current as a function of ambient temperature (including losses due to reverse leakage).



BYM36F and G

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.
Device mounted as shown in Fig.25.
Switched mode application.

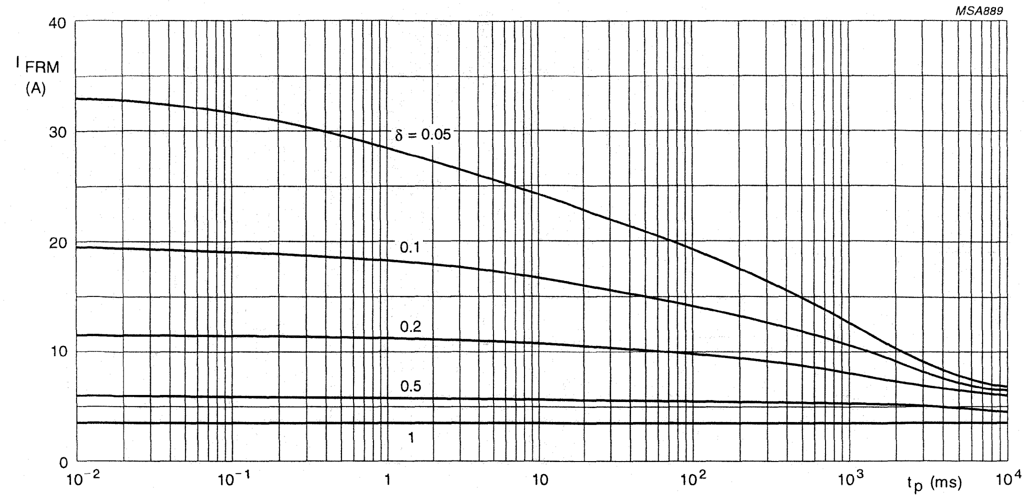
Fig.7 Maximum average forward current as a function of ambient temperature (including losses due to reverse leakage).



BYM36A to C

$T_{tp} = 55°C$; $R_{th\ j\text{-}tp} = 25$ K/W.
V_{RRMmax} during $1 - \delta$; curves include derating for $T_{j\ max}$ at $V_{RRM} = 600$ V.

Fig.8 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

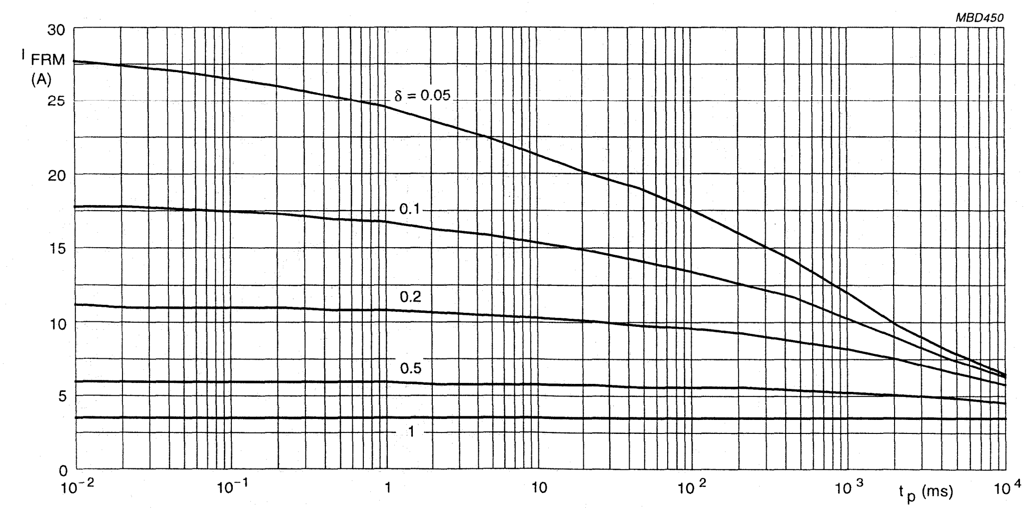


BYM36D and E

$T_{tp} = 55°C$; $R_{th\ j\text{-}tp} = 25$ K/W.

V_{RRMmax} during $1 - \delta$; curves include derating for $T_{j\ max}$ at $V_{RRM} = 1000$ V.

Fig.9 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

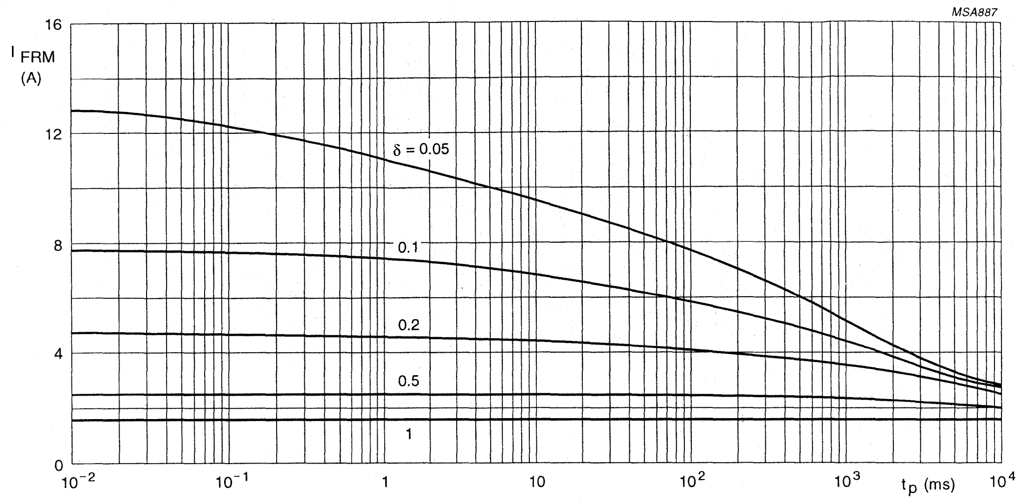


BYM36F and G

$T_{tp} = 55°C$; $R_{th\ j\text{-}tp} = 25$ K/W.

V_{RRMmax} during $1 - \delta$; curves include derating for $T_{j\ max}$ at $V_{RRM} = 1400$ V.

Fig.10 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

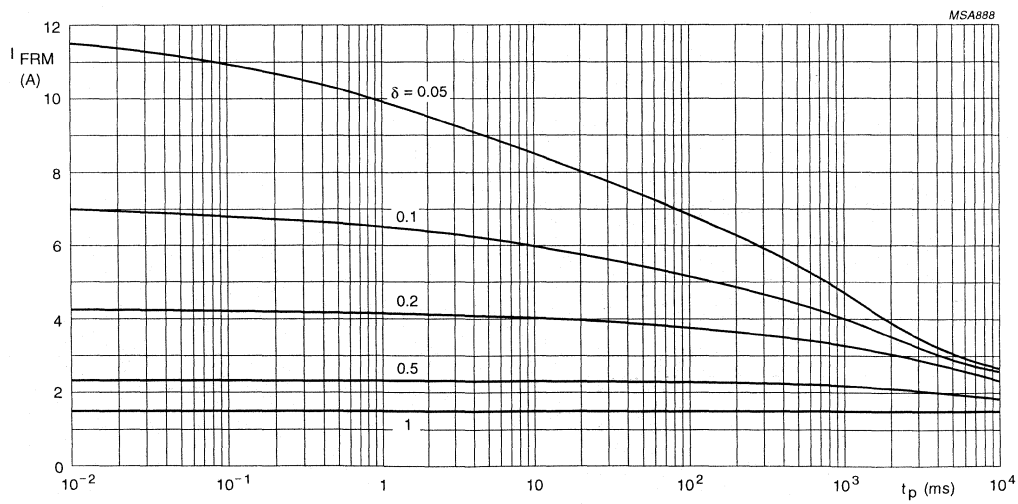


BYM36A to C

T_{amb} = 65 °C; $R_{th\ j\text{-}a}$ = 75 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 600 V.

Fig.11 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

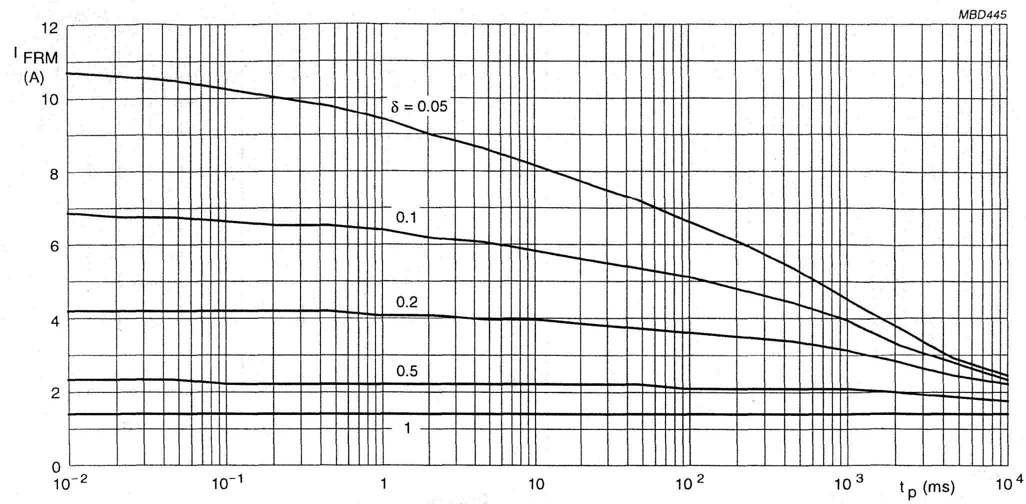


BYM36D and E

T_{amb} = 65 °C; $R_{th\ j\text{-}a}$ = 75 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1000 V.

Fig.12 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

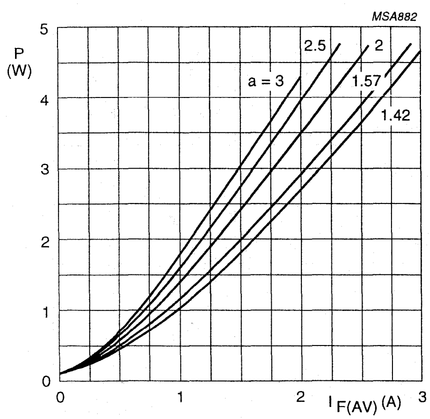


BYM36F and G

T_{amb} = 65 °C; $R_{th\,j\text{-}a}$ = 75 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\,max}$ at V_{RRM} = 1400 V.

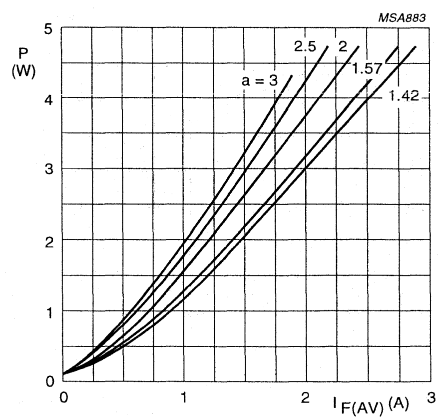
Fig.13 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



BYM36A to C

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; δ = 0.5.

Fig.14 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



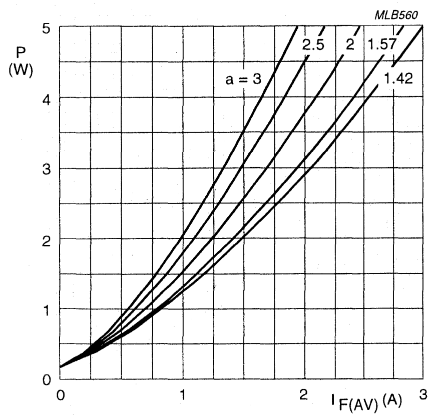
BYM36D and E

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; δ = 0.5.

Fig.15 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.

Fast soft-recovery controlled avalanche rectifiers

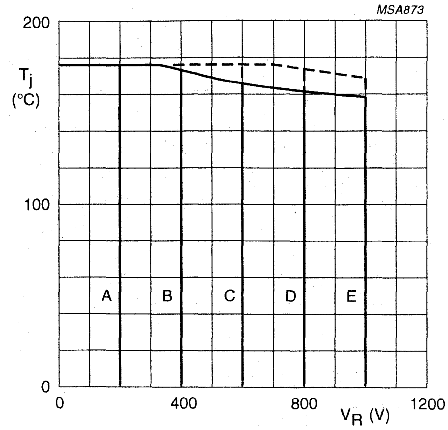
BYM36 series



BYM36F and G

$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Fig.16 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.

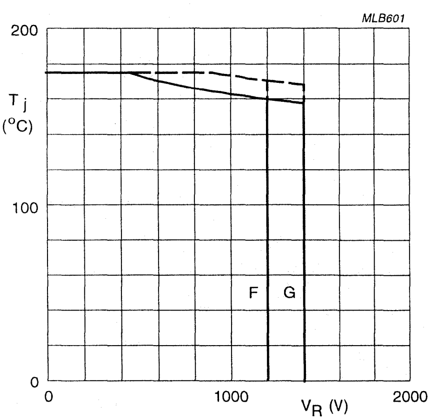


BYM36A to E

Solid line = V_R.

Dotted line = V_{RRM}; $\delta = 0.5$.

Fig.17 Maximum permissible junction temperature as a function of reverse voltage.

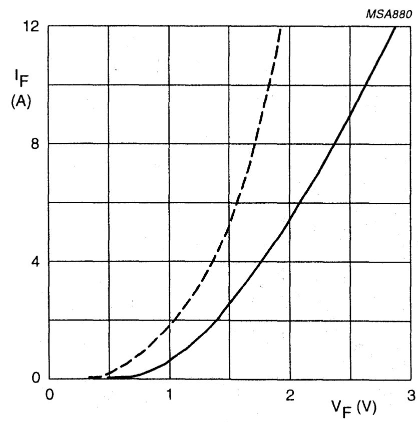


BYM36F and G

Solid line = V_R.

Dotted line = V_{RRM}; $\delta = 0.5$.

Fig.18 Maximum permissible junction temperature as a function of reverse voltage.

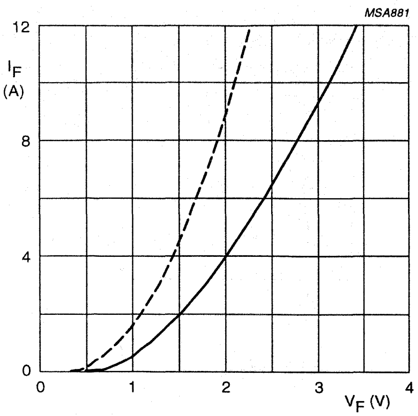


BYM36A to C

Dotted line: T_j = 175 °C.

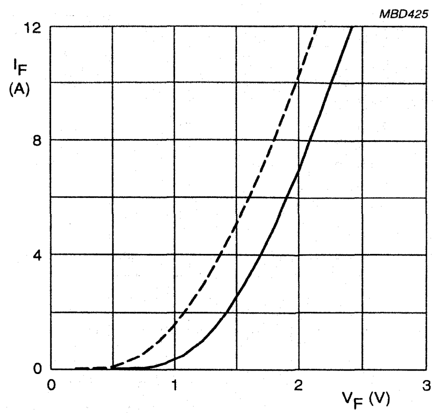
Solid line: T_j = 25 °C.

Fig.19 Forward current as a function of forward voltage; maximum values.



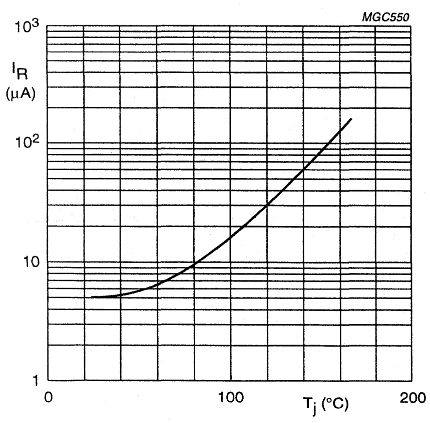
BYM36D and E.
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.20 Forward current as a function of forward voltage; maximum values.



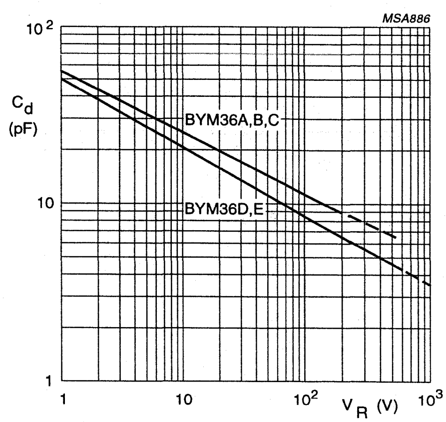
BYM36F and G.
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.21 Forward current as a function of forward voltage; maximum values.



$V_R = V_{RRMmax}$.

Fig.22 Reverse current as a function of junction temperature; maximum values.

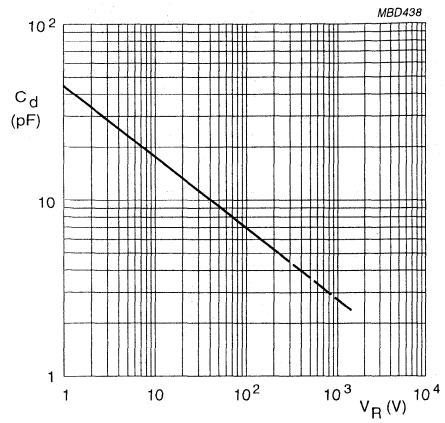


BYM36A to E
f = 1 MHz; T_j = 25 °C.

Fig.23 Diode capacitance as a function of reverse voltage, typical values.

Fast soft-recovery controlled avalanche rectifiers

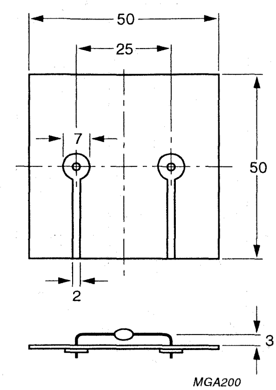
BYM36 series



BYM36F and G

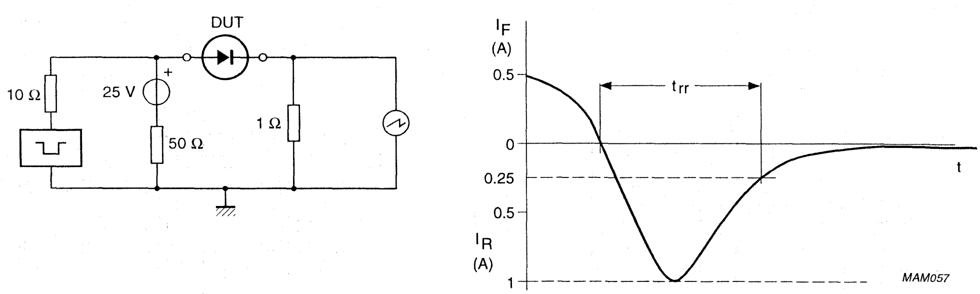
f = 1 MHz; T_j = 25 °C.

Fig.24 Diode capacitance as a function of reverse voltage, typical values.



Dimensions in mm.

Fig.25 Device mounted on a printed-circuit board.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq< 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.26 Test circuit and reverse recovery time waveform and definition.

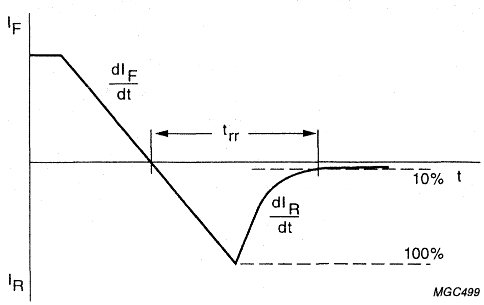


Fig.27 Reverse recovery definitions.

Controlled avalanche rectifiers

BYM56 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack
- Also available with preformed leads for easy insertion.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

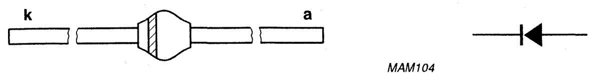


Fig.1 Simplified outline (SOD64) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYM56A		–	200	V
	BYM56B		–	400	V
	BYM56C		–	600	V
	BYM56D		–	800	V
	BYM56E		–	1000	V
V_{RWM}	crest working reverse voltage				
	BYM56A		–	200	V
	BYM56B		–	400	V
	BYM56C		–	600	V
	BYM56D		–	800	V
	BYM56E		–	1000	V
V_R	continuous reverse voltage				
	BYM56A		–	200	V
	BYM56B		–	400	V
	BYM56C		–	600	V
	BYM56D		–	800	V
	BYM56E		–	1000	V
$I_{F(AV)}$	average forward current	T_{tp} = 60 °C; lead length = 10 mm; averaged over any 20 ms period; see Figs 2 and 4	–	3.5	A
		T_{amb} = 65 °C; PCB mounting (see Fig.9); averaged over any 20 ms period; see Figs 3 and 4	–	1.4	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	80	A

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	20	mJ
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature	see Fig.5	−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 3 A; $T_j = T_{j\,max}$; see Fig.6	–	–	0.95	V
		I_F = 3 A; see Fig.6	–	–	1.15	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYM56A		225	–	–	V
	BYM56B		450	–	–	V
	BYM56C		650	–	–	V
	BYM56D		900	–	–	V
	BYM56E		1100	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.7	–	–	1	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.7	–	–	150	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.10	–	3	–	μs
C_d	diode capacitance	V_R = 0 V; f = 1 MHz; see Fig.8	–	90	–	pF

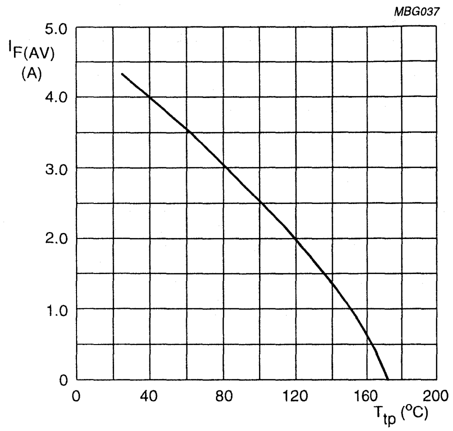
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	25	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	75	K/W

Note

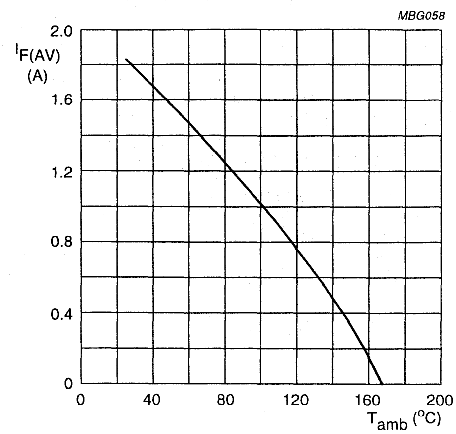
1. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.9. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA



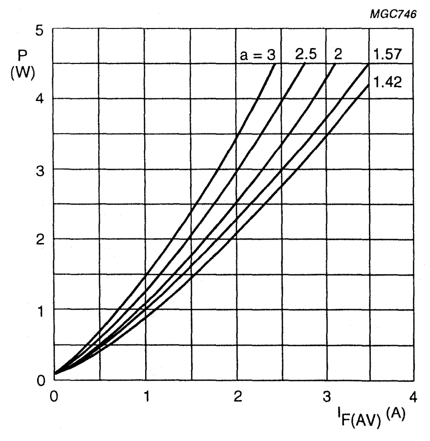
a = 1.57; $V_R = V_{RRMmax}$; $\delta = 0.5$.
Lead length 10 mm.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



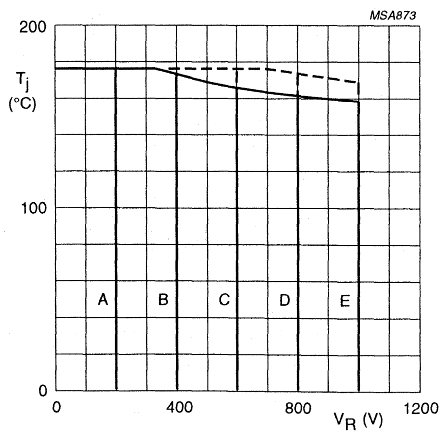
a = 1.57; $V_R = V_{RRMmax}$; $\delta = 0.5$.
Device mounted as shown in Fig.9.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



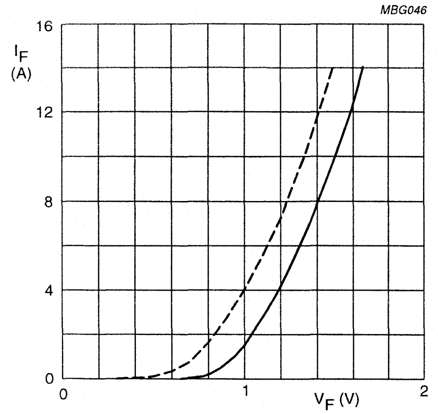
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Fig.4 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



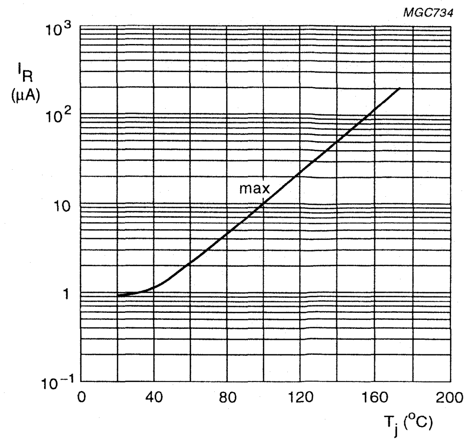
Solid line = V_R.
Dotted line = V_{RRM}; $\delta = 0.5$.

Fig.5 Maximum permissible junction temperature as a function of reverse voltage.



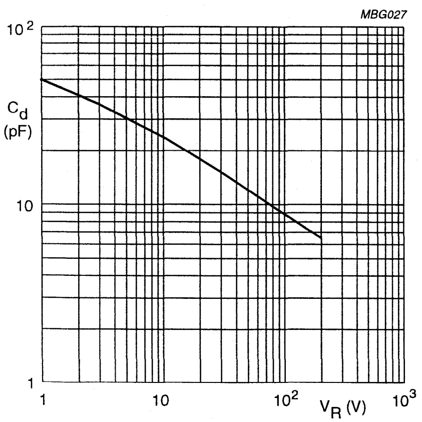
Solid line: T_j = 25 °C.
Dotted line: T_j = 175 °C.

Fig.6 Forward current as a function of forward voltage; maximum values.



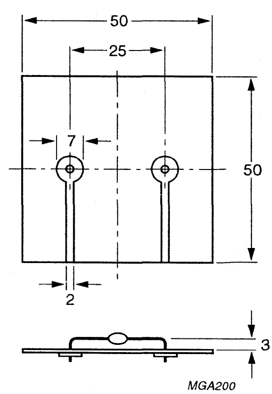
$V_R = V_{RRMmax}$.

Fig.7 Reverse current as a function of junction temperature; maximum values.



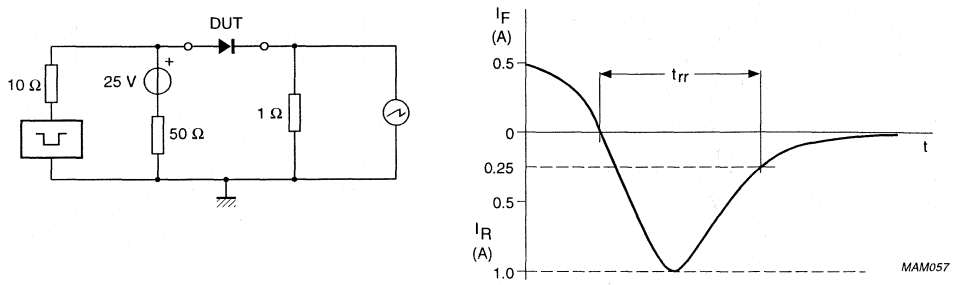
f = 1 MHz; T_j = 25 °C.

Fig.8 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.9 Device mounted on a printed-circuit board.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.10 Test circuit and reverse recovery time waveform and definition.

Ripple blocking diode — BYM63

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed minimum turn-on time for absorbing forward current transients and oscillations
- Specially designed as rectifier in the auxiliary power supply in e.g. switched mode power supplies
- Available in ammo-pack.
- Also available with preformed leads for easy insertion.

DESCRIPTION

Rugged glass SOD64 package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

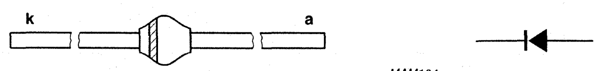


Fig.1 Simplified outline (SOD64) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	300	V
V_R	continuous reverse voltage		–	300	V
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; T_{tp} = 55 °C; lead length = 10 mm; see Fig.2; see also Fig.4	–	2.4	A
		averaged over any 20 ms period; T_{amb} = 65 °C; PCB mounting (Fig.8); see Fig.3; see also Fig.4	–	1.0	A
I_{FRM}	repetitive peak forward current	T_{tp} = 55 °C	–	21	A
		T_{amb} = 65 °C	–	8.5	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	45	A
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 2 A; $T_j = T_{j\,max}$; see Fig.5	–	–	1.34	V
		I_F = 2 A; see Fig.5	–	–	2.30	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.6	–	–	10	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.6	–	–	150	μA
t_{fr}	forward recovery time	when switched to I_F = 5 A in 50 ns; see Fig.9	–	–	1.5	μs
t_{on}	turn-on time	when switched from V_F = 0 V to V_F = 3 V; measured between 10% and 90% of $I_{F\,max}$; see Fig.11	400	–	–	ns
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.11	–	–	150	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Fig.7	–	65	–	pF

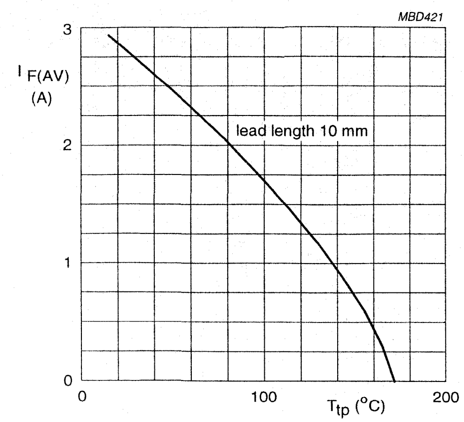
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	25	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	75	K/W

Note

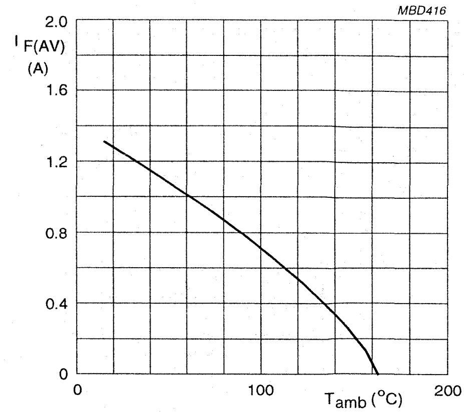
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.8. For more information please refer to the *'General Part of Handbook SC01.'*

GRAPHICAL DATA



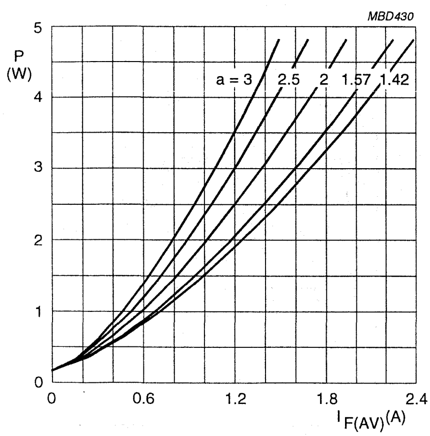
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Switched mode application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



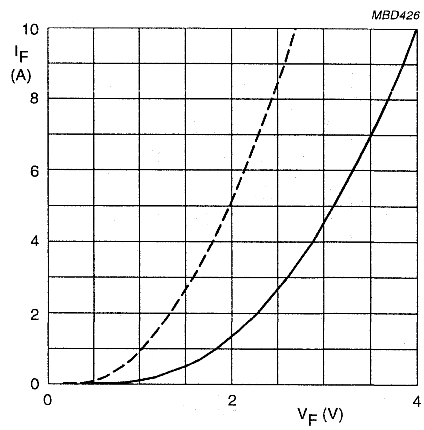
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Device mounted as shown in Fig.8.
Switched mode application.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



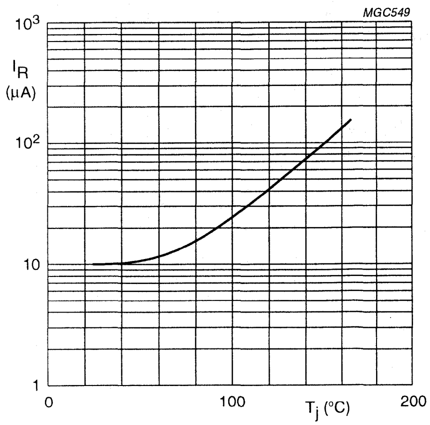
$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; δ = 0.5.

Fig.4 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



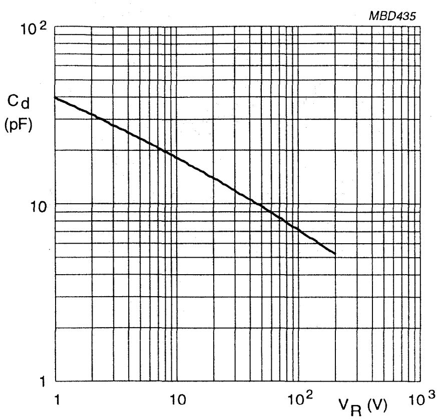
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.5 Forward current as a function of forward voltage; maximum values.



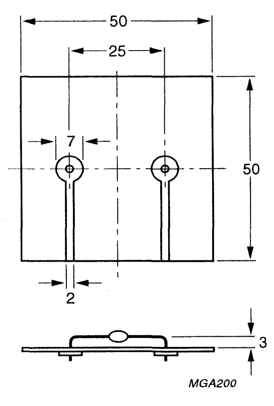
$V_R = V_{RRMmax}$.

Fig.6 Reverse current as a function of junction temperature; maximum values.



f = 1 MHz; T_j = 25 °C.

Fig.7 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.8 Device mounted on a printed-circuit board.

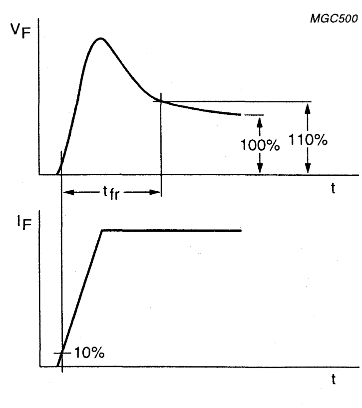
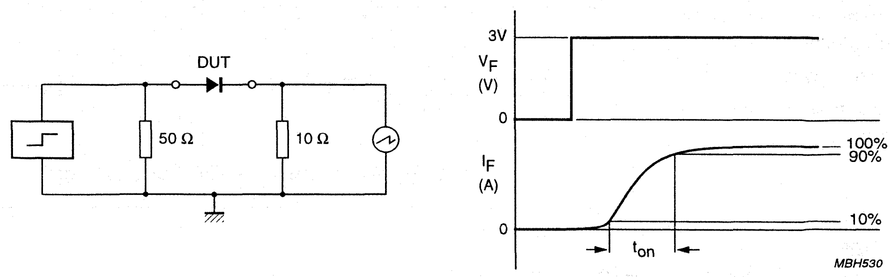
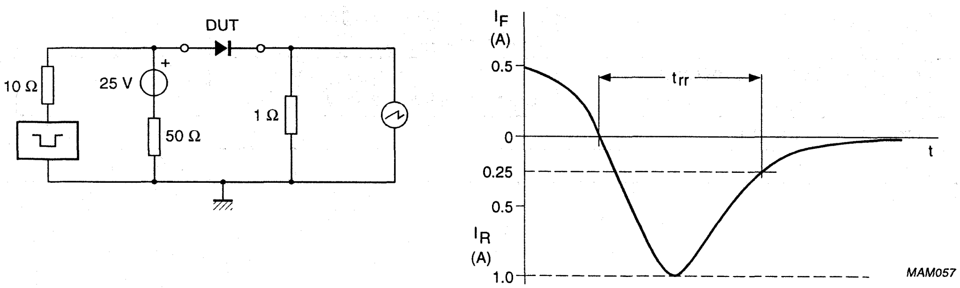


Fig.9 Forward recovery time definition.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 10$ ns.

Fig.10 Test circuit and turn-on time waveform and definition.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.11 Test circuit and reverse recovery time waveform and definition.

Ultra fast low-loss controlled avalanche rectifier

BYM99

FEATURES

- Glass passivated
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack
- Also available with preformed leads for easy insertion.

DESCRIPTION

Rugged glass SOD64 package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

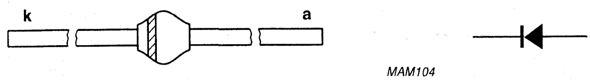


Fig.1 Simplified outline (SOD64) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	600	V
V_R	continuous reverse voltage		–	600	V
$I_{F(AV)}$	average forward current	T_{tp} = 50 °C; lead length = 10 mm see Fig. 2; averaged over any 20 ms period; see also Fig 6	–	1.8	A
		T_{amb} = 60 °C; PCB mounting (see Fig.10); see Fig. 3; averaged over any 20 ms period; see also Fig. 6	–	0.8	A
I_{FRM}	repetitive peak forward current	T_{tp} = 50 °C; see Fig. 4	–	15	A
		T_{amb} = 60 °C; see Fig. 5	–	7	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	40	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	10	mJ
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+150	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 3 A; $T_j = T_{j\,max}$; see Fig. 7	–	–	1.95	V
		I_F = 3 A; see Fig. 7	–	–	3.60	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA	700	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig. 8	–	–	5	μA
		$V_R = V_{RRMmax}$; T_j = 150 °C; see Fig. 8	–	–	75	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig. 12	–	–	15	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Fig. 9	–	135	–	pF
$\left\lvert\frac{dI_R}{dt}\right\rvert$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq 30$ V and dI_F/dt = –1 A/μs; see Fig.11	–	–	3	A/μs

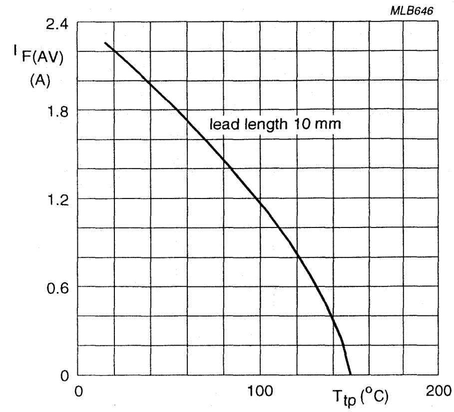
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	25	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	75	K/W

Note

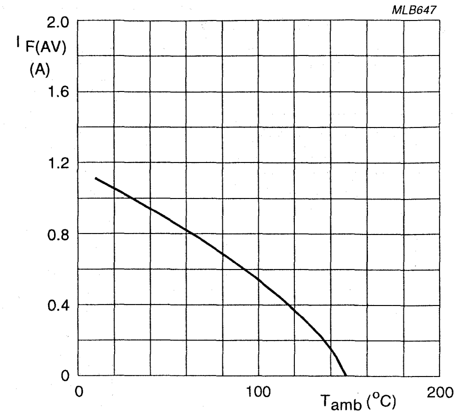
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.10. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA



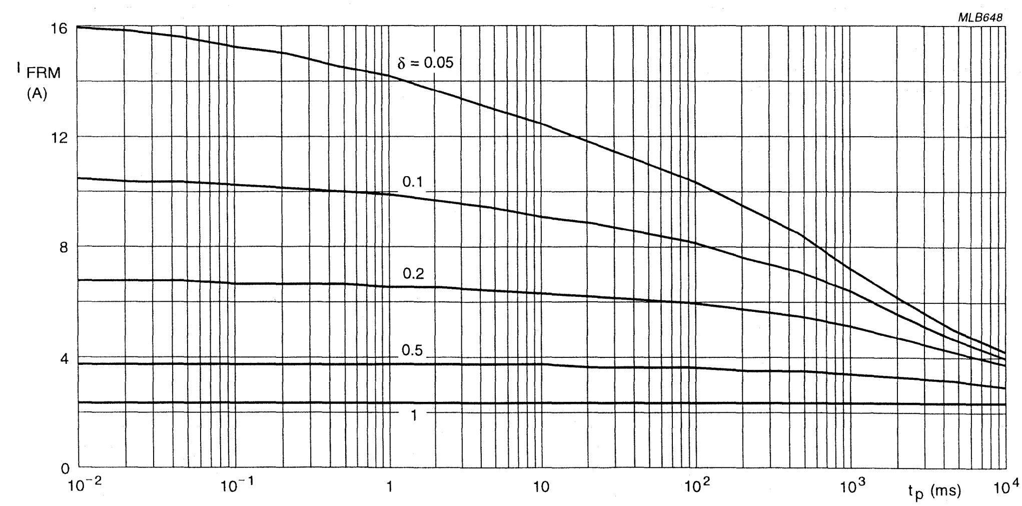
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Switched mode application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



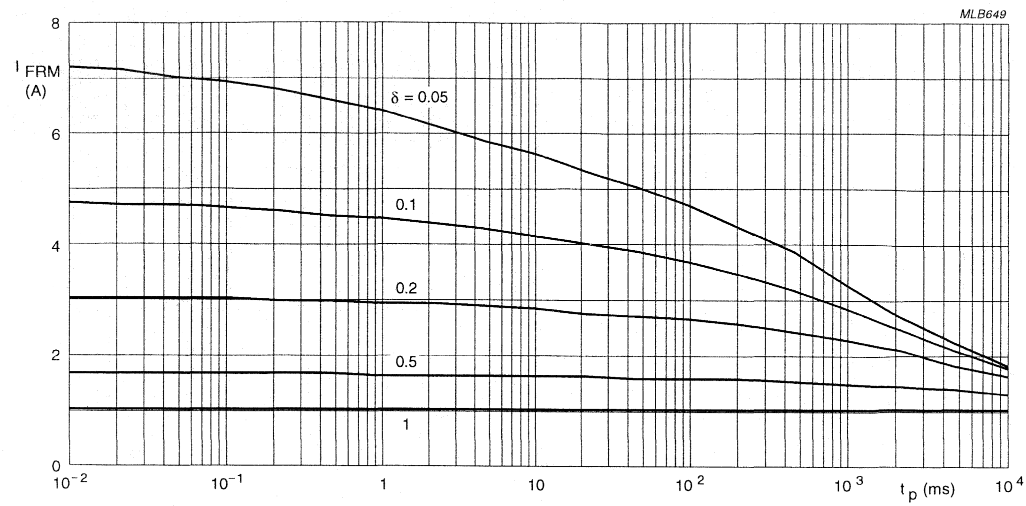
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Device mounted as shown in Fig.10.
Switched mode application.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



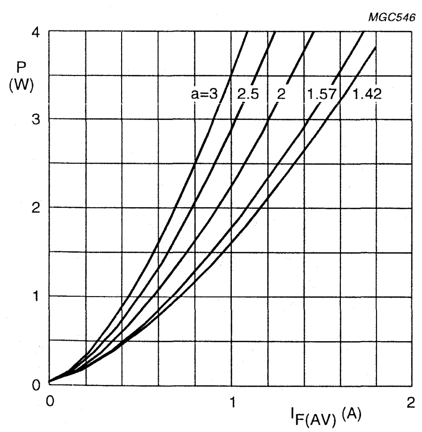
T_{tp} = 50°C; $R_{th\ j\text{-}tp}$ = 25 K/W.
V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 600 V.

Fig.4 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



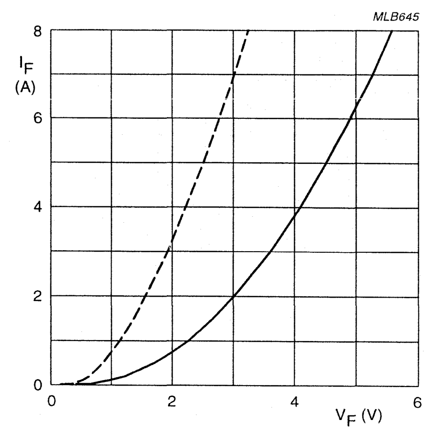
T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 75 K/W.
V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 600 V.

Fig.5 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



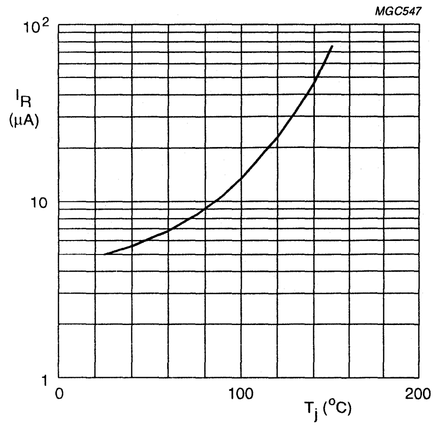
a = $I_{F(RMS)}/I_{F(AV)}$; V_R = V_{RRMmax}; δ = 0.5.

Fig.6 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



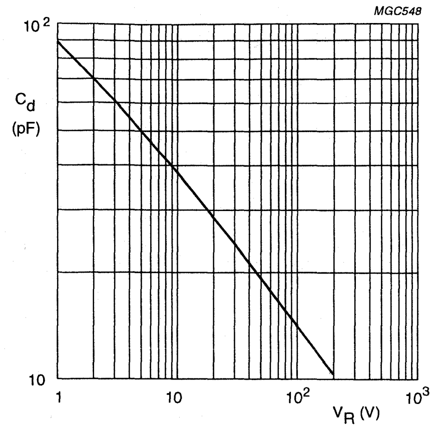
Dotted line: T_j = 150 °C.
Solid line: T_j = 25 °C.

Fig.7 Forward current as a function of forward voltage; maximum values.



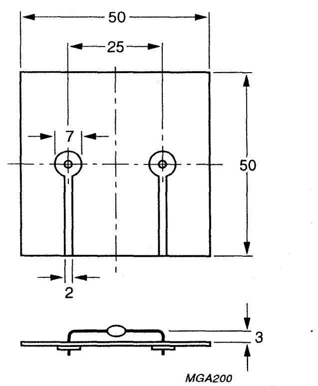
$V_R = V_{RRMmax}$.

Fig.8 Reverse current as a function of junction temperature; maximum values.



f = 1 MHz; T_j = 25 °C.

Fig.9 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.10 Device mounted on a printed-circuit board.

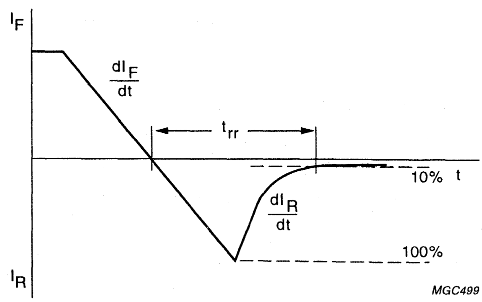
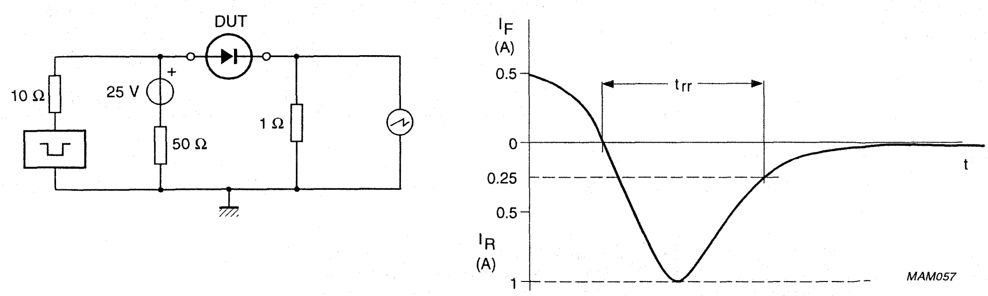


Fig.11 Reverse recovery definitions.



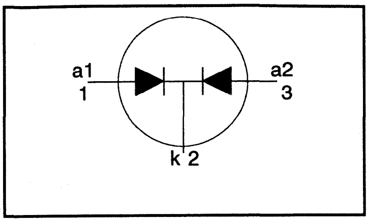
Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.12 Test circuit and reverse recovery time waveform and definition.

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 150 V/ 200 V

$V_F \leq 0.895$ V

$I_{O(AV)}$ = 10 A

I_{RRM} = 0.2 A

$t_{rr} \leq 25$ ns

GENERAL DESCRIPTION

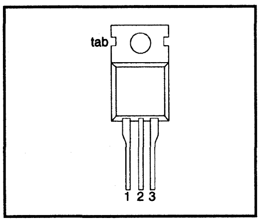
Dual, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode powe supplies.

The BYQ28E series is supplied in the SOT78 conventional leaded package.
The BYQ28EB series is supplied in the SOT404 surface mounting package.
The BYQ28ED series is supplied in the SOT428 surface mounting package.

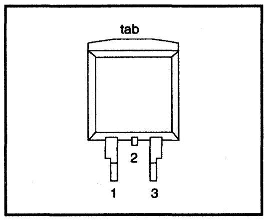
PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode [1]
3	anode 2
tab	cathode

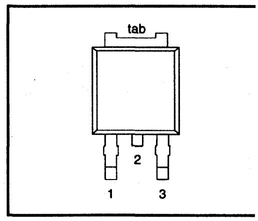
SOT78 (TO220AB)



SOT404



SOT428



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		BYQ28E/ BYQ28EB/ BYQ28ED		**-150**	**-200**	
V_{RRM}	Peak repetitive reverse voltage		-	150	200	V
V_{RWM}	Working peak reverse voltage		-	150	200	V
V_R	Continuous reverse voltage		-	150	200	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{mb} \leq 119$ ˚C	-	10		A
I_{FRM}	Repetitive peak forward current per diode	square wave; $\delta = 0.5$; $T_{mb} \leq 119$ ˚C	-	10		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$	- -	50 55		A A
I_{RRM}	Peak repetitive reverse surge current per diode	t_p = 2 µs; $\delta = 0.001$	-	0.2		A
I_{RSM}	Peak non-repetitive reverse surge current per diode	t_p = 100 µs	-	0.2		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 40	150		˚C

1. It is not possible to make connection to pin 2 of the SOT428 or SOT404 packages.

SD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage	Human body model; C = 250 pF; R = 1.5 kΩ	-	8	kV

HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	4.5	K/W
		both diodes	-	-	3	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	SOT78 package, in free air	-	60	-	K/W
		SOT404 and SOT428 packages, pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

LECTRICAL CHARACTERISTICS

ll characteristics are per diode at T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 5 A; T_j = 150˚C	-	0.8	0.895	V
		I_F = 5 A	-	0.95	1.1	V
		I_F = 10 A	-	1.1	1.25	V
I_R	Reverse current	$V_R = V_{RWM}$	-	2	10	µA
		$V_R = V_{RWM}$; T_j = 100˚C	-	0.1	0.2	mA
Q_{rr}	Reverse recovered charge	I_F = 2 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 20 A/µs	-	4	9	nC
t_{rr1}	Reverse recovery time	I_F = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 100 A/µs		15	25	ns
t_{rr2}	Reverse recovery time	I_F = 0.5 A to I_R = 1 A; I_{rec} = 0.25 A	-	10	20	ns
I_{rrm}	Peak reverse recovery current	I_F = 5 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 50 A/µs	-	0.5	0.7	A
V_{fr}	Forward recovery voltage	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

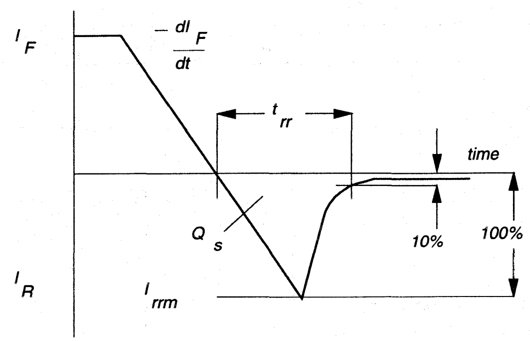


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

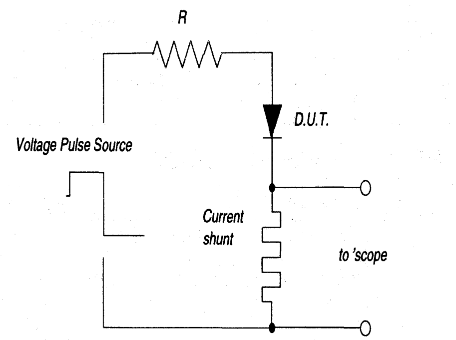


Fig.4. Circuit schematic for t_{rr2}

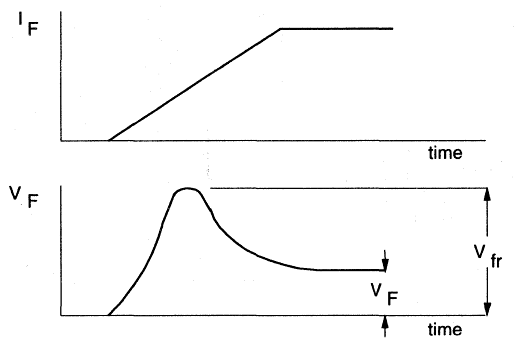


Fig.2. Definition of V_{fr}

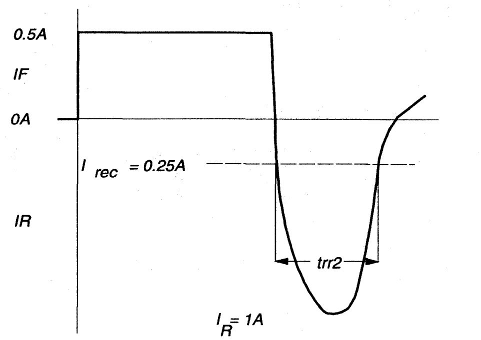


Fig.5. Definition of t_{rr2}

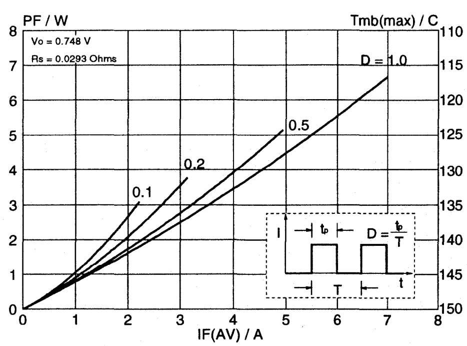


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

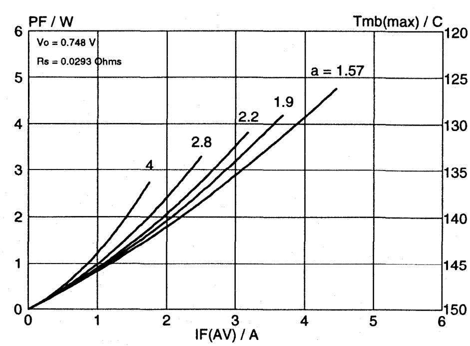


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

Rectifier diodes ultrafast, rugged
BYQ28E, BYQ28EB, BYQ28ED series

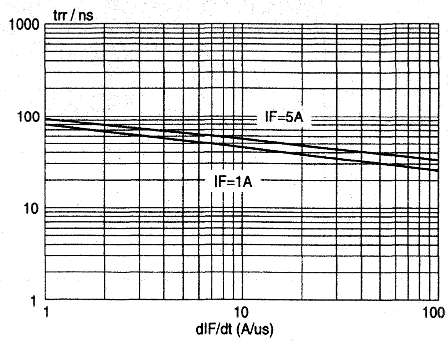


Fig.7. Maximum t_{rr} at T_j = 25 ˚C; per diode

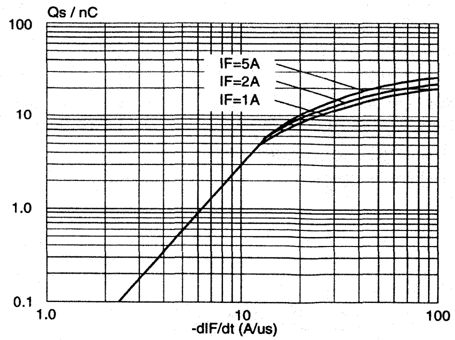


Fig.10. Maximum Q_s at T_j = 25 ˚C; per diode

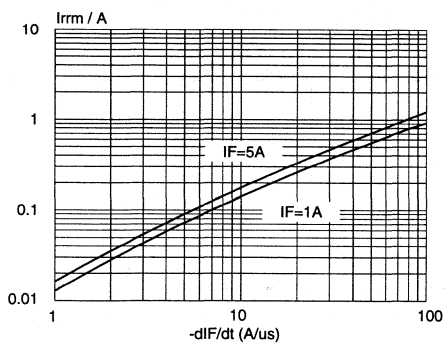


Fig.8. Maximum I_{rrm} at T_j = 25 ˚C; per diode

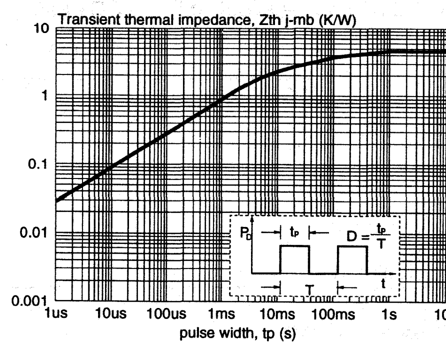


Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.

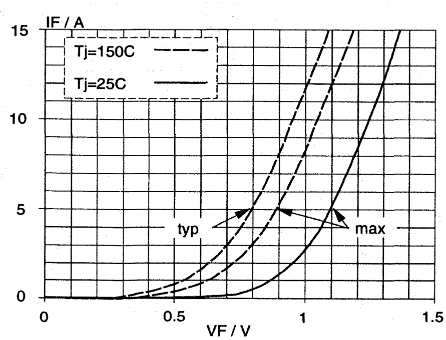


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

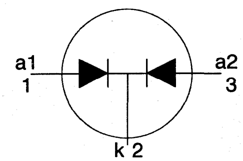
Rectifier diodes ultrafast, rugged

BYQ28F, BYQ28EX series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

V_R = 150 V/ 200 V

$V_F \leq 0.895$ V

$I_{O(AV)}$ = 10 A

I_{RRM} = 0.2 A

$t_{rr} \leq 25$ ns

GENERAL DESCRIPTION

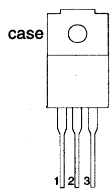
Dual, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode powe supplies.

The BYQ28F series is supplied in the SOT186 package.
The BYQ28EX series is supplied in the SOT186A package.

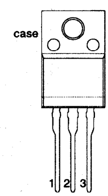
PINNING

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	isolated

SOT186



SOT186A



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		BYQ28F / BYQ28EX		-150	-200	
V_{RRM}	Peak repetitive reverse voltage		-	150	200	V
V_{RWM}	Crest working reverse voltage		-	150	200	V
V_R	Continuous reverse voltage	$T_{hs} \leq 148$˚C	-	150	200	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)[1]	square wave $\delta = 0.5$; $T_{hs} \leq 92$ ˚C	-	10		A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 92$ ˚C	-	10		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-	50		A
		t = 8.3 ms sinusoidal; with reapplied $V_{RWM(max)}$	-	55		A
I_{RRM}	Repetitive peak reverse current per diode	t_p = 2 µs; $\delta = 0.001$	-	0.2		A
I_{RSM}	Non-repetitive peak reverse current per diode	t_p = 100 µs	-	0.2		A
T_{stg}	Storage temperature		-40	150		˚C
T_j	Operating junction temperature		-	150		˚C

1 Neglecting switching and reverse current losses

:SD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage	Human body model; C = 250 pF; R = 1.5 kΩ	-	8	kV

SOLATION LIMITING VALUE & CHARACTERISTIC

$_{hs}$ = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Peak isolation voltage from all terminals to external heatsink	SOT186 package; R.H. ≤ 65%; clean and dustfree	-	-	1500	V
V_{isol}	R.M.S. isolation voltage from all terminals to external heatsink	SOT186A package; f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65%; clean and dustfree	-	-	2500	V
C_{isol}	Capacitance from pin 2 to external heatsink	f = 1 MHz	-	10	-	pF

'HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	5.7	K/W
		without heatsink compound	-	-	6.7	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	55	-	K/W

:LECTRICAL CHARACTERISTICS

haracteristics are per diode at T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 5 A; T_j = 150˚C	-	0.80	0.895	V
		I_F = 5 A	-	0.95	1.10	V
		I_F = 10 A	-	1.10	1.25	V
I_R	Reverse current	$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.1	0.2	mA
		$V_R = V_{RWM}$	-	2	10	µA
Q_s	Reverse recovery charge	I_F = 2 A; V_R ≥ 30 V; $-dI_F/dt$ = 20 A/µs	-	4	9	nC
t_{rr1}	Reverse recovery time	I_F = 1 A; V_R ≥ 30 V; $-dI_F/dt$ = 100 A/µs	-	15	25	ns
t_{rr2}	Reverse recovery time	I_F = 0.5 A to I_R = 1 A; I_{rec} = 0.25 A	-	10	20	ns
I_{rrm}	Peak reverse recovery current	I_F = 5 A; V_R ≥ 30 V; $-dI_F/dt$ = 50 A/µs	-	0.5	0.7	A
V_{fr}	Forward recovery voltage	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

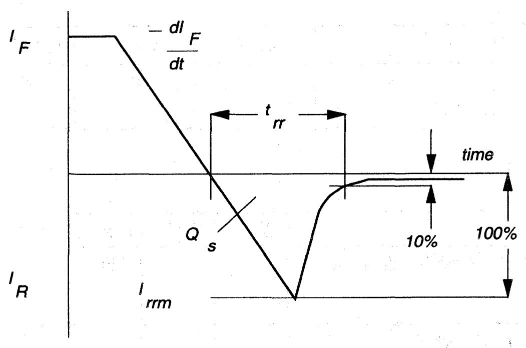


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

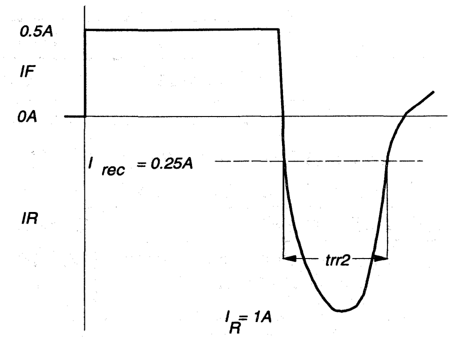


Fig.4. Definition of t_{rr2}

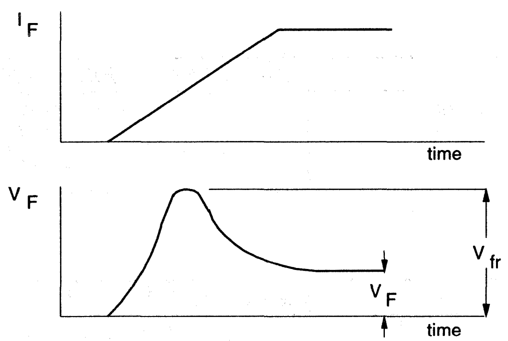


Fig.2. Definition of V_{fr}

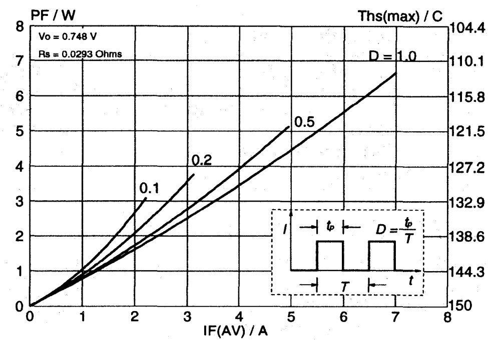


Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

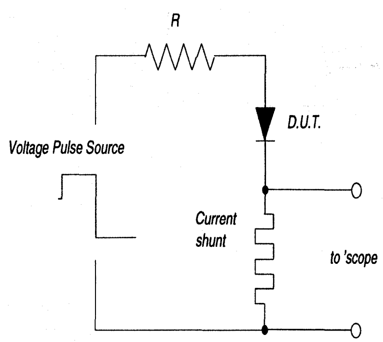


Fig.3. Circuit schematic for t_{rr2}

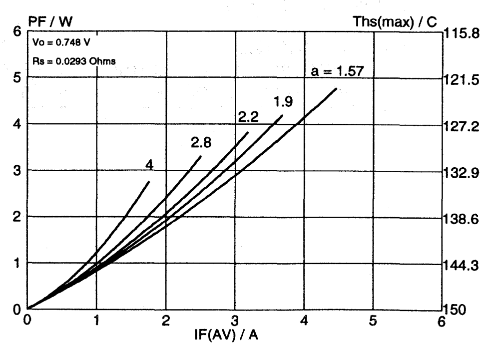


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

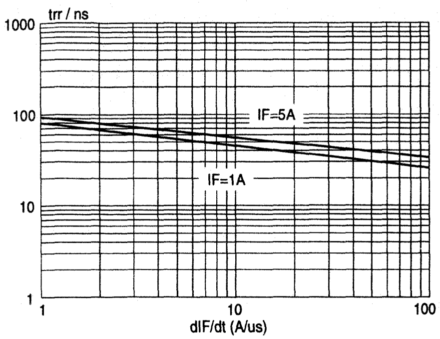


Fig.7. Maximum t_{rr} at $T_j = 25$ ˚C; per diode

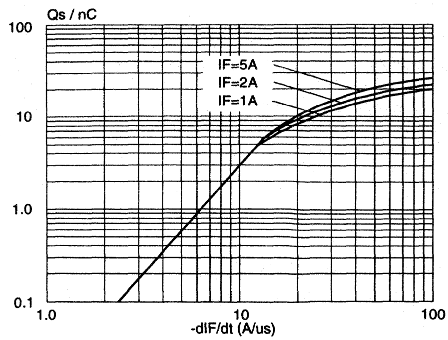


Fig.10. Maximum Q_s at $T_j = 25$ ˚C; per diode

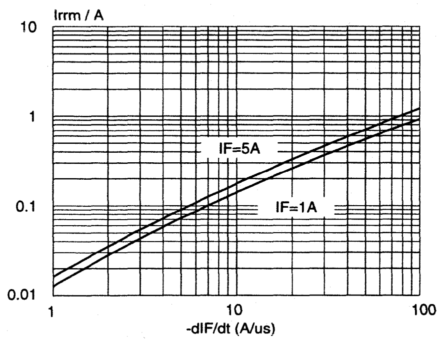


Fig.8. Maximum I_{rrm} at $T_j = 25$ ˚C; per diode

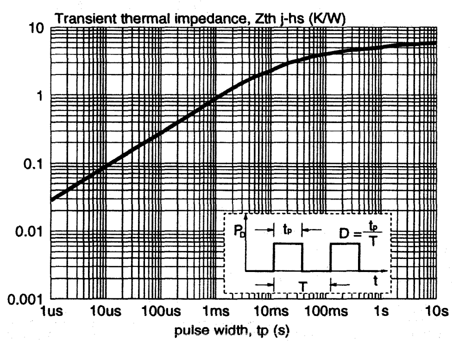


Fig.11. Transient thermal impedance; per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.

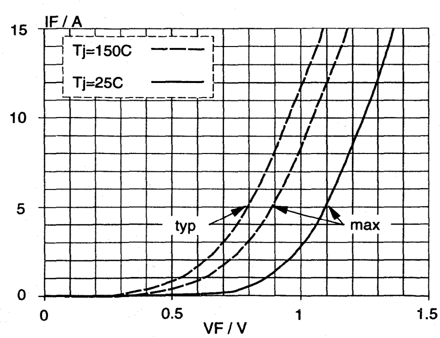


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

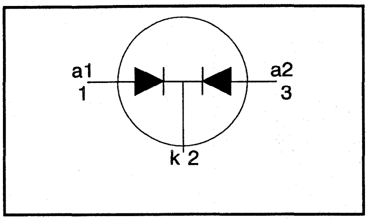
Rectifier diodes ultrafast, rugged

BYQ30E, BYQ30EB, BYQ30ED series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 150 V/ 200 V

$V_F \leq 0.95$ V

$I_{O(AV)}$ = 16 A

I_{RRM} = 0.2 A

$t_{rr} \leq 25$ ns

GENERAL DESCRIPTION

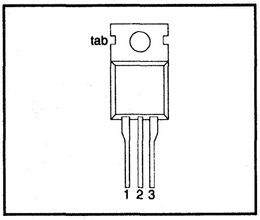
Dual, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYQ30E series is supplied in the SOT78 conventional leaded package.
The BYQ30EB series is supplied in the SOT404 surface mounting package.
The BYQ30ED series is supplied in the SOT428 surface mounting package.

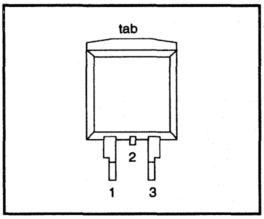
PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode [1]
3	anode 2
tab	cathode

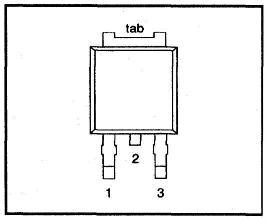
SOT78 (TO220AB)



SOT404



SOT428



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		BYQ30E/ BYQ30EB/ BYQ30ED		**-150**	**-200**	
V_{RRM}	Peak repetitive reverse voltage		-	150	200	V
V_{RWM}	Working peak reverse voltage		-	150	200	V
V_R	Continuous reverse voltage		-	150	200	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{mb} \leq 104$ ˚C	-	16		A
I_{FRM}	Repetitive peak forward current per diode	square wave; $\delta = 0.5$; $T_{mb} \leq 104$ ˚C	-	16		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$	- -	80 88		A A
I_{RRM}	Peak repetitive reverse surge current per diode	$t_p = 2$ µs; $\delta = 0.001$	-	0.2		A
I_{RSM}	Peak non-repetitive reverse surge current per diode	$t_p = 100$ µs	-	0.2		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 40	150		˚C

1. It is not possible to make connection to pin 2 of the SOT428 or SOT404 packages.

SD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage	Human body model; C = 250 pF; R = 1.5 kΩ	-	8	kV

HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	3	K/W
		both diodes	-	-	2.5	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	SOT78 package, in free air	-	60	-	K/W
		SOT404 and SOT428 packages, pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

LECTRICAL CHARACTERISTICS

ll characteristics are per diode at T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 8 A; T_j = 150˚C	-	0.84	0.95	V
		I_F = 16 A; T_j = 150˚C	-	1	1.15	V
		I_F = 16 A	-	1.12	1.25	V
$_R$	Reverse current	$V_R = V_{RWM}$	-	4	30	µA
		$V_R = V_{RWM}$; T_j = 100˚C	-	0.3	0.6	mA
Q_{rr}	Reverse recovered charge	I_F = 2 A; $V_R \geq$ 30 V; -dI_F/dt = 20 A/µs	-	4	11	nC
$_{rr1}$	Reverse recovery time	I_F = 1 A; $V_R \geq$ 30 V; -dI_F/dt = 100 A/µs		20	25	ns
$_{rr2}$	Reverse recovery time	I_F = 0.5 A to I_R = 1 A; I_{rec} = 0.25 A	-	12	22	ns
V_{fr}	Forward recovery voltage	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

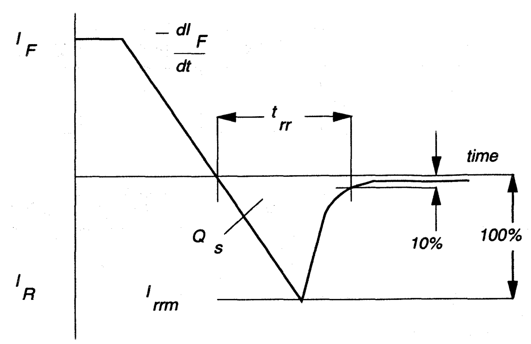


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

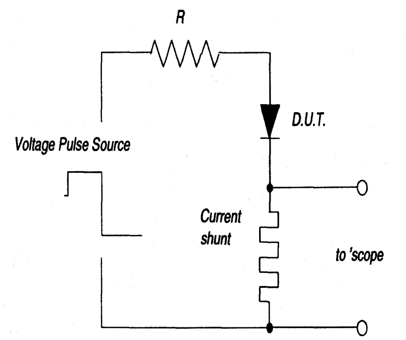


Fig.4. Circuit schematic for t_{rr2}

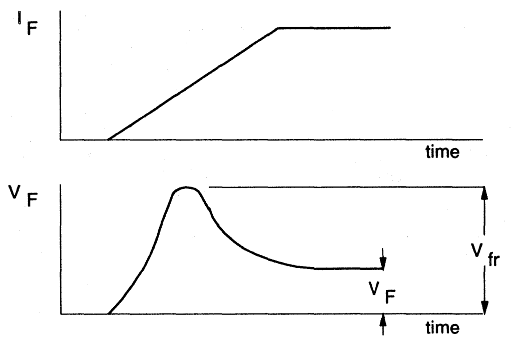


Fig.2. Definition of V_{fr}

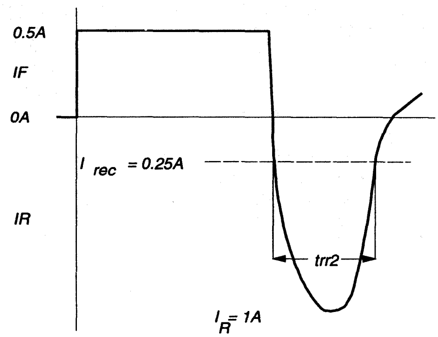


Fig.5. Definition of t_{rr2}

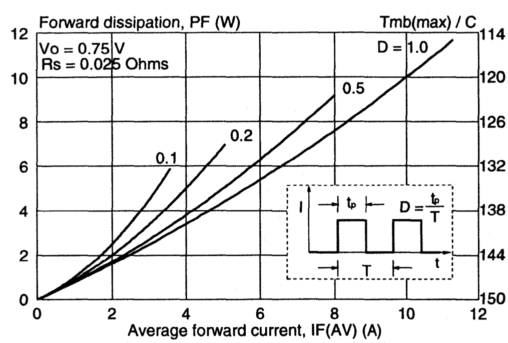


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

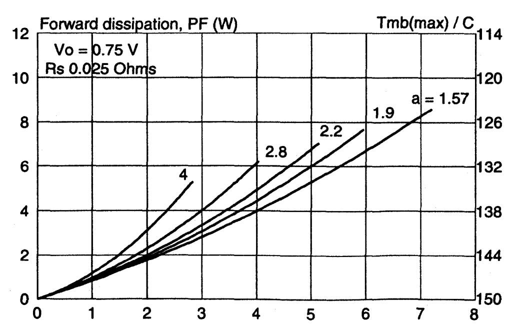


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

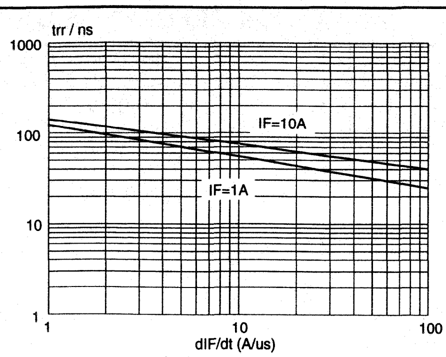


Fig.7. Maximum t_{rr} at T_j = 25 ˚C; per diode

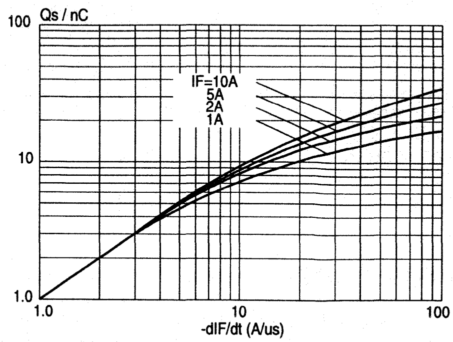


Fig.10. Maximum Q_s at T_j = 25 ˚C; per diode

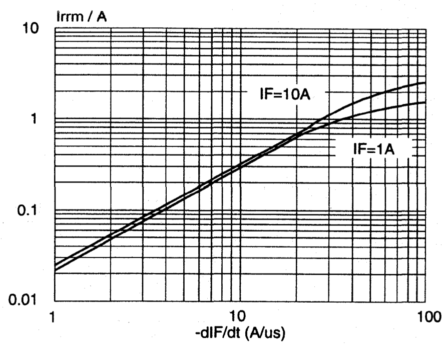


Fig.8. Maximum I_{rrm} at T_j = 25 ˚C; per diode

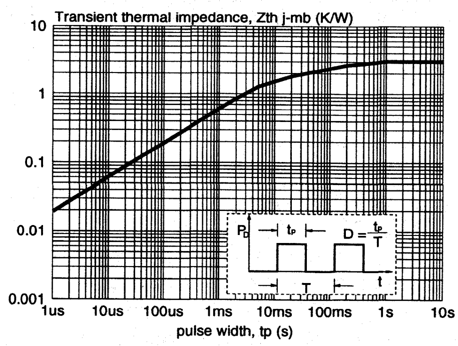


Fig.11. Transient thermal impedance; per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

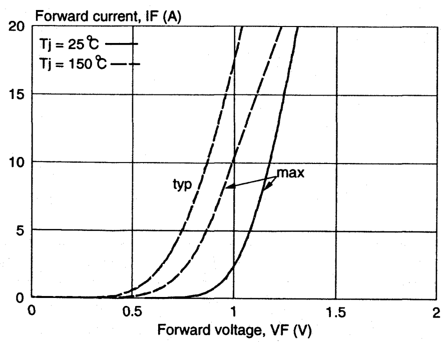
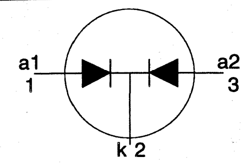


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

V_R = 150 V/ 200 V

$V_F \leq 0.95$ V

$I_{O(AV)}$ = 16 A

$I_{RRM} \leq 0.2$ A

$t_{rr} \leq 25$ ns

GENERAL DESCRIPTION

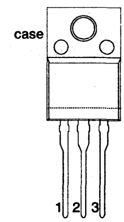
Ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYQ30EX series is supplied in the conventional leaded SOT186A package.

PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode
3	anode 2
tab	isolated

SOT186A



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		BYQ30EX		-150	-200	
V_{RRM}	Peak repetitive reverse voltage		-	150	200	V
V_{RWM}	Crest working reverse voltage		-	150	200	V
V_R	Continuous reverse voltage		-	150	200	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)[1]	square wave $\delta = 0.5$; $T_{hs} \leq 59$ ˚C	-	16		A
I_{FRM}	Repetitive peak forward current per diode	$t = 25$ µs; $\delta = 0.5$; $T_{hs} \leq 59$ ˚C	-	16		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-	100		A
		t = 8.3 ms sinusoidal; with reapplied $V_{RWM(max)}$	-	110		A
I_{RRM}	Repetitive peak reverse current per diode	$t_p = 2$ µs; $\delta = 0.001$	-	0.2		A
I_{RSM}	Non-repetitive peak reverse current per diode	$t_p = 100$ µs	-	0.2		A
T_{stg}	Storage temperature		-40	150		˚C
T_j	Operating junction temperature		-	150		˚C

ESD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage	Human body model; C = 250 pF; R = 1.5 kΩ	-	8	kV

1 Neglecting switching and reverse current losses.

OLATION LIMITING VALUE & CHARACTERISTIC

$_s$ = 25 ˚C unless otherwise specified

YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$'_{isol}$	R.M.S. isolation voltage from all three terminals to external heatsink	f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree	-		2500	V
$'_{isol}$	Capacitance from T2 to external heatsink	f = 1 MHz	-	10	-	pF

HERMAL RESISTANCES

YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	with heatsink compound without heatsink compound	- -	- -	5.0 7.0	K/W K/W
$_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	55	-	K/W

LECTRICAL CHARACTERISTICS

aracteristics are per diode at T_j = 25 ˚C unless otherwise stated

YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$'_F$	Forward voltage	I_F = 8 A; T_j = 150˚C I_F = 16 A; T_j = 150˚C I_F = 16 A;	- - -	0.83 1.0 0.98	0.95 1.15 1.25	V V
	Reverse current	$V_R = V_{RWM}$; T_j = 100 ˚C $V_R = V_{RWM}$	- -	0.3 2	0.6 30	mA µA
$_s$	Reverse recovery charge	I_F = 2 A; V_R ≥ 30 V; -dI_F/dt = 20 A/µs	-	4	11	nC
$_r$	Reverse recovery time	I_F = 1 A; V_R ≥ 30 V; -dI_F/dt = 100 A/µs	-	20	25	ns
$_{rm}$	Peak reverse recovery current	I_F = 1 A; V_R ≥ 30 V; -dI_F/dt = 50 A/µs; T_j = 100 ˚C	-	1.0	2	A
$'_{fr}$	Forward recovery voltage	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

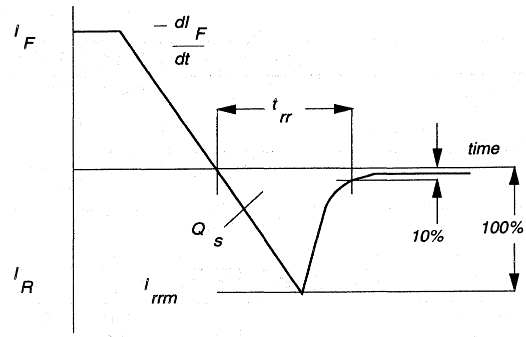


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

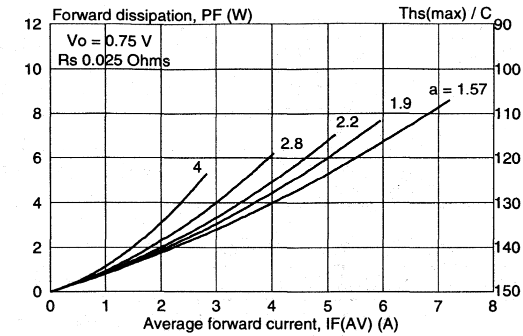


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

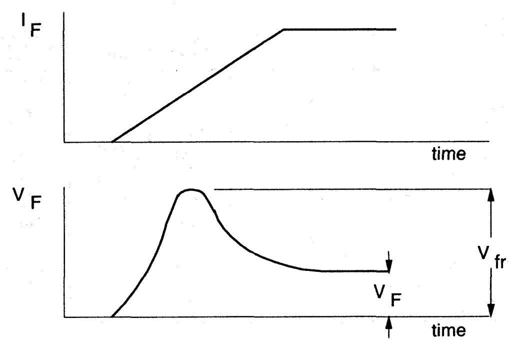


Fig.2. Definition of V_{fr}

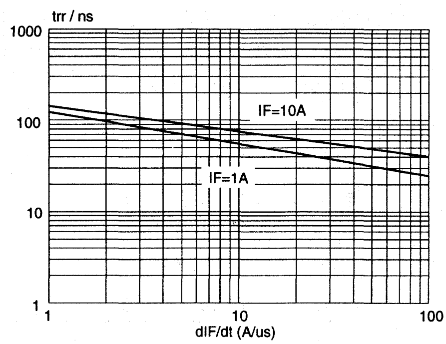


Fig.5. Maximum t_{rr} at T_j = 25 ˚C.

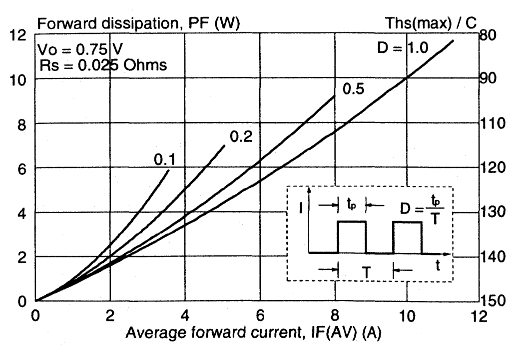


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

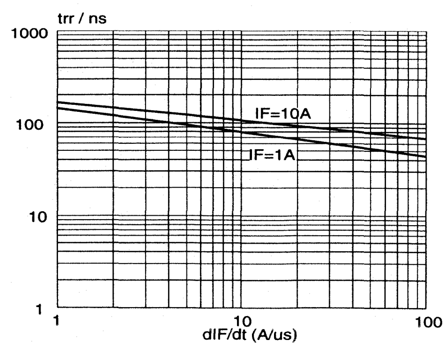


Fig.6. Maximum t_{rr} at T_j = 100 ˚C.

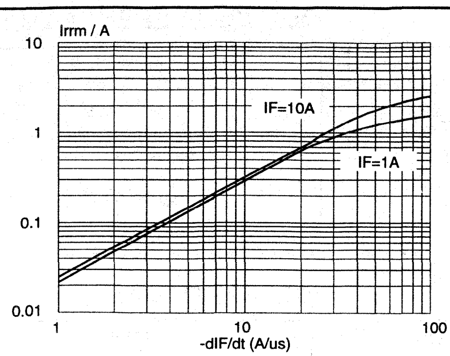


Fig.7. Maximum I_{rrm} at T_j = 25 ˚C.

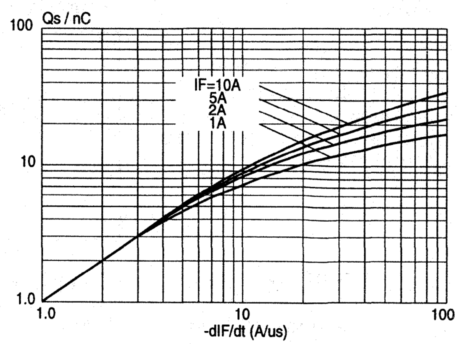


Fig.10. Maximum Q_s at T_j = 25 ˚C.

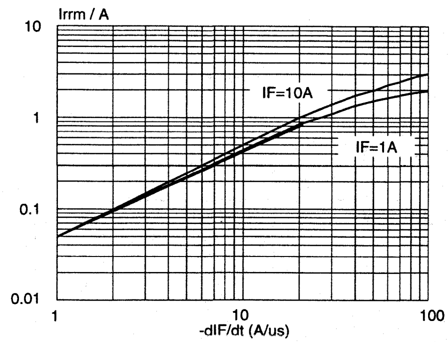


Fig.8. Maximum I_{rrm} at T_j = 100 ˚C.

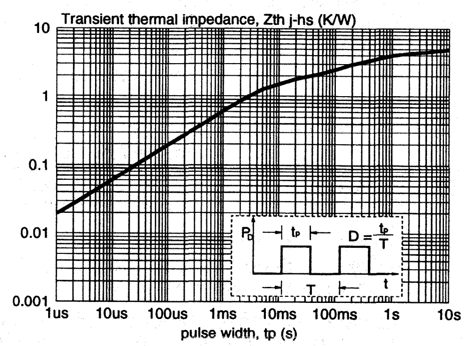


Fig.11. Transient thermal impedance; $Z_{th\,j\text{-}hs} = f(t_p)$.

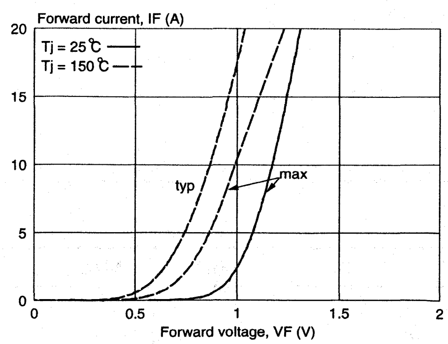
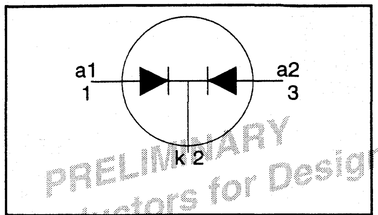


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 150 V/ 200 V

$V_F \leq$ 0.85 V

$I_{O(AV)}$ = 40 A

$I_{RRM} \leq$ 0.2 A

$t_{rr} \leq$ 40 ns

GENERAL DESCRIPTION

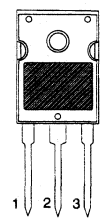
Dual, common cathode, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYQ40EW series is supplied in the conventional leaded SOT429 (TO247) package.

PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode
3	anode 2
tab	cathode

SOT429 (TO247)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNI
		BYQ40EW		-150	-200	
V_{RRM}	Peak repetitive reverse voltage		-	150	200	V
V_{RWM}	Crest working reverse voltage		-	150	200	V
V_R	Continuous reverse voltage		-	150	200	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave δ = 0.5; $T_{mb} \leq$ 117 ˚C	-	40		A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; δ = 0.5; $T_{mb} \leq$ 117 ˚C	-	40		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-	180		A
		t = 8.3 ms sinusoidal; with reapplied $V_{RWM(max)}$	-	200		A
I_{RRM}	Repetitive peak reverse current per diode	t_p = 2 µs; δ = 0.001	-	0.2		A
I_{RSM}	Non-repetitive peak reverse current per diode	t_p = 100 µs	-	0.2		A
T_{stg}	Storage temperature		-40	150		˚C
T_j	Operating junction temperature		-	150		˚C

ESD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNI
V_C	Electrostatic discharge capacitor voltage	Human body model; C = 250 pF; R = 1.5 kΩ	-	8	kV

HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	1	K/W
		both diodes conducting	-	-	0.85	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	45	-	K/W

LECTRICAL CHARACTERISTICS

ıaracteristics are per diode at T_j = 25 ˚C unless otherwise stated

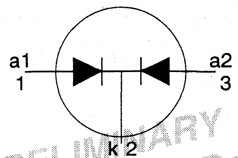
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 20 A; T_j = 150˚C	-	0.8	0.85	V
		I_F = 20 A	-	0.95	1.05	V
		I_F = 40 A	-	1.00	1.20	V
I_R	Reverse current	$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.5	1	mA
		$V_R = V_{RWM}$	-	10	100	µA
Q_s	Reverse recovery charge	I_F = 2 A; $V_R \geq$ 30 V; -dI_F/dt = 20 A/µs	-	10	21	nC
t_{rr}	Reverse recovery time	I_F = 1 A; $V_R \geq$ 30 V; -dI_F/dt = 100 A/µs	-	35	40	ns
V_{fr}	Forward recovery voltage	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

Rectifier diodes ultrafast, rugged

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 150 V/ 200 V

$V_F \leq 0.85$ V

$I_{O(AV)}$ = 60 A

$I_{RRM} \leq 0.2$ A

$t_{rr} \leq 60$ ns

GENERAL DESCRIPTION

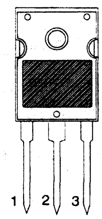
Dual, common cathode, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYQ60EW series is supplied in the conventional leaded SOT429 (TO247) package.

PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode
3	anode 2
tab	cathode

SOT429 (TO247)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		BYQ60EW		-150	-200	
V_{RRM}	Peak repetitive reverse voltage		-	150	200	V
V_{RWM}	Crest working reverse voltage		-	150	200	V
V_R	Continuous reverse voltage		-	150	200	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave $\delta = 0.5$; $T_{mb} \leq 100$ ˚C	-	60		A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 100$ ˚C	-	60		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-	250		A
		t = 8.3 ms sinusoidal; with reapplied $V_{RWM(max)}$	-	274		A
I_{RRM}	Repetitive peak reverse current per diode	t_p = 2 µs; $\delta = 0.001$	-	0.2		A
I_{RSM}	Non-repetitive peak reverse current per diode	t_p = 100 µs	-	0.2		A
T_{stg}	Storage temperature		-40	150		˚C
T_j	Operating junction temperature		-	150		˚C

ESD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage	Human body model; C = 250 pF; R = 1.5 kΩ	-	8	kV

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	1	K/W
		both diodes conducting	-	-	0.85	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	45	-	K/W

ELECTRICAL CHARACTERISTICS

characteristics arre per diode at T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 30 A; T_j = 150˚C	-	0.8	0.85	V
		I_F = 30 A	-	0.95	1.05	V
		I_F = 60 A	-	1.00	1.20	V
I_R	Reverse current	$V_R = V_{RWM}$; T_j = 100 ˚C	-	1	2	mA
		$V_R = V_{RWM}$	-	20	200	µA
Q_s	Reverse recovery charge	I_F = 2 A; $V_R \geq$ 30 V; -dI_F/dt = 20 A/µs	-	20	30	nC
t_{rr}	Reverse recovery time	I_F = 1 A; $V_R \geq$ 30 V; -dI_F/dt = 100 A/µs	-	50	60	ns
V_{fr}	Forward recovery voltage	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

Ripple blocking diode BYQ63

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed minimum turn-on time for absorbing forward current transients and oscillations
- Specially designed as rectifier in the auxiliary power supply in e.g. switched mode power supplies
- Available in ammo-pack
- Also available with preformed leads for easy insertion.

DESCRIPTION

Rugged glass SOD57 package, using a high temperature alloyed construction.

The SOD57 is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

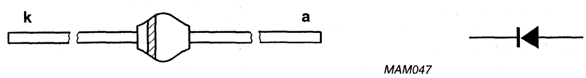


Fig.1 Simplified outline (SOD57) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	300	V
V_R	continuous reverse voltage		–	300	V
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; T_{tp} = 85 °C; lead length = 10 mm; see Fig.2; see also Fig.4	–	1.05	A
		averaged over any 20 ms period; T_{amb} = 60 °C; PCB mounting (Fig.8); see Fig.3; see also Fig.4	–	0.68	A
I_{FRM}	repetitive peak forward current	T_{tp} = 85 °C	–	9.6	A
		T_{amb} = 60 °C	–	6.4	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	30	A
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Fig.5	–	–	1.3	V
		I_F = 1 A; see Fig.5	–	–	2.15	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.6	–	–	5	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.6	–	–	150	μA
t_{fr}	forward recovery time	when switched to I_F = 5 A in 50 ns; see Fig.9	–	–	1.5	μs
t_{on}	turn-on time	when switched from V_F = 0 to V_F = 3 V; measured between 10% and 90% of I_{Fmax}; see Fig.11	400	–	–	ns
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.11	–	–	150	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0; see Fig.7	–	35	–	pF

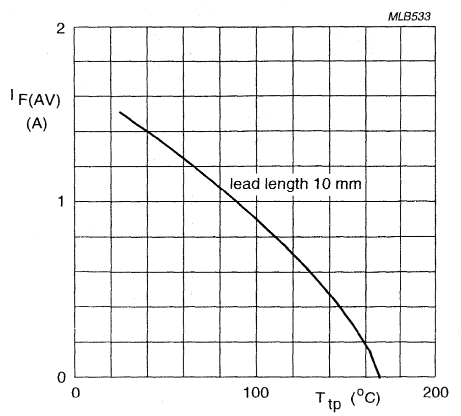
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	46	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

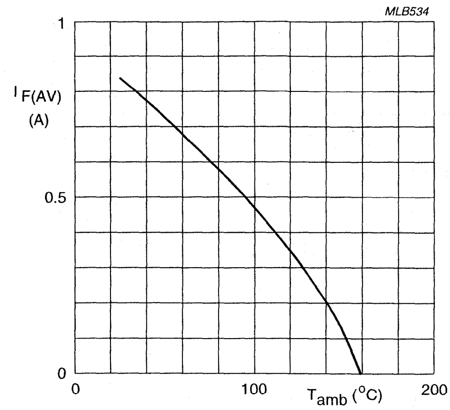
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.8. For more information please refer to the *'General Part of associated Handbook.'*

GRAPHICAL DATA



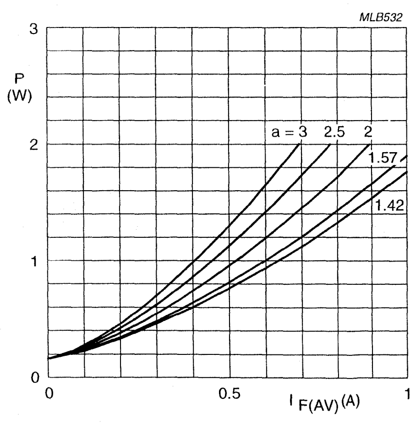
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Switched mode application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



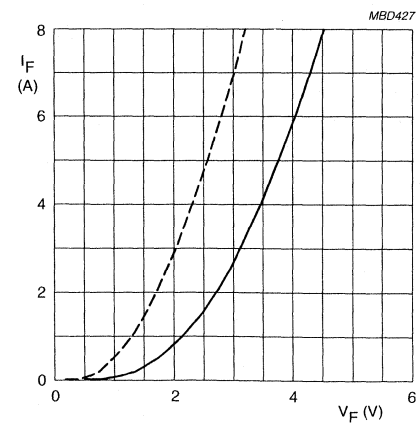
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Device mounted as shown in Fig.8.
Switched mode application.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



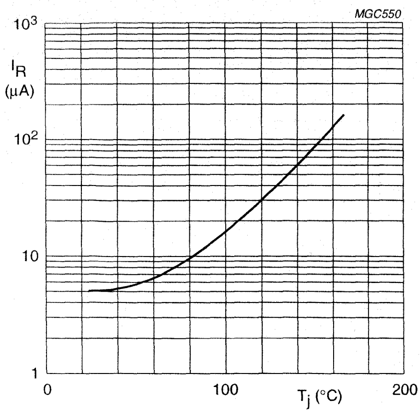
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; δ = 0.5.

Fig.4 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



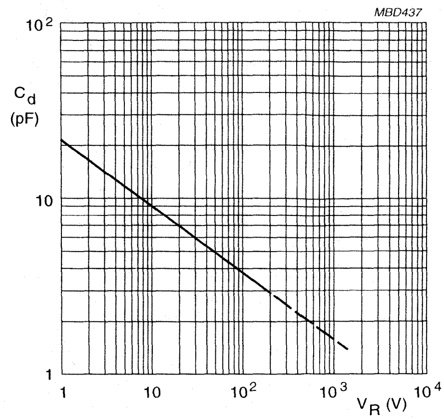
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.5 Forward current as a function of forward voltage; maximum values.



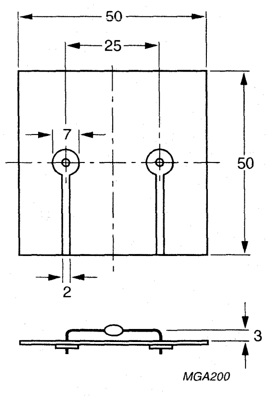
$V_R = V_{RRMmax}$.

Fig.6 Reverse current as a function of junction temperature; maximum values.



f = 1 MHz; T_j = 25 °C.

Fig.7 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.8 Device mounted on a printed-circuit board.

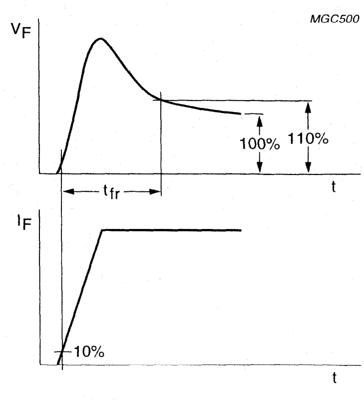
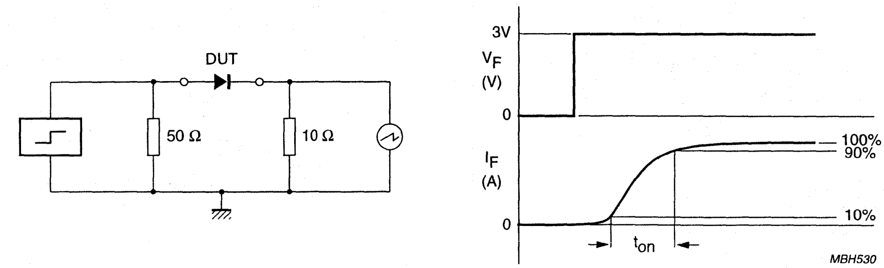
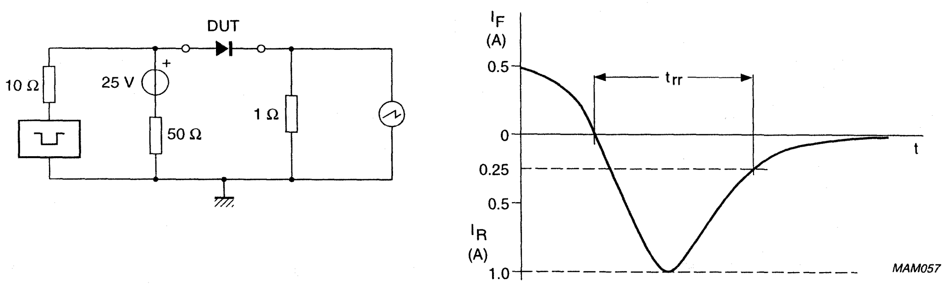


Fig.9 Forward recovery time definition.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 10$ ns.

Fig.10 Test circuit and turn-on time waveform and definition.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.11 Test circuit and reverse recovery time waveform and definition.

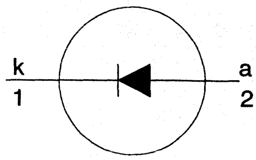
Rectifier diodes ultrafast

BYR29 series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 500 V/ 600 V/ 700 V / 800 V

$V_F \leq 1.5$ V

$I_{F(AV)} = 8$ A

$t_{rr} \leq 75$ ns

GENERAL DESCRIPTION

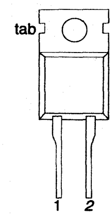
Ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYR29 series is supplied in the conventional leaded SOD59 (TO220AC) package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.				UNIT
		BYR29		-500	-600	-700	-800	
V_{RRM}	Peak repetitive reverse voltage		-	500	600	700	800	V
V_{RWM}	Crest working reverse voltage		-	500	600	700	800	V
V_R	Continuous reverse voltage		-	500	600	700	800	V
$I_{F(AV)}$	Average forward current[1]	square wave; $\delta = 0.5$; $T_{mb} \leq 115$ ˚C	-	8				A
I_{FRM}	Repetitive peak forward current	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 115$ ˚C	-	16				A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms	-	60				A
		t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$	-	66				A
T_{stg}	Storage temperature		-40	150				˚C
T_j	Operating junction temperature		-	150				˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2.5	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	60	-	K/W

1 Neglecting switching and reverse current losses

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 8 A; T_j = 150˚C	-	1.07	1.50	V
		I_F = 20 A	-	1.75	1.95	V
I_R	Reverse current	$V_R = V_{RRM}$	-	1.0	10	µA
		$V_R = V_{RRM}$; T_j = 100 ˚C	-	0.1	0.2	mA
Q_s	Reverse recovery charge	I_F = 2 A to $V_R \geq$ 30 V; dI_F/dt = 20 A/µs	-	150	200	nC
t_{rr}	Reverse recovery time	I_F = 1 A to $V_R \geq$ 30 V; dI_F/dt = 100 A/µs	-	60	75	ns
I_{rrm}	Peak reverse recovery current	I_F = 10 A to $V_R \geq$ 30 V; dI_F/dt = 50 A/µs; T_j = 100 ˚C	-	-	6	A
V_{fr}	Forward recovery voltage	I_F = 10 A; dI_F/dt = 10 A/µs	-	5.0	-	V

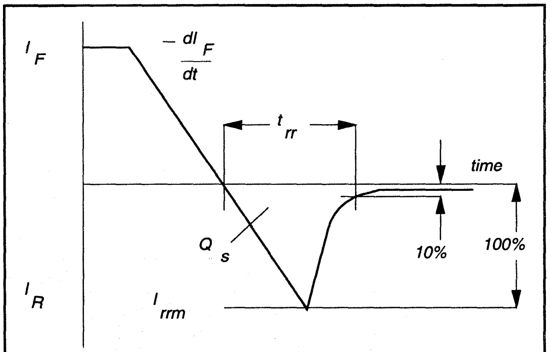


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

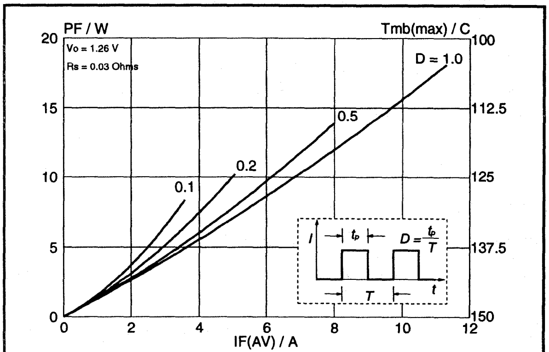


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

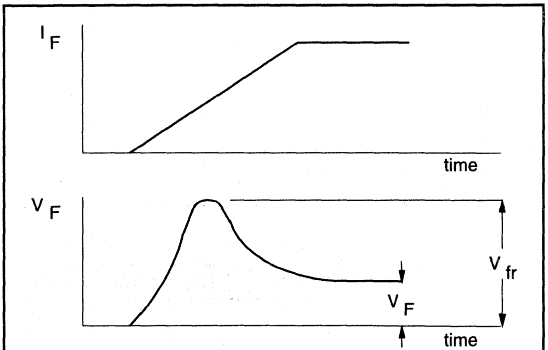


Fig.2. Definition of V_{fr}

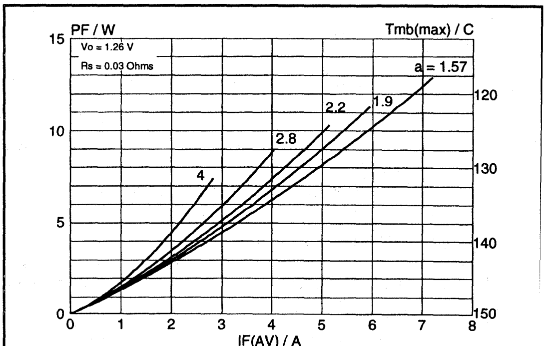


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

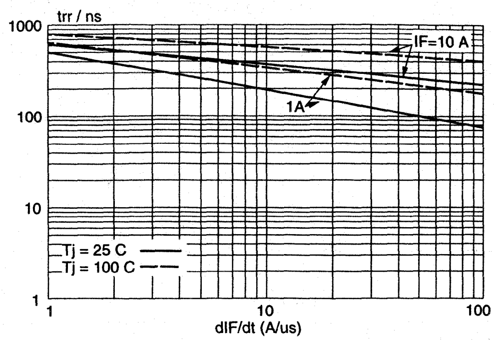


Fig.5. Maximum t_{rr} at T_j = 25˚C and 100˚C.

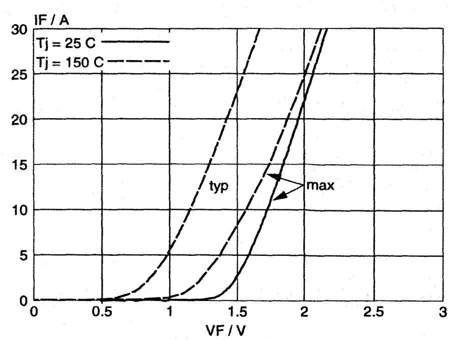


Fig.7. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

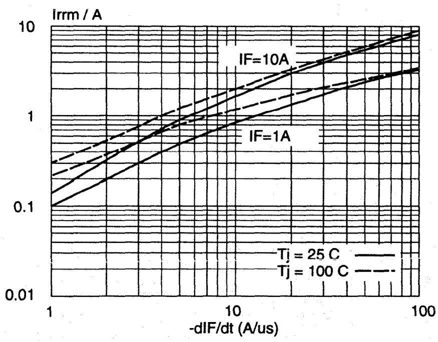


Fig.6. Maximum I_{rrm} at T_j = 25˚C and 100˚C.

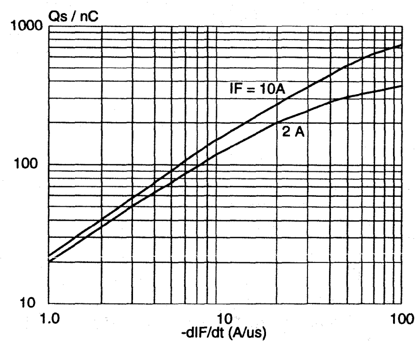


Fig.8. Maximum Q_s at T_j = 25˚C

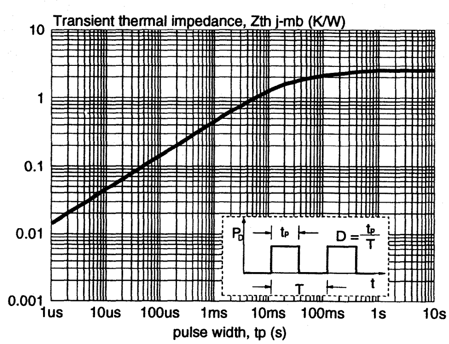


Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$

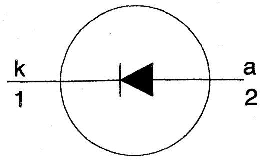
Rectifier diodes ultrafast

BYR29F series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

V_R = 500 V/ 600 V/ 700 V / 800 V

$V_F \leq 1.5$ V

$I_{F(AV)} = 8$ A

$t_{rr} \leq 75$ ns

GENERAL DESCRIPTION

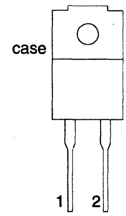
Ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYR29F series is supplied in the conventional leaded SOD100 package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	isolated

SOD100



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.				UNIT
		BYR29F		-500	-600	-700	-800	
V_{RRM}	Peak repetitive reverse voltage		-	500	600	700	800	V
V_{RWM}	Crest working reverse voltage		-	500	600	700	800	V
V_R	Continuous reverse voltage	$T_{hs} \leq 136$ ˚C	-	500	600	700	800	V
$I_{F(AV)}$	Average forward current[1]	square wave; $\delta = 0.5$; $T_{hs} \leq 73$ ˚C	-	8				A
I_{FRM}	Repetitive peak forward current	t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 73$ ˚C	-	16				A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms	-	60				A
		t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$	-	66				A
T_{stg}	Storage temperature		-40	150				˚C
T_j	Operating junction temperature		-	150				˚C

1 Neglecting switching and reverse current losses

SOLATION LIMITING VALUE & CHARACTERISTIC

$_{hs}$ = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Repetitive peak voltage from both terminals to external heatsink	R.H. ≤ 65% ; clean and dustfree	-		1500	V
C_{isol}	Capacitance from cathode to external heatsink	f = 1 MHz	-	12	-	pF

HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\,j-hs}$	Thermal resistance junction to heatsink	with heatsink compound without heatsink compound	- -	- -	5.5 7.2	K/W K/W
$R_{th\,j-a}$	Thermal resistance junction to ambient	in free air.	-	55	-	K/W

LECTRICAL CHARACTERISTICS

= 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 8 A; T_j = 150˚C I_F = 20 A	- -	1.07 1.75	1.50 1.95	V V
I_R	Reverse current	$V_R = V_{RRM}$ $V_R = V_{RRM}$; T_j = 100 ˚C	- -	1.0 0.1	10 0.2	µA mA
Q_s	Reverse recovery charge	I_F = 2 A to $V_R \geq$ 30 V; dI_F/dt = 20 A/µs	-	150	200	nC
t_{rr}	Reverse recovery time	I_F = 1 A to $V_R \geq$ 30 V; dI_F/dt = 100 A/µs	-	60	75	ns
I_{rrm}	Peak reverse recovery current	I_F = 10 A to $V_R \geq$ 30 V; dI_F/dt = 50 A/µs; T_j = 100 ˚C	-	-	6	A
V_{fr}	Forward recovery voltage	I_F = 10 A; dI_F/dt = 10 A/µs	-	5.0	-	V

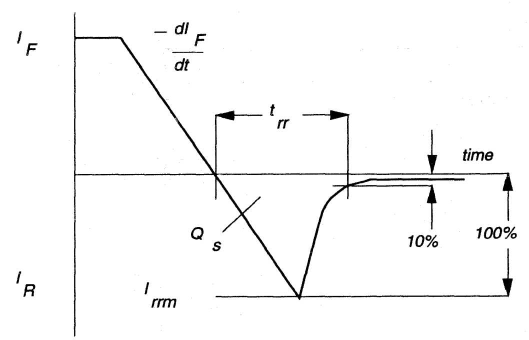


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

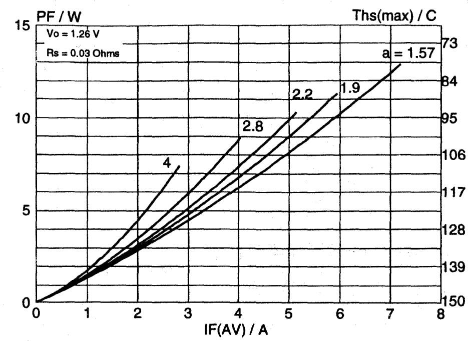


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

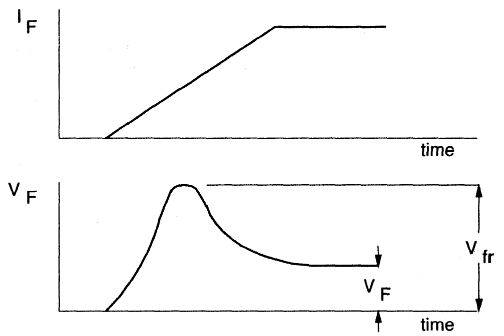


Fig.2. Definition of V_{fr}

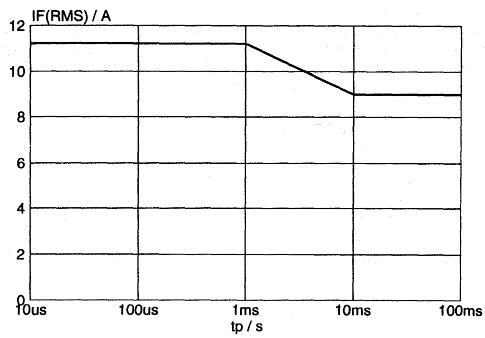


Fig.5. Maximum permissible rms current $I_{F(RMS)}$ versus pulse width.

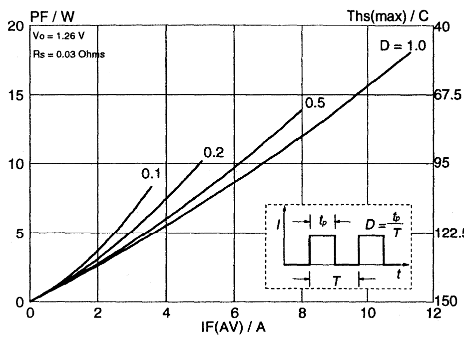


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

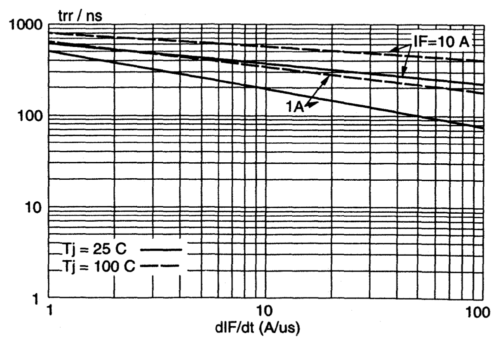


Fig.6. Maximum t_{rr} at T_j = 25˚C and 100˚C.

Rectifier diodes ultrafast

BYR29F series

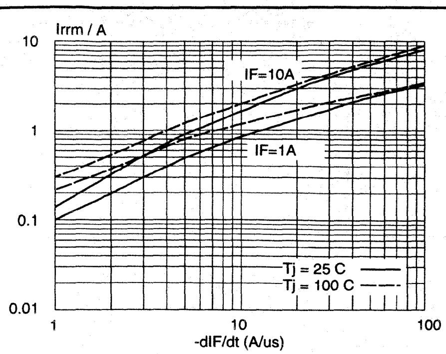


Fig.7. Maximum I_{rrm} at T_j = 25˚C and 100˚C.

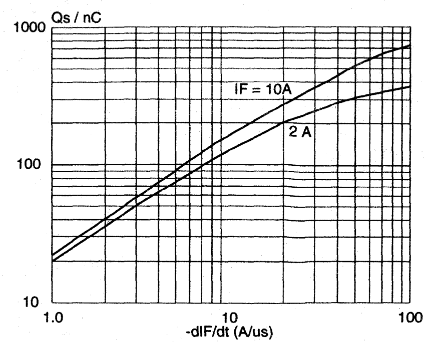


Fig.9. Maximum Q_s at T_j = 25˚C

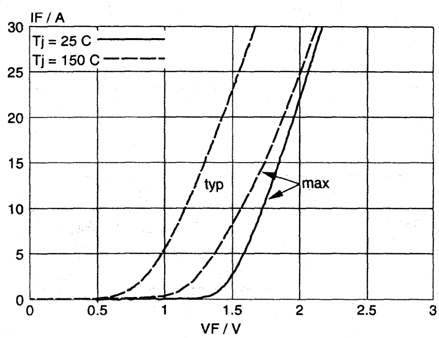


Fig.8. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

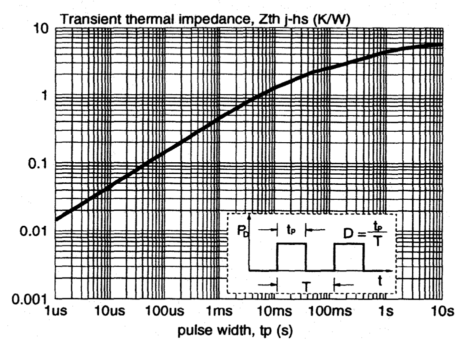


Fig.10. Transient thermal impedance $Z_{th} = f(t_p)$

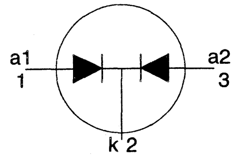
Dual rectifier diodes ultrafast

BYT28 series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 300 V/ 400 V/ 500 V

$V_F \leq 1.05$ V

$I_{O(AV)}$ = 10 A

$t_{rr} \leq 60$ ns

GENERAL DESCRIPTION

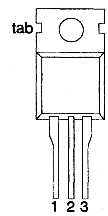
Dual, common cathode, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYT28 series is supplied in the conventional leaded SOT78 (TO220AB) package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOT78 (TO220AB)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
		BYT28		-300	-400	-500	
V_{RRM}	Repetitive peak reverse voltage		-	300	400	500	V
V_R	Continuous reverse voltage	$T_{mb} \leq 147$˚C	-	300	400	500	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)[1]	square wave; $\delta = 0.5$; $T_{mb} \leq 115$ ˚C	-	10			A
I_{FSM}	Non-repetitive peak forward current per diode.	t = 10 ms	-	50			A
		t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$	-	55			A
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	per diode	-	-	4.5	K/W
		both diodes conducting	-	-	3.0	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	60	-	K/W

1 Neglecting switching and reverse current losses.

ELECTRICAL CHARACTERISTICS

characteristics are per diode at T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 5 A; T_j = 150˚C	-	0.95	1.05	V
		I_F = 10 A	-	1.30	1.40	V
I_R	Reverse current	$V_R = V_{RRM}$	-	2.0	10	µA
		$V_R = V_{RRM}$; T_j = 100 ˚C	-	10	200	µA
Q_s	Reverse recovery charge	I_F = 2 A to $V_R \geq$ 30 V; dI_F/dt = 20 A/µs	-	50	60	nC
t_{rr}	Reverse recovery time	I_F = 1 A to $V_R \geq$ 30 V; dI_F/dt = 100 A/µs	-	50	60	ns
I_{rrm}	Peak reverse recovery current	I_F = 5 A to $V_R \geq$ 30 V; dI_F/dt = 50 A/µs; T_j = 100˚C	-	2.0	3.0	A
V_{fr}	Forward recovery voltage	I_F = 1 A; dI_F/dt = 10 A/µs	-	2.5	-	V

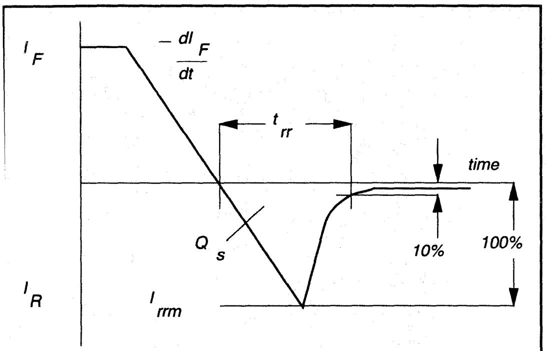


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

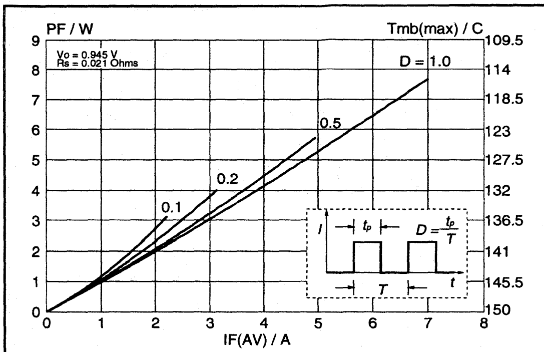


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

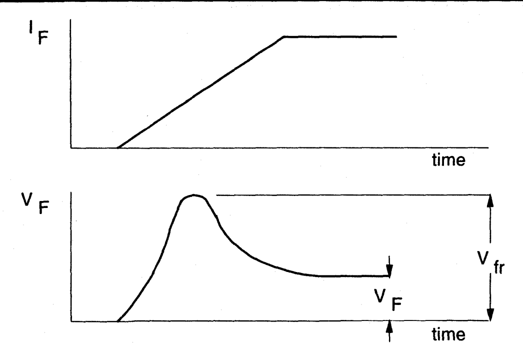


Fig.2. Definition of V_{fr}

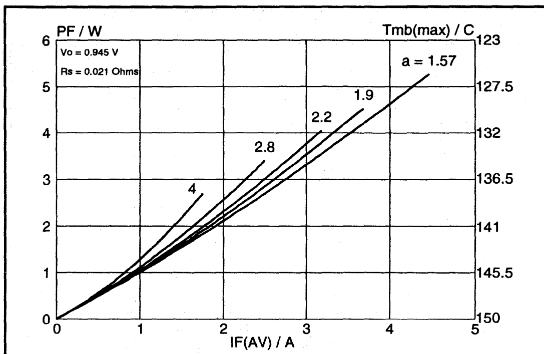


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

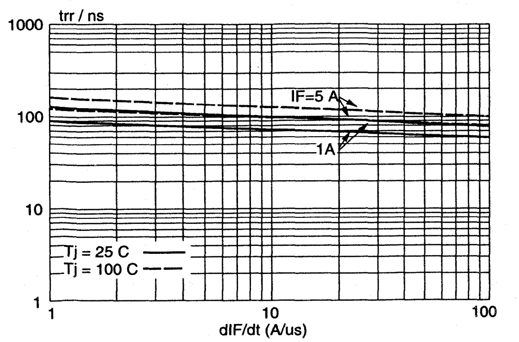


Fig.5. Maximum t_{rr} at T_j = 25˚C and 100˚C; per diode

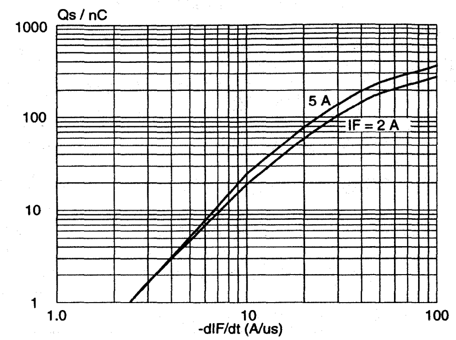


Fig.8. Maximum Q_s at T_j = 25˚C; per diode.

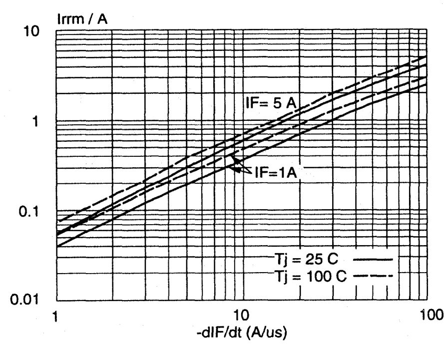


Fig.6. Maximum I_{rrm} at T_j = 25˚C and 100˚C; per diode.

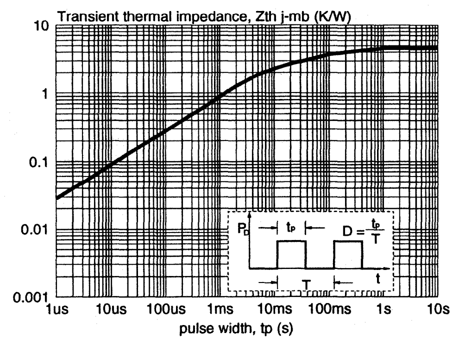


Fig.9. Transient thermal impedance per diode $Z_{th} = f(t_p)$

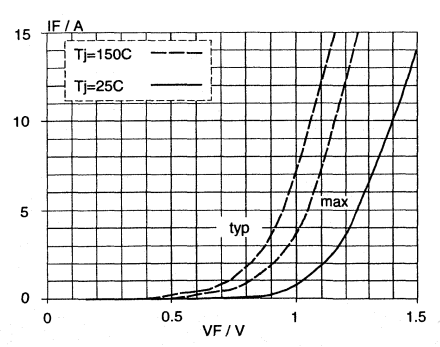


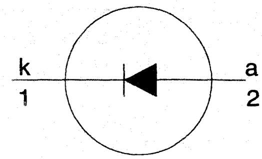
Fig.7. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

Rectifier diodes ultrafast | BYT79 series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 300 V/ 400 V/ 500 V

$V_F \leq 1.05$ V

$I_{F(AV)} = 14$ A

$t_{rr} \leq 60$ ns

GENERAL DESCRIPTION

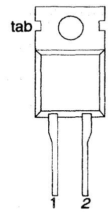
Ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYT79 series is supplied in the conventional leaded SOD59 (TO220AC) package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
		BYT79		-300	-400	-500	
V_{RRM}	Peak repetitive reverse voltage		-	300	400	500	V
V_R	Continuous reverse voltage	$T_{mb} \leq 147$˚C	-	300	400	500	V
$I_{F(AV)}$	Average forward current[1]	square wave; $\delta = 0.5$; $T_{mb} \leq 117$ ˚C	-	14			A
I_{FSM}	Non-repetitive peak forward current.	t = 10 ms	-	130			A
		t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$	-	143			A
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2.0	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	60	-	K/W

Neglecting switching and reverse current losses

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 15 A; T_j = 150˚C	-	0.90	1.05	V
		I_F = 30 A	-	1.17	1.38	V
I_R	Reverse current	$V_R = V_{RRM}$	-	5.0	50	µA
		$V_R = V_{RRM}$; T_j = 100 ˚C	-	0.2	0.8	mA
Q_s	Reverse recovery charge	I_F = 2 A to $V_R \geq$ 30 V; dI_F/dt = 20 A/µs	-	50	60	nC
t_{rr}	Reverse recovery time	I_F = 1 A to $V_R \geq$ 30 V; dI_F/dt = 100 A/µs	-	50	60	ns
I_{rrm}	Peak reverse recovery current	I_F = 10 A to $V_R \geq$ 30 V; dI_F/dt = 50 A/µs; T_j = 100˚C	-	4.0	5.2	A
V_{fr}	Forward recovery voltage	I_F = 10 A; dI_F/dt = 10 A/µs	-	2.5	-	V

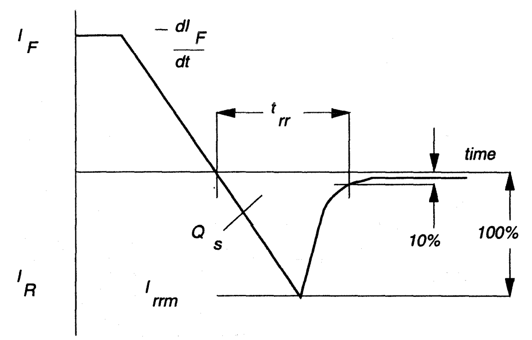


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

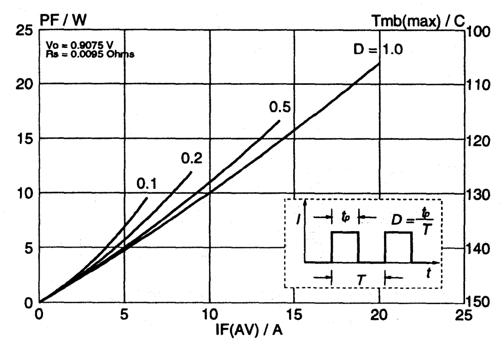


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

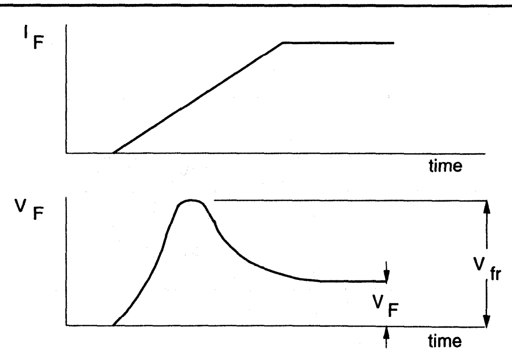


Fig.2. Definition of V_{fr}

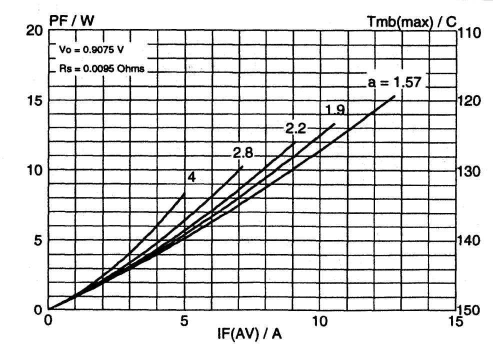


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

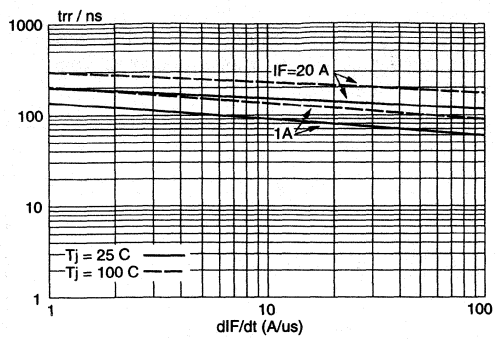


Fig.5. Maximum t_{rr} at T_j = 25˚C and 100˚C

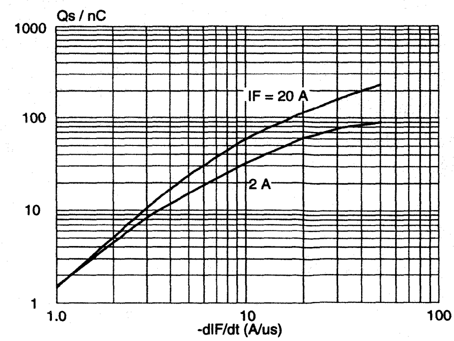


Fig.8. Maximum Q_s at T_j = 25˚C

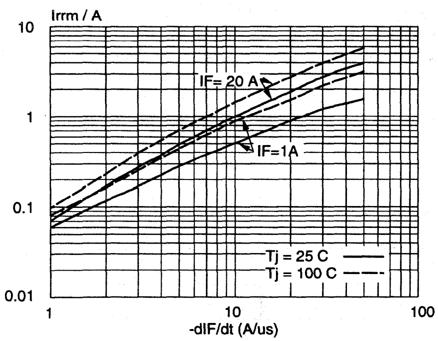


Fig.6. Maximum I_{rrm} at T_j = 25˚C and 100˚C.

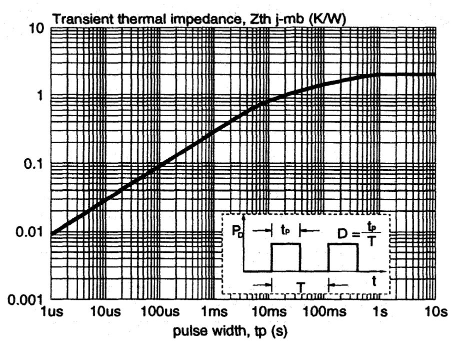


Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$

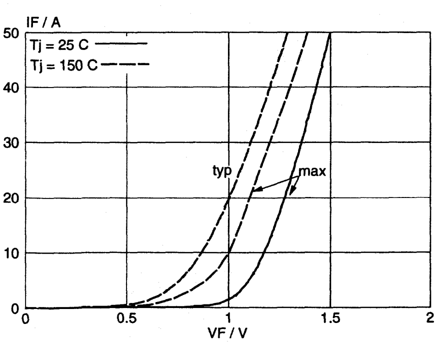


Fig.7. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

Schottky barrier diodes BYV10 series

FEATURES

- Low switching losses
- Fast recovery time
- Guard ring protected
- Hermetically sealed leaded glass package.

APPLICATIONS

- Low power, switched-mode power supplies
- Rectifying
- Polarity protection.

DESCRIPTION

The BYV10-20 to BYV10-40 types are Schottky barrier diodes fabricated in planar technology, and encapsulated in SOD81 hermetically sealed glass packages incorporating Implotec$^{TM(1)}$ technology.

(1) Implotec is a trademark of Philips.

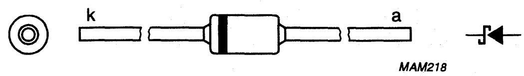


Fig.1 Simplified outline (SOD81) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYV10-20		–	20	V
	BYV10-30		–	30	V
	BYV10-40		–	40	V
$I_{F(AV)}$	average forward current	note 1	–	1	A
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	125	°C

Note

1. Refer to SOD81 standard mounting conditions.

ELECTRICAL CHARACTERISTICS

T_{amb} = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 0.1 A	–	–	390	mV
		I_F = 1 A	–	–	550	mV
		I_F = 3 A	–	–	850	mV
I_R	reverse current	$V_R = V_{RRMmax}$; note 1	–	–	1	mA
C_d	diode capacitance	V_R = 0 V; f = 1 MHz	–	220	–	pF

Note

1. Pulsed test: t_p = 300 μs; δ = 0.02.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

1. Refer to SOD81 standard mounting conditions.

Fast soft-recovery controlled avalanche rectifiers

BYV26 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack.

DESCRIPTION

Rugged glass SOD57 package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

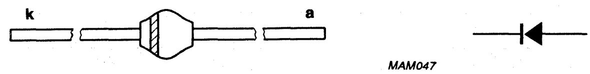


Fig.1 Simplified outline (SOD57) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYV26A		–	200	V
	BYV26B		–	400	V
	BYV26C		–	600	V
	BYV26D		–	800	V
	BYV26E		–	1000	V
	BYV26F		–	1200	V
	BYV26G		–	1400	V
V_R	continuous reverse voltage				
	BYV26A		–	200	V
	BYV26B		–	400	V
	BYV26C		–	600	V
	BYV26D		–	800	V
	BYV26E		–	1000	V
	BYV26F		–	1200	V
	BYV26G		–	1400	V
$I_{F(AV)}$	average forward current	T_{tp} = 85 °C; lead length = 10 mm; see Figs 2 and 3; averaged over any 20 ms period; see also Figs 10 and 11			
	BYV26A to E		–	1.00	A
	BYV26F and G		–	1.05	A
$I_{F(AV)}$	average forward current	T_{amb} = 60 °C; PCB mounting (see Fig.19); see Figs 4 and 5; averaged over any 20 ms period; see also Figs 10 and 11			
	BYV26A to E		–	0.65	A
	BYV26F and G		–	0.68	A
I_{FRM}	repetitive peak forward current	T_{tp} = 85 °C; see Figs 6 and 7			
	BYV26A to E		–	10.0	A
	BYV26F and G		–	9.6	A

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{FRM}	repetitive peak forward current	T_{amb} = 60 °C; see Figs 8 and 9			
	BYV26A to E		–	6.0	A
	BYV26F and G		–	6.4	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	30	A
E_{RSM}	non-repetitive peak reverse avalanche energy	I_R = 400 mA; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	10	mJ
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature	see Figs 12 and 13	–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Figs 14 and 15				
	BYV26A to E		–	–	1.3	V
	BYV26F and G		–	–	1.3	V
V_F	forward voltage	I_F = 1 A; see Figs 14 and 15				
	BYV26A to E		–	–	2.50	V
	BYV26F and G		–	–	2.15	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYV26A		300	–	–	V
	BYV26B		500	–	–	V
	BYV26C		700	–	–	V
	BYV26D		900	–	–	V
	BYV26E		1100	–	–	V
	BYV26F		1300	–	–	V
	BYV26G		1500	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.16	–	–	5	µA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.16	–	–	150	µA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.20				
	BYV26A to C		–	–	30	ns
	BYV26D and E		–	–	75	ns
	BYV26F and G		–	–	150	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Figs 17 and 18				
	BYV26A to C		–	45	–	pF
	BYV26D and E		–	40	–	pF
	BYV26F and G		–	35	–	pF

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$\left\lvert \frac{dI_R}{dt} \right\rvert$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq$ 30 V and dI_F/dt = −1 A/µs; see Fig.21				
	BYV26A to C		–	–	7	A/µs
	BYV26D and E		–	–	6	A/µs
	BYV26F and G		–	–	5	A/µs

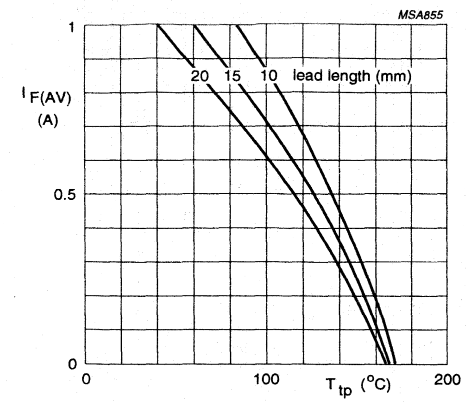
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	46	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm, see Fig.19. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA

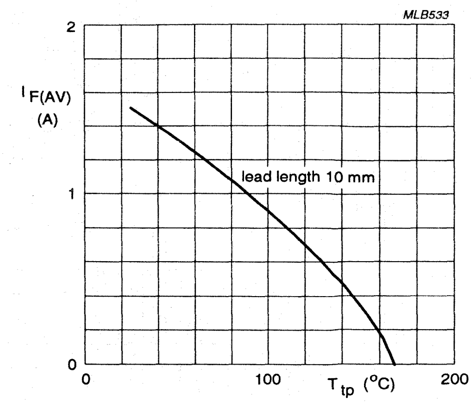


BYV26A to E

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Switched mode application.

Fig.2 Maximum average forward current as a function of tie-point temperature (including losses due to reverse leakage).

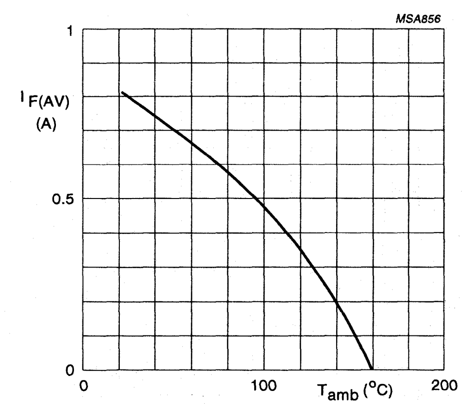


BYV26F and G

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Switched mode application.

Fig.3 Maximum average forward current as a function of tie-point temperature (including losses due to reverse leakage).



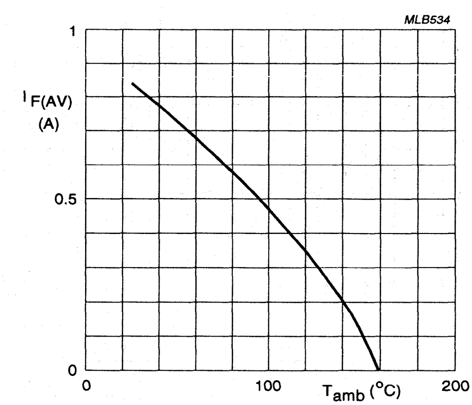
BYV26A to E

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Device mounted as shown in Fig.19.

Switched mode application.

Fig.4 Maximum average forward current as a function of ambient temperature (including losses due to reverse leakage).



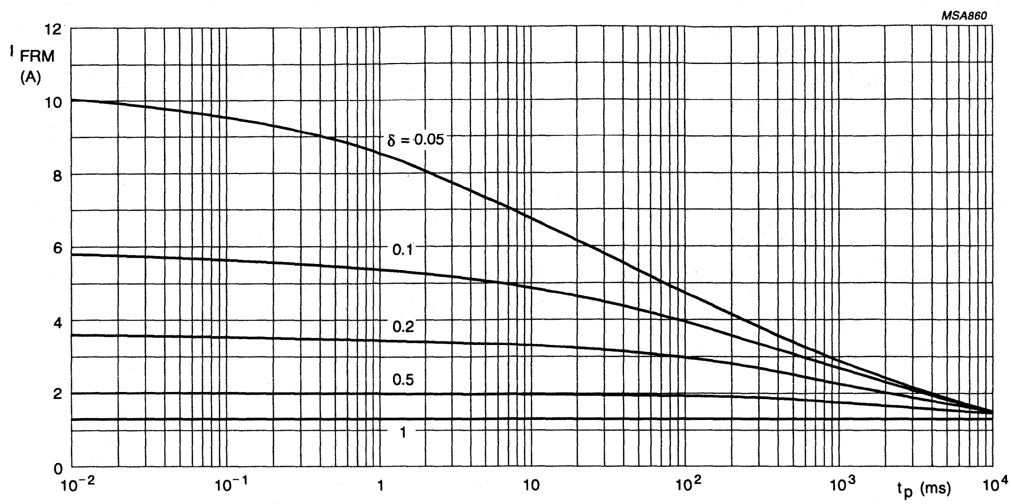
BYV26F and G

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Device mounted as shown in Fig.19.

Switched mode application.

Fig.5 Maximum average forward current as a function of ambient temperature (including losses due to reverse leakage).

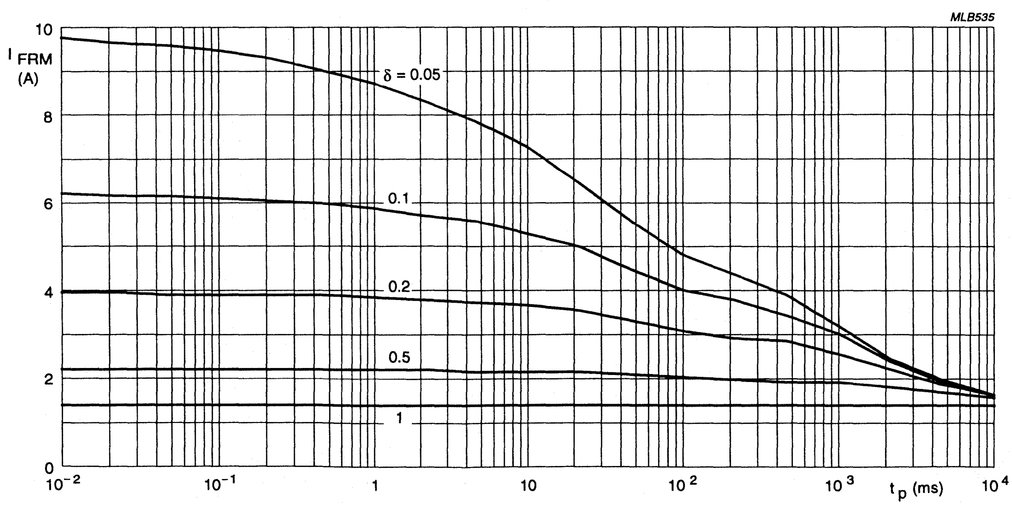


BYV26A to E.

T_{tp} = 85°C; $R_{th\ j\text{-}tp}$ = 46 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1000 V.

Fig.6 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



BYV26F and G.

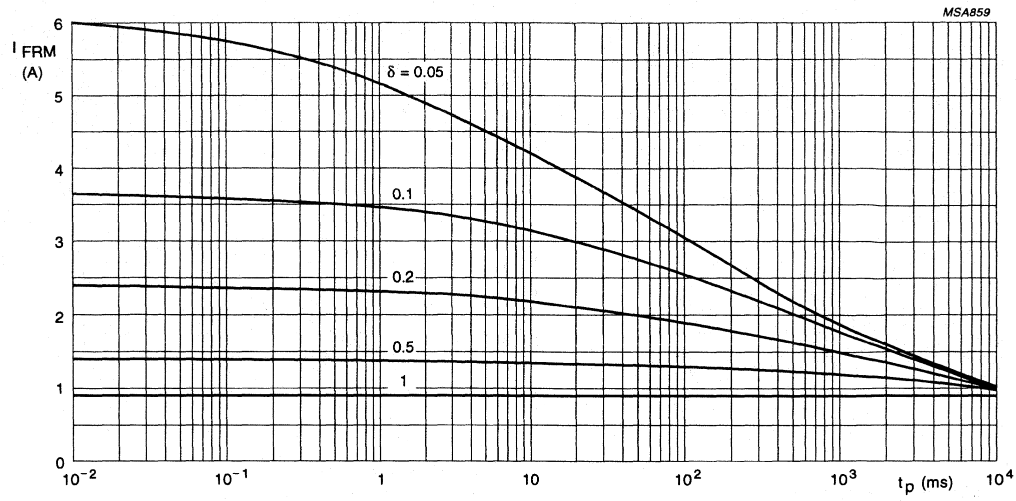
T_{tp} = 85°C; $R_{th\ j\text{-}tp}$ = 46 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1400 V.

Fig.7 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

Fast soft-recovery controlled avalanche rectifiers

BYV26 series

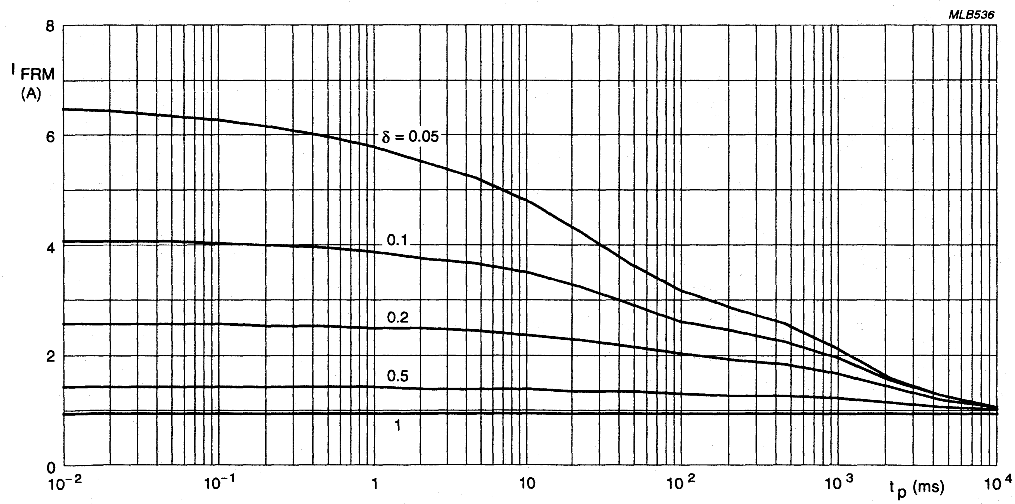


BYV26A to E

T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 100 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1000 V.

Fig.8 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

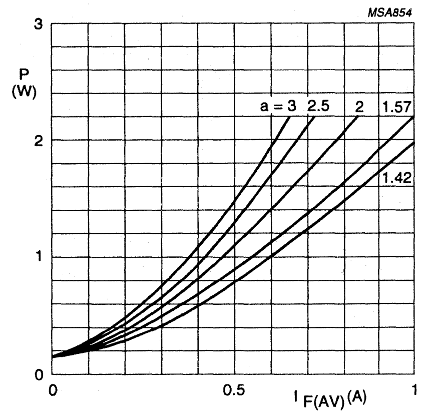


BYV26F and G

T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 100 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1400 V.

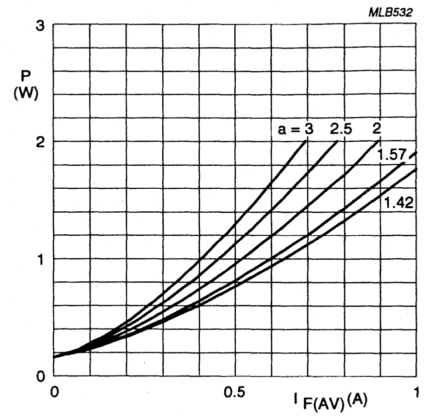
Fig.9 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



BYV26A to E

$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

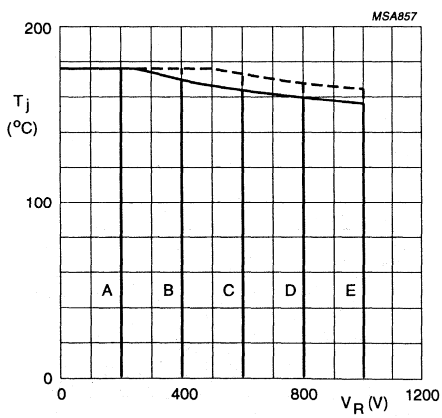
Fig.10 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



BYV26F and G

$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Fig.11 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.

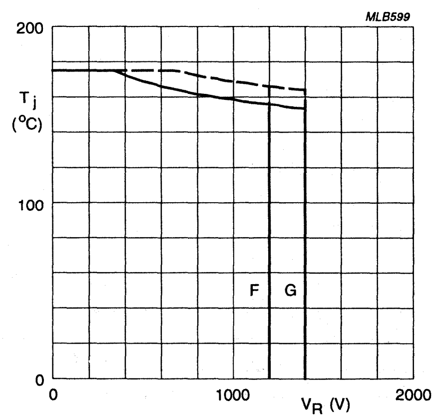


BYV26A to E

Solid line = V_R.

Dotted line = V_{RRM}; $\delta = 0.5$.

Fig.12 Maximum permissible junction temperature as a function of reverse voltage.

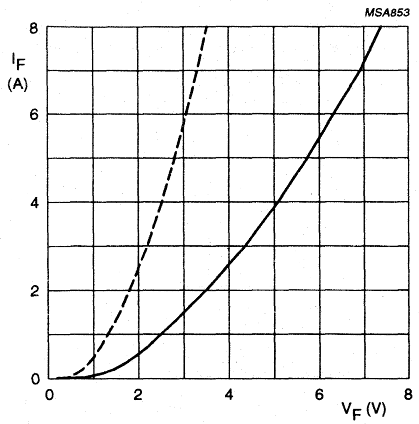


BYV26F and G

Solid line = V_R.

Dotted line = V_{RRM}; $\delta = 0.5$.

Fig.13 Maximum permissible junction temperature as a function of reverse voltage.

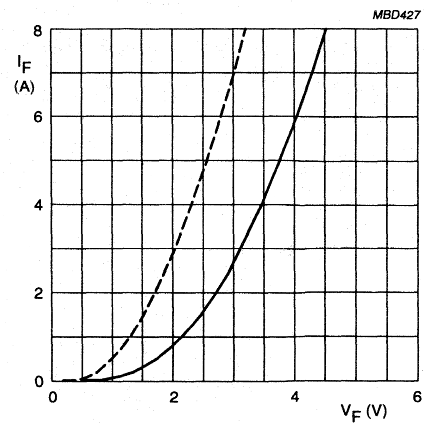


BYV26A to E

Dotted line: T_j = 175 °C.

Solid line: T_j = 25 °C.

Fig.14 Forward current as a function of forward voltage; maximum values.

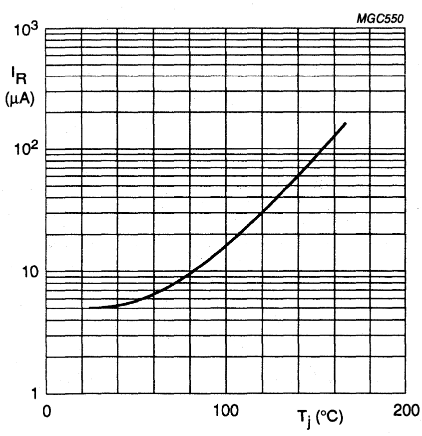


BYV26F and G

Dotted line: T_j = 175 °C.

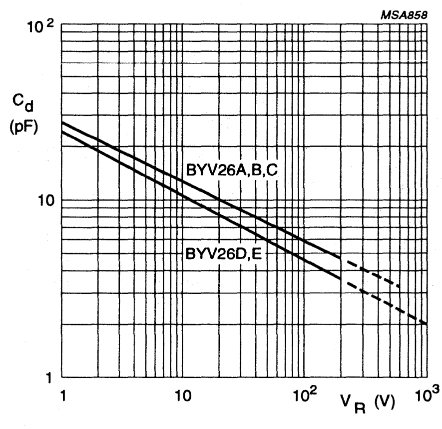
Solid line: T_j = 25 °C.

Fig.15 Forward current as a function of forward voltage; maximum values.



$V_R = V_{RRMmax}$.

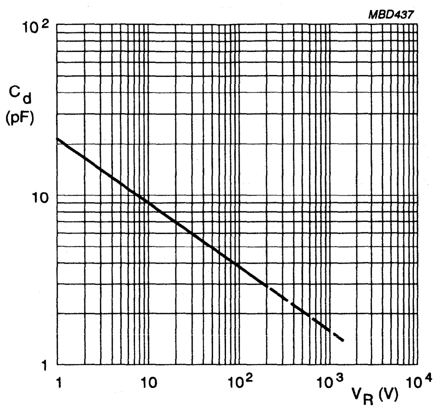
Fig.16 Reverse current as a function of junction temperature; maximum values.



BYV26A to E

f = 1 MHz; T_j = 25 °C.

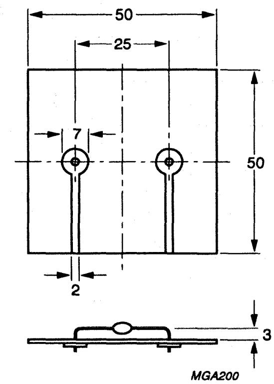
Fig.17 Diode capacitance as a function of reverse voltage, typical values.



BYV26F and G

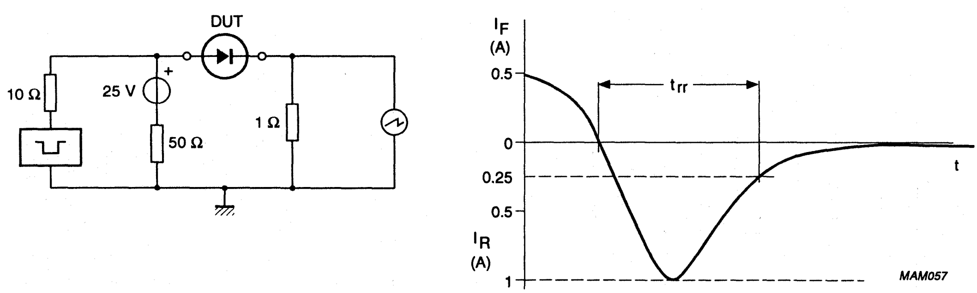
f = 1 MHz; T_j = 25 °C.

Fig.18 Diode capacitance as a function of reverse voltage, typical values.



Dimensions in mm.

Fig.19 Device mounted on a printed-circuit board.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \le 7$ ns.

Source impedance: 50 Ω; $t_r \le 15$ ns.

Fig.20 Test circuit and reverse recovery time waveform and definition.

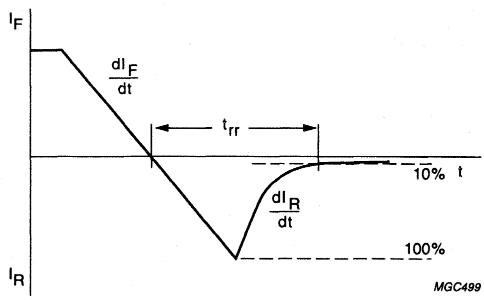


Fig.21 Reverse recovery definitions.

Ultra fast low-loss controlled avalanche rectifiers

BYV27 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack.

DESCRIPTION

Rugged glass SOD57 package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

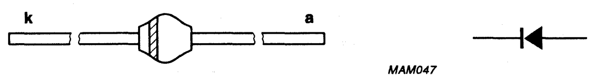


Fig.1 Simplified outline (SOD57) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYV27-50		–	50	V
	BYV27-100		–	100	V
	BYV27-150		–	150	V
	BYV27-200		–	200	V
	BYV27-300		–	300	V
	BYV27-400		–	400	V
	BYV27-500		–	500	V
	BYV27-600		–	600	V
V_R	continuous reverse voltage				
	BYV27-50		–	50	V
	BYV27-100		–	100	V
	BYV27-150		–	150	V
	BYV27-200		–	200	V
	BYV27-300		–	300	V
	BYV27-400		–	400	V
	BYV27-500		–	500	V
	BYV27-600		–	600	V
$I_{F(AV)}$	average forward current	T_{tp} = 85 °C; lead length = 10 mm; see Figs 2, 3 and 4; averaged over any 20 ms period; see also Figs 14, 15 and 16			
	BYV27-50 to 200		–	2.0	A
	BYV27-300 and 400		–	1.9	A
	BYV27-500 and 600		–	1.6	A
$I_{F(AV)}$	average forward current	T_{amb} = 60 °C; printed-circuit board mounting (see Fig. 25); see Figs 5, 6 and 7; averaged over any 20 ms period; see also Figs 14, 15 and 16			
	BYV27-50 to 200		–	1.30	A
	BYV27-300 and 400		–	1.25	A
	BYV27-500 and 600		–	1.10	A

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{FRM}	repetitive peak forward current	T_{tp} = 85 °C; see Figs 8, 9 and 10			
	BYV27-50 to 400		–	20	A
	BYV27-500 and 600		–	16	A
I_{FRM}	repetitive peak forward current	T_{amb} = 60 °C; see Figs 11, 12 and 13			
	BYV27-50 to 200		–	14	A
	BYV27-300 and 400		–	13	A
	BYV27-500 and 600		–	11	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$			
	BYV27-50 to 400		–	50	A
	BYV27-500 and 600		–	40	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	20	mJ
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature	see Fig. 17	–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 2 A; $T_j = T_{j\,max}$; see Figs 18, 19 and 20				
	BYV27-50 to 200		–	–	0.78	V
	BYV27-300 and 400		–	–	0.82	V
	BYV27-500 and 600		–	–	1.00	V
V_F	forward voltage	I_F = 2 A; see Figs 18, 19 and 20				
	BYV27-50 to 200		–	–	0.98	V
	BYV27-300 and 400		–	–	1.05	V
	BYV27-500 and 600		–	–	1.25	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYV27-50		55	–	–	V
	BYV27-100		110	–	–	V
	BYV27-150		165	–	–	V
	BYV27-200		220	–	–	V
	BYV27-300		330	–	–	V
	BYV27-400		440	–	–	V
	BYV27-500		560	–	–	V
	BYV27-600		675	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig. 21	–	–	5	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig. 21	–	–	150	μA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
t_{rr}	reverse recovery time	when switched from $I_F = 0.5$ A to $I_R = 1$ A; measured at $I_R = 0.25$ A; see Fig. 27				
	BYV27-50 to 200		–	–	25	ns
	BYV27-300 to 600		–	–	50	ns
C_d	diode capacitance	f = 1 MHz; $V_R = 0$; see Figs 22, 23 and 24				
	BYV27-50 to 200		–	100	–	pF
	BYV27-300 and 400		–	80	–	pF
	BYV27-500 and 600		–	65	–	pF
$\left\lvert\frac{dI_R}{dt}\right\rvert$	maximum slope of reverse recovery current	when switched from $I_F = 1$ A to $V_R \geq 30$ V and $dI_F/dt = -1$ A/µs; see Fig. 26	–	–	4	A/µs

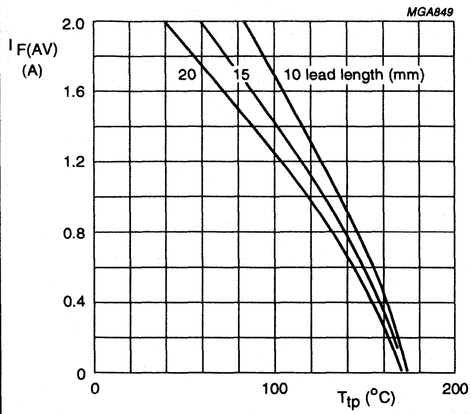
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	46	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm, see Fig. 25. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA

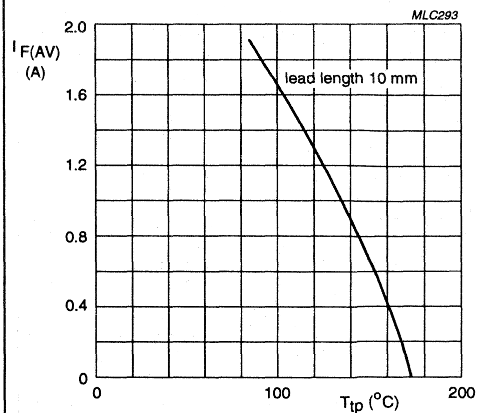


BYV27-50 to 200

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Switched mode application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).

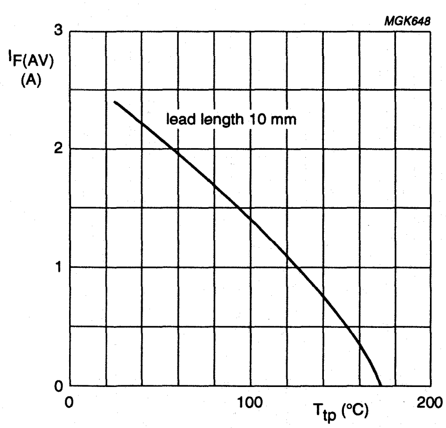


BYV27-300 and 400

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Switched mode application.

Fig.3 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).

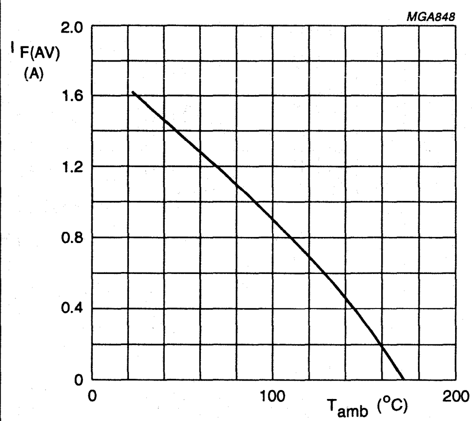


BYV27-500 and 600

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Switched mode application.

Fig.4 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



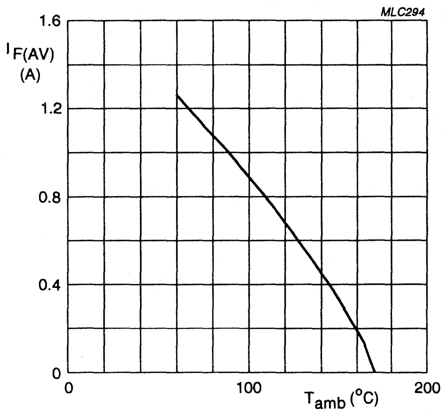
BYV27-50 to 200

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Device mounted as shown in Fig. 25.

Switched mode application.

Fig.5 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



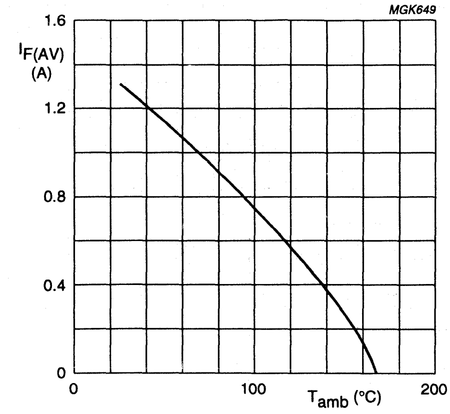
BYV27-300 and 400

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Device mounted as shown in Fig. 25.

Switched mode application.

Fig.6 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



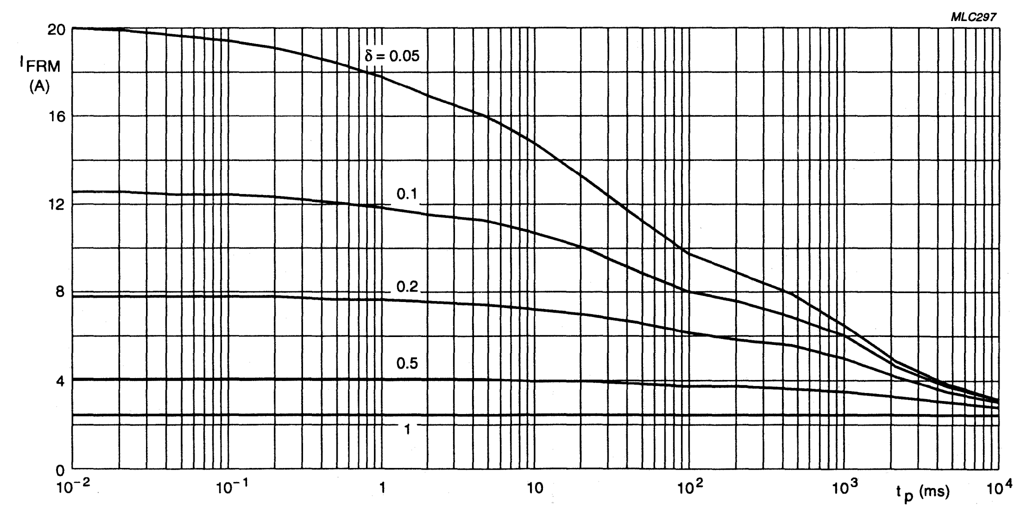
BYV27-500 and 600

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Device mounted as shown in Fig. 25.

Switched mode application.

Fig.7 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).

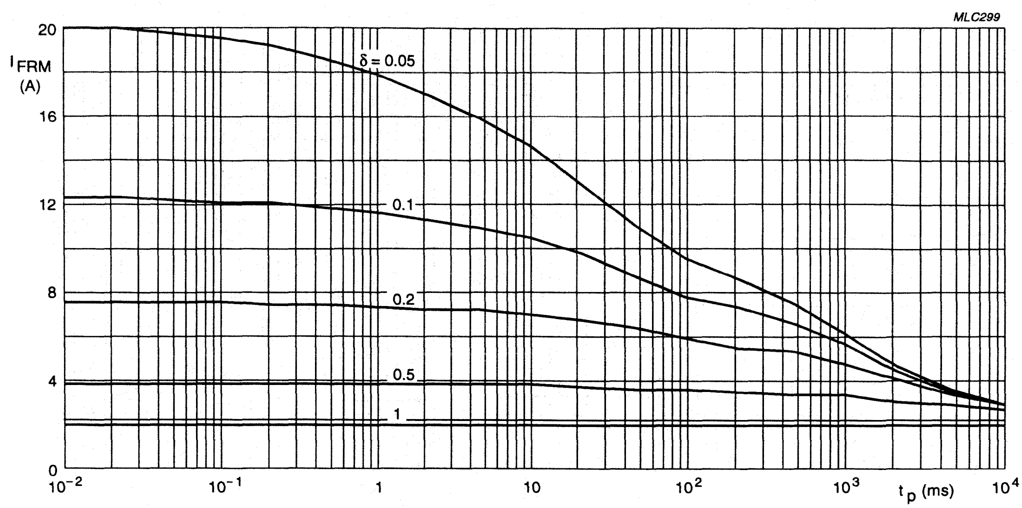


BYV27-50 to 200

T_{tp} = 85 °C; $R_{th\ j\text{-}tp}$ = 46 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 200 V.

Fig.8 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

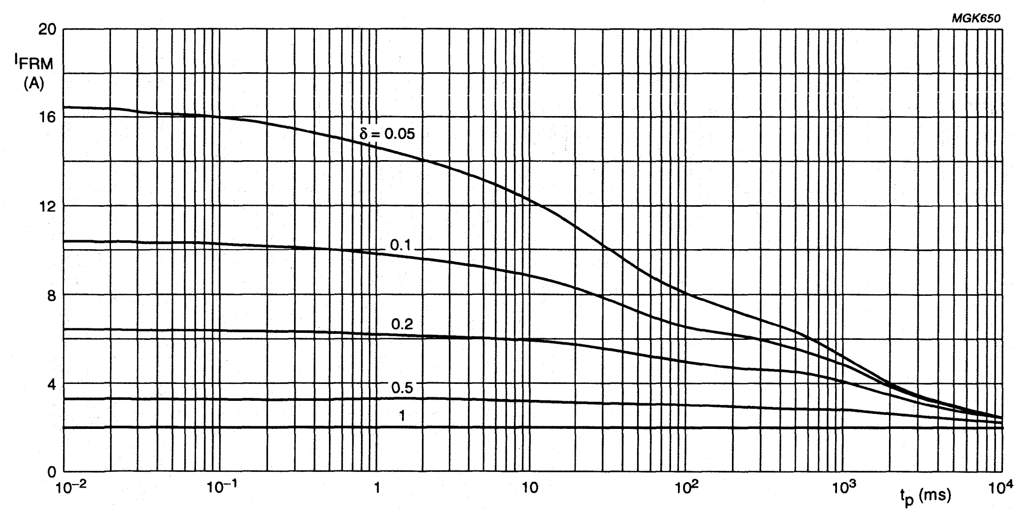


BYV27-300 and 400

T_{tp} = 85 °C; $R_{th\ j\text{-}tp}$ = 46 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 400 V.

Fig.9 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

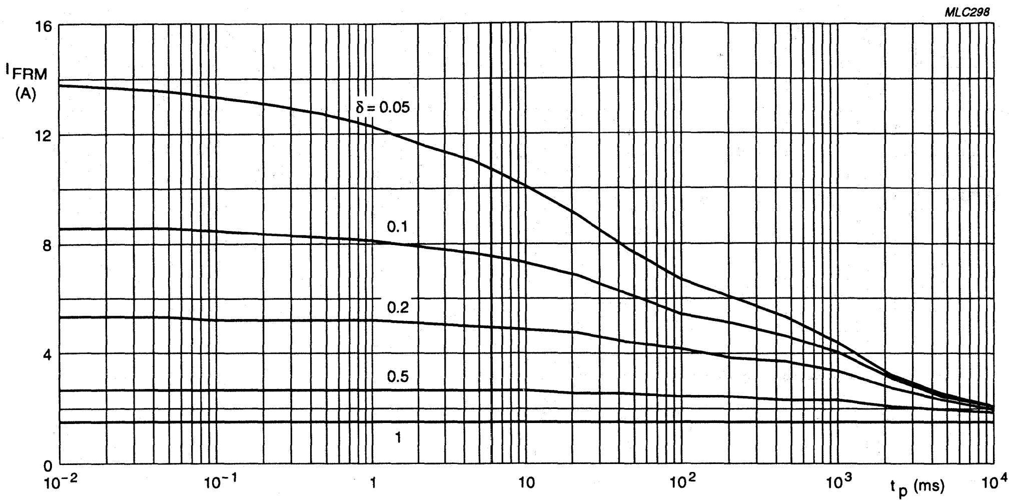


BYV27-500 and 600

T_{tp} = 85 °C; $R_{th\ j\text{-}tp}$ = 46 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 600 V.

Fig.10 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

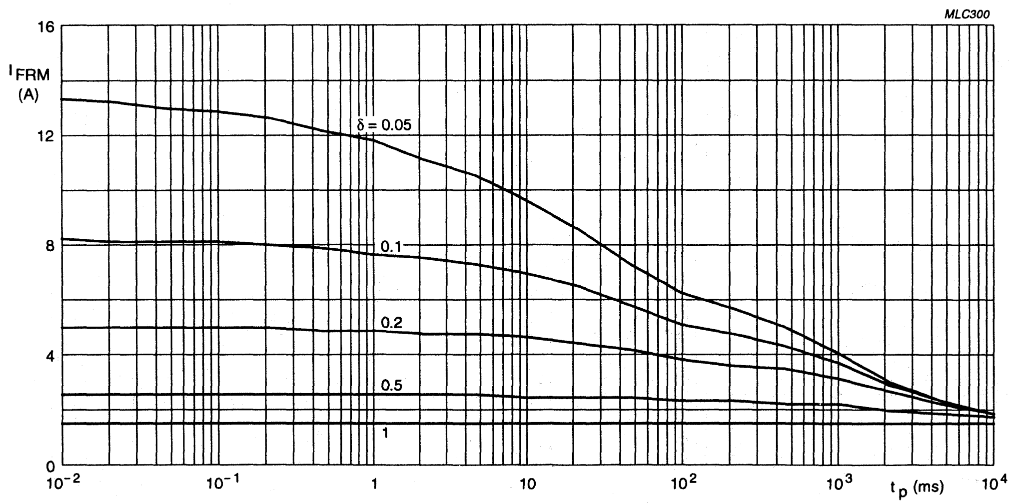


BYV27-50 to 200

T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 100 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 200 V.

Fig.11 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

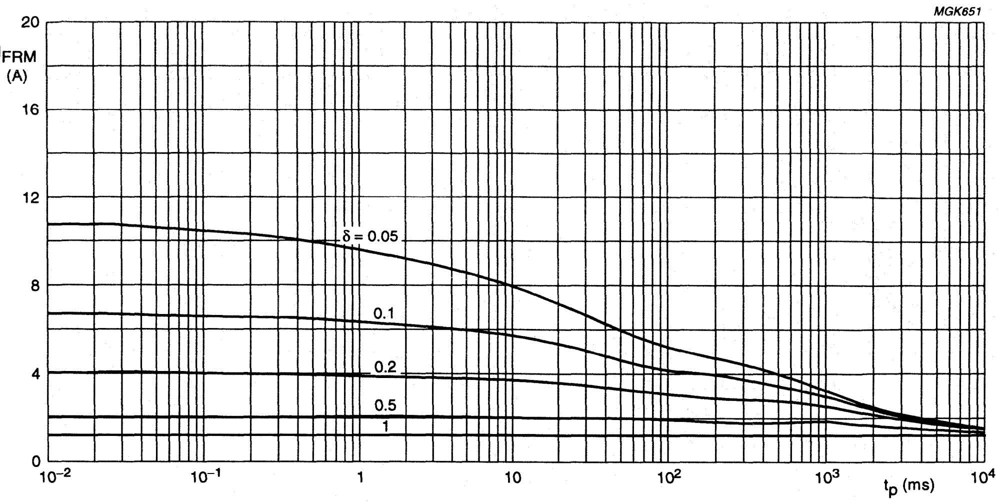


BYV27-300 and 400

T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 100 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 400 V.

Fig.12 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

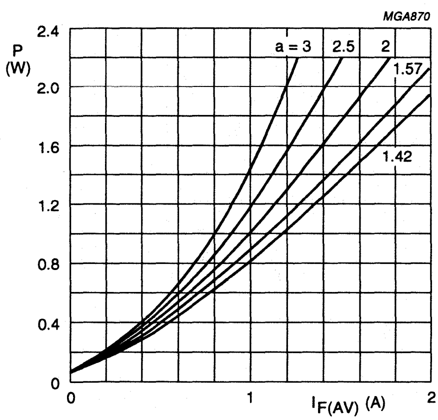


BYV27-500 and 600

T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 100 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 600 V.

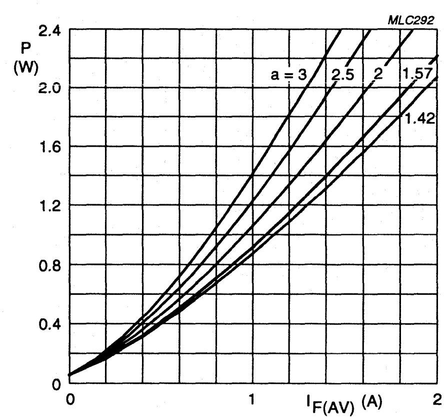
Fig.13 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



BYV27-50 to 200

a = $I_{F(RMS)}/I_{F(AV)}$; V_R = V_{RRMmax}; δ = 0.5.

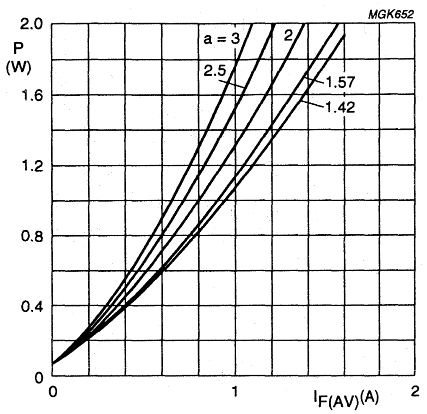
Fig.14 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



BYV27-300 and 400

a = $I_{F(RMS)}/I_{F(AV)}$; V_R = V_{RRMmax}; δ = 0.5.

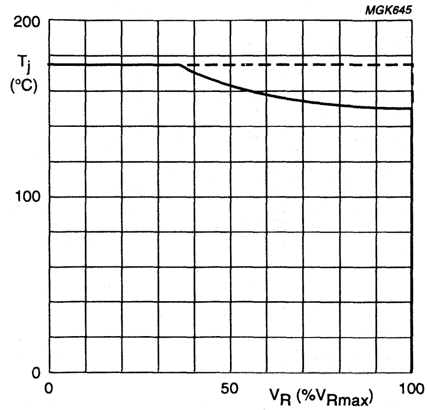
Fig.15 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



BYV27-500 and 600

$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

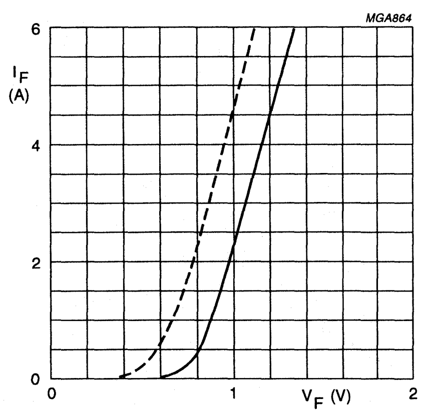
Fig.16 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



Solid line = V_R.

Dotted line = V_{RRM}; $\delta = 0.5$.

Fig.17 Maximum permissible junction temperature as a function of maximum reverse voltage percentage.

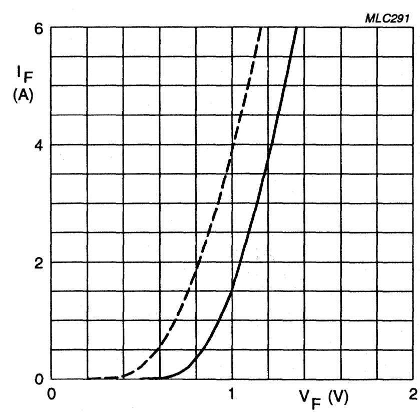


BYV27-50 to 200

Dotted line: T_j = 175 °C.

Solid line: T_j = 25 °C.

Fig.18 Forward current as a function of forward voltage; maximum values.

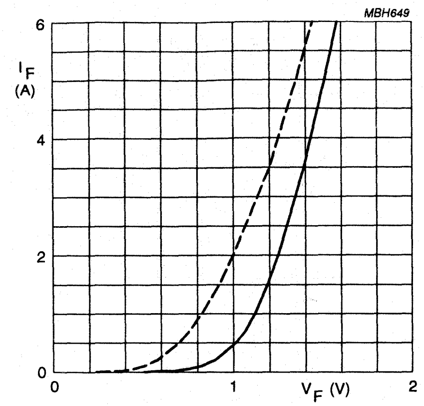


BYV27-300 and 400

Dotted line: T_j = 175 °C.

Solid line: T_j = 25 °C.

Fig.19 Forward current as a function of forward voltage; maximum values.

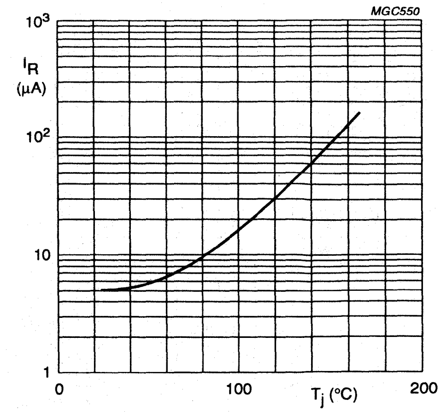


BYV27-500 and 600

Dotted line: T_j = 175 °C.

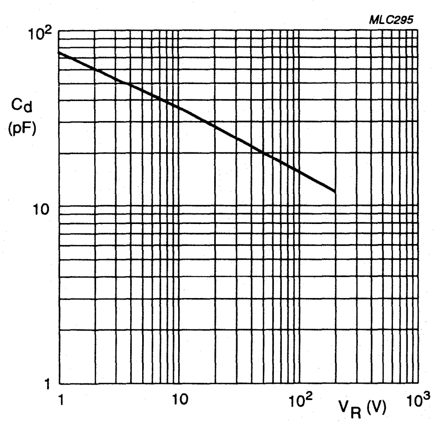
Solid line: T_j = 25 °C.

Fig.20 Forward current as a function of forward voltage; maximum values.



$V_R = V_{RRMmax}$.

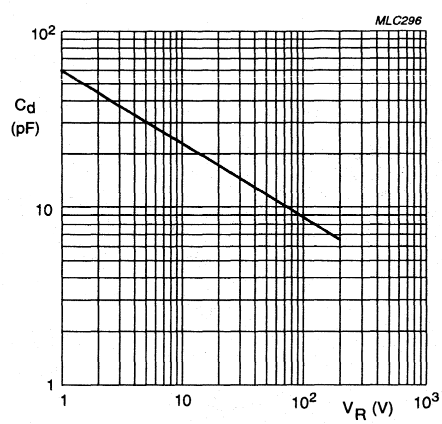
Fig.21 Reverse current as a function of junction temperature; maximum values.



BYV27-50 to 200

f = 1 MHz; T_j = 25 °C.

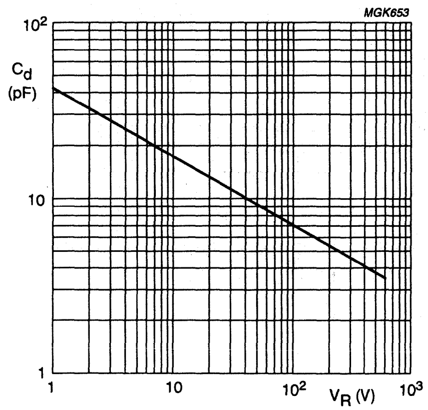
Fig.22 Diode capacitance as a function of reverse voltage; typical values.



BYV27-300 and 400

f = 1 MHz; T_j = 25 °C.

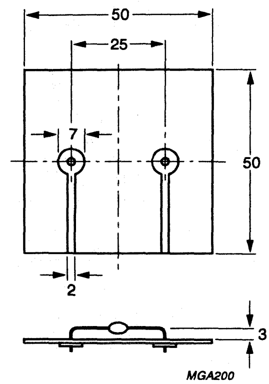
Fig.23 Diode capacitance as a function of reverse voltage; typical values.



BYV27-500 and 600

f = 1 MHz; T_j = 25 °C.

Fig.24 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.25 Device mounted on a printed-circuit board.

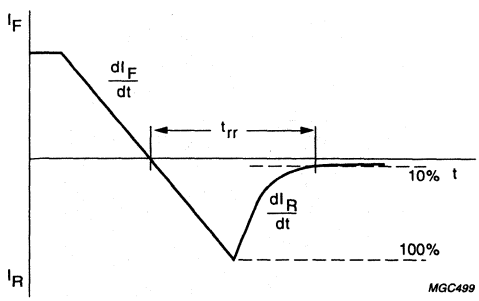
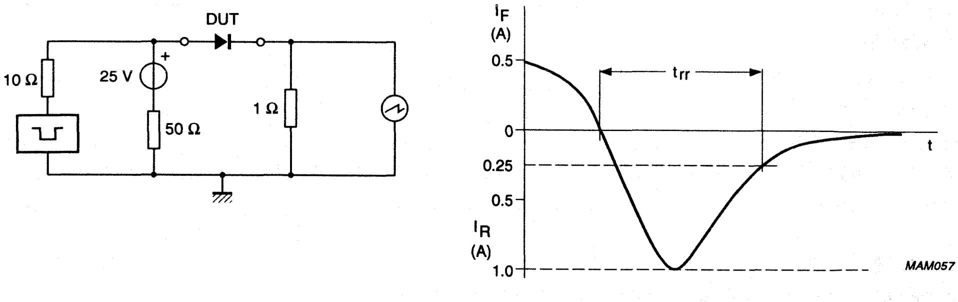


Fig.26 Reverse recovery definitions.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.27 Test circuit and reverse recovery time waveform and definition.

Ultra fast low-loss controlled avalanche rectifiers

BYV28 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack
- Also available with preformed leads for easy insertion.

DESCRIPTION

Rugged glass SOD64 package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

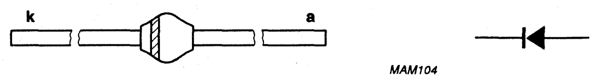


Fig.1 Simplified outline (SOD64) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYV28-50		–	50	V
	BYV28-100		–	100	V
	BYV28-150		–	150	V
	BYV28-200		–	200	V
	BYV28-300		–	300	V
	BYV28-400		–	400	V
	BYV28-500		–	500	V
	BYV28-600		–	600	V
V_R	continuous reverse voltage				
	BYV28-50		–	50	V
	BYV28-100		–	100	V
	BYV28-150		–	150	V
	BYV28-200		–	200	V
	BYV28-300		–	300	V
	BYV28-400		–	400	V
	BYV28-500		–	500	V
	BYV28-600		–	600	V
$I_{F(AV)}$	average forward current	T_{tp} = 85 °C; lead length = 10 mm; see Figs 2 and 3; averaged over any 20 ms period; see also Figs 10 and 11			
	BYV28-50 to 400		–	3.5	A
	BYV28-500 and 600		–	3.1	A
$I_{F(AV)}$	average forward current	T_{amb} = 60 °C; printed-circuit board mounting (see Fig.20); see Figs 4 and 5; averaged over any 20 ms period; see also Figs 10 and 11			
	BYV28-50 to 400		–	1.9	A
	BYV28-500 and 600		–	1.5	A

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{FRM}	repetitive peak forward current	T_{tp} = 85 °C; see Figs 6 and 7			
	BYV28-50 to 400		–	32	A
	BYV28-500 and 600		–	31	A
I_{FRM}	repetitive peak forward current	T_{amb} = 60 °C; see Figs 8 and 9			
	BYV28-50 to 400		–	17	A
	BYV28-500 and 600		–	16	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	90	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	20	mJ
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature	see Fig.12	−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 3.5 A; $T_j = T_{j\,max}$; see Figs 13, 14 and 15				
	BYV28-50 to 200		–	–	0.80	V
	BYV28-300 and 400		–	–	0.83	V
	BYV28-500 and 600		–	–	0.98	V
V_F	forward voltage	I_F = 3.5 A; see Figs 13, 14 and 15				
	BYV28-50 to 200		–	–	1.02	V
	BYV28-300 and 400		–	–	1.05	V
	BYV28-500 and 600		–	–	1.25	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYV28-50		55	–	–	V
	BYV28-100		110	–	–	V
	BYV28-150		165	–	–	V
	BYV28-200		220	–	–	V
	BYV28-300		330	–	–	V
	BYV28-400		440	–	–	V
	BYV28-500		560	–	–	V
	BYV28-600		675	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.16	–	–	5	µA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.16	–	–	150	µA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.22				
	BYV28-50 to 200		–	–	25	ns
	BYV28-300 to 600		–	–	50	ns

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
C_d	diode capacitance	f = 1 MHz; V_R = 0; see Figs 17, 18 and 19				
	BYV28-50 to 200		–	190	–	pF
	BYV28-300 and 400		–	150	–	pF
	BYV28-500 and 600		–	125	–	pF
$\left\|\frac{dI_R}{dt}\right\|$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq 30$ V and $dI_F/dt = -1$ A/µs; see Fig.21	–	–	4	A/µs

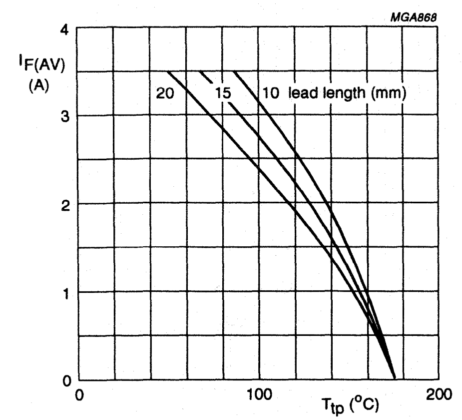
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	25	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	75	K/W

Note

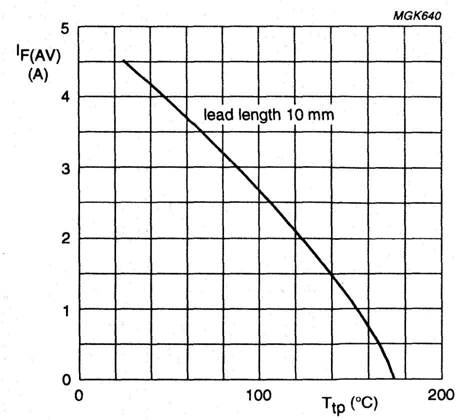
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm, see Fig.20 For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA



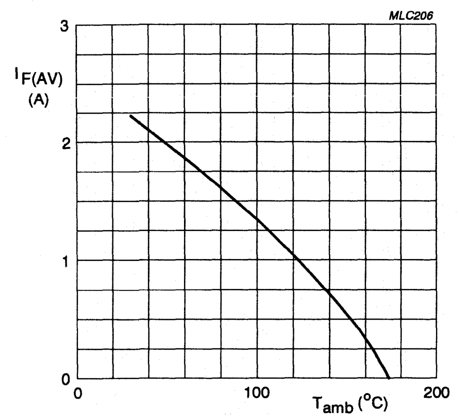
BYV28-50 to 400
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Switched mode application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



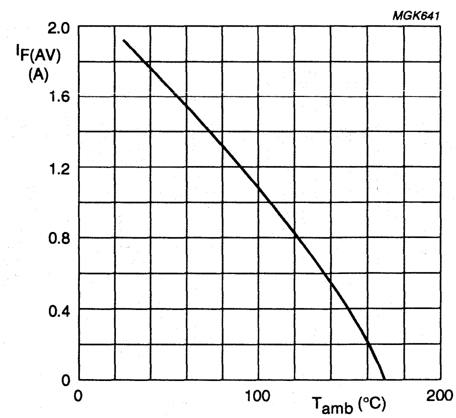
BYV28-500 and 600
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Switched mode application.

Fig.3 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



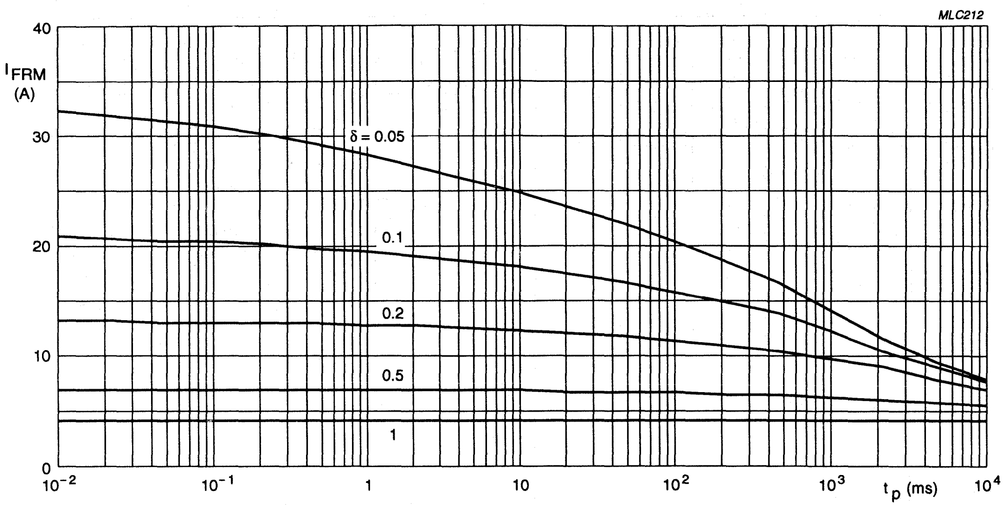
BYV28-50 to 400
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5; switched mode application.
Device mounted as shown in Fig.20.

Fig.4 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



BYV28-500 and 600
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5; switched mode application.
Device mounted as shown in Fig.20.

Fig.5 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).

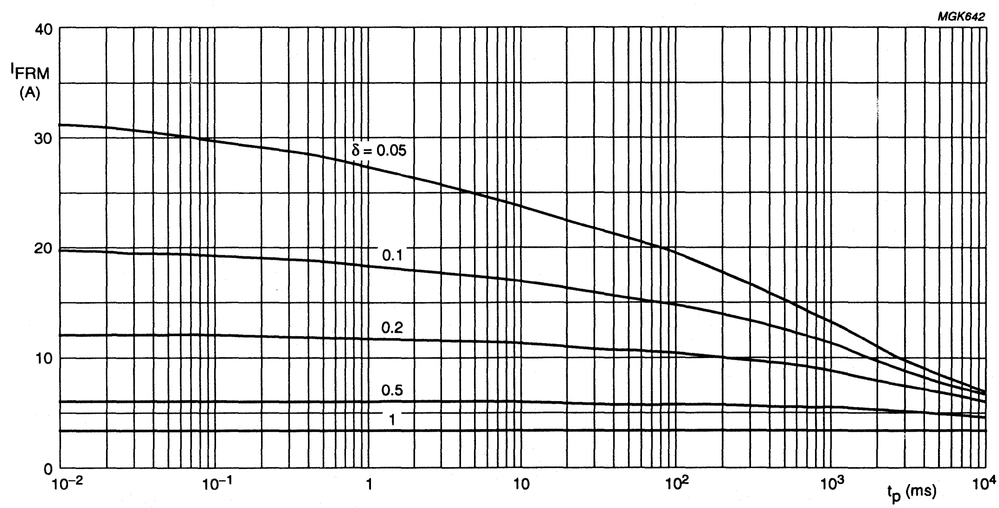


BYV28-50 to 400

T_{tp} = 85°C; $R_{th\ j\text{-}tp}$ = 25 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 200 V.

Fig.6 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

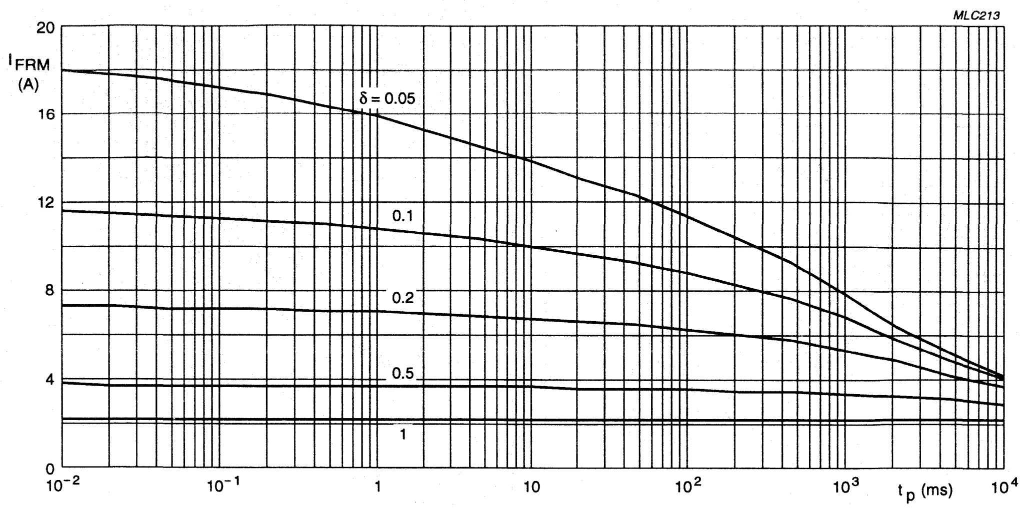


BYV28-500 and 600

T_{tp} = 85°C; $R_{th\ j\text{-}tp}$ = 25 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 600 V.

Fig.7 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

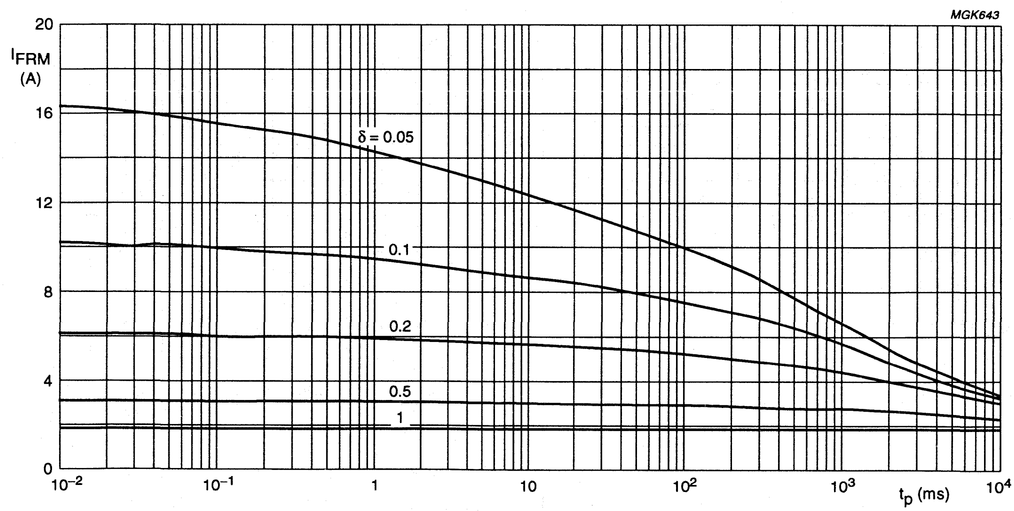


BYV28-50 to 400

T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 75 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 200 V.

Fig.8 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

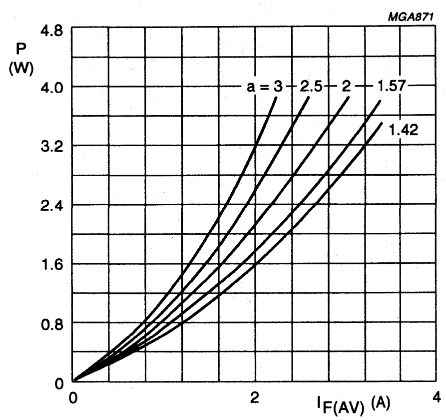


BYV28-500 and 600

T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 75 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 600 V.

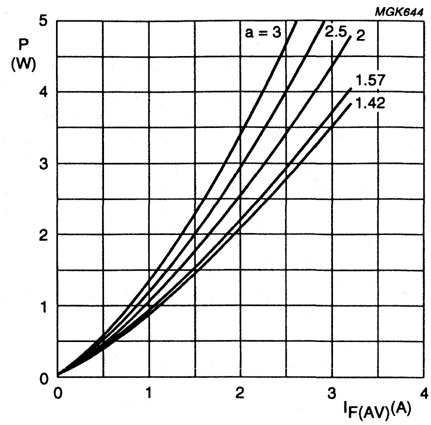
Fig.9 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



BYV28-50 to 400

$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

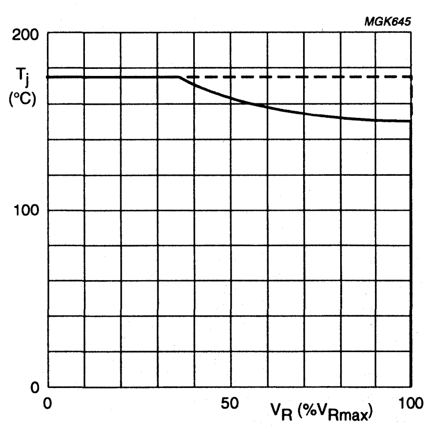
Fig.10 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



BYV28-500 and 600

$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

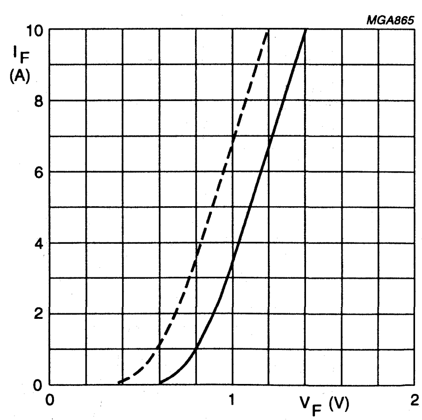
Fig.11 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



Solid line = V_R.

Dotted line = V_{RRM}; $\delta = 0.5$.

Fig.12 Maximum permissible junction temperature as a function of maximum reverse voltage percentage.

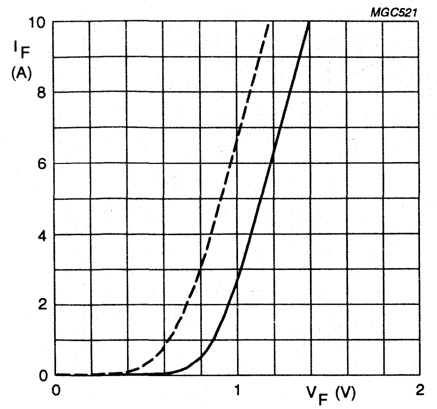


BYV28-50 to 200

Dotted line: T_j = 175 °C.

Solid line: T_j = 25 °C.

Fig.13 Forward current as a function of forward voltage; maximum values.

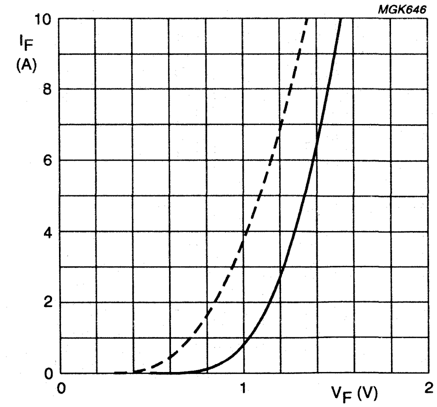


BYV28-300 and 400

Dotted line: T_j = 175 °C.

Solid line: T_j = 25 °C.

Fig.14 Forward current as a function of forward voltage; maximum values.

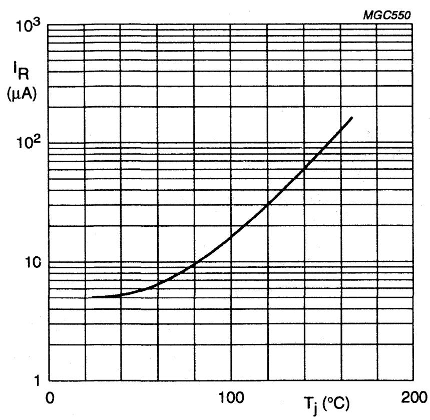


BYV28-500 and 600

Dotted line: T_j = 175 °C.

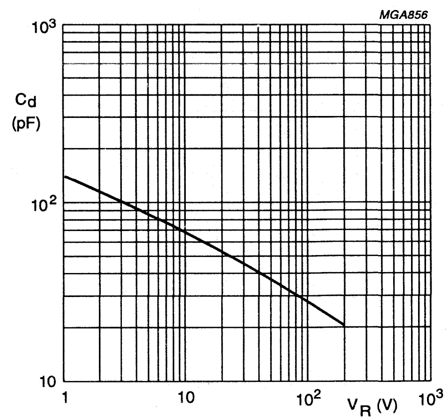
Solid line: T_j = 25 °C.

Fig.15 Forward current as a function of forward voltage; maximum values.



$V_R = V_{RRMmax}$.

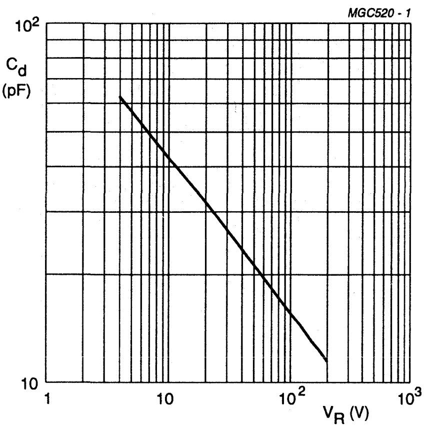
Fig.16 Reverse current as a function of junction temperature; maximum values.



BYV28-50 to 200

f = 1 MHz; T_j = 25 °C.

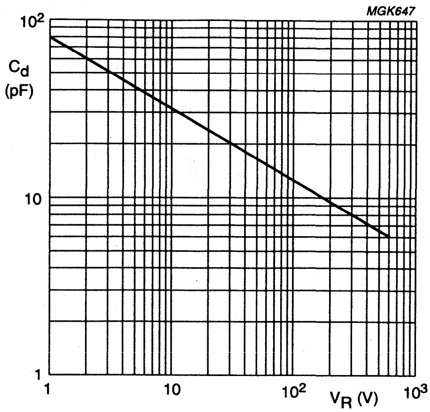
Fig.17 Diode capacitance as a function of reverse voltage; typical values.



BYV28-300 and 400

f = 1 MHz; T_j = 25 °C.

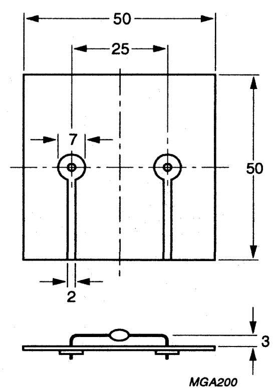
Fig.18 Diode capacitance as a function of reverse voltage; typical values.



BYV28-500 and 600

f = 1 MHz; T_j = 25 °C.

Fig.19 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.20 Device mounted on a printed-circuit board.

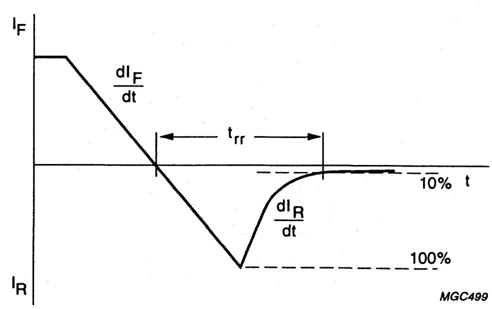
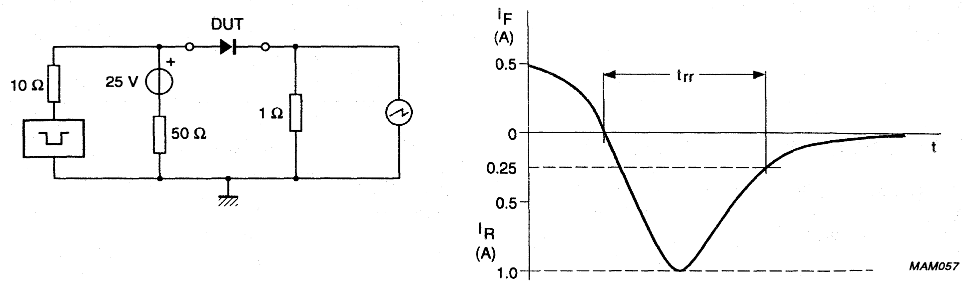


Fig.21 Reverse recovery definitions.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.22 Test circuit and reverse recovery time waveform and definition.

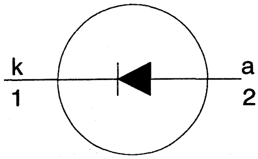
Rectifier diodes ultrafast

BYV29 series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 300 V/ 400 V/ 500 V

$V_F \leq 1.03$ V

$I_{F(AV)} = 9$ A

$t_{rr} \leq 60$ ns

GENERAL DESCRIPTION

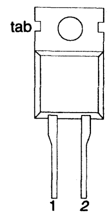
Ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYV29 series is supplied in the conventional leaded SOD59 (TO220AC) package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
		BYV29		-300	-400	-500	
V_{RRM}	Peak repetitive reverse voltage		-	300	400	500	V
V_{RWM}	Crest working reverse voltage		-	300	400	500	V
V_R	Continuous reverse voltage		-	300	400	500	V
$I_{F(AV)}$	Average forward current[1]	square wave; $\delta = 0.5$; $T_{mb} \leq 123$ ˚C	-	9			A
I_{FRM}	Repetitive peak forward current	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 123$ ˚C	-	18			A
I_{FSM}	Non-repetitive peak forward current.	t = 10 ms	-	100			A
		t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$	-	110			A
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2.5	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	60	-	K/W

1 Neglecting switching and reverse current losses.

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 8 A; T_j = 150˚C	-	0.90	1.03	V
		I_F = 8 A	-	1.05	1.25	V
		I_F = 20 A	-	1.20	1.40	V
I_R	Reverse current	$V_R = V_{RRM}$	-	2.0	50	µA
		$V_R = V_{RRM}$; T_j = 100 ˚C	-	0.1	0.35	mA
Q_s	Reverse recovery charge	I_F = 2 A to $V_R \geq$ 30 V; dI_F/dt = 20 A/µs	-	40	60	nC
t_{rr}	Reverse recovery time	I_F = 1 A to $V_R \geq$ 30 V; dI_F/dt = 100 A/µs	-	50	60	ns
I_{rrm}	Peak reverse recovery current	I_F = 10 A to $V_R \geq$ 30 V; dI_F/dt = 50 A/µs; T_j = 100˚C	-	4.0	5.5	A
V_{fr}	Forward recovery voltage	I_F = 10 A; dI_F/dt = 10 A/µs	-	2.5	-	V

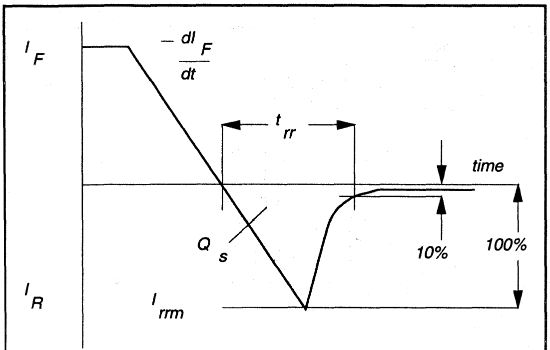


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

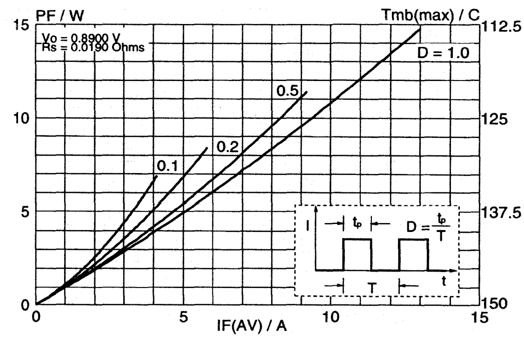


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

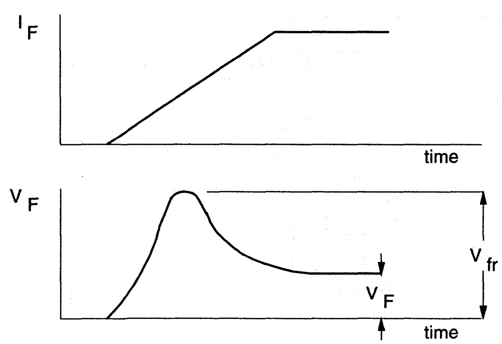


Fig.2. Definition of V_{fr}

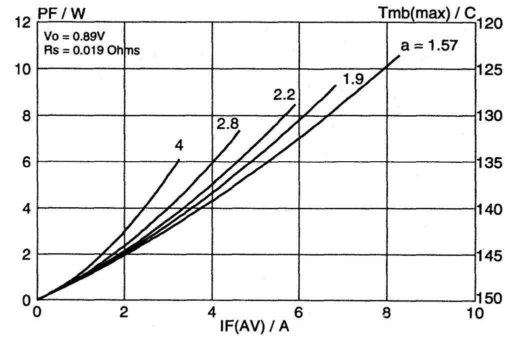


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

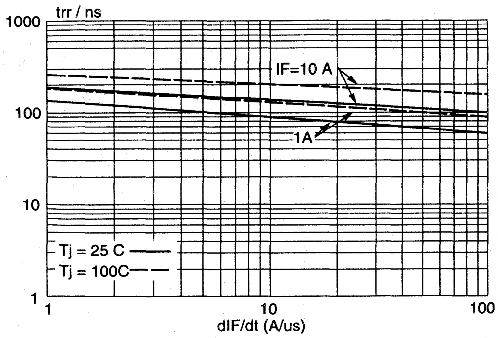


Fig.5. Maximum t_{rr} at T_j = 25˚C and 100˚C

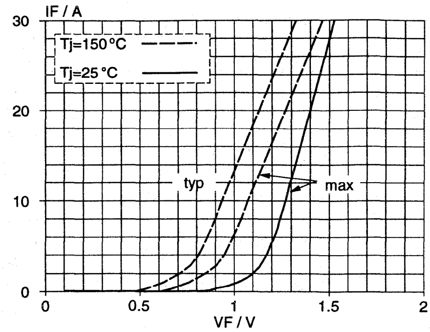


Fig.7. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

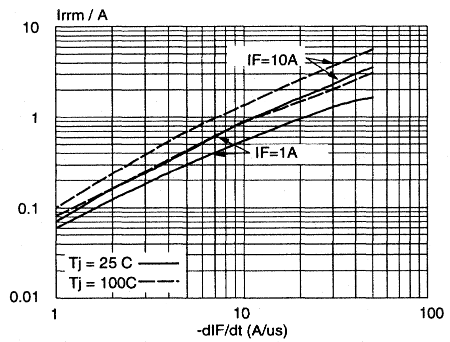


Fig.6. Maximum I_{rrm} at T_j = 25˚C and 100˚C.

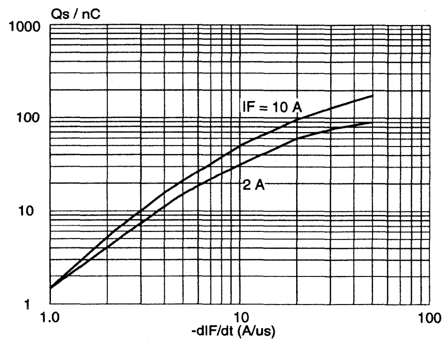


Fig.8. Maximum Q_s at T_j = 25˚C

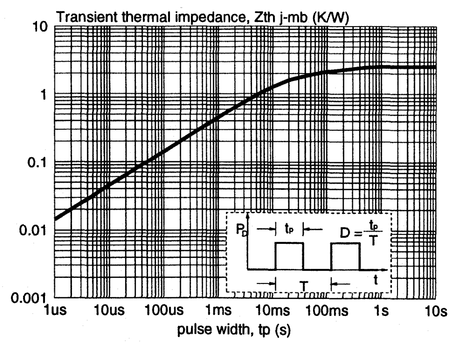


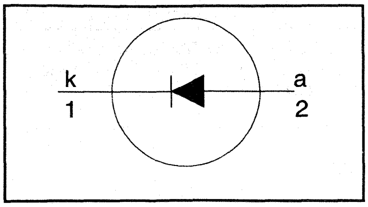
Fig.9. Transient thermal impedance $Z_{th\,j\text{-}mb} = f(t_p)$

Rectifier diodes ultrafast | BYV29F series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

V_R = 300 V/ 400 V/ 500 V

$V_F \leq 1.03$ V

$I_{F(AV)}$ = 9 A

$t_{rr} \leq 60$ ns

GENERAL DESCRIPTION

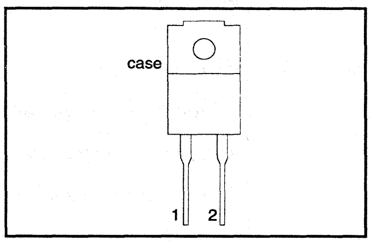
Ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYV29F series is supplied in the conventional leaded SOD100 package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	isolated

SOD100



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
		BYV29F		**-300**	**-400**	**-500**	
V_{RRM}	Peak repetitive reverse voltage		-	300	400	500	V
V_R	Continuous reverse voltage	$T_{hs} \leq 138$˚C	-	300	400	500	V
$I_{F(AV)}$	Average forward current[1]	square wave; $\delta = 0.5$; $T_{hs} \leq 90$ ˚C	-	9			A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms	-	100			A
		t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$	-	110			A
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

ISOLATION LIMITING VALUE & CHARACTERISTIC

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Repetitive peak voltage from both terminals to external heatsink	R.H. ≤ 65% ; clean and dustfree	-		1500	V
C_{isol}	Capacitance from cathode to external heatsink	f = 1 MHz	-	12	-	pF

1 Neglecting switching and reverse current losses

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	5.5	K/W
		without heatsink compound	-	-	7.2	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	55	-	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 8 A; T_j = 150˚C	-	0.90	1.03	V
		I_F = 8 A	-	1.05	1.25	V
		I_F = 20 A	-	1.20	1.40	V
I_R	Reverse current	$V_R = V_{RRM}$	-	2.0	50	µA
		$V_R = V_{RRM}$; T_j = 100 ˚C	-	0.1	0.35	mA
Q_s	Reverse recovery charge	I_F = 2 A to $V_R \geq$ 30 V; dI_F/dt = 20 A/µs	-	40	60	nC
t_{rr}	Reverse recovery time	I_F = 1 A to $V_R \geq$ 30 V; dI_F/dt = 100 A/µs	-	50	60	ns
I_{rrm}	Peak reverse recovery current	I_F = 10 A to $V_R \geq$ 30 V; dI_F/dt = 50 A/µs; T_j = 100˚C	-	4.0	5.5	A
V_{fr}	Forward recovery voltage	I_F = 10 A; dI_F/dt = 10 A/µs	-	2.5	-	V

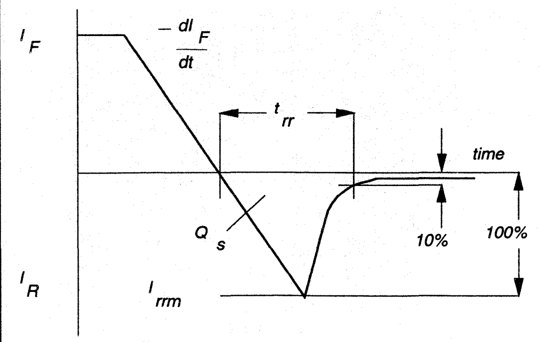


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

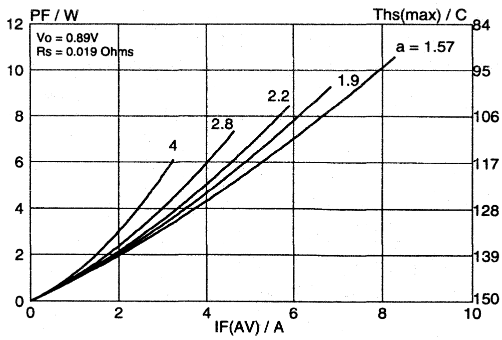


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)}$ / $I_{F(AV)}$.

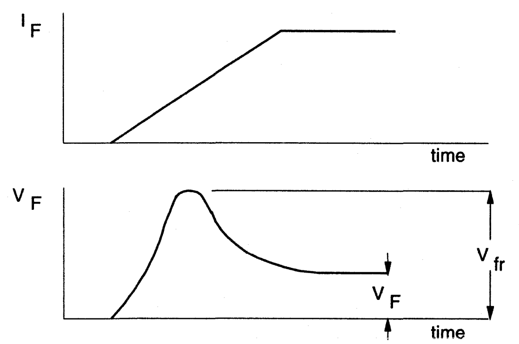


Fig.2. Definition of V_{fr}

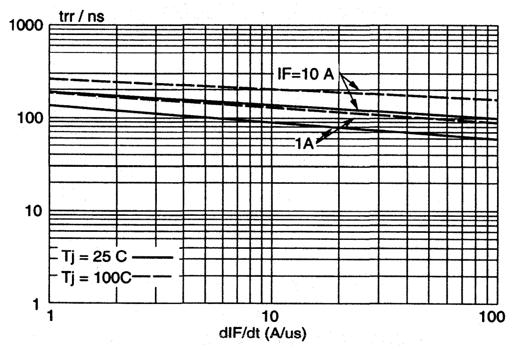


Fig.5. Maximum t_{rr} at T_j = 25˚C and 100˚C

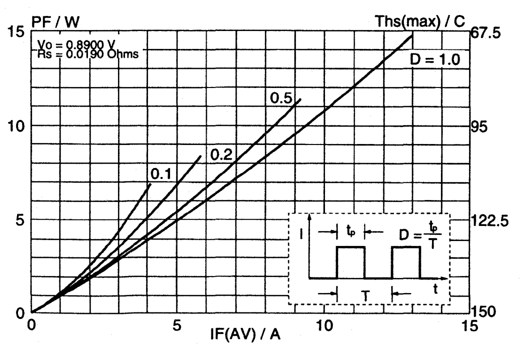


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

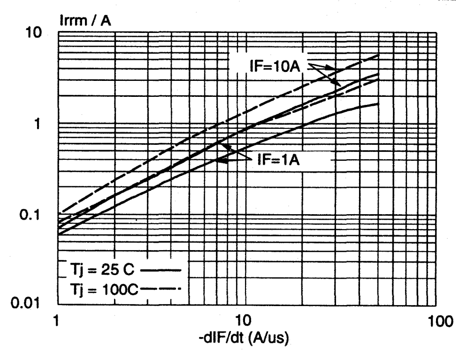


Fig.6. Maximum I_{rrm} at T_j = 25˚C and 100˚C.

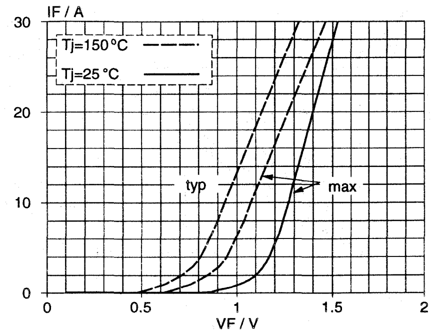


Fig.7. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

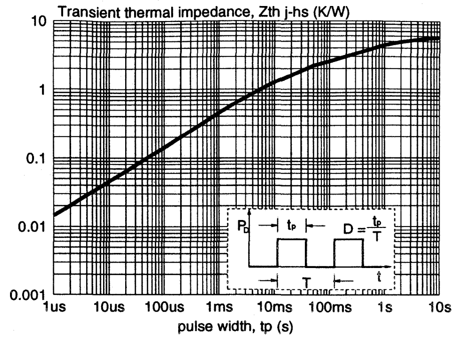


Fig.9. Transient thermal impedance $Z_{th\,j\text{-}hs} = f(t_p)$

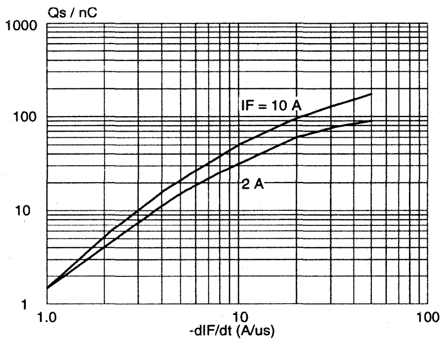


Fig.8. Maximum Q_s at $T_j = 25^{\circ}C$

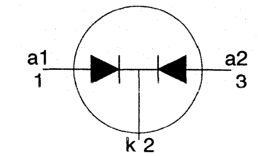
ʾectifier diodes ıltrafast, rugged

BYV32E, BYV32EB series

EATURES

- ̲ow forward volt drop
- ̄ast switching
- Soft recovery characteristic
- Reverse surge capability
- ̄ligh thermal cycling performance
- ̲ow thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 150 V/ 200 V

$V_F \leq 0.85$ V

$I_{O(AV)}$ = 20 A

I_{RRM} = 0.2 A

$t_{rr} \leq 25$ ns

ıENERAL DESCRIPTION

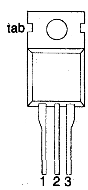
ual, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power ıpplies.

ıe BYV32E series is supplied in the SOT78 conventional leaded package.
ıe BYV32EB series is supplied in the SOT404 surface mounting package.

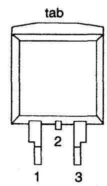
INNING

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k) [1]
3	anode 2 (a)
tab	cathode (k)

SOT78 (TO220AB)



SOT404



IMITING VALUES

miting values in accordance with the Absolute Maximum System (IEC 134).

ʾYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		BYV32E / BYV32EB		**-150**	**-200**	
$/_{RRM}$	Peaqk repetitive reverse voltage		-	150	200	V
$/_{RWM}$	Crest working reverse voltage		-	150	200	V
$/_{R}$	Continuous reverse voltage		-	150	200	V
O(AV)	Average rectified output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{mb} \leq 115$ ˚C	-	20		A
FRM	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 115$ ˚C	-	20		A
FSM	Non-repetitive peak forward current per diode	t = 10 ms	-	125		A
		t = 8.3 ms sinusoidal; with reapplied $V_{RWM(max)}$	-	137		A
RRM	Repetitive peak reverse current per diode	t_p = 2 µs; $\delta = 0.001$	-	0.2		A
RSM	Non-repetitive peak reverse current per diode	t_p = 100 µs	-	0.2		A
$_{stg}$	Storage temperature		-40	150		˚C
$_{j}$	Operating junction temperature		-	150		˚C

It is not possible to make connection to pin 2 of the SOT404 package

ESD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage	Human body model; C = 250 pF; R = 1.5 kΩ	-	8	kV

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	2.4	K/W
		both diodes	-	-	1.6	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	SOT78 package, in free air	-	60	-	K/W
		SOT404 and SOT428 packages, pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

ELECTRICAL CHARACTERISTICS

characteristics are per diode at T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 8 A; T_j = 150˚C	-	0.72	0.85	V
		I_F = 20 A	-	1.00	1.15	V
I_R	Reverse current	$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.2	0.6	mA
		$V_R = V_{RWM}$	-	6	30	µA
Q_s	Reverse recovery charge	I_F = 2 A; $V_R \geq 30$ V; $-dI_F/dt$ = 20 A/µs	-	8	12.5	nC
t_{rr1}	Reverse recovery time	I_F = 1 A; $V_R \geq 30$ V; $-dI_F/dt$ = 100 A/µs	-	20	25	ns
t_{rr2}	Reverse recovery time	I_F = 0.5 A to I_R = 1 A; I_{rec} = 0.25 A	-	10	20	ns
V_{fr}	Forward recovery voltage	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

Rectifier diodes ultrafast, rugged

BYV32E, BYV32EB series

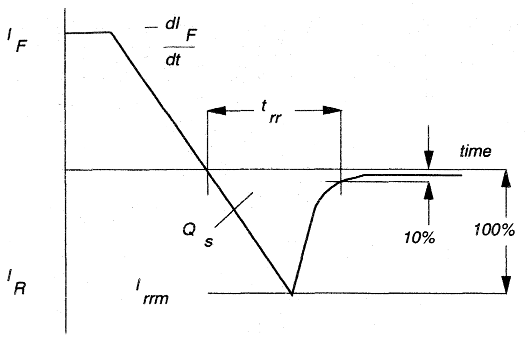


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

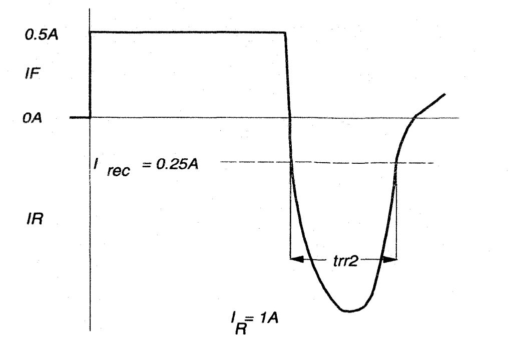


Fig.4. Definition of t_{rr2}

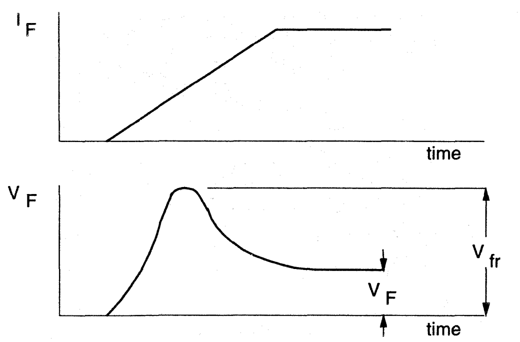


Fig.2. Definition of V_{fr}

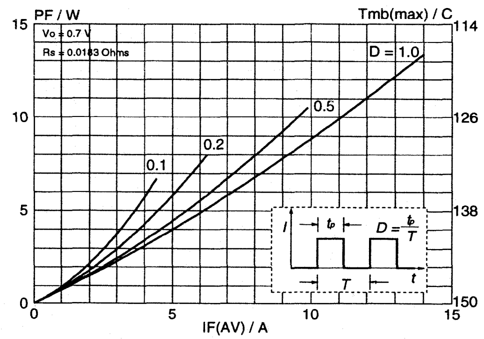


Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

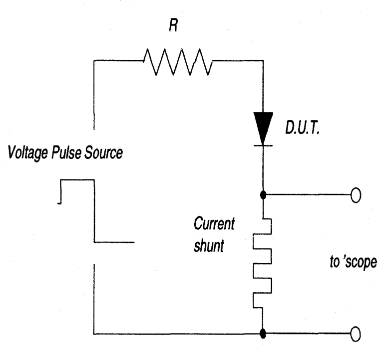


Fig.3. Circuit schematic for t_{rr2}

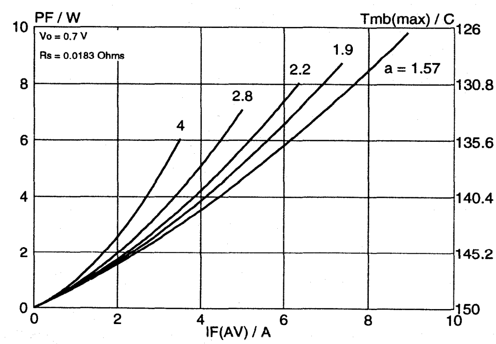


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

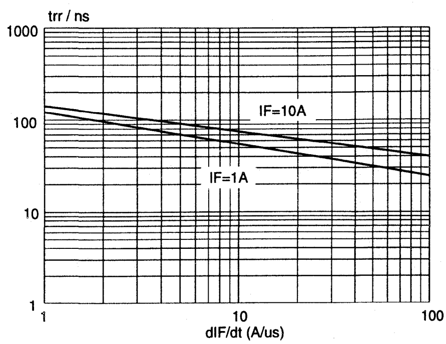


Fig.7. Maximum t_{rr} at T_j = 25 ˚C; per diode

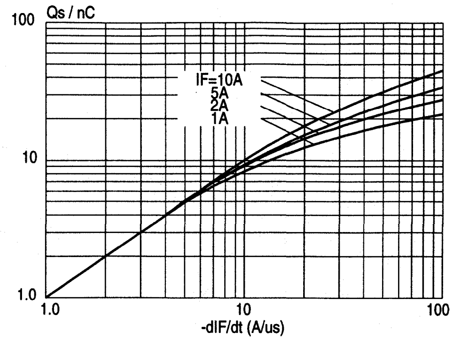


Fig.10. Maximum Q_s at T_j = 25 ˚C; per diode

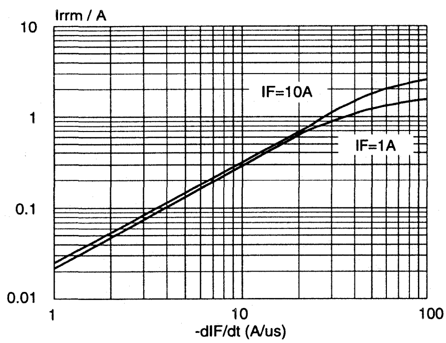


Fig.8. Maximum I_{rrm} at T_j = 25 ˚C; per diode

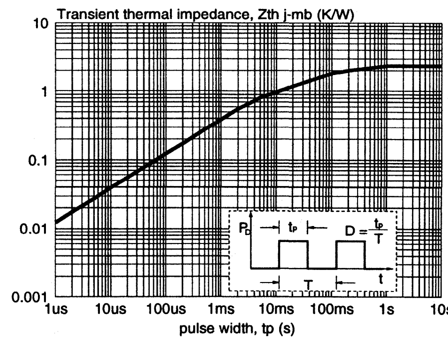


Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.

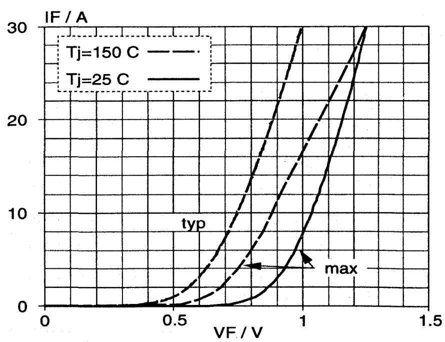


Fig.9. Typical and maximum forward characteristic per diode; $I_F = f(V_F)$; parameter T_j

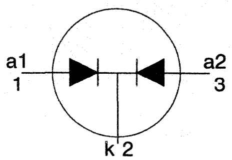
Rectifier diodes ultrafast, rugged

BYV32F, BYV32EX series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

V_R = 150 V/ 200 V

$V_F \leq 0.85$ V

$I_{O(AV)}$ = 12 A

I_{RRM} = 0.2 A

$t_{rr} \leq 25$ ns

GENERAL DESCRIPTION

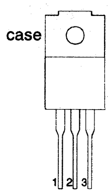
Dual, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYV32F series is supplied in the SOT186 package.
The BYV32EX series is supplied in the SOT186A package.

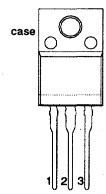
PINNING

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	isolated

SOT186



SOT186A



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		BYV32F / BYV32EX		-150	-200	
V_{RRM}	Peak repetitive reverse voltage		-	150	200	V
V_{RWM}	Crest working reverse voltage		-	150	200	V
V_R	Continuous reverse voltage		-	150	200	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)[1]	square wave $\delta = 0.5$; $T_{hs} \leq 95$ ˚C	-	12		A
I_{FRM}	Repetitive peak forward current per diode	$t = 25$ µs; $\delta = 0.5$; $T_{hs} \leq 95$ ˚C	-	20		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-	125		A
		t = 8.3 ms	-	137		A
		sinusoidal; with reapplied $V_{RWM(max)}$				
I_{RRM}	Repetitive peak reverse current per diode	$t_p = 2$ µs; $\delta = 0.001$	-	0.2		A
I_{RSM}	Non-repetitive peak reverse current per diode	$t_p = 100$ µs	-	0.2		A
T_{stg}	Storage temperature		-40	150		˚C
T_j	Operating junction temperature		-	150		˚C

1 Neglecting switching and reverse current losses

ESD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage	Human body model; C = 250 pF; R = 1.5 kΩ	-	8	kV

ISOLATION LIMITING VALUE & CHARACTERISTIC

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	R.M.S. isolation voltage from all three terminals to external heatsink	SOT186A package; f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65%; clean and dustfree	-		2500	V
V_{isol}	Repetitive peak voltage from all three terminals to external heatsink	SOT186 package; R.H. ≤ 65%; clean and dustfree	-		1500	V
C_{isol}	Capacitance from pin 2 to external heatsink	f = 1 MHz	-	10	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink (per diode)	with heatsink compound	-	-	5.0	K/W
		without heatsink compound	-	-	7.0	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	55	-	K/W

ELECTRICAL CHARACTERISTICS

characteristics are per diode at T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 8 A; T_j = 150˚C	-	0.72	0.85	V
		I_F = 20 A	-	1.00	1.15	V
I_R	Reverse current	$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.2	0.6	mA
		$V_R = V_{RWM}$	-	6	30	µA
Q_s	Reverse recovery charge	I_F = 2 A; V_R ≥ 30 V; $-dI_F/dt$ = 20 A/µs	-	8	12.5	nC
t_{rr1}	Reverse recovery time	I_F = 1 A; V_R ≥ 30 V; $-dI_F/dt$ = 100 A/µs	-	20	25	ns
t_{rr2}	Reverse recovery time	I_F = 0.5 A to I_R = 1 A; I_{rec} = 0.25 A	-	10	20	ns
I_{rrm}	Peak reverse recovery current	I_F = 1 A; V_R ≥ 30 V; $-dI_F/dt$ = 50 A/µs; T_j = 100˚C	-	1.5	2	A
V_{fr}	Forward recovery voltage	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

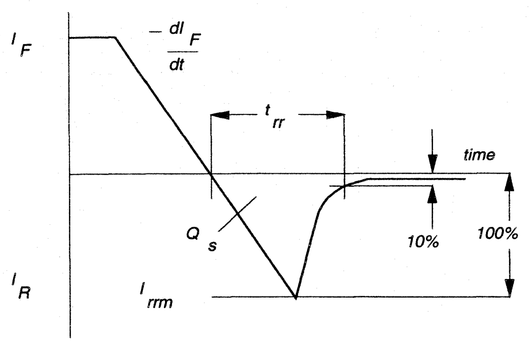


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

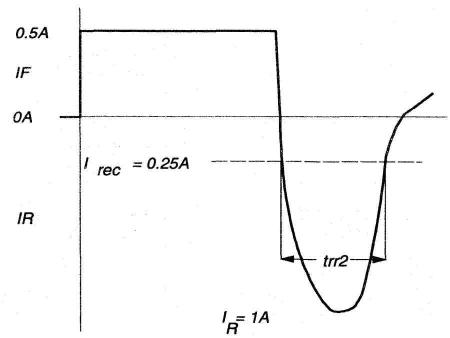


Fig.4. Definition of t_{rr2}

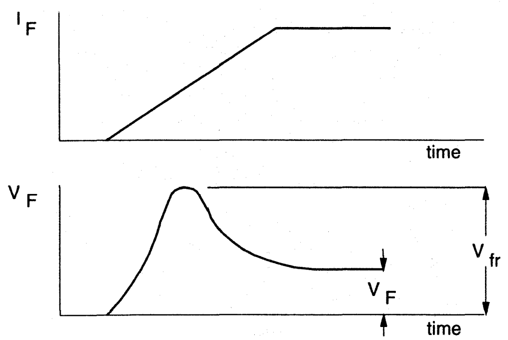


Fig.2. Definition of V_{fr}

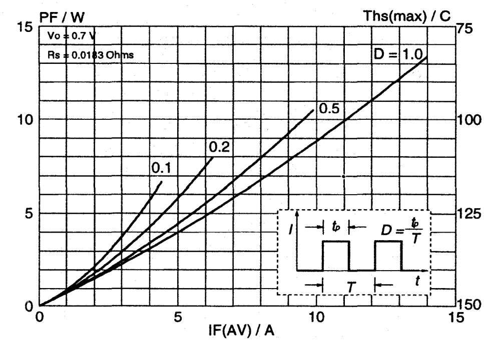


Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

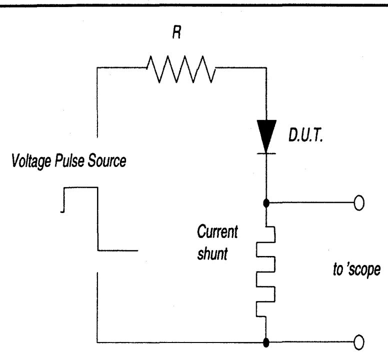


Fig.3. Circuit schematic for t_{rr2}

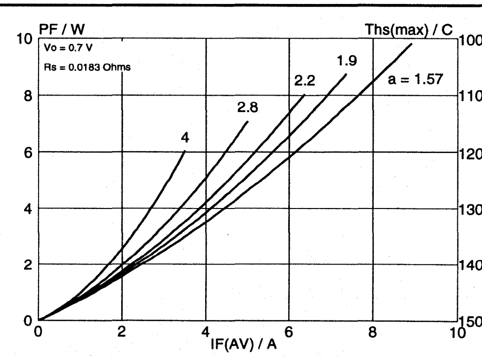


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

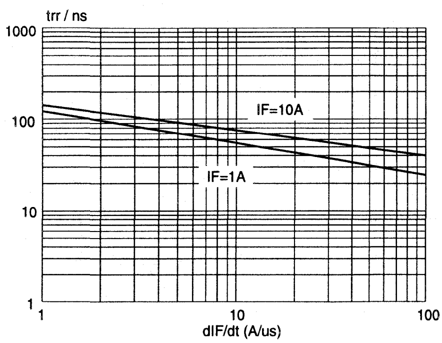


Fig.7. Maximum t_{rr} at $T_j = 25$ ˚C; per diode

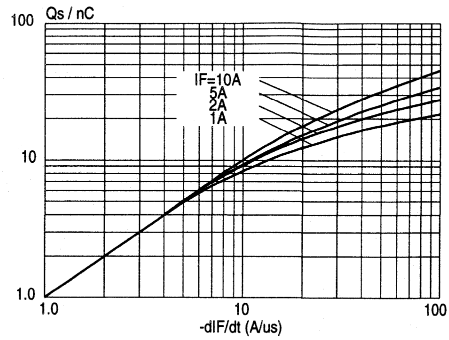


Fig.10. Maximum Q_s at $T_j = 25$ ˚C; per diode

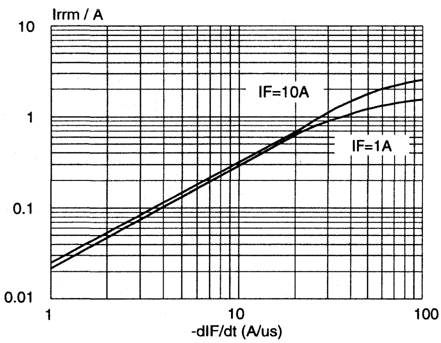


Fig.8. Maximum I_{rrm} at $T_j = 25$ ˚C; per diode

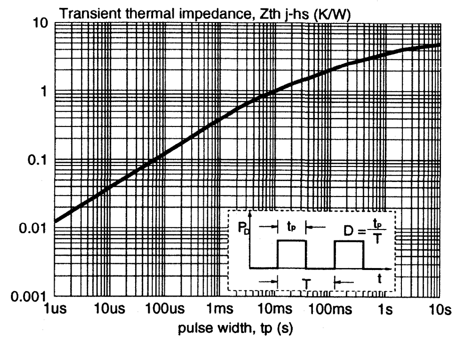


Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}hs} = f(t_p)$.

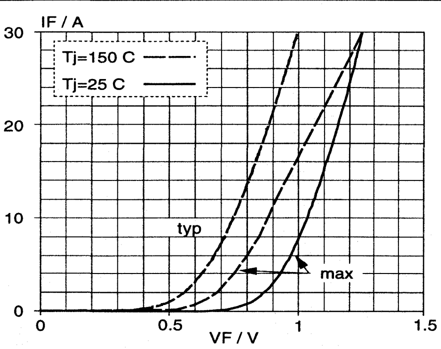


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

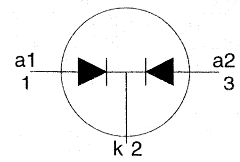
Dual rectifier diodes ultrafast

BYV34 series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 300 V/ 400 V/ 500 V

$V_F \leq$ 1.05 V

$I_{O(AV)}$ = 20 A

$t_{rr} \leq$ 60 ns

GENERAL DESCRIPTION

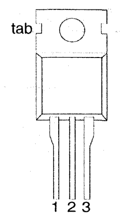
Dual, common cathode, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYV34 series is supplied in the conventional leaded SOT78 (TO220AB) package.

PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode
3	anode 2
tab	cathode

SOT78 (TO220AB)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
		BYV34		-300	-400	-500	
V_{RRM}	Peak repetitive reverse voltage		-	300	400	500	V
V_{RWM}	Crest working reverse voltage		-	300	400	500	V
V_R	Continuous reverse voltage	$T_{mb} \leq$ 138˚C	-	300	400	500	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)[1]	square wave; δ = 0.5; $T_{mb} \leq$ 115 ˚C	-	20			A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; δ = 0.5; $T_{mb} \leq$ 115 ˚C	-	20			A
I_{FSM}	Non-repetitive peak forward current per diode.	t = 10 ms	-	120			A
		t = 8.3 ms	-	132			A
		sinusoidal; with reapplied $V_{RRM(max)}$					
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-hs}$	Thermal resistance junction to heatsink	per diode	-	-	2.4	K/W
		both diodes conducting	-	-	1.6	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	in free air.	-	60	-	K/W

1 Neglecting switching and reverse current losses

ELECTRICAL CHARACTERISTICS

characteristics are per diode at T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 10 A; T_j = 150˚C	-	0.87	1.05	V
		I_F = 20 A	-	1.10	1.35	V
I_R	Reverse current	$V_R = V_{RRM}$	-	10	50	µA
		$V_R = V_{RRM}$; T_j = 100 ˚C	-	0.2	0.6	mA
Q_s	Reverse recovery charge	I_F = 2 A to $V_R \geq$ 30 V; dI_F/dt = 20 A/µs	-	50	60	nC
t_{rr}	Reverse recovery time	I_F = 1 A to $V_R \geq$ 30 V; dI_F/dt = 100 A/µs	-	50	60	ns
I_{rrm}	Peak reverse recovery current	I_F = 10 A to $V_R \geq$ 30 V; dI_F/dt = 50 A/µs; T_j = 100˚C	-	4.0	5.0	A
V_{fr}	Forward recovery voltage	I_F = 10 A; dI_F/dt = 10 A/µs	-	2.5	-	V

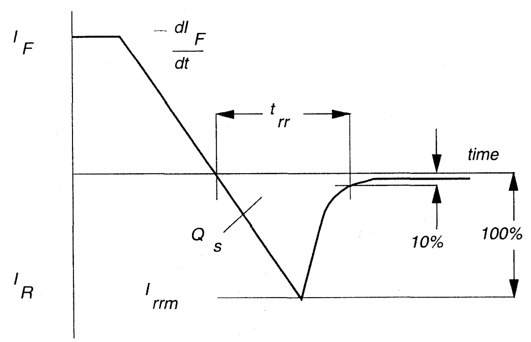


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

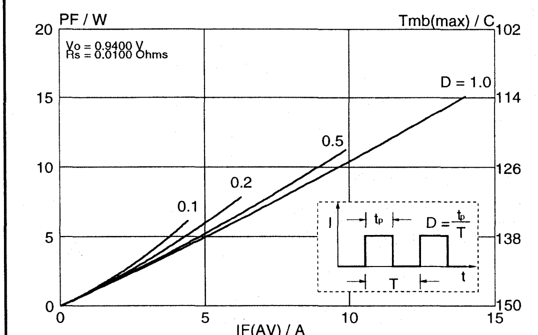


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

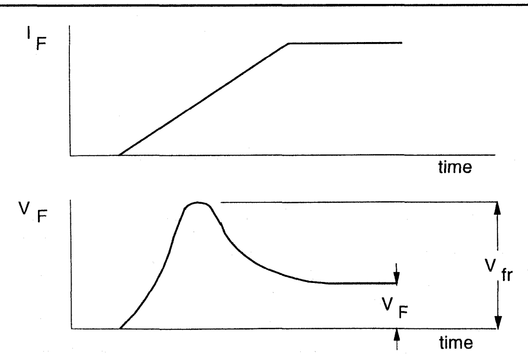


Fig.2. Definition of V_{fr}

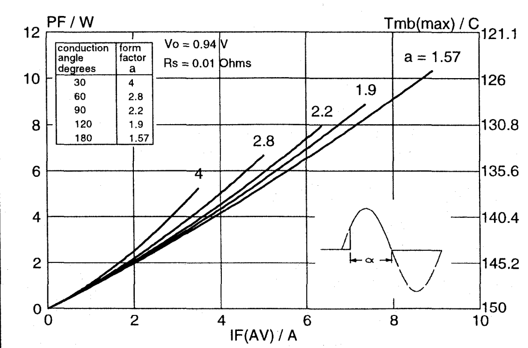


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

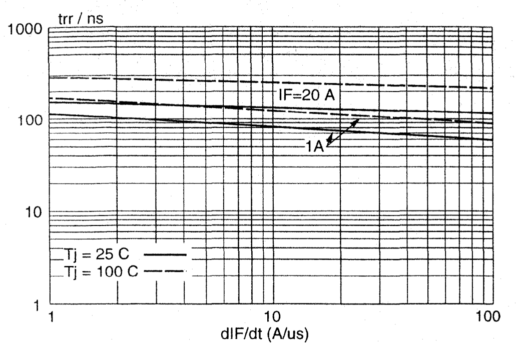


Fig.5. Maximum t_{rr} at T_j = 25˚C and 100˚C; per diode

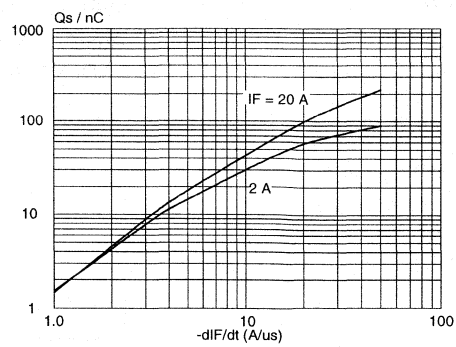


Fig.8. Maximum Q_s at T_j = 25˚C; per diode.

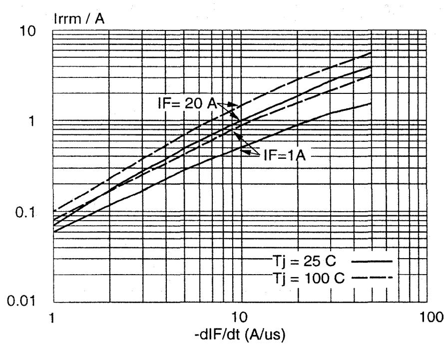


Fig.6. Maximum I_{rrm} at T_j = 25˚C and 100˚C; per diode.

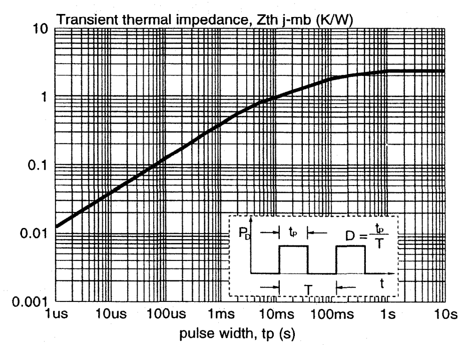


Fig.9. Transient thermal impedance per diode $Z_{th\ j\text{-}mb} = f(t_p)$

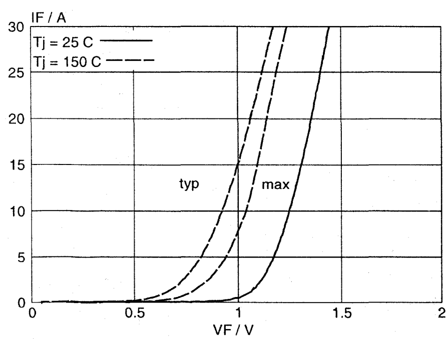


Fig.7. Typical and maximum forward characteristic

Fast soft-recovery controlled avalanche rectifiers

BYV36 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack.

DESCRIPTION

Rugged glass SOD57 package, using a high temperature alloyed construction. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

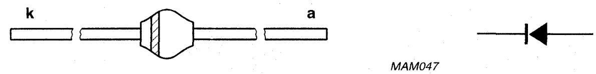


Fig.1 Simplified outline (SOD57) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYV36A		–	200	V
	BYV36B		–	400	V
	BYV36C		–	600	V
	BYV36D		–	800	V
	BYV36E		–	1000	V
	BYV36F		–	1200	V
	BYV36G		–	1400	V
V_R	continuous reverse voltage				
	BYV36A		–	200	V
	BYV36B		–	400	V
	BYV36C		–	600	V
	BYV36D		–	800	V
	BYV36E		–	1000	V
	BYV36F		–	1200	V
	BYV36G		–	1400	V
$I_{F(AV)}$	average forward current	T_{tp} = 60 °C; lead length = 10 mm; see Figs 2; 3 and 4 averaged over any 20 ms period; see also Figs 14; 15 and 16			
	BYV36A to C		–	1.6	A
	BYV36D and E		–	1.5	A
	BYV36F and G		–	1.5	A
$I_{F(AV)}$	average forward current	T_{amb} = 60 °C; PCB mounting (see Fig.25); see Figs 5; 6 and 7 averaged over any 20 ms period; see also Figs 14; 15 and 16			
	BYV36A to C		–	0.87	A
	BYV36D and E		–	0.81	A
	BYV36F and G		–	0.81	A

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{FRM}	repetitive peak forward current	T_{tp} = 60 °C; see Figs 8; 9 and 10			
	BYV36A to C		–	18	A
	BYV36D and E		–	17	A
	BYV36F and G		–	15	A
I_{FRM}	repetitive peak forward current	T_{amb} = 60 °C; see Figs 11; 12 and 13			
	BYV36A to C		–	9	A
	BYV36D and E		–	8	A
	BYV36F and G		–	8	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	30	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	10	mJ
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature	see Figs 17 and 18	–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Figs 19; 20 and 21				
	BYV36A to C		–	–	1.00	V
	BYV36D and E		–	–	1.05	V
	BYV36F and G		–	–	1.05	V
V_F	forward voltage	I_F = 1 A; see Figs 19; 20 and 21				
	BYV36A to C		–	–	1.35	V
	BYV36D and E		–	–	1.45	V
	BYV36F and G		–	–	1.45	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYV36A		300	–	–	V
	BYV36B		500	–	–	V
	BYV36C		700	–	–	V
	BYV36D		900	–	–	V
	BYV36E		1100	–	–	V
	BYV36F		1300	–	–	V
	BYV36G		1500	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.22	–	–	5	µA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.22	–	–	150	µA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
t_{rr}	reverse recovery time	when switched from $I_F = 0.5$ A to $I_R = 1$ A; measured at $I_R = 0.25$ A; see Fig. 26				
	BYV36A to C		–	–	100	ns
	BYV36D and E		–	–	150	ns
	BYV36F and G		–	–	250	ns
C_d	diode capacitance	f = 1 MHz; $V_R = 0$ V; see Figs 23 and 24				
	BYV36A to C		–	45	–	pF
	BYV36D and E		–	40	–	pF
	BYV36F and G		–	35	–	pF
$\left\|\frac{dI_R}{dt}\right\|$	maximum slope of reverse recovery current	when switched from $I_F = 1$ A to $V_R \geq 30$ V and $dI_F/dt = -1$ A/µs; see Fig.27				
	BYV36A to C		–	–	7	A/µs
	BYV36D and E		–	–	6	A/µs
	BYV36F and G		–	–	5	A/µs

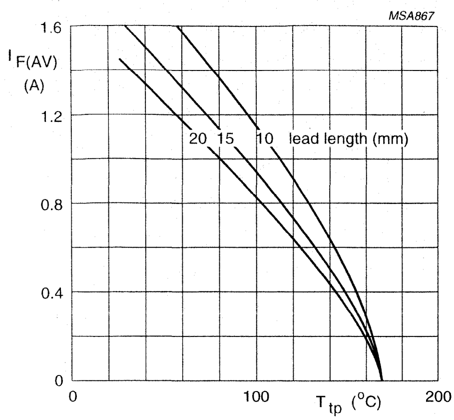
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	46	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm, see Fig.25. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA

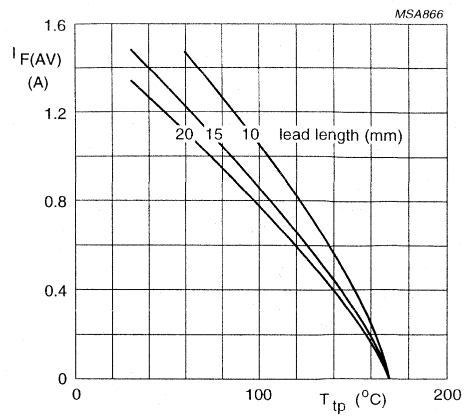


BYV36A to C

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Switched mode application.

Fig.2 Maximum average forward current as a function of tie-point temperature (including losses due to reverse leakage).

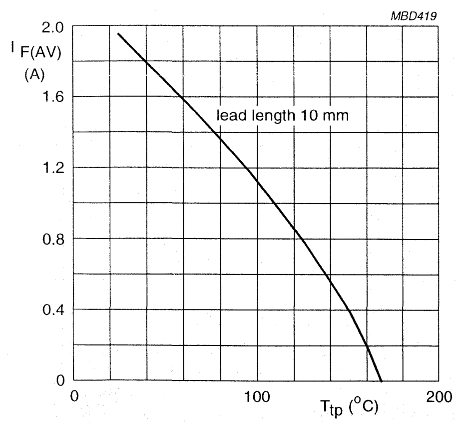


BYV36D and E

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Switched mode application.

Fig.3 Maximum average forward current as a function of tie-point temperature (including losses due to reverse leakage).

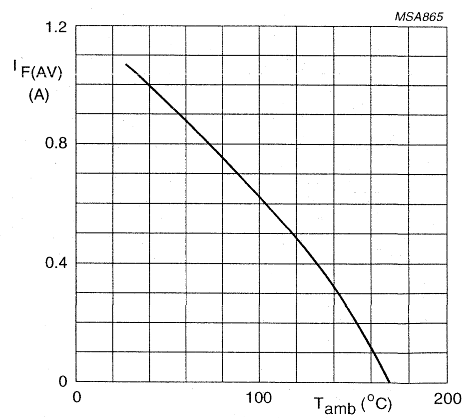


BYV36F and G

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Switched mode application.

Fig.4 Maximum average forward current as a function of tie-point temperature (including losses due to reverse leakage).



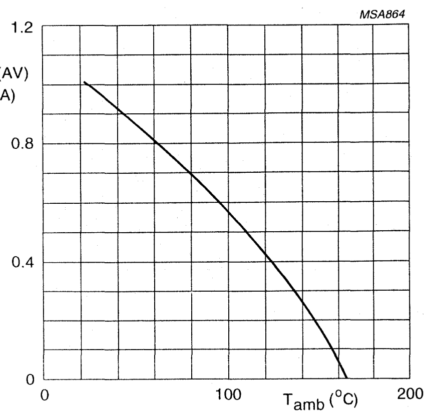
BYV36A to C

a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.

Device mounted as shown in Fig.25.

Switched mode application.

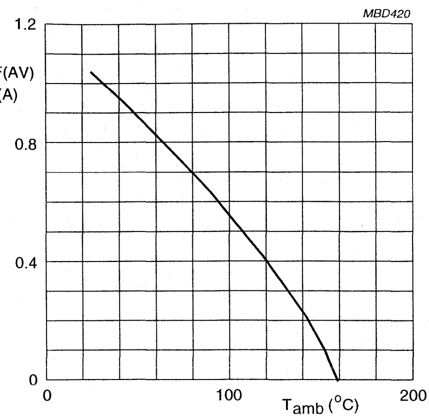
Fig.5 Maximum average forward current as a function of ambient temperature (including losses due to reverse leakage).



BYV36D and E

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.
Device mounted as shown in Fig.25.
Switched mode application.

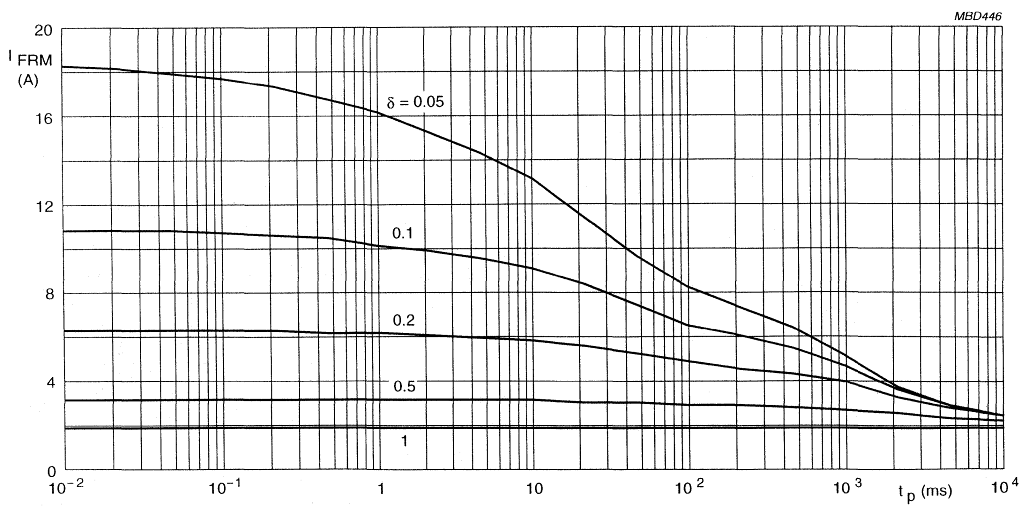
Fig.6 Maximum average forward current as a function of ambient temperature (including losses due to reverse leakage).



BYV36F and G

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.
Device mounted as shown in Fig.25.
Switched mode application.

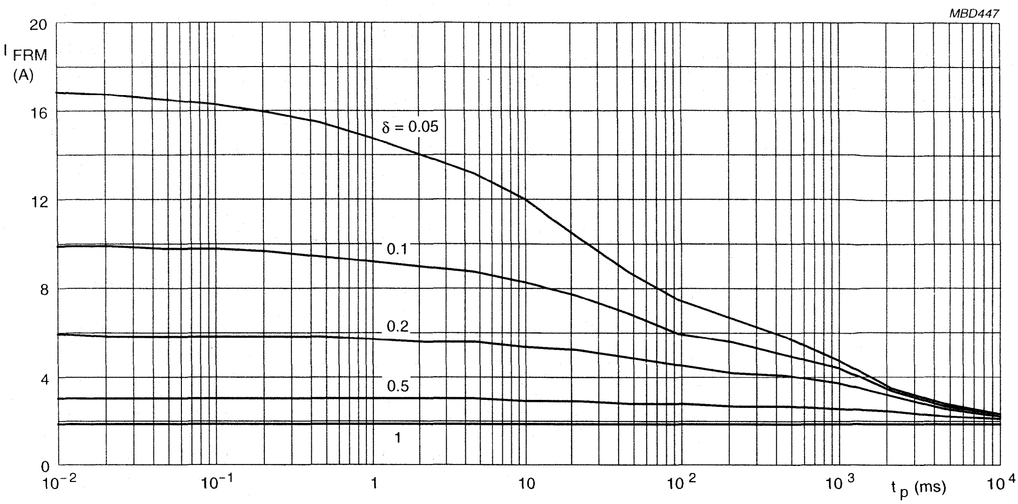
Fig.7 Maximum average forward current as a function of ambient temperature (including losses due to reverse leakage).



BYV36A to C

$T_{tp} = 60°C$; $R_{th\ j\text{-}tp} = 46$ K/W.
V_{RRMmax} during $1 - \delta$; curves include derating for $T_{j\ max}$ at $V_{RRM} = 600$ V.

Fig.8 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

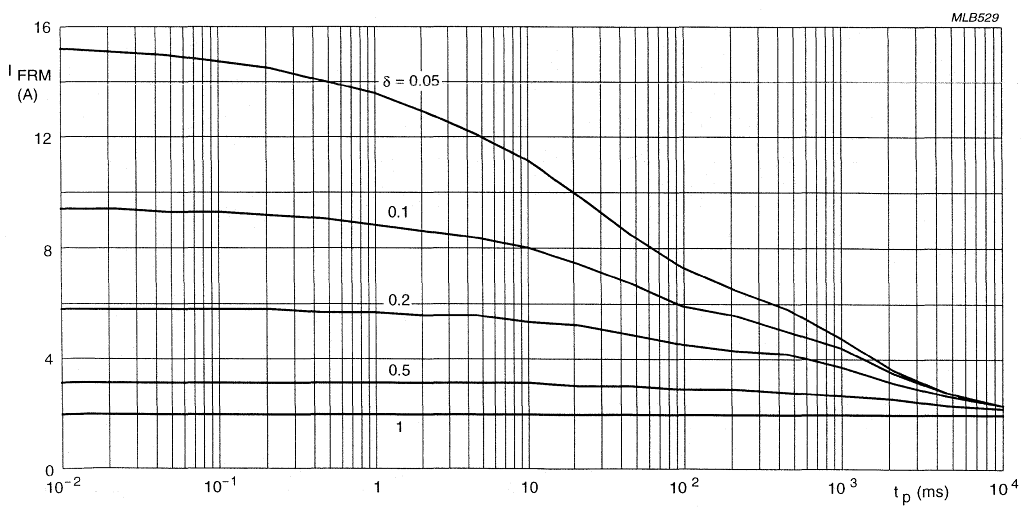


BYV36D and E

$T_{tp} = 60°C$; $R_{th\ j\text{-}tp} = 46$ K/W.

V_{RRMmax} during $1 - \delta$; curves include derating for $T_{j\ max}$ at $V_{RRM} = 1000$ V.

Fig.9 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

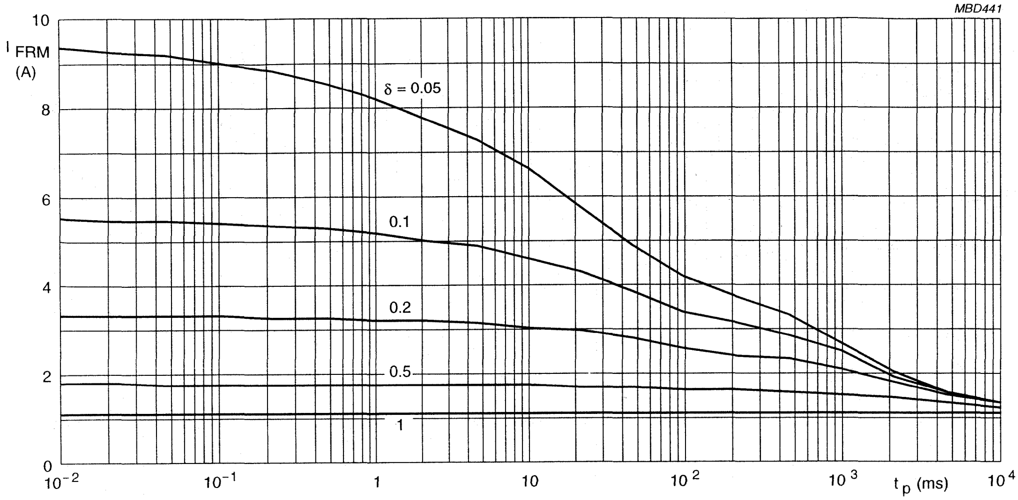


BYV36F and G

$T_{tp} = 60°C$; $R_{th\ j\text{-}tp} = 46$ K/W.

V_{RRMmax} during $1 - \delta$; curves include derating for $T_{j\ max}$ at $V_{RRM} = 1400$ V.

Fig.10 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

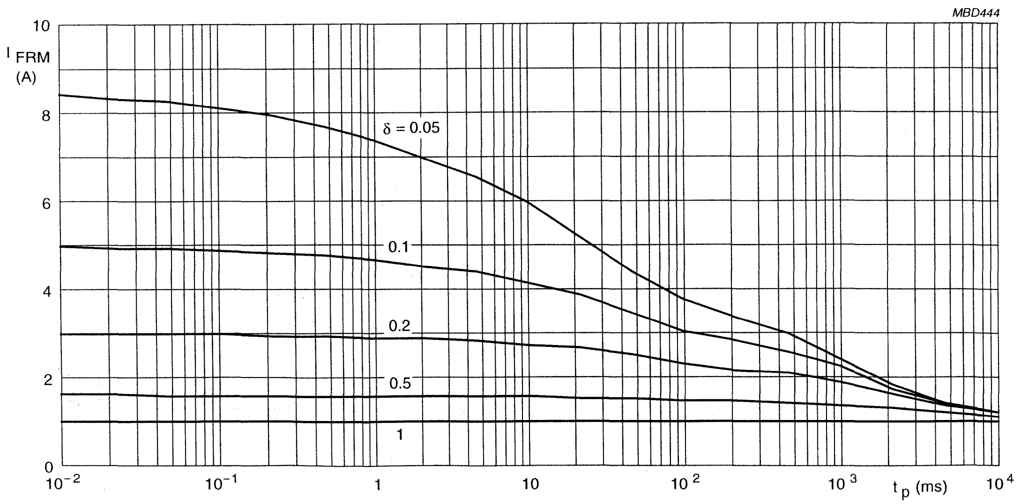


BYV36A to C

$T_{amb} = 60$ °C; $R_{th\ j\text{-}a} = 100$ K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at $V_{RRM} = 600$ V.

Fig.11 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

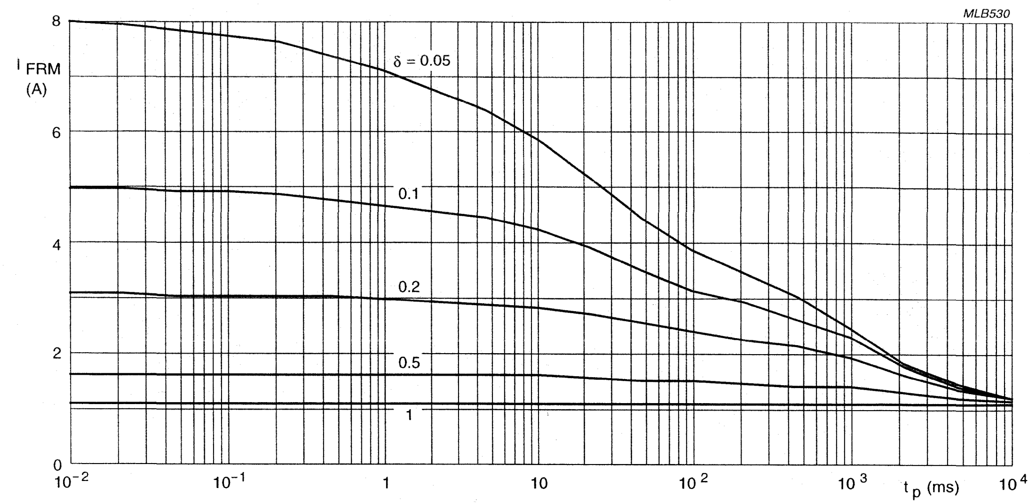


BYV36D and E

$T_{amb} = 60$ °C; $R_{th\ j\text{-}a} = 100$ K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at $V_{RRM} = 1000$ V.

Fig.12 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

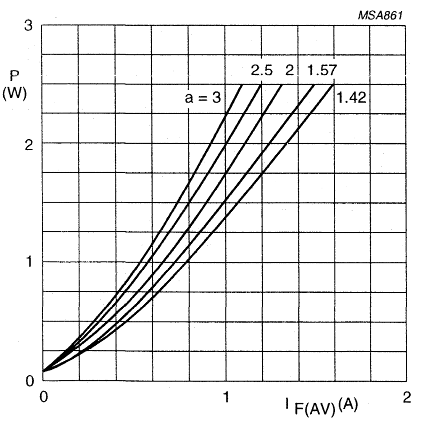


BYV36F and G

T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 100 K/W.

V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1400 V.

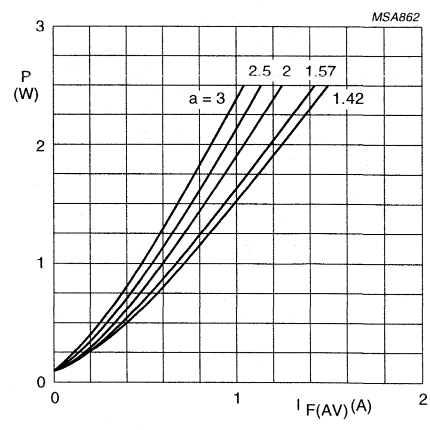
Fig.13 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



BYV36A to C

a = $I_{F(RMS)}/I_{F(AV)}$; V_R = V_{RRMmax}; δ = 0.5.

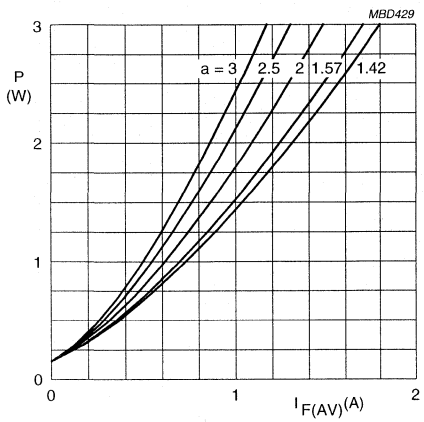
Fig.14 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



BYV36D and E

a = $I_{F(RMS)}/I_{F(AV)}$; V_R = V_{RRMmax}; δ = 0.5.

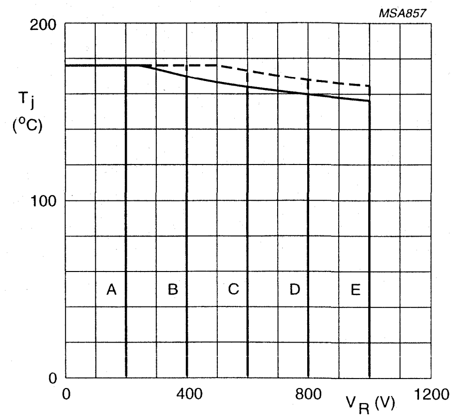
Fig.15 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



BYV36F and G

$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Fig.16 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.

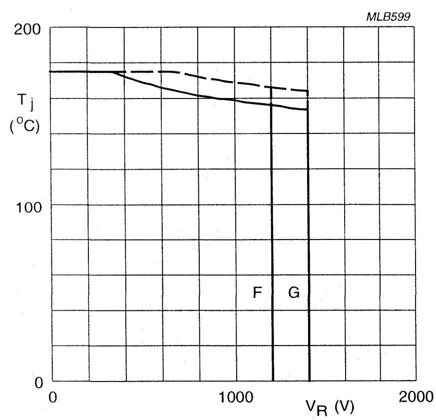


BYV36A to E

Solid line = V_R.

Dotted line = V_{RRM}; $\delta = 0.5$.

Fig.17 Maximum permissible junction temperature as a function of reverse voltage.

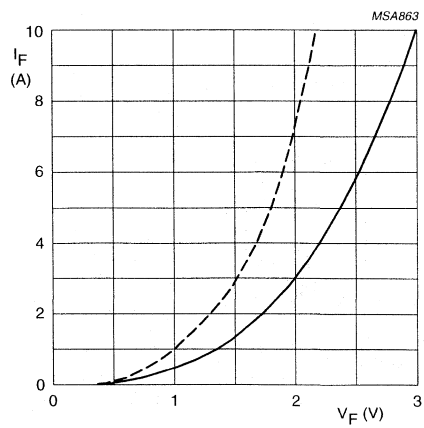


BYV36F and G

Solid line = V_R.

Dotted line = V_{RRM}; $\delta = 0.5$.

Fig.18 Maximum permissible junction temperature as a function of reverse voltage.

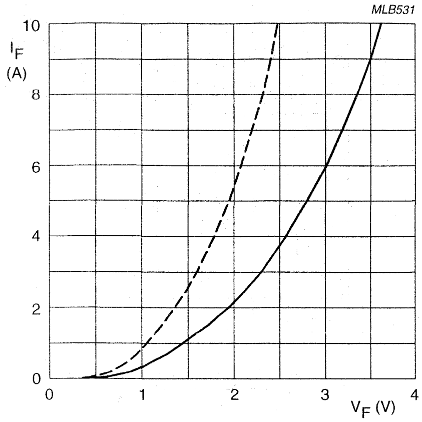


BYV36A to C

Dotted line: T_j = 175 °C.

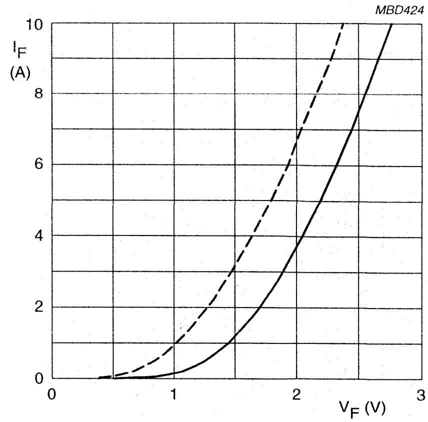
Solid line: T_j = 25 °C.

Fig.19 Forward current as a function of forward voltage; maximum values.



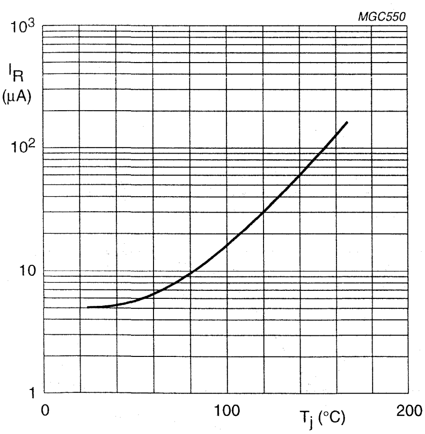
BYV36D and E
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.20 Forward current as a function of forward voltage; maximum values.



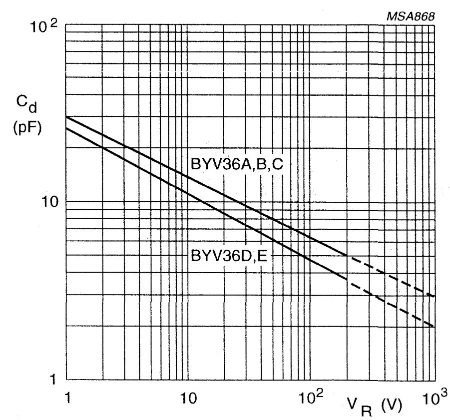
BYV36F and G
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.21 Forward current as a function of forward voltage; maximum values.



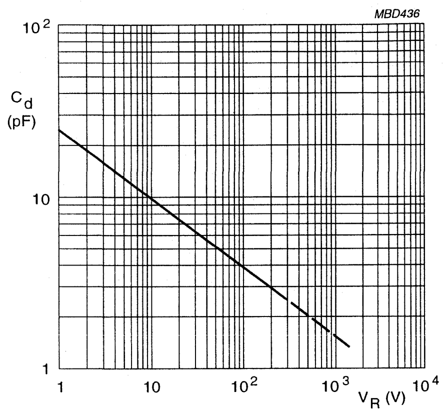
$V_R = V_{RRMmax}$.

Fig.22 Reverse current as a function of junction temperature; maximum values.



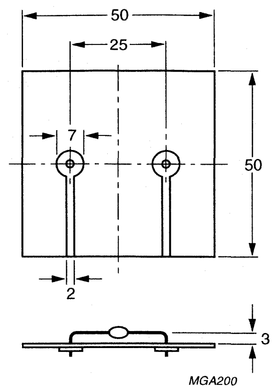
BYV36A to E.
f = 1 MHz; T_j = 25 °C.

Fig.23 Diode capacitance as a function of reverse voltage, typical values.



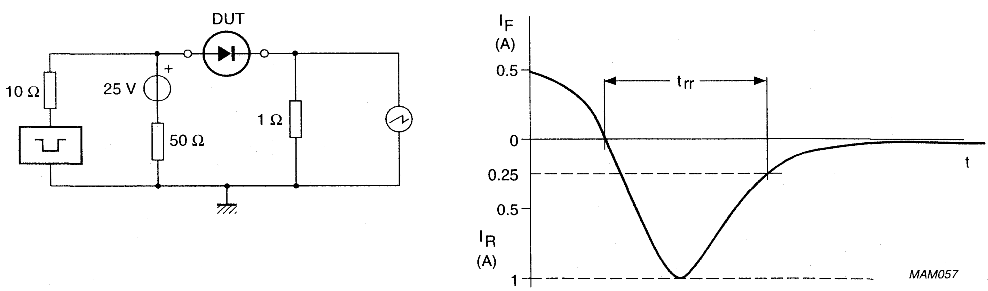
BYV36F and G.
f = 1 MHz; T_j = 25 °C.

Fig.24 Diode capacitance as a function of reverse voltage, typical values.



Dimensions in mm.

Fig.25 Device mounted on a printed-circuit board.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.26 Test circuit and reverse recovery time waveform and definition.

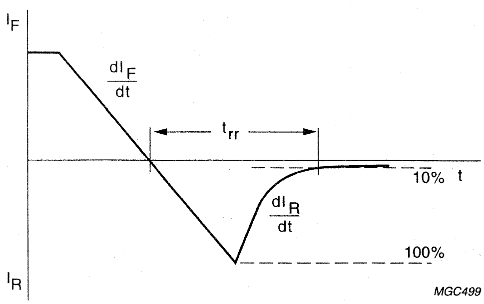


Fig.27 Reverse recovery definitions.

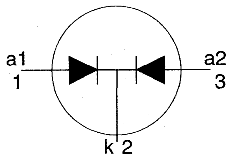
Rectifier diodes ultrafast, rugged

BYV40E series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- low profile surface mounting package

SYMBOL



QUICK REFERENCE DATA

V_R = 150 V/ 200 V

$V_F \leq 0.7$ V

$I_{O(AV)}$ = 1.5 A

I_{RRM} = 0.1 A

$t_{rr} \leq 25$ ns

GENERAL DESCRIPTION

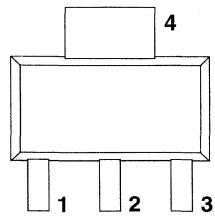
Dual, common cathode, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYV40E series is supplied in the SOT223 surface mounting package.

PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode
3	anode 2
tab	cathode

SOT223



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		BYV40E		**-150**	**-200**	
V_{RRM}	Peak repetitive reverse voltage		-	150	200	V
V_{RWM}	Crest working reverse voltage		-	150	200	V
V_R	Continuous reverse voltage	$T_{sp} \leq 120$˚C	-	150	200	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)[1]	square wave; $\delta = 0.5$; $T_{sp} \leq 132$˚C	-	1.5		A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{sp} \leq 132$ ˚C	-	1.5		A
I_{FSM}	Non-repetitive peak forward current per diode	t_p = 10 ms	-	6		A
		t_p = 8.3 ms	-	6.6		A
		sinusoidal; T_j = 150˚C prior to surge; with reapplied $V_{RWM(max)}$				
I_{RRM}	Repetitive peak reverse current per diode	t_p = 2 µs; $\delta = 0.001$	-	0.1		A
I_{RSM}	Non-repetitive peak reverse current per diode	t_p = 100 µs	-	0.1		A
T_{stg}	Storage temperature		-65	150		˚C
T_j	Operating junction temperature		-	150		˚C

1 Neglecting switching and reverse current losses

SD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage	Human body model; C = 250 pF; R = 1.5 kΩ	-	8	kV

HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}sp}$	Thermal resistance junction to solder point	one or both diodes conducting	-	-	15	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	pcb mounted; minimum footprint	-	156	-	K/W
		pcb mounted; pad area as in fig:11	-	70	-	K/W

LECTRICAL CHARACTERISTICS

ıaracteristics are per diode at T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 0.5 A; T_j = 150˚C	-	0.50	0.7	V
		I_F = 1.5 A	-	0.82	1.0	V
I_R	Reverse current	$V_R = V_{RWM}$; T_j = 100 ˚C	-	100	300	µA
		$V_R = V_{RWM}$	-	5	10	µA
Q_s	Reverse recovery charge	I_F = 2 A; $V_R \geq 30$ V; $-dI_F/dt$ = 20 A/µs	-	-	11	nC
t_{rr1}	Reverse recovery time	I_F = 1 A; $V_R \geq 30$ V; $-dI_F/dt$ = 100 A/µs	-	-	25	ns
t_{rr2}	Reverse recovery time	I_F = 0.5 A to I_R = 1 A; I_{rec} = 0.25 A	-	10	20	ns
V_{fr}	Forward recovery voltage	I_F = 2 A; dI_F/dt = 20 A/µs	-	3	-	V

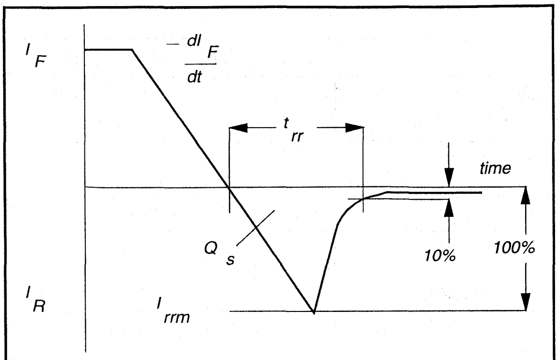


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

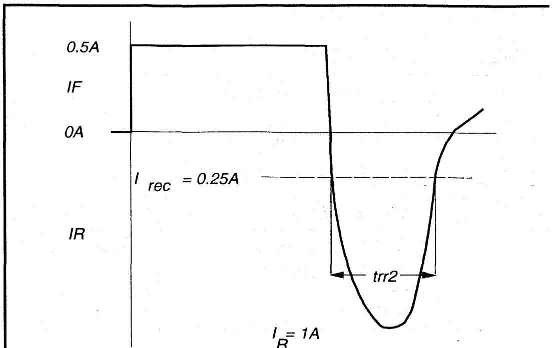


Fig.4. Definition of t_{rr2}

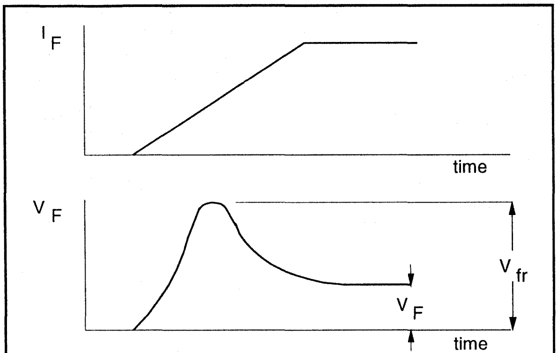


Fig.2. Definition of V_{fr}

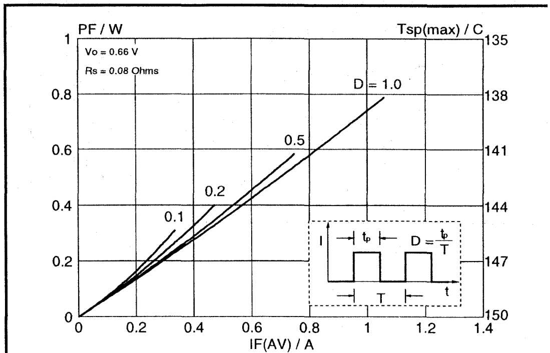


Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

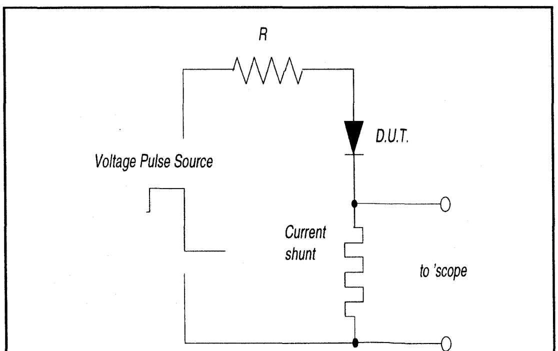


Fig.3. Circuit schematic for t_{rr2}

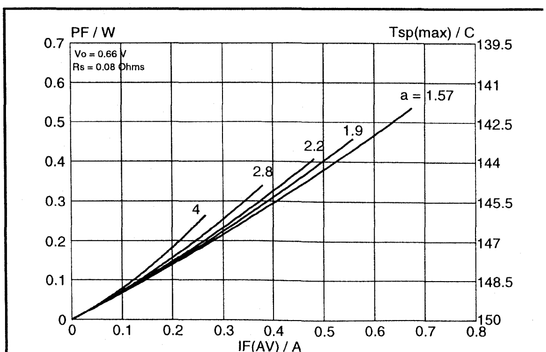


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

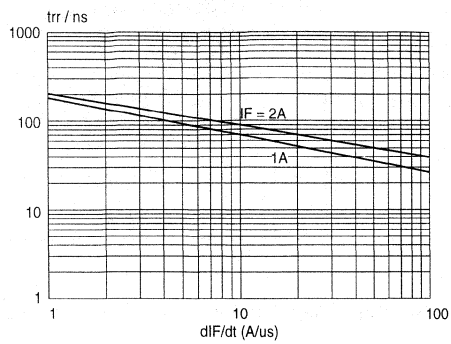


Fig.7. Maximum t_{rr} at T_j = 25 ˚C; per diode

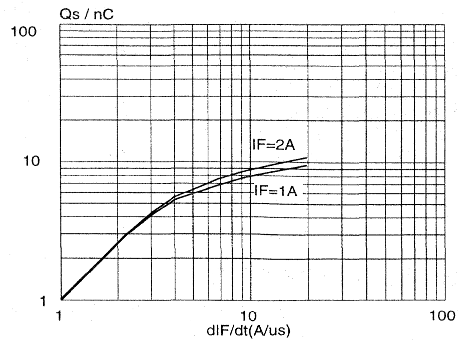


Fig.9. Maximum Q_s at T_j = 25 ˚C; per diode

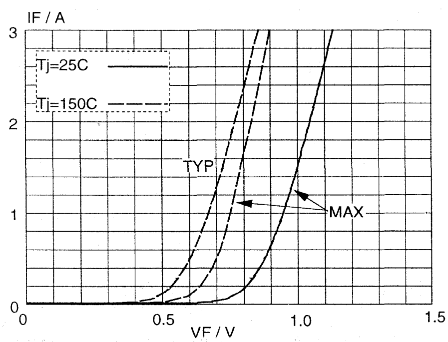


Fig.8. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

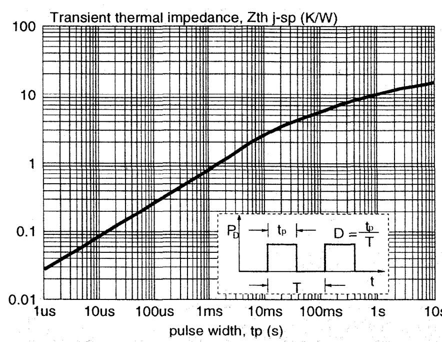


Fig.10. Transient thermal impedance; per diode; $Z_{th\ j\text{-}sp} = f(t_p)$.

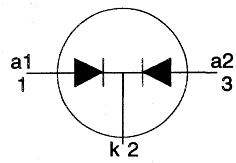
Rectifier diodes ultrafast, rugged

BYV42E, BYV42EB series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 150 V/ 200 V

$V_F \leq$ 0.85 V

$I_{O(AV)}$ = 30 A

I_{RRM} = 0.2 A

$t_{rr} \leq$ 28 ns

GENERAL DESCRIPTION

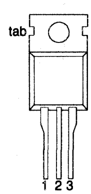
Dual, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode powe supplies.

The BYV42E series is supplied in the SOT78 conventional leaded package.
The BYV42EB series is supplied in the SOT404 surface mounting package.

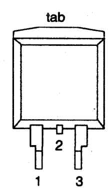
PINNING

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k) [1]
3	anode 2 (a)
tab	cathode (k)

SOT78 (TO220AB)



SOT404



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		BYV42E / BYV42EB		**-150**	**-200**	
V_{RRM}	Peak repetitive reverse voltage		-	150	200	V
V_{RWM}	Crest working reverse voltage		-	150	200	V
V_R	Continuous reverse voltage	$T_{mb} \leq$ 144˚C	-	150	200	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave δ = 0.5; $T_{mb} \leq$ 108 ˚C	-	30		A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; δ = 0.5; $T_{mb} \leq$ 108 ˚C	-	30		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-	150		A
		t = 8.3 ms sinusoidal; with reapplied $V_{RWM(max)}$	-	160		A
I_{RRM}	Repetitive peak reverse current per diode	t_p = 2 µs; δ = 0.001	-	0.2		A
I_{RSM}	Non-repetitive peak reverse current per diode	t_p = 100 µs	-	0.2		A
T_{stg}	Storage temperature		-40	150		˚C
T_j	Operating junction temperature		-	150		˚C

1. It is not possible to make connection to pin 2 of the SOT404 package
2. SOT78 package, For output currents in excess of 20 A, the cathode connection should be made to the mounting tab.

:SD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage	Human body model; C = 250 pF; R = 1.5 kΩ	-	8	kV

'HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	2.4	K/W
		both diodes	-	-	1.4	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	SOT78 package, in free air	-	60	-	K/W
		SOT404 and SOT428 packages, pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

:LECTRICAL CHARACTERISTICS

haracteristics are per diode at T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 15 A; T_j = 150˚C	-	0.78	0.85	V
		I_F = 15 A	-	0.95	1.05	V
		I_F = 30 A	-	1.00	1.20	V
I_R	Reverse current	$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.5	1	mA
		$V_R = V_{RWM}$	-	10	100	µA
Q_s	Reverse recovery charge	I_F = 2 A; $V_R \geq$ 30 V; -dI_F/dt = 20 A/µs	-	6	15	nC
t_{rr1}	Reverse recovery time	I_F = 1 A; $V_R \geq$ 30 V; -dI_F/dt = 100 A/µs	-	20	28	ns
t_{rr2}	Reverse recovery time	I_F = 0.5 A to I_R = 1 A; I_{rec} = 0.25 A	-	13	22	ns
V_{fr}	Forward recovery voltage	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

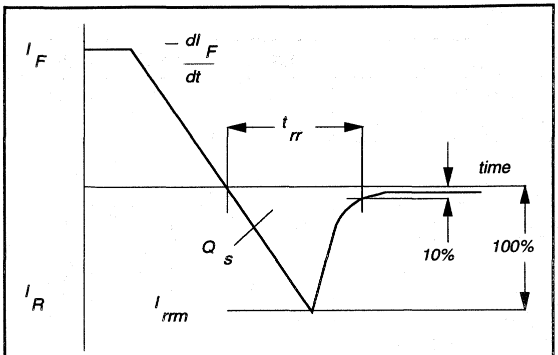


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

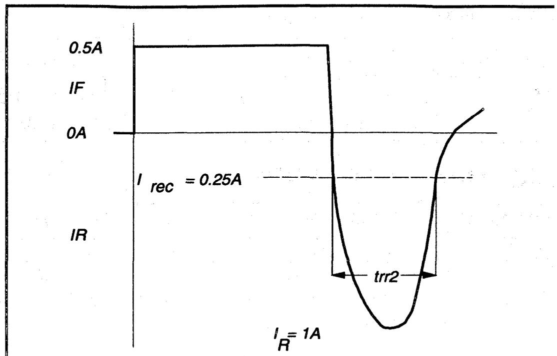


Fig.4. Definition of t_{rr2}

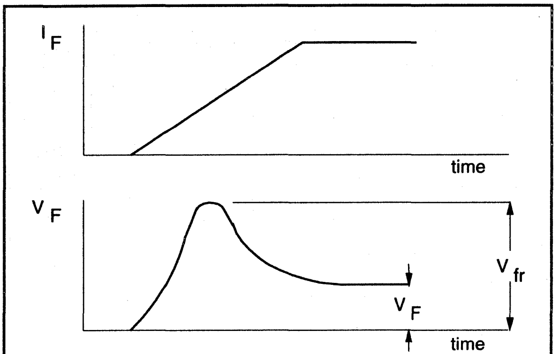


Fig.2. Definition of V_{fr}

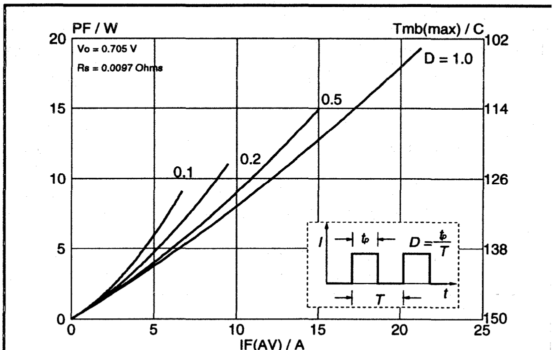


Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

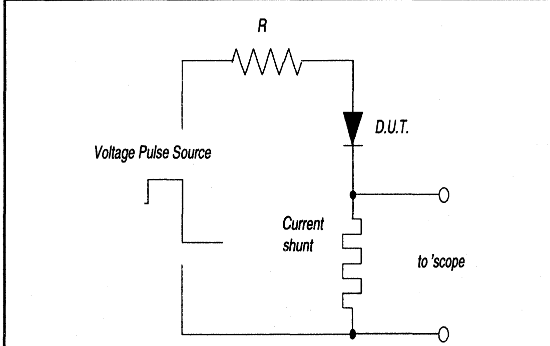


Fig.3. Circuit schematic for t_{rr2}

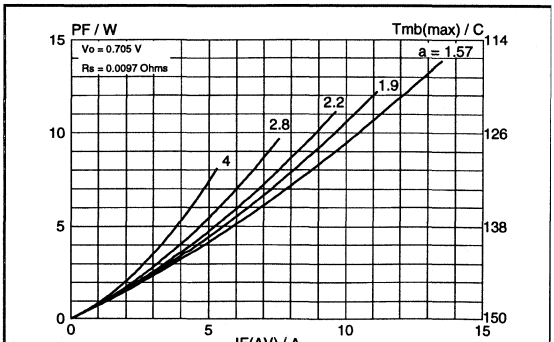


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

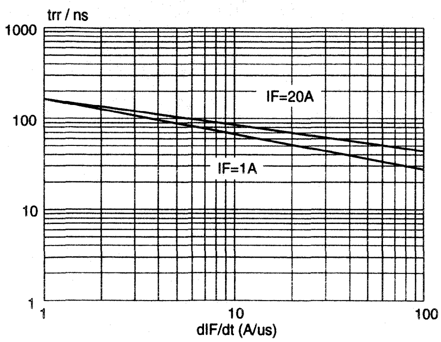


Fig.7. Maximum t_{rr} at T_j = 25 ˚C; per diode

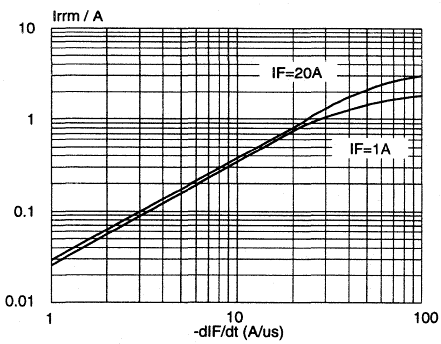


Fig.8. Maximum I_{rrm} at T_j = 25 ˚C; per diode

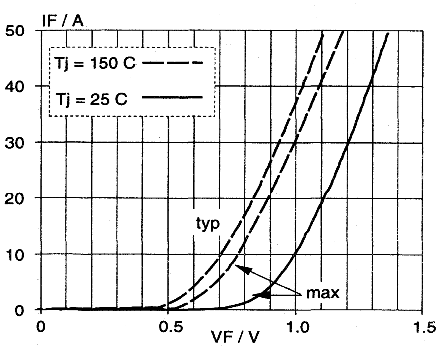


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

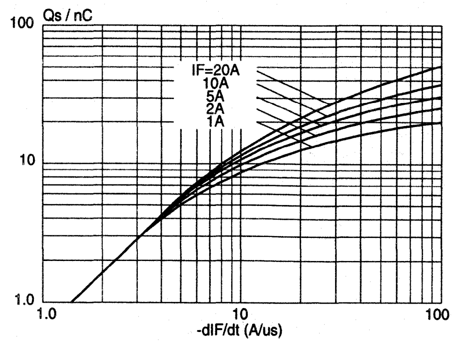


Fig.10. Maximum Q_s at T_j = 25 ˚C; per diode

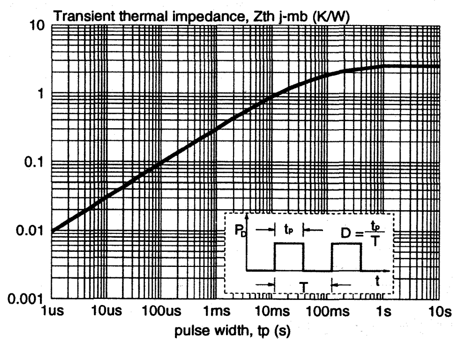


Fig.11. Transient thermal impedance; per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

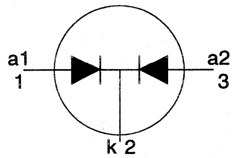
Rectifier diodes ultrafast, rugged

BYV42F, BYV42EX series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

V_R = 150 V/ 200 V

$V_F \leq 0.9$ V

$I_{O(AV)}$ = 20 A

I_{RRM} = 0.2 A

$t_{rr} \leq 28$ ns

GENERAL DESCRIPTION

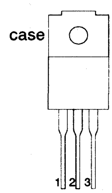
Dual, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYV42F series is supplied in the SOT186 package.
The BYV42EX series is supplied in the SOT186A package.

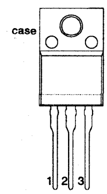
PINNING

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	isolated

SOT186



SOT186A



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		BYV42F / BYV42EX		**-150**	**-200**	
V_{RRM}	Peak repetitive reverse voltage		-	150	200	V
V_{RWM}	Crest working reverse voltage		-	150	200	V
V_R	Continuous reverse voltage	$T_{hs} \leq 125$˚C	-	150	200	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)[1]	square wave $\delta = 0.5$; $T_{hs} \leq 78$ ˚C	-	20		A
I_{FRM}	Repetitive peak forward current per diode	$t = 25$ µs; $\delta = 0.5$; $T_{hs} \leq 78$ ˚C	-	30		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-	150		A
		t = 8.3 ms sinusoidal; with reapplied $V_{RWM(max)}$	-	160		A
I_{RRM}	Repetitive peak reverse current per diode	$t_p = 2$ µs; $\delta = 0.001$	-	0.2		A
I_{RSM}	Non-repetitive peak reverse current per diode	$t_p = 100$ µs	-	0.2		A
T_{stg}	Storage temperature		-40	150		˚C
T_j	Operating junction temperature		-	150		˚C

1 Neglecting switching and reverse current losses.

ESD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage	Human body model; $C = 250$ pF; $R = 1.5$ kΩ	-	8	kV

ISOLATION LIMITING VALUE & CHARACTERISTIC

$T_{hs} = 25$ ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	R.M.S. isolation voltage from all three terminals to external heatsink	SOT186A package; f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65%; clean and dustfree	-		2500	V
V_{isol}	Repetitive peak voltage from all three terminals to external heatsink	SOT186 package; R.H. ≤ 65%; clean and dustfree	-		1500	V
C_{isol}	Capacitance from pin 2 to external heatsink	f = 1 MHz	-	10	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	both diodes conducting				
		with heatsink compound	-	-	4.0	K/W
		without heatsink compound	-	-	8.0	K/W
		per diode				
		with heatsink compound	-	-	5.0	K/W
		without heatsink compound	-	-	9.0	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	55	-	K/W

ELECTRICAL CHARACTERISTICS

characteristics are per diode at $T_j = 25$ ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	$I_F = 15$ A; $T_j = 150$˚C	-	0.83	0.90	V
		$I_F = 15$ A	-	0.95	1.05	V
		$I_F = 30$ A	-	1.00	1.20	V
I_R	Reverse current	$V_R = V_{RWM}$; $T_j = 100$ ˚C	-	0.5	1	mA
		$V_R = V_{RWM}$	-	10	100	µA
Q_s	Reverse recovery charge	$I_F = 2$ A; $V_R \geq 30$ V; $-dI_F/dt = 20$ A/µs	-	6	15	nC
t_{rr1}	Reverse recovery time	$I_F = 1$ A; $V_R \geq 30$ V; $-dI_F/dt = 100$ A/µs	-	20	28	ns
t_{rr2}	Reverse recovery time	$I_F = 0.5$ A to $I_R = 1$ A; $I_{rec} = 0.25$ A	-	13	22	ns
I_{rrm}	Peak reverse recovery current	$I_F = 10$ A; $V_R \geq 30$ V; $-dI_F/dt = 50$ A/µs; $T_j = 100$˚C	-	2	2.4	A
V_{fr}	Forward recovery voltage	$I_F = 1$ A; $dI_F/dt = 10$ A/µs	-	1	-	V

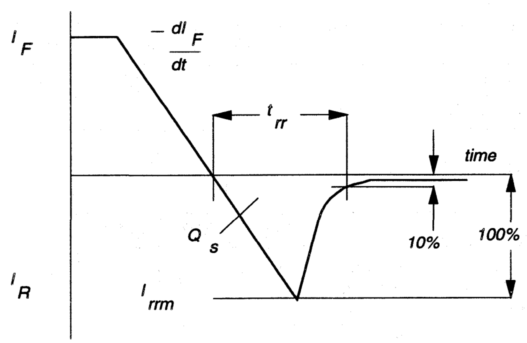


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

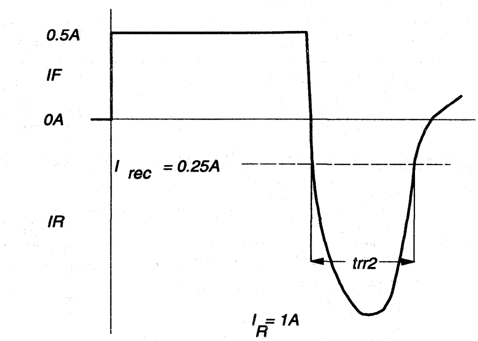


Fig.4. Definition of t_{rr2}

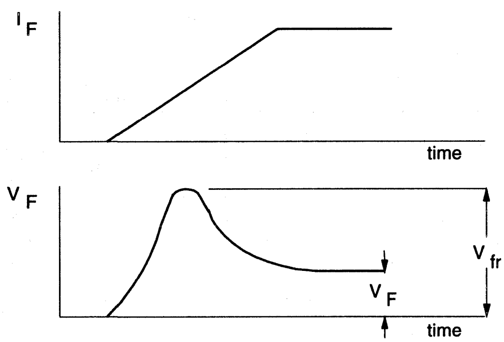


Fig.2. Definition of V_{fr}

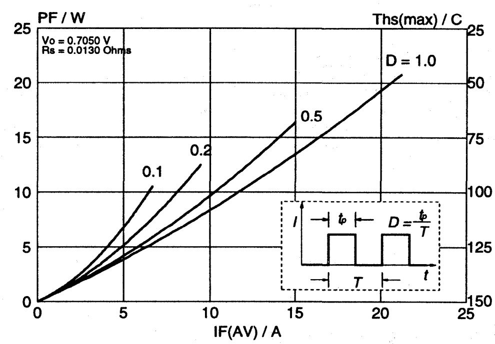


Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

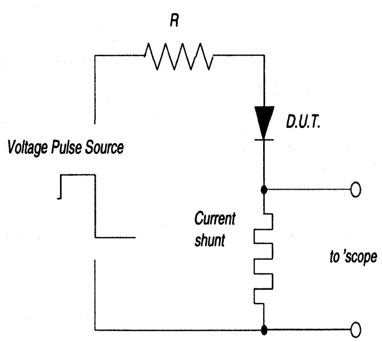


Fig.3. Circuit schematic for t_{rr2}

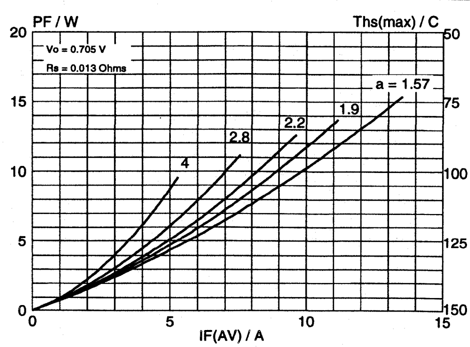


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

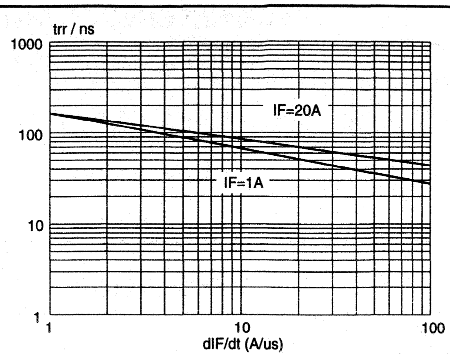


Fig.7. Maximum t_{rr} at T_j = 25 ˚C; per diode

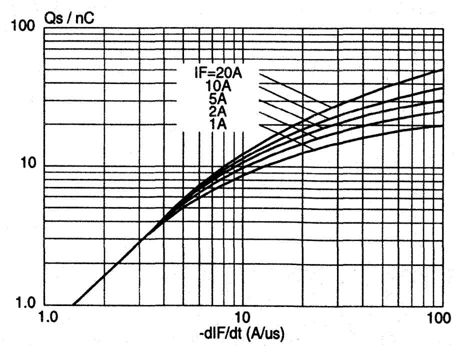


Fig.10. Maximum Q_s at T_j = 25 ˚C; per diode

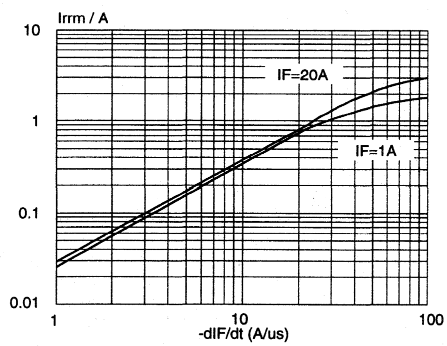


Fig.8. Maximum I_{rrm} at T_j = 25 ˚C; per diode

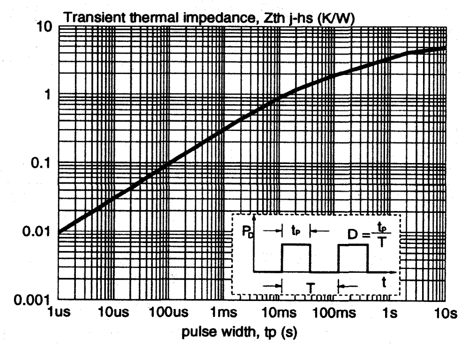


Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}hs} = f(t_p)$.

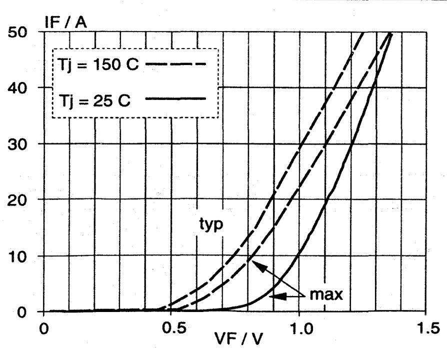


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

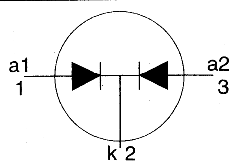
Dual rectifier diodes ultrafast

BYV44 series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 300 V/ 400 V/ 500 V

$V_F \leq 1.12$ V

$I_{O(AV)} = 30$ A

$t_{rr} \leq 60$ ns

GENERAL DESCRIPTION

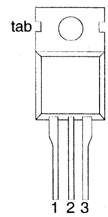
Dual, common cathode, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYV44 series is supplied in the conventional leaded SOT78 (TO220AB) package.

PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode
3	anode 2
tab	cathode

SOT78 (TO220AB)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
		BYV44		-300	-400	-500	
V_{RRM}	Peak repetitive reverse voltage		-	300	400	500	V
V_{RWM}	Crest working reverse voltage		-	300	400	500	V
V_R	Continuous reverse voltage	$T_{mb} \leq 136$˚C	-	300	400	500	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)[1]	square wave; $\delta = 0.5$; $T_{mb} \leq 94$ ˚C	-	30			A
I_{FRM}	Repetitive peak forward current per diode	$t = 25$ µs; $\delta = 0.5$; $T_{mb} \leq 94$ ˚C	-	30			A
I_{FSM}	Non-repetitive peak forward current per diode.	t = 10 ms	-	150			A
		t = 8.3 ms	-	160			A
		sinusoidal; with reapplied $V_{RRM(max)}$					
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	per diode	-	-	2.4	K/W
		both diodes conducting	-	-	1.4	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	60	-	K/W

1 Neglecting switching and reverse current losses.
For output currents in excess of 20 A, the cathode connection should be made to the metal mounting tab.

ELECTRICAL CHARACTERISTICS

Characteristics are per diode at T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 15 A; T_j = 150˚C	-	0.95	1.12	V
		I_F = 15 A	-	1.08	1.25	V
		I_F = 30 A	-	1.15	1.36	V
I_R	Reverse current	$V_R = V_{RRM}$	-	10	50	µA
		$V_R = V_{RRM}$; T_j = 100 ˚C	-	0.3	0.8	mA
Q_s	Reverse recovery charge	I_F = 2 A to $V_R \geq$ 30 V; dI_F/dt = 20 A/µs	-	40	60	nC
t_{rr}	Reverse recovery time	I_F = 1 A to $V_R \geq$ 30 V; dI_F/dt = 100 A/µs	-	50	60	ns
I_{rrm}	Peak reverse recovery current	I_F = 10 A to $V_R \geq$ 30 V; dI_F/dt = 50 A/µs; T_j = 100˚C	-	4.2	5.2	A
V_{fr}	Forward recovery voltage	I_F = 10 A; dI_F/dt = 10 A/µs	-	2.5	-	V

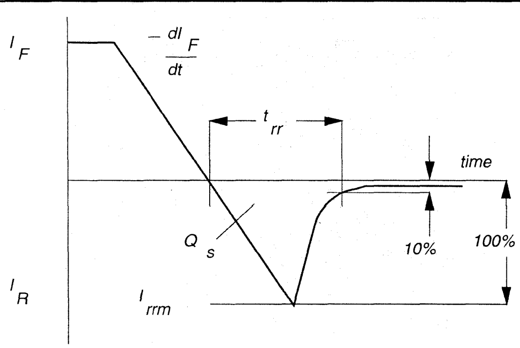


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

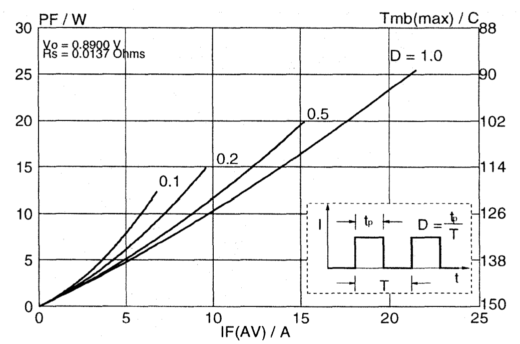


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

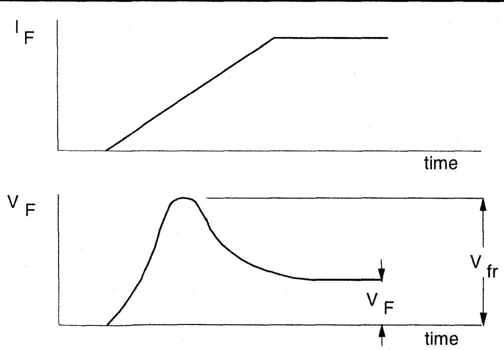


Fig.2. Definition of V_{fr}

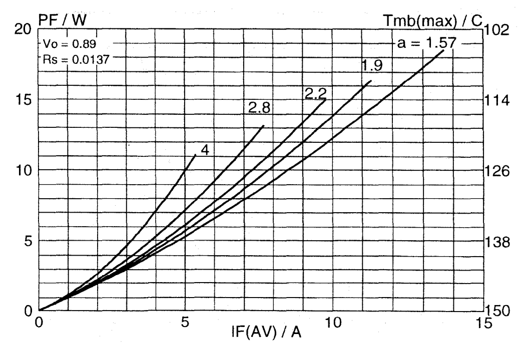


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

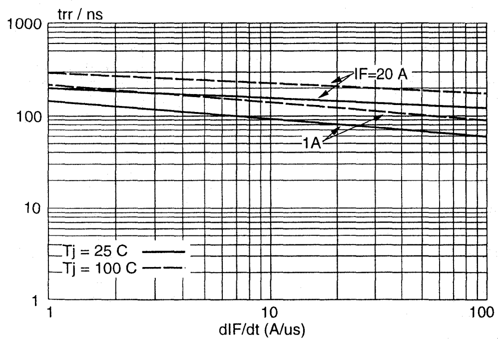


Fig.5. Maximum t_{rr} at T_j = 25˚C and 100˚C; per diode

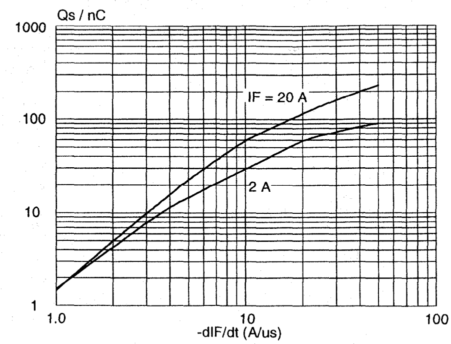


Fig.8. Maximum Q_s at T_j = 25˚C; per diode

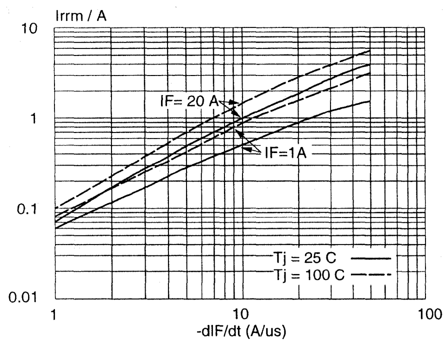


Fig.6. Maximum I_{rrm} at T_j = 25˚C and 100˚C; per diode

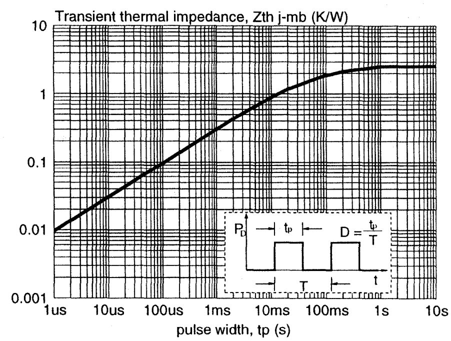


Fig.9. Transient thermal impedance per diode $Z_{th\,j\text{-}mb}= f(t_p)$

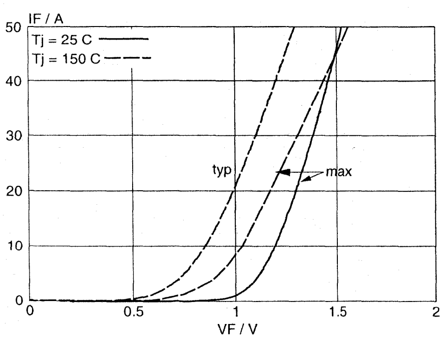


Fig.7. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

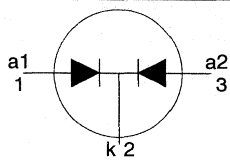
Rectifier diodes ultrafast, rugged

BYV72EW series

ꟷEATURES

Low forward volt drop
Fast switching
Soft recovery characteristic
Reverse surge capability
High thermal cycling performance
Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 150 V/ 200 V

$V_F \leq$ 0.85 V

$I_{O(AV)}$ = 30 A

I_{RRM} = 0.2 A

$t_{rr} \leq$ 28 ns

ƷENERAL DESCRIPTION

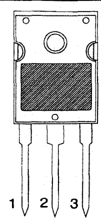
Ɔual, ultra-fast, epitaxial rectifier liodes intended for use as output ectifiers in high frequency switched node power supplies.

ˉhe BYV72EW series is supplied in he conventional leaded SOT429 TO247) package.

PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode
3	anode 2
tab	cathode

SOT429 (TO247)



.IMITING VALUES

.imiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		BYV72EW		-150	-200	
V_{RRM}	Peak repetitive reverse voltage		-	150	200	V
V_{RWM}	Crest working reverse voltage		-	150	200	V
V_R	Continuous reverse voltage	$T_{mb} \leq$ 144˚C	-	150	200	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)[1]	square wave δ = 0.5; $T_{mb} \leq$ 104 ˚C	-	30		A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; δ = 0.5; $T_{mb} \leq$ 104 ˚C	-	30		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-	150		A
		t = 8.3 ms sinusoidal; with reapplied $V_{RWM(max)}$	-	160		A
I_{RRM}	Repetitive peak reverse current per diode	t_p = 2 µs; δ = 0.001	-	0.2		A
I_{RSM}	Non-repetitive peak reverse current per diode	t_p = 100 µs	-	0.2		A
T_{stg}	Storage temperature		-40	150		˚C
T_j	Operating junction temperature		-	150		˚C

Neglecting switching and reverse current losses.

꞉SD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage	Human body model; C = 250 pF; R = 1.5 kΩ	-	8	kV

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	2.4	K/W
		both diodes conducting	-	-	1.4	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	45	-	K/W

ELECTRICAL CHARACTERISTICS

characteristics are per diode at T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 15 A; T_j = 150˚C	-	0.83	0.90	V
		I_F = 15 A	-	0.95	1.05	V
		I_F = 30 A	-	1.00	1.20	V
I_R	Reverse current	$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.5	1	mA
		$V_R = V_{RWM}$	-	10	100	µA
Q_s	Reverse recovery charge	I_F = 2 A; $V_R \geq$ 30 V; -dI_F/dt = 20 A/µs	-	6	15	nC
t_{rr1}	Reverse recovery time	I_F = 1 A; $V_R \geq$ 30 V; -dI_F/dt = 100 A/µs	-	20	28	ns
t_{rr2}	Reverse recovery time	I_F = 0.5 A to I_R = 1 A; I_{rec} = 0.25 A	-	13	22	ns
V_{fr}	Forward recovery voltage	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

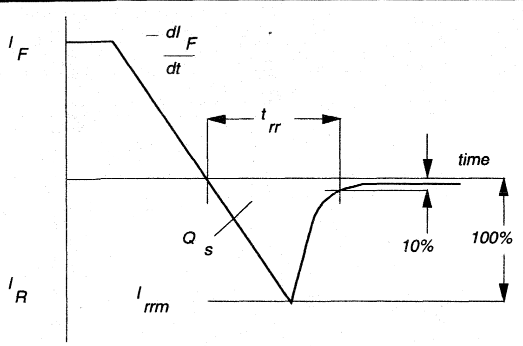


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

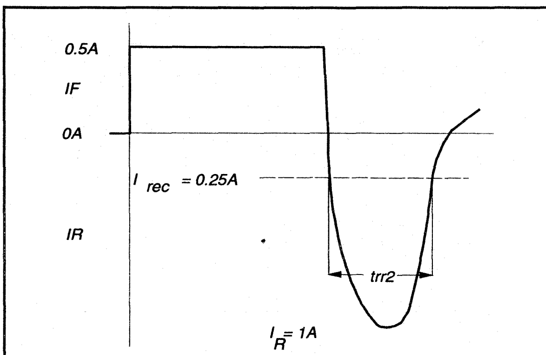


Fig.4. Definition of t_{rr2}

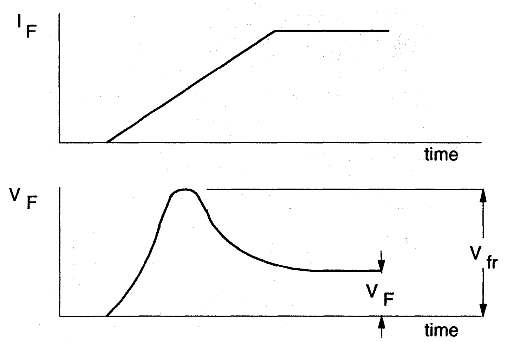


Fig.2. Definition of V_{fr}

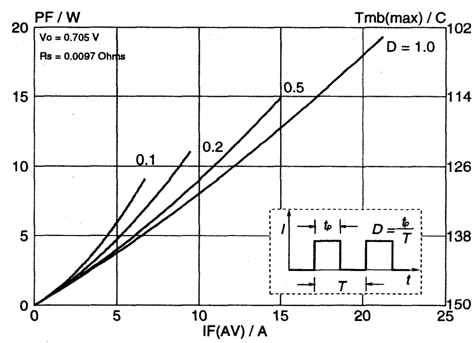


Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

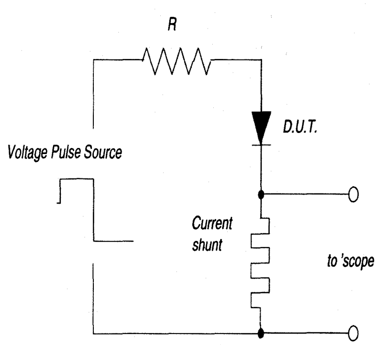


Fig.3. Circuit schematic for t_{rr2}

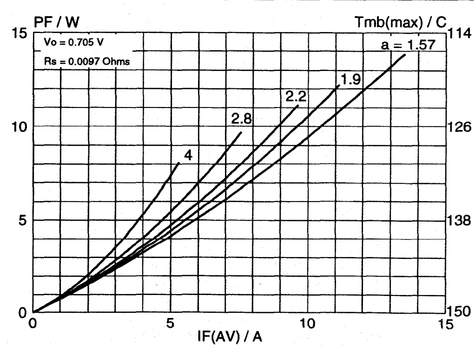


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

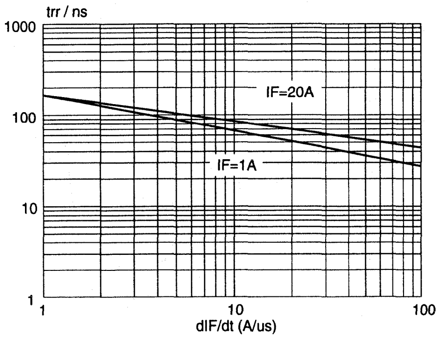


Fig.7. Maximum t_{rr} at T_j = 25 ˚C; per diode

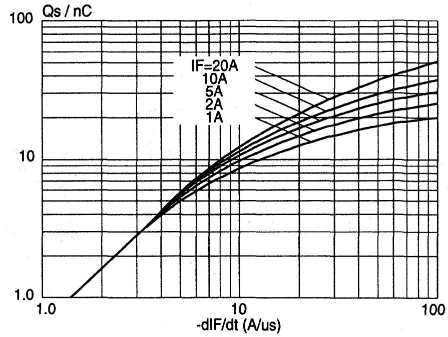


Fig.10. Maximum Q_s at T_j = 25 ˚C; per diode

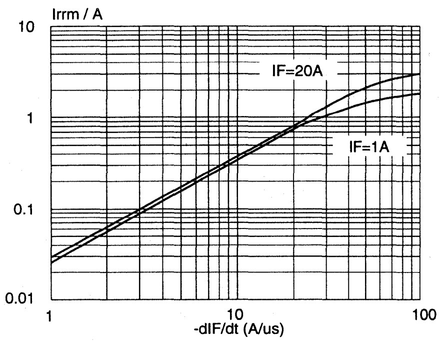


Fig.8. Maximum I_{rrm} at T_j = 25 ˚C; per diode

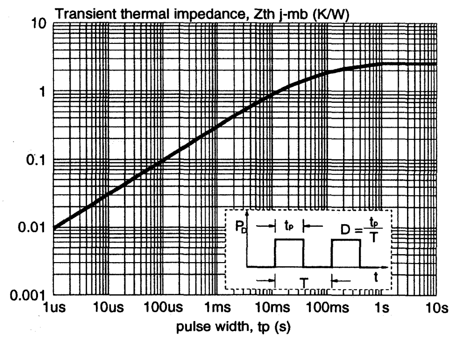


Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.

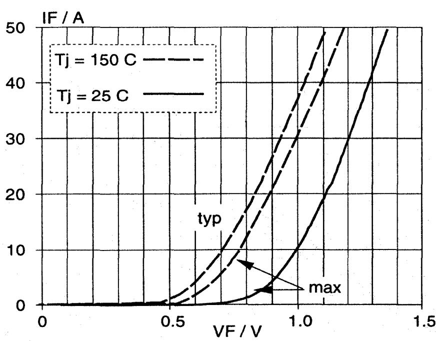


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

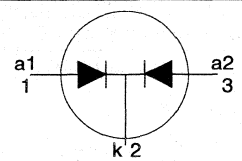
Dual rectifier diodes ultrafast

BYV74W series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 300 V/ 400 V/ 500 V

$V_F \leq 1.12$ V

$I_{O(AV)} = 30$ A

$t_{rr} \leq 60$ ns

GENERAL DESCRIPTION

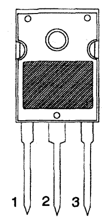
Dual, common cathode, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYV74W series is supplied in the conventional leaded SOT429 (TO247) package.

PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode
3	anode 2
tab	cathode

SOT429 (TO247)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
		BYV74W		-300	-400	-500	
V_{RRM}	Peak repetitive reverse voltage		-	300	400	500	V
V_{RWM}	Crest working reverse voltage		-	300	400	500	V
V_R	Continuous reverse voltage	$T_{mb} \leq 136$˚C	-	300	400	500	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)[1]	square wave; $\delta = 0.5$; $T_{mb} \leq 94$ ˚C	-	30			A
I_{FRM}	Repetitive peak forward current per diode	t = 25 μs; $\delta = 0.5$; $T_{mb} \leq 94$ ˚C	-	30			A
I_{FSM}	Non-repetitive peak forward current per diode.	t = 10 ms	-	150			A
		t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$	-	160			A
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-hs}$	Thermal resistance junction to heatsink	per diode	-	-	2.4	K/W
		both diodes conducting	-	-	1.4	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	in free air.	-	45	-	K/W

1 Neglecting switching and reverse current losses.

ELECTRICAL CHARACTERISTICS

characteristics are per diode at T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 15 A; T_j = 150˚C	-	0.95	1.12	V
		I_F = 15 A	-	1.08	1.25	V
		I_F = 30 A	-	1.15	1.36	V
I_R	Reverse current	$V_R = V_{RRM}$	-	10	50	µA
		$V_R = V_{RRM}$; T_j = 100 ˚C	-	0.3	0.8	mA
Q_s	Reverse recovery charge	I_F = 2 A to $V_R \geq$ 30 V; dI_F/dt = 20 A/µs	-	40	60	nC
t_{rr}	Reverse recovery time	I_F = 1 A to $V_R \geq$ 30 V; dI_F/dt = 100 A/µs	-	50	60	ns
I_{rrm}	Peak reverse recovery current	I_F = 10 A to $V_R \geq$ 30 V; dI_F/dt = 50 A/µs; T_j = 100˚C	-	4.2	5.2	A
V_{fr}	Forward recovery voltage	I_F = 10 A; dI_F/dt = 10 A/µs	-	2.5	-	V

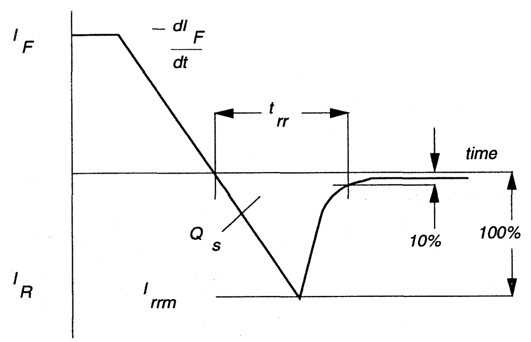


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

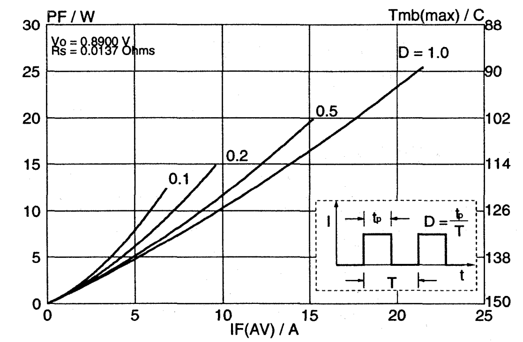


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

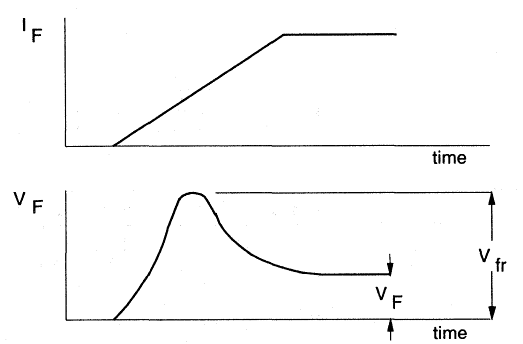


Fig.2. Definition of V_{fr}

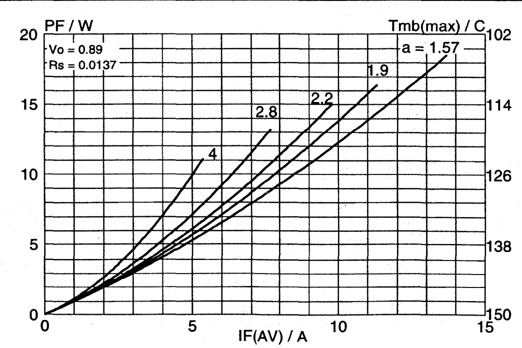


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

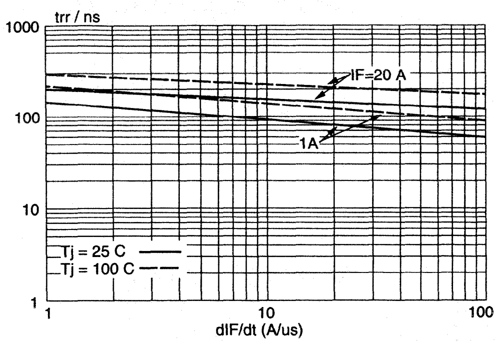


Fig.5. Maximum t_{rr} at T_j = 25˚C and 100˚C; per diode

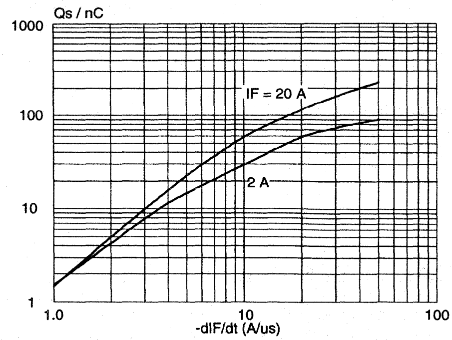


Fig.8. Maximum Q_s at T_j = 25˚C; per diode

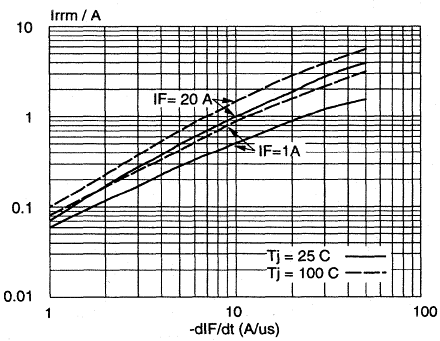


Fig.6. Maximum I_{rrm} at T_j = 25˚C and 100˚C; per diode

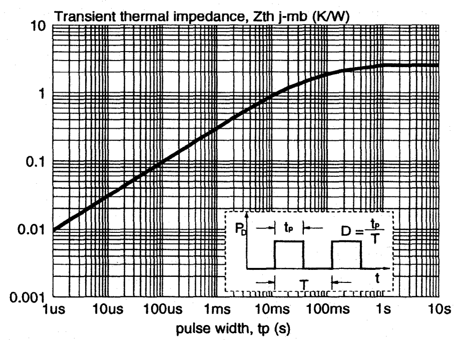


Fig.9. Transient thermal impedance per diode $Z_{th\ j\text{-}mb} = f(t_p)$

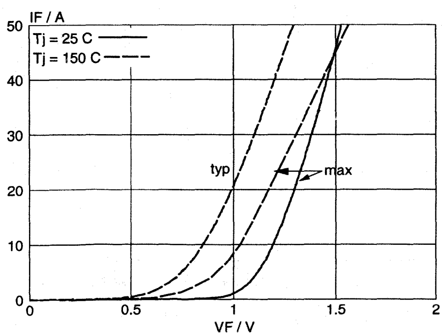
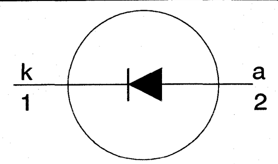


Fig.7. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 150 V/ 200 V

$V_F \leq 0.9$ V

$I_{F(AV)}$ = 14 A

$I_{RRM} \leq 0.2$ A

$t_{rr} \leq 30$ ns

GENERAL DESCRIPTION

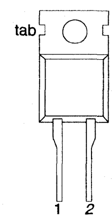
Ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYV79E series is supplied in the conventional leaded SOD59 (TO220AC) package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		BYV79E		-150	-200	
V_{RRM}	Peak repetitive reverse voltage		-	150	200	V
V_{RWM}	Crest working reverse voltage		-	150	200	V
V_R	Continuous reverse voltage	$T_{mb} \leq 145$˚C	-	150	200	V
$I_{F(AV)}$	Average forward current[1]	square wave $\delta = 0.5$; $T_{mb} \leq 120$ ˚C	-	14		A
I_{FRM}	Repetitive peak forward current	$t = 25$ µs; $\delta = 0.5$; $T_{mb} \leq 120$ ˚C	-	28		A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms	-	150		A
		t = 8.3 ms	-	160		A
		sinusoidal; with reapplied $V_{RWM(max)}$				
I_{RRM}	Repetitive peak reverse current	$t_p = 2$ µs; $\delta = 0.001$	-	0.2		A
I_{RSM}	Non-repetitive peak reverse current	$t_p = 100$ µs	-	0.2		A
T_{stg}	Storage temperature		-40	150		˚C
T_j	Operating junction temperature		-	150		˚C

1. Neglecting switching and reverse current losses.

ESD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage	Human body model; C = 250 pF; R = 1.5 kΩ	-	8	kV

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	60	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 14 A; T_j = 150˚C	-	0.83	0.90	V
		I_F = 14 A	-	0.95	1.05	V
		I_F = 50 A	-	1.2	1.4	V
I_R	Reverse current	$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.5	1.3	mA
		$V_R = V_{RWM}$	-	5	50	µA
Q_s	Reverse recovery charge	I_F = 2 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 20 A/µs	-	6	15	nC
t_{rr1}	Reverse recovery time	I_F = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 100 A/µs	-	20	30	ns
t_{rr2}	Reverse recovery time	I_F = 0.5 A to I_R = 1 A; I_{rec} = 0.25 A	-	13	22	ns
V_{fr}	Forward recovery voltage	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

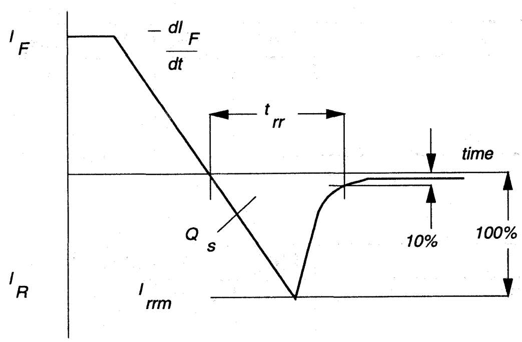


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

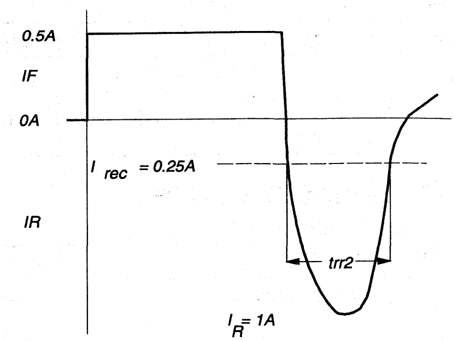


Fig.4. Definition of t_{rr2}

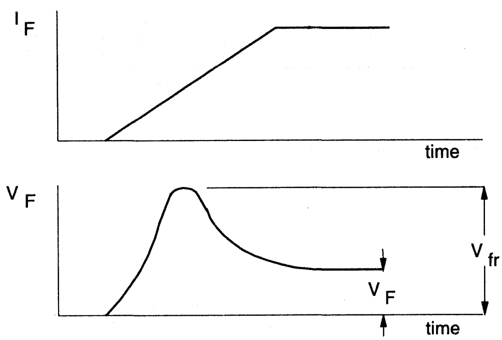


Fig.2. Definition of V_{fr}

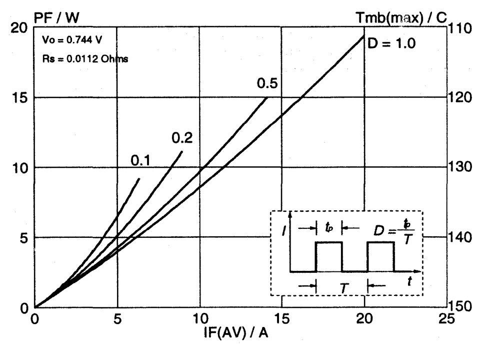


Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

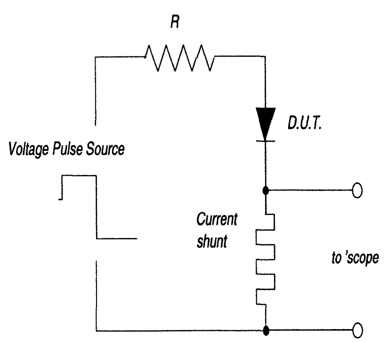


Fig.3. Circuit schematic for t_{rr2}

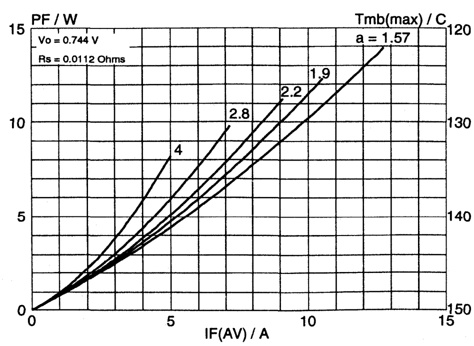


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

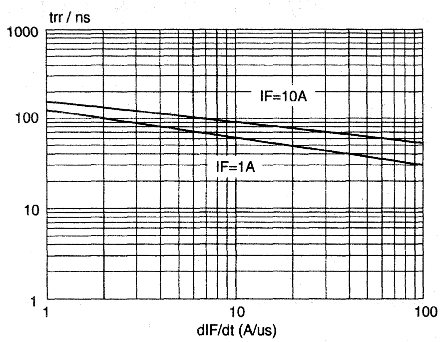


Fig.7. Maximum t_{rr} at T_j = 25 ˚C.

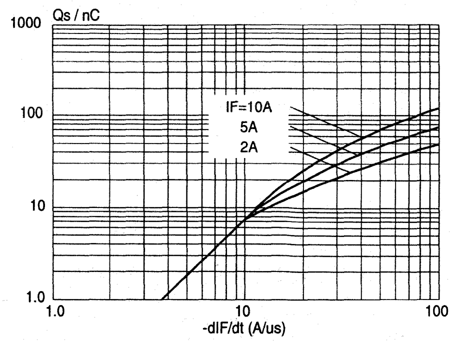


Fig.10. Maximum Q_s at T_j = 25 ˚C.

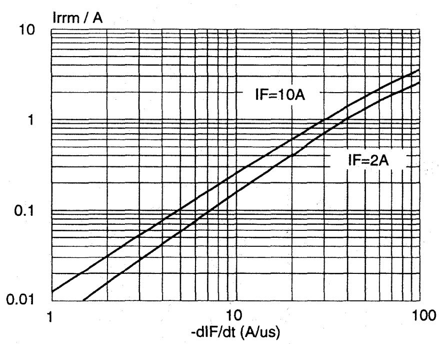


Fig.8. Maximum I_{rrm} at T_j = 25 ˚C.

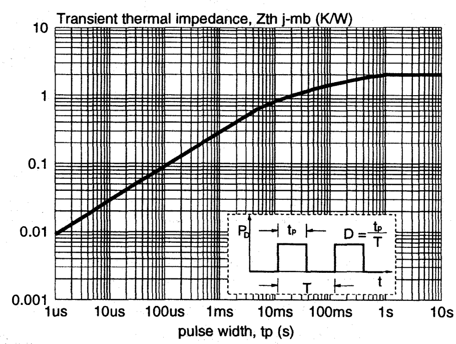


Fig.11. Transient thermal impedance; $Z_{th\ j\text{-}mb} = f(t_p)$.

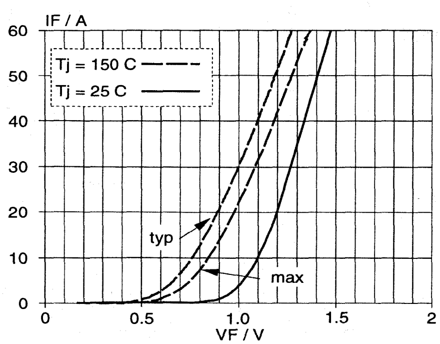


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

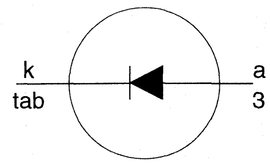
Rectifier diodes ultrafast, rugged

BYV79EB series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 150 V/ 200 V

$V_F \leq 0.9$ V

$I_{F(AV)}$ = 14 A

I_{RRM} = 0.2 A

$t_{rr} \leq 30$ ns

GENERAL DESCRIPTION

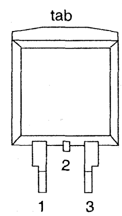
Ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYV79EB series is supplied in the surface mounting SOT404 package.

PINNING

PIN	DESCRIPTION
1	no connection
2	cathode [1]
3	anode
tab	cathode

SOT404



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		BYV79EB		-150	-200	
V_{RRM}	Peak repetitive reverse voltage		-	150	200	V
V_{RWM}	Crest working reverse voltage		-	150	200	V
V_R	Continuous reverse voltage	$T_{mb} \leq 145$˚C	-	150	200	V
$I_{F(AV)}$	Average rectified forward current [2]	square wave $\delta = 0.5$; $T_{mb} \leq 120$ ˚C	-	14		A
I_{FRM}	Repetitive peak forward current per diode	$t = 25\ \mu s$; $\delta = 0.5$; $T_{mb} \leq 120$ ˚C	-	28		A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms	-	150		A
		t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$	-	160		A
I_{RRM}	Repetitive peak reverse current	$t_p = 2\ \mu s$; $\delta = 0.001$	-	0.2		A
I_{RSM}	Non-repetitive peak reverse current	$t_p = 100\ \mu s$	-	0.2		A
T_{stg}	Storage temperature		-40	150		˚C
T_j	Operating junction temperature		-	150		˚C

1. It is not possible to make connection to pin 2 of the SOT404 package
2. Neglecting switching and reverse current losses.

ESD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage	Human body model; C = 250 pF; R = 1.5 kΩ	-	8	kV

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	minimum footprint, FR4 board	-	50	-	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 14 A; T_j = 150°C	-	0.83	0.90	V
		I_F = 14 A	-	0.95	1.05	V
		I_F = 50 A	-	1.2	1.4	V
I_R	Reverse current	$V_R = V_{RRM}$; T_j = 100 °C	-	0.5	1.3	mA
		$V_R = V_{RRM}$	-	5	50	µA
Q_s	Reverse recovery charge	I_F = 2 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 20 A/µs	-	6	15	nC
t_{rr1}	Reverse recovery time	I_F = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 100 A/µs	-	20	30	ns
t_{rr2}	Reverse recovery time	I_F = 0.5 A to I_R = 1 A; I_{rec} = 0.25 A	-	13	22	ns
V_{fr}	Forward recovery voltage	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

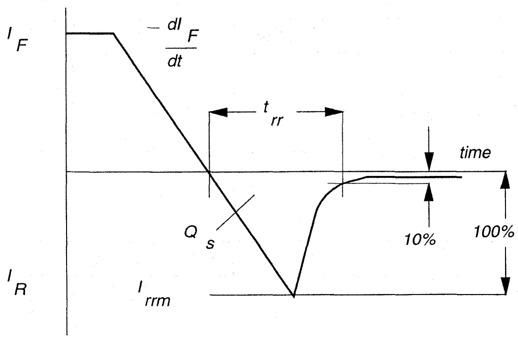


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

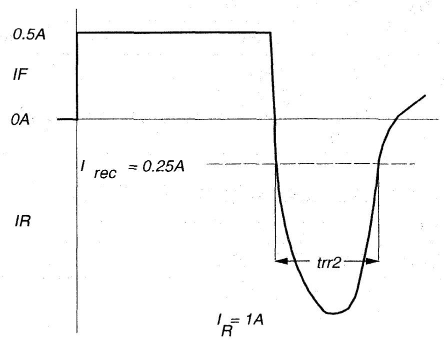


Fig.4. Definition of t_{rr2}

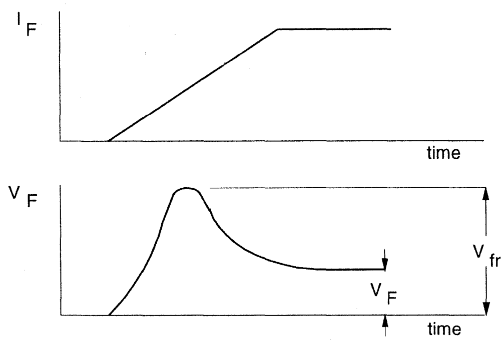


Fig.2. Definition of V_{fr}

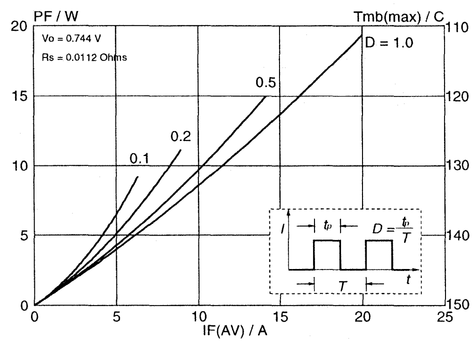


Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

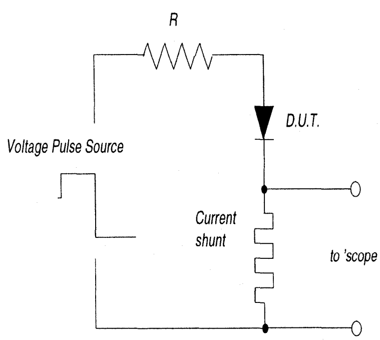


Fig.3. Circuit schematic for t_{rr2}

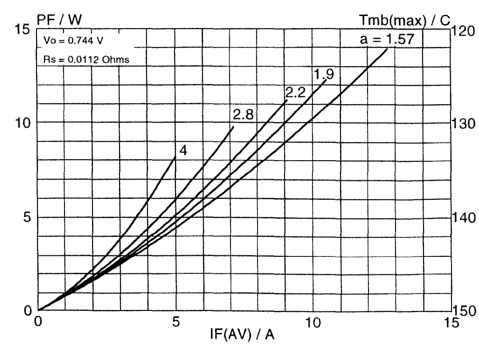


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

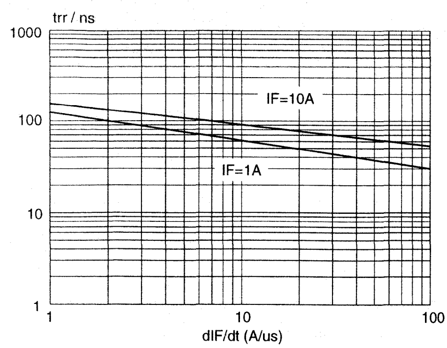


Fig.7. Maximum t_{rr} at $T_j = 25$ ˚C.

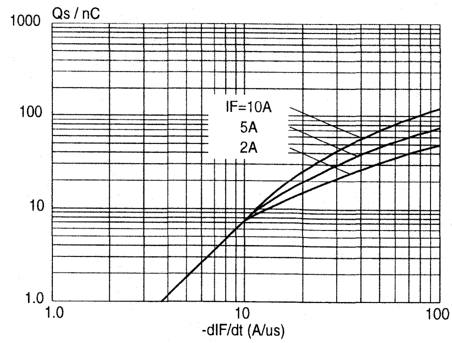


Fig.10. Maximum Q_s at $T_j = 25$ ˚C.

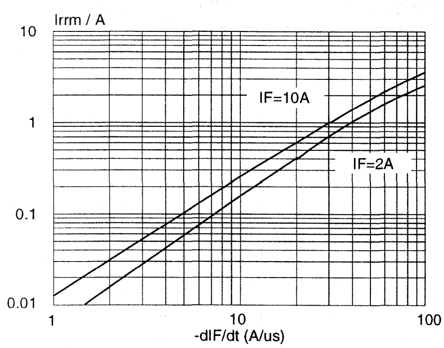


Fig.8. Maximum I_{rrm} at $T_j = 25$ ˚C.

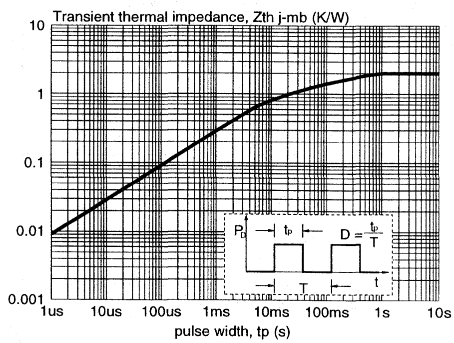


Fig.11. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

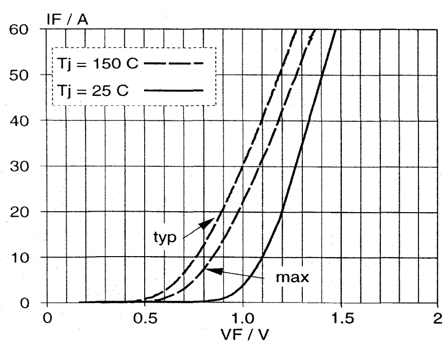


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

Fast soft-recovery controlled avalanche rectifiers

BYV95 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack.

DESCRIPTION

Rugged glass SOD57 package, using a high temperature alloyed construction. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

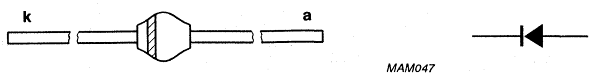


Fig.1 Simplified outline (SOD57) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYV95A		–	200	V
	BYV95B		–	400	V
	BYV95C		–	600	V
V_R	continuous reverse voltage				
	BYV95A		–	200	V
	BYV95B		–	400	V
	BYV95C		–	600	V
$I_{F(AV)}$	average forward current	T_{tp} = 65 °C; lead length = 10 mm see Fig. 2; averaged over any 20 ms period; see also Fig. 6	–	1.5	A
		T_{amb} = 65 °C; PCB mounting (see Fig.11); see Fig. 3; averaged over any 20 ms period; see also Fig. 6	–	0.8	A
I_{FRM}	repetitive peak forward current	T_{tp} = 65 °C; see Fig. 4	–	17	A
		T_{amb} = 65 °C; see Fig. 5	–	9	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	35	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	10	mJ
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature	see Fig. 7	–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 3 A; $T_j = T_{j\,max}$; see Fig. 8	–	–	1.35	V
		I_F = 3 A; see Fig. 8	–	–	1.60	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYV95A		300	–	–	V
	BYV95B		500	–	–	V
	BYV95C		700	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig. 9	–	–	1	µA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig. 9	–	–	150	µA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig. 12	–	–	250	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Fig. 10	–	45	–	pF
$\left\|\frac{dI_R}{dt}\right\|$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq$ 30 V and dI_F/dt = –1 A/µs; see Fig.13	–	–	7	A/µs

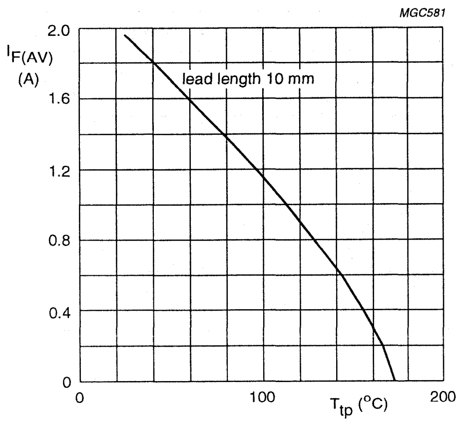
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	46	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

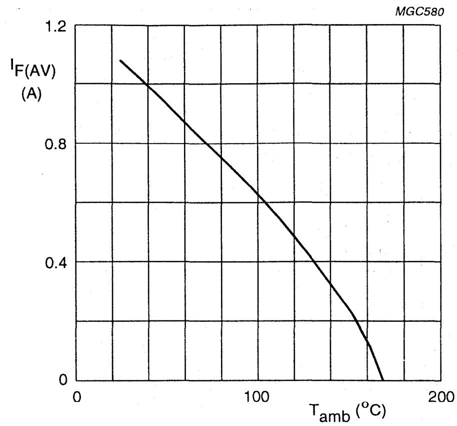
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm, see Fig.11. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA



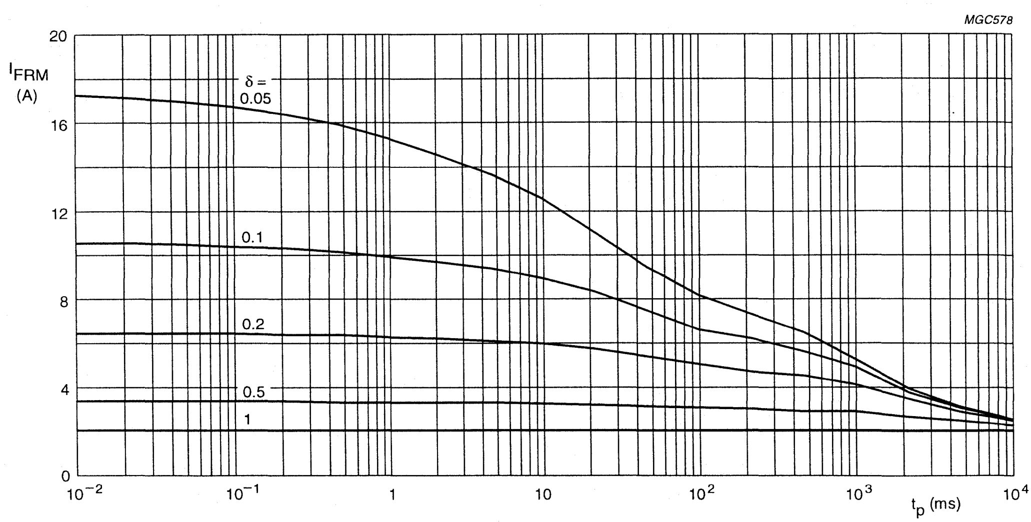
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Switched mode application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



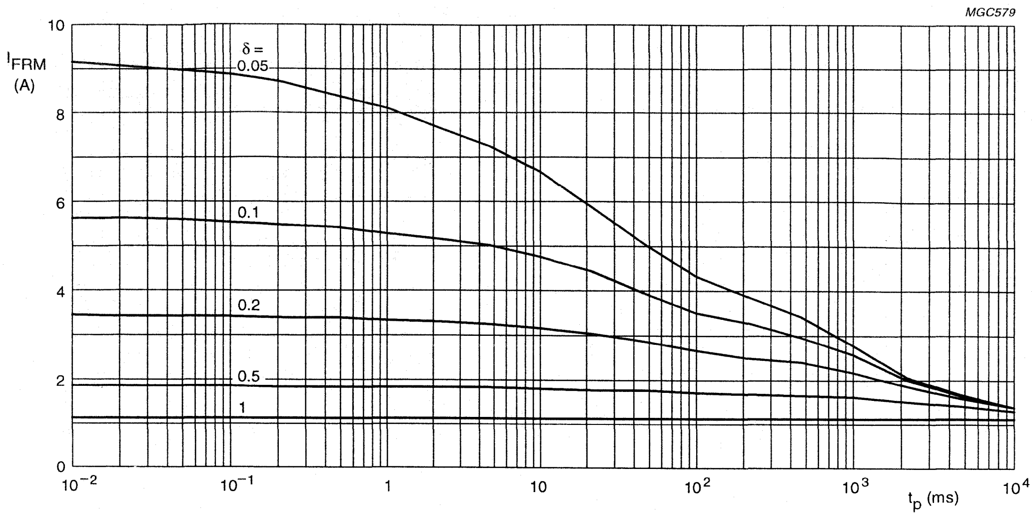
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Device mounted as shown in Fig.11.
Switched mode application.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



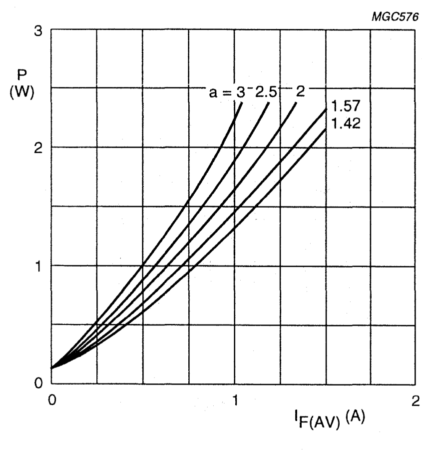
T_{tp} = 65 °C; $R_{th\ j\text{-}tp}$ = 46 K/W.
V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 600 V.

Fig.4 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



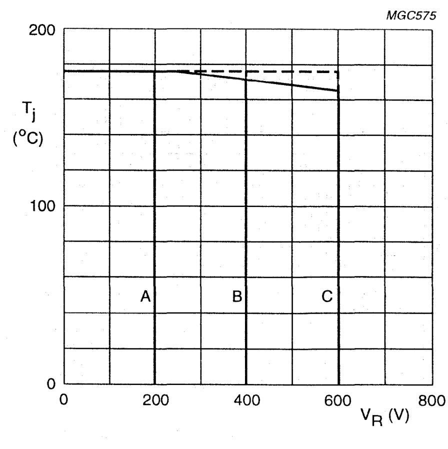
T_{amb} = 65 °C; $R_{th\ j\text{-}a}$ = 100 K/W.
V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 600 V.

Fig.5 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



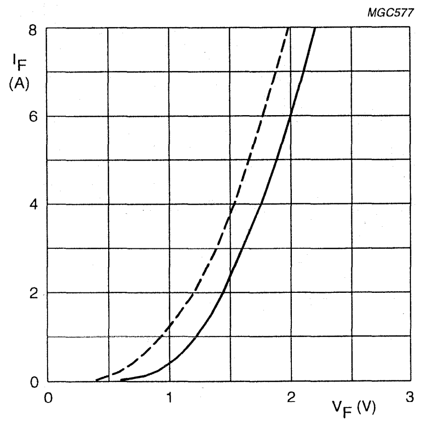
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; δ = 0.5.

Fig.6 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



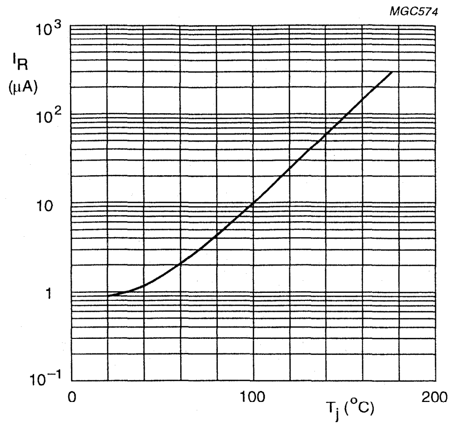
Solid line = V_R.
Dotted line = V_{RRM}; δ = 0.5.

Fig.7 Maximum permissible junction temperature as a function of reverse voltage.



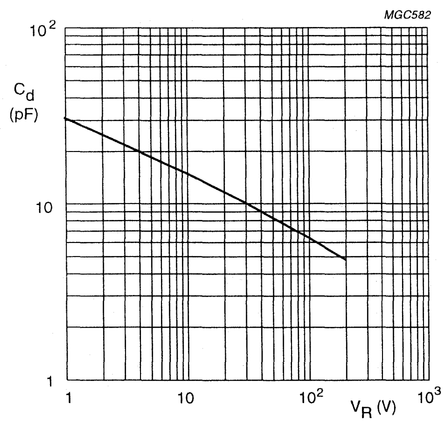
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.8 Forward current as a function of forward voltage; maximum values.



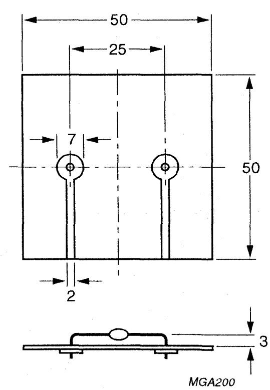
$V_R = V_{RRMmax}$.

Fig.9 Reverse current as a function of junction temperature; maximum values.



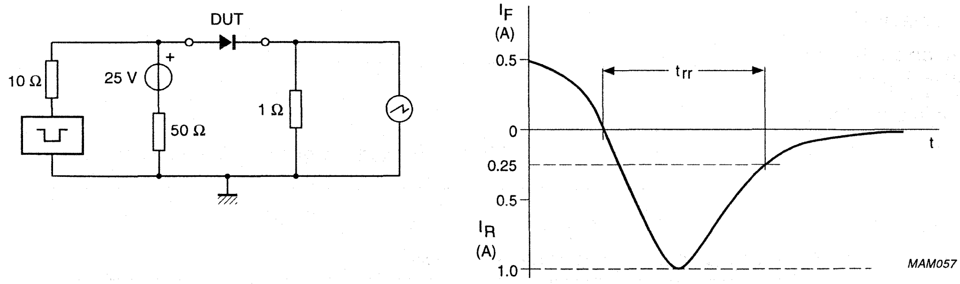
f = 1 MHz; T_j = 25 °C.

Fig.10 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.11 Device mounted on a printed-circuit board.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.12 Test circuit and reverse recovery time waveform and definition.

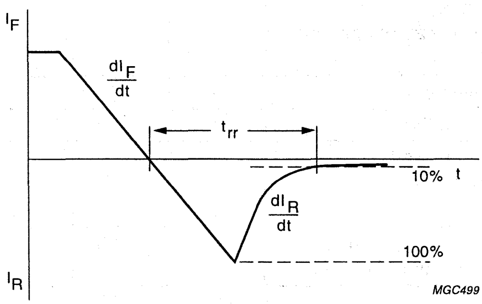


Fig.13 Reverse recovery definitions.

Fast soft-recovery controlled avalanche rectifiers

BYV96 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

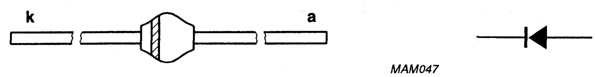


Fig.1 Simplified outline (SOD57) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYV96D		–	800	V
	BYV96E		–	1 000	V
V_R	continuous reverse voltage				
	BYV96D		–	800	V
	BYV96E		–	1 000	V
$I_{F(AV)}$	average forward current	T_{tp} = 55 °C; lead length = 10 mm see Fig 2; averaged over any 20 ms period; see also Fig 6	–	1.5	A
		T_{amb} = 55 °C; PCB mounting (see Fig.11); see Fig 3; averaged over any 20 ms period; see also Fig 6	–	0.8	A
I_{FRM}	repetitive peak forward current	T_{tp} = 55 °C; see Fig 4	–	17	A
		T_{amb} = 55 °C; see Fig 5	–	9	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	35	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	10	mJ
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature	see Fig 7	–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 3 A; $T_j = T_{j\,max}$; see Fig 8	–	–	1.35	V
		I_F = 3 A; see Fig 8	–	–	1.60	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYV96D		900	–	–	V
	BYV96E		1 100	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig 9	–	–	1	µA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig 9	–	–	150	µA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig 12	–	–	300	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Fig 10	–	40	–	pF
$\left\|\frac{dI_R}{dt}\right\|$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq$ 30 V and dI_F/dt = −1 A/µs; see Fig.13	–	–	6	A/µs

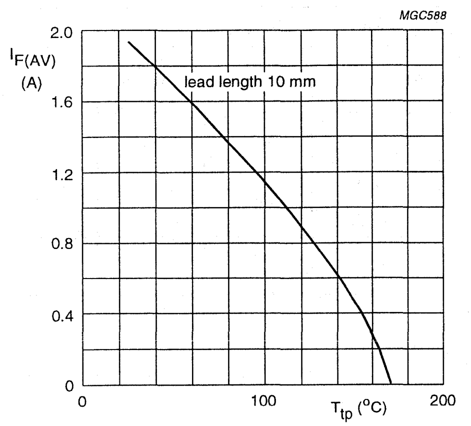
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	46	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

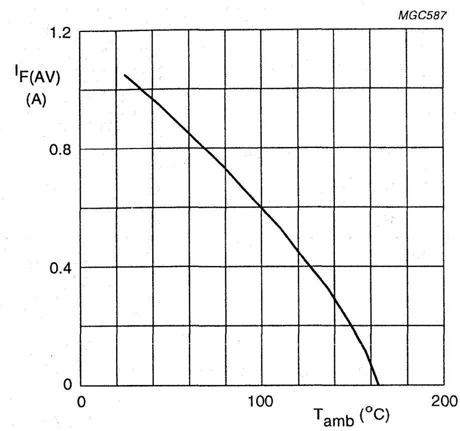
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm, see Fig.11. For more information please refer to the *'General Part of Handbook SC01'*

GRAPHICAL DATA



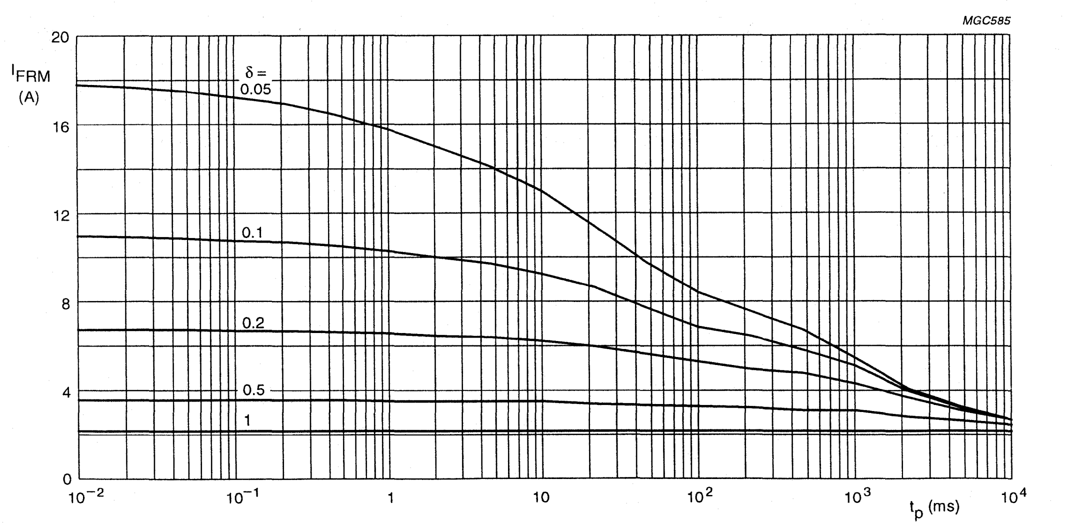
a = 1.57; $V_R = V_{RRMmax}$; δ = 0.5.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



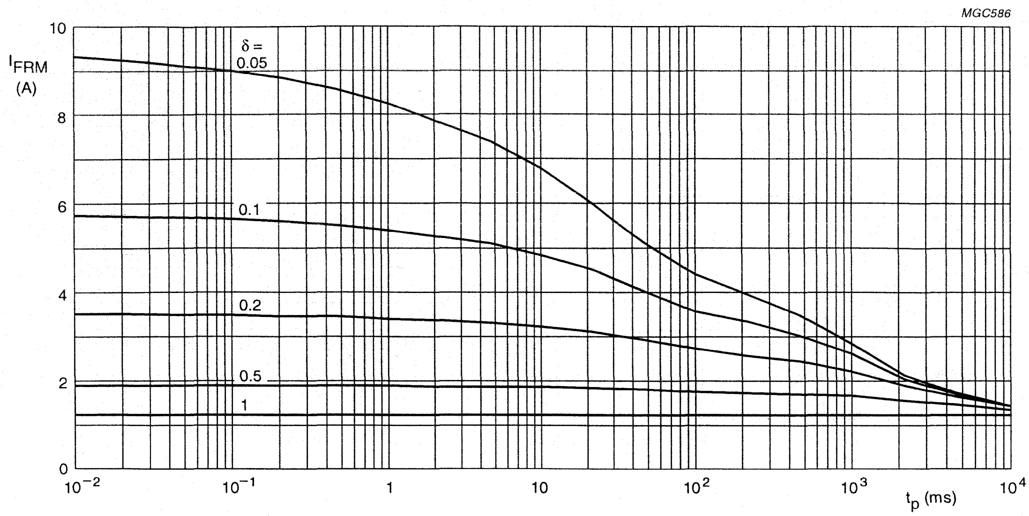
a = 1.57; $V_R = V_{RRMmax}$; δ = 0.5.
Device mounted as shown in Fig.11.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



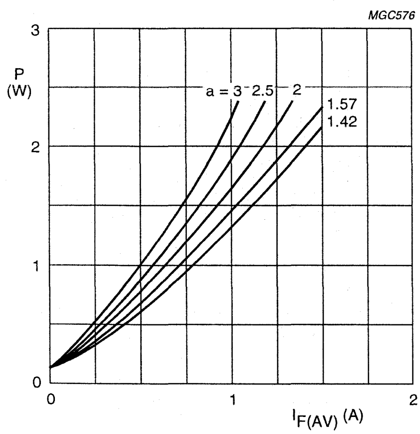
T_{tp} = 55°C; $R_{th\ j\text{-}tp}$ = 46 K/W.
V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1000 V.

Fig.4 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



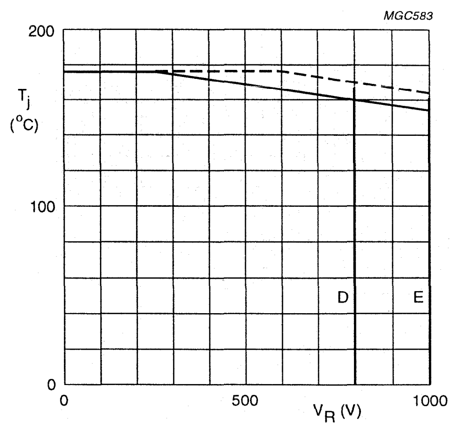
T_{amb} = 55 °C; $R_{th\ j\text{-}a}$ = 100 K/W.
V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1000 V.

Fig.5 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



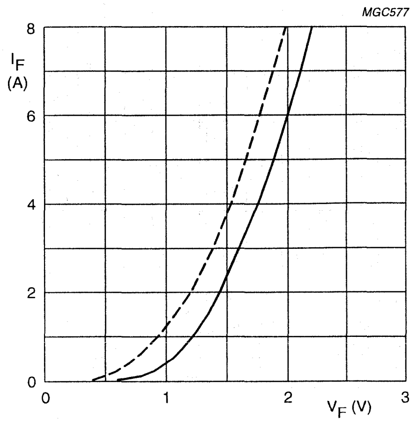
a = $I_{F(RMS)}/I_{F(AV)}$; V_R = V_{RRMmax}; δ = 0.5.

Fig.6 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



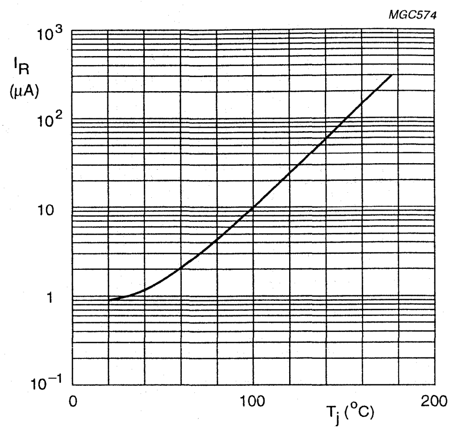
Solid line = V_R.
Dotted line = V_{RRM}; δ = 0.5.

Fig.7 Maximum permissible junction temperature as a function of reverse voltage.



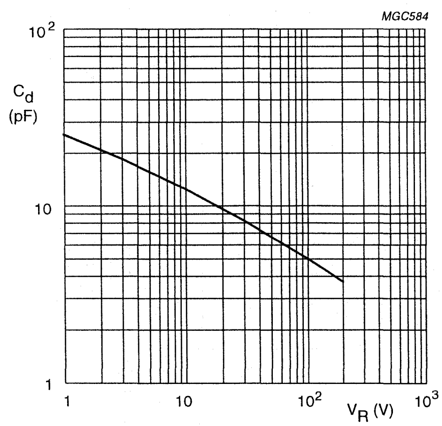
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.8 Forward current as a function of forward voltage; maximum values.



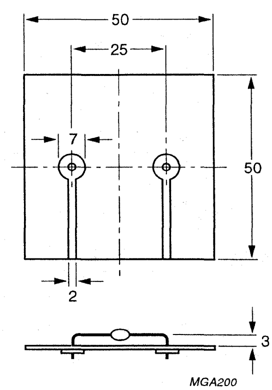
$V_R = V_{RRMmax}$.

Fig.9 Reverse current as a function of junction temperature; maximum values.



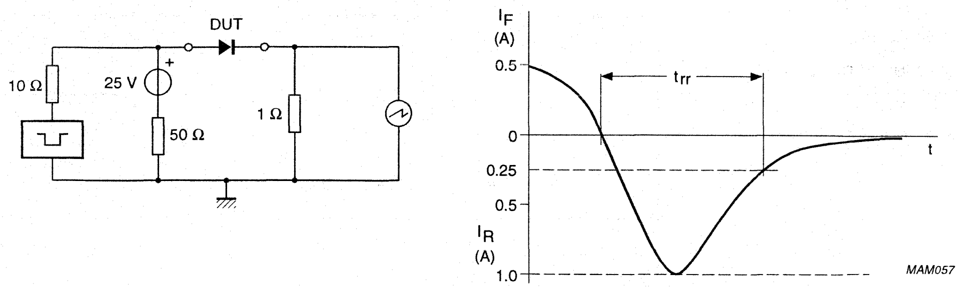
f = 1 MHz; T_j = 25 °C.

Fig.10 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.11 Device mounted on a printed-circuit board.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.12 Test circuit and reverse recovery time waveform and definition.

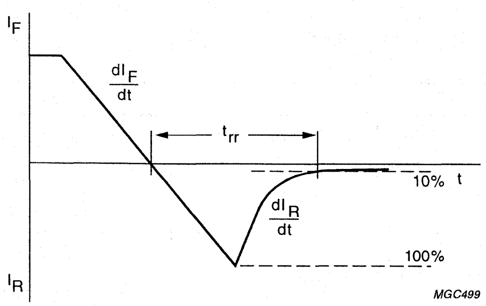


Fig.13 Reverse recovery definitions.

Fast soft-recovery controlled avalanche rectifiers

BYV97 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack.

DESCRIPTION

Rugged glass SOD57 package, using a high temperature alloyed construction. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

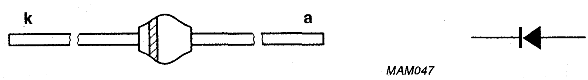


Fig.1 Simplified outline (SOD57) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYV97F		–	1200	V
	BYV97G		–	1400	V
V_R	continuous reverse voltage				
	BYV97F		–	1200	V
	BYV97G		–	1400	V
$I_{F(AV)}$	average forward current	T_{tp} = 60 °C; lead length = 10 mm see Fig.2; averaged over any 20 ms period; see also Fig.6	–	1.6	A
$I_{F(AV)}$	average forward current	T_{amb} = 50 °C; PCB mounting (see Fig. 12); see Fig.3; averaged over any 20 ms period; see also Fig.6	–	0.9	A
I_{FRM}	repetitive peak forward current	T_{tp} = 65 °C; see Fig.4	–	15	A
		T_{amb} = 65 °C; see Fig.5	–	8	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	20	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	10	mJ
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature	see Fig.7	−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 3 A; $T_j = T_{j\,max}$; see Fig.8			1.35	V
		I_F = 3 A; see Fig.8	–	–	1.65	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYV97F		1300	–	–	V
	BYV97G		1500	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.9	–	–	1	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.9	–	–	150	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.14	–	–	500	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Fig.11	–	35	–	pF
$\left\lvert\frac{dI_R}{dt}\right\rvert$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq$ 30 V and dI_F/dt = −1 A/μs; see Figs 10 and 13	–	–	5	A/μs

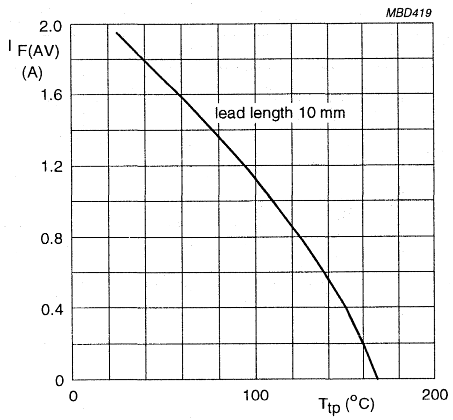
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	46	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

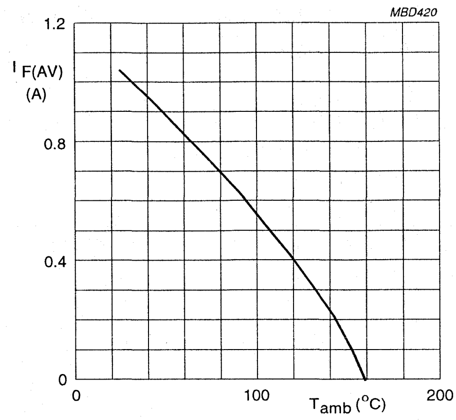
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig. 12. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA



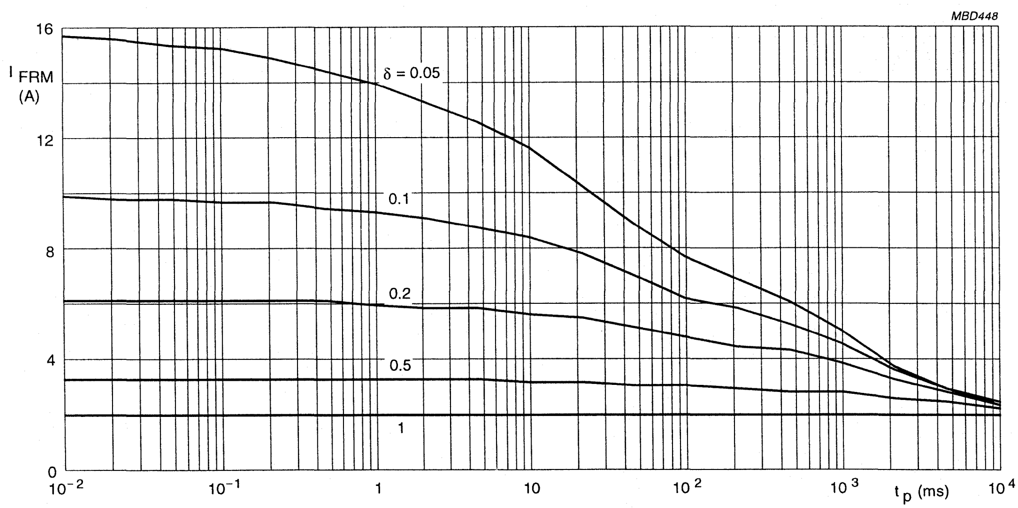
a = 1.57; $V_R = V_{RRMmax}$; δ = 0.5.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



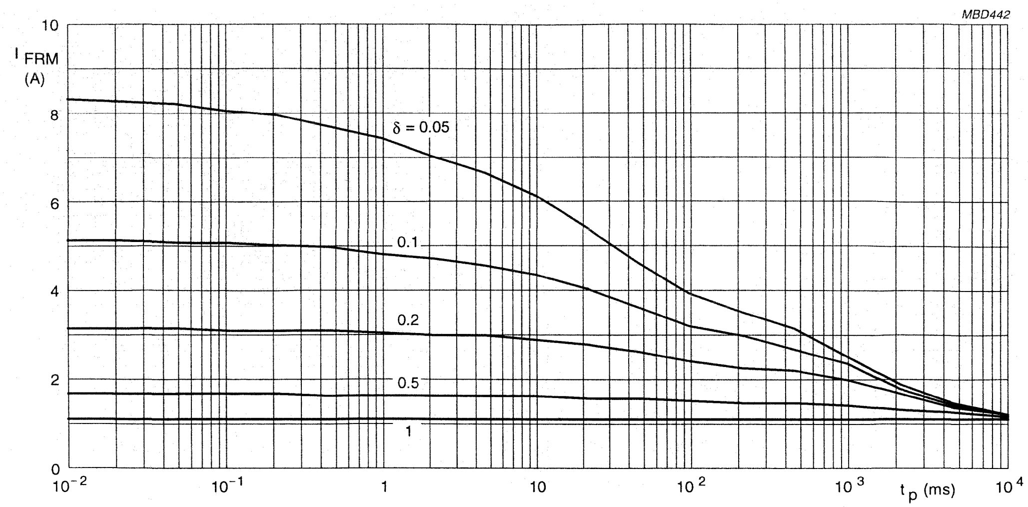
a = 1.57; $V_R = V_{RRMmax}$; δ = 0.5.
Device mounted as shown in Fig.12.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



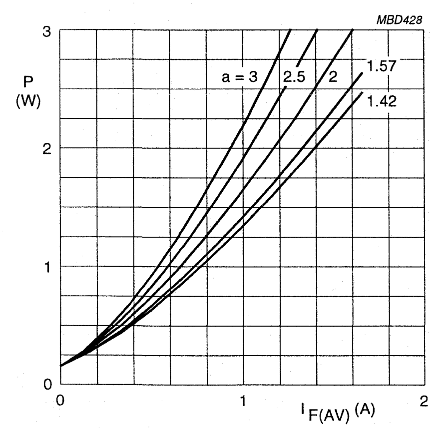
T_{tp} = 65°C; $R_{th\ j\text{-}tp}$ = 46 K/W.
V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1400 V.

Fig.4 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



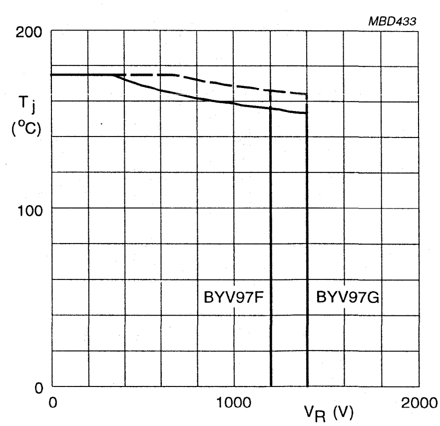
T_{amb} = 65 °C; $R_{th\ j\text{-}a}$ = 100 K/W.
V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1400 V.

Fig.5 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



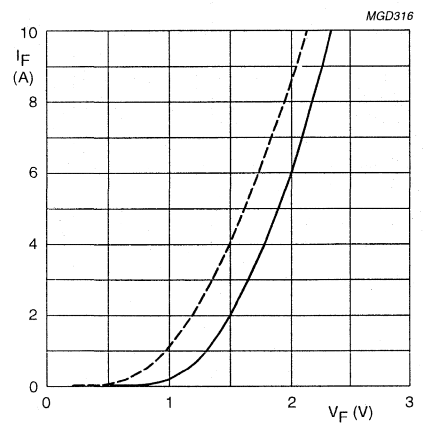
a = $I_{F(RMS)}/I_{F(AV)}$; V_R = V_{RRMmax}; δ = 0.5.

Fig.6 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



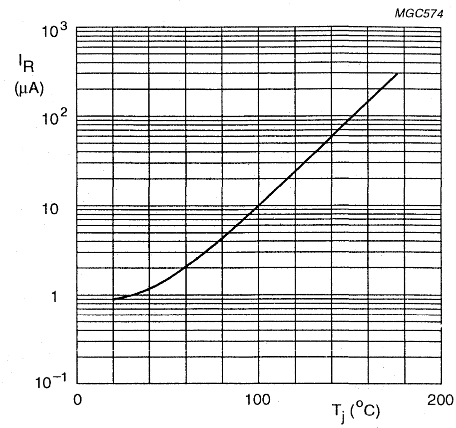
Solid line = V_R.
Dotted line = V_{RRM}; δ = 0.5.

Fig.7 Maximum permissible junction temperature as a function of reverse voltage.



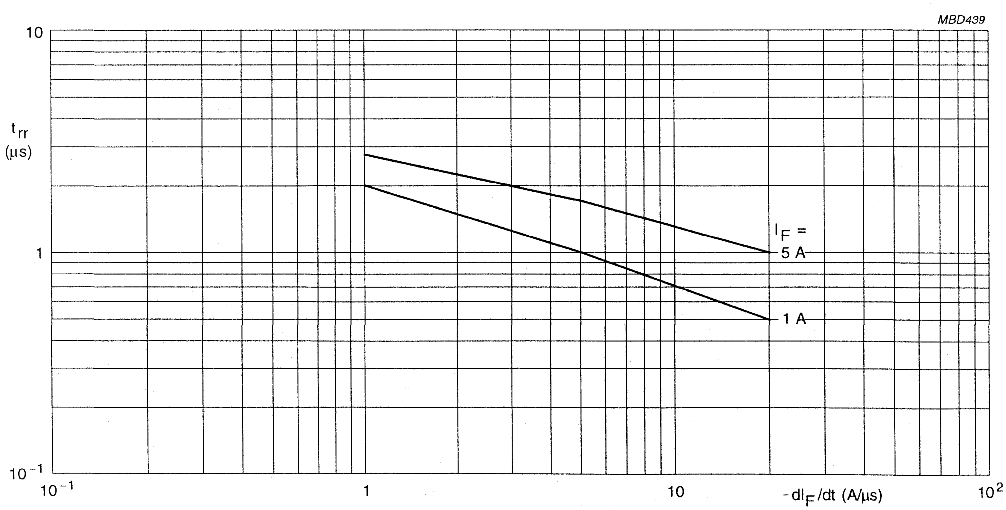
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.8 Forward current as a function of forward voltage; maximum values.



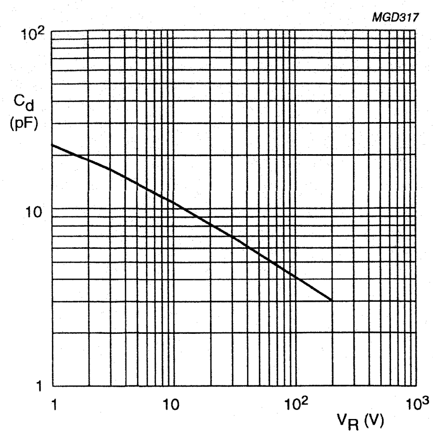
$V_R = V_{RRMmax}$.

Fig.9 Reverse current as a function of junction temperature; maximum values.



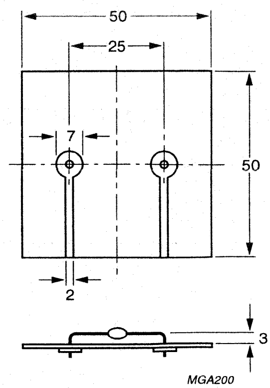
T_j = 25°C.
For definitions see Fig. 13.

Fig.10 Maximum reverse recovery time as a function of the rate of fall of forward current.



f = 1 MHz; T_j = 25 °C.

Fig.11 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.12 Device mounted on a printed-circuit board.

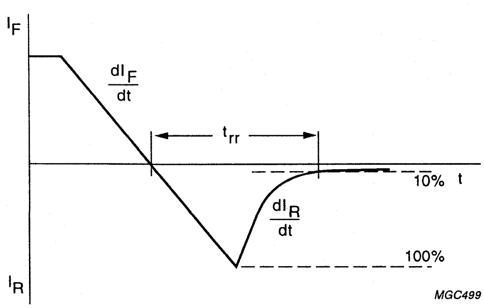
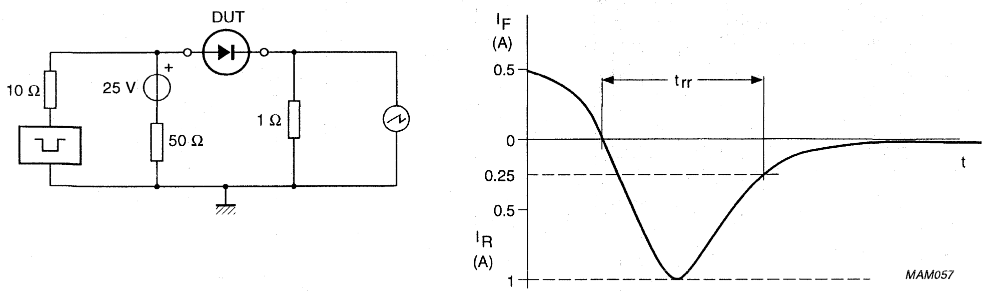


Fig.13 Reverse recovery definitions.



Input impedance oscilloscope: 1 MΩ, 22 pF; t_r < 7 ns.
Source impedance: 50 Ω; t_r < 15 ns.

Fig.14 Test circuit and reverse recovery time waveform and definition.

Fast soft-recovery rectifier | BYV98

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Available in ammo-pack.

DESCRIPTION

Rugged glass SOD57 package, using a high temperature alloyed construction. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

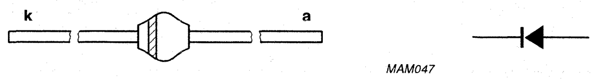


Fig.1 Simplified outline (SOD57) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RSM}	non-repetitive peak reverse voltage		–	2100	V
V_{RRM}	repetitive peak reverse voltage		–	2000	V
$I_{F(AV)}$	average forward current	T_{tp} = 55 °C; lead length = 10 mm see Fig. 2; averaged over any 20 ms period; see also Fig. 6	–	1.00	A
$I_{F(AV)}$	average forward current	T_{amb} = 60 °C; PCB mounting (see Fig.11); see Fig. 3; averaged over any 20 ms period; see also Fig. 6	–	0.43	A
I_{FRM}	repetitive peak forward current	T_{tp} = 55 °C; see Fig. 4	–	9.0	A
		T_{amb} = 60 °C; see Fig. 5	–	4.5	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	15	A
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature	see Fig.7	–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 2 A; $T_j = T_{j\,max}$; see Fig. 8	–	–	2.2	V
		I_F = 2 A; see Fig. 8	–	–	2.4	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig. 9	–	–	5	μA
		$V_R = V_{RRMmax}$; T_j = 125 °C; see Fig. 9	–	–	50	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig. 12	–	–	300	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Fig 10	–	30	–	pF
$\left\lvert\frac{dI_R}{dt}\right\rvert$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq$ 30 V and dI_F/dt = –1 A/μs; see Fig.13	–	–	5	A/μs

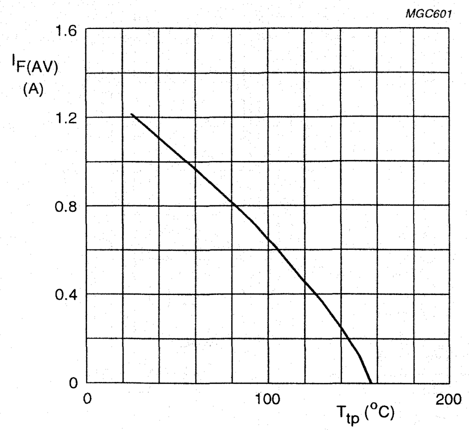
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	46	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

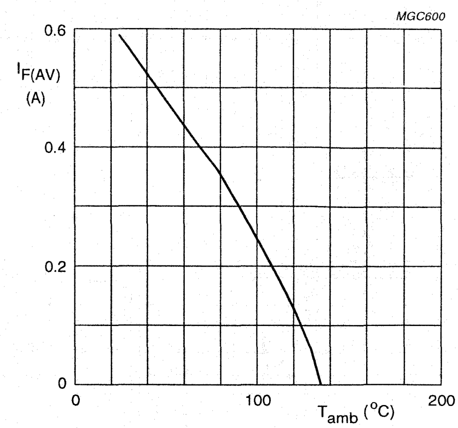
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.11. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA



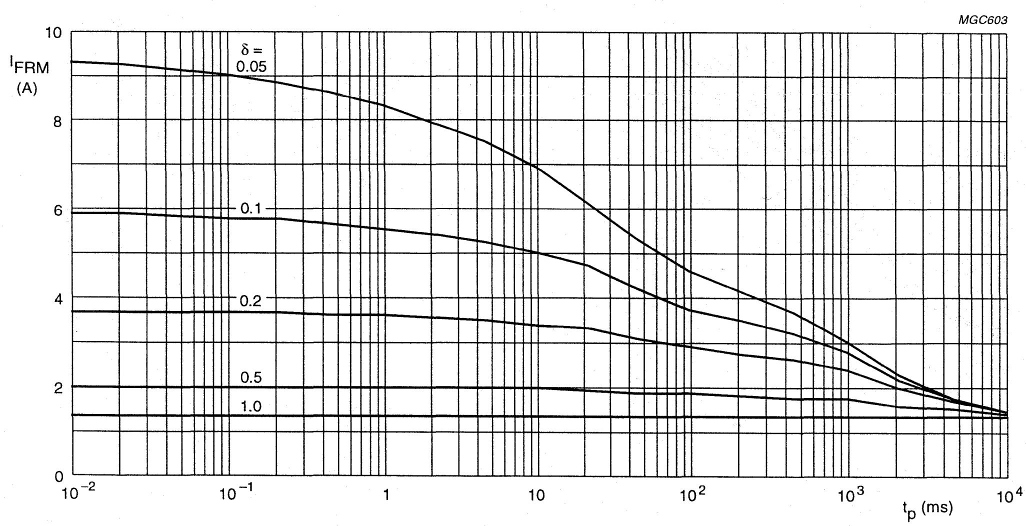
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Switched mode application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



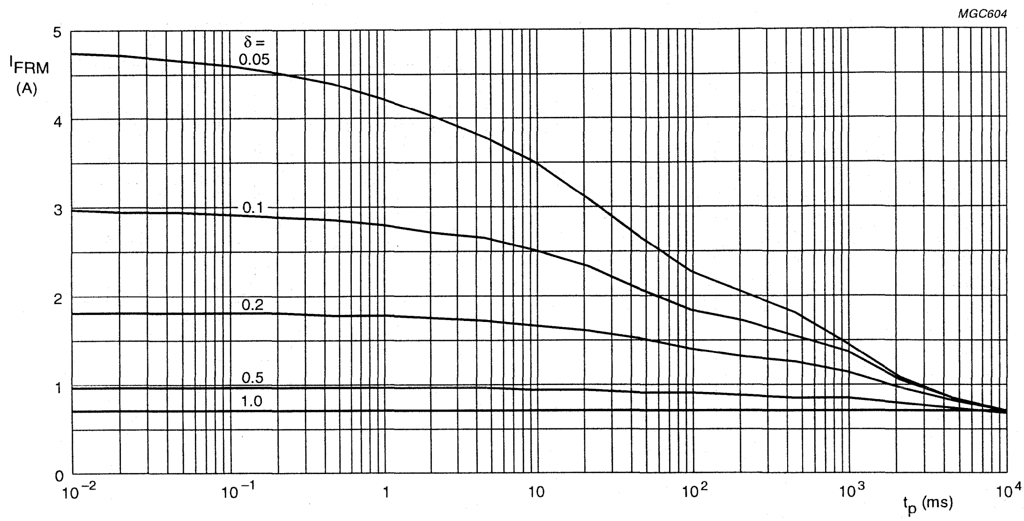
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Device mounted as shown in Fig.11.
Switched mode application.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



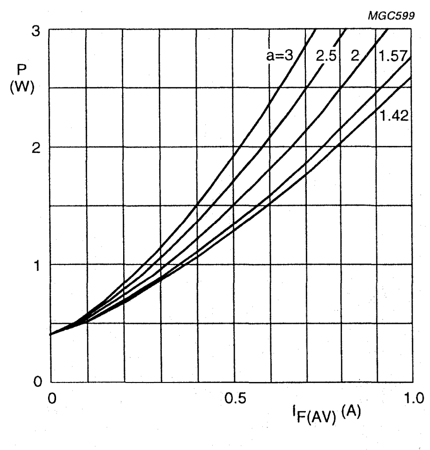
T_{tp} = 55°C; $R_{th\ j\text{-}tp}$ = 46 K/W.
V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 2000 V.

Fig.4 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



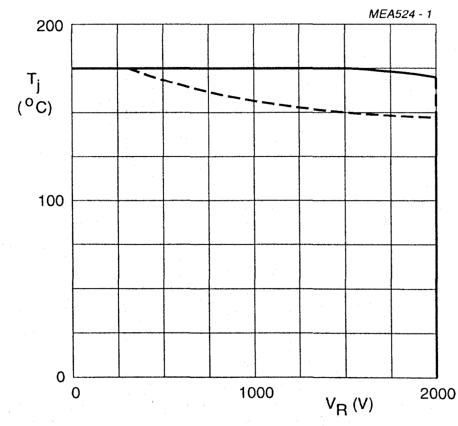
T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 100 K/W.
V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 2000 V.

Fig.5 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



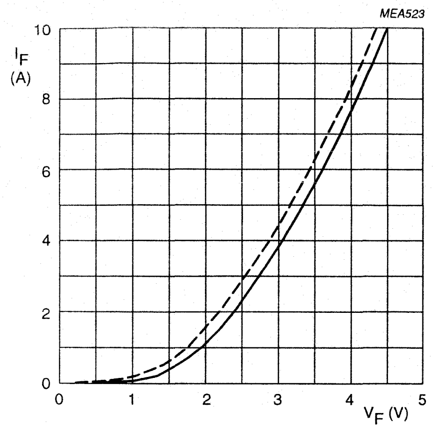
a = $I_{F(RMS)}/I_{F(AV)}$; V_R = V_{RRMmax}; δ = 0.5.

Fig.6 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



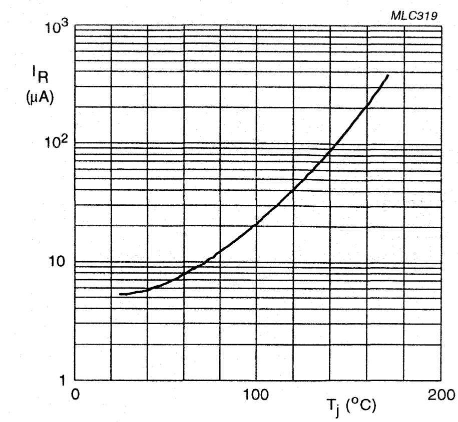
Solid line = V_{RRM}; δ = 0.1.
Dotted line = V_{RRM}; δ = 0.5.

Fig.7 Maximum permissible junction temperature as a function of reverse voltage.



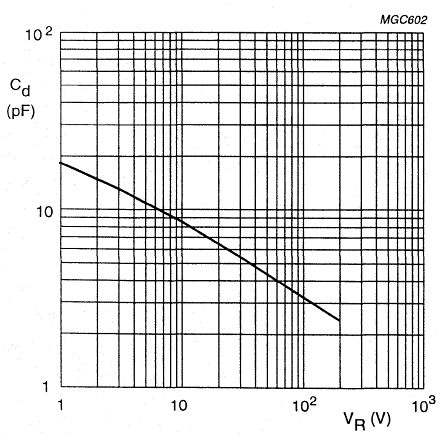
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.8 Forward current as a function of forward voltage; maximum values.



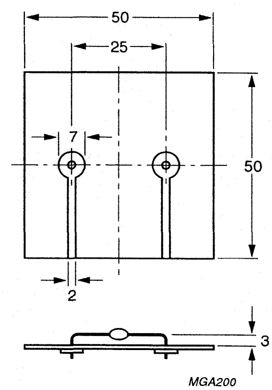
$V_R = V_{RRMmax}$.

Fig.9 Reverse current as a function of junction temperature; maximum values.



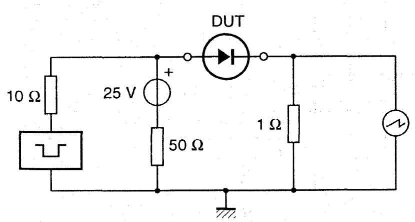
f = 1 MHz; T_j = 25 °C.

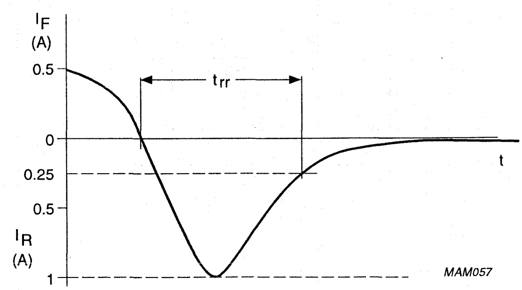
Fig.10 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.11 Device mounted on a printed-circuit board.





Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.12 Test circuit and reverse recovery time waveform and definition.

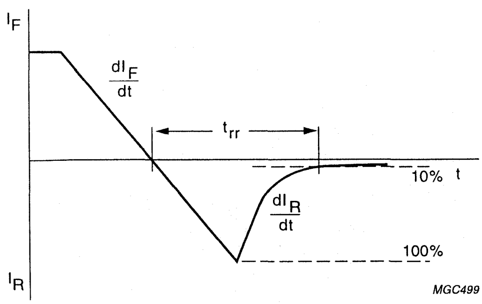


Fig.13 Reverse recovery definitions.

Ultra fast low-loss controlled avalanche rectifier

BYV99

FEATURES

- Glass passivated
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack.

DESCRIPTION

Rugged glass SOD57 package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

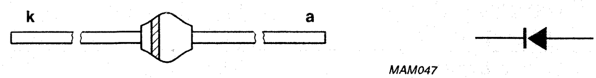


Fig.1 Simplified outline (SOD57) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	600	V
V_R	continuous reverse voltage		–	600	V
$I_{F(AV)}$	average forward current	T_{tp} = 50 °C; lead length = 10 mm see Fig. 2; averaged over any 20 ms period; see also Fig. 6	–	1.00	A
		T_{amb} = 60 °C; PCB mounting (see Fig.10); see Fig. 3; averaged over any 20 ms period; see also Fig. 6	–	0.55	A
I_{FRM}	repetitive peak forward current	T_{tp} = 50 °C; see Fig. 4	–	9	A
		T_{amb} = 60 °C; see Fig. 5	–	5	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	20	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	10	mJ
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+150	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Fig. 7	–	–	1.5	V
		I_F = 1 A; see Fig. 7	–	–	2.7	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA	700	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig. 8	–	–	5	µA
		$V_R = V_{RRMmax}$; T_j = 150 °C; see Fig. 8	–	–	75	µA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig. 12	–	–	15	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Fig. 9	–	75	–	pF
$\left\lvert\frac{dI_R}{dt}\right\rvert$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq$ 30 V and dI_F/dt = −1 A/µs; see Fig.11	–	–	3	A/µs

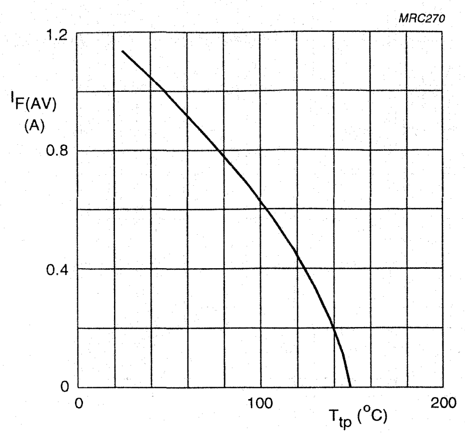
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	46	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

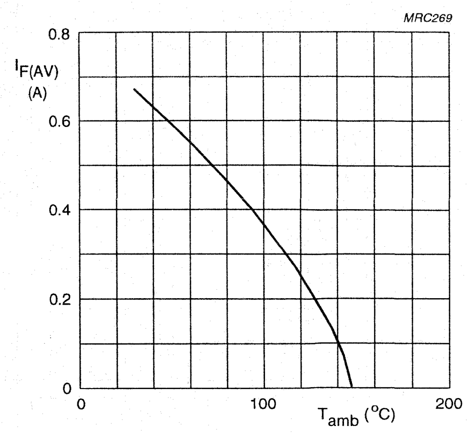
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm, see Fig.10. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA



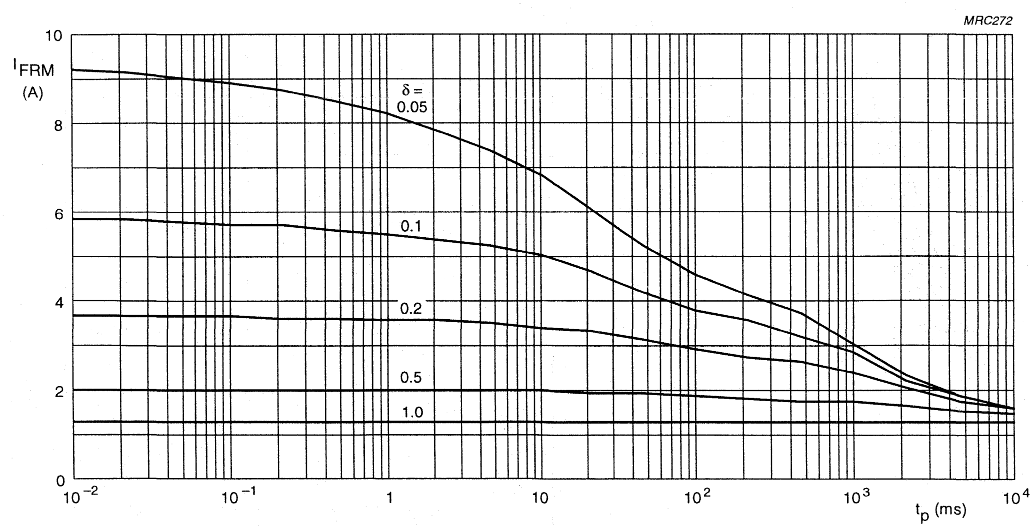
a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.
Switched mode application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



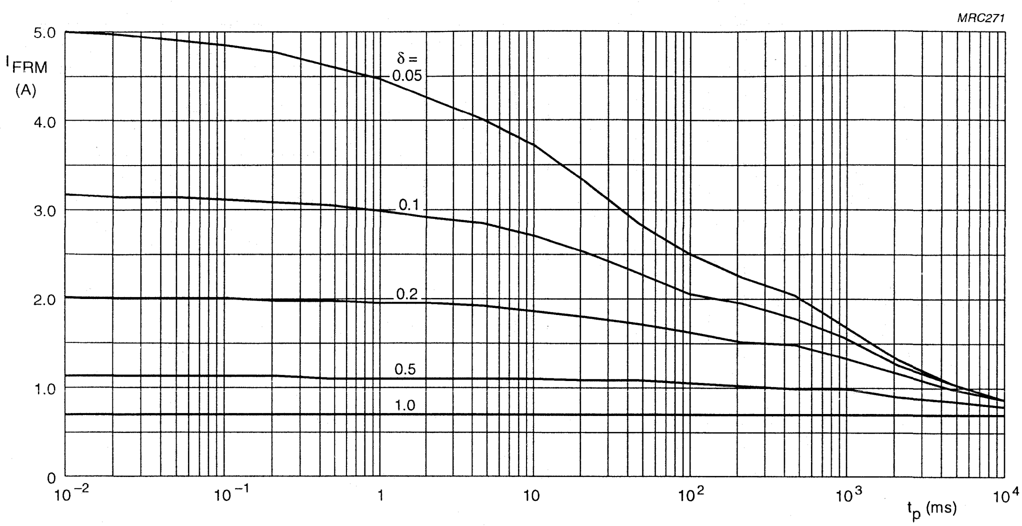
a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.
Device mounted as shown in Fig.10.
Switched mode application.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



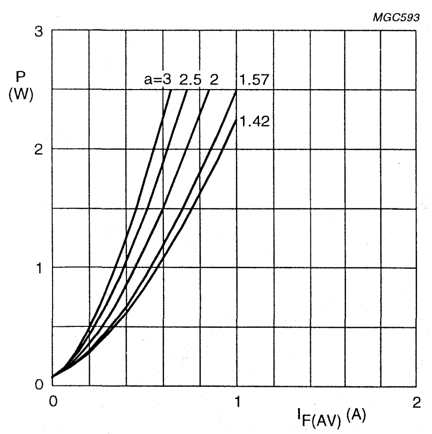
$T_{tp} = 50°C$; $R_{th\ j\text{-}tp} = 46$ K/W.
V_{RRMmax} during $1 - \delta$; curves include derating for $T_{j\ max}$ at $V_{RRM} = 600$ V.

Fig.4 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



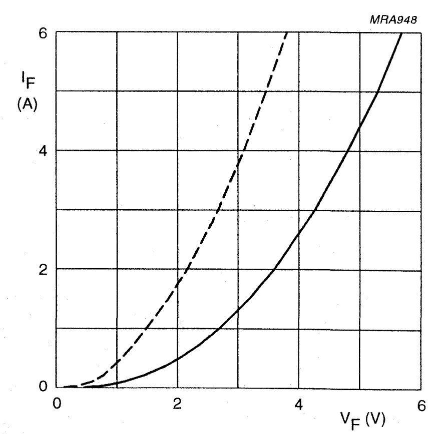
T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 100 K/W.
V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 600 V.

Fig.5 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



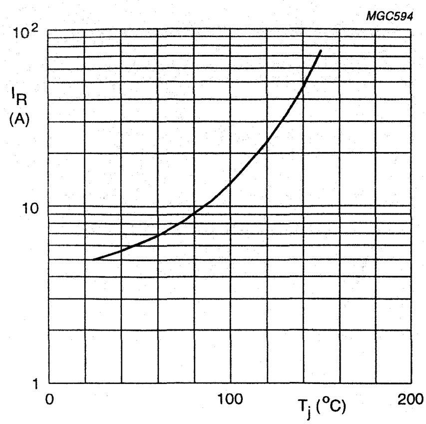
a = $I_{F(RMS)}/I_{F(AV)}$; V_R = V_{RRMmax}; δ = 0.5.

Fig.6 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



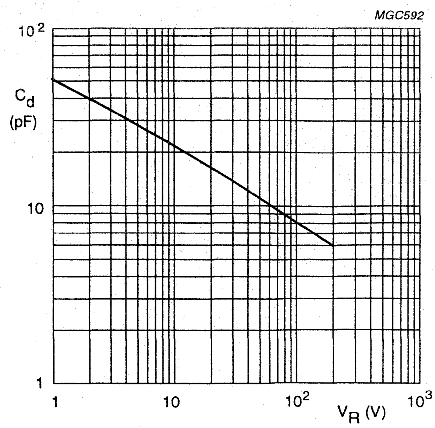
Dotted line: T_j = 150 °C.
Solid line: T_j = 25 °C.

Fig.7 Forward current as a function of forward voltage; maximum values.



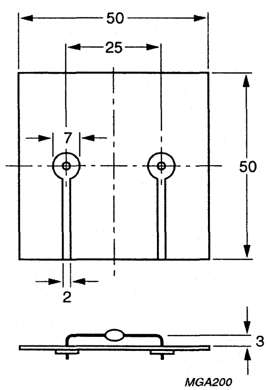
$V_R = V_{RRMmax}$.

Fig.8 Reverse current as a function of junction temperature; maximum values.



f = 1 MHz; T_j = 25 °C.

Fig.9 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.10 Device mounted on a printed-circuit board.

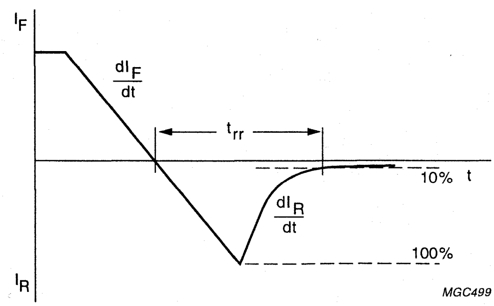
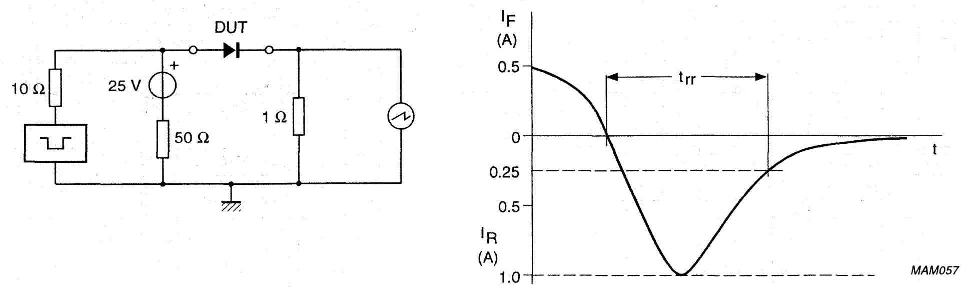


Fig.11 Reverse recovery definitions.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.12 Test circuit and reverse recovery time waveform and definition.

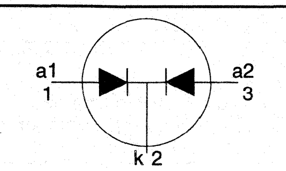
Rectifier diodes Schottky barrier

BYV116, BYV116B series

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 20 V/ 25 V

$I_{O(AV)}$ = 10 A

$V_F \leq$ 0.54 V

GENERAL DESCRIPTION

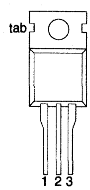
Dual schottky rectifier diodes intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The BYV116 series is supplied in the SOT78 (TO220AB) conventional leaded package.
The BYV116B series is supplied in the SOT404 surface mounting package.

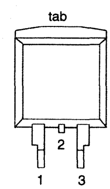
PINNING

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k) [1]
3	anode 2 (a)
tab	cathode (k)

SOT78 (TO220AB)



SOT404



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		BYV118-		**20**	**25**	
		BYV116B-		**20**	**25**	
V_{RRM}	Peak repetitive reverse voltage		-	20	25	V
V_{RWM}	Working peak reverse voltage		-	20	25	V
V_R	Continuous reverse voltage	$T_{mb} \leq 124$ ˚C	-	20	25	V
$I_{O(AV)}$	Average rectified forward current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{mb} \leq 123$ ˚C	-	10		A
I_{FRM}	Repetitive peak forward current per diode	square wave; $\delta = 0.5$; $T_{mb} \leq 123$ ˚C	-	10		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	50 55		A A
I_{RRM}	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

1. It is not possible to make connection to pin 2 of the SOT404 package.

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-mb}$	Thermal resistance junction to mounting base	per diode	-	-	4	K/W
		both diodes	-	-	3.5	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	SOT78 package, in free air	-	60	-	K/W
		SOT404 package, pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

ELECTRICAL CHARACTERISTICS

All characteristics are per diode at T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 5 A; T_j = 125˚C	-	0.47	0.54	V
		I_F = 10 A; T_j = 125˚C	-	0.66	0.77	V
		I_F = 5 A	-	0.58	0.64	V
I_R	Reverse current	$V_R = V_{RWM}$	-	0.05	3	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	5	10	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	160	-	pF

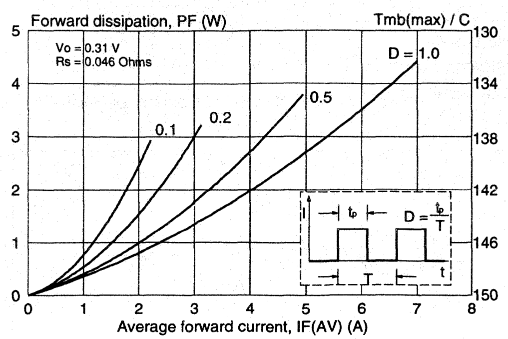


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

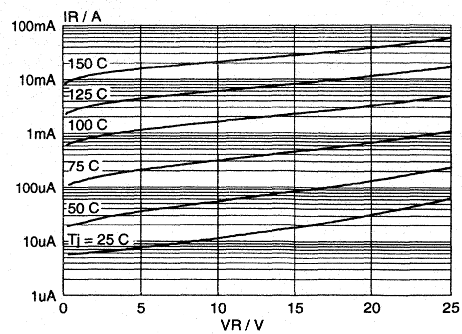


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

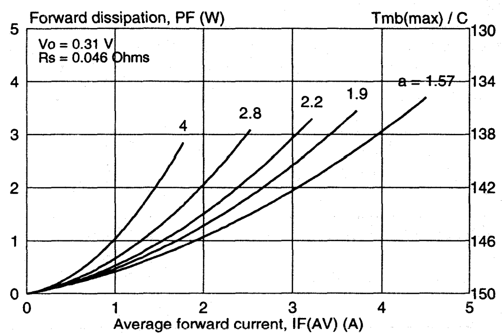


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

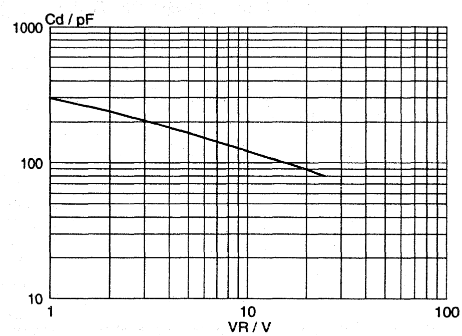


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

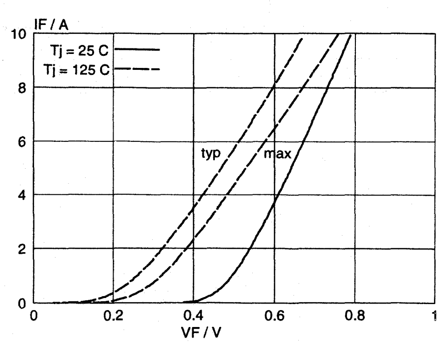


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

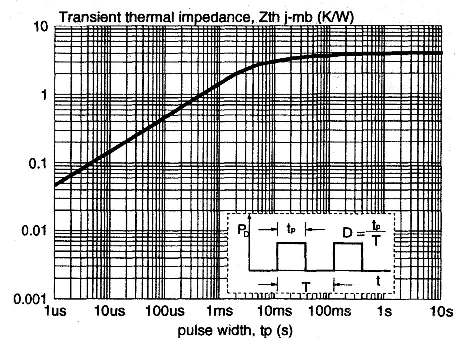


Fig.6. Transient thermal impedance; per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.

Fast soft-recovery rectifier | BYV1100

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Available in ammo-pack.

DESCRIPTION

Cavity free cylindrical glass package through Implotec™(1) technology. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

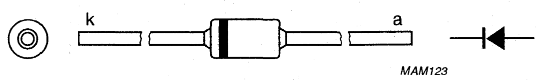


Fig.1 Simplified outline (SOD81) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	100	V
V_R	continuous reverse voltage		–	100	V
$I_{F(AV)}$	average forward current	T_{tp} = 55 °C; lead length = 10 mm; averaged over any 20 ms period; see Figs.2 and 4	–	1.7	A
		T_{amb} = 60 °C; printed-circuit board mounting, see Fig.12; averaged over any 20 ms period; see Figs.3 and 4	–	1.0	A
I_{FRM}	repetitive peak forward current	T_{tp} = 55 °C; see Fig.6	–	15	A
		T_{amb} = 60 °C; see Fig.7	–	9.5	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	15	A
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Fig.5	–	–	0.735	V
		I_F = 1 A; see Fig.5	–	–	0.96	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA	120	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.8	–	–	5	µA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.8	–	–	150	µA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.10	–	–	10	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0; see Fig.9	–	70	–	pF
$\left\lvert \frac{dI_R}{dt} \right\rvert$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq$ 30 V and dI_F/dt = −1 A/µs; see Fig.11	–	–	2	A/µs

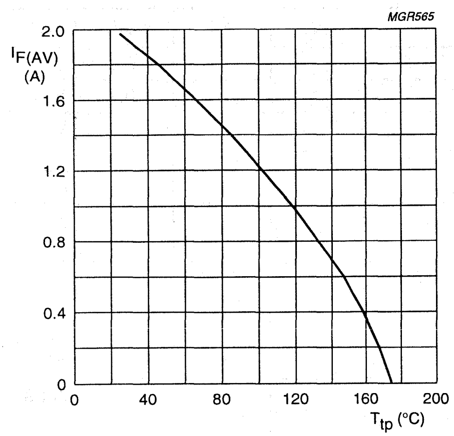
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	60	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	120	K/W

Note

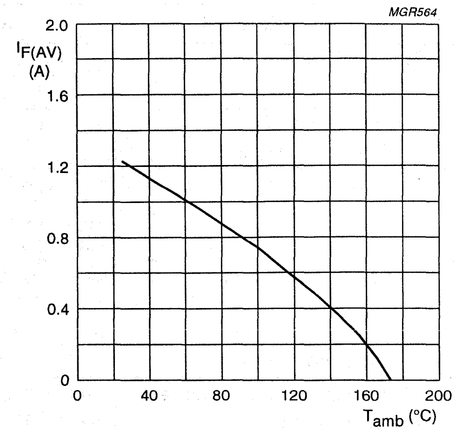
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm, see Fig.12. For more information please refer to the *'General Part of associated Handbook'*.

GRAPHICAL DATA



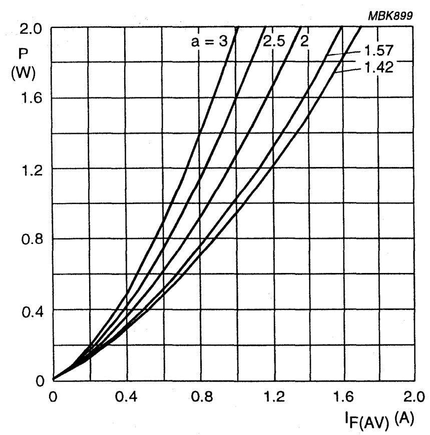
Switched mode application.
a = 1.42; δ = 0.5; $V_R = V_{RRMmax}$.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



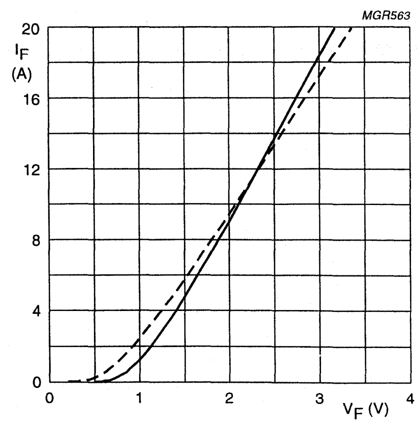
Switched mode application.
a = 1.42; δ = 0.5; $V_R = V_{RRMmax}$.
Device mounted as shown in Fig.12.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



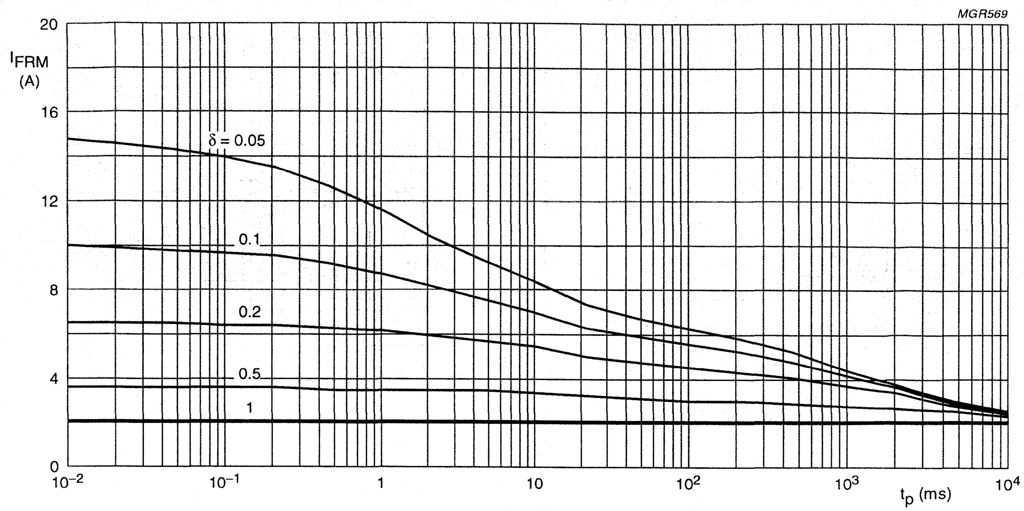
a = $I_{F(RMS)}/I_{F(AV)}$; δ = 0.5; $V_R = V_{RRMmax}$.

Fig.4 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



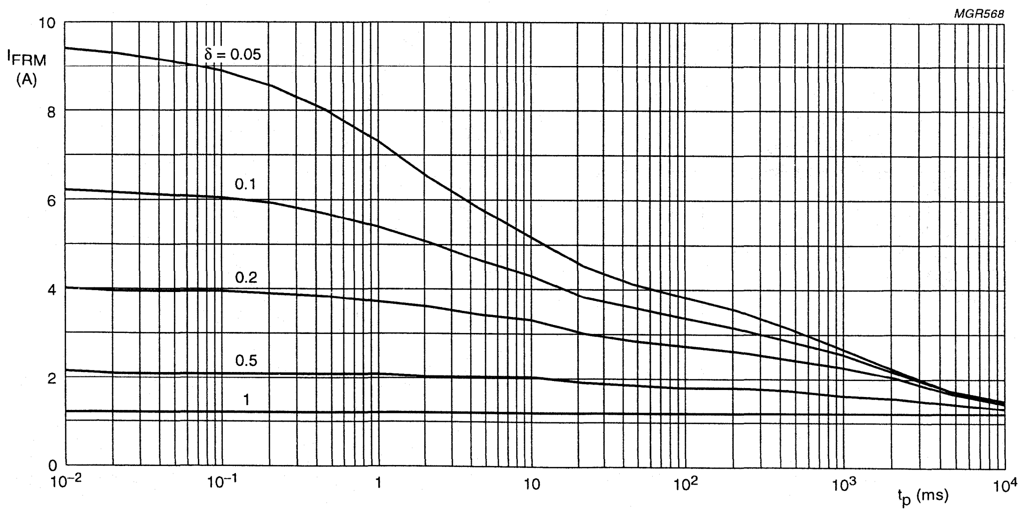
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.5 Maximum forward voltage as a function of forward current.



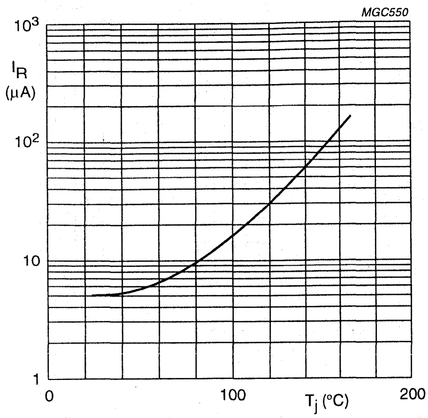
T_{tp} = 55 °C; $R_{th\ j\text{-}tp}$ = 60 K/W; $V_R = V_{RRMmax}$ during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 100 V.

Fig.6 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



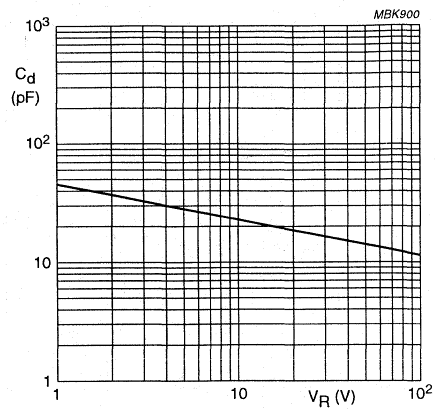
T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 120 K/W; $V_R = V_{RRMmax}$ during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 100 V.

Fig.7 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



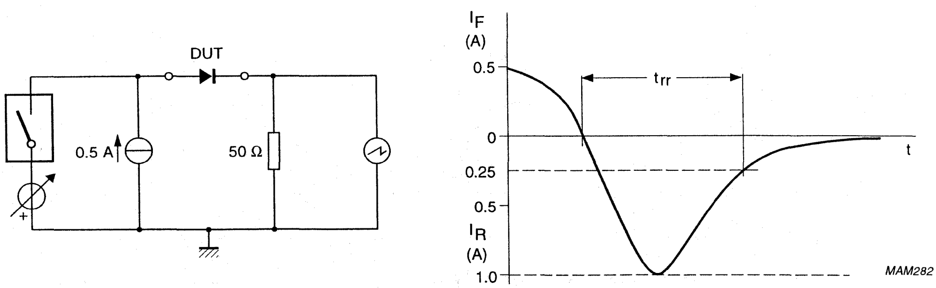
$V_R = V_{RRMmax}$.

Fig.8 Reverse current as a function of junction temperature; maximum values.



f = 1 MHz; T_j = 25 °C.

Fig.9 Diode capacitance as a function of reverse voltage; typical values.



Rise time oscilloscope: $t_r \leq 2$ ns.
Turn-on time switch: $t \leq 3$ ns.

Fig.10 Test circuit and reverse recovery time waveform and definition.

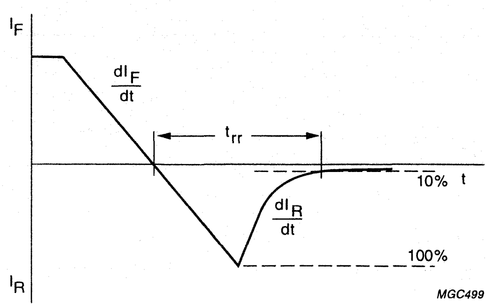
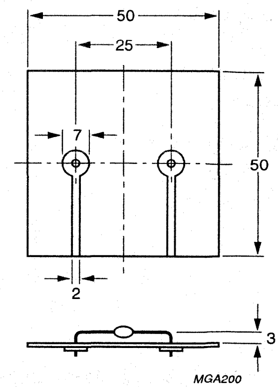


Fig.11 Reverse recovery definitions.



Dimensions in mm.

Fig.12 Device mounted on a printed-circuit board.

Fast soft-recovery controlled avalanche rectifier

BYV2100

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack.

DESCRIPTION

Rugged glass SOD57 package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

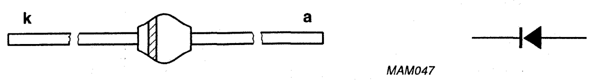


Fig.1 Simplified outline (SOD57) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	100	V
V_R	continuous reverse voltage		–	100	V
$I_{F(AV)}$	average forward current	T_{tp} = 80 °C; lead length = 10 mm; averaged over any 20 ms period; see Fig.2; see also Fig.4	–	2.0	A
		T_{amb} = 60 °C; PCB mounting (see Fig.12); averaged over any 20 ms period; see Fig.3; see also Fig.4	–	1.3	A
I_{FRM}	repetitive peak forward current	T_{tp} = 80 °C; see Fig.6	–	18	A
		T_{amb} = 60 °C; see Fig.7	–	12	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	50	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	20	mJ
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 2 A; $T_j = T_{j\,max}$; see Fig.5	–	–	0.78	V
		I_F = 2 A; see Fig.5	–	–	0.98	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA	120	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.8	–	–	5	µA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.8	–	–	150	µA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.10	–	–	12.5	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Fig.9	–	135	–	pF
$\left\|\frac{dI_R}{dt}\right\|$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq$ 30 V and dI_F/dt = −1 A/µs; see Fig.11	–	–	2	A/µs

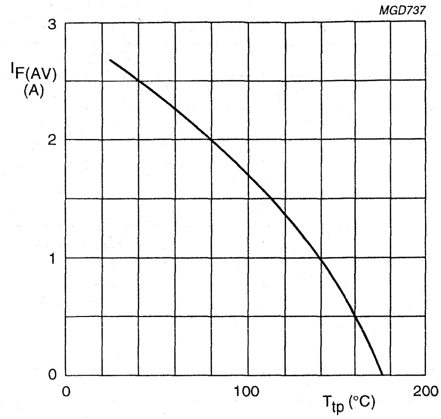
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	46	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

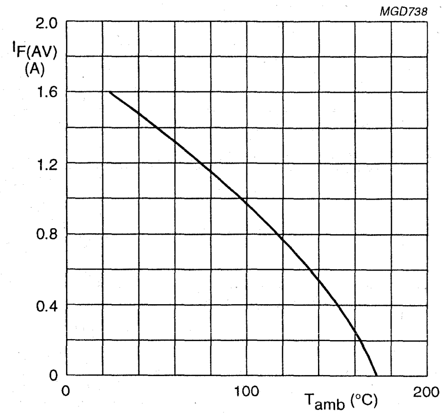
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm, see Fig.12. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA



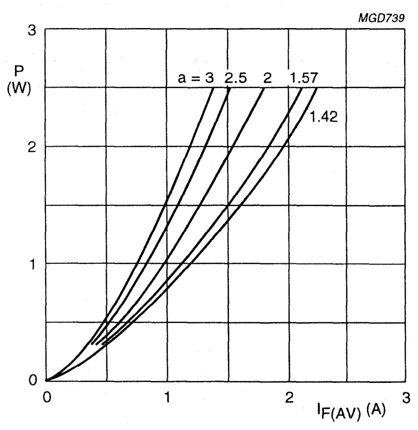
Switched mode application.
a = 1.42; δ = 0.5; $V_R = V_{RRMmax}$.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



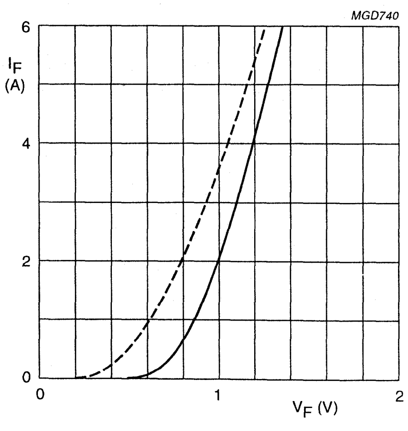
Switched mode application.
a = 1.42; δ = 0.5; $V_R = V_{RRMmax}$.
Device mounted as shown in Fig.12.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



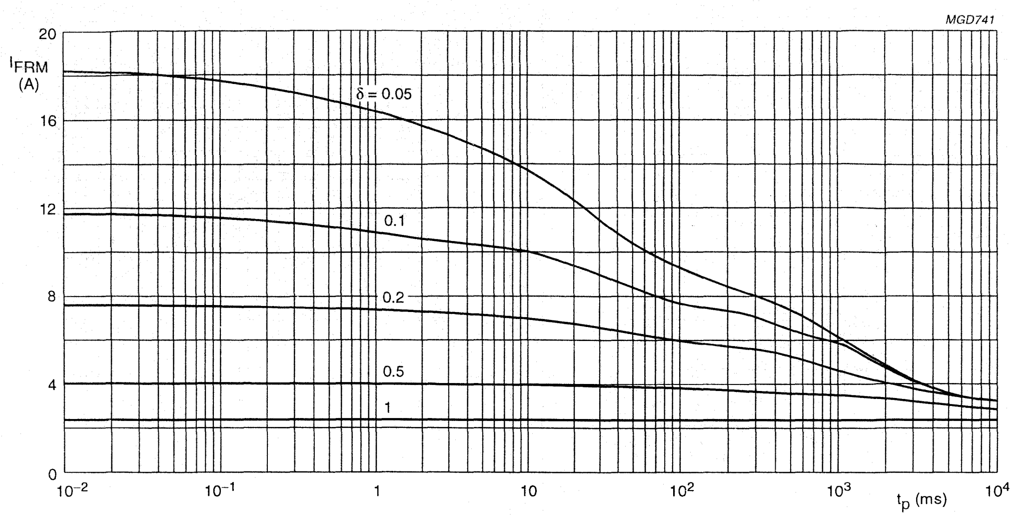
a = $I_{F(RMS)}/I_{F(AV)}$; δ = 0.5; $V_R = V_{RRMmax}$.

Fig.4 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



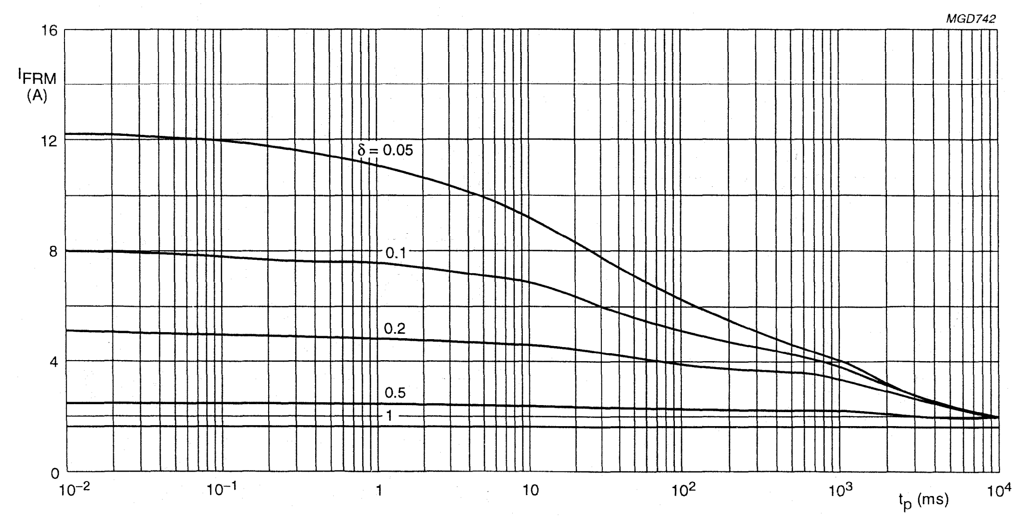
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.5 Maximum forward voltage as a function of forward current.



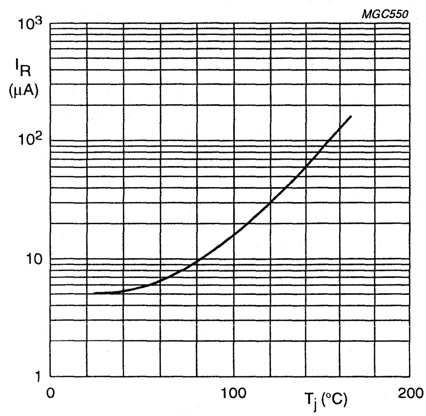
T_{tp} = 80 °C; $R_{th\ j\text{-}tp}$ = 46 K/W; $V_R = V_{RRMmax}$ during 1 – δ.

Fig.6 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



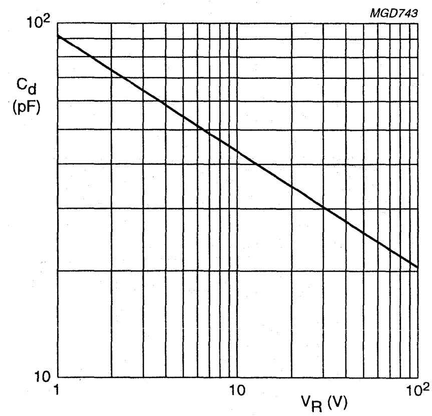
T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 100 K/W; $V_R = V_{RRMmax}$ during 1 – δ.

Fig.7 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



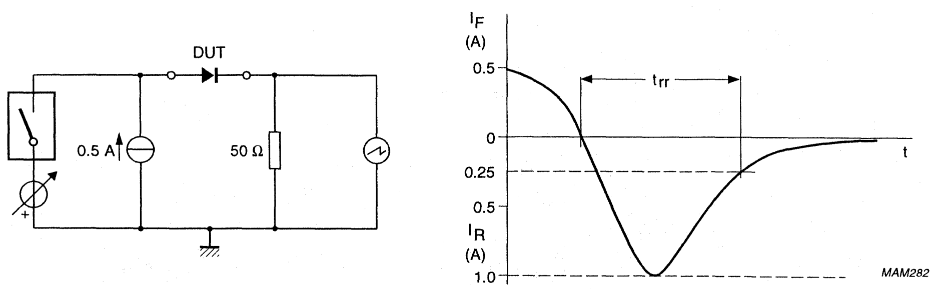
$V_R = V_{RRMmax}$.

Fig.8 Reverse current as a function of junction temperature; maximum values.



f = 1 MHz; T_j = 25 °C.

Fig.9 Diode capacitance as a function of reverse voltage; typical values.



Rise time oscilloscope: $t_r \leq 2$ ns.
Turn-on time switch: $t \leq 3$ ns.

Fig.10 Test circuit and reverse recovery time waveform and definition.

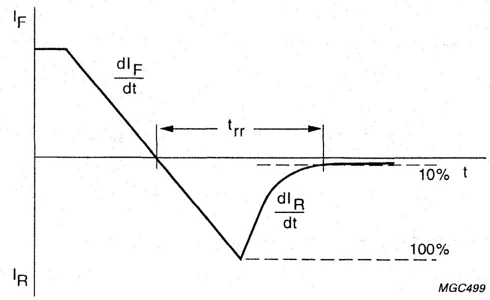
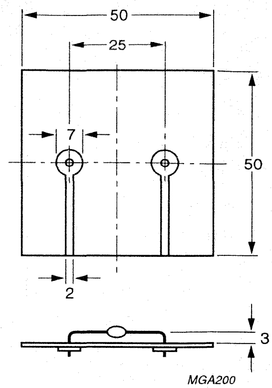


Fig.11 Reverse recovery definitions.



Dimensions in mm.

Fig.12 Device mounted on a printed-circuit board.

Fast soft-recovery controlled avalanche rectifier

BYV4100

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack
- Also available with preformed leads for easy insertion.

DESCRIPTION

Rugged glass SOD64 package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

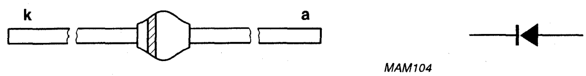


Fig.1 Simplified outline (SOD64) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	100	V
V_R	continuous reverse voltage		–	100	V
$I_{F(AV)}$	average forward current	T_{tp} = 65 °C; lead length = 10 mm; averaged over any 20 ms period; see Fig.2; see also Fig.4	–	4.0	A
		T_{amb} = 60 °C; PCB mounting (see Fig.12); averaged over any 20 ms period; see Fig.3; see also Fig.4	–	1.9	A
I_{FRM}	repetitive peak forward current	T_{tp} = 65 °C; see Fig.6	–	34	A
		T_{amb} = 60 °C; see Fig.7	–	17	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	90	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	20	mJ
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 3.5 A; $T_j = T_{j\,max}$; see Fig.5	–	–	0.78	V
		I_F = 3.5 A; see Fig.5	–	–	0.98	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA	120	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.8	–	–	5	µA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.8	–	–	150	µA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.10	–	–	15	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Fig.9	–	245	–	pF
$\left\lvert\frac{dI_R}{dt}\right\rvert$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq$ 30 V and dI_F/dt = −1 A/µs; see Fig.11	–	–	2	A/µs

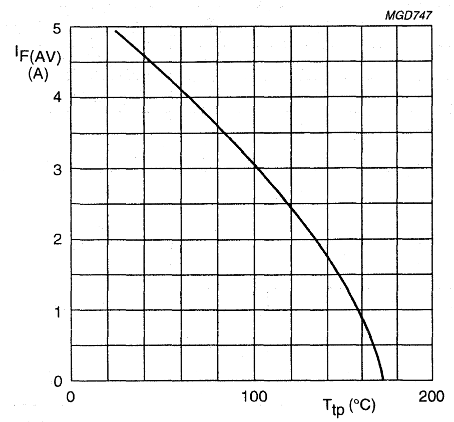
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	25	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	75	K/W

Note

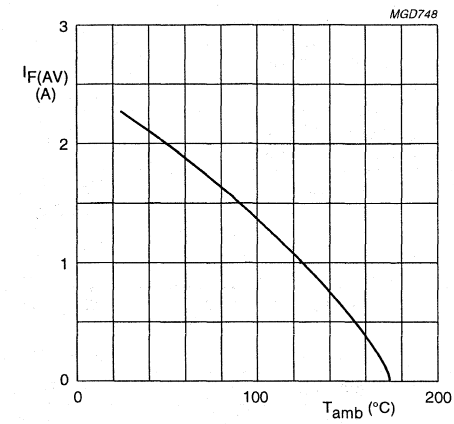
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm, see Fig.12. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA



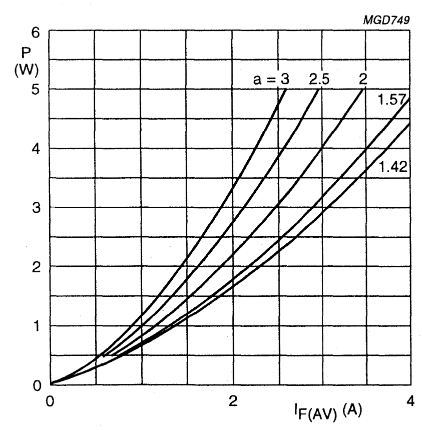
Switched mode application.
a = 1.42; δ = 0.5; $V_R = V_{RRMmax}$.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



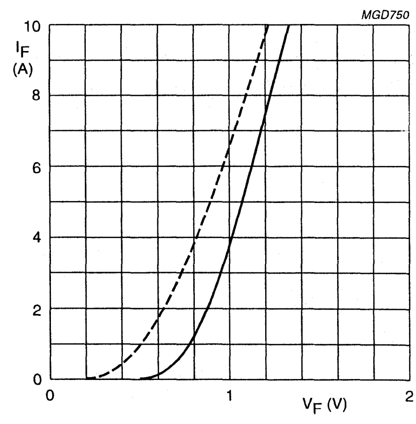
Switched mode application.
a = 1.42; δ = 0.5; $V_R = V_{RRMmax}$.
Device mounted as shown in Fig.12.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



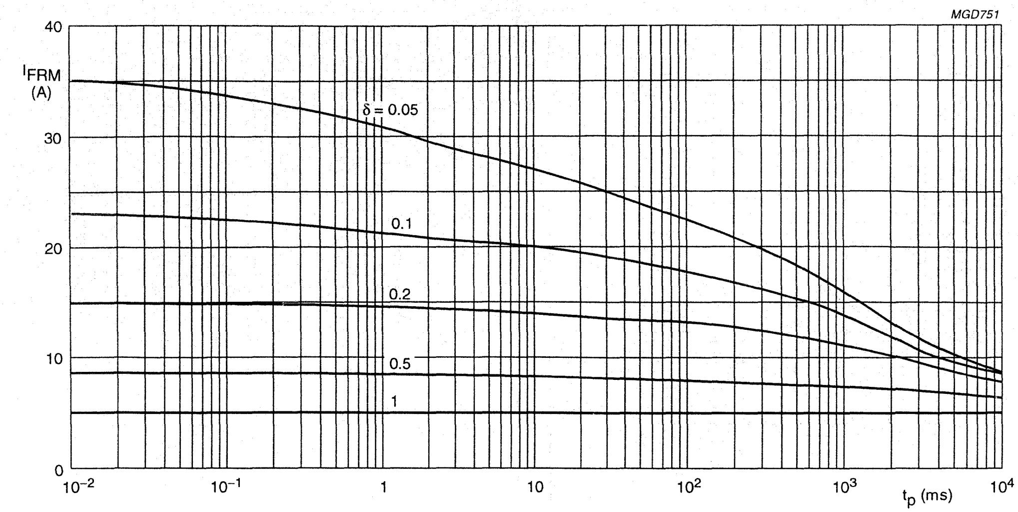
a = $I_{F(RMS)}/I_{F(AV)}$; δ = 0.5; $V_R = V_{RRMmax}$.

Fig.4 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



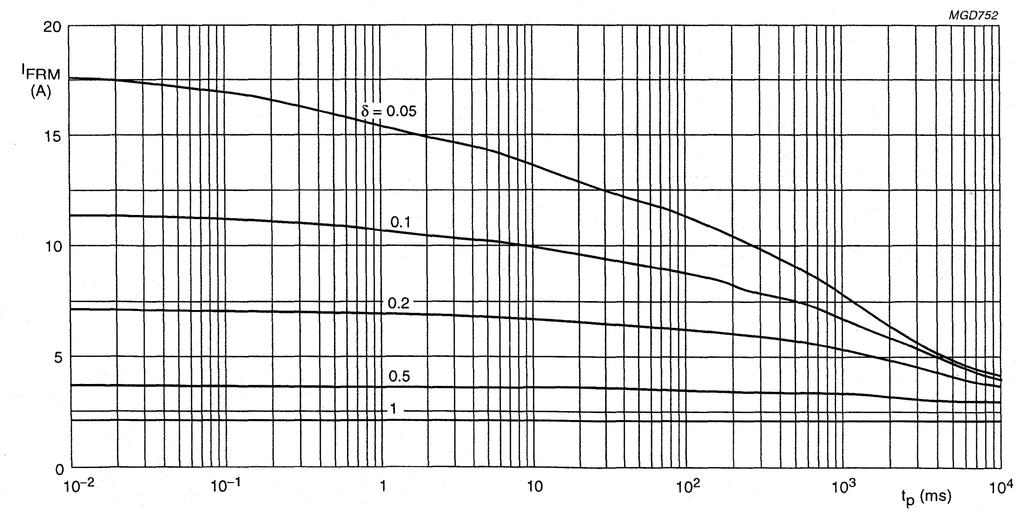
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.5 Maximum forward voltage as a function of forward current.



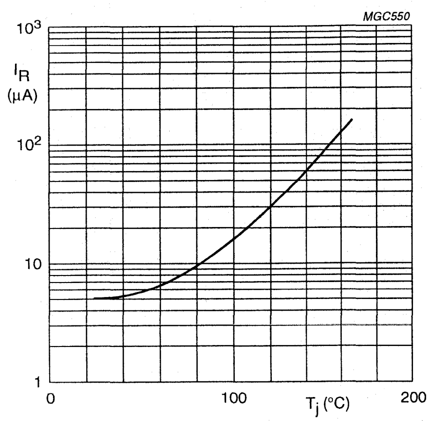
T_{tp} = 65 °C; $R_{th\ j\text{-}tp}$ = 25 K/W; $V_R = V_{RRMmax}$ during 1 – δ.

Fig.6 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



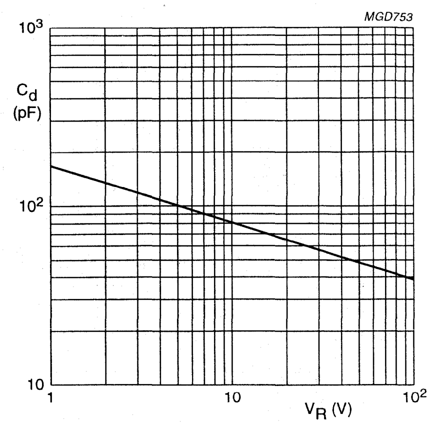
T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 75 K/W; $V_R = V_{RRMmax}$ during 1 – δ.

Fig.7 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



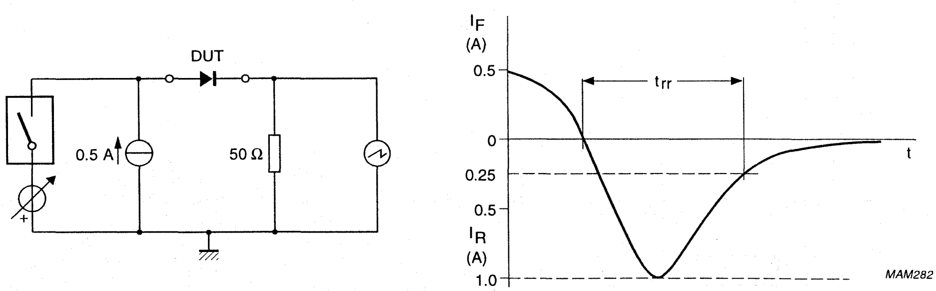
$V_R = V_{RRMmax}$.

Fig.8 Reverse current as a function of junction temperature; maximum values.



f = 1 MHz; T_j = 25 °C.

Fig.9 Diode capacitance as a function of reverse voltage; typical values.



Rise time oscilloscope: $t_r \leq 2$ ns.
Turn-on time switch: $t \leq 3$ ns.

Fig.10 Test circuit and reverse recovery time waveform and definition.

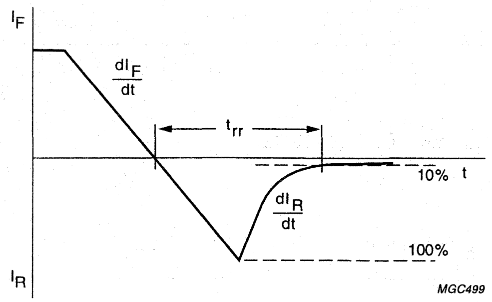
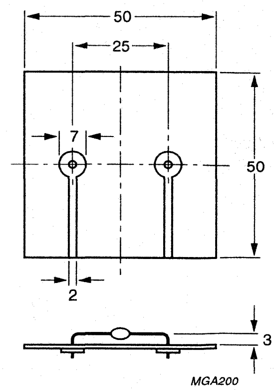


Fig.11 Reverse recovery definitions.



Dimensions in mm.

Fig.12 Device mounted on a printed-circuit board.

Ultra fast low-loss controlled avalanche rectifier

BYW28 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability.

DESCRIPTION

Rugged glass SOD115 package, using a high temperature alloyed construction.

The package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

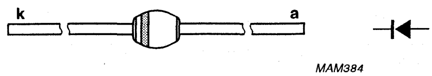


Fig.1 Simplified outline (SOD115) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYW28-500		–	500	V
	BYW28-600		–	600	V
V_R	continuous reverse voltage				
	BYW28-500		–	500	V
	BYW28-600		–	600	V
$I_{F(AV)}$	average forward current	T_{tp} = 85 °C; lead length = 10 mm; see Fig.2; averaged over any 20 ms period; see also Fig.6	–	4	A
		T_{amb} = 60 °C; printed-circuit board mounting (see Fig.11); see Fig.3; averaged over any 20 ms period; see also Fig.6	–	1.7	A
I_{FRM}	repetitive peak forward current	T_{tp} = 85 °C; see Fig.4	–	46	A
		T_{amb} = 60 °C; see Fig.5	–	21	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	170	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	20	mJ
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature	see Fig.7	−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 3.5 A; $T_j = T_{j\,max}$; see Fig.8	–	–	0.90	V
		I_F = 3.5 A; see Fig.8	–	–	1.15	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYW28-500		560	–	–	V
	BYW28-600		675	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.9	–	–	5	µA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.9	–	–	150	µA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.12	–	–	50	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0; see Fig.10	–	275	–	pF
$\left\lvert\frac{dI_R}{dt}\right\rvert$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq$ 30 V and dI_F/dt = −1 A/µs; see Fig.13	–	–	4	A/µs

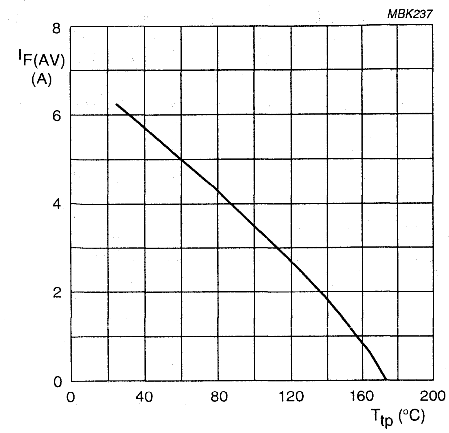
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	20	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	70	K/W

Note

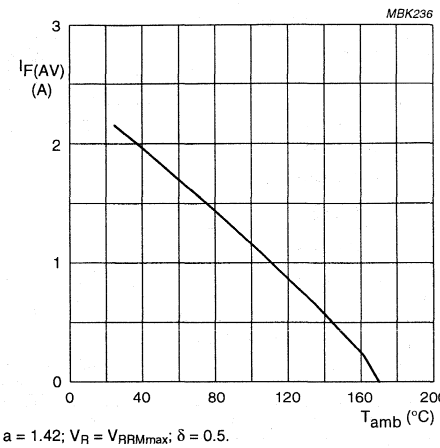
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm, see Fig.11. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA



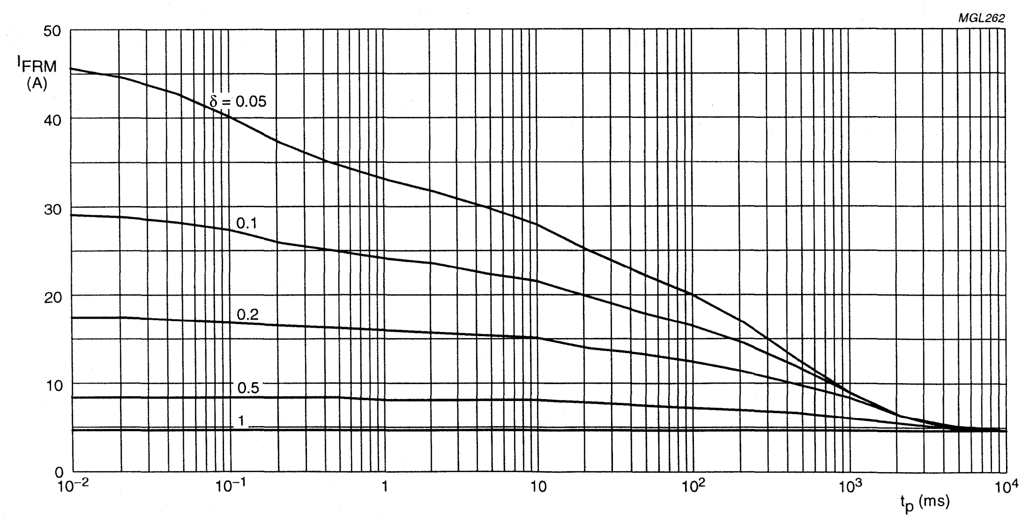
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Switched mode application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



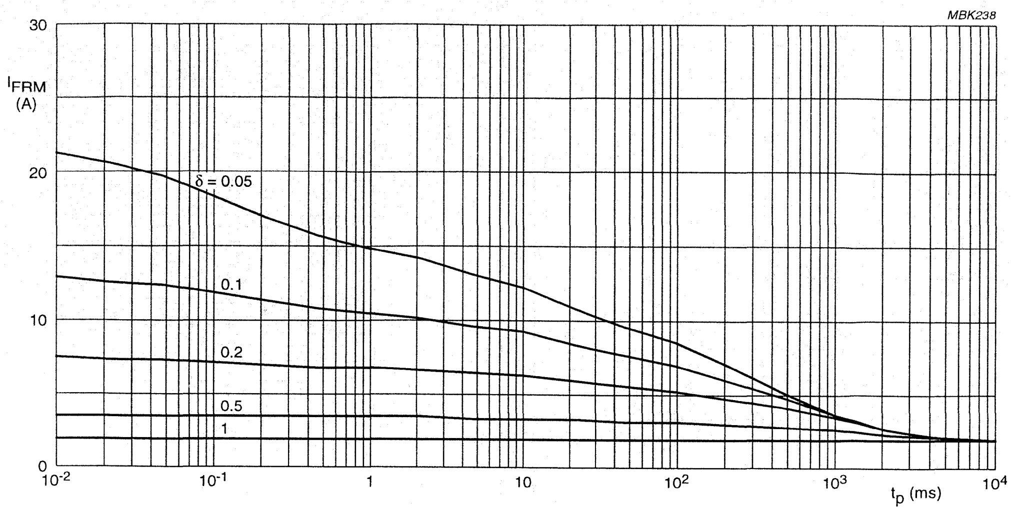
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Device mounted as shown in Fig.11.
Switched mode application.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



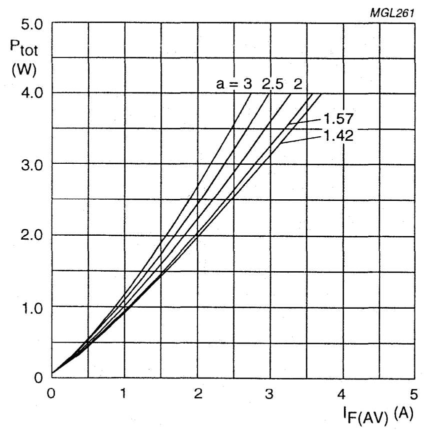
T_{tp} = 85 °C; $R_{th\ j\text{-}tp}$ = 20 K/W.
V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at $V_{RRM} = V_{RRMmax}$.

Fig.4 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 70 K/W.
V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at $V_{RRM} = V_{RRMmax}$.

Fig.5 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; δ = 0.5.

Fig.6 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.

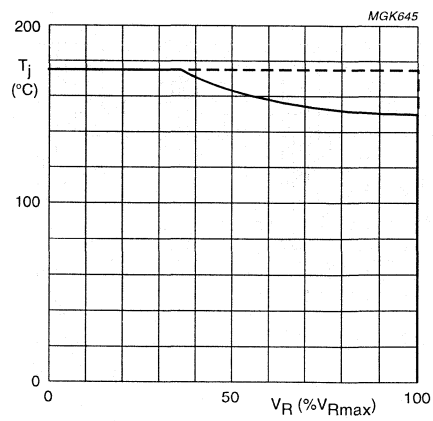
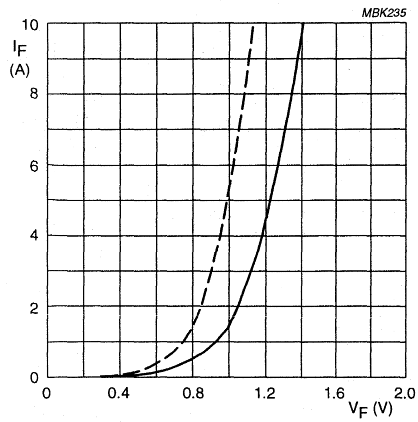
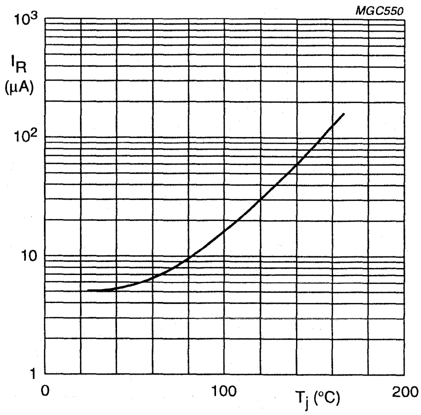


Fig.7 Maximum permissible junction temperature as a function of reverse voltage.



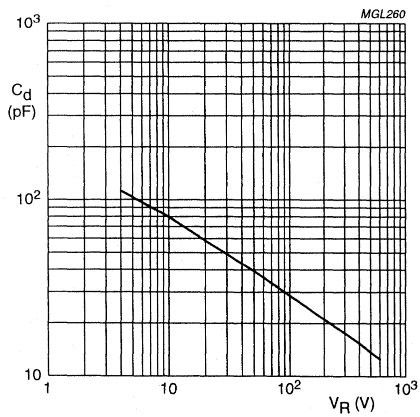
Dotted line: $T_j = 175$ °C.
Solid line: $T_j = 25$ °C.

Fig.8 Forward current as a function of forward voltage; maximum values.



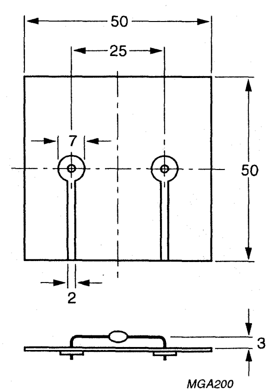
$V_R = V_{RRMmax}$.

Fig.9 Reverse current as a function of junction temperature; maximum values.



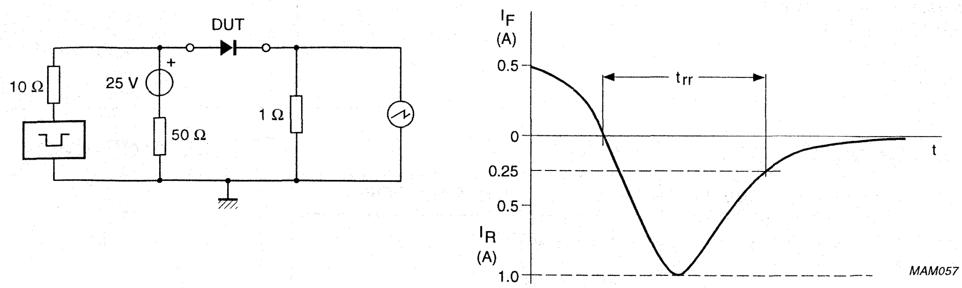
f = 1 MHz; $T_j = 25$ °C.

Fig.10 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.11 Device mounted on a printed-circuit board.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.12 Test circuit and reverse recovery time waveform and definition.

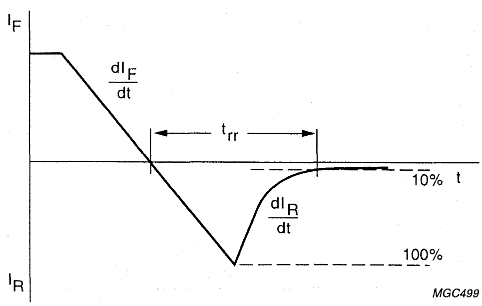


Fig.13 Reverse recovery definitions.

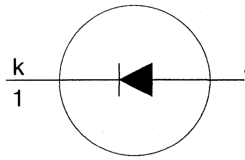
Rectifier diodes ultrafast, rugged

BYW29E series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 150 V/ 200 V

$V_F \leq$ 0.895 V

$I_{F(AV)}$ = 8 A

$I_{RRM} \leq$ 0.2 A

$t_{rr} \leq$ 25 ns

GENERAL DESCRIPTION

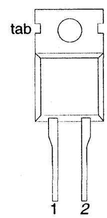
Ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYW29E series is supplied in the conventional leaded SOD59 (TO220AC) package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		BYW29E		-150	-200	
V_{RRM}	Peak repetitive reverse voltage		-	150	200	V
V_{RWM}	Working peak reverse voltage		-	150	200	V
V_R	Continuous reverse voltage		-	150	200	V
$I_{F(AV)}$	Average rectified forward current	square wave; δ = 0.5; $T_{mb} \leq$ 128 ˚C	-	8		A
I_{FRM}	Repetitive peak forward current	square wave; δ = 0.5; $T_{mb} \leq$ 128 ˚C	-	16		A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$	- -	80 88		A A
I_{RRM}	Peak repetitive reverse surge current	t_p = 2 µs; δ = 0.001	-	0.2		A
I_{RSM}	Peak non-repetitive reverse surge current	t_p = 100 µs	-	0.2		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 40	150		˚C

ESD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage	Human body model; C = 250 pF; R = 1.5 kΩ	-	8	kV

HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2.7	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	60	-	K/W

LECTRICAL CHARACTERISTICS

$_j$ = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 8 A; T_j = 150˚C	-	0.8	0.895	V
		I_F = 8 A	-	0.92	1.05	V
		I_F = 20 A	-	1.1	1.3	V
I_R	Reverse current	$V_R = V_{RWM}$	-	2	10	µA
		$V_R = V_{RWM}$; T_j = 100˚C	-	0.2	0.6	mA
Q_{rr}	Reverse recovered charge	I_F = 2 A; $V_R \geq$ 30 V; -dI_F/dt = 20 A/µs	-	4	11	nC
t_{rr1}	Reverse recovery time	I_F = 1 A; $V_R \geq$ 30 V; -dI_F/dt = 100 A/µs		20	25	ns
t_{rr2}	Reverse recovery time	I_F = 0.5 A to I_R = 1 A; I_{rec} = 0.25 A	-	15	20	ns
V_{fr}	Forward recovery voltage	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

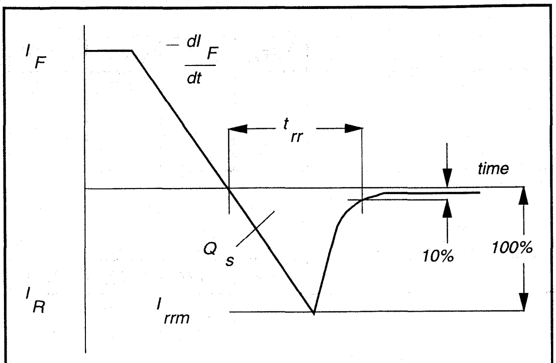


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

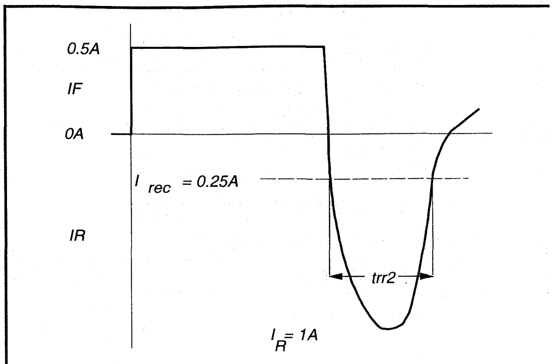


Fig.4. Definition of t_{rr2}

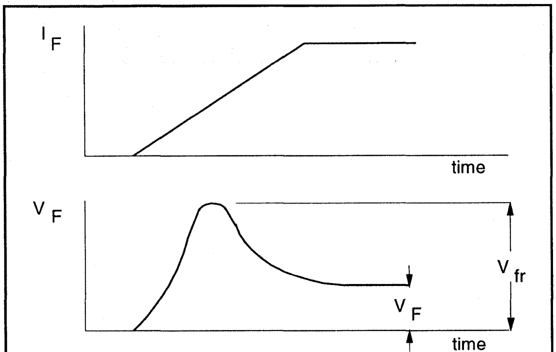


Fig.2. Definition of V_{fr}

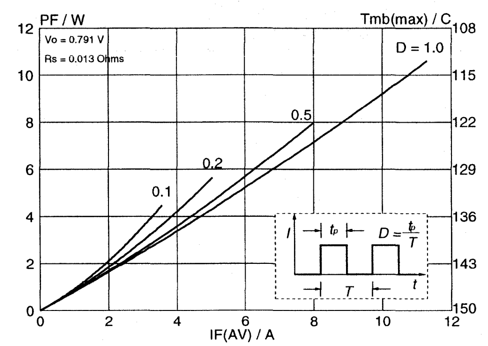


Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

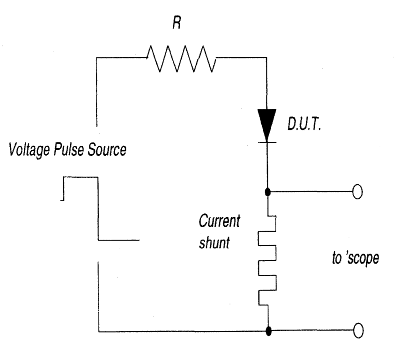


Fig.3. Circuit schematic for t_{rr2}

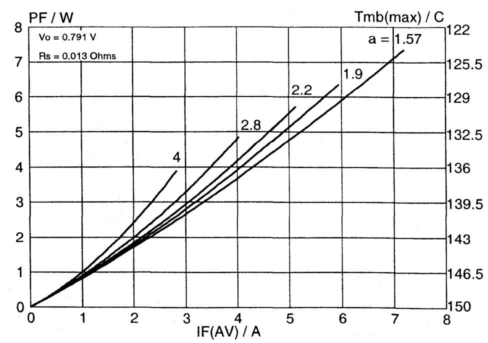


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

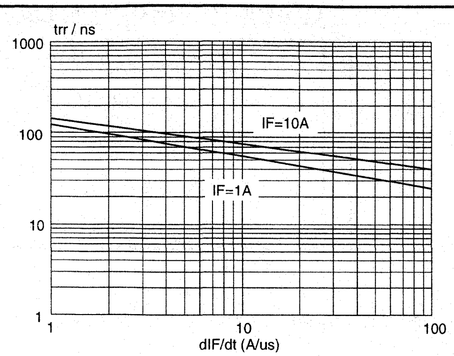


Fig.7. Maximum t_{rr} at T_j = 25 ˚C.

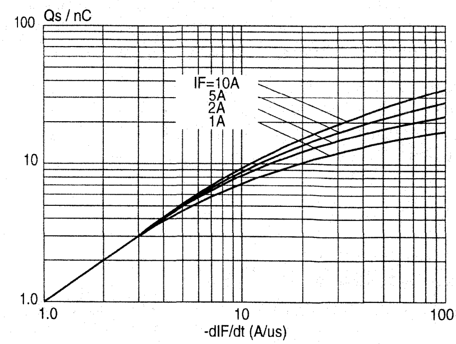


Fig.10. Maximum Q_s at T_j = 25 ˚C.

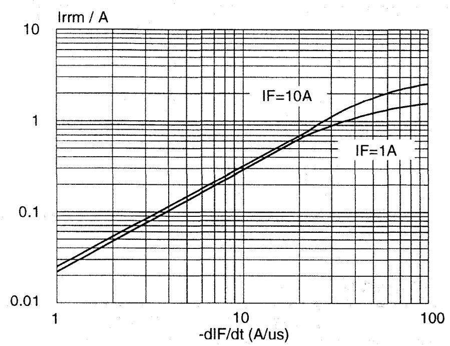


Fig.8. Maximum I_{rrm} at T_j = 25 ˚C.

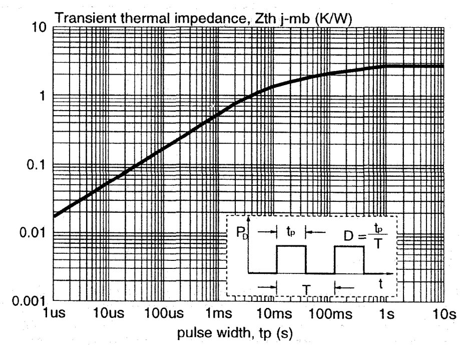


Fig.11. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

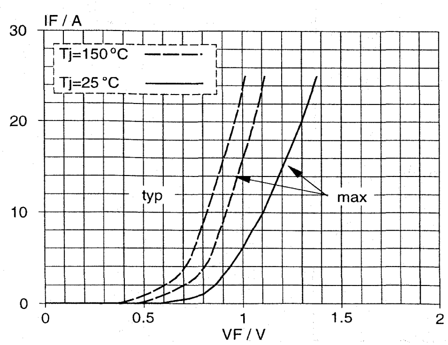


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

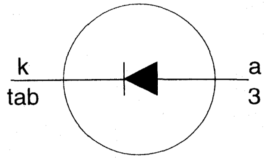
Rectifier diodes ultrafast, rugged

BYW29EB, BYW29ED series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 150 V/ 200 V

$V_F \leq$ 0.895 V

$I_{F(AV)}$ = 8 A

I_{RRM} = 0.2 A

$t_{rr} \leq$ 25 ns

GENERAL DESCRIPTION

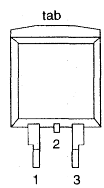
Ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies

The BYW29EB series is supplied in the SOT404 surface mounting package.
The BYW29ED series is supplied in the SOT428 surface mounting package.

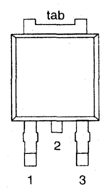
PINNING

PIN	DESCRIPTION
1	no connection
2	cathode[1]
3	anode
tab	cathode

SOT404



SOT428



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		BYW29EB/ BYW29ED		**-150**	**-200**	
V_{RRM}	Peak repetitive reverse voltage		-	150	200	V
V_{RWM}	Working peak reverse voltage		-	150	200	V
V_R	Continuous reverse voltage		-	150	200	V
$I_{F(AV)}$	Average rectified forward current	square wave; δ = 0.5; $T_{mb} \leq$ 128 ˚C	-	8		A
I_{FRM}	Repetitive peak forward current	square wave; δ = 0.5; $T_{mb} \leq$ 128 ˚C	-	16		A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$	- -	80 88		A A
I_{RRM}	Peak repetitive reverse surge current	t_p = 2 µs; δ = 0.001	-	0.2		A
I_{RSM}	Peak non-repetitive reverse surge current	t_p = 100 µs	-	0.2		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 40	150		˚C

1. It is not possible to make connection to pin 2 of the SOT428 or SOT404 packages.

:SD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage	Human body model; C = 250 pF; R = 1.5 kΩ	-	8	kV

'HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2.7	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	SOT404 and SOT428 packages, pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

:LECTRICAL CHARACTERISTICS

$_j$ = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 8 A; T_j = 150˚C	-	0.8	0.895	V
		I_F = 8 A	-	0.92	1.05	V
		I_F = 20 A	-	1.1	1.3	V
I_R	Reverse current	$V_R = V_{RWM}$	-	2	10	µA
		$V_R = V_{RWM}$; T_j = 100˚C	-	0.2	0.6	mA
Q_{rr}	Reverse recovered charge	I_F = 2 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 20 A/µs	-	4	11	nC
t_{rr1}	Reverse recovery time	I_F = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 100 A/µs		20	25	ns
t_{rr2}	Reverse recovery time	I_F = 0.5 A to I_R = 1 A; I_{rec} = 0.25 A	-	15	20	ns
V_{fr}	Forward recovery voltage	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

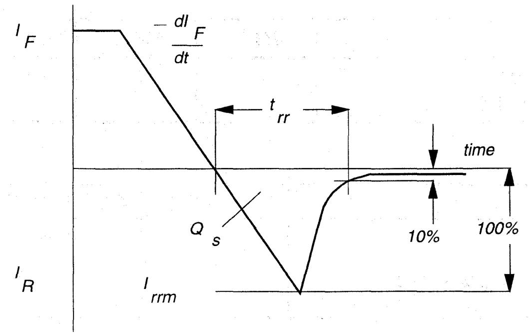


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

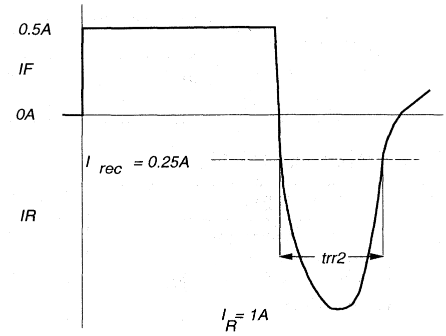


Fig.4. Definition of t_{rr2}

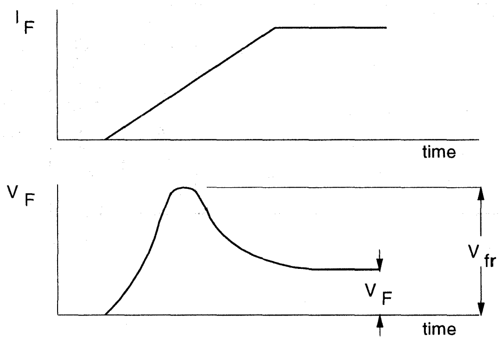


Fig.2. Definition of V_{fr}

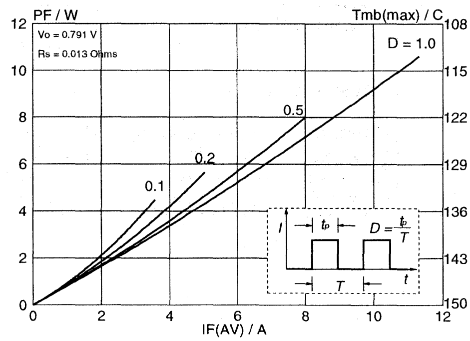


Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

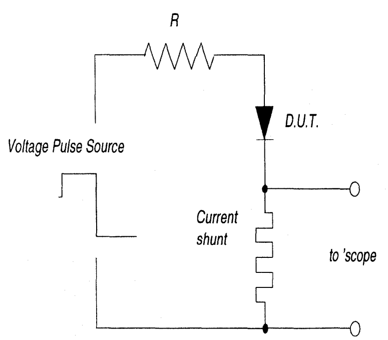


Fig.3. Circuit schematic for t_{rr2}

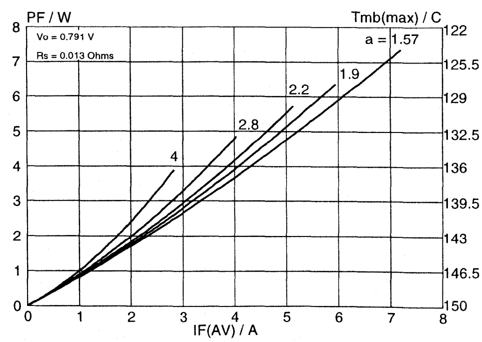


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

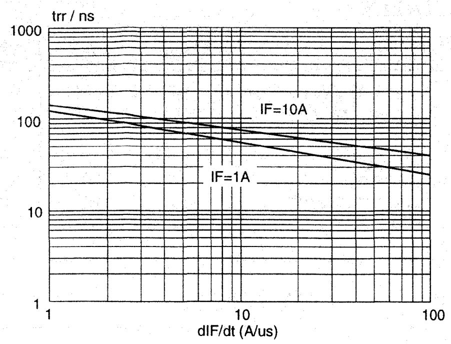


Fig.7. Maximum t_{rr} at T_j = 25 ˚C.

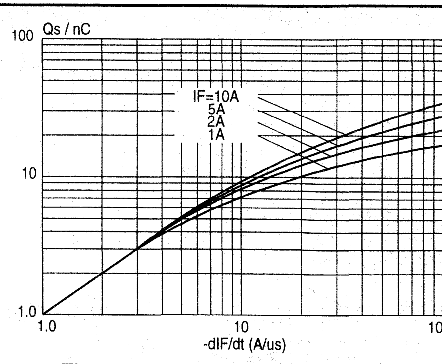


Fig.10. Maximum Q_s at T_j = 25 ˚C.

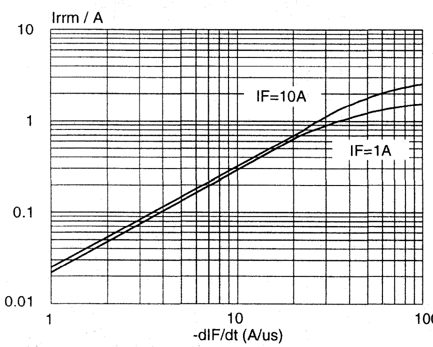


Fig.8. Maximum I_{rrm} at T_j = 25 ˚C.

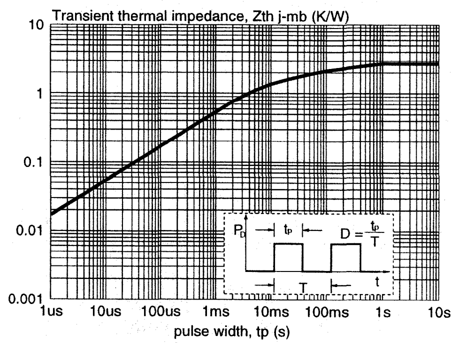


Fig.11. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

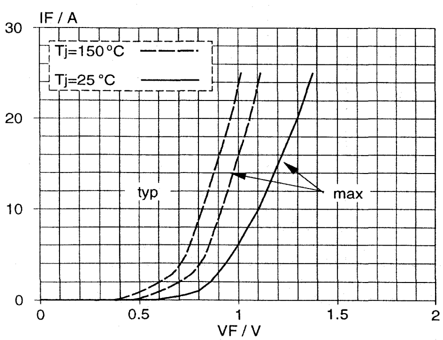


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

Rectifier diodes ultrafast, rugged

BYW29EX series

GENERAL DESCRIPTION

Glass passivated epitaxial rectifier diodes in a full pack plastic envelope, featuring low forward voltage drop, ultra-fast recovery times, soft recovery characteristic and guaranteed reverse surge and ESD capability. They are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and switching losses are essential.

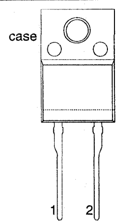
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	UNIT
	BYW29EX-	**150**	**200**	
V_{RRM}	Repetitive peak reverse voltage	150	200	V
V_F	Forward voltage	0.895	0.895	V
$I_{F(AV)}$	Forward current	8	8	A
t_{rr}	Reverse recovery time	25	25	ns
I_{RRM}	Repetitive peak reverse current	0.2	0.2	A

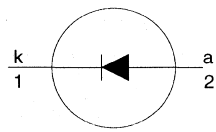
PINNING - SOD113

PIN	DESCRIPTION
1	cathode
2	anode
case	isolated

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
				-150	**-200**	
V_{RRM}	Repetitive peak reverse voltage		-	150	200	V
V_{RWM}	Crest working reverse voltage		-	150	200	V
V_R	Continuous reverse voltage		-	150	200	V
$I_{F(AV)}$	Average forward current[1]	square wave; $\delta = 0.5$; $T_{hs} \leq 106$ ˚C	-	8		A
		sinusoidal; a = 1.57; $T_{hs} \leq 109$ ˚C	-	7.3		A
$I_{F(RMS)}$	RMS forward current		-	11.3		A
I_{FRM}	Repetitive peak forward current	t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 106$ ˚C	-	16		A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms	-	80		A
		t = 8.3 ms	-	88		A
		sinusoidal; with reapplied $V_{RWM(max)}$				
I^2t	I^2t for fusing	t = 10 ms	-	32		A^2s
I_{RRM}	Repetitive peak reverse current	$t_p = 2$ µs; $\delta = 0.001$	-	0.2		A
I_{RSM}	Non-repetitive peak reverse current	$t_p = 100$ µs	-	0.2		A
T_{stg}	Storage temperature		-40	150		˚C
T_j	Operating junction temperature		-	150		˚C

1 Neglecting switching and reverse current losses

:SD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage	Human body model; C = 250 pF; R = 1.5 kΩ	-	8	kV

SOLATION LIMITING VALUE & CHARACTERISTIC

$_{hs}$ = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	R.M.S. isolation voltage from both terminals to external heatsink	f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree	-		2500	V
C_{isol}	Capacitance from both terminals to external heatsink	f = 1 MHz	-	10	-	pF

'HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	with heatsink compound without heatsink compound	- -	- -	5.5 7.2	K/W K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	55	-	K/W

;TATIC CHARACTERISTICS

$_j$ = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 8 A; T_j = 150˚C I_F = 8 A I_F = 20 A	- - -	0.80 0.92 1.1	0.895 1.05 1.3	V V V
I_R	Reverse current	$V_R = V_{RWM}$; T_j = 100 ˚C $V_R = V_{RWM}$	- -	0.2 2	0.6 10	mA µA

)YNAMIC CHARACTERISTICS

$_j$ = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_s	Reverse recovery charge	I_F = 2 A; V_R ≥ 30 V; -dI_F/dt = 20 A/µs	-	4	11	nC
t_{rr1}	Reverse recovery time	I_F = 1 A; V_R ≥ 30 V; -dI_F/dt = 100 A/µs	-	20	25	ns
t_{rr2}	Reverse recovery time	I_F = 0.5 A to I_R = 1 A; I_{rec} = 0.25 A	-	15	20	ns
V_{fr}	Forward recovery voltage	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

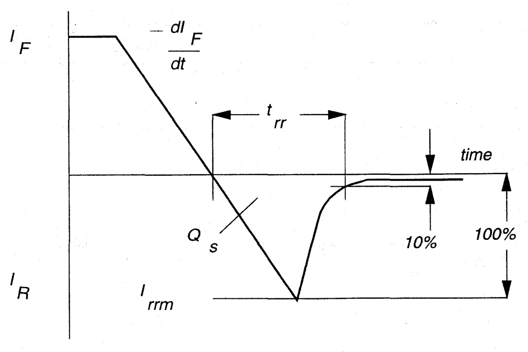


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

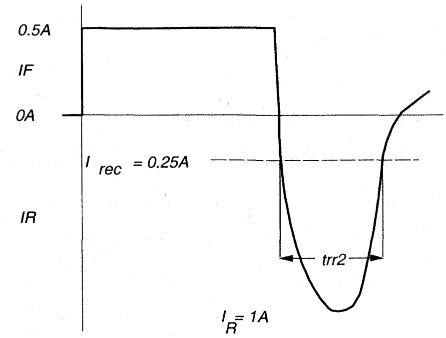


Fig.4. Definition of t_{rr2}

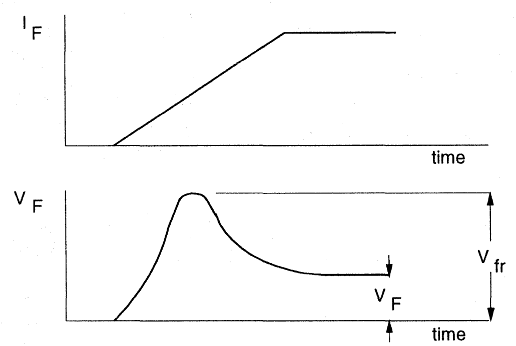


Fig.2. Definition of V_{fr}

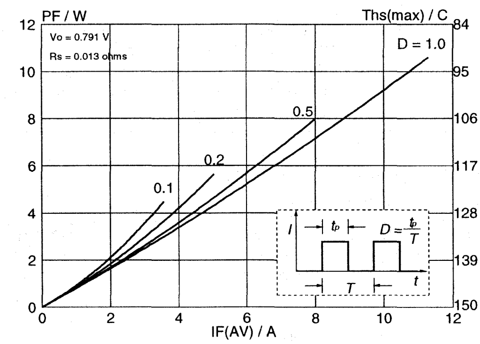


Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

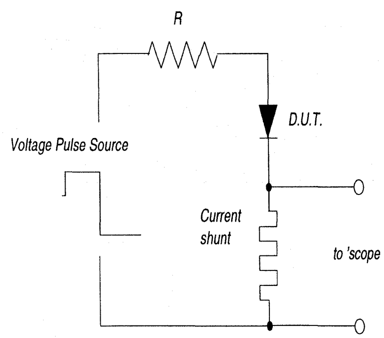


Fig.3. Circuit schematic for t_{rr2}

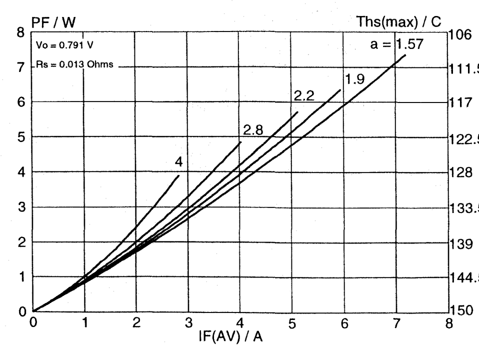


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

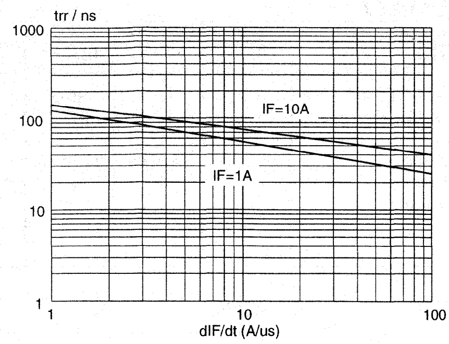


Fig.7. Maximum t_{rr} at T_j = 25 ˚C.

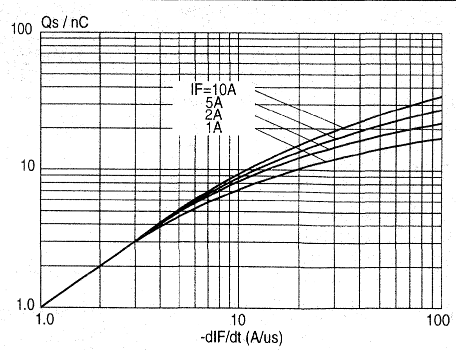


Fig.10. Maximum Q_s at T_j = 25 ˚C.

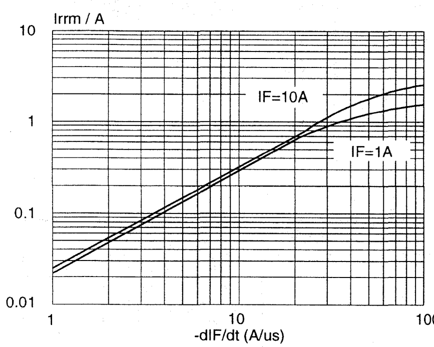


Fig.8. Maximum I_{rrm} at T_j = 25 ˚C.

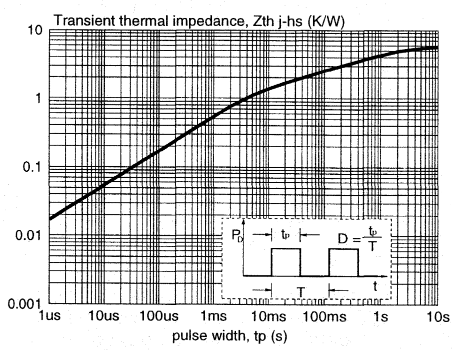


Fig.11. Transient thermal impedance; $Z_{th\ j\text{-}hs} = f(t_p)$.

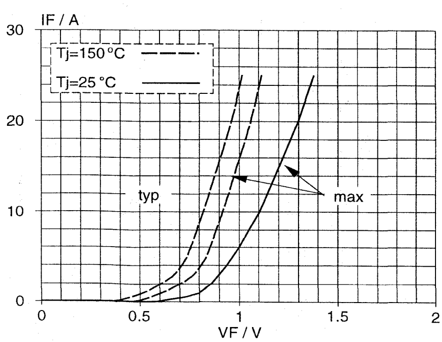


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

Rectifier diodes ultrafast

BYW29F serie

GENERAL DESCRIPTION

Glass passivated high efficiency rectifier diodes in full pack, plastic envelopes, featuring low forward voltage drop, ultra-fast recovery times and soft recovery characteristic. They are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and switching losses are essential.

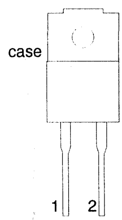
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNI
	BYW29F-	**100**	**150**	**200**	
V_{RRM}	Repetitive peak reverse voltage	100	150	200	V
V_F	Forward voltage	0.895	0.895	0.895	V
$I_{F(AV)}$	Forward current	8	8	8	A
t_{rr}	Reverse recovery time	25	25	25	ns

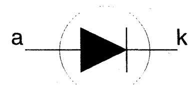
PINNING - SOD100

PIN	DESCRIPTION
1	cathode
2	anode
case	isolated

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNI
				-100	-150	-200	
V_{RRM}	Repetitive peak reverse voltage		-	100	150	200	V
V_{RWM}	Crest working reverse voltage		-	100	150	200	V
V_R	Continuous reverse voltage[1]		-	100	150	200	V
$I_{F(AV)}$	Average forward current[2]	square wave; $\delta = 0.5$; $T_{hs} \leq 106$ ˚C	-	8			A
		sinusoidal; a = 1.57; $T_{hs} \leq 109$ ˚C	-	7.3			A
$I_{F(RMS)}$	RMS forward current		-	11.3			A
I_{FRM}	Repetitive peak forward current	t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 109$ ˚C	-	16			A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms	-	80			A
		t = 8.3 ms sinusoidal; with reapplied $V_{RWM(max)}$	-	88			A
I^2t	I^2t for fusing	t = 10 ms	-	32			A^2s
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

1 $T_{hs} \leq 141$˚C for thermal stability.

2 Neglecting switching and reverse current losses

ıOLATION

$_s$ = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Repetitive peak voltage from both terminals to external heatsink	R.H. ≤ 65% ; clean and dustfree	-	-	1500	V
C_{isol}	Capacitance from cathode to external heatsink	f = 1 MHz	-	12	-	pF

ɦERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to mounting base	with heatsink compound	-	-	5.5	K/W
		without heatsink compound	-	-	7.2	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	55	-	K/W

TATIC CHARACTERISTICS

= 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 8 A; T_j = 150˚C	-	0.80	0.895	V
		I_F = 8 A	-	0.92	1.05	V
		I_F = 20 A	-	1.1	1.3	V
I_R	Reverse current	$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.3	0.6	mA
		$V_R = V_{RWM}$	-	2	10	µA

YNAMIC CHARACTERISTICS

= 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_s	Reverse recovery charge	I_F = 2 A; V_R ≥ 30 V; $-dI_F/dt$ = 20 A/µs	-	4	11	nC
t_{rr}	Reverse recovery time	I_F = 1 A; V_R ≥ 30 V; $-dI_F/dt$ = 100 A/µs	-	20	25	ns
I_{rrm}	Peak reverse recovery current	I_F = 10 A; V_R ≥ 30 V; T_j = 100 ˚C; $-dI_F/dt$ = 50 A/µs	-	1	2	A
V_{fr}	Forward recovery voltage	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

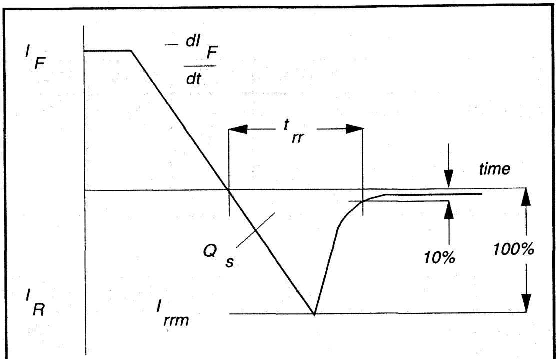


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

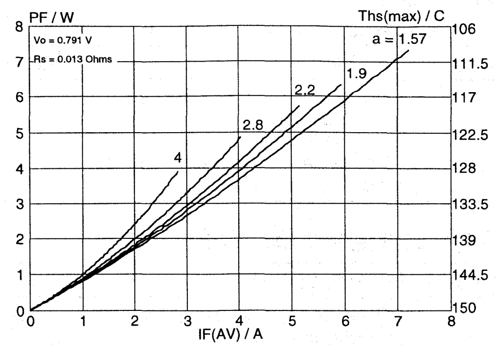


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)}$ / $I_{F(AV)}$.

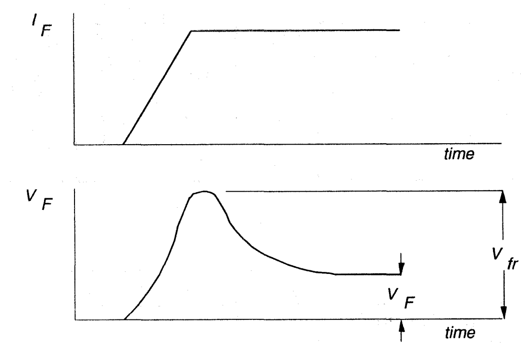


Fig.2. Definition of V_{fr}

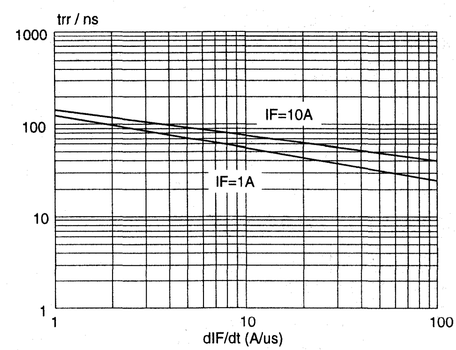


Fig.5. Maximum t_{rr} at T_j = 25 ˚C.

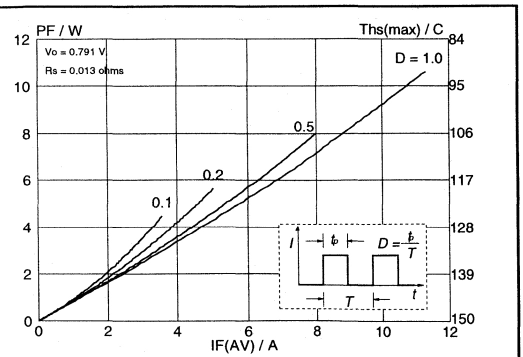


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

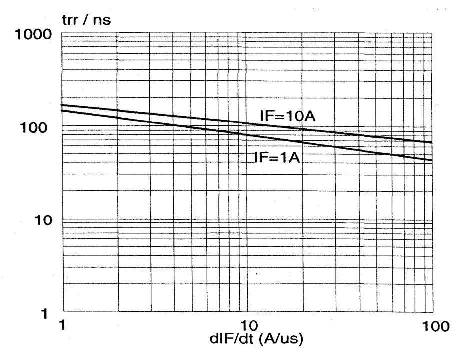


Fig.6. Maximum t_{rr} at T_j = 100 ˚C.

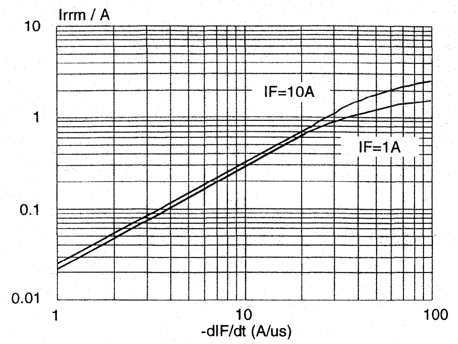


Fig.7. Maximum I_{rrm} at T_j = 25 ˚C.

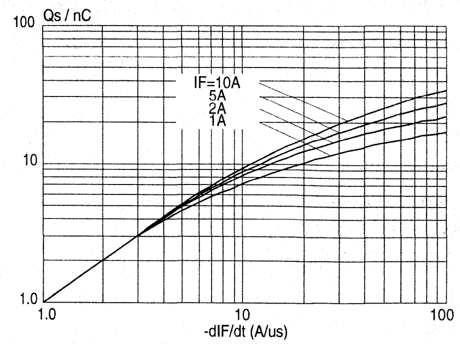


Fig.10. Maximum Q_s at T_j = 25 ˚C.

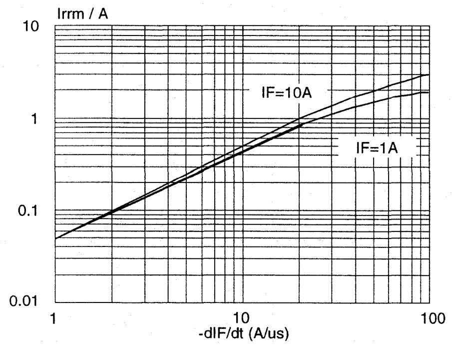


Fig.8. Maximum I_{rrm} at T_j = 100 ˚C.

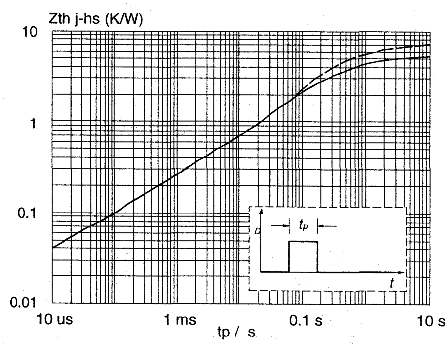


Fig.11. Transient thermal impedance; $Z_{th\,j\text{-}hs} = f(t_p)$.

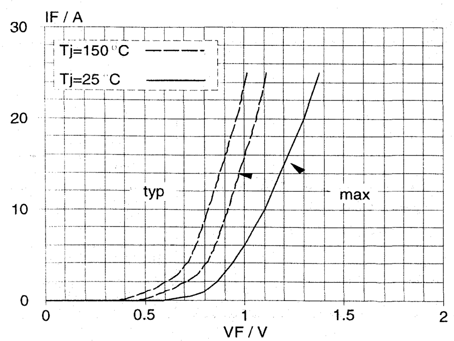


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

Controlled avalanche rectifiers

BYW54 to BYW56

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

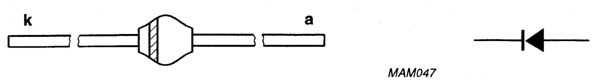


Fig.1 Simplified outline (SOD57) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYW54		–	600	V
	BYW55		–	800	V
	BYW56		–	1 000	V
V_{RWM}	crest working reverse voltage				
	BYW54		–	600	V
	BYW55		–	800	V
	BYW56		–	1 000	V
V_R	continuous reverse voltage				
	BYW54		–	600	V
	BYW55		–	800	V
	BYW56		–	1 000	V
$I_{F(AV)}$	average forward current	T_{tp} = 45 °C; lead length = 10 mm; averaged over any 20 ms period; see Figs 2 and 4	–	2.0	A
		T_{amb} = 80 °C; PCB mounting (see Fig.9); averaged over any 20 ms period; see Figs 3 and 4	–	0.8	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave	–	50	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	20	mJ
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature	see Fig.5	–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Fig.6	–	–	0.8	V
		I_F = 1 A; see Fig.6	–	–	1.0	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYW54		650	–	–	V
	BYW55		900	–	–	V
	BYW56		1100	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.7	–	–	1	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.7	–	–	150	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.10	–	3	–	μs
C_d	diode capacitance	V_R = 0 V; f = 1 MHz; see Fig.8	–	50	–	pF

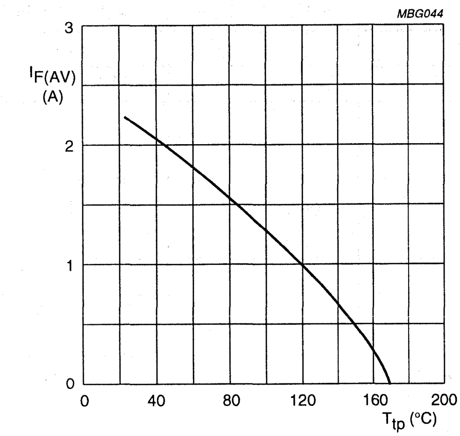
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	46	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

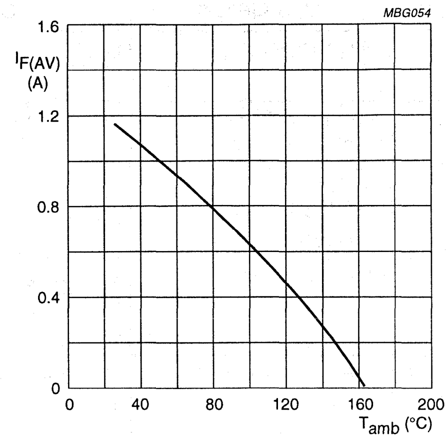
1. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.9. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA



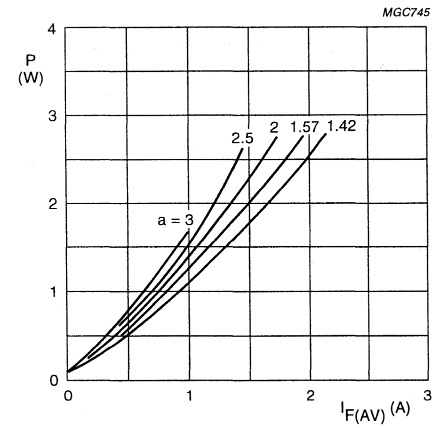
a = 1.57; $V_R = V_{RRMmax}$; $\delta = 0.5$; lead length 10 mm.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



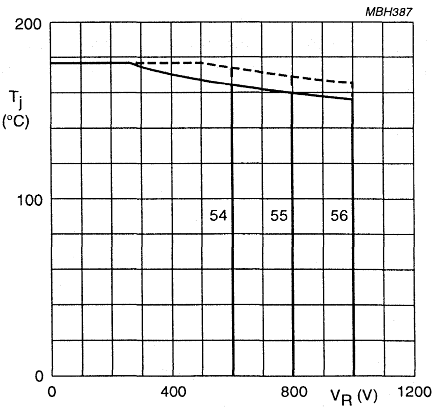
a = 1.57; $V_R = V_{RRMmax}$; $\delta = 0.5$; device mounted as shown in Fig.9.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



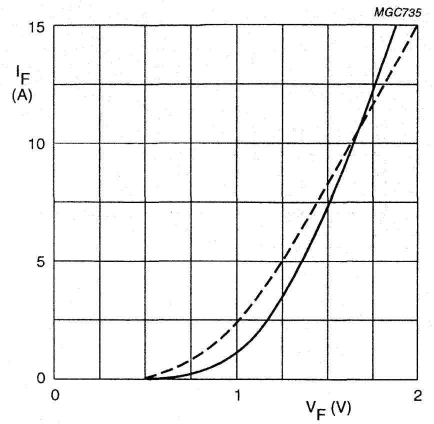
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Fig.4 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



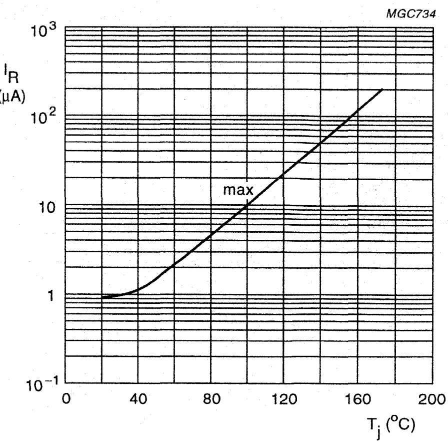
Solid line = V_R.
Dotted line = V_{RRM}; $\delta = 0.5$.

Fig.5 Maximum permissible junction temperature as a function of reverse voltage.



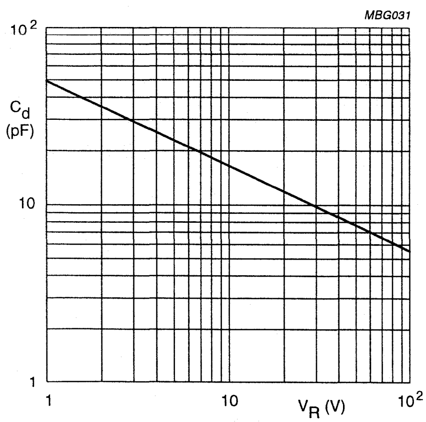
Solid line: T_j = 25 °C.
Dotted line: $T_j = T_{j\,max}$.

Fig.6 Forward current as a function of forward voltage; maximum values.



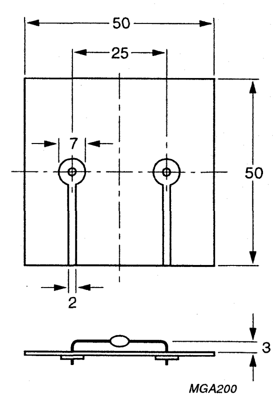
$V_R = V_{RRMmax}$.

Fig.7 Reverse current as a function of junction temperature; maximum values.



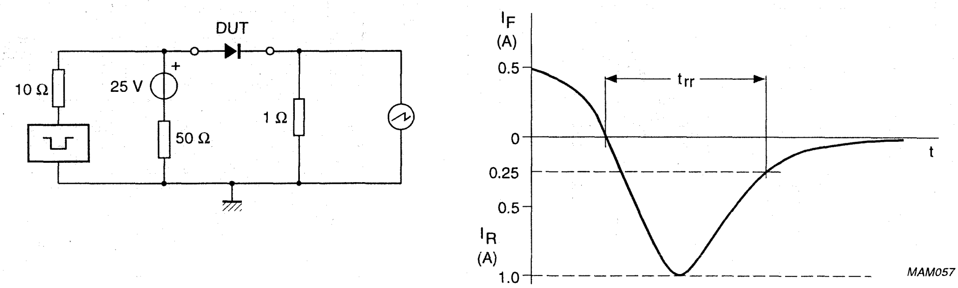
f = 1 MHz; T_j = 25 °C.

Fig.8 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.9 Device mounted on a printed-circuit board.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.10 Test circuit and reverse recovery time waveform and definition.

Fast soft-recovery controlled avalanche rectifiers

BYW95 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack
- Also available with preformed leads for easy insertion.

DESCRIPTION

Rugged glass SOD64 package, using a high temperature alloyed construction. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

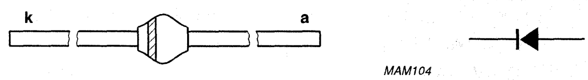


Fig.1 Simplified outline (SOD64) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYW95A		–	200	V
	BYW95B		–	400	V
	BYW95C		–	600	V
V_R	continuous reverse voltage				
	BYW95A		–	200	V
	BYW95B		–	400	V
	BYW95C		–	600	V
$I_{F(AV)}$	average forward current	T_{tp} = 60 °C; lead length = 10 mm see Fig.2; averaged over any 20 ms period; see also Fig.6	–	3.00	A
		T_{amb} = 65 °C; PCB mounting (see Fig.11); see Fig.3; averaged over any 20 ms period; see also Fig.6	–	1.25	A
I_{FRM}	repetitive peak forward current	T_{tp} = 60 °C; see Fig.4	–	30	A
		T_{amb} = 65 °C; see Fig.5	–	13	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	70	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	10	mJ
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature	see Fig.7	−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 5 A; $T_j = T_{j\,max}$; see Fig.8	–	–	1.25	V
		I_F = 5 A; see Fig.8	–	–	1.50	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYW95A		300	–	–	V
	BYW95B		500	–	–	V
	BYW95C		700	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.9	–	–	1	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.9	–	–	150	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.12	–	–	250	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Fig.10	–	85	–	pF
$\left\|\frac{dI_R}{dt}\right\|$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq 30$ V and dI_F/dt = –1 A/μs; see Fig.13	–	–	7	A/μs

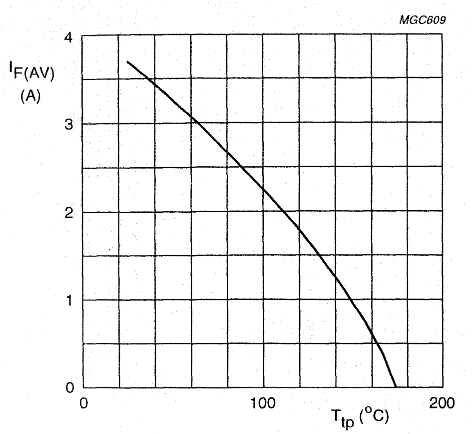
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	25	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	75	K/W

Note

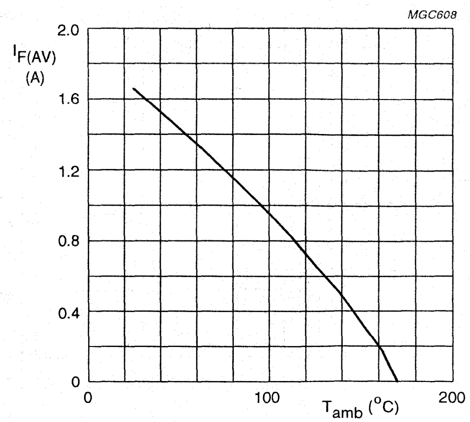
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.11. For more information please refer to the *'General Part of Handbook SC01.'*

GRAPHICAL DATA



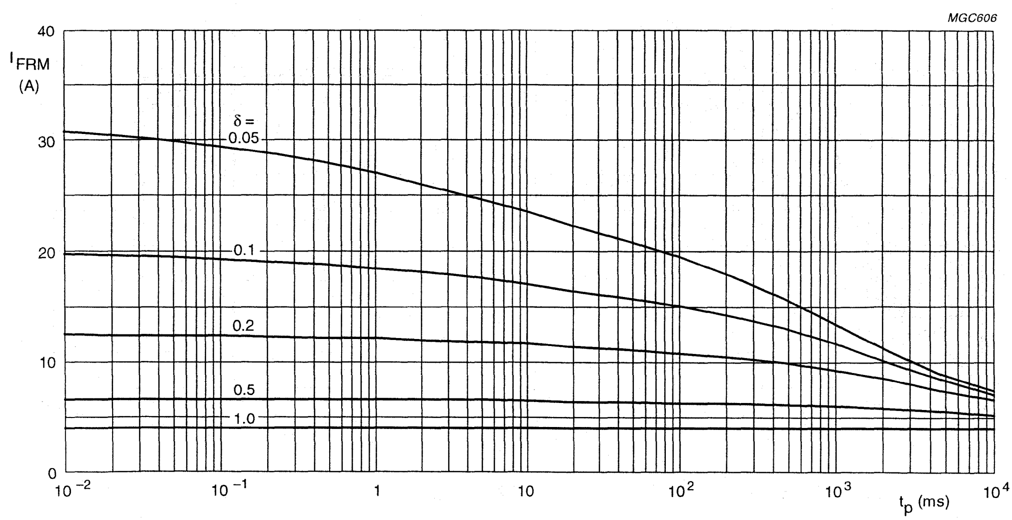
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Switched mode application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



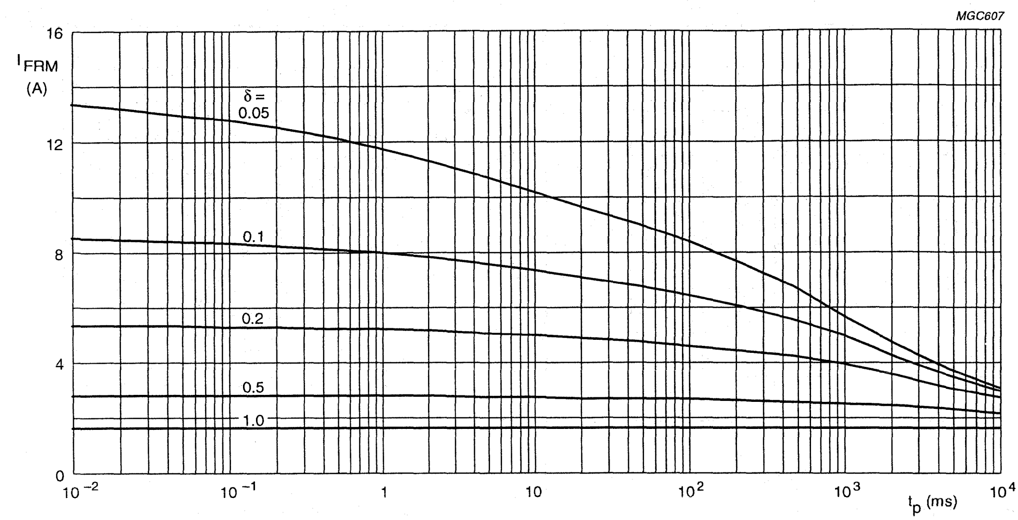
a = 1.42; $V_R = V_{RRMmax}$; δ = 0.5.
Device mounted as shown in Fig.11.
Switched mode application.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



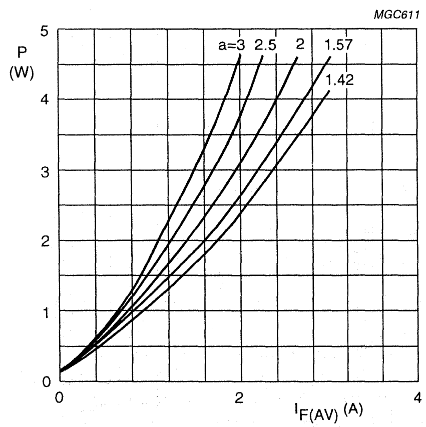
T_{tp} = 60 °C; $R_{th\ j\text{-}tp}$ = 25 K/W.
V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 600 V.

Fig.4 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



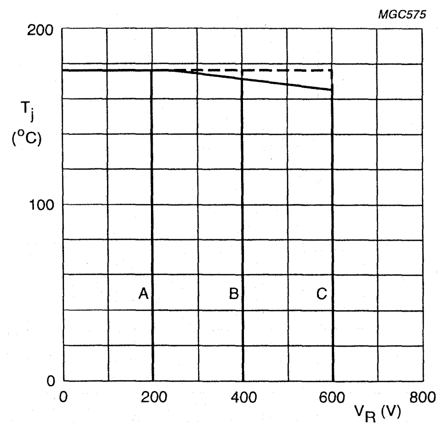
T_{amb} = 65 °C; $R_{th\ j\text{-}a}$ = 75 K/W.
V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 600 V.

Fig.5 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



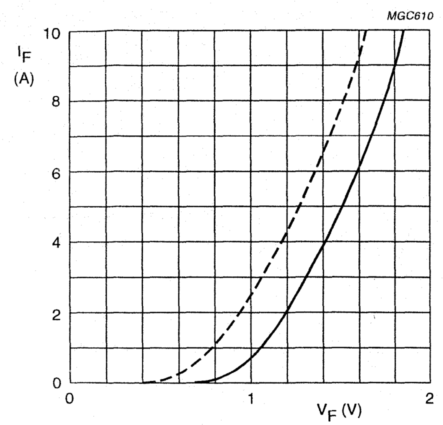
a = $I_{F(RMS)}/I_{F(AV)}$; V_R = V_{RRMmax}; δ = 0.5.

Fig.6 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



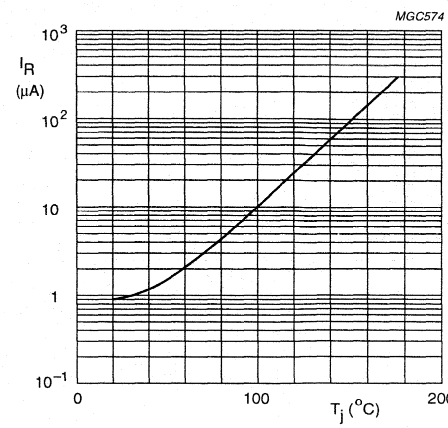
Solid line = V_R.
Dotted line = V_{RRM}; δ = 0.5.

Fig.7 Maximum permissible junction temperature as a function of reverse voltage.



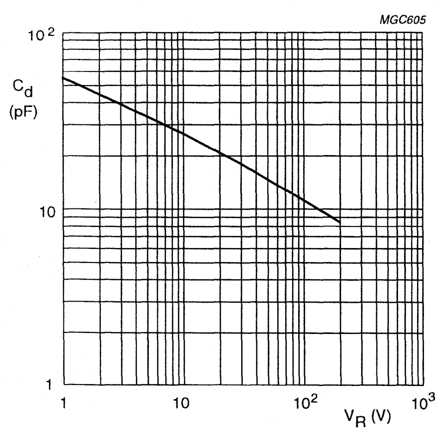
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.8 Forward current as a function of forward voltage; maximum values.



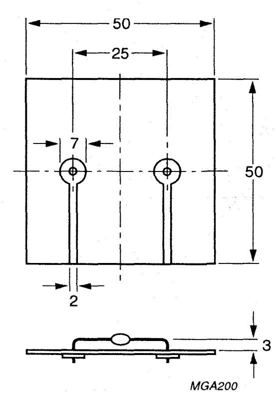
$V_R = V_{RRMmax}$.

Fig.9 Reverse current as a function of junction temperature; maximum values.



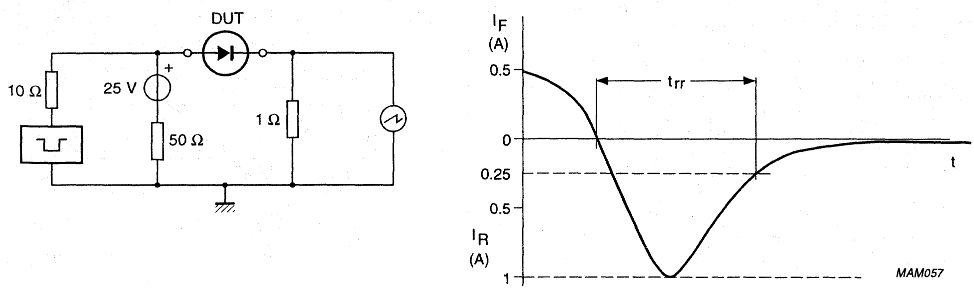
f = 1 MHz; T_j = 25 °C.

Fig.10 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.11 Device mounted on a printed-circuit board.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.12 Test circuit and reverse recovery time waveform and definition.

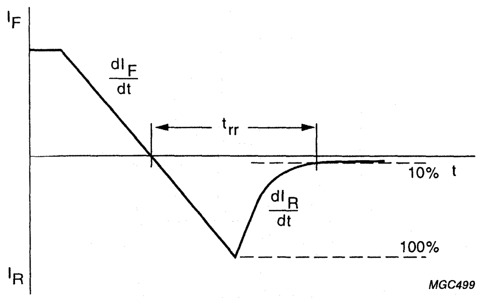


Fig.13 Reverse recovery definitions.

Fast soft-recovery controlled avalanche rectifiers

BYW96 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack
- Also available with preformed leads for easy insertion.

DESCRIPTION

Rugged glass SOD64 package, using a high temperature alloyed construction. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

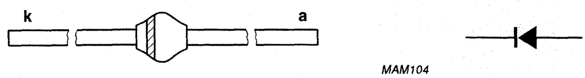


Fig.1 Simplified outline (SOD64) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYW96D		–	800	V
	BYW96E		–	1 000	V
V_R	continuous reverse voltage				
	BYW96D		–	800	V
	BYW96E		–	1 000	V
$I_{F(AV)}$	average forward current	T_{tp} = 50 °C; lead length = 10 mm see Fig.2; averaged over any 20 ms period; see also Fig.6	–	3	A
$I_{F(AV)}$	average forward current	T_{amb} = 55 °C; PCB mounting (see Fig.11); see Fig.3; averaged over any 20 ms period; see also Fig.6	–	1.25	A
I_{FRM}	repetitive peak forward current	T_{tp} = 50 °C; see Fig.4	–	30	A
		T_{amb} = 55 °C; see Fig.5	–	13	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	70	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	10	mJ
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature	see Fig.7	−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 5 A; $T_j = T_{j\,max}$; see Fig.8	–	–	1.25	V
		I_F = 5 A; see Fig.8	–	–	1.50	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYW96D		900	–	–	V
	BYW96E		1100	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.9	–	–	1	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.9	–	–	150	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.12	–	–	300	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Fig.10	–	75	–	pF
$\left\lvert\frac{dI_R}{dt}\right\rvert$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq 30$ V and dI_F/dt = −1 A/μs; see Fig.13	–	–	6	A/μs

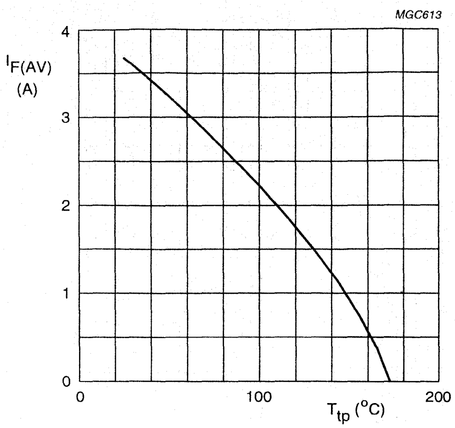
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	25	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	75	K/W

Note

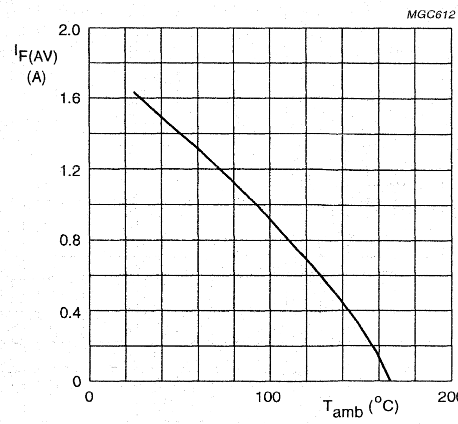
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.11. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA



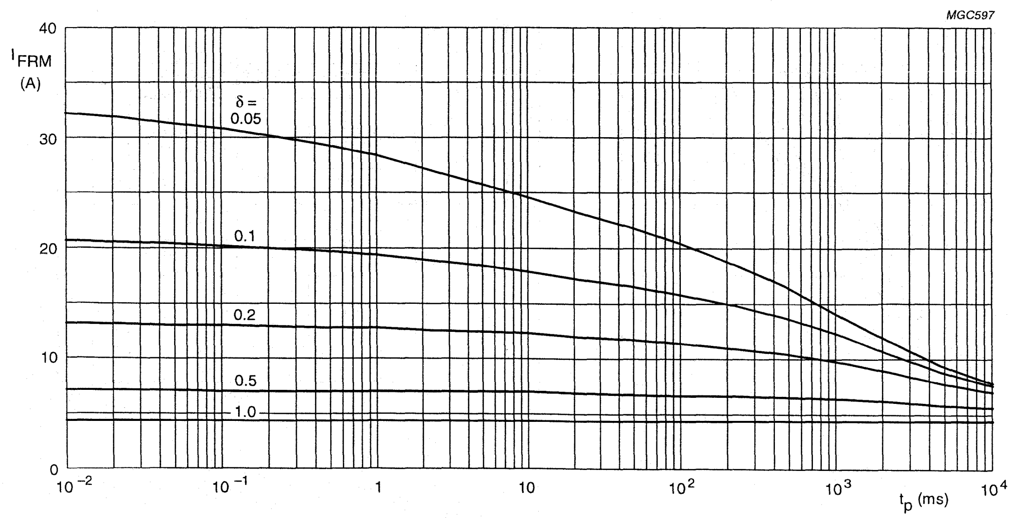
a = 1.57; $V_R = V_{RRMmax}$; δ = 0.5.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



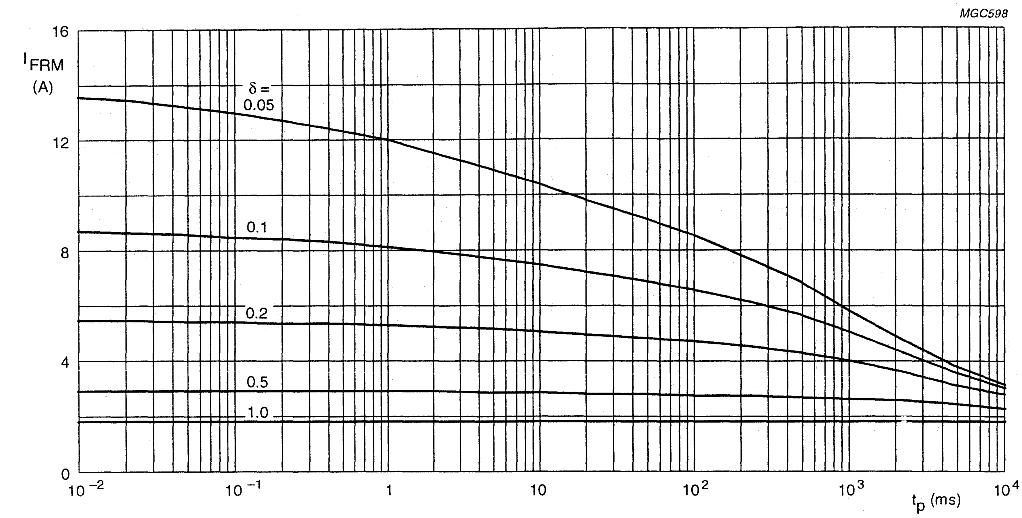
a = 1.57; $V_R = V_{RRMmax}$; δ = 0.5.
Device mounted as shown in Fig.11.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



$T_{tp} = 50°C$; $R_{th\ j\text{-}tp} = 25$ K/W.
V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at $V_{RRM} = 1000$ V.

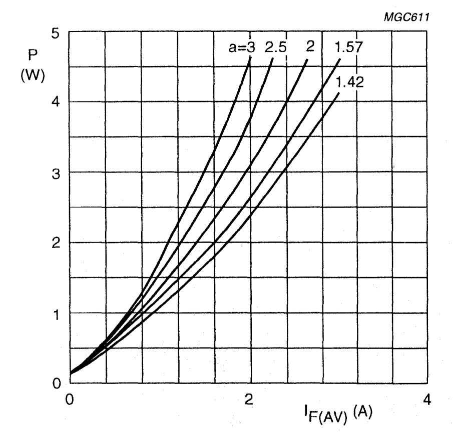
Fig.4 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



T_{amb} = 55 °C; $R_{th\ j\text{-}a}$ = 75 K/W.

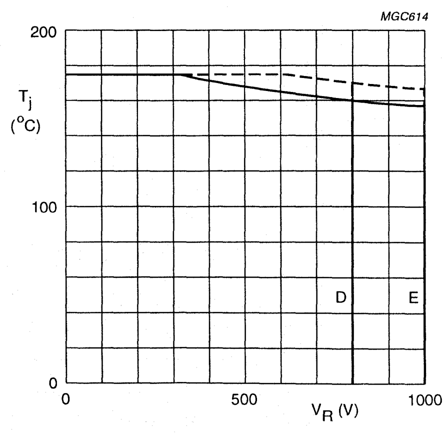
V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1000 V.

Fig.5 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; δ = 0.5.

Fig.6 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



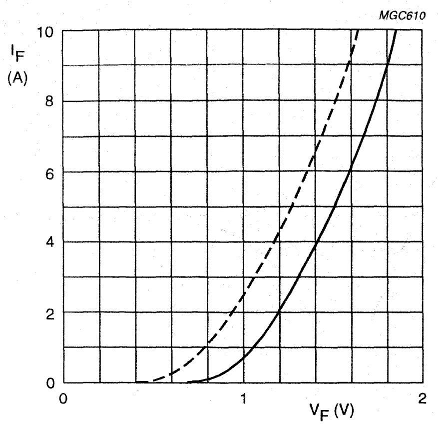
Solid line = V_R.

Dotted line = V_{RRM}; δ = 0.5.

Fig.7 Maximum permissible junction temperature as a function of reverse voltage.

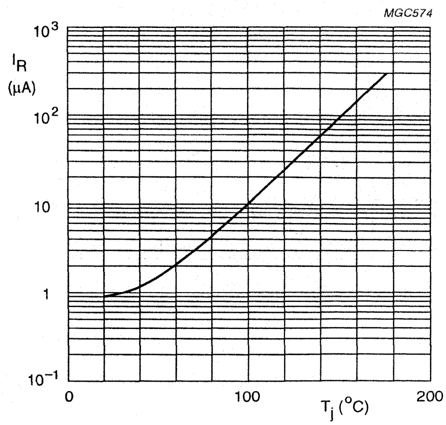
Fast soft-recovery controlled avalanche rectifiers

BYW96 series



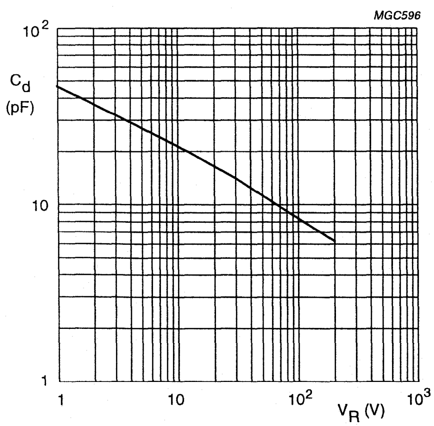
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.8 Forward current as a function of forward voltage; maximum values.



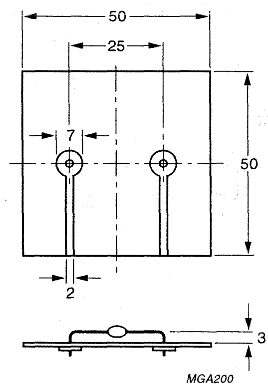
$V_R = V_{RRMmax}$.

Fig.9 Reverse current as a function of junction temperature; maximum values.



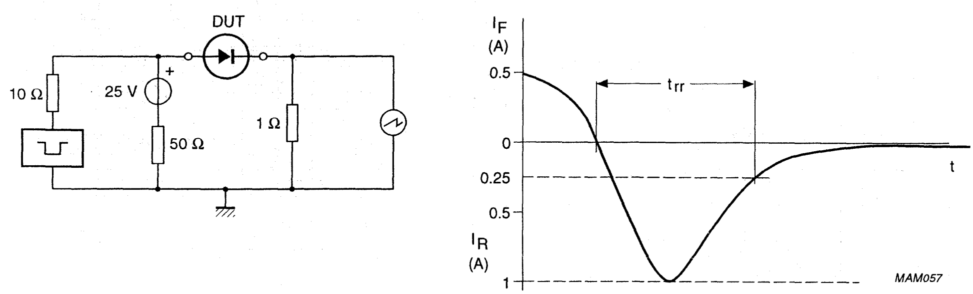
f = 1 MHz; T_j = 25 °C.

Fig.10 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.11 Device mounted on a printed-circuit board.



Input impedance oscilloscope: 1 MΩ, 22 pF; t_r < 7 ns.
Source impedance: 50 Ω; t_r < 15 ns.

Fig.12 Test circuit and reverse recovery time waveform and definition.

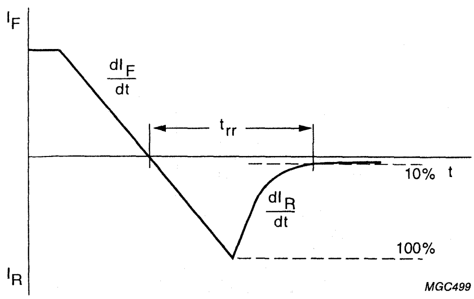


Fig.13 Reverse recovery definitions.

Fast soft-recovery controlled avalanche rectifiers

BYW97 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack
- Also available with preformed leads for easy insertion.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

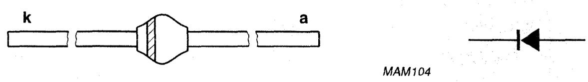


Fig.1 Simplified outline (SOD64) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYW97F		–	1200	V
	BYW97G		–	1400	V
V_R	continuous reverse voltage				
	BYW97F		–	1200	V
	BYW97G		–	1400	V
$I_{F(AV)}$	average forward current	T_{tp} = 50 °C; lead length = 10 mm see Fig.2; averaged over any 20 ms period; see also Fig.6	–	3.3	A
$I_{F(AV)}$	average forward current	T_{amb} = 55 °C; PCB mounting (see Fig.11); see Fig.3; averaged over any 20 ms period; see also Fig.6	–	1.3	A
I_{FRM}	repetitive peak forward current	T_{tp} = 50 °C; see Fig.4	–	33	A
		T_{amb} = 55 °C; see Fig.5	–	13	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	60	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	10	mJ
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature	see Fig.7	−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 5 A; $T_j = T_{j\,max}$; see Fig.8	–	–	1.25	V
		I_F = 5 A; see Fig.8	–	–	1.45	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYW97F		1300	–	–	V
	BYW97G		1500	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.9	–	–	1	μA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.9	–	–	150	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.12	–	–	500	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Fig.10	–	65	–	pF
$\left\lvert\frac{dI_R}{dt}\right\rvert$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq$ 30 V and dI_F/dt = −1 A/μs; see Fig.13	–	–	5	A/μs

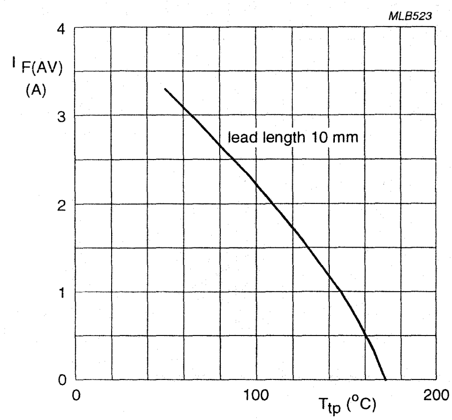
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	25	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	75	K/W

Note

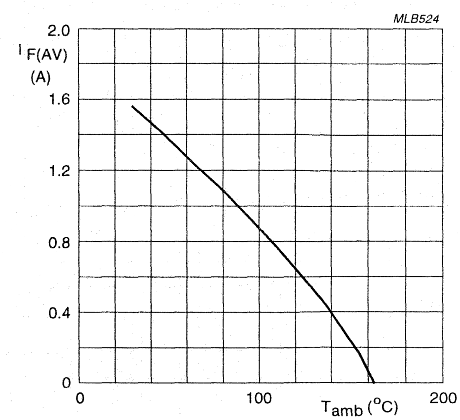
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.11. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA



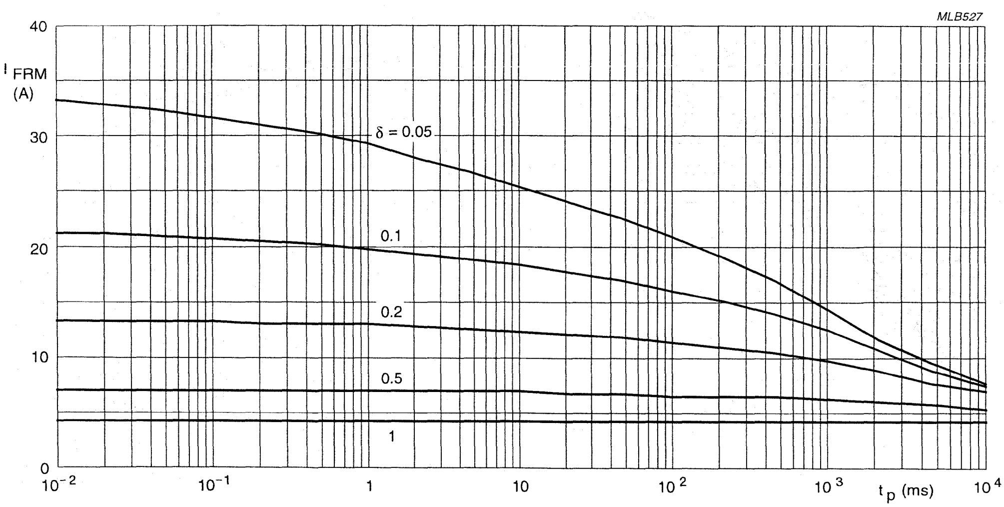
a = 1.57; $V_R = V_{RRMmax}$; δ = 0.5.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



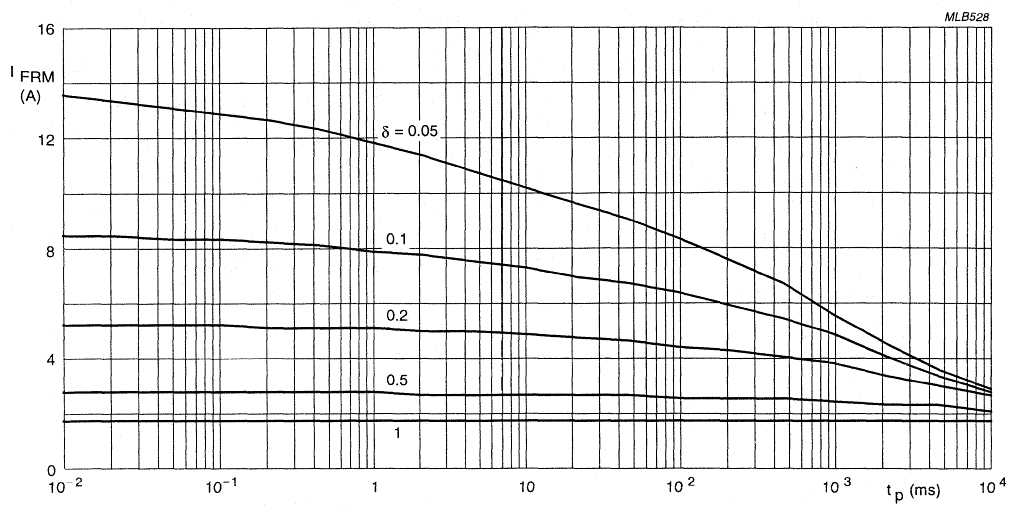
a = 1.57; $V_R = V_{RRMmax}$; δ = 0.5.
Device mounted as shown in Fig.11.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



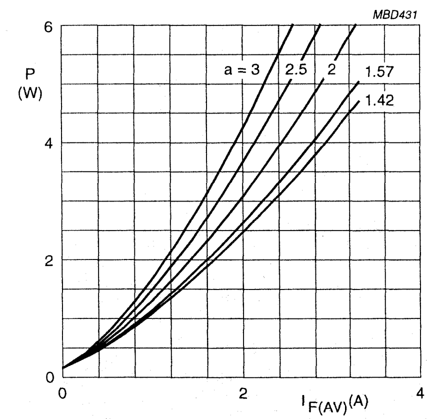
T_{tp} = 50°C; $R_{th\ j\text{-}tp}$ = 25 K/W.
V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1400 V.

Fig.4 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



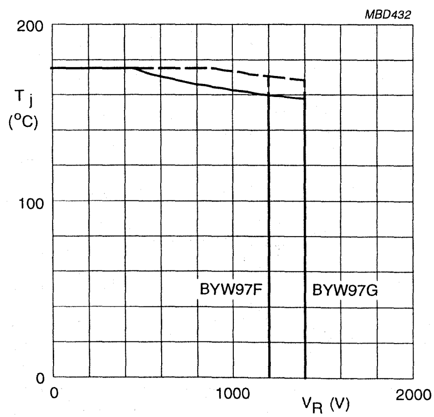
T_{amb} = 55 °C; $R_{th\ j\text{-}a}$ = 75 K/W.
V_{RRMmax} during 1 – δ; curves include derating for $T_{j\ max}$ at V_{RRM} = 1400 V.

Fig.5 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



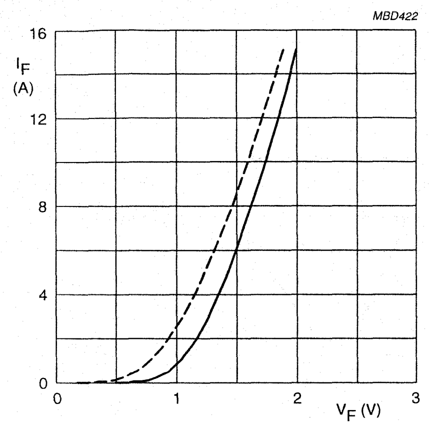
a = $I_{F(RMS)}/I_{F(AV)}$; V_R = V_{RRMmax}; δ = 0.5.

Fig.6 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



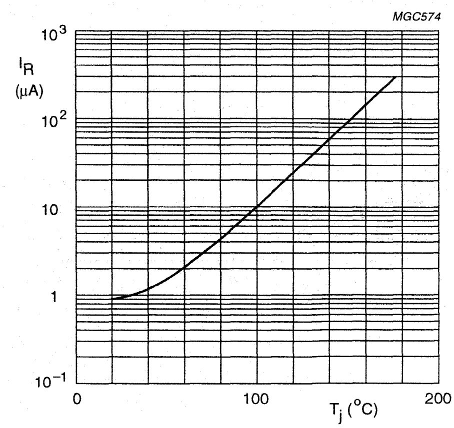
Solid line = V_R.
Dotted line = V_{RRM}; δ = 0.5.

Fig.7 Maximum permissib'le junction temperature as a function of reverse voltage.



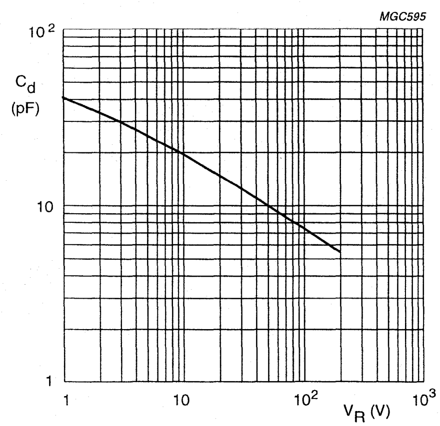
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

Fig.8 Forward current as a function of forward voltage; maximum values.



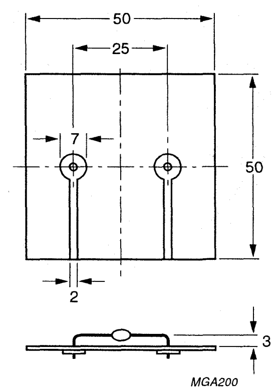
$V_R = V_{RRMmax}$.

Fig.9 Reverse current as a function of junction temperature; maximum values.



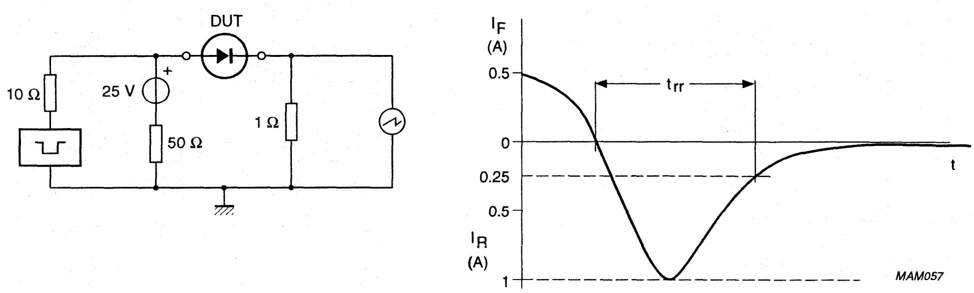
f = 1 MHz; T_j = 25 °C.

Fig.10 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.11 Device mounted on a printed-circuit board.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.12 Test circuit and reverse recovery time waveform and definition.

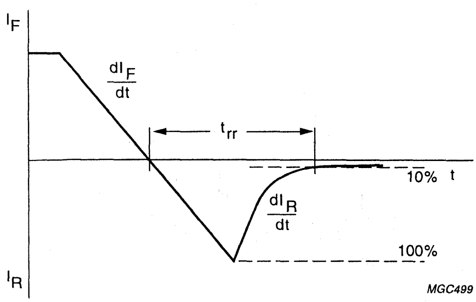


Fig.13 Reverse recovery definitions.

Rectifier | BYX10G

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Available in ammo-pack.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

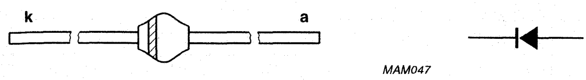


Fig.1 Simplified outline (SOD57) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RSM}	non-repetitive peak reverse voltage		–	1600	V
V_{RRM}	repetitive peak reverse voltage		–	1600	V
V_{RWM}	crest working reverse voltage		–	800	V
$I_{F(AV)}$	average forward current	T_{tp} = 50 °C; lead length = 10 mm; averaged over any 20 ms period; see Figs 2 and 4	–	1.2	A
		T_{amb} = 60 °C; PCB mounting (see Fig.9); averaged over any 20 ms period; see Figs 3 and 4	–	0.6	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RWMmax}$	–	25	A
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature	see Fig.5	−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 2 A; $T_j = T_{j\,max}$; see Fig.6	–	–	1.5	V
		I_F = 2 A; see Fig.6	–	–	1.5	V
I_R	reverse current	$V_R = V_{RWMmax}$; see Fig.7	–	–	1	μA
		$V_R = V_{RWMmax}$; T_j = 150 °C; see Fig.7	–	–	200	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.10	–	3	–	μs
C_d	diode capacitance	V_R = 0 V; f = 1 MHz; see Fig.8	–	30	–	pF

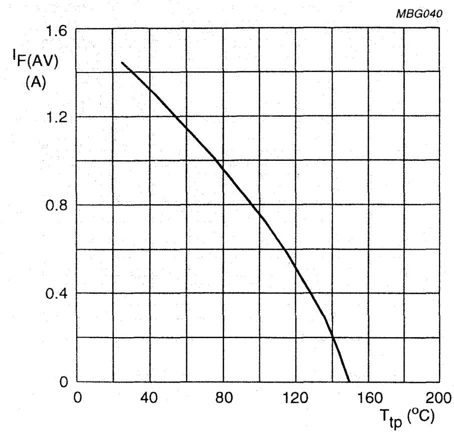
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	46	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

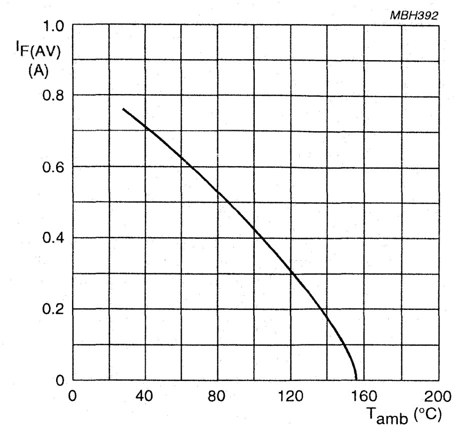
1. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.9. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA



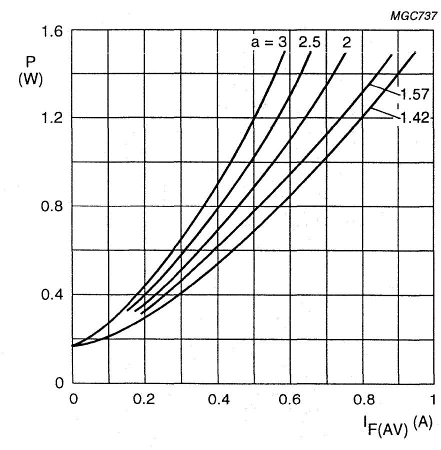
a = 1.57; $V_R = V_{RWMmax}$; $\delta = 0.5$.
Lead length 10 mm.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



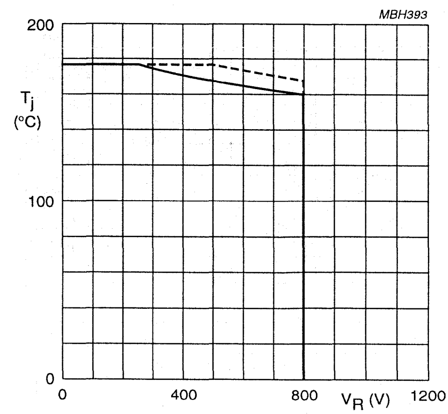
a = 1.57; $V_R = V_{RWMmax}$; $\delta = 0.5$.
Device mounted as shown in Fig.9.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



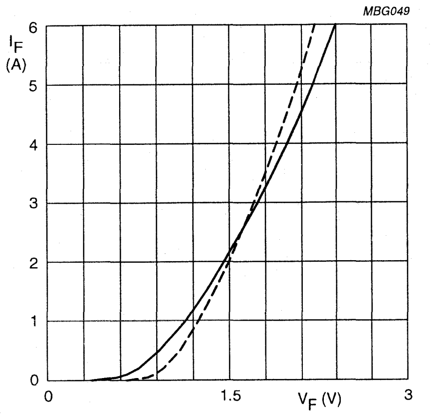
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWMmax}$; $\delta = 0.5$.

Fig.4 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



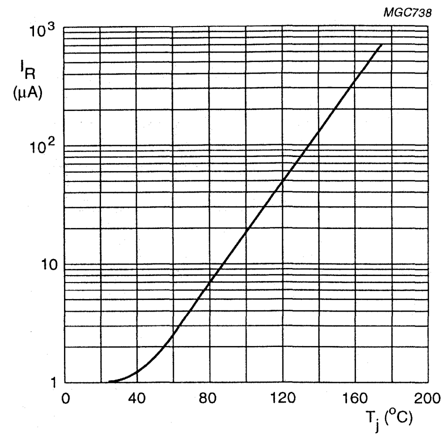
Solid line = V_R.
Dotted line = V_{RWM}; $\delta = 0.5$.

Fig.5 Maximum permissible junction temperature as a function of reverse voltage.



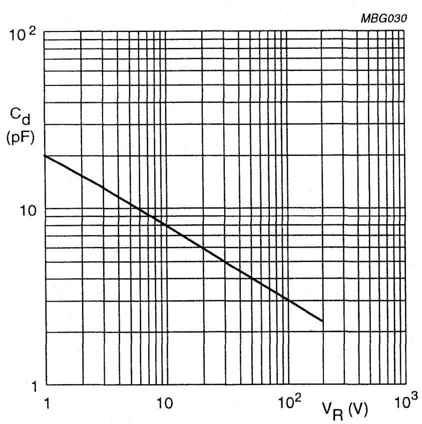
Solid line: T_j = 25 °C.
Dotted line: T_j = 175 °C.

Fig.6 Forward current as a function of forward voltage; maximum values.



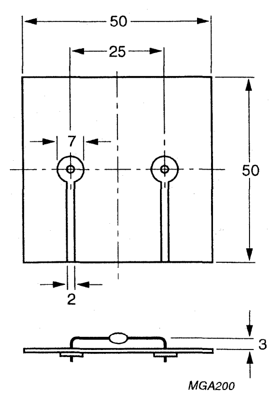
$V_R = V_{RWMmax}$.

Fig.7 Reverse current as a function of junction temperature; maximum values.



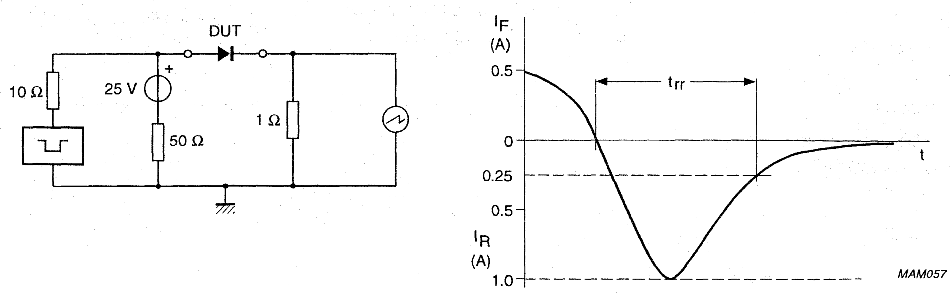
f = 1 MHz; T_j = 25 °C.

Fig.8 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.9 Device mounted on a printed-circuit board.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.10 Test circuit and reverse recovery time waveform and definition.

High-voltage soft-recovery controlled avalanche rectifier

BYX90G

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Soft-recovery switching characteristics
- Guaranteed avalanche energy absorption capability.

APPLICATIONS

- High-voltage rectification at high frequencies
- Sub-component for very high voltage rectifiers, for example, in X-ray and radar equipment.

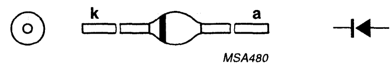
DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

The package is designed to be used in an insulating medium such as resin, oil or SF6 gas.

See also the chapter on custom made high-voltage rectifiers in the *"General Part of Handbook SC01"*.



The cathode is marked by a black band on the body.

Fig.1 Simplified outline (SOD83A) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	7.5	kV
V_{RWM}	crest working reverse voltage		–	6	kV
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; T_{oil} = 45 °C; see Fig.2; see also Fig.3	–	550	mA
I_{FRM}	repetitive peak forward current		–	5	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RWMmax}$; see Fig.4	–	20	A
P_{RSM}	non-repetitive peak reverse power dissipation	t = 10 µs; triangular pulse; $T_j = T_{j\,max}$ prior to surge	–	5	kW
T_{stg}	storage temperature		−65	+165	°C
T_j	junction temperature		−65	+165	°C

High-voltage soft-recovery controlled avalanche rectifier

BYX90G

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 2 A; see Fig.5	–	–	14.5	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA	8	–	–	kV
I_R	reverse current	$V_R = V_{RWMmax}$; $T_j = T_{j\,max}$	–	–	50	μA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.7	–	–	350	ns

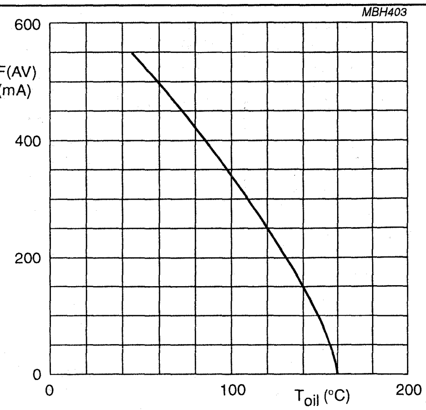
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}o}$	thermal resistance from junction to oil	note 1; see also Fig.6	20	K/W

Note

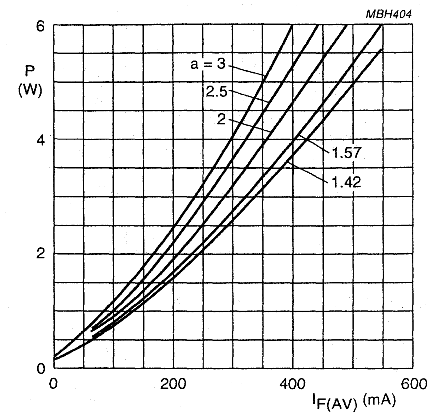
1. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA



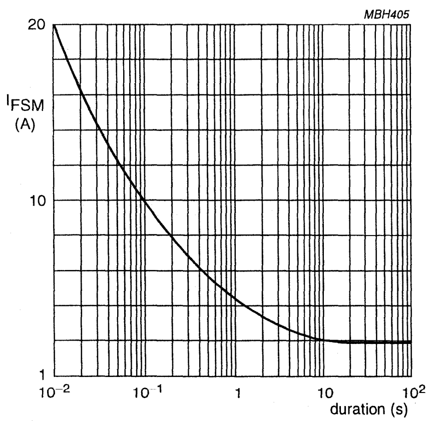
a = 1.57; δ = 0.5; $V_R = V_{RWMmax}$.

Fig.2 Maximum permissible average forward current as a function of oil temperature (including losses due to reverse leakage).



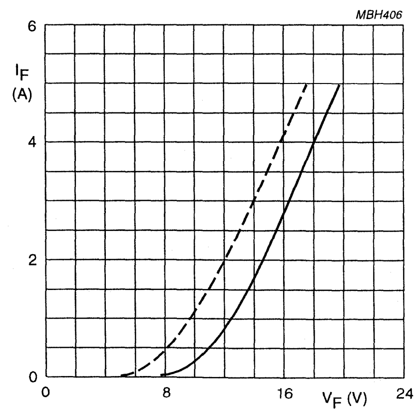
a = $I_{F(RMS)}/I_{F(AV)}$; δ = 0.5; $V_R = V_{RWMmax}$.

Fig.3 Maximum steady state power dissipation (forward plus leakage losses) as a function of average forward current.



50 Hz half sinewave current burst.
T_j = 165 °C prior to surge.
$V_R = V_{RWMmax}$.

Fig.4 Maximum non-repetitive peak forward current as a function of burst duration.



Dotted lines: T_j = 165 °C.
Solid line: T_j = 25 °C.

Fig.5 Forward current as a function of maximum forward voltage.

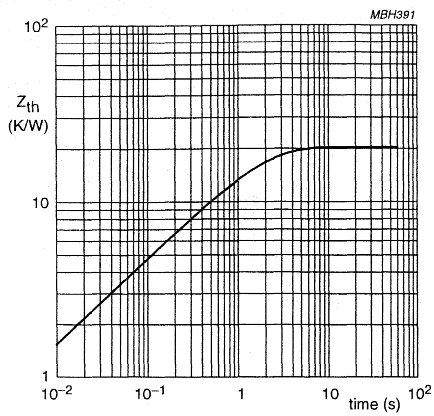
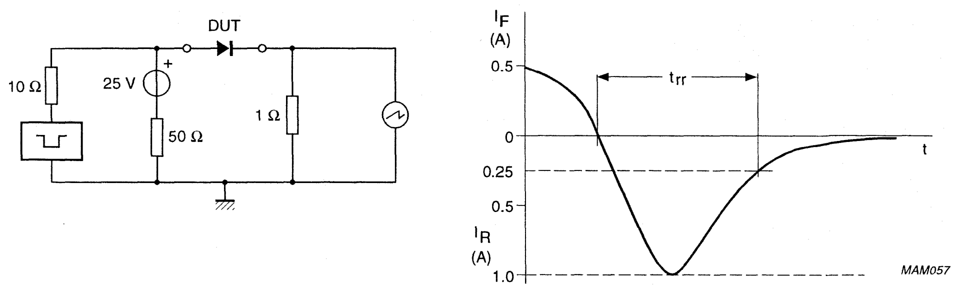


Fig.6 Thermal impedance in oil as a function of time.

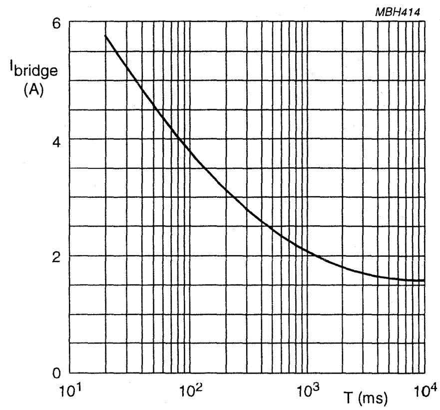


Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.7 Test circuit and reverse recovery time waveform and definition.

APPLICATION INFORMATION

Typical 3-phase bridge application information



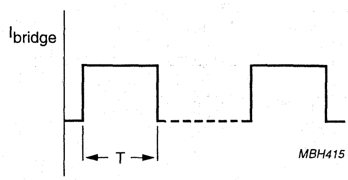
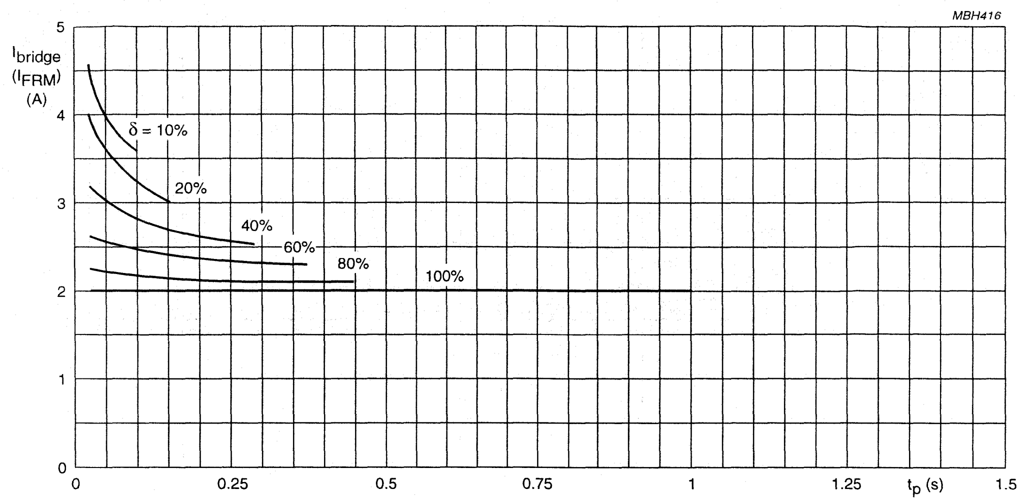


Fig.8 Maximum permissible output current in a 3-phase rectifier bridge with a minimum time between exposures of 20 s; T_{oil} = 50 °C.



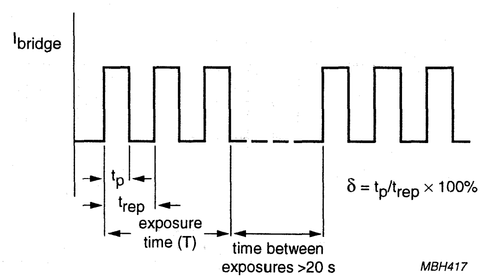
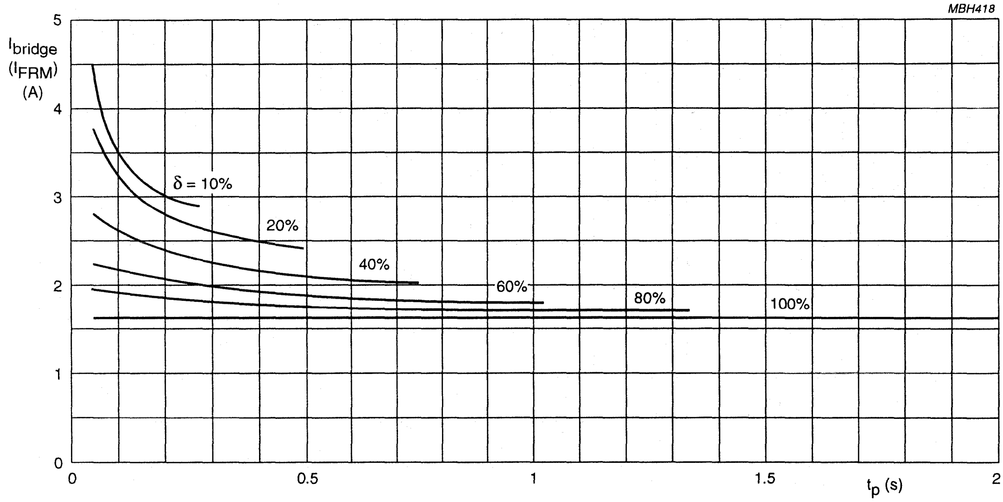


Fig.9 Maximum current through a 3-phase bridge rectifier versus pulse duration; exposure time T = 1 s; T_{oil} = 50 °C.



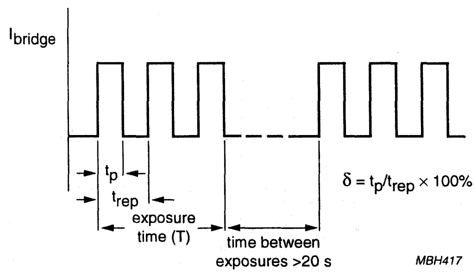


Fig.10 Maximum current through a 3-phase bridge rectifier versus pulse duration; exposure time T = 3 s; T_{oil} = 50 °C.

High-voltage soft-recovery controlled avalanche rectifiers

BYX101G to BYX104G

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Recovery times ranging from 600 to 50 ns
- Soft-recovery switching characteristics
- Compact construction.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

The package is designed to be used in an insulating medium such as resin, oil or SF6 gas.

See also the chapter on custom made high-voltage rectifiers in the *"General Part of Handbook SC01"*.

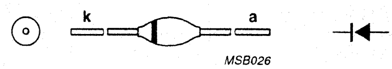


Fig.1 Simplified outline (SOD88A) and symbol.

APPLICATIONS

- High-voltage power supply units in, for example, X-ray or radar systems.

MARKING

TYPE NUMBER	CATHODE BAND
BYX101G	black
BYX102G	red
BYX103G	green
BYX104G	violet

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	10	kV
V_{RW}	working reverse voltage		–	9	kV
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; T_{oil} = 25 °C			
	BYX101G		–	400	mA
	BYX102G		–	360	mA
	BYX103G		–	310	mA
	BYX104G		–	225	mA
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; T_{oil} = 70 °C			
	BYX101G		–	285	mA
	BYX102G		–	255	mA
	BYX103G		–	220	mA
	BYX104G		–	160	mA
I_{FSM}	non-repetitive peak forward current	t = 10 ms; half sinewave; T_j = 45 °C prior to surge			
	BYX101G		–	20	A
	BYX102G		–	15	A
	BYX103G		–	14	A
	BYX104G		–	14	A

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
P_{RSM}	non-repetitive peak reverse power dissipation	t = 10 µs; triangular pulse; $T_j = T_{j\,max}$ prior to surge	–	4	kW
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; T_j = 165 °C				
	BYX101G		–	–	17.5	V
	BYX102G		–	–	19.5	V
	BYX103G		–	–	22.5	V
	BYX104G		–	–	31.0	V
V_F	forward voltage	I_F = 1 A				
	BYX101G		–	–	20.5	V
	BYX102G		–	–	23.9	V
	BYX103G		–	–	29.7	V
	BYX104G		–	–	52.0	V
I_R	reverse current	$V_R = V_{RWmax}$	–	–	15	µA
		$V_R = V_{RWmax}$; T_j = 165 °C	–	–	50	µA
t_{rr}	reverse recovery time	when switched from I_F = 50 mA to I_R = 100 mA; measured at I_R = 25 mA				
	BYX101G		–	–	600	ns
	BYX102G		–	–	350	ns
	BYX103G		–	–	175	ns
	BYX104G		–	–	50	ns

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}oil}$	thermal resistance from junction to oil	note 1	20	K/W

Note

1. For more information please refer to the *"General Part of Handbook SC01"*.

High-voltage soft-recovery controlled avalanche rectifiers

BYX105G to BYX108G

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Recovery times ranging from 600 to 50 ns
- Soft-recovery switching characteristics
- Compact construction.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

The package is designed to be used in an insulating medium such as resin, oil or SF6 gas.

See also the chapter on custom made high-voltage rectifiers in the *"General Part of Handbook SC01"*.

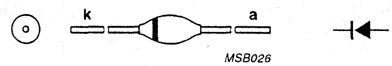


Fig.1 Simplified outline (SOD88A) and symbol.

APPLICATIONS

- High-voltage power supply units in, for example, X-ray or radar systems.

MARKING

TYPE NUMBER	CATHODE BAND
BYX105G	black
BYX106G	red
BYX107G	green
BYX108G	violet

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	5	kV
V_{RW}	working reverse voltage		–	4.5	kV
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; T_{oil} = 25 °C			
	BYX105G		–	650	mA
	BYX106G		–	575	mA
	BYX107G		–	480	mA
	BYX108G		–	340	mA
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; T_{oil} = 70 °C			
	BYX105G		–	460	mA
	BYX106G		–	400	mA
	BYX107G		–	340	mA
	BYX108G		–	240	mA
I_{FSM}	non-repetitive peak forward current	t = 10 ms; half sinewave; T_j = 45 °C prior to surge			
	BYX105G		–	20	A
	BYX106G		–	15	A
	BYX107G		–	14	A
	BYX108G		–	14	A

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
P_{RSM}	non-repetitive peak reverse power dissipation	t = 10 µs; triangular pulse; $T_j = T_{j\,max}$ prior to surge	–	2	kW
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature		−65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; T_j = 165 °C				
	BYX105G		–	–	9.3	V
	BYX106G		–	–	10.4	V
	BYX107G		–	–	12.0	V
	BYX108G		–	–	16.5	V
V_F	forward voltage	I_F = 1 A				
	BYX105G		–	–	10.9	V
	BYX106G		–	–	12.7	V
	BYX107G		–	–	15.8	V
	BYX108G		–	–	27.7	V
I_R	reverse current	$V_R = V_{RWmax}$	–	–	15	µA
		$V_R = V_{RWmax}$; T_j = 165 °C	–	–	50	µA
t_{rr}	reverse recovery time	when switched from I_F = 50 mA to I_R = 100 mA; measured at I_R = 25 mA				
	BYX105G		–	–	600	ns
	BYX106G		–	–	350	ns
	BYX107G		–	–	175	ns
	BYX108G		–	–	50	ns

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}oil}$	thermal resistance from junction to oil	note 1	20	K/W

Note

1. For more information please refer to the *"General Part of Handbook SC01"*.

High-voltage soft-recovery controlled avalanche rectifier

BYX120G

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability.

APPLICATIONS

- Car ignition systems
- Automotive applications with extreme temperature requirements.

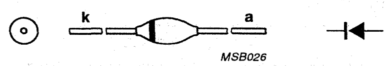
DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

The package is designed to be used in an insulating medium such as resin, oil or SF6 gas.

See also the chapter on custom made high-voltage rectifiers in the *"General Part of Handbook SC01"*.



The cathode is marked by an orange band on the body.

Fig.1 Simplified outline (SOD88A) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.
V_{RRM}	repetitive peak reverse voltage		–	3	kV
V_{RWM}	crest working reverse voltage		–	3	kV
$I_{F(AV)}$	average forward current		–	100	mA
I_{FRM}	repetitive peak forward current		–	5	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RWMmax}$	–	15	A
P_{RSM}	non-repetitive peak reverse power dissipation	t = 10 μs; triangular pulse; $T_j = T_{j\,max}$ prior to surge	–	3	kW
T_{stg}	storage temperature		−65	+200	°C
T_j	junction temperature	continuous	−65	+180	°C
		maximum 30 mins	−65	+200	°C

High-voltage soft-recovery controlled avalanche rectifier

BYX120G

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 250 mA	–	–	5	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA	3.5	–	–	kV
I_R	reverse current	$V_R = V_{RWMmax}$; T_j = 180 °C	–	–	75	μA

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	$T_{amb} = T_{leads}$	55	K/W

High-voltage car ignition diodes BYX132G

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability.

APPLICATIONS

- Car ignition systems
- Automotive applications with extreme temperature requirements.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

The package is designed to be used in an insulating medium such as resin, oil or SF6 gas.

The BYX132G is marked with a black cathode band on the body.

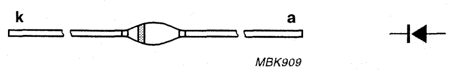


Fig.1 Simplified outline (SOD61ABA) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	2	kV
V_{RWM}	crest working reverse voltage		–	2	kV
$I_{F(AV)}$	average forward current		–	50	mA
I_{RSM}	non-repetitive peak reverse current	t = 100 μs triangular pulse; $T_{j\,max}$ prior to surge	–	50	mA
T_{stg}	storage temperature		−65	+200	°C
T_j	junction temperature	continuous	–	175	°C
T_j	junction temperature	max. 30 min.	–	200	°C

CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_F	forward voltage	I_F = 10 mA	2.5	3.5	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 100 μA	2.6	3.7	kV
I_R	reverse current	$V_R = V_{RWMmax}$; T_j = 175 °C	–	30	μA

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	$T_{amb} = T_{leads}$; lead length = 10 mm	90	K/W

High-voltage car ignition diodes BYX133G

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability.

APPLICATIONS

- Car ignition systems
- Automotive applications with extreme temperature requirements.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

The package is designed to be used in an insulating medium such as resin, oil or SF6 gas.

The BYX133G is marked with a black cathode band on the body.

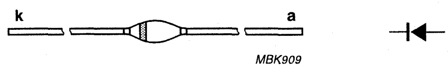


Fig.1 Simplified outline (SOD61ABA) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	3	kV
V_{RWM}	crest working reverse voltage		–	3	kV
$I_{F(AV)}$	average forward current		–	50	mA
I_{RSM}	non-repetitive peak reverse current	t = 100 μs triangular pulse; $T_{j\,max}$ prior to surge	–	50	mA
T_{stg}	storage temperature		–65	+200	°C
T_j	junction temperature	continuous	–	175	°C
T_j	junction temperature	max. 30 min.	–	200	°C

CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_F	forward voltage	I_F = 10 mA	3.75	5.25	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 100 μA	4.0	5.5	kV
I_R	reverse current	$V_R = V_{RWMmax}$; T_j = 175 °C	–	30	μA

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	$T_{amb} = T_{leads}$; lead length = 10 mm	90	K/W

High-voltage car ignition diodes | BYX134G

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability.

APPLICATIONS

- Car ignition systems
- Automotive applications with extreme temperature requirements.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

The package is designed to be used in an insulating medium such as resin, oil or SF6 gas.

The BYX134G is marked with a black cathode band on the body.

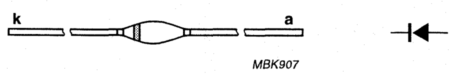


Fig.1 Simplified outline (SOD61ACC) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	4	kV
V_{RWM}	crest working reverse voltage		–	4	kV
$I_{F(AV)}$	average forward current		–	50	mA
I_{RSM}	non-repetitive peak reverse current	t = 100 µs triangular pulse; $T_{j\,max}$ prior to surge	–	50	mA
T_{stg}	storage temperature		–65	+200	°C
T_j	junction temperature	continuous	–	175	°C
T_j	junction temperature	max. 30 min.	–	200	°C

CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_F	forward voltage	I_F = 10 mA	5	7	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 100 µA	5.5	7.5	kV
I_R	reverse current	$V_R = V_{RWMmax}$; T_j = 175 °C	–	30	µA

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	$T_{amb} = T_{leads}$; lead length = 10 mm	90	K/W

High-voltage car ignition diodes BYX134GP

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability.

APPLICATIONS

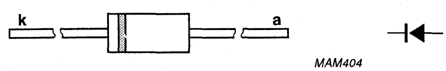
- Car ignition systems
- Automotive applications with extreme temperature requirements.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

The SOD107A is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

The package is designed to be used in an insulating medium such as resin, oil or SF6 gas.



Cathode indicated by light blue band.

Fig.1 Simplified outline (SOD107A) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	4	kV
V_{RWM}	crest working reverse voltage		–	4	kV
$I_{F(AV)}$	average forward current		–	50	mA
I_{RSM}	non-repetitive peak reverse current	t = 100 μs triangular pulse; $T_{j\,max}$ prior to surge	–	50	mA
T_{stg}	storage temperature		–65	175	°C
T_j	junction temperature	continuous	–	175	°C

CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_F	forward voltage	I_F = 10 mA	5	7	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 100 μA	5.5	7.5	kV
I_R	reverse current	$V_R = V_{RWMmax}$; T_j = 175 °C	–	30	μA

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	$T_{amb} = T_{leads}$; lead length = 10 mm	100	K/W

High-voltage car ignition diodes BYX135G

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability.

APPLICATIONS

- Car ignition systems
- Automotive applications with extreme temperature requirements.

DESCRIPTION

Rugged glass package, using a high temperature alloyed construction.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

The package is designed to be used in an insulating medium such as resin, oil or SF6 gas.

The BYX135G is marked with a black cathode band on the body.

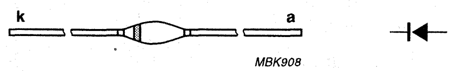


Fig.1 Simplified outline (SOD61ADD) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	5	kV
V_{RWM}	crest working reverse voltage		–	5	kV
$I_{F(AV)}$	average forward current		–	50	mA
I_{RSM}	non-repetitive peak reverse current	t = 100 µs triangular pulse; $T_{j\,max}$ prior to surge	–	50	mA
T_{stg}	storage temperature		−65	+200	°C
T_j	junction temperature	continuous	–	175	°C
T_j	junction temperature	max. 30 min.	–	200	°C

CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_F	forward voltage	I_F = 10 mA	6.25	8.75	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 100 µA	7.0	9.5	kV
I_R	reverse current	$V_R = V_{RWMmax}$; T_j = 175 °C	–	30	µA

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	$T_{amb} = T_{leads}$; lead length = 10 mm	90	K/W

18-fold ESD transient voltage suppressor | BZA100

FEATURES

- SO20 SMD package allows 18 separate voltage regulator diodes in a common anode configuration
- Working voltage: typ. 6.8 V
- Forward voltage: max. 1.3 V
- Maximum reverse peak power dissipation: 27.5 W at t_p = 1 ms
- Maximum clamping voltage at peak pulse current: 11 V at 2.5 A
- Low leakage current: max. 2 μA
- ESD rating >8 kV, according IEC 801-2.

APPLICATIONS

- Where transient overvoltage protection in voltage and ESD sensitive equipment is required such as:
  - Computers
  - Printers
  - Business machines
  - Communication systems
  - Medical equipment.

DESCRIPTION

18-fold monolitic transient voltage suppressor. Its 18-fold junction common anode design protects 18 separate lines using only one package. This device is ideal for situations where board space is a premium.

PINNING

PIN	DESCRIPTION
1 to 5	cathode (k_1 to k_5)
6 and 16	common anode (a_1; a_2)
7 to 15	cathode (k_6 to k_{14})
17 to 20	cathode (k_{15} to k_{18})

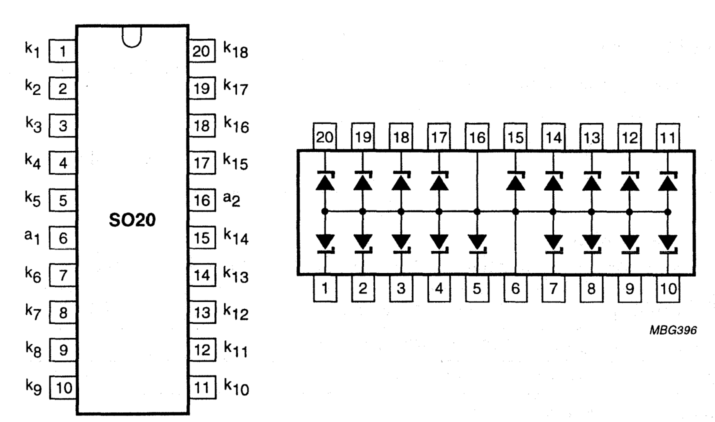


Fig.1 Pin configuration for SO20 (SOT163-1) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_Z	working current		–	note 1	mA
I_F	continuous forward current		–	200	mA
I_{FSM}	non-repetitive peak forward current	t_p = 1 ms; square pulse	–	4	A
I_{ZSM}	non-repetitive peak reverse current	t_p = 1 ms; square pulse; see Fig.2	–	2.5	A
P_{tot}	total power dissipation	see Fig.3			
		up to T_s = 60 °C; note 2	–	1.6	W
		up to T_{amb} = 25 °C; note 3	–	1.25	W
P_{ZSM}	non-repetitive peak reverse power dissipation	t_p = 1 ms; square pulse; see Fig.4	–	27.5	W
T_{stg}	storage temperature		–65	+150	°C
T_j	operating junction temperature		–	150	°C

Notes

1. DC working current limited by $P_{tot\ max}$.
2. One or more diodes loaded; T_s is the temperature at the soldering point.
3. One or more diodes loaded; device mounted on a printed-circuit board with $R_{th\ a\text{-}s}$ = 43.5 K/W.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}s}$	thermal resistance from junction to soldering point	one or more diodes loaded	56.5	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient		100	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Per diode						
V_Z	working voltage	I_Z = 5 mA	6.4	6.8	7.2	V
V_F	forward voltage	I_F = 200 mA	–	–	1.3	V
V_{ZSM}	non-repetitive peak reverse voltage	t_p = 1 ms; I_{ZSM} = 2.5 A	–	–	11	V
I_R	reverse current	V_R = 5.25 V	–	–	2	µA
r_{dif}	differential resistance	I_Z = 1 mA	–	–	40	Ω
		I_Z = 5 mA	–	–	8	Ω
S_Z	temperature coefficient of working voltage	I_Z = 5mA	–	3	–	mV/K
C_d	diode capacitance	see Fig.5				
		V_R = 0; f = 1 MHz	–	–	120	pF
		V_R = 5.25 V; f = 1 MHz	–	–	60	pF

GRAPHICAL DATA

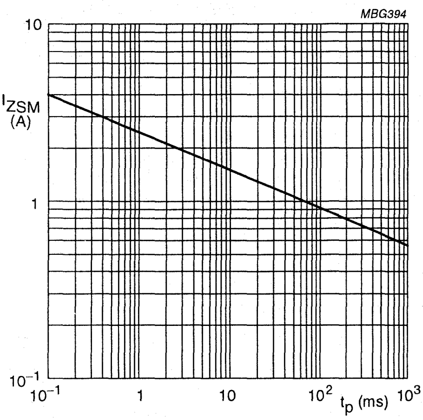
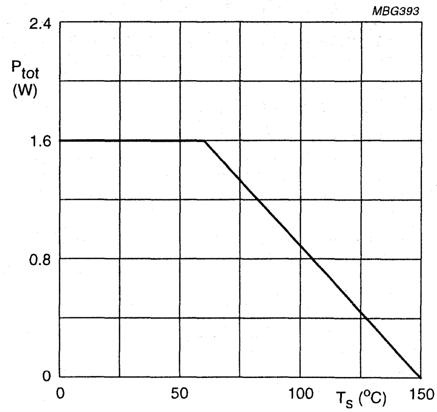
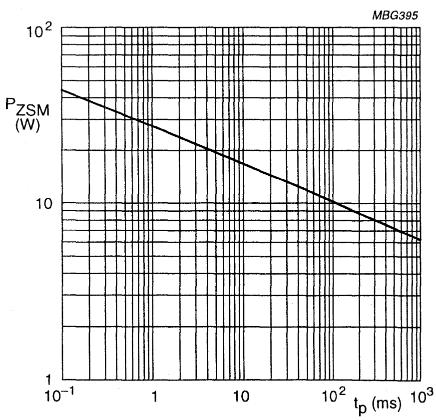


Fig.2 Maximum non-repetitive peak reverse current as a function of pulse time.



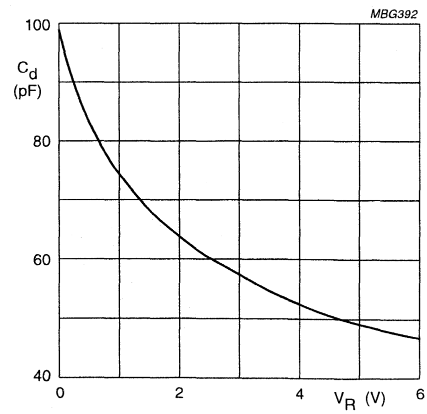
All diodes loaded.

Fig.3 Power derating curve.



$P_{ZSM} = V_{ZSM} \times I_{ZSM}$.
V_{ZSM} is the non-repetitive peak reverse voltage at I_{ZSM}.

Fig.4 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (square pulse).



T_j = 25 °C; f = 1 MHz.

Fig.5 Diode capacitance as a function of reverse voltage; typical values.

9-fold ESD transient voltage suppressor — BZA109

FEATURES

- ESD rating >8 kV, according to IEC1000-4-2
- SOT163-1 surface mount package
- Common anode configuration
- Non-clamping range 0.5 to 6.8 V
- Maximum non-repetitive peak reverse power dissipation: 25 W at $t_p = 1$ ms
- Maximum clamping voltage at peak pulse current: 10 V at $I_{ZSM} = 2.5$ A.

APPLICATIONS

- For 9-bit wide undershoot/ overshoot clamping and fast ESD transient suppression in:
  - Computers and peripherals
  - Audio and video equipment
  - Business machines
  - Communication systems
  - Medical equipment.

DESCRIPTION

9-fold monolithic transient voltage suppressor in an SO20; SOT163-1 surface mount package. The device is ideal in situations where board space is a premium.

PINNING

PIN	DESCRIPTION
1 to 5	input (IN1 to IN5)
6 and 15	common anode (GND)
7 to 10	input (IN6 to IN9)
11 to 14	output (OUT9 to OUT6)
16 to 20	output (OUT5 to OUT1)

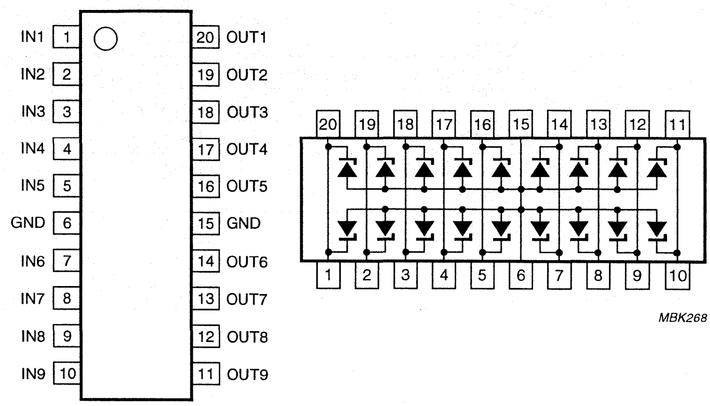


Fig.1 Pin configuration for SO20 (SOT163-1) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per diode					
I_Z	working current	$T_{amb} = 25$ °C	–	20	mA
I_F	continuous forward current	$T_{amb} = 25$ °C	–	100	mA
I_{FT}	feed-through current	$T_{amb} = 25$ °C; note 1	–	100	mA
I_{FSM}	non-repetitive peak forward current	$t_p = 1$ ms; square pulse	–	4.5	A
I_{ZSM}	non-repetitive peak reverse current	$t_p = 1$ ms; square pulse; see Fig.2	–	2.5	A
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C; note 2; see Fig.3	–	1.25	W
P_{ZSM}	non-repetitive peak reverse power dissipation	$t_p = 1$ ms; square pulse; see Fig.4	–	25	W
T_{stg}	storage temperature		–65	+150	°C
T_j	operating junction temperature		–65	+150	°C

Notes

1. Current is flowing from input to corresponding output.
2. One or more diodes loaded.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	one or more diodes loaded	100	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Per diode						
V_Z	working voltage	I_Z = 250 μA	6.4	6.8	7.2	V
V_F	forward voltage	I_F = 100 mA	–	–	1.1	V
V_{ZSM}	non-repetitive peak reverse voltage	I_{ZSM} = 2.5 A; t_p = 1 ms	–	–	10	V
I_H	input high current	V_{IN} = 5.25 V	–	–	0.5	μA
r_{dif}	differential resistance	I_Z = 250 μA	–	–	100	Ω
S_Z	temperature coefficient of working voltage	I_Z = 5 mA	–	3	–	mV/K
C_d	diode capacitance	see Fig.5				
		V_R = 0; f = 1 MHz	–	–	200	pF
		V_R = 5.25 V; f = 1 MHz	–	–	100	pF

GRAPHICAL DATA

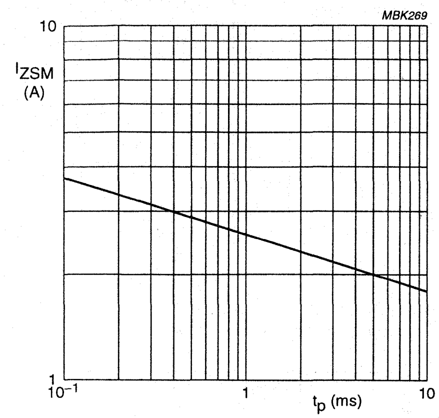
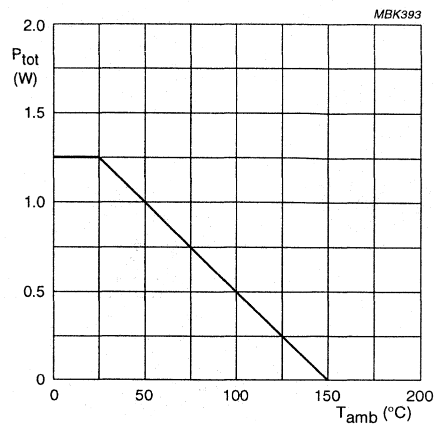
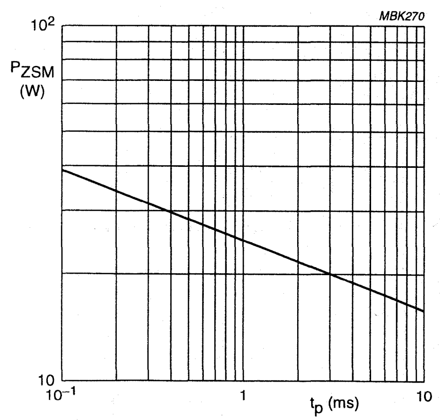


Fig.2 Maximum non-repetitive peak reverse current as a function of pulse time.



One or more diodes loaded.

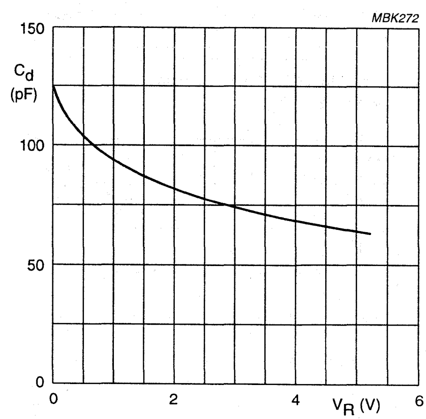
Fig.3 Power derating curve.



$P_{ZSM} = V_{ZSM} \times I_{ZSM}$.

V_{ZSM} is the non-repetitive peak reverse voltage at I_{ZSM}.

Fig.4 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (square pulse).



$T_j = 25$ °C; f = 1 MHz.

Fig.5 Diode capacitance as a function of reverse voltage; typical values.

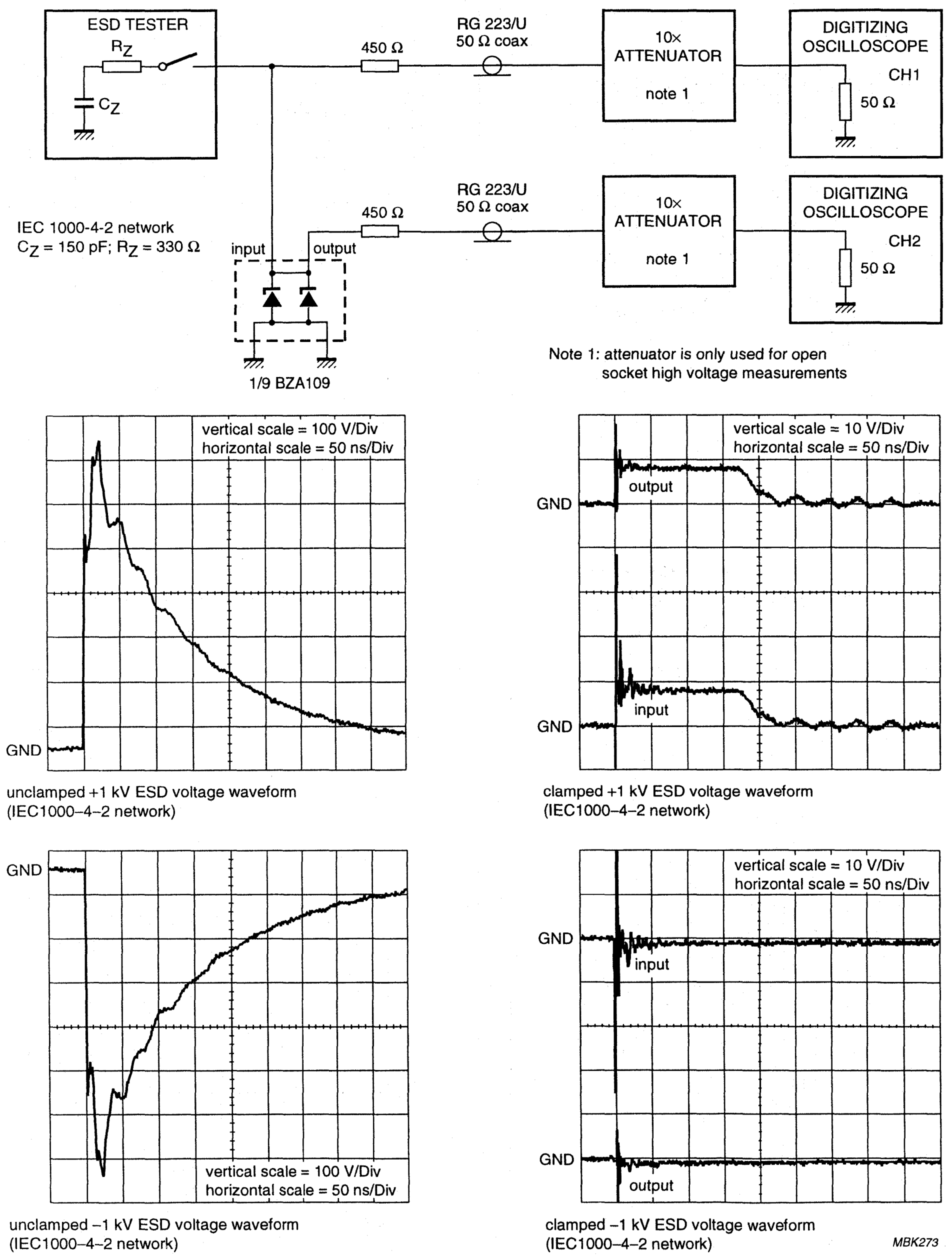


Fig.6 ESD clamping test set-up and waveforms.

APPLICATION INFORMATION

Typical common anode application

A 9-fold transient suppressor in an SO20; SOT163-1 package makes it possible to protect nine separate lines using only one package. Two simplified examples are shown in Figs 7 and 8.

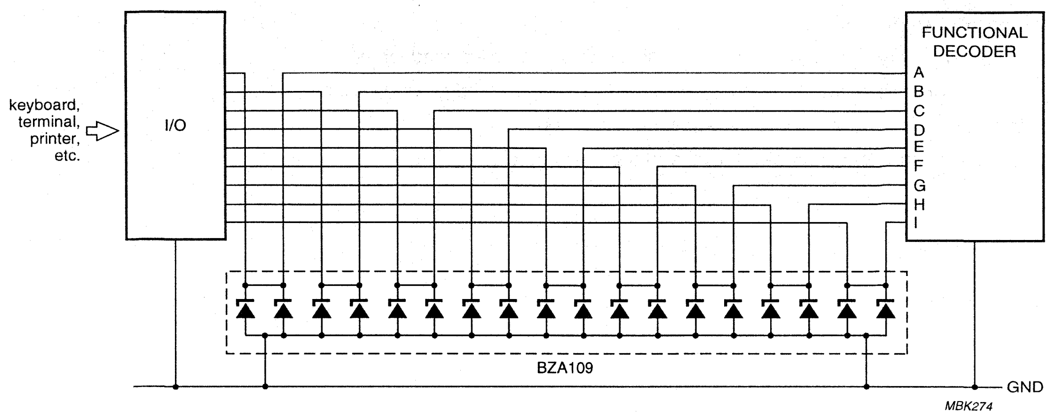


Fig.7 Computer interface protection.

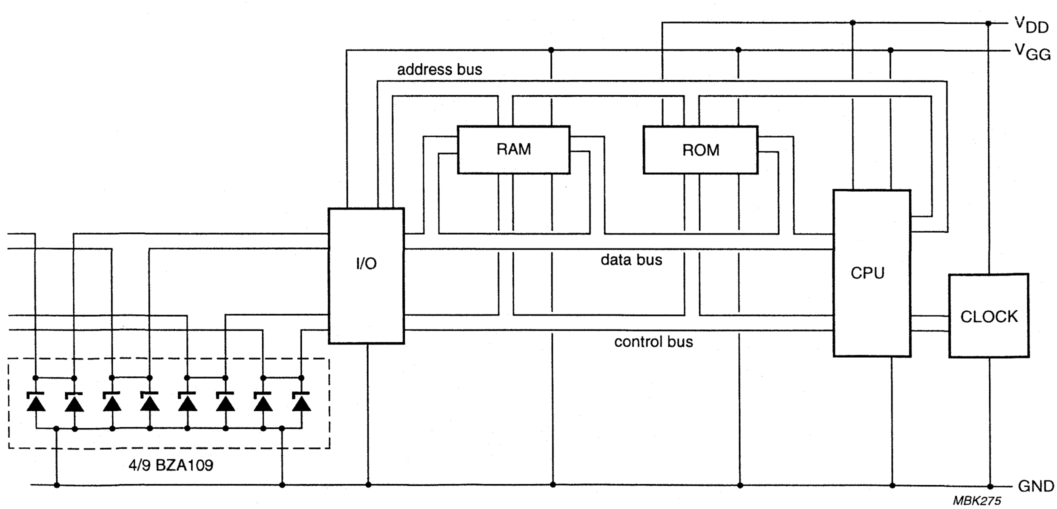


Fig.8 Microprocessor protection.

Device placement and printed-circuit board layout

Circuit board layout is of extreme importance in the suppression of transients. The clamping voltage of the BZA109 is determined by the peak transient current and the rate of rise of that current (di/dt). Since parasitic inductances can further add to the clamping voltage (V = L di/dt) the series conductor lengths on the printed-circuit board should be kept to a minimum. This includes the lead length of the suppression element.

In addition to minimizing conductor length the following printed-circuit board layout guidelines are recommended:

1. Place the suppression element close to the input terminals or connectors.
2. Keep parallel signal paths to a minimum.
3. Avoid running protection conductors in parallel with unprotected conductors.
4. Minimize all printed-circuit board loop areas including power and ground loops.
5. Minimize the length of the transient return path to ground.
6. Avoid using shared transient return paths to a common ground point.

9-fold ESD transient voltage suppressor — BZA109TS

FEATURES

- ESD rating >8 kV, according to IEC1000-4-2
- SOT339-1 surface mount package
- Common anode configuration
- Non-clamping range −0.5 to +6.8 V
- Maximum non-repetitive peak reverse power dissipation: 25 W at t_p = 1 ms
- Maximum clamping voltage at peak pulse current: 10 V at I_{ZSM} = 2.5 A.

APPLICATIONS

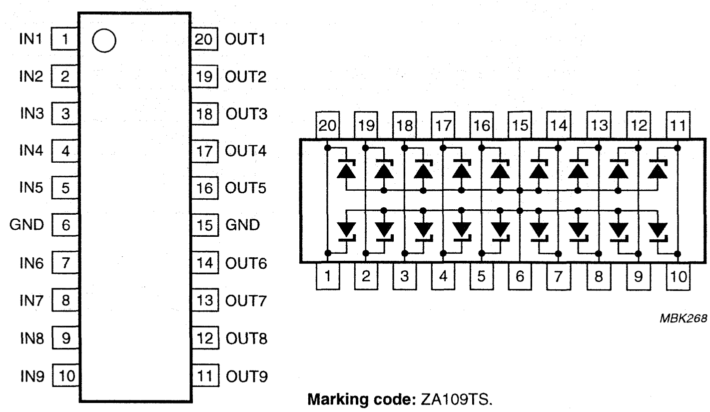
- For 9-bit wide undershoot/ overshoot clamping and fast ESD transient suppression in:
  - Computers and peripherals
  - Audio and video equipment
  - Business machines
  - Communication systems
  - Medical equipment.

DESCRIPTION

9-fold monolithic transient voltage suppressor in an SSOP20; SOT339-1 surface mount package. The device is ideal in situations where board space is a premium.

PINNING

PIN	DESCRIPTION
1 to 5	input (IN1 to IN5)
6 and 15	common anode (GND)
7 to 10	input (IN6 to IN9)
11 to 14	output (OUT9 to OUT6)
16 to 20	output (OUT5 to OUT1)



Marking code: ZA109TS.

Fig.1 Pin configuration for SSOP20 (SOT339-1) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per diode					
I_Z	working current	T_{amb} = 25 °C	–	20	mA
I_F	continuous forward current	T_{amb} = 25 °C	–	100	mA
I_{FT}	feed-through current	T_{amb} = 25 °C; note 1	–	100	mA
I_{FSM}	non-repetitive peak forward current	t_p = 1 ms; square pulse	–	4.5	A
I_{ZSM}	non-repetitive peak reverse current	t_p = 1 ms; square pulse; see Fig.2	–	2.5	A
P_{tot}	total power dissipation	$T_{amb} \leq$ 25 °C; note 2; see Fig.3	–	0.95	W
P_{ZSM}	non-repetitive peak reverse power dissipation	t_p = 1 ms; square pulse; see Fig.4	–	25	W
T_{stg}	storage temperature		−65	+150	°C
T_j	operating junction temperature		−65	+150	°C

Notes

1. Current is flowing from input to corresponding output.
2. One or more diodes loaded.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	one or more diodes loaded	135	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Per diode						
V_Z	working voltage	I_Z = 250 μA	6.4	6.8	7.2	V
V_F	forward voltage	I_F = 100 mA	–	–	1.1	V
V_{ZSM}	non-repetitive peak reverse voltage	I_{ZSM} = 2.5 A; t_p = 1 ms	–	–	10	V
I_H	input high current	V_{IN} = 5.25 V	–	–	0.5	μA
r_{dif}	differential resistance	I_Z = 250 μA	–	–	100	Ω
S_Z	temperature coefficient of working voltage	I_Z = 5 mA	–	3	–	mV/K
C_d	diode capacitance	see Fig.5				
		V_R = 0; f = 1 MHz	–	–	200	pF
		V_R = 5.25 V; f = 1 MHz	–	–	100	pF

GRAPHICAL DATA

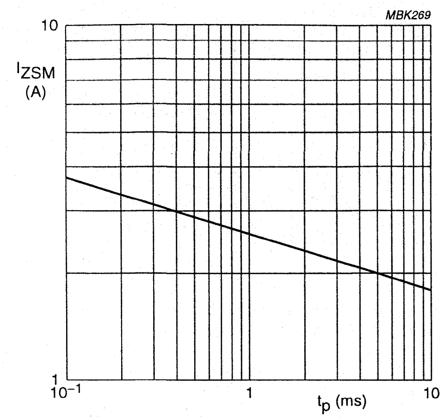
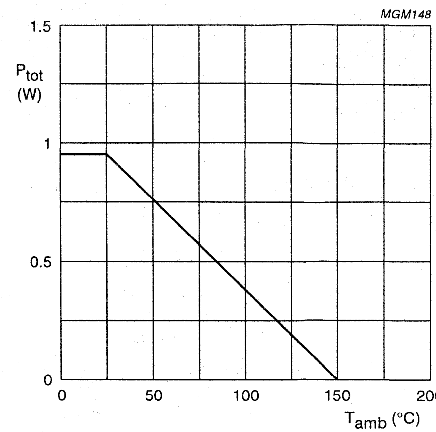
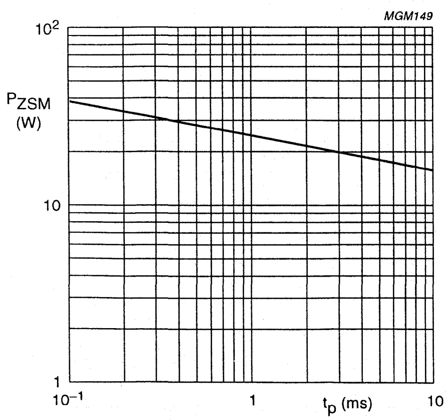


Fig.2 Maximum non-repetitive peak reverse current as a function of pulse time.



One or more diodes loaded.

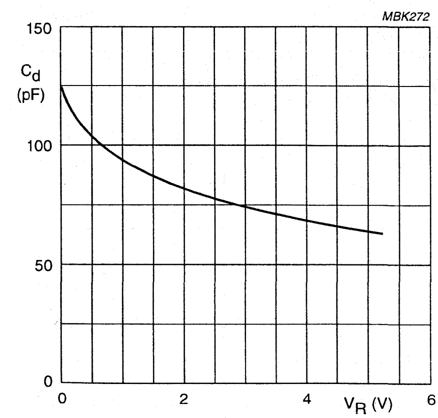
Fig.3 Power derating curve.



$P_{ZSM} = V_{ZSM} \times I_{ZSM}$.

V_{ZSM} is the non-repetitive peak reverse voltage at I_{ZSM}.

Fig.4 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (square pulse).



T_j = 25 °C; f = 1 MHz.

Fig.5 Diode capacitance as a function of reverse voltage; typical values.

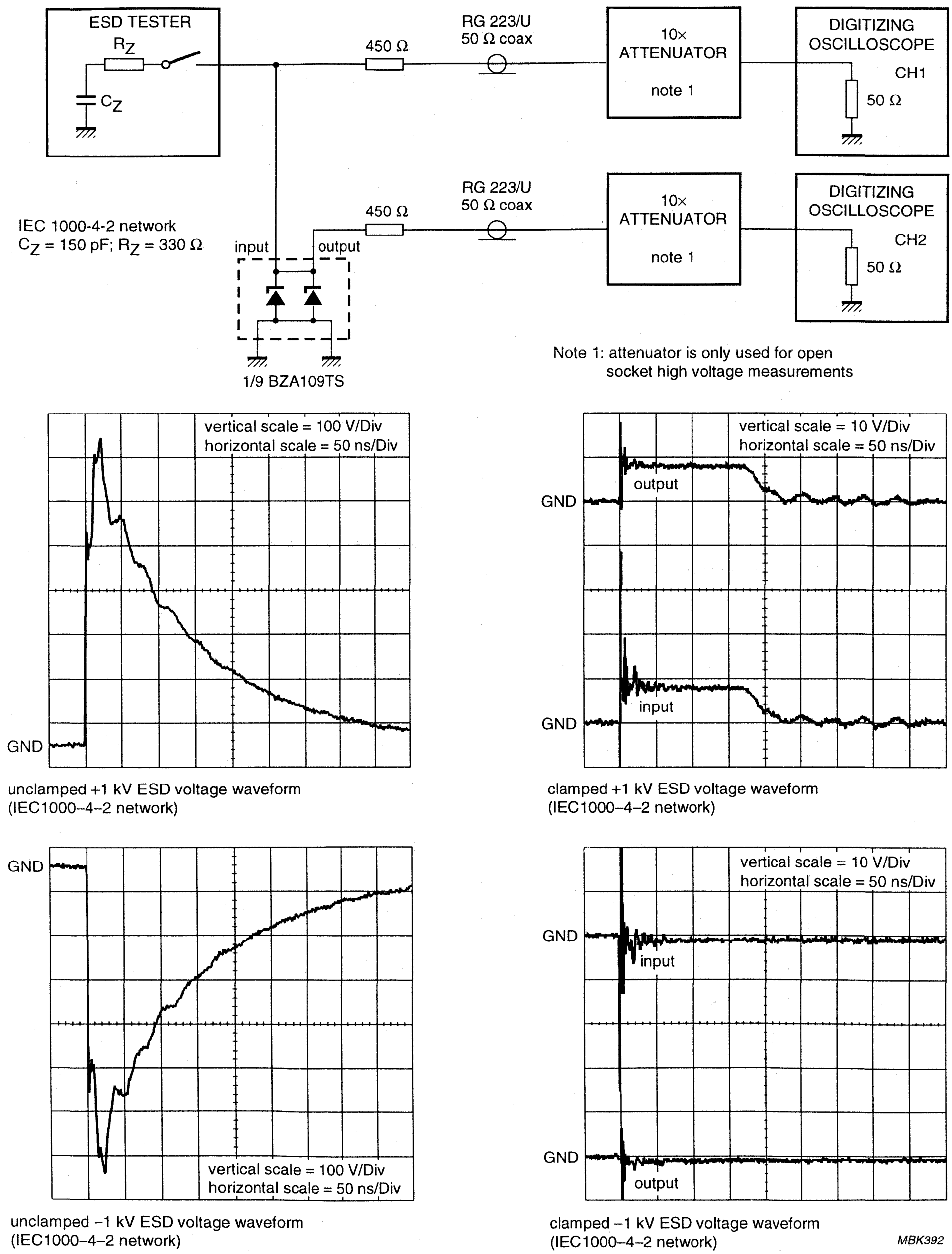


Fig.6 ESD clamping test set-up and waveforms.

APPLICATION INFORMATION

Typical common anode application

A 9-fold transient suppressor in an SSOP20; SOT339-1 package makes it possible to protect nine separate lines using only one package. Two simplified examples are shown in Figs 7 and 8.

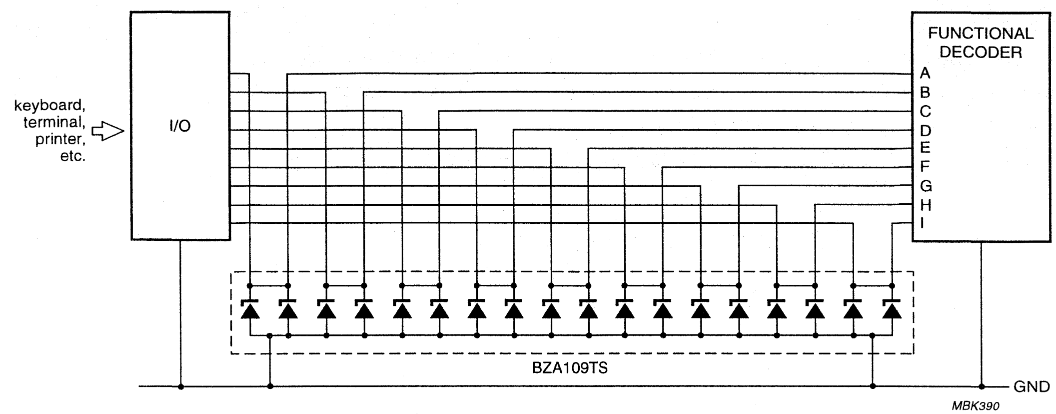


Fig.7 Computer interface protection.

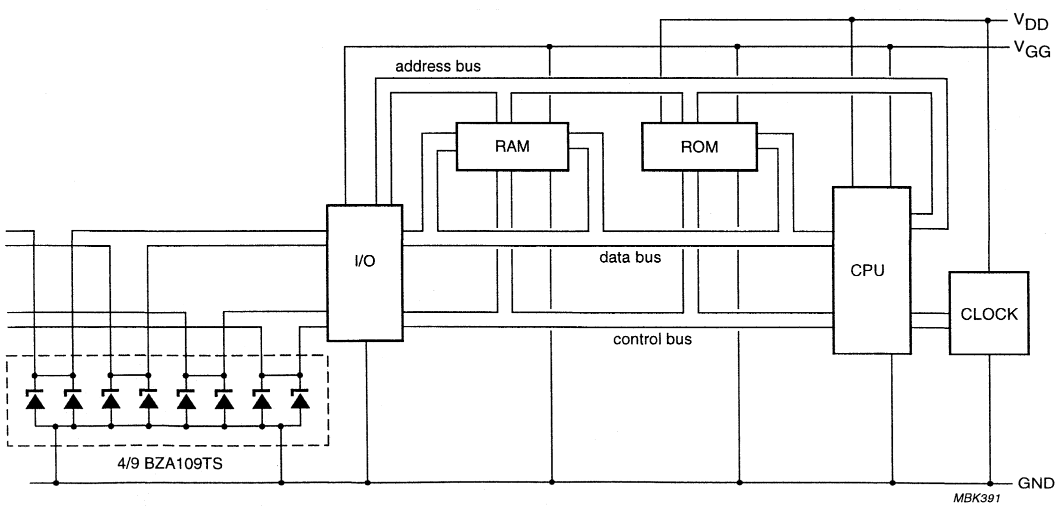


Fig.8 Microprocessor protection.

Device placement and printed-circuit board layout

Circuit board layout is of extreme importance in the suppression of transients. The clamping voltage of the BZA109TS is determined by the peak transient current and the rate of rise of that current (di/dt). Since parasitic inductances can further add to the clamping voltage (V = L di/dt) the series conductor lengths on the printed-circuit board should be kept to a minimum. This includes the lead length of the suppression element.

In addition to minimizing conductor length the following printed-circuit board layout guidelines are recommended:

1. Place the suppression element close to the input terminals or connectors.
2. Keep parallel signal paths to a minimum.
3. Avoid running protection conductors in parallel with unprotected conductors.
4. Minimize all printed-circuit board loop areas including power and ground loops.
5. Minimize the length of the transient return path to ground.
6. Avoid using shared transient return paths to a common ground point.

Quadruple ESD transient voltage suppressor — BZA420A

FEATURES

- ESD rating >8 kV, according to IEC1000-4-2
- SOT457 surface mount package
- Common anode configuration
- Non-clamping range –0.5 to 20 V
- Maximum reverse peak power dissipation: 19.6 W at t_p = 1 ms
- Maximum clamping voltage at peak pulse current: 28 V at I_{ZSM} = 0.7 A.

APPLICATIONS

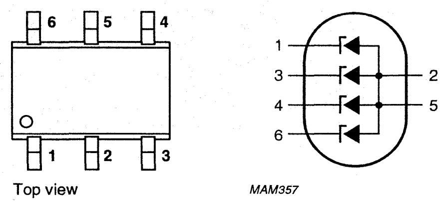
- Computers and peripherals
- Audio and video equipment
- Communication systems
- Medical equipment.

DESCRIPTION

Monolithic transient voltage suppressor diode in a six lead SOT457 (SC-74) package for 4-bit wide ESD transient suppression at 20 V level.

PINNING

PIN	DESCRIPTION
1	cathode 1
2	common
3	cathode 2
4	cathode 3
5	common
6	cathode 4



Marking code: Z0.

Fig.1 Simplified outline (SOT457) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per diode					
I_Z	working current	T_s = 60 °C; note 1	–	note 2	mA
I_F	continuous forward current	T_s = 60 °C	–	100	mA
I_{FSM}	non-repetitive peak forward current	t_p = 1 ms; square pulse	–	3.75	A
I_{ZSM}	non-repetitive peak reverse current	t_p = 1 ms; square pulse; see Fig.2	–	0.7	A
P_{tot}	total power dissipation	T_s = 60 °C; see Fig.3	–	720	mW
P_{ZSM}	non repetitive peak reverse power dissipation	square pulse; t_p = 1 ms; see Fig.4	–	19.6	W
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–65	+150	°C

Notes

1. T_s is the temperature at the soldering point of the anode pin.
2. DC working current limited by $P_{tot\ max}$.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}s}$	thermal resistance from junction to soldering point	one or more diodes loaded	125	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Per diode						
V_Z	working voltage	I_Z = 1 mA	19	20	21	V
V_F	forward voltage	I_F = 200 mA	–	–	1.3	V
V_{ZSM}	non-repetitive peak reverse voltage	I_{ZSM} = 0.7 A; t_p = 1 ms	–	–	28	V
I_R	reverse current	V_R = 15 V	–	–	100	nA
r_{dif}	differential resistance	I_Z = 1 mA	–	–	125	Ω
S_Z	temperature coefficient of working voltage		–	16.2	–	mV/K
C_d	diode capacitance	see Fig.5				
		V_R = 0; f = 1 MHz	–	–	48	pF
		V_R = 15 V; f = 1 MHz	–	–	14	pF

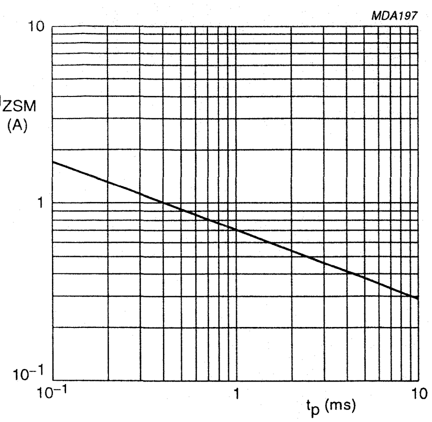
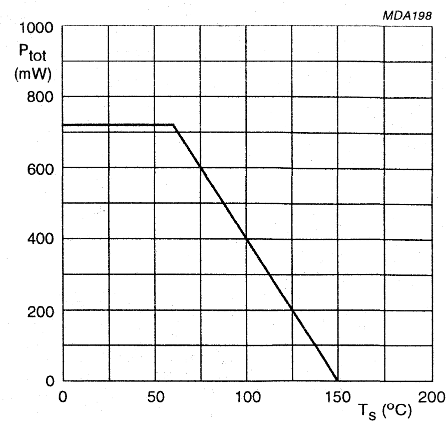
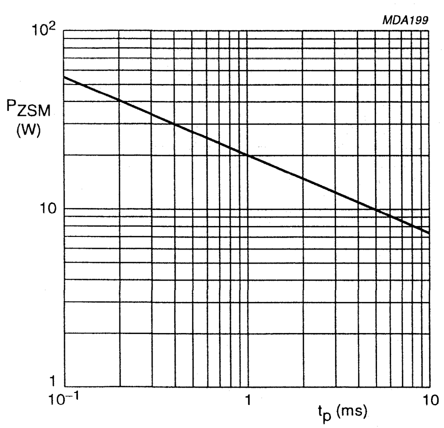


Fig.2 Maximum non-repetitive peak reverse current as a function of pulse time.



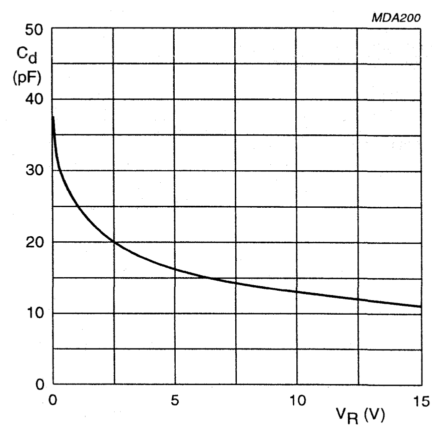
All diodes loaded.

Fig.3 Power derating curve.



$P_{ZSM} = V_{ZSM} \times I_{ZSM}$.
V_{ZSM} is the non-repetitive peak reverse voltage at I_{ZSM}.

Fig.4 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (square pulse).



T_j = 25 °C; f = 1 MHz.

Fig.5 Diode capacitance as a function of reverse voltage; typical values.

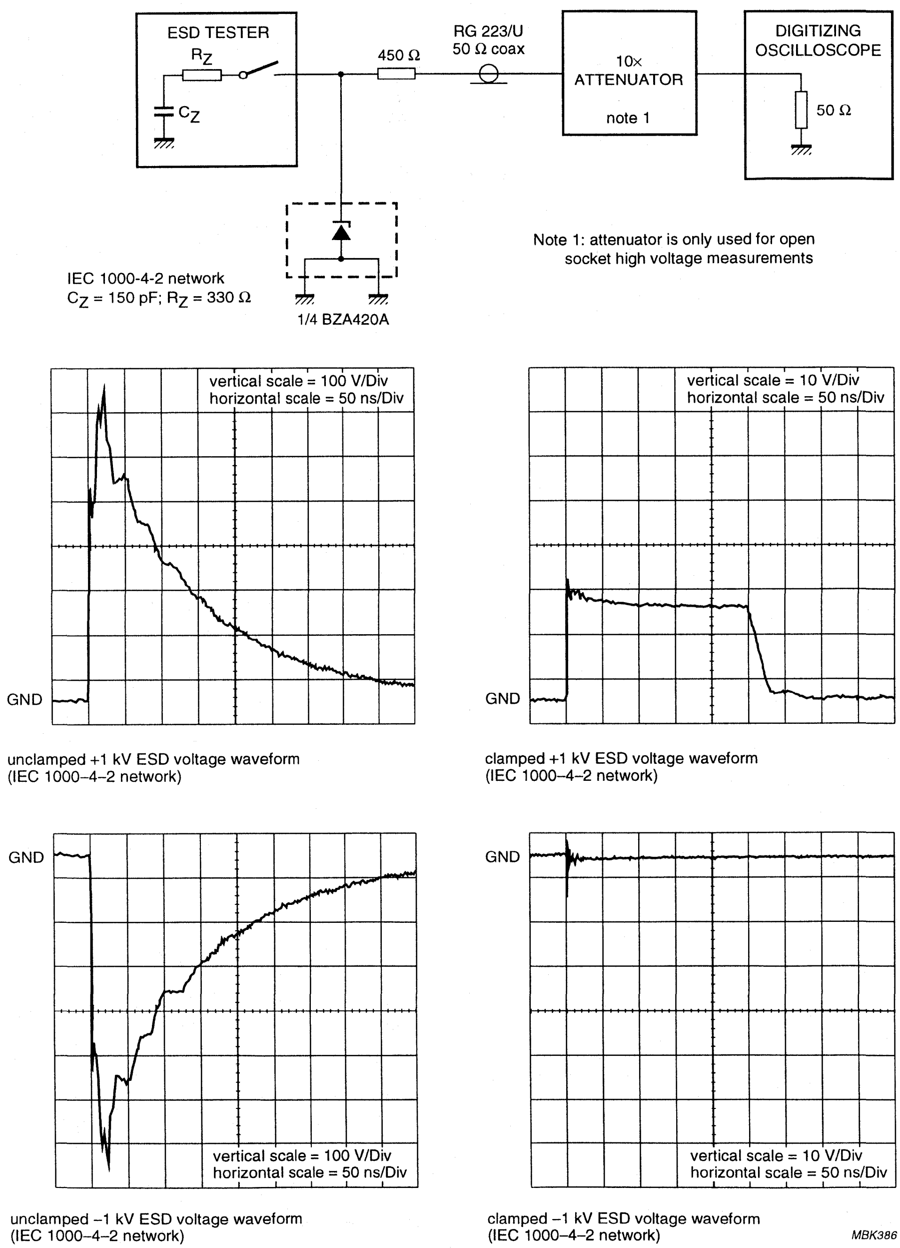


Fig.6 ESD clamping test set-up and waveforms.

Quadruple ESD transient voltage suppressor BZA420A

APPLICATION INFORMATION

Typical common anode application

A quadruple transient suppressor in a SOT457 package makes it possible to protect four separate lines using only one package. Two simplified examples are shown in Figs 7 and 8.

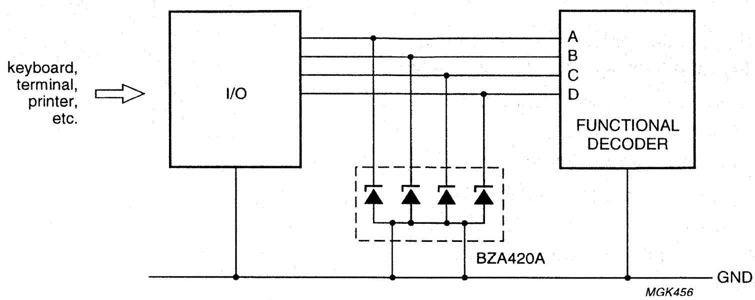


Fig.7 Computer interface protection.

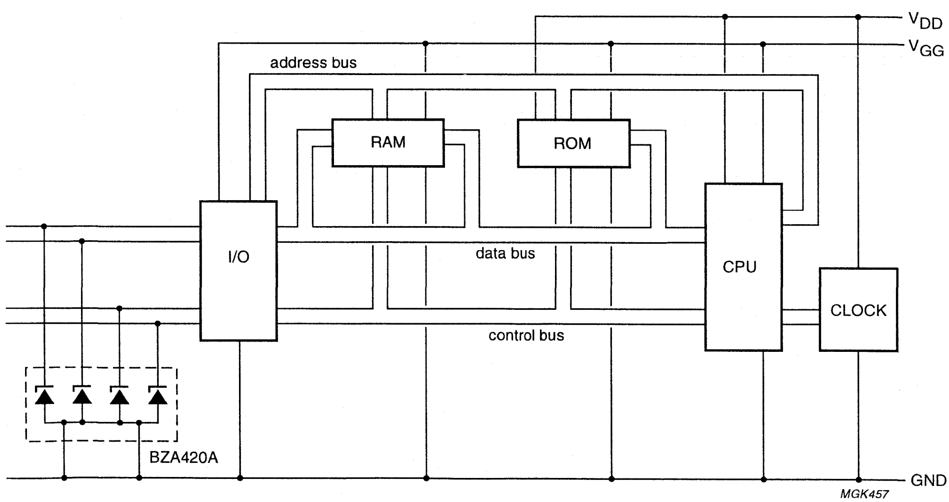


Fig.8 Microprocessor protection.

Device placement and printed-circuit board layout

Circuit board layout is of extreme importance in the suppression of transients. The clamping voltage of the BZA420A is determined by the peak transient current and the rate of rise of that current (di/dt). Since parasitic inductances can further add to the clamping voltage (V = L di/dt) the series conductor lengths on the printed-circuit board should be kept to a minimum. This includes the lead length of the suppression element.

In addition to minimizing conductor length the following printed-circuit board layout guidelines are recommended:

1. Place the suppression element close to the input terminals or connectors.
2. Keep parallel signal paths to a minimum.
3. Avoid running protection conductors in parallel with unprotected conductors.
4. Minimize all printed-circuit board loop areas including power and ground loops.
5. Minimize the length of the transient return path to ground.
6. Avoid using shared transient return paths to a common ground point.

Quadruple ESD transient voltage suppressor BZA456A

FEATURES

- ESD rating >8 kV, according to IEC1000-4-2
- SOT457 surface mount package
- Common anode configuration
- Non-clamping range –0.5 to 5.6 V
- Maximum reverse peak power dissipation: 24 W at t_p = 1 ms
- Maximum clamping voltage at peak pulse current: 8 V at I_{ZSM} = 3 A.

APPLICATIONS

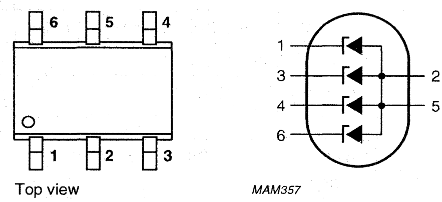
- Computers and peripherals
- Audio and video equipment
- Communication systems
- Medical equipment.

DESCRIPTION

Monolithic transient voltage suppressor diode in a six lead SOT457 (SC-74) package for 4-bit wide ESD transient suppression at 5.6 V level.

PINNING

PIN	DESCRIPTION
1	cathode 1
2	common
3	cathode 2
4	cathode 3
5	common
6	cathode 4



Marking code: Z6.

Fig.1 Simplified outline (SOT457) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per diode					
I_Z	working current	T_s = 60 °C; note 1	–	note 2	mA
I_F	continuous forward current	T_s = 60 °C	–	100	mA
I_{FSM}	non-repetitive peak forward current	t_p = 1 ms; square pulse	–	3.75	A
I_{ZSM}	non-repetitive peak reverse current	t_p = 1 ms; square pulse; see Fig.2	–	3	A
P_{tot}	total power dissipation	T_s = 60 °C; see Fig.3	–	720	mW
P_{ZSM}	non repetitive peak reverse power dissipation	square pulse; t_p = 1 ms; see Fig.4	–	24	W
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–65	+150	°C

Notes

1. T_s is the temperature at the soldering point of the anode pin.
2. DC working current limited by $P_{tot\ max}$.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}s}$	thermal resistance from junction to soldering point	one or more diodes loaded	125	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Per diode						
V_Z	working voltage	I_Z = 1 mA	5.32	5.6	5.88	V
V_F	forward voltage	I_F = 200 mA	–	–	1.3	V
V_{ZSM}	non-repetitive peak reverse voltage	I_{ZSM} = 3 A; t_p = 1 ms	–	–	8	V
I_R	reverse current	V_R = 3 V	–	–	2	μA
r_{dif}	differential resistance	I_Z = 250 μA	–	–	1600	Ω
		I_Z = 1 mA	–	–	400	Ω
S_Z	temperature coefficient of working voltage		–	1.2	–	mV/K
C_d	diode capacitance	see Fig.5				
		V_R = 0; f = 1 MHz	–	–	240	pF
		V_R = 3 V; f = 1 MHz	–	–	140	pF

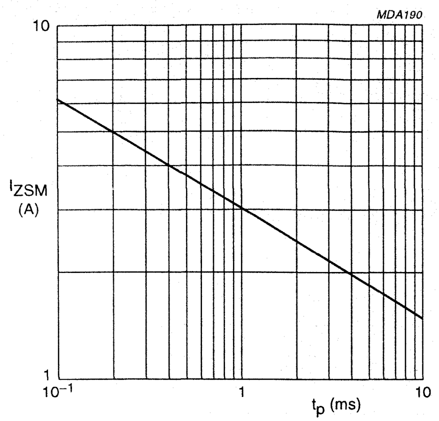
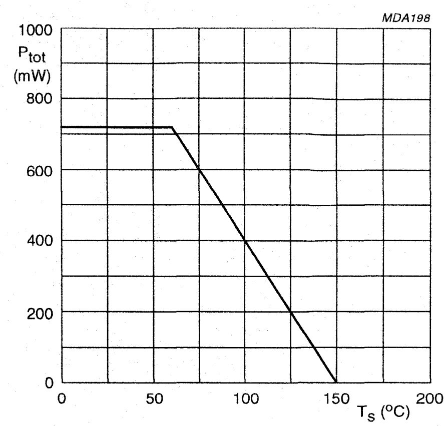
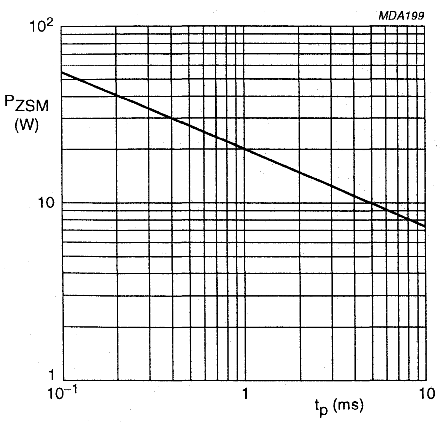


Fig.2 Maximum non-repetitive peak reverse current as a function of pulse time.



All diodes loaded.

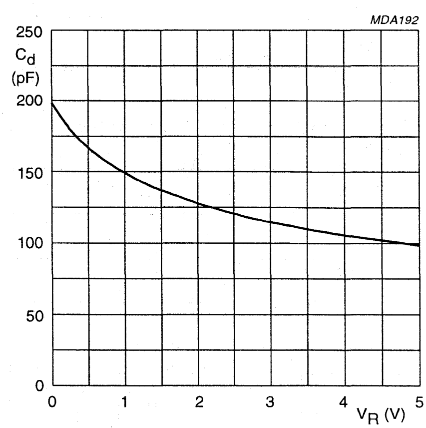
Fig.3 Power derating curve.



$P_{ZSM} = V_{ZSM} \times I_{ZSM}$.

V_{ZSM} is the non-repetitive peak reverse voltage at I_{ZSM}.

Fig.4 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (square pulse).



T_j = 25 °C; f = 1 MHz.

Fig.5 Diode capacitance as a function of reverse voltage; typical values.

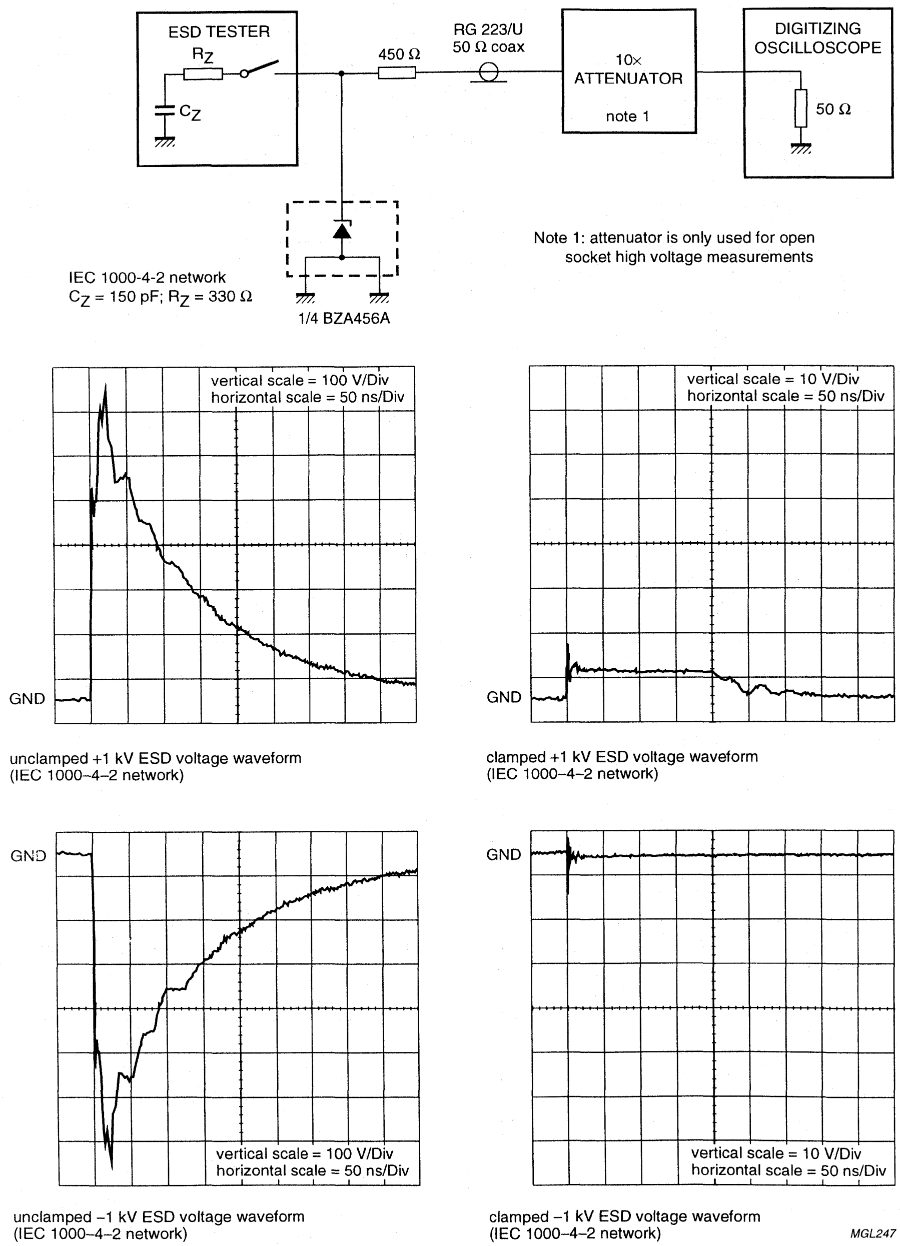


Fig.6 ESD clamping test set-up and waveforms.

APPLICATION INFORMATION

Typical common anode application

A quadruple transient suppressor in a SOT457 package makes it possible to protect four separate lines using only one package. Two simplified examples are shown in Figs 7 and 8.

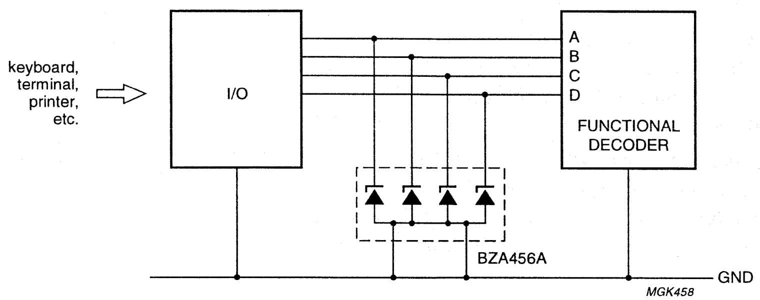


Fig.7 Computer interface protection.

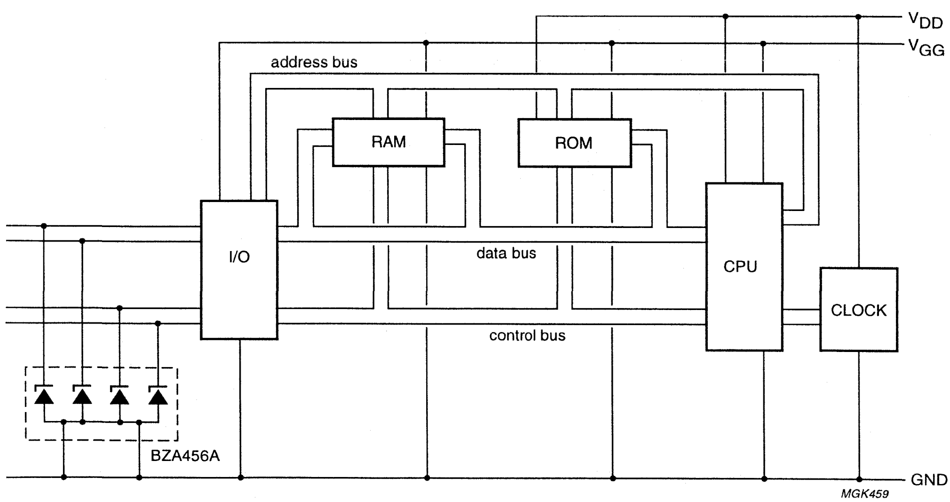


Fig.8 Microprocessor protection.

Device placement and printed-circuit board layout

Circuit board layout is of extreme importance in the suppression of transients. The clamping voltage of the BZA456A is determined by the peak transient current and the rate of rise of that current (di/dt). Since parasitic inductances can further add to the clamping voltage ($V = L\ di/dt$) the series conductor lengths on the printed-circuit board should be kept to a minimum. This includes the lead length of the suppression element.

In addition to minimizing conductor length the following printed-circuit board layout guidelines are recommended:

1. Place the suppression element close to the input terminals or connectors.
2. Keep parallel signal paths to a minimum.
3. Avoid running protection conductors in parallel with unprotected conductors.
4. Minimize all printed-circuit board loop areas including power and ground loops.
5. Minimize the length of the transient return path to ground.
6. Avoid using shared transient return paths to a common ground point.

Quadruple ESD transient voltage suppressor — BZA462A

FEATURES

- ESD rating >15 kV, according to IEC1000-4-2
- SOT457 surface mount package
- Common anode configuration
- Non-clamping range –0.5 to 6.2 V
- Maximum reverse peak power dissipation: 24 W at t_p = 1 ms
- Maximum clamping voltage at peak pulse current: 9 V at I_{ZSM} = 2.66 A.

APPLICATIONS

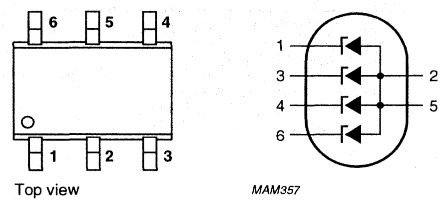
- Computers and peripherals
- Audio and video equipment
- Communication systems
- Medical equipment.

DESCRIPTION

Monolithic transient voltage suppressor diode in a six lead SOT457 (SC-74) package for 4-bit wide ESD transient suppression at 6.2 V level.

PINNING

PIN	DESCRIPTION
1	cathode 1
2	common
3	cathode 2
4	cathode 3
5	common
6	cathode 4



Marking code: Z2t.

Fig.1 Simplified outline (SOT457) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per diode					
I_Z	working current	T_s = 60 °C; note 1	–	note 2	mA
I_F	continuous forward current	T_s = 60 °C	–	100	mA
I_{FSM}	non-repetitive peak forward current	t_p = 1 ms; square pulse	–	3.75	A
I_{ZSM}	non-repetitive peak reverse current	t_p = 1 ms; square pulse; see Fig.2	–	2.66	A
P_{tot}	total power dissipation	T_s = 60 °C; see Fig.3	–	720	mW
P_{ZSM}	non repetitive peak reverse power dissipation	square pulse; t_p = 1 ms; see Fig.4	–	24	W
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–65	+150	°C

Notes

1. T_s is the temperature at the soldering point of the anode pin.
2. DC working current limited by $P_{tot\ max}$.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}s}$	thermal resistance from junction to soldering point	one or more diodes loaded	125	K/W

ELECTRICAL CHARACTERISTICS

$T_j = 25$ °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Per diode						
V_Z	working voltage	$I_Z = 1$ mA	5.89	6.2	6.51	V
V_F	forward voltage	$I_F = 200$ mA	–	–	1.3	V
V_{ZSM}	non-repetitive peak reverse voltage	$I_{ZSM} = 3.5$ A; $t_p = 1$ ms	–	–	9	V
I_R	reverse current	$V_R = 4$ V	–	–	700	nA
r_{dif}	differential resistance	$I_Z = 1$ mA	–	–	300	Ω
S_Z	temperature coefficient of working voltage		–	1.2	–	mV/K
C_d	diode capacitance	see Fig.5				
		$V_R = 0$; f = 1 MHz	–	–	200	pF
		$V_R = 4$ V; f = 1 MHz	–	–	110	pF

Quadruple ESD transient voltage suppressor BZA462A

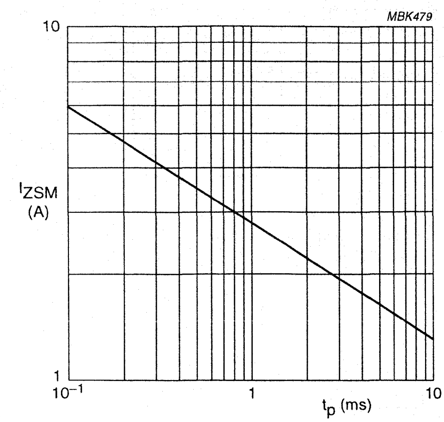
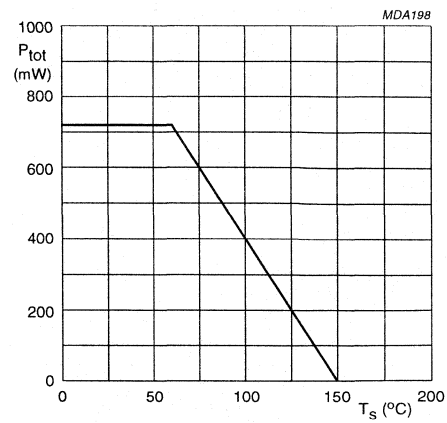
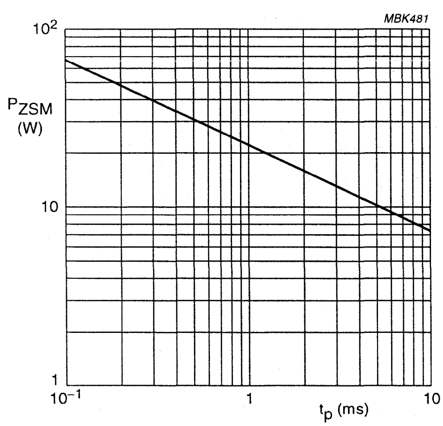


Fig.2 Maximum non-repetitive peak reverse current as a function of pulse time.



All diodes loaded.

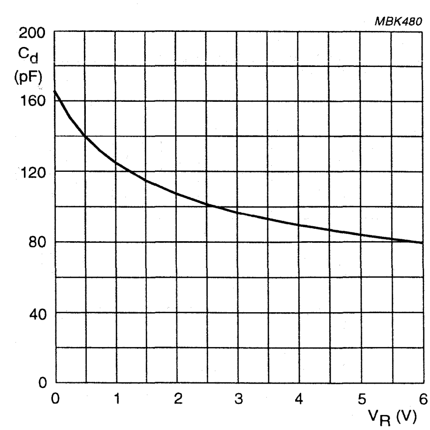
Fig.3 Power derating curve.



$P_{ZSM} = V_{ZSM} \times I_{ZSM}$.

V_{ZSM} is the non-repetitive peak reverse voltage at I_{ZSM}.

Fig.4 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (square pulse).



T_j = 25 °C; f = 1 MHz.

Fig.5 Diode capacitance as a function of reverse voltage; typical values.

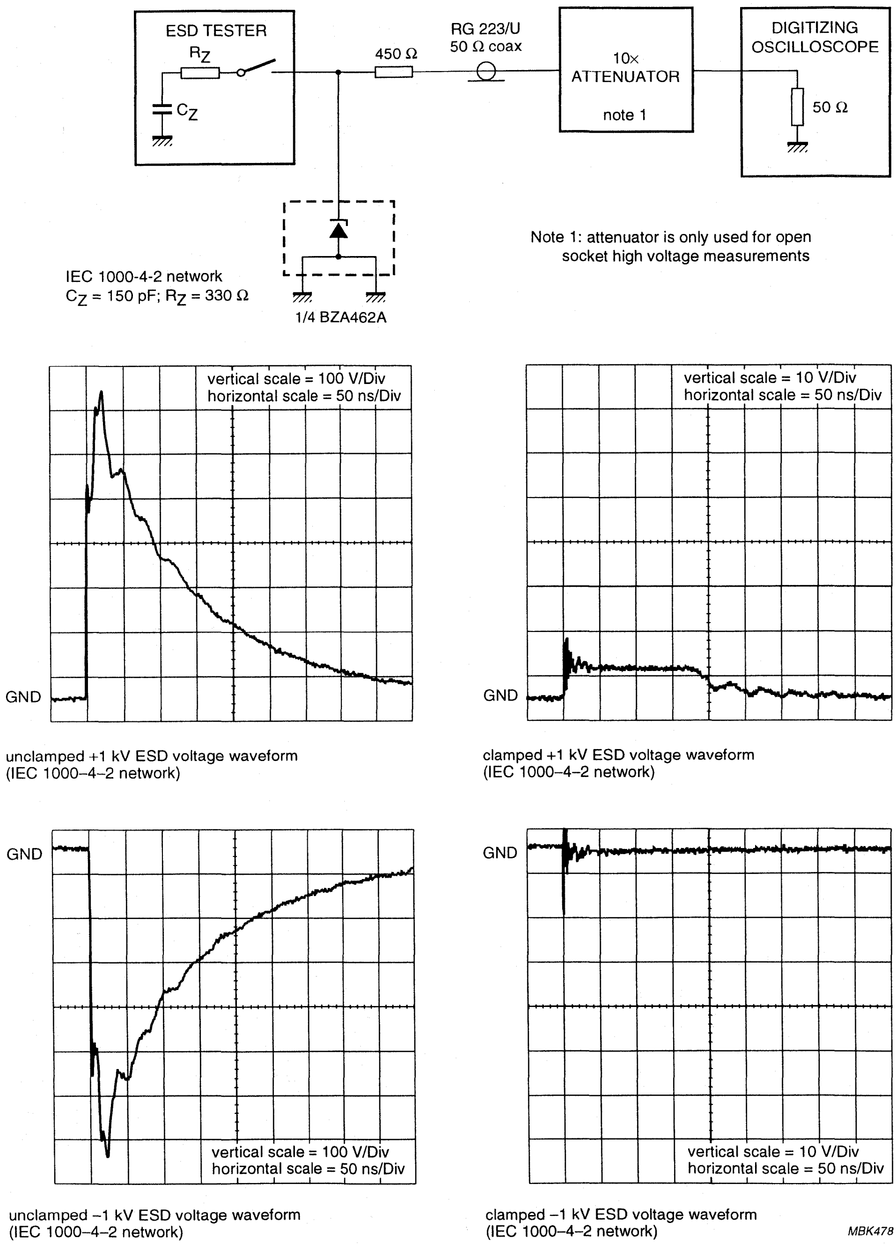


Fig.6 ESD clamping test set-up and waveforms.

APPLICATION INFORMATION

Typical common anode application

A quadruple transient suppressor in a SOT457 package makes it possible to protect four separate lines using only one package. Two simplified examples are shown in Figs 7 and 8.

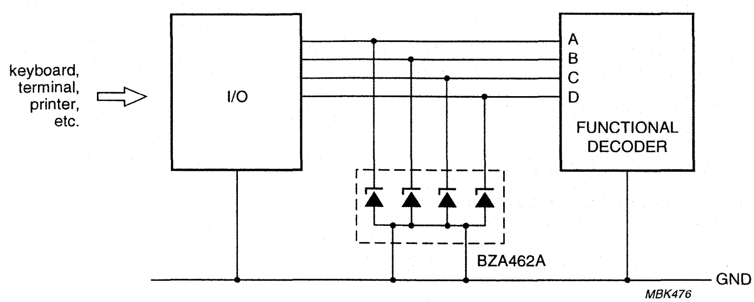


Fig.7 Computer interface protection.

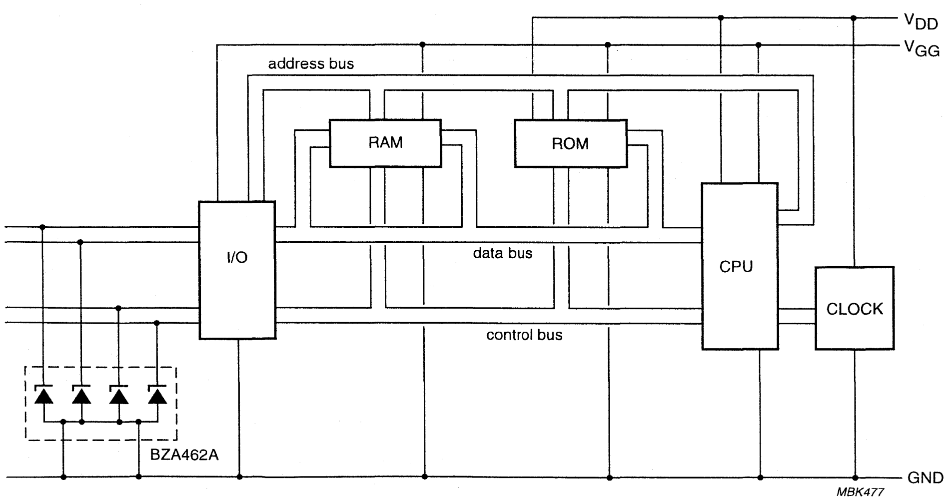


Fig.8 Microprocessor protection.

Device placement and printed-circuit board layout

Circuit board layout is of extreme importance in the suppression of transients. The clamping voltage of the BZA462A is determined by the peak transient current and the rate of rise of that current (di/dt). Since parasitic inductances can further add to the clamping voltage ($V = L\ di/dt$) the series conductor lengths on the printed-circuit board should be kept to a minimum. This includes the lead length of the suppression element.

In addition to minimizing conductor length the following printed-circuit board layout guidelines are recommended:

1. Place the suppression element close to the input terminals or connectors.
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3. Avoid running protection conductors in parallel with unprotected conductors.
4. Minimize all printed-circuit board loop areas including power and ground loops.
5. Minimize the length of the transient return path to ground.
6. Avoid using shared transient return paths to a common ground point.

Voltage regulator diodes BZD23 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Zener working voltage range: 3.6 to 270 V for 46 types
- Transient suppressor stand-off voltage range: 6.2 to 430 V for 45 types
- Available in ammo-pack.

DESCRIPTION

Cavity free cylindrical glass package through Implotec™(1) technology. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

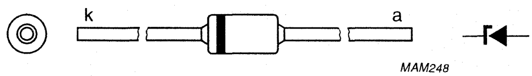


Fig.1 Simplified outline (SOD81) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
P_{tot}	total power dissipation	T_{tp} = 25 °C; lead length 10 mm; see Figs 2 and 3			
	BZD23-C3V6 to -C6V8		–	2.0	W
	BZD23-C7V5 to -C510		–	2.5	W
P_{tot}	total power dissipation	T_{amb} = 55 °C; see Figs 2 and 3; PCB mounted (see Fig.7)			
	BZD23-C3V6 to -C6V8		–	1.0	W
	BZD23-C7V5 to -C510		–	1.0	W
P_{ZSM}	non-repetitive peak reverse power dissipation	t_p = 100 µs; square pulse; T_j = 25 °C prior to surge; see Figs 4 and 5			
	BZD23-C3V6 to -C6V8		–	300	W
	BZD23-C7V5 to -C510		–	300	W
P_{RSM}	non-repetitive peak reverse power dissipation	10/1 000 µs exponential pulse (see Fig.8); T_j = 25 °C prior to surge			
	BZD23-C7V5 to -C510		–	150	W
T_{stg}	storage temperature				
	BZD23-C3V6 to -C6V8		−65	+200	°C
	BZD23-C7V5 to -C510		−65	+175	°C
T_j	junction temperature				
	BZD23-C3V6 to -C6V8		−65	+200	°C
	BZD23-C7V5 to -C510		−65	+175	°C

ELECTRICAL CHARACTERISTICS

Total series

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 0.2 A; see Fig.6	1.2	V

Per type when used as voltage regulator diodes

T_j = 25 °C unless otherwise specified.

TYPE No. SUFFIX (1)	WORKING VOLTAGE V_Z (V) at I_Z			DIFFERENTIAL RESISTANCE r_{dif} (Ω) at I_Z		TEMPERATURE COEFFICIENT S_Z (%/K) at I_Z		TEST CURRENT I_Z (mA)	REVERSE CURRENT at REVERSE VOLTAGE I_R (μA)	V_R (V)
	MIN.	NOM.	MAX.	TYP.	MAX.	MIN.	MAX.		MAX.	
C3V6	3.4	3.6	3.8	4	8	–0.14	–0.04	100	100	1
C3V9	3.7	3.9	4.1	4	8	–0.14	–0.04	100	50	1
C4V3	4.0	4.3	4.6	4	7	–0.12	–0.02	100	25	1
C4V7	4.4	4.7	5.0	3	7	–0.10	0.00	100	10	1
C5V1	4.8	5.1	5.4	3	6	–0.08	–0.02	100	5	1
C5V6	5.2	5.6	6.0	2	4	–0.04	0.04	100	10	2
C6V2	5.8	6.2	6.6	2	3	–0.01	0.06	100	5	2
C6V8	6.4	6.8	7.2	1	3	0.00	0.07	100	10	3
C7V5	7.0	7.5	7.9	1	2	0.00	0.07	100	50	3
C8V2	7.7	8.2	8.7	1	2	0.03	0.08	100	10	3
C9V1	8.5	9.1	9.6	2	4	0.03	0.08	50	10	5
C10	9.4	10	10.6	2	4	0.05	0.09	50	7	7.5
C11	10.4	11	11.6	4	7	0.05	0.10	50	4	8.2
C12	11.4	12	12.7	4	7	0.05	0.10	50	3	9.1
C13	12.4	13	14.1	5	10	0.05	0.10	50	2	10
C15	13.8	15	15.6	5	10	0.05	0.10	50	1	11
C16	15.3	16	17.1	6	15	0.06	0.11	25	1	12
C18	16.8	18	19.1	6	15	0.06	0.11	25	1	13
C20	18.8	20	21.2	6	15	0.06	0.11	25	1	15
C22	20.8	22	23.3	6	15	0.06	0.11	25	1	16
C24	22.8	24	25.6	7	15	0.06	0.11	25	1	18
C27	25.1	27	28.9	7	15	0.06	0.11	25	1	20
C30	28	30	32	8	15	0.06	0.11	25	1	22
C33	31	33	35	8	15	0.06	0.11	25	1	24
C36	34	36	38	21	40	0.06	0.11	10	1	27
C39	37	39	41	21	40	0.06	0.11	10	1	30
C43	40	43	46	24	45	0.07	0.12	10	1	33
C47	44	47	50	24	45	0.07	0.12	10	1	36

TYPE No. SUFFIX (1)	WORKING VOLTAGE V_Z (V) at I_Z			DIFFERENTIAL RESISTANCE r_{dif} (Ω) at I_Z		TEMPERATURE COEFFICIENT S_Z (%/K) at I_Z		TEST CURRENT I_Z (mA)	REVERSE CURRENT at REVERSE VOLTAGE	
	MIN.	NOM.	MAX.	TYP.	MAX.	MIN.	MAX.		I_R (μA) MAX.	V_R (V)
C51	48	51	54	25	60	0.07	0.12	10	1	39
C56	52	56	60	25	60	0.07	0.12	10	1	43
C62	58	62	66	25	80	0.08	0.13	10	1	47
C68	64	68	72	25	80	0.08	0.13	10	1	51
C75	70	75	79	30	100	0.08	0.13	10	1	56
C82	77	82	87	30	100	0.08	0.13	10	1	62
C91	85	91	96	60	200	0.09	0.13	5	1	68
C100	94	100	106	60	200	0.09	0.13	5	1	75
C110	104	110	116	80	250	0.09	0.13	5	1	82
C120	114	120	127	80	250	0.09	0.13	5	1	91
C130	124	130	141	110	300	0.09	0.13	5	1	100
C150	138	150	156	130	300	0.09	0.13	5	1	110
C160	153	160	171	150	350	0.09	0.13	5	1	120
C180	168	180	191	180	400	0.09	0.13	5	1	130
C200	188	200	212	200	500	0.09	0.13	5	1	150
C220	208	220	233	350	750	0.09	0.13	2	1	160
C240	228	240	256	400	850	0.09	0.13	2	1	180
C270	251	270	289	450	1000	0.09	0.13	2	1	200

Note

1. To complete the type number the suffix is added to the basic type number, e.g. BZD23-C51.

Per type when used as transient suppressor diodes

T_j = 25 °C unless otherwise specified.

TYPE NUMBER	REVERSE BREAKDOWN VOLTAGE	TEMPERATURE COEFFICIENT		TEST CURRENT	CLAMPING VOLTAGE		REVERSE CURRENT at STAND-OFF VOLTAGE	
	$V_{(BR)R}$ (V) at I_{test}	S_Z (%/K) at I_{test}		I_{test} (mA)	$V_{(CL)R}$ (V)	at I_{RSM} (A) note 1	I_R (μA)	at V_R (V)
	MIN.	MIN.	MAX.		MAX.		MAX.	
BZD23-C7V5	7.0	0.00	0.07	100	11.3	13.3	1500	6.2
BZD23-C8V2	7.7	0.03	0.08	100	12.3	12.2	1200	6.8
BZD23-C9V1	8.5	0.03	0.08	50	13.3	11.3	100	7.5
BZD23-C10	9.4	0.05	0.09	50	14.8	10.1	20	8.2
BZD23-C11	10.4	0.05	0.10	50	15.7	9.6	5	9.1
BZD23-C12	11.4	0.05	0.10	50	17.0	8.8	5	10
BZD23-C13	12.4	0.05	0.10	50	18.9	7.9	5	11
BZD23-C15	13.8	0.05	0.10	50	20.9	7.2	5	12
BZD23-C16	15.3	0.06	0.11	25	22.9	6.6	5	13
BZD23-C18	16.8	0.06	0.11	25	25.6	5.9	5	15
BZD23-C20	18.8	0.06	0.11	25	28.4	5.3	5	16
BZD23-C22	20.8	0.06	0.11	25	31.0	4.8	5	18
BZD23-C24	22.8	0.06	0.11	25	33.8	4.4	5	20
BZD23-C27	25.1	0.06	0.11	25	38.1	3.9	5	22
BZD23-C30	28	0.06	0.11	25	42.2	3.6	5	24
BZD23-C33	31	0.06	0.11	25	46.2	3.2	5	27
BZD23-C36	34	0.06	0.11	10	50.1	3.0	5	30
BZD23-C39	37	0.06	0.11	10	54.1	2.8	5	33
BZD23-C43	40	0.07	0.12	10	60.7	2.5	5	36
BZD23-C47	44	0.07	0.12	10	65.5	2.3	5	39
BZD23-C51	48	0.07	0.12	10	70.8	2.1	5	43
BZD23-C56	52	0.07	0.12	10	78.6	1.9	5	47
BZD23-C62	58	0.08	0.13	10	86.5	1.7	5	51
BZD23-C68	64	0.08	0.13	10	94.4	1.6	5	56
BZD23-C75	70	0.08	0.13	10	103.5	1.5	5	62
BZD23-C82	77	0.08	0.13	10	114	1.3	5	68
BZD23-C91	85	0.09	0.13	5	126	1.2	5	75
BZD23-C100	94	0.09	0.13	5	139	1.1	5	82
BZD23-C110	104	0.09	0.13	5	152	1.0	5	91
BZD23-C120	114	0.09	0.13	5	167	0.90	5	100
BZD23-C130	124	0.09	0.13	5	185	0.81	5	110
BZD23-C150	138	0.09	0.13	5	204	0.73	5	120
BZD23-C160	153	0.09	0.13	5	224	0.67	5	130

TYPE NUMBER	REVERSE BREAKDOWN VOLTAGE	TEMPERATURE COEFFICIENT		TEST CURRENT	CLAMPING VOLTAGE		REVERSE CURRENT at STAND-OFF VOLTAGE	
	$V_{(BR)R}$ (V) at I_{test}	S_Z (%/K) at I_{test}		I_{test} (mA)	$V_{(CL)R}$ (V)	at I_{RSM} (A) note 1	I_R (µA)	at V_R (V)
	MIN.	MIN.	MAX.		MAX.		MAX.	
BZD23-C180	168	0.09	0.13	5	249	0.60	5	150
BZD23-C200	188	0.09	0.13	5	276	0.54	5	160
BZD23-C220	208	0.09	0.13	2	305	0.50	5	180
BZD23-C240	228	0.09	0.13	2	336	0.45	5	200
BZD23-C270	251	0.09	0.13	2	380	0.40	5	220
BZD23-C300	280	0.09	0.13	2	419	0.36	5	240
BZD23-C330	310	0.09	0.13	2	459	0.33	5	270
BZD23-C360	340	0.09	0.13	2	498	0.30	5	300
BZD23-C390	370	0.09	0.13	2	537	0.28	5	330
BZD23-C430	400	0.09	0.13	2	603	0.25	5	360
BZD23-C470	440	0.09	0.13	2	655	0.23	5	390
BZD23-C510	480	0.09	0.13	2	707	0.21	5	430

Note

1. Non-repetitive peak reverse current in accordance with *"IEC 60-1, Section 8"* (10/1000 µs pulse); see Fig.8.

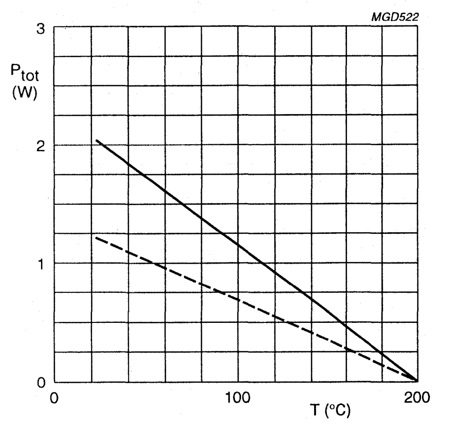
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm		
	BZD23-C3V6 to -C6V8		87	K/W
	BZD23-C7V5 to -C510		60	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1		
	BZD23-C3V6 to -C6V8		145	K/W
	BZD23-C7V5 to -C510		120	K/W

Note

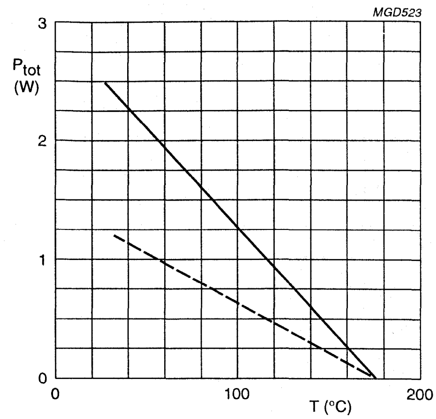
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm, see Fig.7. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA



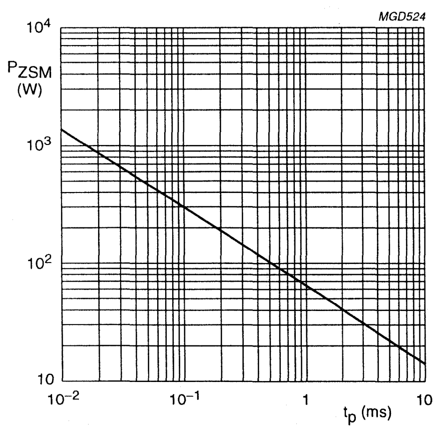
Types BZD23-C3V6 to -C6V8
Solid line: tie-point temperature; lead length = 10 mm.
Dotted line: ambient temperature; PCB mounted as shown in Fig.7.

Fig.2 Maximum total power dissipation as a function of temperature.



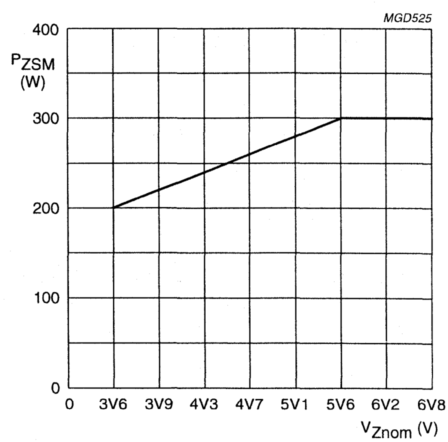
Types BZD23-C7V5 to -C510
Solid line: tie-point temperature; lead length = 10 mm.
Dotted line: ambient temperature; PCB mounted as shown in Fig.7.

Fig.3 Maximum total power dissipation as a function of temperature.



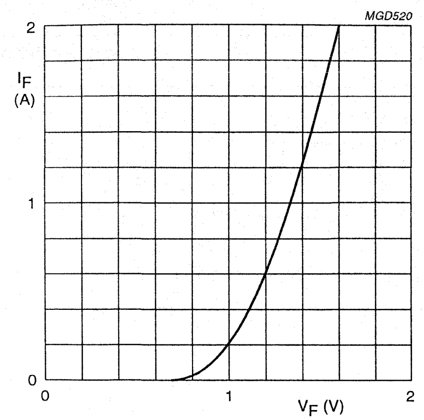
$T_j = 25$ °C prior to surge.
See also Fig.5.

Fig.4 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (square pulse).



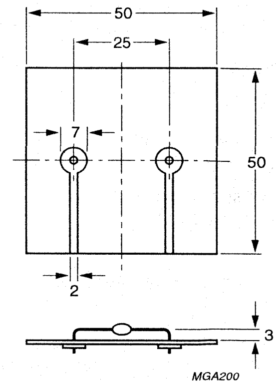
$T_j = 25$ °C prior to surge.

Fig.5 Maximum non-repetitive peak reverse power dissipation as a function of nominal working voltage.



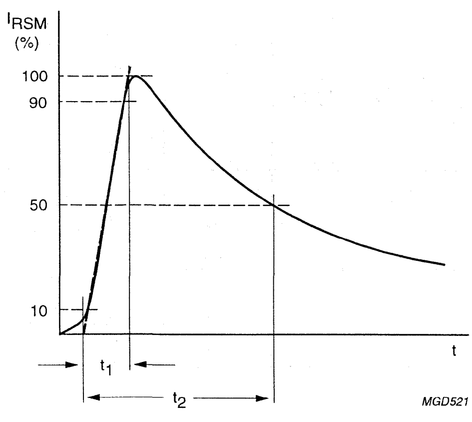
T_j = 25 °C.

Fig.6 Forward current as a function of forward voltage; typical values.



Dimensions in mm.

Fig.7 Device mounted on a printed-circuit board.



In accordance with *"IEC 60-1, Section 8"*.
t_1 = 10 µs.
t_2 = 1000 µs.

Fig.8 Non-repetitive peak reverse current pulse definition.

Voltage regulator diodes BZD27 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Zener working voltage range: 3.6 to 270 V for 46 types
- Transient suppressor stand-off voltage range: 6.2 to 430 V for 45 types
- Supplied in 8 mm embossed tape.

DESCRIPTION

Cavity free cylindrical glass SOD87 package through Implotec™(1) technology. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

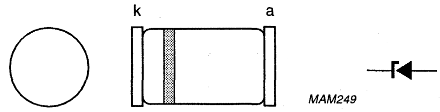


Fig.1 Simplified outline (SOD87) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
P_{tot}	total power dissipation	T_{tp} = 105 °C; see Figs 2 and 3			
	BZD27-C3V6 to -C6V8		–	1.7	W
	BZD27-C7V5 to -C510		–	2.3	W
P_{tot}	total power dissipation	PCB mounted (see Fig.7)			
	BZD27-C3V6 to -C6V8	T_{amb} = 60 °C; see Fig.2	–	0.8	W
	BZD27-C7V5 to -C510	T_{amb} = 55 °C; see Fig.3	–	0.8	W
P_{ZSM}	non-repetitive peak reverse power dissipation	t_p = 100 µs; square pulse; T_j = 25 °C prior to surge; see Figs.4 and 5			
	BZD27-C3V6 to -C6V8		–	300	W
	BZD27-C7V5 to -C510		–	300	W
P_{RSM}	non-repetitive peak reverse power dissipation	10/1 000 µs exponential pulse (see Fig.8); T_j = 25 °C prior to surge			
	BZD27-C7V5 to -C510		–	150	W
T_{stg}	storage temperature				
	BZD27-C3V6 to -C6V8		−65	+200	°C
	BZD27-C7V5 to -C510		−65	+175	°C
T_j	junction temperature				
	BZD27-C3V6 to -C6V8		−65	+200	°C
	BZD27-C7V5 to -C510		−65	+175	°C

ELECTRICAL CHARACTERISTICS

Total series

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_F	forward voltage	I_F = 0.2 A; see Fig.6	–	1.2	V

Per type when used as voltage regulator diodes

T_j = 25 °C unless otherwise specified.

TYPE No. SUFFIX (1)	WORKING VOLTAGE V_Z (V) at I_Z			DIFFERENTIAL RESISTANCE r_{dif} (Ω) at I_Z		TEMPERATURE COEFFICIENT S_Z (%/K) at I_Z		TEST CURRENT I_Z (mA)	REVERSE CURRENT at REVERSE VOLTAGE I_R (μA)	V_R (V)
	MIN.	NOM.	MAX.	TYP.	MAX.	MIN.	MAX.		MAX.	
C3V6	3.4	3.6	3.8	4	8	−0.14	−0.04	100	100	1
C3V9	3.7	3.9	4.1	4	8	−0.14	−0.04	100	50	1
C4V3	4.0	4.3	4.6	4	7	−0.12	−0.02	100	25	1
C4V7	4.4	4.7	5.0	3	7	−0.10	0.00	100	10	1
C5V1	4.8	5.1	5.4	3	6	−0.08	−0.02	100	5	1
C5V6	5.2	5.6	6.0	2	4	−0.04	0.04	100	10	2
C6V2	5.8	6.2	6.6	2	3	−0.01	0.06	100	5	2
C6V8	6.4	6.8	7.2	1	3	0.00	0.07	100	10	3
C7V5	7.0	7.5	7.9	1	2	0.00	0.07	100	50	3
C8V2	7.7	8.2	8.7	1	2	0.03	0.08	100	10	3
C9V1	8.5	9.1	9.6	2	4	0.03	0.08	50	10	5
C10	9.4	10	10.6	2	4	0.05	0.09	50	7	7.5
C11	10.4	11	11.6	4	7	0.05	0.10	50	4	8.2
C12	11.4	12	12.7	4	7	0.05	0.10	50	3	9.1
C13	12.4	13	14.1	5	10	0.05	0.10	50	2	10
C15	13.8	15	15.6	5	10	0.05	0.10	50	1	11
C16	15.3	16	17.1	6	15	0.06	0.11	25	1	12
C18	16.8	18	19.1	6	15	0.06	0.11	25	1	13
C20	18.8	20	21.2	6	15	0.06	0.11	25	1	15
C22	20.8	22	23.3	6	15	0.06	0.11	25	1	16
C24	22.8	24	25.6	7	15	0.06	0.11	25	1	18
C27	25.1	27	28.9	7	15	0.06	0.11	25	1	20
C30	28	30	32	8	15	0.06	0.11	25	1	22
C33	31	33	35	8	15	0.06	0.11	25	1	24
C36	34	36	38	21	40	0.06	0.11	10	1	27
C39	37	39	41	21	40	0.06	0.11	10	1	30
C43	40	43	46	24	45	0.07	0.12	10	1	33
C47	44	47	50	24	45	0.07	0.12	10	1	36

TYPE No. SUFFIX (1)	WORKING VOLTAGE V_Z (V) at I_Z			DIFFERENTIAL RESISTANCE r_{dif} (Ω) at I_Z		TEMPERATURE COEFFICIENT S_Z (%/K) at I_Z		TEST CURRENT I_Z (mA)	REVERSE CURRENT at REVERSE VOLTAGE I_R (μA)	V_R (V)
	MIN.	NOM.	MAX.	TYP.	MAX.	MIN.	MAX.		MAX.	
C51	48	51	54	25	60	0.07	0.12	10	1	39
C56	52	56	60	25	60	0.07	0.12	10	1	43
C62	58	62	66	25	80	0.08	0.13	10	1	47
C68	64	68	72	25	80	0.08	0.13	10	1	51
C75	70	75	79	30	100	0.08	0.13	10	1	56
C82	77	82	87	30	100	0.08	0.13	10	1	62
C91	85	91	96	60	200	0.09	0.13	5	1	68
C100	94	100	106	60	200	0.09	0.13	5	1	75
C110	104	110	116	80	250	0.09	0.13	5	1	82
C120	114	120	127	80	250	0.09	0.13	5	1	91
C130	124	130	141	110	300	0.09	0.13	5	1	100
C150	138	150	156	130	300	0.09	0.13	5	1	110
C160	153	160	171	150	350	0.09	0.13	5	1	120
C180	168	180	191	180	400	0.09	0.13	5	1	130
C200	188	200	212	200	500	0.09	0.13	5	1	150
C220	208	220	233	350	750	0.09	0.13	2	1	160
C240	228	240	256	400	850	0.09	0.13	2	1	180
C270	251	270	289	450	1000	0.09	0.13	2	1	200

Note

1. To complete the type number the suffix is added to the basic type number, e.g. BZD27-C51.

Per type when used as transient suppressor diodes

T_j = 25 °C unless otherwise specified.

TYPE NUMBER	REVERSE BREAKDOWN VOLTAGE	TEMPERATURE COEFFICIENT		TEST CURRENT	CLAMPING VOLTAGE		REVERSE CURRENT at STAND-OFF VOLTAGE	
	$V_{(BR)R}$ (V) at I_{test}	S_Z (%/K) at I_{test}		I_{test} (mA)	$V_{(CL)R}$ (V)	at I_{RSM} (A) note 1	I_R (μA)	at V_R (V)
	MIN.	MIN.	MAX.		MAX.		MAX.	
BZD27-C7V5	7.0	0.00	0.07	100	11.3	13.3	1500	6.2
BZD27-C8V2	7.7	0.03	0.08	100	12.3	12.2	1200	6.8
BZD27-C9V1	8.5	0.03	0.08	50	13.3	11.3	100	7.5
BZD27-C10	9.4	0.05	0.09	50	14.8	10.1	20	8.2
BZD27-C11	10.4	0.05	0.10	50	15.7	9.6	5	9.1
BZD27-C12	11.4	0.05	0.10	50	17.0	8.8	5	10
BZD27-C13	12.4	0.05	0.10	50	18.9	7.9	5	11
BZD27-C15	13.8	0.05	0.10	50	20.9	7.2	5	12
BZD27-C16	15.3	0.06	0.11	25	22.9	6.6	5	13
BZD27-C18	16.8	0.06	0.11	25	25.6	5.9	5	15
BZD27-C20	18.8	0.06	0.11	25	28.4	5.3	5	16
BZD27-C22	20.8	0.06	0.11	25	31.0	4.8	5	18
BZD27-C24	22.8	0.06	0.11	25	33.8	4.4	5	20
BZD27-C27	25.1	0.06	0.11	25	38.1	3.9	5	22
BZD27-C30	28	0.06	0.11	25	42.2	3.6	5	24
BZD27-C33	31	0.06	0.11	25	46.2	3.2	5	27
BZD27-C36	34	0.06	0.11	10	50.1	3.0	5	30
BZD27-C39	37	0.06	0.11	10	54.1	2.8	5	33
BZD27-C43	40	0.07	0.12	10	60.7	2.5	5	36
BZD27-C47	44	0.07	0.12	10	65.5	2.3	5	39
BZD27-C51	48	0.07	0.12	10	70.8	2.1	5	43
BZD27-C56	52	0.07	0.12	10	78.6	1.9	5	47
BZD27-C62	58	0.08	0.13	10	86.5	1.7	5	51
BZD27-C68	64	0.08	0.13	10	94.4	1.6	5	56
BZD27-C75	70	0.08	0.13	10	103.5	1.5	5	62
BZD27-C82	77	0.08	0.13	10	114	1.3	5	68
BZD27-C91	85	0.09	0.13	5	126	1.2	5	75
BZD27-C100	94	0.09	0.13	5	139	1.1	5	82
BZD27-C110	104	0.09	0.13	5	152	1.0	5	91
BZD27-C120	114	0.09	0.13	5	167	0.90	5	100
BZD27-C130	124	0.09	0.13	5	185	0.81	5	110
BZD27-C150	138	0.09	0.13	5	204	0.73	5	120
BZD27-C160	153	0.09	0.13	5	224	0.67	5	130

TYPE NUMBER	REVERSE BREAKDOWN VOLTAGE $V_{(BR)R}$ (V) at I_{test}	TEMPERATURE COEFFICIENT S_Z (%/K) at I_{test}		TEST CURRENT I_{test} (mA)	CLAMPING VOLTAGE $V_{(CL)R}$ (V)	at I_{RSM} (A) note 1	REVERSE CURRENT at STAND-OFF VOLTAGE I_R (µA)	at V_R (V)
	MIN.	MIN.	MAX.		MAX.		MAX.	
BZD27-C180	168	0.09	0.13	5	249	0.60	5	150
BZD27-C200	188	0.09	0.13	5	276	0.54	5	160
BZD27-C220	208	0.09	0.13	2	305	0.50	5	180
BZD27-C240	228	0.09	0.13	2	336	0.45	5	200
BZD27-C270	251	0.09	0.13	2	380	0.40	5	220
BZD27-C300	280	0.09	0.13	2	419	0.36	5	240
BZD27-C330	310	0.09	0.13	2	459	0.33	5	270
BZD27-C360	340	0.09	0.13	2	498	0.30	5	300
BZD27-C390	370	0.09	0.13	2	537	0.28	5	330
BZD27-C430	400	0.09	0.13	2	603	0.25	5	360
BZD27-C470	440	0.09	0.13	2	655	0.23	5	390
BZD27-C510	480	0.09	0.13	2	707	0.21	5	430

Note

1. Non-repetitive peak reverse current in accordance with *"IEC 60-1, Section 8"* (10/1000 µs pulse); see Fig.8.

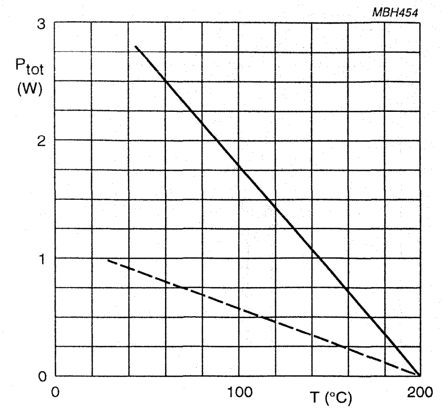
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point			
	BZD27-C3V6 to -C6V8		55	K/W
	BZD27-C7V5 to -C510		30	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1		
	BZD27-C3V6 to -C6V8		175	K/W
	BZD27-C7V5 to -C510		150	K/W

Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm, see Fig.7. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA

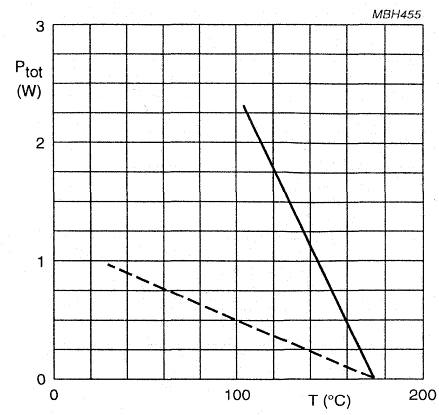


Types BZD27-C3V6 to -C6V8

Solid line: tie-point temperature.

Dotted line: ambient temperature; device mounted as shown in Fig.7.

Fig.2 Maximum total power dissipation as a function of temperature.

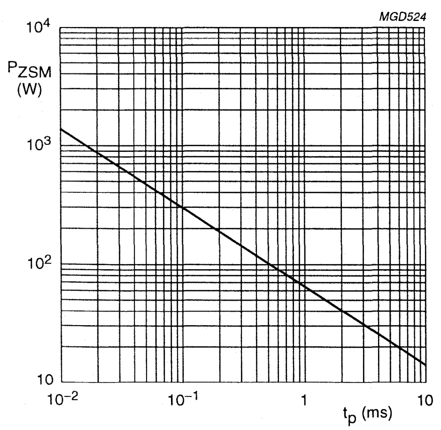


Types BZD27-C7V5 to -C510

Solid line: tie-point temperature.

Dotted line: ambient temperature; device mounted as shown in Fig.7.

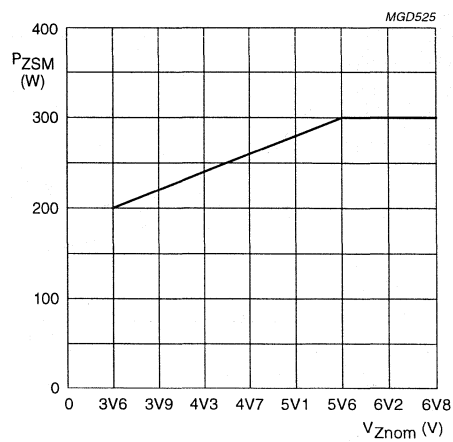
Fig.3 Maximum total power dissipation as a function of temperature.



T_j = 25 °C prior to surge.

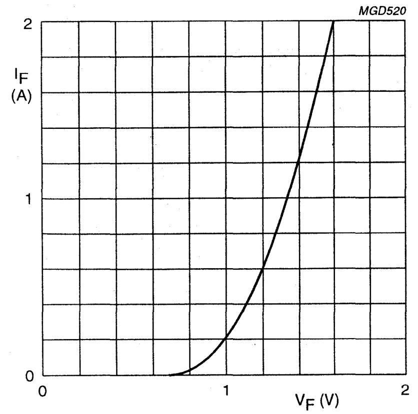
See also Fig 5.

Fig.4 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (square pulse).



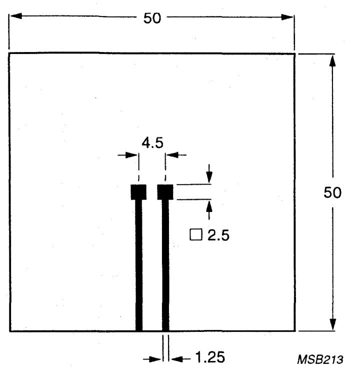
T_j = 25 °C prior to surge.

Fig.5 Maximum non-repetitive peak reverse power dissipation as a function of nominal working voltage.



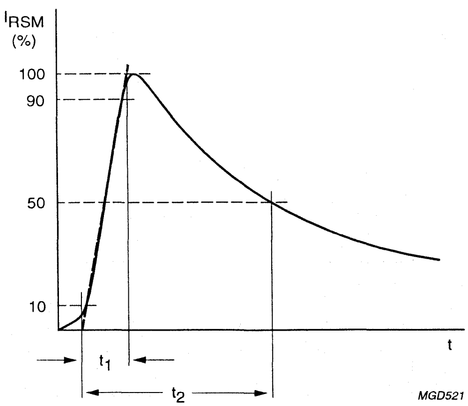
T_j = 25 °C.

Fig.6 Forward current as a function of forward voltage; typical values.



Dimensions in mm.

Fig.7 Printed-circuit board for surface mounting.



In accordance with *"IEC 60-1, Section 8"*.

t_1 = 10 μs.

t_2 = 1000 μs.

Fig.8 Non-repetitive peak reverse current pulse definition.

Voltage regulator diodes BZG03 series

FEATURES

- Glass passivatedb
- High maximum operating temperature
- Low leakage current
- Excellent stability
- UL 94V-O classified plastic package
- Zener working voltage range: 10 to 270 V for 35 types
- Supplied in 12 mm embossed tape.

DESCRIPTION

DO-214AC surface mountable package with glass passivated chip.

The well-defined void-free case is of a transfer-moulded thermo-setting plastic.

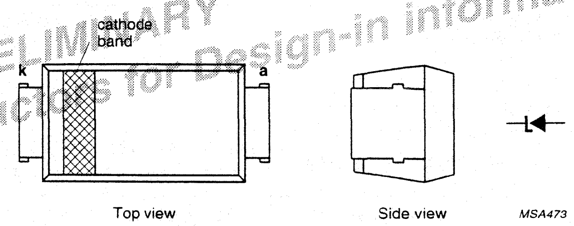


Fig.9 Simplified outline (DO-214AC; SOD106) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
P_{tot}	total power dissipation	T_{tp} = 100 °C; see Fig.10	–	3.00	W
P_{tot}	total power dissipation	T_{amb} = 50 °C; see Fig.10; device mounted on an Al_2O_3 PCB (see Fig.13)	–	1.25	W
P_{ZSM}	non-repetitive peak reverse power dissipation	t_p = 100 µs; square pulse; T_j = 25 °C prior to surge; see Fig.11	–	600	W
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature		−65	+175	°C

ELECTRICAL CHARACTERISTICS

Total series

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 0.5 A; see Fig.12	1.2	V

Per type

T_j = 25 °C unless otherwise specified.

TYPE No. SUFFIX (1)	WORKING VOLTAGE			DIFFERENTIAL RESISTANCE		TEMPERATURE COEFFICIENT		TEST CURRENT	REVERSE CURRENT at REVERSE VOLTAGE	
	V_Z (V) at I_Z			r_{dif} (Ω) at I_Z		S_Z (%/K) at I_Z		I_Z (mA)	I_R (μA)	V_R (V)
	MIN.	NOM.	MAX.	TYP.	MAX.	MIN.	MAX.		MAX.	
C10	9.4	10	10.6	2	4	0.05	0.09	50	7	7.5
C11	10.4	11	11.6	4	7	0.05	0.10	50	4	8.2
C12	11.4	12	12.7	4	7	0.05	0.10	50	3	9.1
C13	12.4	13	14.1	5	10	0.05	0.10	50	2	10
C15	13.8	15	15.6	5	10	0.05	0.10	50	1	11
C16	15.3	16	17.1	6	15	0.06	0.11	25	1	12
C18	16.8	18	19.1	6	15	0.06	0.11	25	1	13
C20	18.8	20	21.2	6	15	0.06	0.11	25	1	15
C22	20.8	22	23.3	6	15	0.06	0.11	25	1	16
C24	22.8	24	25.6	7	15	0.06	0.11	25	1	18
C27	25.1	27	28.9	7	15	0.06	0.11	25	1	20
C30	28	30	32	8	15	0.06	0.11	25	1	22
C33	31	33	35	8	15	0.06	0.11	25	1	24
C36	34	36	38	21	40	0.06	0.11	10	1	27
C39	37	39	41	21	40	0.06	0.11	10	1	30
C43	40	43	46	24	45	0.07	0.12	10	1	33
C47	44	47	50	24	45	0.07	0.12	10	1	36
C51	48	51	54	25	60	0.07	0.12	10	1	39
C56	52	56	60	25	60	0.07	0.12	10	1	43
C62	58	62	66	25	80	0.08	0.13	10	1	47
C68	64	68	72	25	80	0.08	0.13	10	1	51
C75	70	75	79	30	100	0.08	0.13	10	1	56
C82	77	82	87	30	100	0.08	0.13	10	1	62
C91	85	91	96	60	200	0.09	0.13	5	1	68
C100	94	100	106	60	200	0.09	0.13	5	1	75
C110	104	110	116	80	250	0.09	0.13	5	1	82
C120	114	120	127	80	250	0.09	0.13	5	1	91

TYPE No. SUFFIX (1)	WORKING VOLTAGE			DIFFERENTIAL RESISTANCE		TEMPERATURE COEFFICIENT		TEST CURRENT	REVERSE CURRENT at REVERSE VOLTAGE	
	V_Z (V) at I_Z			r_{dif} (Ω) at I_Z		S_Z (%/K) at I_Z		I_Z (mA)	I_R (µA)	V_R (V)
	MIN.	NOM.	MAX.	TYP.	MAX.	MIN.	MAX.		MAX.	
C130	124	130	141	110	300	0.09	0.13	5	1	100
C150	138	150	156	130	300	0.09	0.13	5	1	110
C160	153	160	171	150	350	0.09	0.13	5	1	120
C180	168	180	191	180	400	0.09	0.13	5	1	130
C200	188	200	212	200	500	0.09	0.13	5	1	150
C220	208	220	233	350	750	0.09	0.13	2	1	160
C240	228	240	256	400	850	0.09	0.13	2	1	180
C270	251	270	289	450	1000	0.09	0.13	2	1	200

Note

1. To complete the type number the suffix is added to the basic type number, e.g. BZG03-C130.

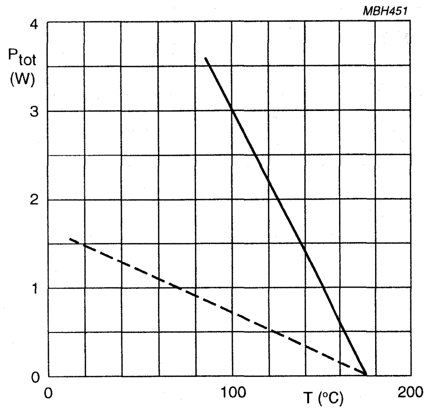
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point		25	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W
		note 2	150	K/W

Notes

1. Device mounted on an Al_2O_3 printed-circuit board, 0.7 mm thick; thickness of Cu-layer ≥35 µm, see Fig.13.
2. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm, see Fig.13. For more information please refer to the *'General Part of Handbook SC01'*.

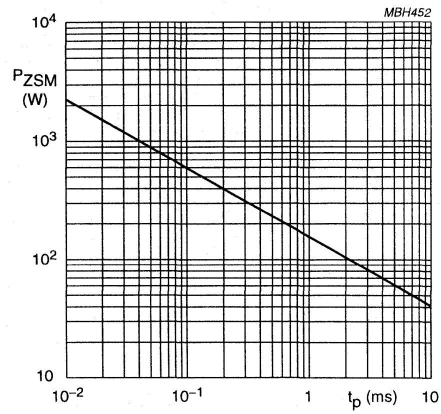
GRAPHICAL DATA



Solid line: tie-point temperature.

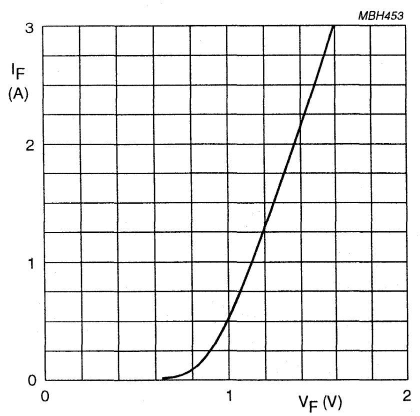
Dotted line: ambient temperature; device mounted on an Al_2O_3 PCB as shown in Fig.13.

Fig.10 Maximum total power dissipation as a function of temperature.



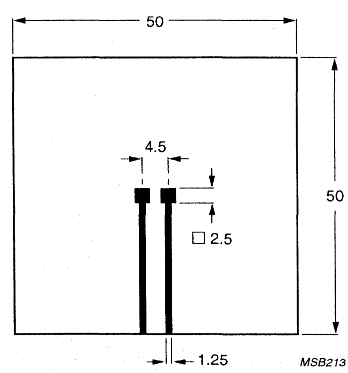
T_j = 25 °C prior to surge.

Fig.11 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (square pulse).



T_j = 25 °C.

Fig.12 Forward current as a function of forward voltage; typical values.



Dimensions in mm.

Fig.13 Printed-circuit board for surface mounting.

Transient voltage suppressor diodes | BZG04 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- UL 94V-O classified plastic package
- Transient suppressor stand-off voltage range: 8.2 to 220 V for 32 types
- Shipped in 12 mm embossed tape.

DESCRIPTION

DO-214AC surface mountable package with glass passivated chip.

The well-defined void-free case is of a transfer-moulded thermo-setting plastic.

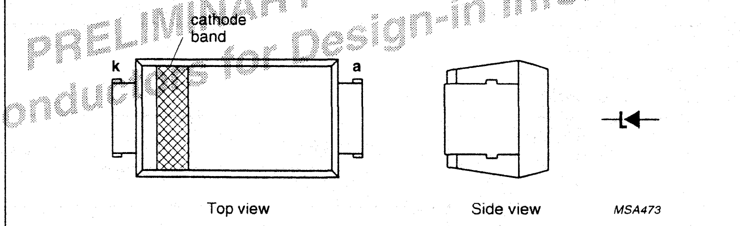


Fig.14 Simplified outline (DO-214AC; SOD106) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
P_{RSM}	non-repetitive peak reverse power dissipation	10/1 000 μs exponential pulse (see Fig.17); T_j = 25 °C prior to surge; see also Fig.15	–	300	W
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature		−65	+175	°C

ELECTRICAL CHARACTERISTICS

Total series

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_F	forward voltage	I_F = 0.5 A; see Fig.16	–	1.2	V

Per type

T_j = 25 °C unless otherwise specified.

TYPE NUMBER	REVERSE BREAKDOWN VOLTAGE	TEMPERATURE COEFFICIENT		TEST CURRENT	CLAMPING VOLTAGE		REVERSE CURRENT at STAND-OFF VOLTAGE	
	$V_{(BR)R}$ (V) at I_{test}	S_Z (%/K) at I_{test}		I_{test} (mA)	$V_{(CL)R}$ (V)	at I_{RSM} (A) note 1	I_R (μA)	at V_R (V)
	MIN.	MIN.	MAX.		MAX.		MAX.	
BZG04-8V2	9.4	0.05	0.09	50	14.8	20.3	20	8.2
BZG04-9V1	10.4	0.05	0.10	50	15.7	19.1	5	9.1
BZG04-10	11.4	0.05	0.10	50	17.0	17.7	5	10
BZG04-11	12.4	0.05	0.10	50	18.9	15.9	5	11
BZG04-12	13.8	0.05	0.10	50	20.9	14.4	5	12
BZG04-13	15.3	0.06	0.11	25	22.9	13.1	5	13
BZG04-15	16.8	0.06	0.11	25	25.6	11.7	5	15
BZG04-16	18.8	0.06	0.11	25	28.4	10.6	5	16
BZG04-18	20.8	0.06	0.11	25	31.0	9.7	5	18
BZG04-20	22.8	0.06	0.11	25	33.8	8.9	5	20
BZG04-22	25.1	0.06	0.11	25	38.1	7.9	5	22
BZG04-24	28	0.06	0.11	25	42.2	7.1	5	24
BZG04-27	31	0.06	0.11	25	46.2	6.5	5	27
BZG04-30	34	0.06	0.11	10	50.1	6.0	5	30
BZG04-33	37	0.06	0.11	10	54.1	5.5	5	33
BZG04-36	40	0.07	0.12	10	60.7	4.9	5	36
BZG04-39	44	0.07	0.12	10	65.5	4.6	5	39
BZG04-43	48	0.07	0.12	10	70.8	4.2	5	43
BZG04-47	52	0.07	0.12	10	78.6	3.8	5	47
BZG04-51	58	0.08	0.13	10	86.5	3.5	5	51
BZG04-56	64	0.08	0.13	10	94.4	3.2	5	56
BZG04-62	70	0.08	0.13	10	103.5	2.9	5	62
BZG04-68	77	0.08	0.13	10	114	2.6	5	68
BZG04-75	85	0.09	0.13	5	126	2.4	5	75
BZG04-82	94	0.09	0.13	5	139	2.2	5	82
BZG04-91	104	0.09	0.13	5	152	2.0	5	91
BZG04-100	114	0.09	0.13	5	167	1.8	5	100

TYPE NUMBER	REVERSE BREAKDOWN VOLTAGE	TEMPERATURE COEFFICIENT		TEST CURRENT	CLAMPING VOLTAGE		REVERSE CURRENT at STAND-OFF VOLTAGE	
	$V_{(BR)R}$ (V) at I_{test}	S_Z (%/K) at I_{test}		I_{test} (mA)	$V_{(CL)R}$ (V)	at I_{RSM} (A) note 1	I_R (μA)	at V_R (V)
	MIN.	MIN.	MAX.		MAX.		MAX.	
BZG04-110	124	0.09	0.13	5	185	1.6	5	110
BZG04-120	138	0.09	0.13	5	204	1.5	5	120
BZG04-130	153	0.09	0.13	5	224	1.3	5	130
BZG04-150	168	0.09	0.13	5	249	1.2	5	150
BZG04-160	188	0.09	0.13	5	276	1.1	5	160
BZG04-180	208	0.09	0.13	2	305	1.0	5	180
BZG04-200	228	0.09	0.13	2	336	0.9	5	200
BZG04-220	251	0.09	0.13	2	380	0.8	5	220

Note

1. Non-repetitive peak reverse current in accordance with *"IEC 60-1, Section 8"* (10/1 000 μs pulse); see Fig.17.

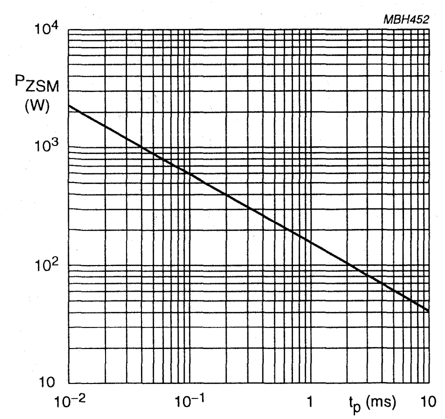
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point		25	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W
		note 2	150	K/W

Notes

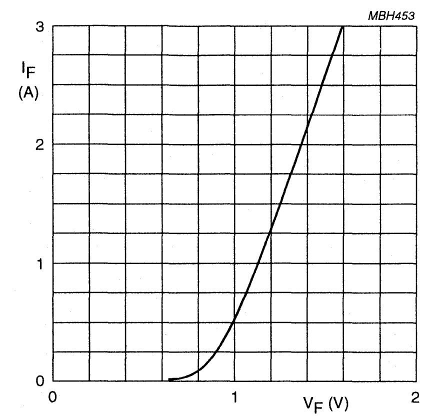
1. Device mounted on an Al_2O_3 printed-circuit board, 0.7 mm thick; thickness of Cu-layer ≥35 μm, see Fig.18.
2. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.18. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA



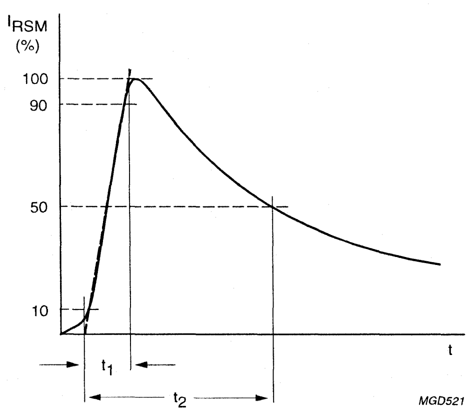
T_j = 25 °C prior to surge.

Fig.15 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (square pulse).



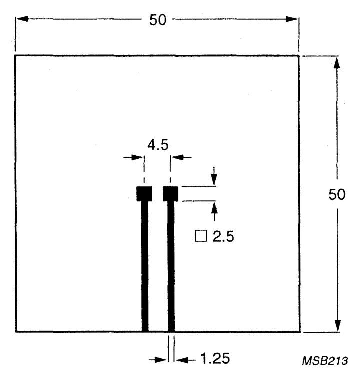
T_j = 25 °C.

Fig.16 Forward current as a function of forward voltage; typical values.



In accordance with *"IEC 60-1, Section 8"*.
t_1 = 10 µs.
t_2 = 1000 µs.

Fig.17 Non-repetitive peak reverse current pulse definition.



Dimensions in mm.

Fig.18 Printed-circuit board for surface mounting.

Voltage regulator diodes BZT03 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Zener working voltage range: 7.5 to 270 V for 38 types
- Transient suppressor stand-off voltage range: 6.2 to 430 V for 45 types
- Available in ammo-pack.

DESCRIPTION

Rugged glass SOD57 package, using a high temperature alloyed construction. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

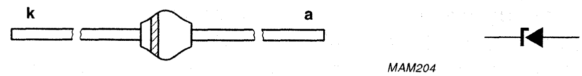


Fig.19 Simplified outline (SOD57) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
P_{tot}	total power dissipation	T_{tp} = 25 °C; lead length 10 mm; see Fig.20	–	3.25	W
		T_{amb} = 45 °C; see Fig.20; PCB mounted (see Fig.24)	–	1.30	W
P_{ZRM}	repetitive peak reverse power dissipation		–	10	W
P_{ZSM}	non-repetitive peak reverse power dissipation	t_p = 100 µs; square pulse; T_j = 25 °C prior to surge; see Fig.21	–	600	W
P_{RSM}	non-repetitive peak reverse power dissipation	10/1 000 µs exponential pulse (see Fig.22); T_j = 25 °C prior to surge	–	300	W
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature		−65	+175	°C

ELECTRICAL CHARACTERISTICS

Total series

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 0.5 A; see Fig.23	1.2	V

Per type when used as voltage regulator diodes

T_j = 25 °C unless otherwise specified.

TYPE No. SUFFIX (1)	WORKING VOLTAGE V_Z (V) at I_Z			DIFFERENTIAL RESISTANCE r_{dif} (Ω) at I_Z		TEMPERATURE COEFFICIENT S_Z (%/K) at I_Z		TEST CURRENT	REVERSE CURRENT at REVERSE VOLTAGE	
	MIN.	NOM.	MAX.	TYP.	MAX.	MIN.	MAX.	I_Z (mA)	I_R (μA) MAX.	V_R (V)
C7V5	7.0	7.5	7.9	1	2	0.00	0.07	100	750	5.6
C8V2	7.7	8.2	8.7	1	2	0.03	0.08	100	600	6.2
C9V1	8.5	9.1	9.6	2	4	0.03	0.08	50	20	6.8
C10	9.4	10	10.6	2	4	0.05	0.09	50	10	7.5
C11	10.4	11	11.6	4	7	0.05	0.10	50	4	8.2
C12	11.4	12	12.7	4	7	0.05	0.10	50	3	9.1
C13	12.4	13	14.1	5	10	0.05	0.10	50	2	10
C15	13.8	15	15.6	5	10	0.05	0.10	50	1	11
C16	15.3	16	17.1	6	15	0.06	0.11	25	1	12
C18	16.8	18	19.1	6	15	0.06	0.11	25	1	13
C20	18.8	20	21.2	6	15	0.06	0.11	25	1	15
C22	20.8	22	23.3	6	15	0.06	0.11	25	1	16
C24	22.8	24	25.6	7	15	0.06	0.11	25	1	18
C27	25.1	27	28.9	7	15	0.06	0.11	25	1	20
C30	28	30	32	8	15	0.06	0.11	25	1	22
C33	31	33	35	8	15	0.06	0.11	25	1	24
C36	34	36	38	21	40	0.06	0.11	10	1	27
C39	37	39	41	21	40	0.06	0.11	10	1	30
C43	40	43	46	24	45	0.07	0.12	10	1	33
C47	44	47	50	24	45	0.07	0.12	10	1	36
C51	48	51	54	25	60	0.07	0.12	10	1	39
C56	52	56	60	25	60	0.07	0.12	10	1	43
C62	58	62	66	25	80	0.08	0.13	10	1	47
C68	64	68	72	25	80	0.08	0.13	10	1	51
C75	70	75	79	30	100	0.08	0.13	10	1	56
C82	77	82	87	30	100	0.08	0.13	10	1	62
C91	85	91	96	60	200	0.09	0.13	5	1	68

TYPE No. SUFFIX (1)	WORKING VOLTAGE			DIFFERENTIAL RESISTANCE		TEMPERATURE COEFFICIENT		TEST CURRENT	REVERSE CURRENT at REVERSE VOLTAGE	
	V_Z (V) at I_Z			r_{dif} (Ω) at I_Z		S_Z (%/K) at I_Z		I_Z (mA)	I_R (μA)	V_R (V)
	MIN.	NOM.	MAX.	TYP.	MAX.	MIN.	MAX.		MAX.	
C100	94	100	106	60	200	0.09	0.13	5	1	75
C110	104	110	116	80	250	0.09	0.13	5	1	82
C120	114	120	127	80	250	0.09	0.13	5	1	91
C130	124	130	141	110	300	0.09	0.13	5	1	100
C150	138	150	156	130	300	0.09	0.13	5	1	110
C160	153	160	171	150	350	0.09	0.13	5	1	120
C180	168	180	191	180	400	0.09	0.13	5	1	130
C200	188	200	212	200	500	0.09	0.13	5	1	150
C220	208	220	233	350	750	0.09	0.13	2	1	160
C240	228	240	256	400	850	0.09	0.13	2	1	180
C270	251	270	289	450	1000	0.09	0.13	2	1	200

Note

1. To complete the type number the suffix is added to the basic type number, e.g. BZT03-C100.

Per type when used as transient suppressor diodes

T_j = 25 °C unless otherwise specified.

TYPE NUMBER	REVERSE BREAKDOWN VOLTAGE	TEMPERATURE COEFFICIENT		TEST CURRENT	CLAMPING VOLTAGE		REVERSE CURRENT at STAND-OFF VOLTAGE	
	$V_{(BR)R}$ (V) at I_{test}	S_Z (%/K) at I_{test}		I_{test} (mA)	$V_{(CL)R}$ (V)	at I_{RSM} (A) note 1	I_R (μA)	at V_R (V)
	MIN.	MIN.	MAX.		MAX.		MAX.	
BZT03-C7V5	7.0	0.00	0.07	100	11.3	26.5	1500	6.2
BZT03-C8V2	7.7	0.03	0.08	100	12.3	24.4	1200	6.8
BZT03-C9V1	8.5	0.03	0.08	50	13.3	22.7	100	7.5
BZT03-C10	9.4	0.05	0.09	50	14.8	20.3	20	8.2
BZT03-C11	10.4	0.05	0.10	50	15.7	19.1	5	9.1
BZT03-C12	11.4	0.05	0.10	50	17.0	17.7	5	10
BZT03-C13	12.4	0.05	0.10	50	18.9	15.9	5	11
BZT03-C15	13.8	0.05	0.10	50	20.9	14.4	5	12
BZT03-C16	15.3	0.06	0.11	25	22.9	13.1	5	13
BZT03-C18	16.8	0.06	0.11	25	25.6	11.7	5	15
BZT03-C20	18.8	0.06	0.11	25	28.4	10.6	5	16
BZT03-C22	20.8	0.06	0.11	25	31.0	9.7	5	18
BZT03-C24	22.8	0.06	0.11	25	33.8	8.9	5	20
BZT03-C27	25.1	0.06	0.11	25	38.1	7.9	5	22
BZT03-C30	28	0.06	0.11	25	42.2	7.1	5	24
BZT03-C33	31	0.06	0.11	25	46.2	6.5	5	27
BZT03-C36	34	0.06	0.11	10	50.1	6.0	5	30
BZT03-C39	37	0.06	0.11	10	54.1	5.5	5	33
BZT03-C43	40	0.07	0.12	10	60.7	4.9	5	36
BZT03-C47	44	0.07	0.12	10	65.5	4.6	5	39
BZT03-C51	48	0.07	0.12	10	70.8	4.2	5	43
BZT03-C56	52	0.07	0.12	10	78.6	3.8	5	47
BZT03-C62	58	0.08	0.13	10	86.5	3.5	5	51
BZT03-C68	64	0.08	0.13	10	94.4	3.2	5	56
BZT03-C75	70	0.08	0.13	10	103.5	2.9	5	62
BZT03-C82	77	0.08	0.13	10	114.0	2.6	5	68
BZT03-C91	85	0.09	0.13	5	126	2.4	5	75
BZT03-C100	94	0.09	0.13	5	139	2.2	5	82
BZT03-C110	104	0.09	0.13	5	152	2.0	5	91
BZT03-C120	114	0.09	0.13	5	167	1.8	5	100
BZT03-C130	124	0.09	0.13	5	185	1.6	5	110
BZT03-C150	138	0.09	0.13	5	204	1.5	5	120
BZT03-C160	153	0.09	0.13	5	224	1.3	5	130

TYPE NUMBER	REVERSE BREAKDOWN VOLTAGE	TEMPERATURE COEFFICIENT		TEST CURRENT	CLAMPING VOLTAGE		REVERSE CURRENT at STAND-OFF VOLTAGE	
	$V_{(BR)R}$ (V) at I_{test}	S_Z (%/K) at I_{test}		I_{test} (mA)	$V_{(CL)R}$ (V)	at I_{RSM} (A) note 1	I_R (μA)	at V_R (V)
	MIN.	MIN.	MAX.		MAX.		MAX.	
BZT03-C180	168	0.09	0.13	5	249	1.2	5	150
BZT03-C200	188	0.09	0.13	5	276	1.1	5	160
BZT03-C220	208	0.09	0.13	2	305	1.0	5	180
BZT03-C240	228	0.09	0.13	2	336	0.9	5	200
BZT03-C270	251	0.09	0.13	2	380	0.8	5	220
BZT03-C300	280	0.09	0.13	2	419	0.72	5	240
BZT03-C330	310	0.09	0.13	2	459	0.65	5	270
BZT03-C360	340	0.09	0.13	2	498	0.60	5	300
BZT03-C390	370	0.09	0.13	2	537	0.56	5	330
BZT03-C430	400	0.09	0.13	2	603	0.50	5	360
BZT03-C470	440	0.09	0.13	2	655	0.45	5	390
BZT03-C510	480	0.09	0.13	2	707	0.42	5	430

Note

1. Non-repetitive peak reverse current in accordance with *"IEC 60-1, Section 8"* (10/1 000 μs pulse); see Fig.22.

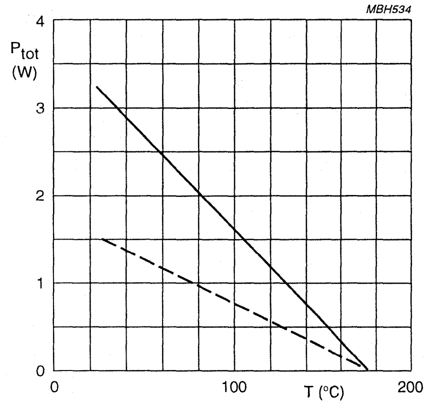
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	46	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

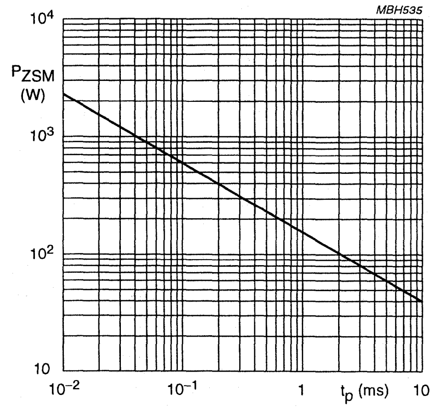
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.24. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA



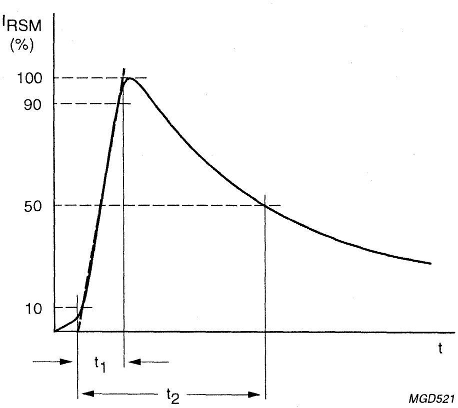
Solid line: tie-point temperature; lead length = 10 mm.
Dotted line: ambient temperature; PCB mounted as shown in

Fig.20 Maximum total power dissipation as a function of temperature.



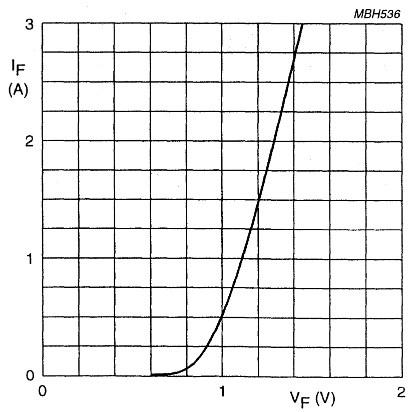
T_j = 25 °C prior to surge.

Fig.21 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (square pulse).



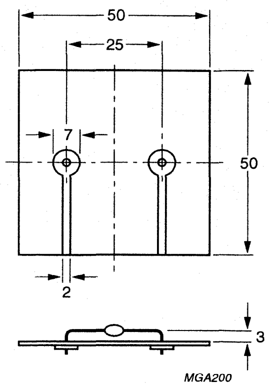
In accordance with *"IEC 60-1, Section 8"*.
t_1 = 10 µs.
t_2 = 1000 µs.

Fig.22 Non-repetitive peak reverse current pulse definition.



T_j = 25 °C.

Fig.23 Forward current as a function of forward voltage; typical values.



Dimensions in mm.

Fig.24 Device mounted on a printed-circuit board.

Voltage regulator diodes — BZW03 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Zener working voltage range: 7.5 to 270 V for 38 types
- Transient suppressor stand-off voltage range: 6.2 to 430 V for 45 types
- Available in ammo-pack
- Also available with preformed leads for easy insertion.

DESCRIPTION

Rugged glass SOD64 package, using a high temperature alloyed construction. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

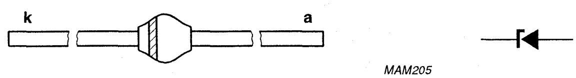


Fig.25 Simplified outline (SOD64) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
P_{tot}	total power dissipation	T_{tp} = 25 °C; lead length 10 mm; see Fig.26	–	6.00	W
		T_{amb} = 45 °C; see Fig.26; PCB mounted (see Fig.30)	–	1.75	W
P_{ZRM}	repetitive peak reverse power dissipation		–	20	W
P_{ZSM}	non-repetitive peak reverse power dissipation	t_p = 100 µs; square pulse; T_j = 25 °C prior to surge; see Fig.27	–	1000	W
P_{RSM}	non-repetitive peak reverse power dissipation	10/1 000 µs exponential pulse (see Fig.31); T_j = 25 °C prior to surge; see Fig.28	–	500	W
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+175	°C

Voltage regulator diodes BZW03 series

ELECTRICAL CHARACTERISTICS

Total series

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; see Fig.29	1.2	V

Per type when used as voltage regulator diodes

T_j = 25 °C unless otherwise specified.

TYPE No. SUFFIX (1)	WORKING VOLTAGE V_Z (V) at I_Z			DIFFERENTIAL RESISTANCE r_{dif} (Ω) at I_Z		TEMPERATURE COEFFICIENT S_Z (%/K) at I_Z		TEST CURRENT I_Z (mA)	REVERSE CURRENT at REVERSE VOLTAGE I_R (μA)	at V_R (V)
	MIN.	NOM.	MAX.	TYP.	MAX.	MIN.	MAX.		MAX.	
C7V5	7.0	7.5	7.9	0.7	1.5	0.00	0.07	175	1500	5.6
C8V2	7.7	8.2	8.7	0.8	1.5	0.03	0.08	150	1200	6.2
C9V1	8.5	9.1	9.6	0.9	2.0	0.03	0.08	150	40	6.8
C10	9.4	10	10.6	1.0	2.0	0.05	0.09	125	20	7.5
C11	10.4	11	11.6	1.1	2.5	0.05	0.10	125	15	8.2
C12	11.4	12	12.7	1.1	2.5	0.05	0.10	100	10	9.1
C13	12.4	13	14.1	1.2	2.5	0.05	0.10	100	4	10
C15	13.8	15	15.6	1.2	2.5	0.05	0.10	75	2	11
C16	15.3	16	17.1	1.3	2.5	0.06	0.11	75	2	12
C18	16.8	18	19.1	1.3	2.5	0.06	0.11	65	2	13
C20	18.8	20	21.2	1.5	3.0	0.06	0.11	65	2	15
C22	20.8	22	23.3	1.6	3.5	0.06	0.11	50	2	16
C24	22.8	24	25.6	1.8	3.5	0.06	0.11	50	2	18
C27	25.1	27	28.9	2.5	5	0.06	0.11	50	2	20
C30	28	30	32	4	8	0.06	0.11	40	2	22
C33	31	33	35	5	10	0.06	0.11	40	2	24
C36	34	36	38	6	11	0.06	0.11	30	2	27
C39	37	39	41	7	14	0.06	0.11	30	2	30
C43	40	43	46	10	20	0.07	0.12	30	2	33
C47	44	47	50	12	25	0.07	0.12	25	2	36
C51	48	51	54	14	27	0.07	0.12	25	2	39
C56	52	56	60	18	35	0.07	0.12	20	2	43
C62	58	62	66	20	42	0.08	0.13	20	2	47
C68	64	68	72	22	44	0.08	0.13	20	2	51
C75	70	75	79	25	45	0.08	0.13	20	2	56
C82	77	82	87	30	65	0.08	0.13	15	2	62
C91	85	91	96	40	75	0.09	0.13	15	2	68

TYPE No. SUFFIX (1)	WORKING VOLTAGE			DIFFERENTIAL RESISTANCE		TEMPERATURE COEFFICIENT		TEST CURRENT	REVERSE CURRENT at REVERSE VOLTAGE	
	V_Z (V) at I_Z			r_{dif} (Ω) at I_Z		S_Z (%/K) at I_Z		I_Z (mA)	I_R (μA)	at V_R (V)
	MIN.	NOM.	MAX.	TYP.	MAX.	MIN.	MAX.		MAX.	
C100	94	100	106	45	90	0.09	0.13	12	2	75
C110	104	110	116	65	125	0.09	0.13	12	2	82
C120	114	120	127	90	170	0.09	0.13	10	2	91
C130	124	130	141	100	190	0.09	0.13	10	2	100
C150	138	150	156	150	330	0.09	0.13	8	2	110
C160	153	160	171	180	350	0.09	0.13	8	2	120
C180	168	180	191	210	430	0.09	0.13	5	2	130
C200	188	200	212	250	500	0.09	0.13	5	2	150
C220	208	220	233	350	700	0.09	0.13	5	2	160
C240	228	240	256	450	900	0.09	0.13	5	2	180
C270	251	270	289	600	1200	0.09	0.13	5	2	200

Note

1. To complete the type number the suffix is added to the basic type number, e.g. BZW03-C100.

Per type when used as transient suppressor diodes

T_j = 25 °C unless otherwise specified.

TYPE NUMBER	REVERSE BREAKDOWN VOLTAGE	TEMPERATURE COEFFICIENT		TEST CURRENT	CLAMPING VOLTAGE		REVERSE CURRENT at STAND-OFF VOLTAGE	
	$V_{(BR)R}$ (V) at I_{test}	S_Z (%/K) at I_{test}		I_{test} (mA)	$V_{(CL)R}$ (V)	at I_{RSM} (A) note 1	I_R (μA)	at V_R (V)
	MIN.	MIN.	MAX.		MAX.		MAX.	
BZW03-C7V5	7.0	0.00	0.07	175	11.3	44.2	3000	6.2
BZW03-C8V2	7.7	0.03	0.08	150	12.3	40.6	2400	6.8
BZW03-C9V1	8.5	0.03	0.08	150	13.3	37.6	100	7.5
BZW03-C10	9.4	0.05	0.09	125	14.8	34.0	40	8.2
BZW03-C11	10.4	0.05	0.10	125	15.7	31.8	30	9.1
BZW03-C12	11.4	0.05	0.10	100	17.0	29.4	20	10
BZW03-C13	12.4	0.05	0.10	100	18.9	26.4	10	11
BZW03-C15	13.8	0.05	0.10	75	20.9	23.9	10	12
BZW03-C16	15.3	0.06	0.11	75	22.9	21.8	10	13
BZW03-C18	16.8	0.06	0.11	65	25.6	19.5	10	15
BZW03-C20	18.8	0.06	0.11	65	28.4	17.6	10	16
BZW03-C22	20.8	0.06	0.11	50	31.0	16.1	10	18
BZW03-C24	22.8	0.06	0.11	50	33.8	14.8	10	20
BZW03-C27	25.1	0.06	0.11	50	38.1	13.1	10	22
BZW03-C30	28	0.06	0.11	40	42.2	11.8	10	24
BZW03-C33	31	0.06	0.11	40	46.2	10.8	10	27
BZW03-C36	34	0.06	0.11	30	50.1	10.0	10	30
BZW03-C39	37	0.06	0.11	30	54.1	9.2	10	33
BZW03-C43	40	0.07	0.12	30	60.7	8.2	10	36
BZW03-C47	44	0.07	0.12	25	65.5	7.6	10	39
BZW03-C51	48	0.07	0.12	25	70.8	7.0	10	43
BZW03-C56	52	0.07	0.12	20	78.6	6.3	10	47
BZW03-C62	58	0.08	0.13	20	86.5	5.8	10	51
BZW03-C68	64	0.08	0.13	20	94.4	5.3	10	56
BZW03-C75	70	0.08	0.13	20	103.5	4.8	10	62
BZW03-C82	77	0.08	0.13	15	114.0	4.3	10	68
BZW03-C91	85	0.09	0.13	15	126	3.9	10	75
BZW03-C100	94	0.09	0.13	12	139	3.6	10	82
BZW03-C110	104	0.09	0.13	12	152	3.3	10	91
BZW03-C120	114	0.09	0.13	10	167	3.0	10	100
BZW03-C130	124	0.09	0.13	10	185	2.7	10	110
BZW03-C150	138	0.09	0.13	8	204	2.4	10	120
BZW03-C160	153	0.09	0.13	8	224	2.2	10	130

TYPE NUMBER	REVERSE BREAKDOWN VOLTAGE	TEMPERATURE COEFFICIENT		TEST CURRENT	CLAMPING VOLTAGE		REVERSE CURRENT at STAND-OFF VOLTAGE	
	$V_{(BR)R}$ (V) at I_{test}	S_Z (%/K) at I_{test}		I_{test} (mA)	$V_{(CL)R}$ (V)	at I_{RSM} (A) note 1	I_R (μA)	at V_R (V)
	MIN.	MIN.	MAX.		MAX.		MAX.	
BZW03-C180	168	0.09	0.13	5	249	2.0	10	150
BZW03-C200	188	0.09	0.13	5	276	1.8	10	160
BZW03-C220	208	0.09	0.13	5	305	1.6	10	180
BZW03-C240	228	0.09	0.13	5	336	1.5	10	200
BZW03-C270	251	0.09	0.13	5	380	1.3	10	220
BZW03-C300	280	0.09	0.13	5	419	1.2	10	240
BZW03-C330	310	0.09	0.13	5	459	1.1	10	270
BZW03-C360	340	0.09	0.13	5	498	1.0	10	300
BZW03-C390	370	0.09	0.13	5	537	0.93	10	330
BZW03-C430	400	0.09	0.13	5	603	0.83	10	360
BZW03-C470	440	0.09	0.13	5	655	0.76	10	390
BZW03-C510	480	0.09	0.13	5	707	0.71	10	430

Note

1. Non-repetitive peak reverse current in accordance with *"IEC 60-1, Section 8"* (10/1000 μs pulse); see Fig.31.

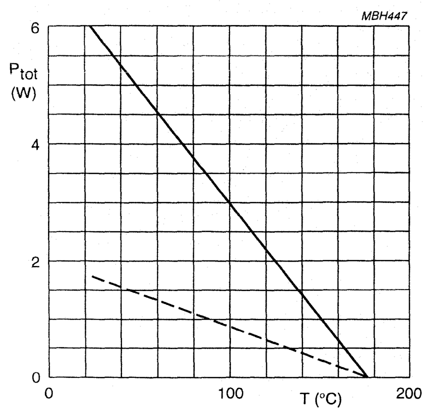
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	25	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	75	K/W

Note

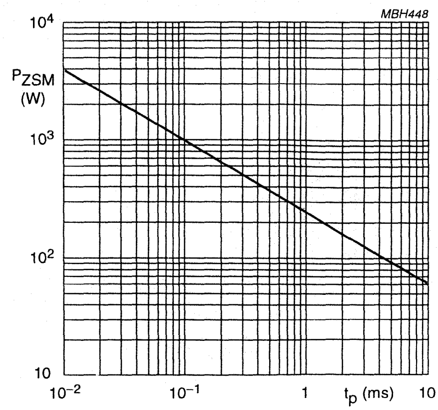
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.30. For more information please refer to the *'General Part of Handbook SC01'*.

GRAPHICAL DATA



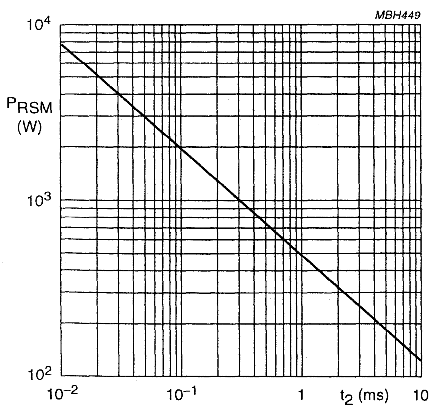
Solid line: tie-point temperature; lead length = 10 mm.
Dotted line: ambient temperature; device mounted as shown in Fig.30.

Fig.26 Maximum total power dissipation as a function of temperature.



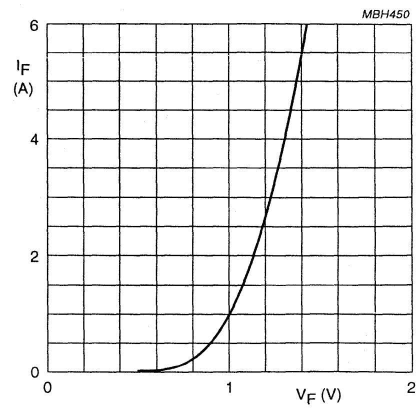
T_j = 25 °C prior to surge.

Fig.27 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (square pulse).



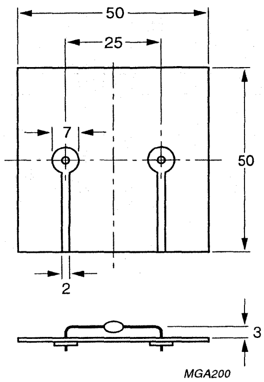
T_j = 25 °C prior to surge.
For definition of exponential pulse see Fig.31.

Fig.28 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (exponential pulse).



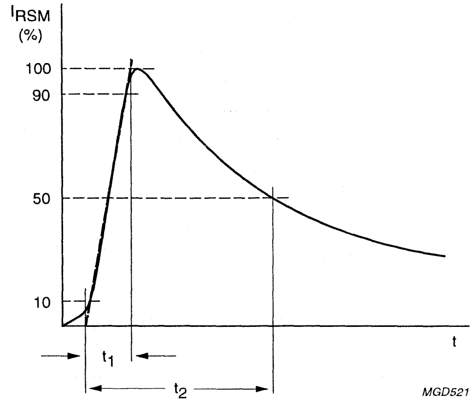
T_j = 25 °C.

Fig.29 Forward current as a function of forward voltage; typical values.



Dimensions in mm.

Fig.30 Device mounted on a printed-circuit board.



In accordance with *"IEC 60-1, Section 8"*.
t_1 = 10 μs.
t_2 = 1000 μs.

Fig.31 Non-repetitive peak reverse current pulse definition.

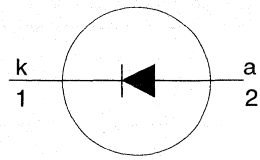
Rectifier diodes Schottky barrier

PBYL1025 series

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 20 V/ 25 V

$I_{F(AV)}$ = 10 A

$V_F \leq 0.4$ V

GENERAL DESCRIPTION

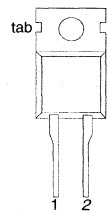
Schottky rectifier diodes intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYL1025 series is supplied in the SOD59 (TO220AC) conventional leaded package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYL10		**20**	**25**	
V_{RRM}	Peak repetitive reverse voltage		-	20	25	V
V_{RWM}	Working peak reverse voltage		-	20	25	V
V_R	Continuous reverse voltage	$T_{mb} \leq 119$ ˚C	-	20	25	V
$I_{F(AV)}$	Average rectified forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 132$ ˚C	-	10		A
I_{FRM}	Repetitive peak forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 132$ ˚C	-	20		A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	135 150		A A
I_{RRM}	Peak repetitive reverse surge current	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	3	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	60	-	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 10 A; T_j = 150˚C	-	0.33	0.4	V
		I_F = 10 A; T_j = 125˚C	-	0.39	0.45	V
		I_F = 20 A; T_j = 125˚C	-	0.54	0.61	V
		I_F = 20 A	-	0.57	0.64	V
I_R	Reverse current	$V_R = V_{RWM}$	-	0.2	5	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	15	30	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	580	-	pF

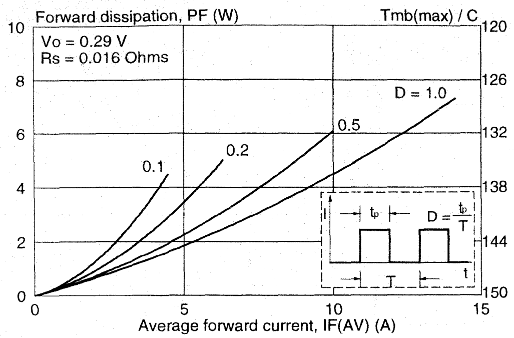


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

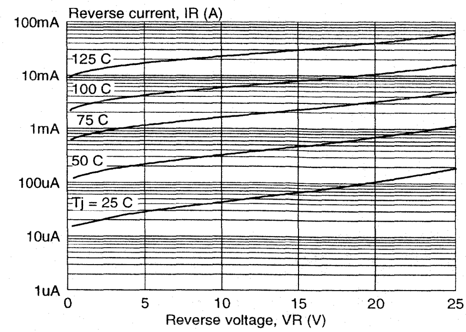


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

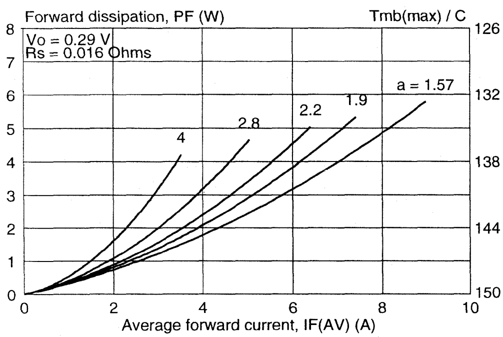


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

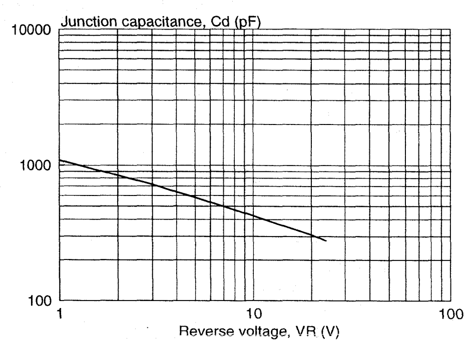


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; $f = 1$ MHz; $T_j = 25^\circ C$ to $125^\circ C$.

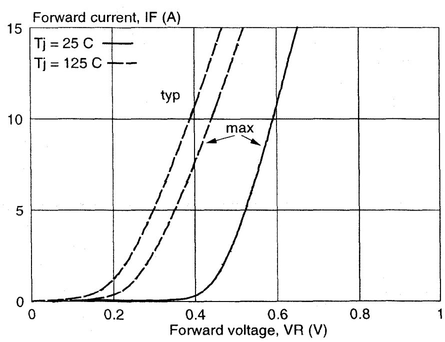


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

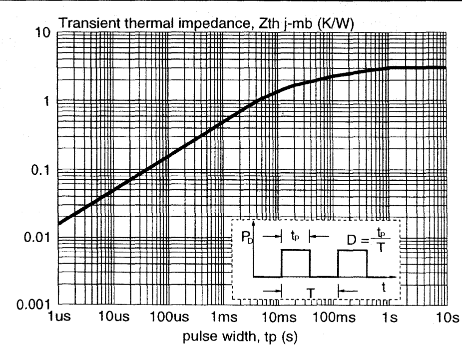


Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

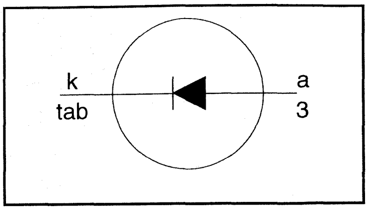
Rectifier diodes Schottky barrier

PBYL1025B series

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

$V_R = 20$ V/ 25 V

$I_{F(AV)} = 10$ A

$V_F \leq 0.4$ V

GENERAL DESCRIPTION

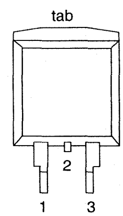
Schottky rectifier diodes intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYL1025B series is supplied in the SOT404 surface mounting package.

PINNING

PIN	DESCRIPTION
1	no connection
2	cathode[1]
3	anode
tab	cathode

SOT404



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYL10		20B	25B	
V_{RRM}	Peak repetitive reverse voltage		-	20	25	V
V_{RWM}	Working peak reverse voltage		-	20	25	V
V_R	Continuous reverse voltage	$T_{mb} \leq 119$ ˚C	-	20	25	V
$I_{F(AV)}$	Average rectified forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 132$ ˚C	-	10		A
I_{FRM}	Repetitive peak forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 132$ ˚C	-	20		A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms t = 8.3 ms sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	130 150		A A
I_{RRM}	Peak repetitive reverse surge current	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

1 it is not possible to make connection to pin 2 of the SOT428 package

HERMAL RESISTANCES

YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$_{th\ j-mb}$	Thermal resistance junction to mounting base		-	-	3	K/W
$_{th\ j-a}$	Thermal resistance junction to ambient	pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

LECTRICAL CHARACTERISTICS

= 25 ˚C unless otherwise specified

YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$_F$	Forward voltage	I_F = 10 A; T_j = 150˚C	-	0.33	0.4	V
		I_F = 10 A; T_j = 125˚C	-	0.39	0.45	V
		I_F = 20 A; T_j = 125˚C	-	0.54	0.61	V
		I_F = 20 A	-	0.57	0.64	V
	Reverse current	$V_R = V_{RWM}$	-	0.2	5	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	15	30	mA
$_d$	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	580	-	pF

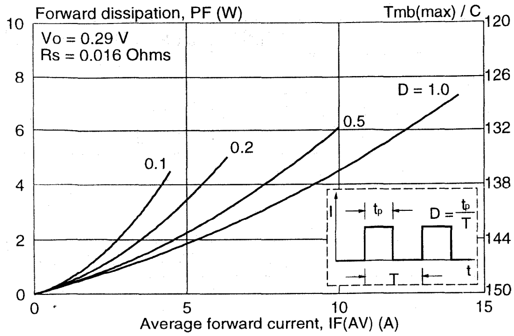


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

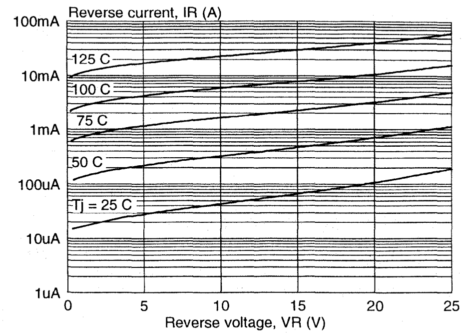


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

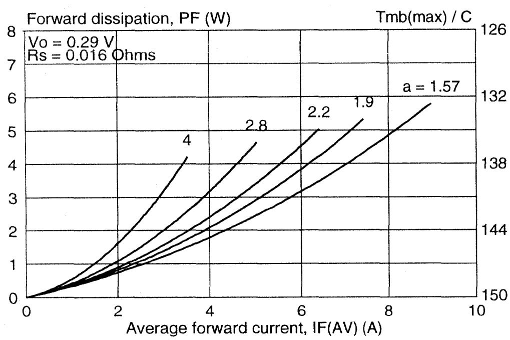


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

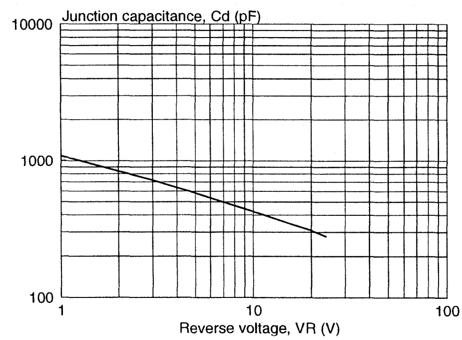


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; $f = 1$ MHz; $T_j = 25^\circ C$ to $125^\circ C$.

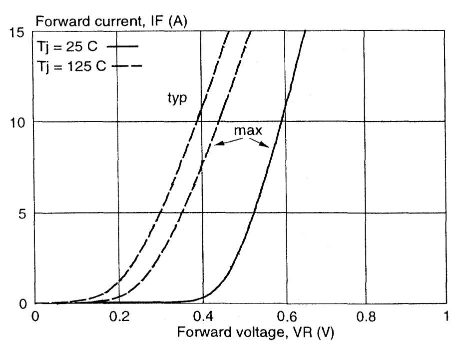


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

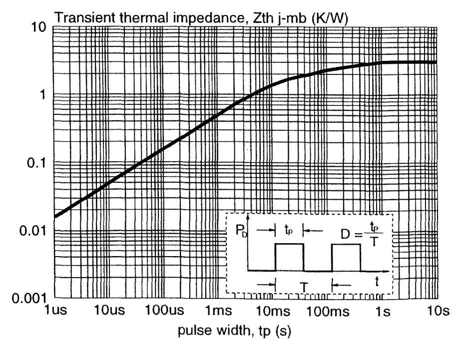


Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

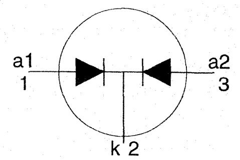
₹ectifier diodes
Schottky barrier

PBYL1525CT, PBYL1525CTB series

EATURES

Low forward volt drop
Fast switching
Reverse surge capability
High thermal cycling performance
Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 20 V/ 25 V

$I_{O(AV)}$ = 15 A

$V_F \leq$ 0.42 V

ıENERAL DESCRIPTION

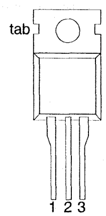
ual schottky rectifier diodes intended for use as output rectifiers in low voltage, high frequency switched mode power ıpplies.

ıe PBYL1525CT series is supplied in the SOT78 (TO220AB) conventional leaded package.
ıe PBYL1525CTB series is supplied in the SOT404 surface mounting package.

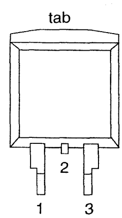
INNING

PIN	DESCRIPTION
1	gate
2	drain [1]
3	source
tab	drain

SOT78 (TO220AB)



SOT404



IMITING VALUES

miting values in accordance with the Absolute Maximum System (IEC 134)

›YMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYL15 PBYL15		20CT 20CTB	25CT 25CTB	
$/_{RRM}$	Peak repetitive reverse voltage		-	20	25	V
$/_{RWM}$	Working peak reverse voltage		-	20	25	V
$/_{R}$	Continuous reverse voltage	$T_{mb} \leq 107$ ˚C	-	20	25	V
$_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{mb} \leq 127$ ˚C	-	15		A
$_{FRM}$	Repetitive peak forward current per diode	square wave; $\delta = 0.5$; $T_{mb} \leq 127$ ˚C	-	15		A
$_{FSM}$	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	90 100		A A
$_{RRM}$	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
$_{j}$	Operating junction temperature		-	150		˚C
$_{stg}$	Storage temperature		- 65	175		˚C

It is not possible to make connection to pin 2 of the SOT404 package.

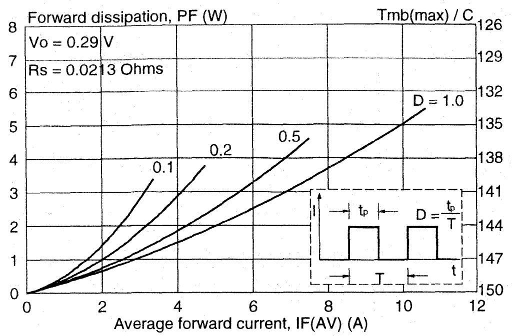
THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	3	K/W
		both diodes	-	-	2.5	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	SOT78 package, in free air	-	60	-	K/W
		SOT404 package, pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

ELECTRICAL CHARACTERISTICS

All characteristics are per diode at T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 7.5 A; T_j = 150˚C	-	0.37	0.42	V
		I_F = 7.5 A; T_j = 125˚C	-	0.39	0.45	V
		I_F = 15 A; T_j = 125˚C	-	0.57	0.61	V
		I_F = 15 A	-	0.59	0.64	V
I_R	Reverse current	$V_R = V_{RWM}$	-	0.2	5	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	10	20	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	350	-	pF



ig.1. *Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

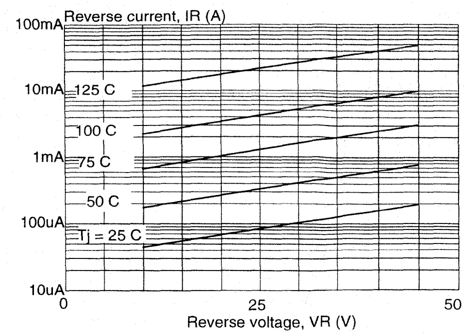
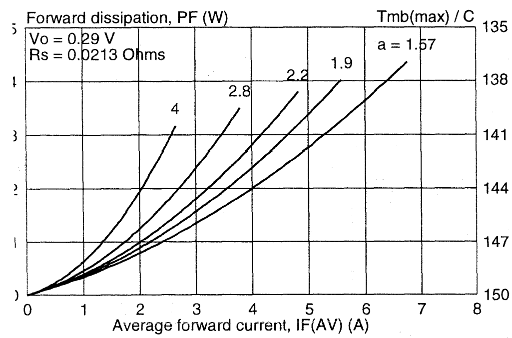


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j



ig.2. *Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

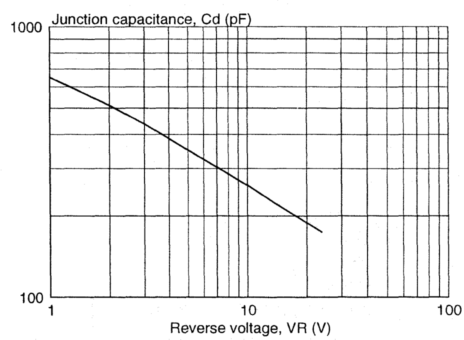
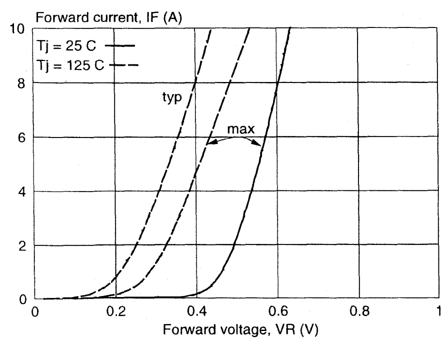


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.



ig.3. *Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j*

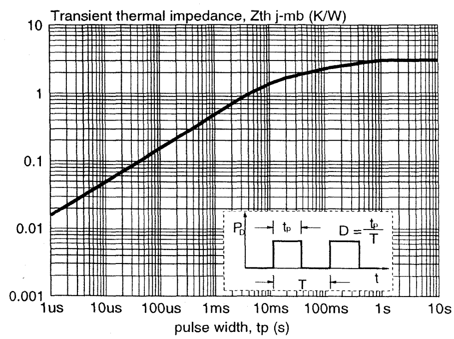
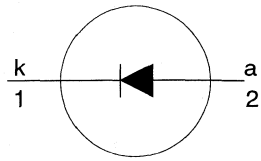


Fig.6. Transient thermal impedance; per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 20 V/ 25 V

$I_{F(AV)}$ = 16 A

$V_F \leq$ 0.46 V

GENERAL DESCRIPTION

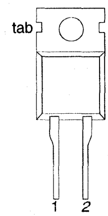
Schottky rectifier diodes intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYL1625 series is supplied in the SOD59 (TO220AC) conventional leaded package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNI
		PBYL16		**20**	**25**	
V_{RRM}	Peak repetitive reverse voltage		-	20	25	V
V_{RWM}	Working peak reverse voltage		-	20	25	V
V_R	Continuous reverse voltage	$T_{mb} \leq 120$ ˚C	-	20	25	V
$I_{F(AV)}$	Average rectified forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 131$ ˚C	-	16		A
I_{FRM}	Repetitive peak forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 131$ ˚C	-	32		A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	135 150		A A
I_{RRM}	Peak repetitive reverse surge current	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

HERMAL RESISTANCES

YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2	K/W
$_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	60	-	K/W

ECTRICAL CHARACTERISTICS

= 25 ˚C unless otherwise specified

YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$_F$	Forward voltage	I_F = 16 A; T_j = 125˚C	-	0.42	0.46	V
		I_F = 32 A; T_j = 125˚C	-	0.57	0.61	V
		I_F = 32 A	-	0.55	0.68	V
	Reverse current	$V_R = V_{RWM}$	-	1	5	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	22	40	mA
$_d$	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	700	-	pF

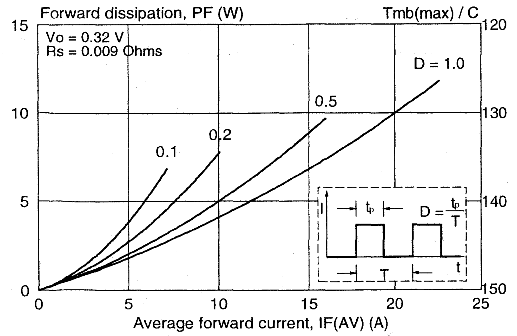


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

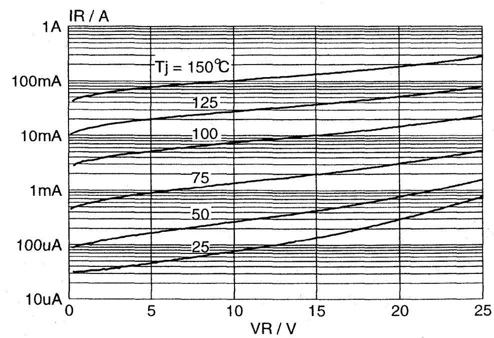


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

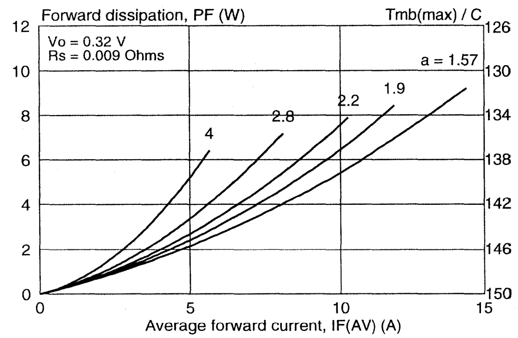


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

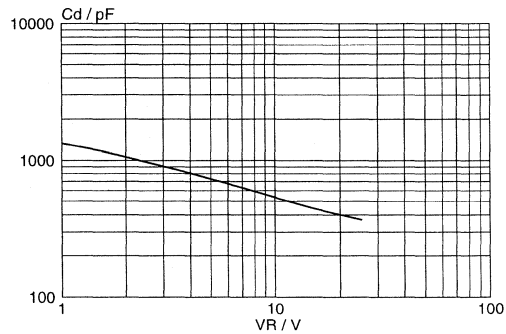


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

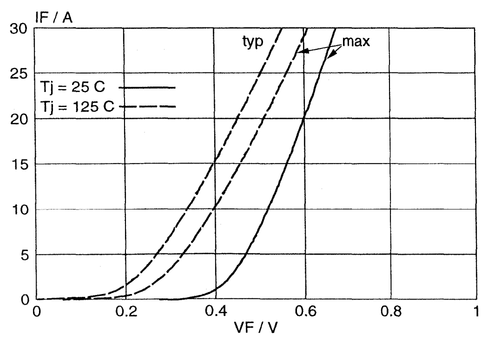


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

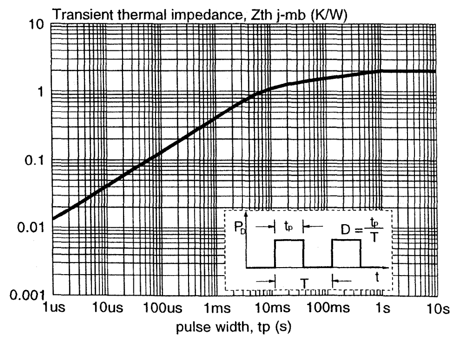


Fig.6. Transient thermal impedance; $Z_{th\ j\text{-}mb} = f(t_p)$.

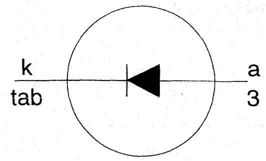
ectifier diodes chottky barrier

PBYL1625B series

EATURES

- .ow forward volt drop
- ast switching
- everse surge capability
- igh thermal cycling performance
- .ow thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 20 V/ 25 V

$I_{F(AV)}$ = 16 A

$V_F \leq$ 0.46 V

ENERAL DESCRIPTION

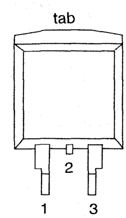
hottky rectifier diodes intended use as output rectifiers in low ltage, high frequency switched de power supplies.

e PBYL1625B series is supplied the SOT404 surface mounting ckage.

PINNING

PIN	DESCRIPTION
1	no connection
2	cathode [1]
3	anode
tab	cathode

SOT404



MITING VALUES

niting values in accordance with the Absolute Maximum System (IEC 134)

YMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYL16		20B	25B	
RRM	Peak repetitive reverse voltage		-	20	25	V
RWM	Working peak reverse voltage		-	20	25	V
R	Continuous reverse voltage	$T_{mb} \leq$ 120 ˚C	-	20	25	V
(AV)	Average rectified forward current	square wave; δ = 0.5; $T_{mb} \leq$ 131 ˚C	-	16		A
RM	Repetitive peak forward current	square wave; δ = 0.5; $T_{mb} \leq$ 131 ˚C	-	32		A
SM	Non-repetitive peak forward current	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	135 150		A A
RM	Peak repetitive reverse surge current	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
	Operating junction temperature		-	150		˚C
stg	Storage temperature		- 65	175		˚C

It is not possible to make connection to pin 2 ofthe SOT404 package.

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 16 A; T_j = 125˚C	-	0.42	0.46	V
		I_F = 32 A; T_j = 125˚C	-	0.57	0.61	V
		I_F = 32 A	-	0.55	0.68	V
I_R	Reverse current	$V_R = V_{RWM}$	-	1	5	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	22	40	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	700	-	pF

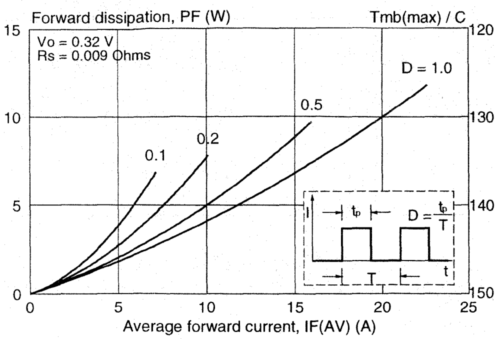


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

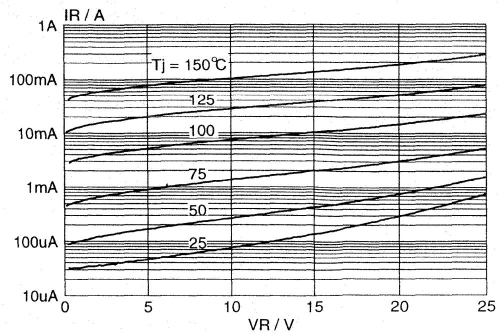


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

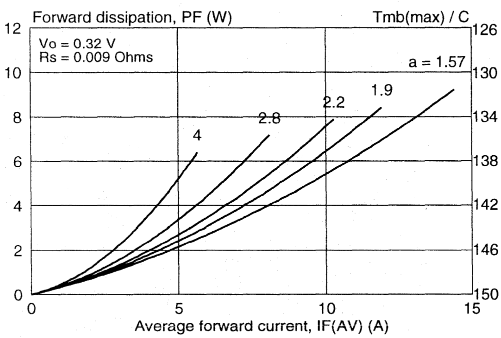


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

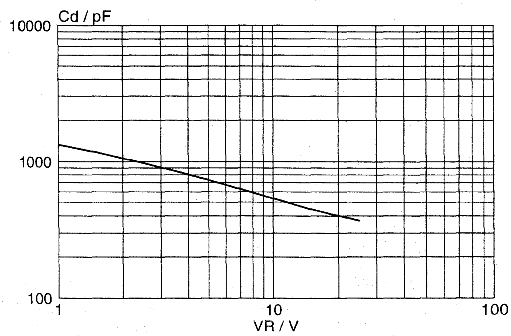


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; $f = 1$ MHz; $T_j = 25^{\circ}C$ to $125^{\circ}C$.

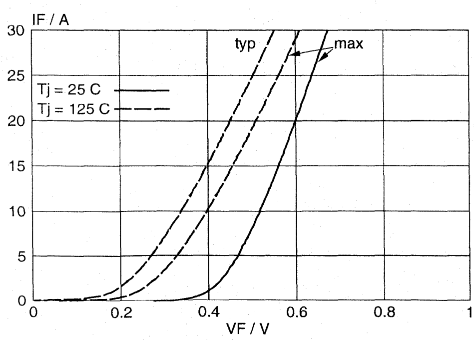


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

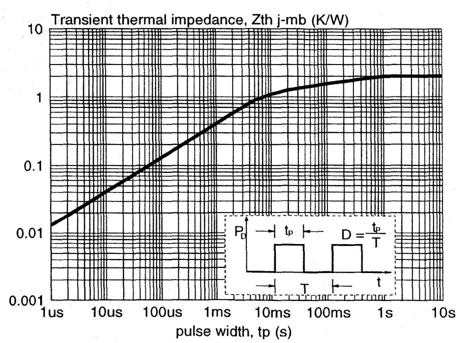


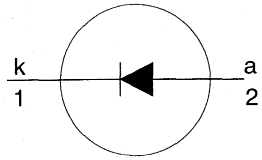
Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

Rectifier diodes Schottky barrier | PBYL2025 series

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 20 V/ 25 V

$I_{F(AV)}$ = 20 A

$V_F \leq$ 0.43 V

GENERAL DESCRIPTION

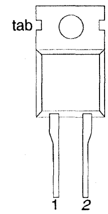
Schottky rectifier diodes intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYL2025 series is supplied in the SOD59 (TO220AC) conventional leaded package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYL20		**20**	**25**	
V_{RRM}	Peak repetitive reverse voltage		-	20	25	V
V_{RWM}	Working peak reverse voltage		-	20	25	V
V_R	Continuous reverse voltage	$T_{mb} \leq$ 120 ˚C	-	20	25	V
$I_{F(AV)}$	Average rectified forward current	square wave; δ = 0.5; $T_{mb} \leq$ 131 ˚C	-	20		A
I_{FRM}	Repetitive peak forward current	square wave; δ = 0.5; $T_{mb} \leq$ 131 ˚C	-	40		A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	180 200		A A
I_{RRM}	Peak repetitive reverse surge current	pulse width and repetition rate limited by $T_{j\,max}$	-	2		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

IERMAL RESISTANCES

YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
h j-mb	Thermal resistance junction to mounting base		-	-	1.5	K/W
h j-a	Thermal resistance junction to ambient	in free air	-	60	-	K/W

.ECTRICAL CHARACTERISTICS

: 25 ˚C unless otherwise specified

YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
:	Forward voltage	I_F = 20 A; T_j = 150˚C	-	0.36	0.43	V
		I_F = 20 A; T_j = 125˚C	-	0.39	0.45	V
		I_F = 40 A; T_j = 125˚C	-	0.55	0.62	V
		I_F = 40 A	-	0.59	0.65	V
	Reverse current	$V_R = V_{RWM}$	-	0.4	10	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	30	60	mA
ı	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	1230	-	pF

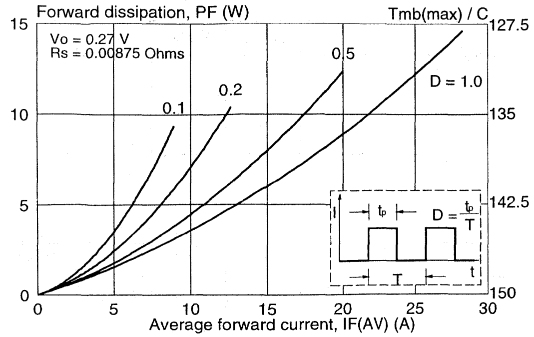


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

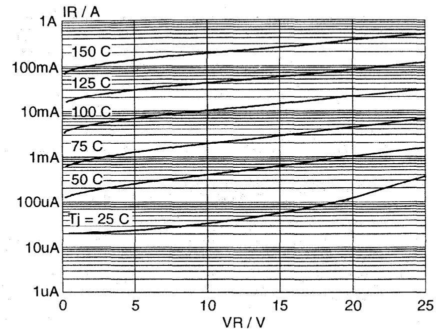


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

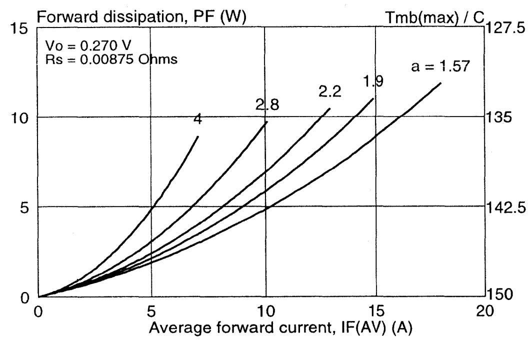


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

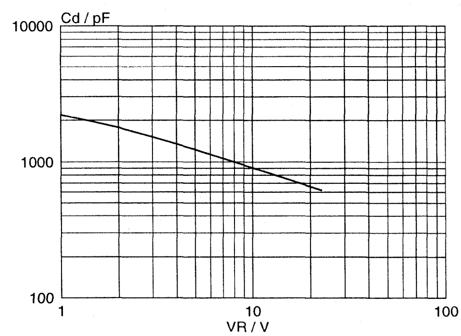


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; $f = 1$ MHz; $T_j = 25^\circ C$ to $125\ ^\circ C$.

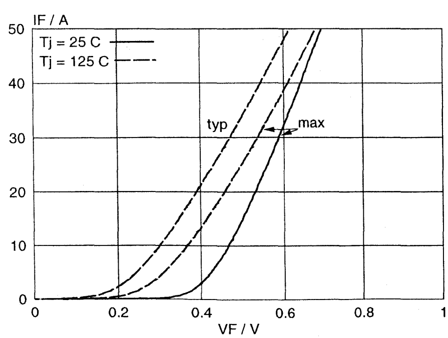


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

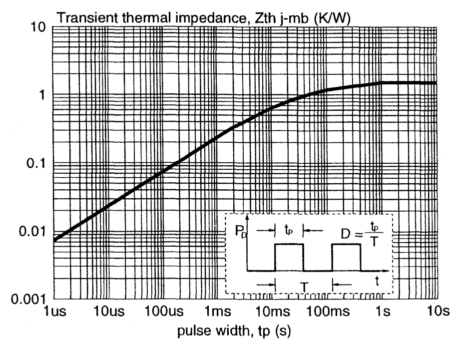


Fig.6. Transient thermal impedance; $Z_{th\ j\text{-}mb} = f(t_p)$

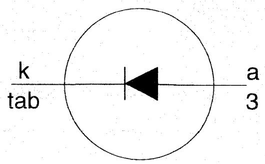
łectifier diodes ¡chottky barrier

PBYL2025B series

:ATURES

- .ow forward volt drop
- 'ast switching
- łeverse surge capability
- ligh thermal cycling performance
- .ow thermal resistance

SYMBOL



QUICK REFERENCE DATA

$V_R = 20$ V/ 25 V

$I_{F(AV)} = 20$ A

$V_F \leq 0.43$ V

ENERAL DESCRIPTION

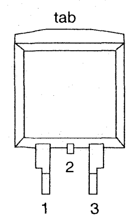
:hottky rectifier diodes intended ' use as output rectifiers in low ltage, high frequency switched ɔde power supplies.

ıe PBYL2025B series is supplied the SOT404 surface mounting ckage.

PINNING

PIN	DESCRIPTION
1	no connection
2	cathode [1]
3	anode
tab	cathode

SOT404



MITING VALUES

 niting values in accordance with the Absolute Maximum System (IEC 134)

¡YMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYL20		20B	25B	
'$_{RRM}$	Peak repetitive reverse voltage		-	20	25	V
'$_{RWM}$	Working peak reverse voltage		-	20	25	V
'$_{R}$	Continuous reverse voltage	$T_{mb} \leq 120$ ˚C	-	20	25	V
$_{F(AV)}$	Average rectified forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 131$ ˚C	-	20		A
$_{FRM}$	Repetitive peak forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 131$ ˚C	-	40		A
$_{FSM}$	Non-repetitive peak forward current	t = 10 ms t = 8.3 ms sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	180 200		A A
$_{RRM}$	Peak repetitive reverse surge current	pulse width and repetition rate limited by $T_{j\,max}$	-	2		A
$_{j}$	Operating junction temperature		-	150		˚C
$_{stg}$	Storage temperature		- 65	175		˚C

It is not possible to make connection to pin 2 ofthe SOT404 package.

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	1.5	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 20 A; T_j = 150˚C	-	0.36	0.43	V
		I_F = 20 A; T_j = 125˚C	-	0.39	0.45	V
		I_F = 40 A; T_j = 125˚C	-	0.55	0.62	V
		I_F = 40 A	-	0.59	0.65	V
I_R	Reverse current	$V_R = V_{RWM}$	-	0.4	10	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	30	60	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	1230	-	pF

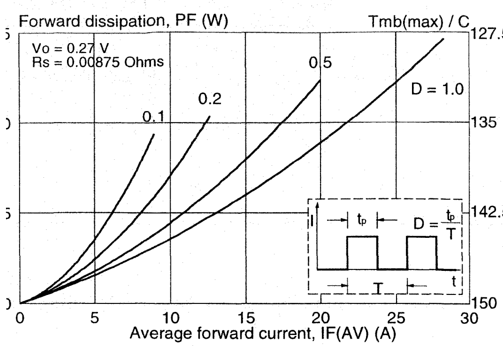


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

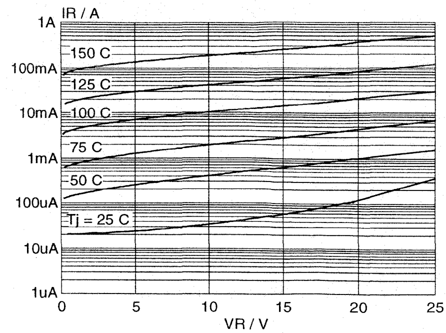


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

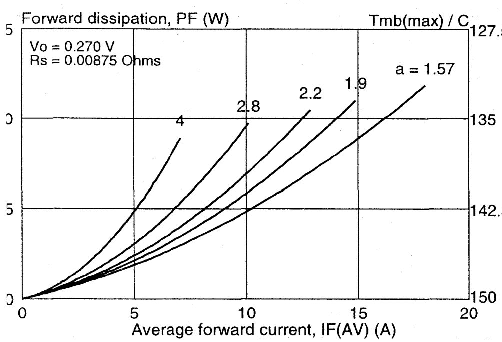


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

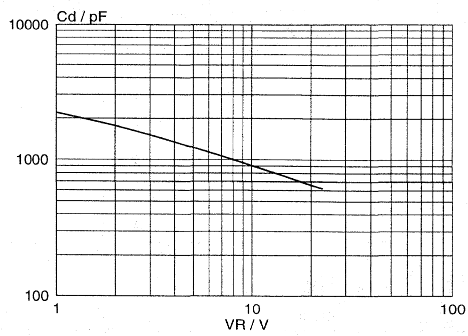


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; $f = 1$ MHz; $T_j = 25^\circ C$ to $125^\circ C$.

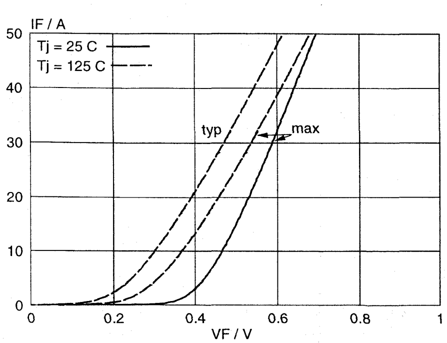


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

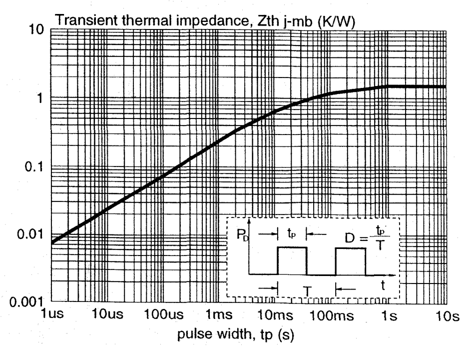


Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

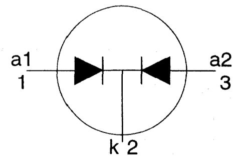
Rectifier diodes Schottky barrier

PBYL2525CT, PBYL2525CTB serie:

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

$V_R = 20\ V/\ 25\ V$

$I_{O(AV)} = 25\ A$

$V_F \leq 0.43\ V$

GENERAL DESCRIPTION

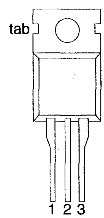
Dual schottky rectifier diodes intended for use as output rectifiers in low voltage, high frequency switched mode pow supplies.

The PBYL2525CT series is supplied in the SOT78 (TO220AB) conventional leaded package.
The PBYL2525CTB series is supplied in the SOT404 surface mounting package.

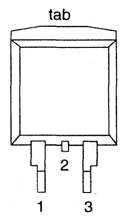
PINNING

PIN	DESCRIPTION
1	gate
2	drain [1]
3	source
tab	drain

SOT78 (TO220AB)



SOT404



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNI
		PBYL25 PBYL25		20CT 20CTB	25CT 25CTB	
V_{RRM}	Peak repetitive reverse voltage		-	20	25	V
V_{RWM}	Working peak reverse voltage		-	20	25	V
V_R	Continuous reverse voltage	$T_{mb} \leq 120$ ˚C	-	20	25	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{mb} \leq 119$ ˚C	-	25		A
I_{FRM}	Repetitive peak forward current per diode	square wave; $\delta = 0.5$; $T_{mb} \leq 119$ ˚C	-	25		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	135 150		A A
I_{RRM}	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

1. It is not possible to make connection to pin 2 of the SOT404 package.

IERMAL RESISTANCES

YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
th j-mb	Thermal resistance junction to mounting base	per diode	-	-	3	K/W
		both diodes	-	-	2	K/W
th j-a	Thermal resistance junction to ambient	SOT78 package, in free air	-	60	-	K/W
		SOT404 package, pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

.ECTRICAL CHARACTERISTICS

characteristics are per diode at T_j = 25 ˚C unless otherwise specified

YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
F	Forward voltage	I_F = 12.5 A; T_j = 150˚C	-	0.36	0.43	V
		I_F = 12.5 A; T_j = 125˚C	-	0.38	0.47	V
		I_F = 25 A; T_j = 125˚C	-	0.5	0.62	V
		I_F = 25 A	-	0.54	0.66	V
	Reverse current	$V_R = V_{RWM}$	-	1	5	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	20	30	mA
d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	600	-	pF

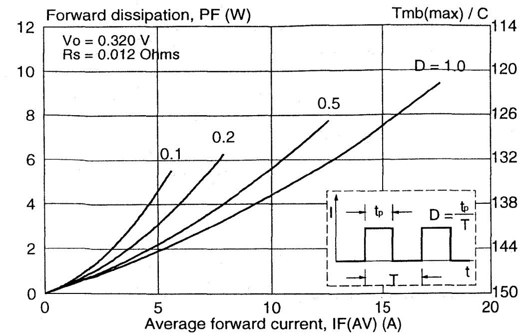


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

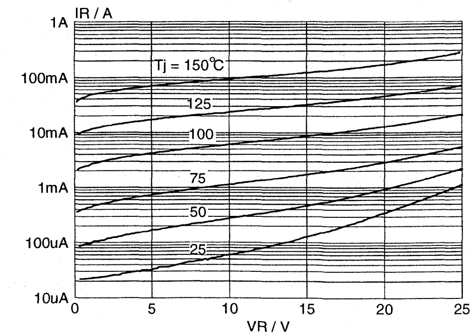


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

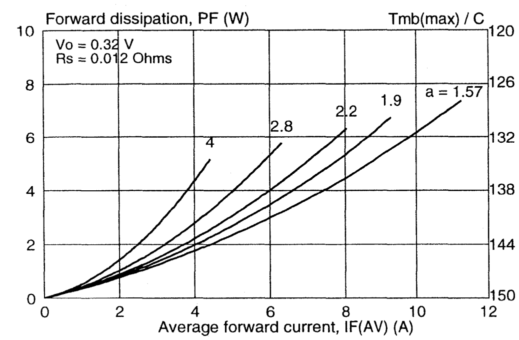


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

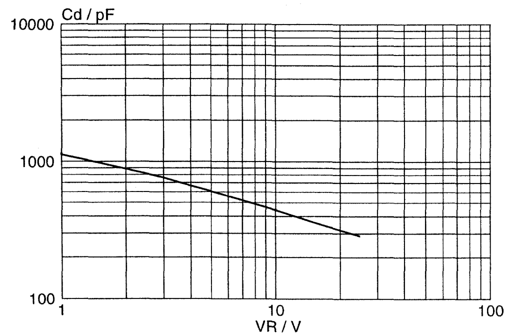


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

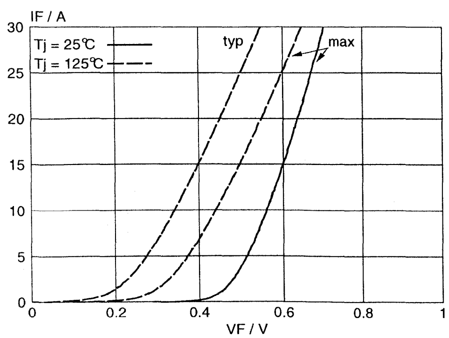


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

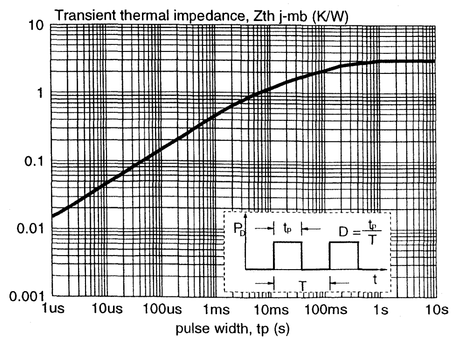


Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

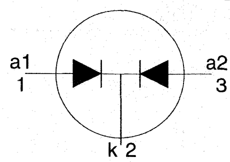
ıectifier diodes ıchottky barrier

PBYL3025CT, PBYL3025CTB series

:ATURES

ow forward volt drop
'ast switching
ıeverse surge capability
ligh thermal cycling performance
ow thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 20 V/ 25 V

$I_{O(AV)}$ = 30 A

$V_F \leq$ 0.43 V

ENERAL DESCRIPTION

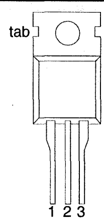
ıal schottky rectifier diodes intended for use as output rectifiers in low voltage, high frequency switched mode power pplies.

e PBYL3025CT series is supplied in the SOT78 (TO220AB) conventional leaded package.
e PBYL3025CTB series is supplied in the SOT404 surface mounting package.

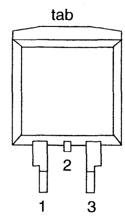
NNING

PIN	DESCRIPTION
1	gate
2	drain [1]
3	source
tab	drain

SOT78 (TO220AB)



SOT404



MITING VALUES

niting values in accordance with the Absolute Maximum System (IEC 134)

YMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYL30 PBYL30		20CT 20CTB	25CT 25CTB	
RRM	Peak repetitive reverse voltage		-	20	25	V
RWM	Working peak reverse voltage		-	20	25	V
R	Continuous reverse voltage	$T_{mb} \leq$ 120 ˚C	-	20	25	V
'(AV)	Average rectified output current (both diodes conducting)	square wave; δ = 0.5; $T_{mb} \leq$ 123 ˚C	-	30		A
RM	Repetitive peak forward current per diode	square wave; δ = 0.5; $T_{mb} \leq$ 123 ˚C	-	30		A
SM	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	135 150		A A
:RM	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
i	Operating junction temperature		-	150		˚C
stg	Storage temperature		- 65	175		˚C

It is not possible to make connection to pin 2 of the SOT404 package.

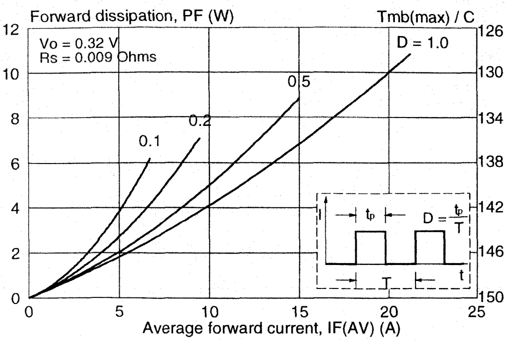
THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	2	K/W
		both diodes	-	-	1.5	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	SOT78 package, in free air	-	60	-	K/W
		SOT404 package, pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

ELECTRICAL CHARACTERISTICS

All characteristics are per diode at $T_j = 25$ ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	$I_F = 15$ A; $T_j = 150$˚C	-	0.35	0.43	V
		$I_F = 15$ A; $T_j = 125$˚C	-	0.38	0.46	V
		$I_F = 30$ A; $T_j = 125$˚C	-	0.52	0.6	V
		$I_F = 30$ A	-	0.6	0.67	V
I_R	Reverse current	$V_R = V_{RWM}$	-	1	5	mA
		$V_R = V_{RWM}$; $T_j = 100$˚C	-	22	40	mA
C_d	Junction capacitance	$V_R = 5$ V; f = 1 MHz, $T_j = 25$˚C to 125˚C	-	700	-	pF



ig.1. *Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

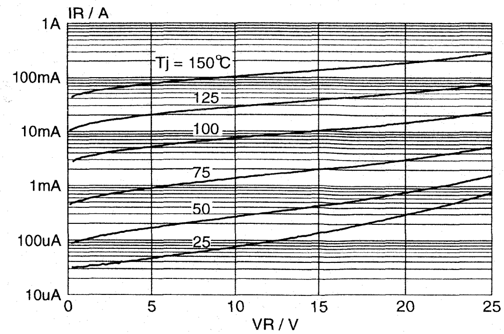
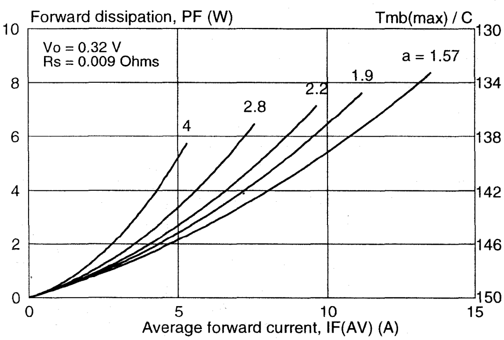


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j



ig.2. *Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

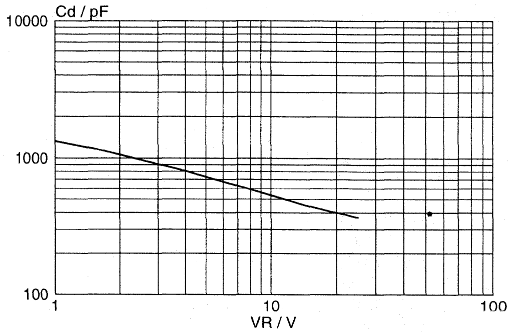


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

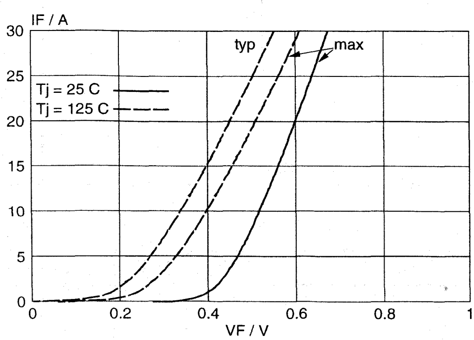


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

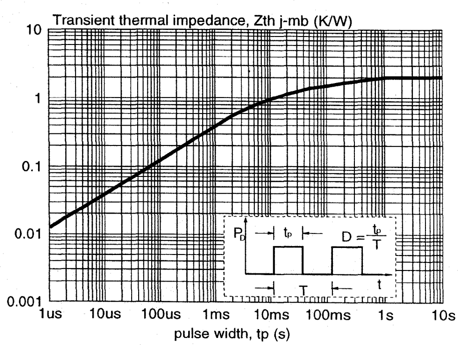


Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

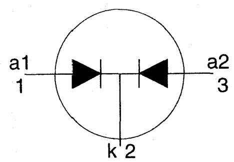
Rectifier diodes Schottky barrier

PBYR225CT series

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- low profile surface mounting package

SYMBOL



QUICK REFERENCE DATA

$V_R = 20\ V\ /\ 25\ V$

$I_{O(AV)} = 2\ A$

$V_F \leq 0.33V$

GENERAL DESCRIPTION

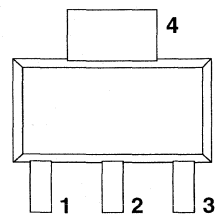
Dual, common cathode schottky rectifier diodes in a plastic envelope. Intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYR225CT series is supplied in the surface mounting SOT223 package.

PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode
3	anode 2
tab	cathode

SOT223



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR2		20CT	25CT	
V_{RRM}	Peak repetitive reverse voltage		-	20	25	V
V_{RWM}	Working peak reverse voltage		-	20	25	V
V_R	Continuous reverse voltage	$T_{sp} \leq 97\ ˚C$	-	20	25	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{sp} \leq 136\ ˚C$	-	2		A
I_{FRM}	Repetitive peak forward current per diode	square wave; $\delta = 0.5$; $T_{sp} \leq 136\ ˚C$	-	2		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-	6		A
		t = 8.3 ms	-	6.6		A
		sinusoidal; $T_j = 125\ ˚C$ prior to surge; with reapplied $V_{RRM(max)}$				
I_{RRM}	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\ max}$	-	1		A
T_j	Operating junction temperature per diode		-	150		˚C
T_{stg}	Storage temperature		- 40	150		˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}sp}$	Thermal resistance junction to solder point	one or both diodes conducting	-	-	15	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	pcb mounted, minimum footprint	-	156	-	K/W
		pcb mounted, pad area as in fig:1	-	70	-	K/W

.ECTRICAL CHARACTERISTICS

ıracteristics are per diode at T_j = 25 ˚C unless otherwise specified

YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
	Forward voltage	I_F = 1 A; T_j = 125˚C	-	0.28	0.33	V
		I_F = 2 A	-	0.42	0.51	V
	Reverse current	$V_R = V_{RWM}$	-	0.05	3	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	5	10	mA
	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	160	-	pF

ꞁINTED CIRCUIT BOARD

Dimensions in mm.

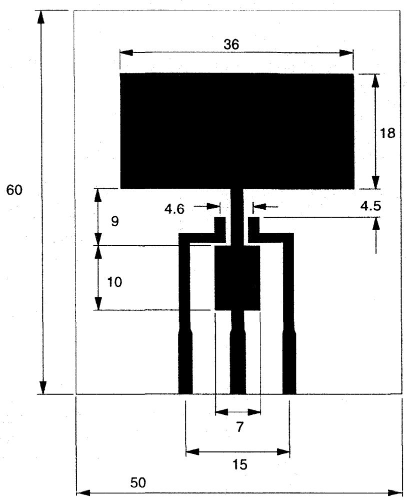


Fig.1. PCB for thermal resistance and power rating for SOT223.
PCB: FR4 epoxy glass (1.6 mm thick), copper laminate (35 μm thick).

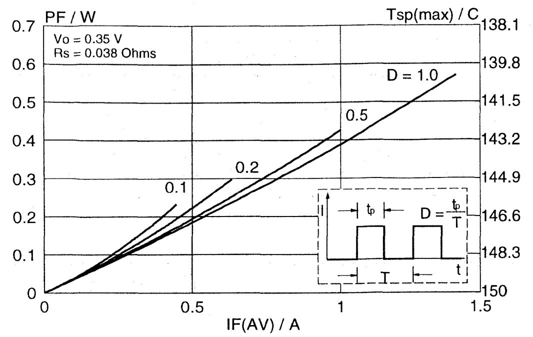


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

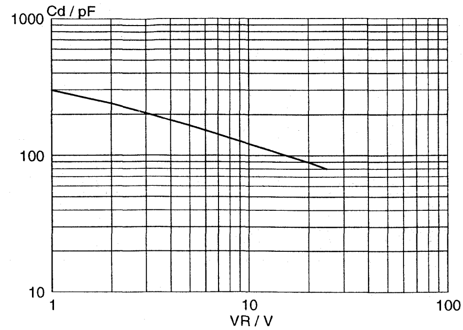


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

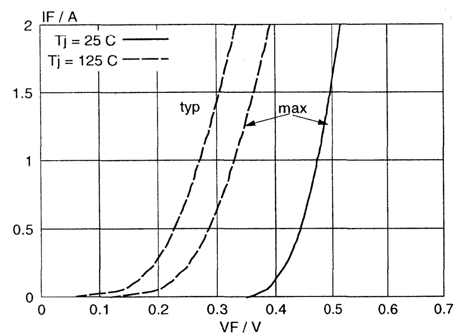


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

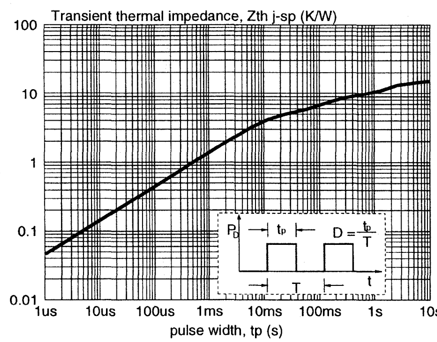


Fig.6. Transient thermal impedance; per diode; $Z_{th\ j\text{-}sp} = f(t_p)$.

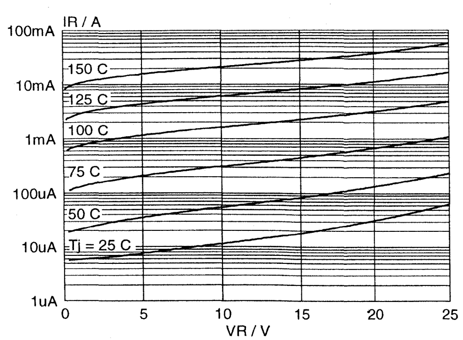


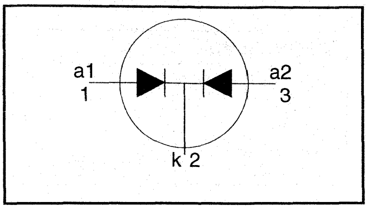
Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

ꞁectifier diodes ;chottky barrier | PBYR245CT series

EATURES

- .ow forward volt drop
- ⁼ast switching
- ꞁeverse surge capability
- ꟷigh thermal cycling performance
- ɔw profile surface mounting
- ıckage

SYMBOL



QUICK REFERENCE DATA

V_R = 40 V/ 45 V

$I_{O(AV)}$ = 2 A

$V_F \leq$ 0.45V

ENERAL DESCRIPTION

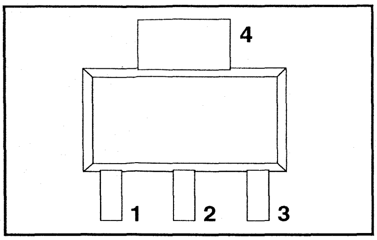
ɹal, common cathode schottky ctifier diodes in a plastic ıvelope. Intended for use as ıtput rectifiers in low voltage, high ꞁquency switched mode power ıpplies.

ıe PBYR245CT series is supplied the surface mounting SOT223 ıckage.

PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode
3	anode 2
tab	cathode

SOT223



MITING VALUES

ꞁiting values in accordance with the Absolute Maximum System (IEC 134)

;YMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR2		40CT	45CT	
$_{RRM}$	Peak repetitive reverse voltage		-	40	45	V
$_{RWM}$	Working peak reverse voltage		-	40	45	V
$_{R}$	Continuous reverse voltage	$T_{sp} \leq$ 74 ˚C	-	40	45	V
)(AV)	Average rectified output current (both diodes conducting)	square wave; δ = 0.5; $T_{sp} \leq$ 119 ˚C	-	2		A
⁼RM	Repetitive peak forward current per diode	square wave; δ = 0.5; $T_{sp} \leq$ 119 ˚C	-	2		A
⁼SM	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	6 6.6		A A
ꞁRM	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
$_{j}$	Operating junction temperature		-	150		˚C
$_{stg}$	Storage temperature		- 40	150		˚C

HERMAL RESISTANCES

;YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$ꞁ_{th\,j-a}$	Thermal resistance junction to ambient	pcb mounted, minimum footprint pcb mounted, pad area as in fig:1	- -	156 70	- -	K/W K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 1 A; T_j = 125˚C	-	0.41	0.45	V
		I_F = 2 A	-	0.58	0.7	V
I_R	Reverse current	$V_R = V_{RWM}$	-	0.03	0.2	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	1.5	10	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	60	-	pF

PRINTED CIRCUIT BOARD

Dimensions in mm.

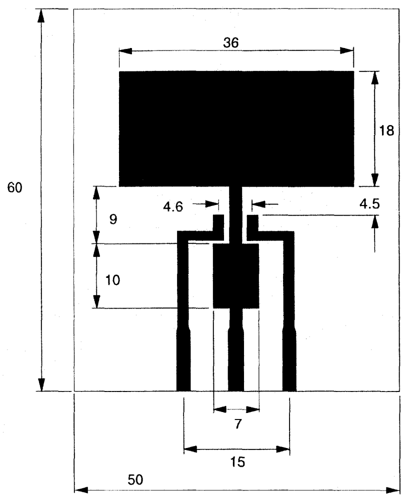
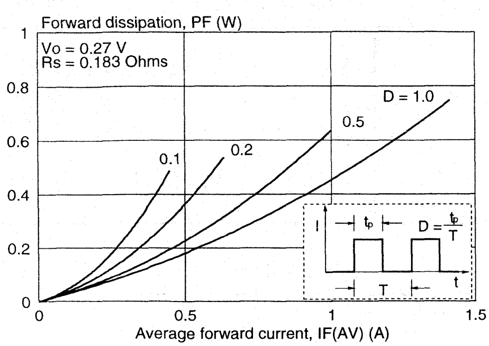
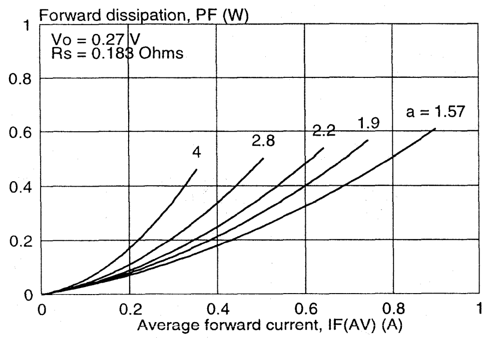


Fig.1. PCB for thermal resistance and power rating for SOT223.
PCB: FR4 epoxy glass (1.6 mm thick), copper laminate (35 µm thick).



ig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.



ig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

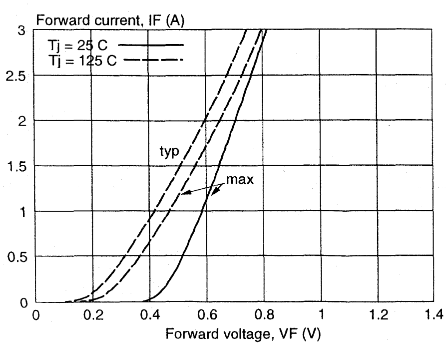


Fig.4. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

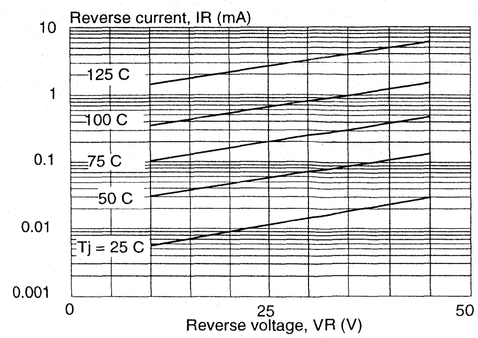


Fig.5. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

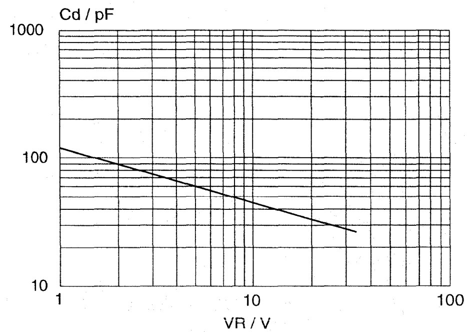


Fig.6. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

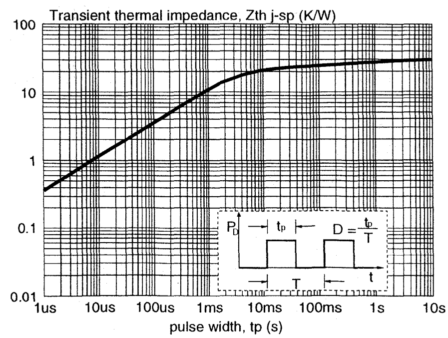


Fig.7. Transient thermal impedance; per diode; $Z_{th\ j\text{-}sp} = f(t_p)$.

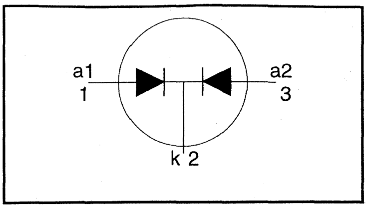
Rectifier diodes Schottky barrier

PBYR325CTD serie

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 20 V/ 25 V

$I_{O(AV)}$ = 3 A

$V_F \leq 0.4$ V

GENERAL DESCRIPTION

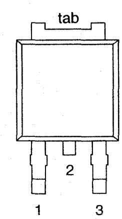
Dual schottky rectifier diodes intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYR325CTD series is supplied in the SOT428 surface mounting package.

PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode[1]
3	anode 2
tab	cathode

SOT428



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNI
		PBYR3		20CTD	25CTD	
V_{RRM}	Peak repetitive reverse voltage		-	20	25	V
V_{RWM}	Working peak reverse voltage		-	20	25	V
V_R	Continuous reverse voltage	$T_{mb} \leq 125$ ˚C	-	20	25	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{mb} \leq 144$ ˚C	-	3		A
I_{FRM}	Repetitive peak forward current per diode	square wave; $\delta = 0.5$; $T_{mb} \leq 144$ ˚C	-	3		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	55 60		A A
I_{RRM}	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

1 it is not possible to make connection to pin 2 of the SOT428 package

HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	5	K/W
		both diodes	-	-	4	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

LECTRICAL CHARACTERISTICS

ll characteristics are per diode at $T_j = 25$ ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	$I_F = 1.5$ A; $T_j = 125$˚C	-	0.34	0.4	V
		$I_F = 3$ A; $T_j = 125$˚C	-	0.39	0.5	V
		$I_F = 3$ A	-	0.47	0.6	V
I_R	Reverse current	$V_R = V_{RWM}$	-	0.05	2	mA
		$V_R = V_{RWM}$; $T_j = 100$˚C	-	4	8	mA
C_d	Junction capacitance	$V_R = 5$ V; f = 1 MHz, $T_j = 25$˚C to 125˚C	-	117	-	pF

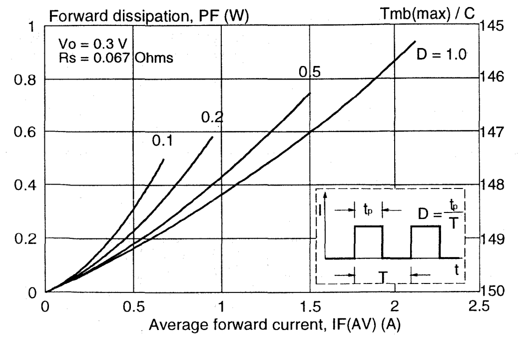


Fig.1. *Maximum forward dissipation per diode $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

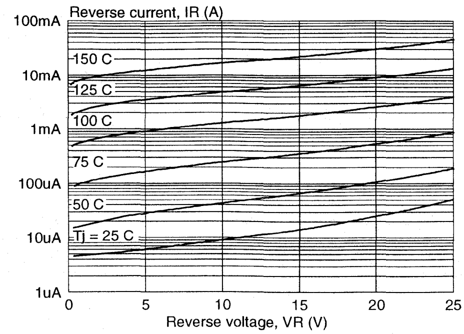


Fig.4. *Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j*

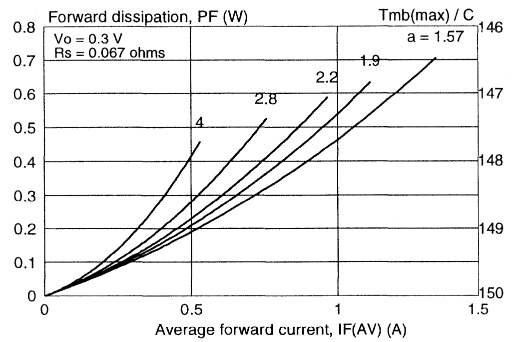


Fig.2. *Maximum forward dissipation per diode $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

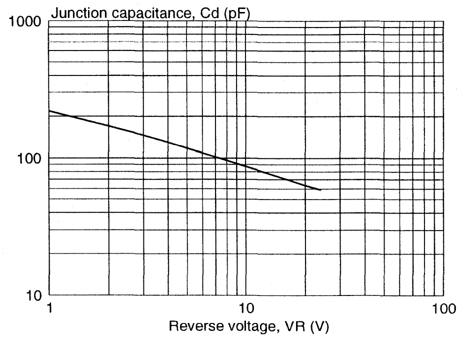


Fig.5. *Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.*

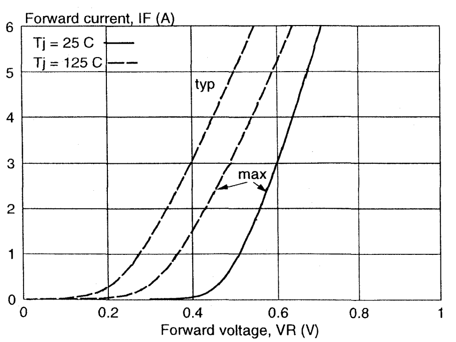


Fig.3. *Typical and maximum forward characteristic per diode $I_F = f(V_F)$; parameter T_j*

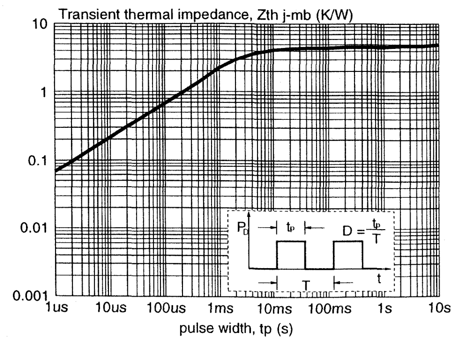
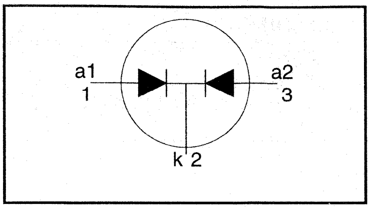


Fig.6. *Transient thermal impedance per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.*

·EATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 40 V/ 45 V

$I_{O(AV)}$ = 3 A

$V_F \leq$ 0.57 V

;ENERAL DESCRIPTION

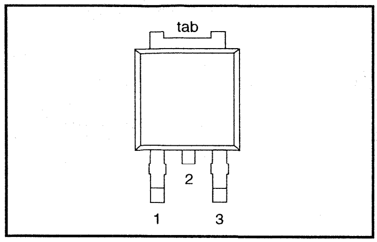
)ual schottky rectifier diodes ıtended for use as output rectifiers ı low voltage, high frequency witched mode power supplies.

'he PBYR345CTD series is upplied in the SOT428 surface ıounting package.

PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode[1]
3	anode 2
tab	cathode

SOT428



.IMITING VALUES

.imiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR3		40CTD	45CTD	
V_{RRM}	Peak repetitive reverse voltage		-	40	45	V
V_{RWM}	Working peak reverse voltage		-	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq$ 115 ˚C	-	40	45	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave; δ = 0.5; $T_{mb} \leq$ 142 ˚C	-	3		A
I_{FRM}	Repetitive peak forward current per diode	square wave; δ = 0.5; $T_{mb} \leq$ 142 ˚C	-	3		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	55 60		A A
I_{RRM}	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

I it is not possible to make connection to pin 2 of the SOT428 package

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	5	K/W
		both diodes	-	-	4	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

ELECTRICAL CHARACTERISTICS

All characteristics are per diode at T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 1.5 A; T_j = 125˚C	-	0.51	0.57	V
		I_F = 3 A; T_j = 125˚C	-	0.62	0.7	V
		I_F = 3 A	-	0.71	0.84	V
I_R	Reverse current	$V_R = V_{RWM}$	-	0.05	0.2	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	3.2	8	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	65	-	pF

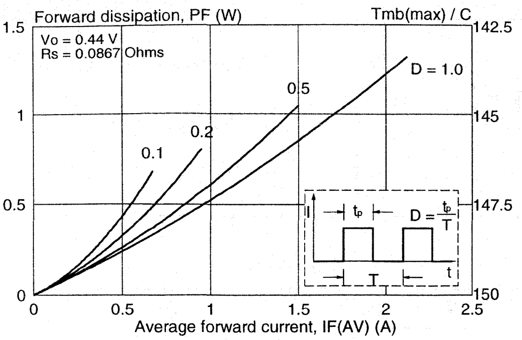


Fig.1. Maximum forward dissipation per diode $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

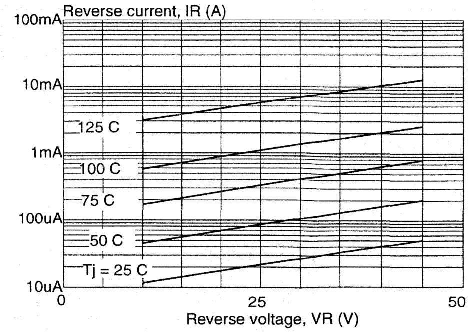


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

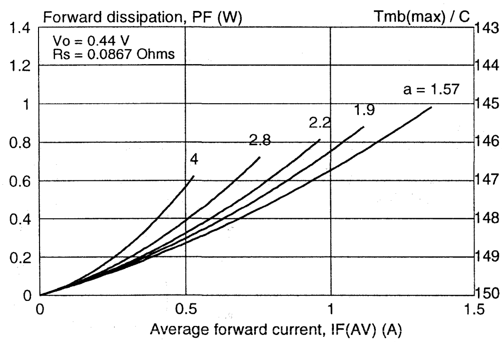


Fig.2. Maximum forward dissipation per diode $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

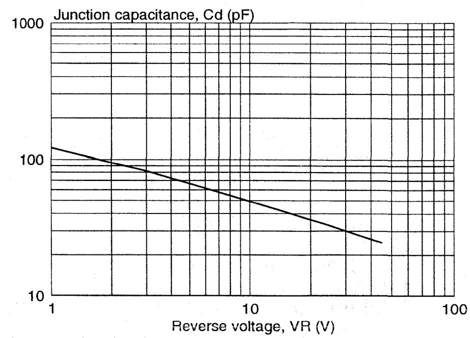


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

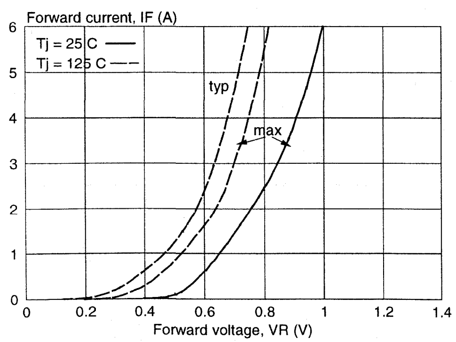


Fig.3. Typical and maximum forward characteristic per diode $I_F = f(V_F)$; parameter T_j

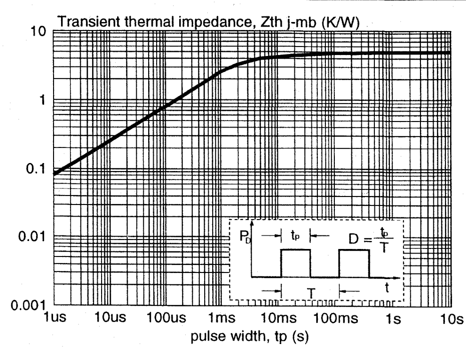


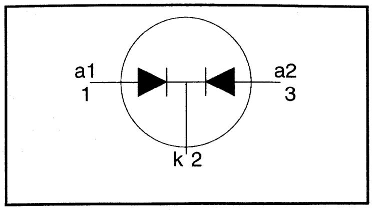
Fig.6. Transient thermal impedance per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.

Rectifier diodes Schottky barrier
PBYR625CTD series

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

$V_R = 20$ V/ 25 V

$I_{O(AV)} = 6$ A

$V_F \leq 0.44$ V

GENERAL DESCRIPTION

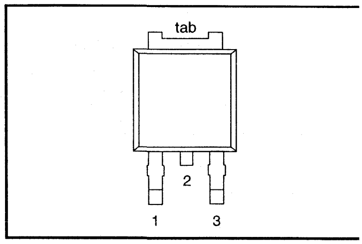
Dual schottky rectifier diodes intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYR625CTD series is supplied in the SOT428 surface mounting package.

PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode[1]
3	anode 2
tab	cathode

SOT428



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR6		20CTD	25CTD	
V_{RRM}	Peak repetitive reverse voltage		-	20	25	V
V_{RWM}	Working peak reverse voltage		-	20	25	V
V_R	Continuous reverse voltage	$T_{mb} \leq 124$ ˚C	-	20	25	V
$I_{O(AV)}$	Average rectified forward current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{mb} \leq 138$ ˚C	-	6		A
I_{FRM}	Repetitive peak forward current per diode	square wave; $\delta = 0.5$; $T_{mb} \leq 138$ ˚C	-	6		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	65 70		A A
I_{RRM}	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

1 it is not possible to make connection to pin 2 of the SOT428 package

HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	4	K/W
		both diodes	-	-	3.5	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

LECTRICAL CHARACTERISTICS

ll characteristics are per diode at T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 3 A; T_j = 125˚C	-	0.38	0.44	V
		I_F = 6 A; T_j = 125˚C	-	0.50	0.59	V
		I_F = 6 A	-	0.61	0.68	V
I_R	Reverse current	V_R = V_{RWM}	-	0.05	3	mA
		V_R = V_{RWM}; T_j = 100˚C	-	5	10	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	160	-	pF

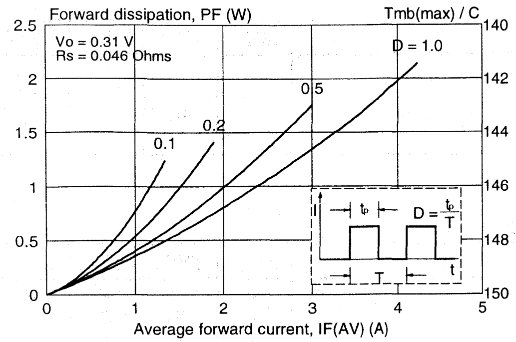


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

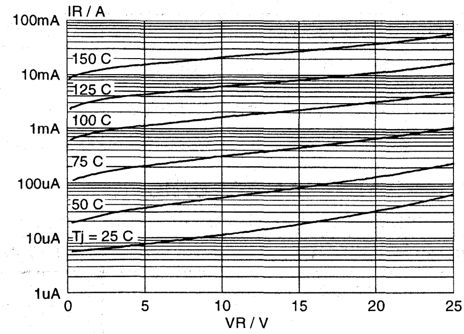


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

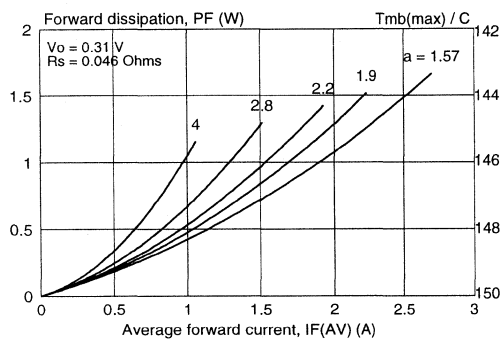


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

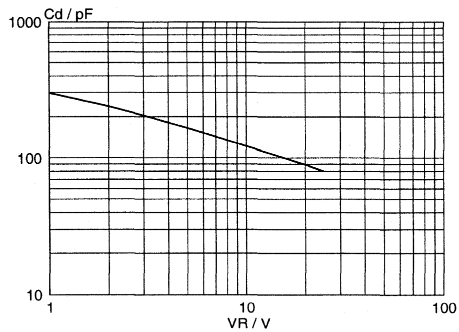


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

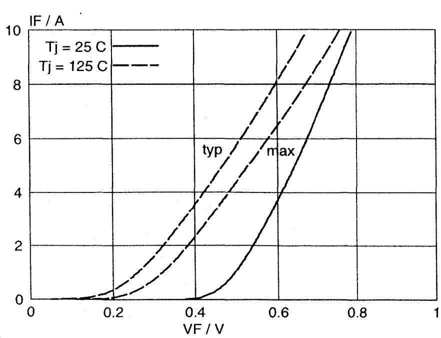


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

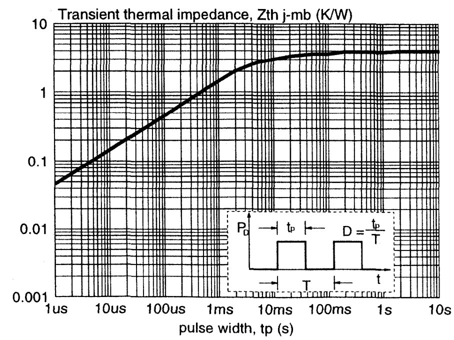


Fig.6. Transient thermal impedance; per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

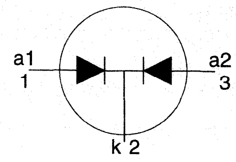
Rectifier diodes Schottky barrier

PBYR645CTD series

'EATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 40 V/ 45 V

$I_{O(AV)}$ = 6 A

$V_F \leq$ 0.6 V

;ENERAL DESCRIPTION

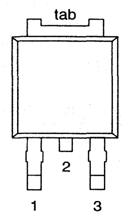
)ual schottky rectifier diodes ıtended for use as output rectifiers ı low voltage, high frequency witched mode power supplies.

'he PBYR645CTD series is upplied in the SOT428 surface ıounting package.

PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode[1]
3	anode 2
tab	cathode

SOT428



.IMITING VALUES

imiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR6		40CTD	45CTD	
V_{RRM}	Peak repetitive reverse voltage		-	40	45	V
V_{RWM}	Working peak reverse voltage		-	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq$ 113 ˚C	-	40	45	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave; δ = 0.5; $T_{mb} \leq$ 134 ˚C	-	6		A
I_{FRM}	Repetitive peak forward current per diode	square wave; δ = 0.5; $T_{mb} \leq$ 134 ˚C	-	6		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	65 70		A A
I_{RRM}	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

it is not possible to make connection to pin 2 of the SOT428 package

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	4	K/W
		both diodes	-	-	3.5	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

ELECTRICAL CHARACTERISTICS

All characteristics are per diode at T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 3 A; T_j = 125˚C	-	0.55	0.6	V
		I_F = 6 A; T_j = 125˚C	-	0.67	0.72	V
		I_F = 6 A	-	0.77	0.94	V
I_R	Reverse current	$V_R = V_{RWM}$	-	0.1	0.4	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	5	15	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	96	-	pF

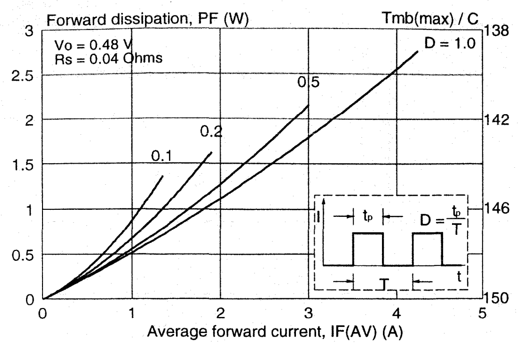


Fig.1. Maximum forward dissipation per diode $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

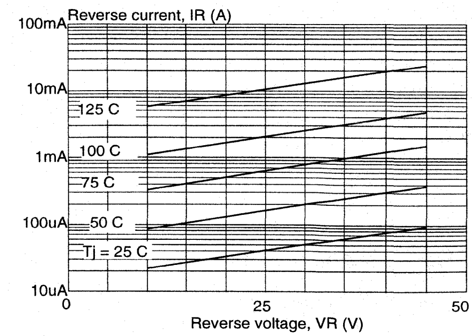


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

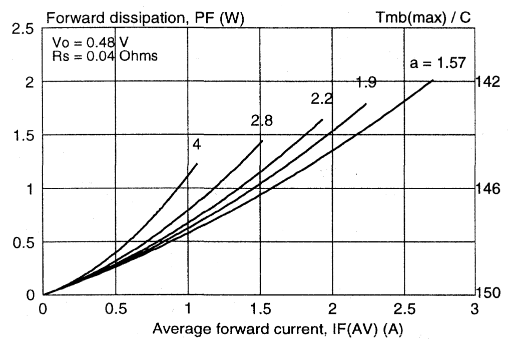


Fig.2. Maximum forward dissipation per diode $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

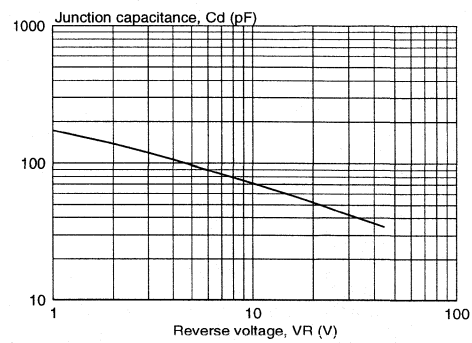


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

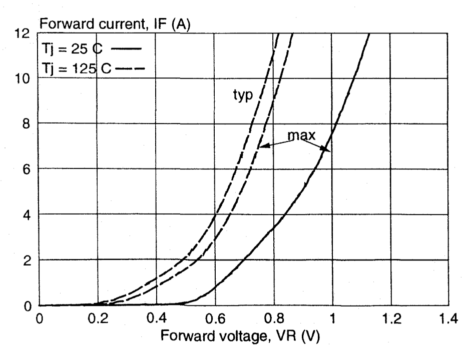


Fig.3. Typical and maximum forward characteristic per diode $I_F = f(V_F)$; parameter T_j

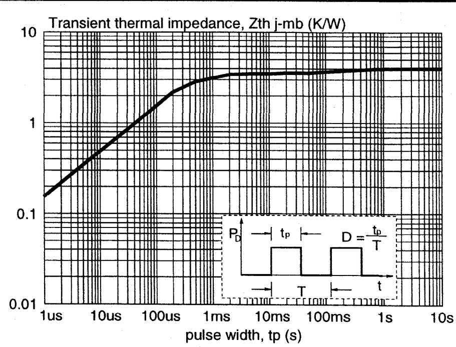


Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

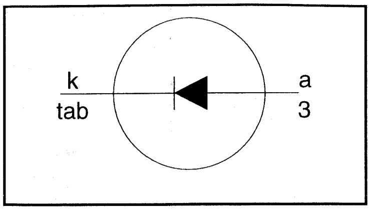
Rectifier diodes Schottky barrier

PBYR725D series

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 20 V/ 25 V

$I_{F(AV)}$ = 7.5 A

$V_F \leq 0.4$ V

GENERAL DESCRIPTION

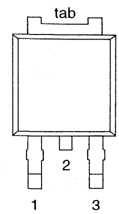
Schottky rectifier diodes intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYR725D series is supplied in the SOT428 surface mounting package.

PINNING

PIN	DESCRIPTION
1	no connection
2	cathode[1]
3	anode
tab	cathode

SOT428



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR7		20D	25D	
V_{RRM}	Peak repetitive reverse voltage		-	20	25	V
V_{RWM}	Working peak reverse voltage		-	20	25	V
V_R	Continuous reverse voltage	$T_{mb} \leq 119$ ˚C	-	20	25	V
$I_{F(AV)}$	Average rectified forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 138$ ˚C	-	7.5		A
I_{FRM}	Repetitive peak forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 138$ ˚C	-	15		A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	100 110		A A
I_{RRM}	Peak repetitive reverse surge current	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

1 it is not possible to make connection to pin 2 of the SOT428 package

HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	3	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

ELECTRICAL CHARACTERISTICS

= 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 7.5 A; T_j = 125˚C	-	0.33	0.4	V
		I_F = 15 A; T_j = 125˚C	-	0.45	0.52	V
		I_F = 15 A	-	0.52	0.62	V
I_R	Reverse current	$V_R = V_{RWM}$	-	0.2	5	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	15	30	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	580	-	pF

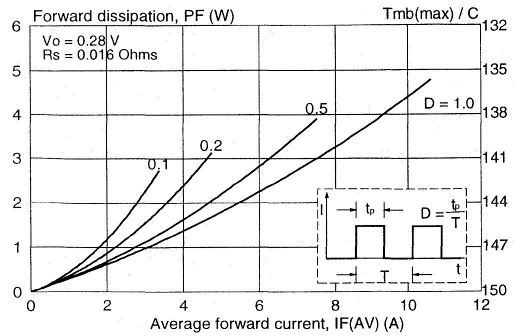


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

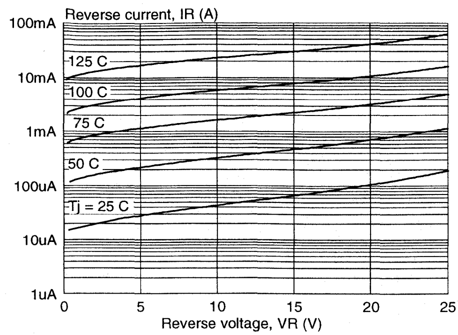


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

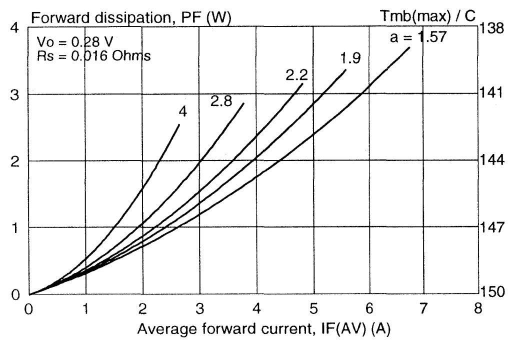


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

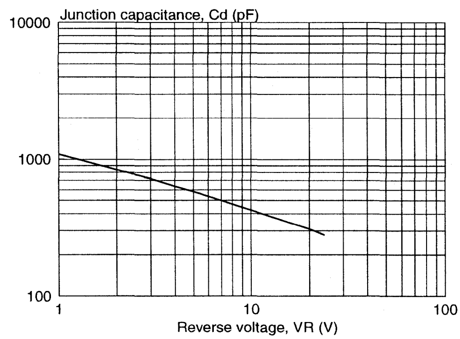


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

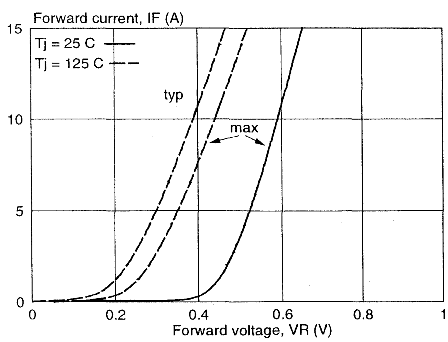


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

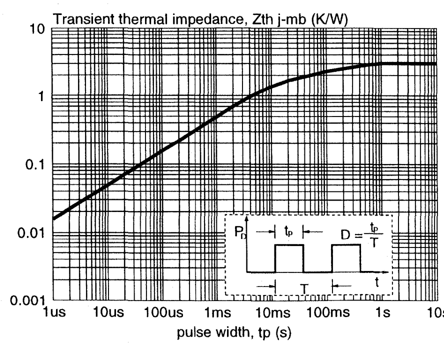


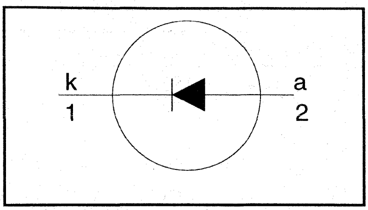
Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

Rectifier diodes Schottky barrier — PBYR745 series

EATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 40 V/ 45 V

$I_{F(AV)}$ = 7.5 A

$V_F \leq$ 0.57 V

ENERAL DESCRIPTION

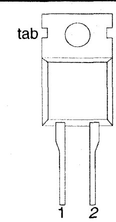
chottky rectifier diodes in a plastic nvelope. Intended for use as utput rectifiers in low voltage, high equency switched mode power upplies.

he PBYR745 series is supplied in ie conventional leaded SOD59 O220AC) package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



IMITING VALUES

miting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR7		40	45	
V_{RRM}	Peak repetitive reverse voltage		-	40	45	V
V_{RWM}	Working peak reverse voltage		-	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq 114$ ˚C	-	40	45	V
$I_{F(AV)}$	Average rectified forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 136$ ˚C	-	7.5		A
I_{FRM}	Repetitive peak forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 136$ ˚C	-	15		A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	135 150		A A
I_{RRM}	Peak repetitive reverse surge current	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\,j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	3	K/W
$R_{th\,j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	60	-	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 7.5 A; T_j = 125˚C	-	0.45	0.57	V
		I_F = 15 A; T_j = 125˚C	-	0.65	0.72	V
		I_F = 15 A	-	0.64	0.84	V
I_R	Reverse current	$V_R = V_{RWM}$	-	0.13	1	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	17	22	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	270	-	pF

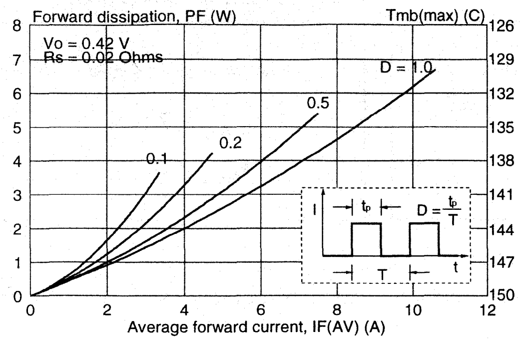


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

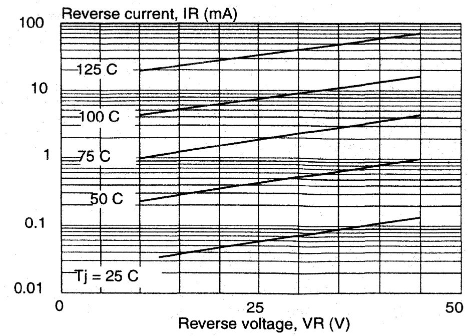


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

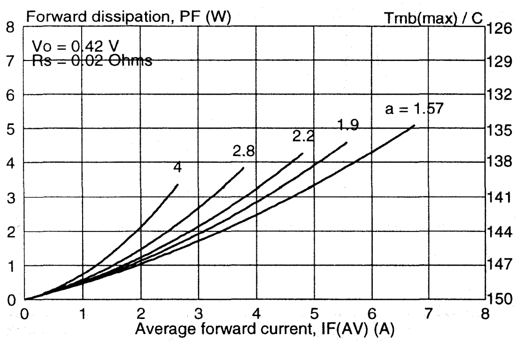


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

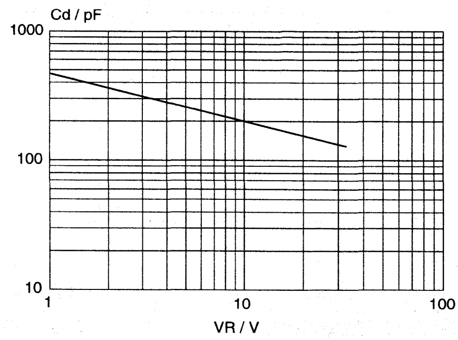


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

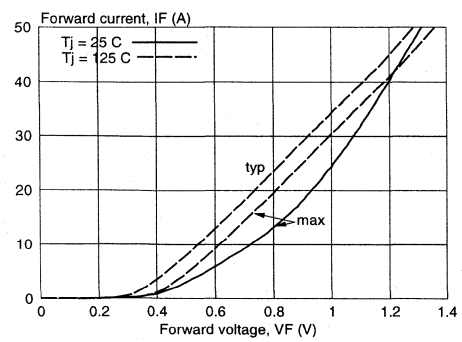


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

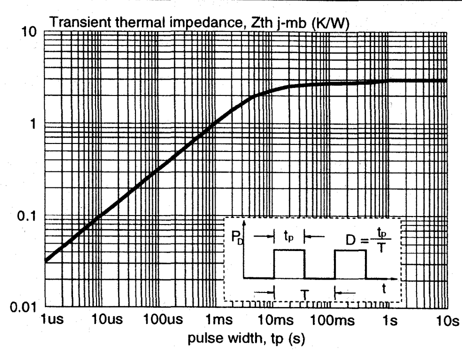
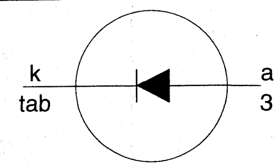


Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 40 V/ 45 V

$I_{F(AV)}$ = 7.5 A

$V_F \leq$ 0.57 V

GENERAL DESCRIPTION

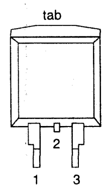
Schottky rectifier diodes in a surface mounting plastic envelope. Intended for use as output rectifiers in low voltage high frequency switched mode power supplies.

The PBYR745B series is supplied in the SOT404 surface mounting package.
The PBYR745D series is supplied in the SOT428 surface mounting package.

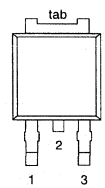
PINNING

PIN	DESCRIPTION
1	no connection
2	cathode[1]
3	anode
tab	cathode

SOT404



SOT428



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR7 PBYR7		40B 40D	45B 45D	
V_{RRM}	Peak repetitive reverse voltage		-	40	45	V
V_{RWM}	Working peak reverse voltage		-	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq$ 114 ˚C	-	40	45	V
$I_{F(AV)}$	Average rectified forward current	square wave; δ = 0.5; $T_{mb} \leq$ 136 ˚C	-	7.5		A
I_{FRM}	Repetitive peak forward current	square wave; δ = 0.5; $T_{mb} \leq$ 136 ˚C	-	15		A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms PBYR7..B t = 8.3 ms t = 10 ms PBYR7..D t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- - - -	135 150 100 110		A A A A
I_{RRM}	Peak repetitive reverse surge current	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

1. It is not possible to make connection to pin 2 of the SOT404 or SOT428 package.

HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	3	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

LECTRICAL CHARACTERISTICS

$_j$ = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 7.5 A; T_j = 125˚C	-	0.45	0.57	V
		I_F = 15 A; T_j = 125˚C	-	0.65	0.72	V
		I_F = 15 A	-	0.64	0.84	V
I_R	Reverse current	$V_R = V_{RWM}$	-	0.13	1	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	17	22	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	270	-	pF

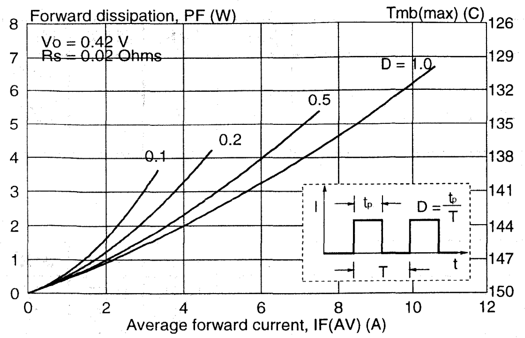


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

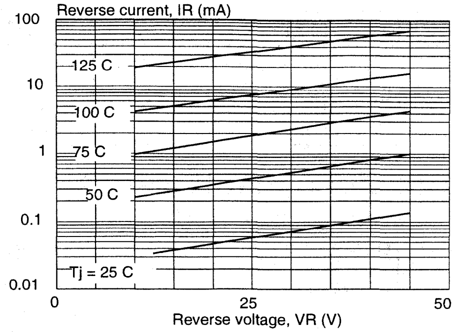


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

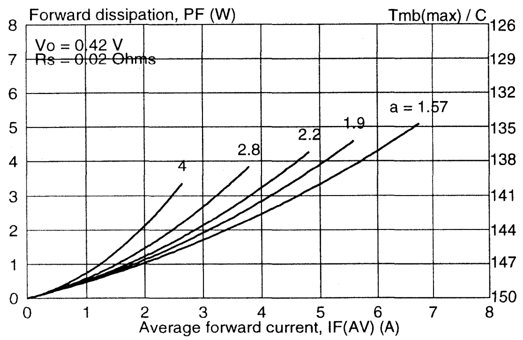


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

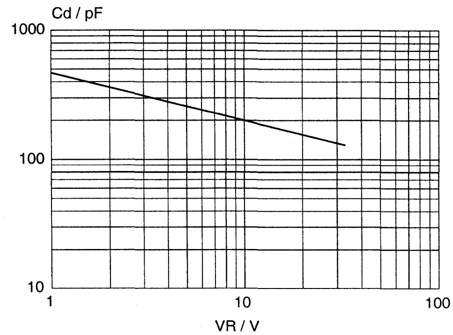


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

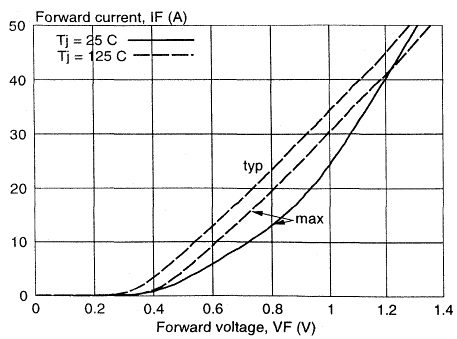


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

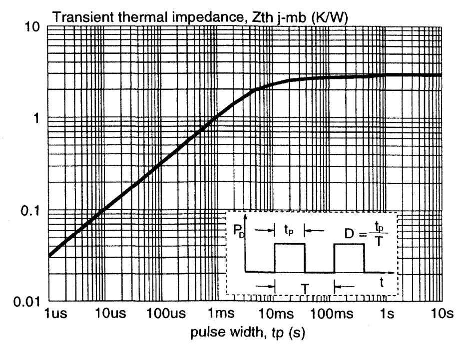


Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

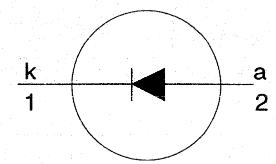
Rectifier diodes Schottky barrier

PBYR745F, PBYR745X series

EATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

V_R = 40 V/ 45 V

$I_{F(AV)}$ = 7.5 A

$V_F \leq$ 0.57 V

;ENERAL DESCRIPTION

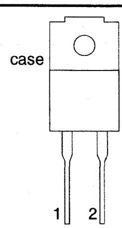
chottky rectifier diodes in a plastic envelope with electrically isolated mounting tab. Intended for use as output rectifiers ı low voltage, high frequency switched mode power supplies.

he PBYR745F series is supplied in the SOD100 package.
he PBYR745X series is supplied in the SOD113 package.

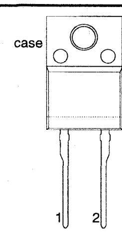
'INNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	isolated

SOD100



SOD113



.IMITING VALUES

imiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR7 PBYR7		40F 40X	45F 45X	
V_{RRM}	Peak repetitive reverse voltage		-	40	45	V
V_{RWM}	Working peak reverse voltage		-	40	45	V
V_R	Continuous reverse voltage	$T_{hs} \leq$ 103 ˚C	-	40	45	V
$I_{F(AV)}$	Average rectified forward current	square wave; δ = 0.5; $T_{hs} \leq$ 123 ˚C	-	7.5		A
I_{FRM}	Repetitive peak forward current	square wave; δ = 0.5; $T_{hs} \leq$ 123 ˚C	-	15		A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	100 110		A A
I_{RRM}	Peak repetitive reverse surge current	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

ISOLATION LIMITING VALUE & CHARACTERISTIC

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Peak isolation voltage from both terminals to external heatsink	SOD100 package; R.H. ≤ 65%; clean and dustfree	-	-	1500	V
V_{isol}	R.M.S. isolation voltage from both terminals to external heatsink	SOD113 package; f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65%; clean and dustfree	-	-	2500	V
C_{isol}	Capacitance from pin 1 to external heatsink	f = 1 MHz	-	10	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	5.5	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	55	-	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 7.5 A; T_j = 125˚C	-	0.45	0.57	V
		I_F = 15 A; T_j = 125˚C	-	0.65	0.72	V
		I_F = 15 A	-	0.64	0.84	V
I_R	Reverse current	$V_R = V_{RWM}$	-	0.13	1	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	17	22	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	270	-	pF

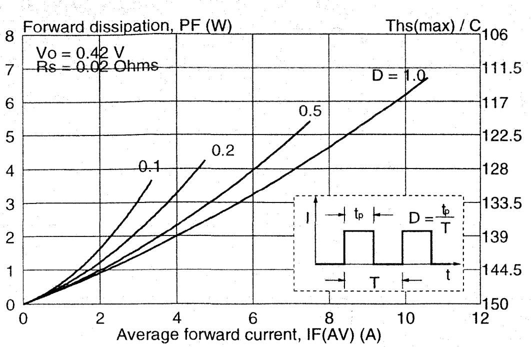


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

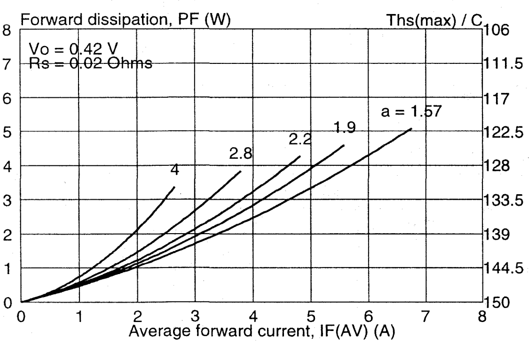


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

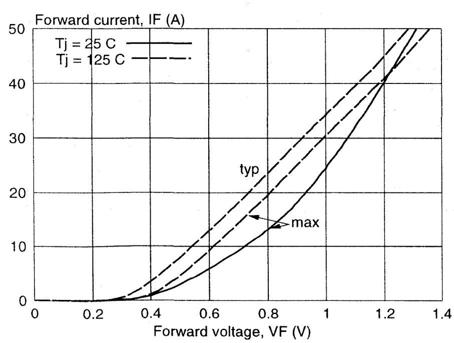


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

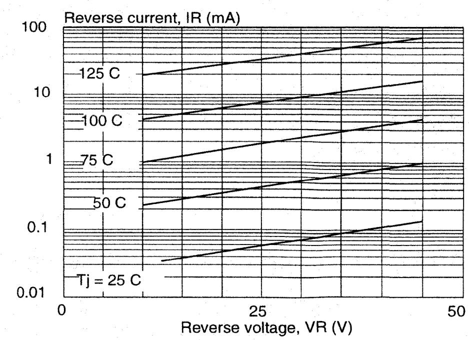


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

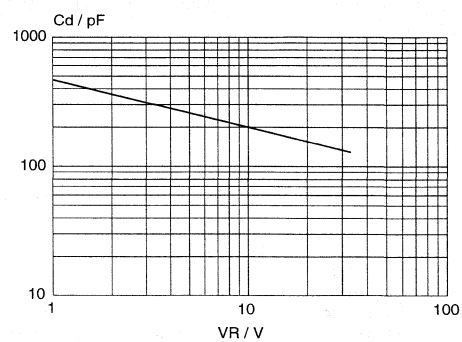


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

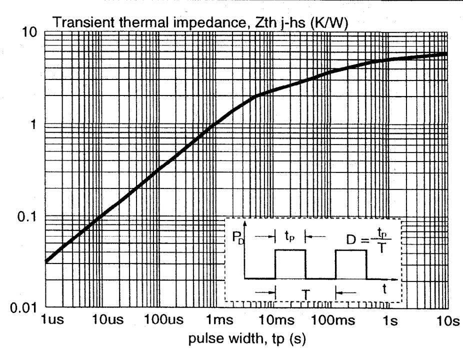


Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}hs} = f(t_p)$.

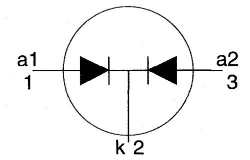
Rectifier diodes Schottky barrier

PBYR1025CTD series

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

$V_R = 20\ V/\ 25\ V$

$I_{O(AV)} = 10\ A$

$V_F \leq 0.4\ V$

GENERAL DESCRIPTION

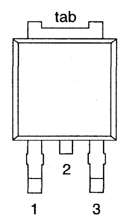
Dual schottky rectifier diodes intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYR1025CTD series is supplied in the SOT428 surface mounting package.

PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode[1]
3	anode 2
tab	cathode

SOT428



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR10		20CTD	25CTD	
V_{RRM}	Peak repetitive reverse voltage		-	20	25	V
V_{RWM}	Working peak reverse voltage		-	20	25	V
V_R	Continuous reverse voltage	$T_{mb} \leq 107$ ˚C	-	20	25	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{mb} \leq 136$ ˚C	-	10		A
I_{FRM}	Repetitive peak forward current per diode	square wave; $\delta = 0.5$; $T_{mb} \leq 136$ ˚C	-	10		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	90 100		A A
I_{RRM}	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

1 it is not possible to make connection to pin 2 of the SOT428 package

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	3	K/W
		both diodes	-	-	2.5	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

ELECTRICAL CHARACTERISTICS

All characteristics are per diode at T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 5 A; T_j = 125˚C	-	0.33	0.4	V
		I_F = 10 A; T_j = 125˚C	-	0.44	0.55	V
		I_F = 10 A	-	0.5	0.62	V
I_R	Reverse current	V_R = V_{RWM}	-	0.2	5	mA
		V_R = V_{RWM}; T_j = 100˚C	-	10	20	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	350	-	pF

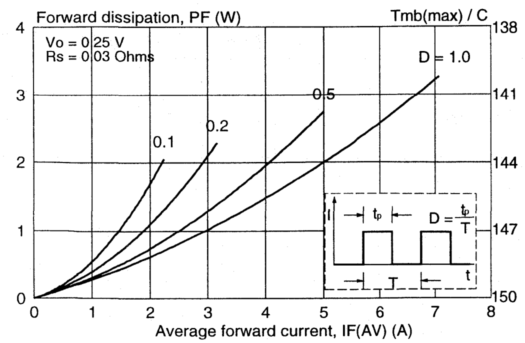


Fig.1. Maximum forward dissipation per diode $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

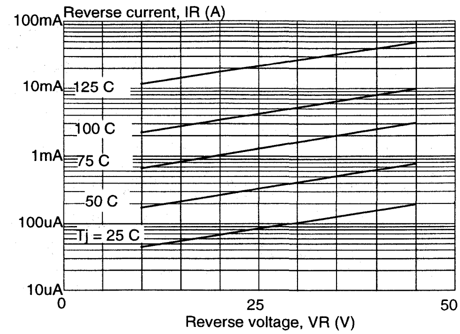


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

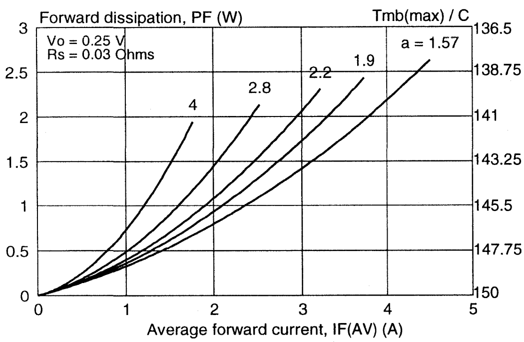


Fig.2. Maximum forward dissipation per diode $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

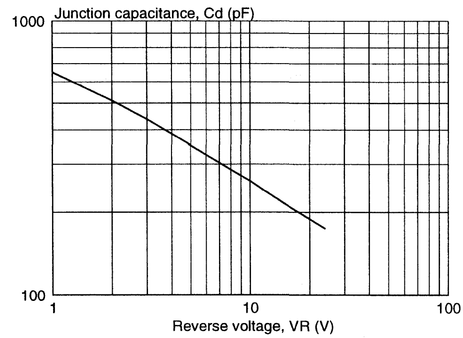


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

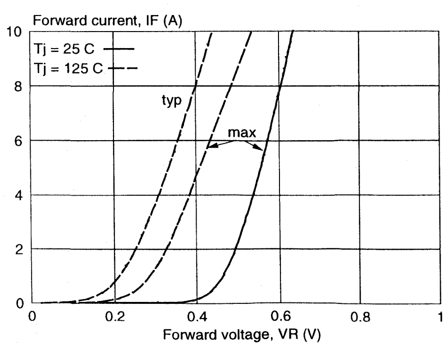


Fig.3. Typical and maximum forward characteristic per diode $I_F = f(V_F)$; parameter T_j

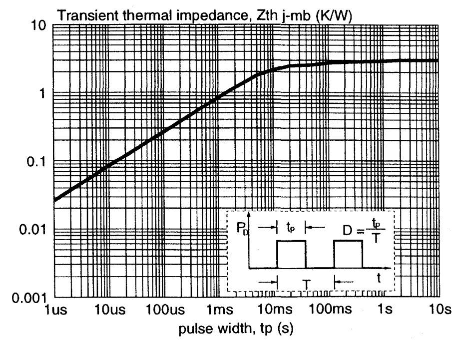


Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

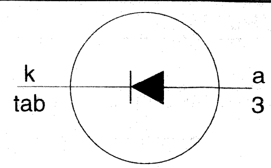
℩ectifier diodes ℨchottky barrier

PBYR1025D series

EATURES

Low forward volt drop
Fast switching
Reverse surge capability
High thermal cycling performance
Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 20 V/ 25 V

$I_{F(AV)}$ = 10 A

$V_F \leq$ 0.41 V

¡ENERAL DESCRIPTION

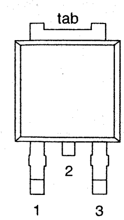
chottky rectifier diodes in a ɹrface mounting plastic envelope. ıtended for use as output rectifiers low voltage, high frequency ʌitched mode power supplies.

he PBYR1025D series is supplied the SOT428 surface mounting ɘckage.

PINNING

PIN	DESCRIPTION
1	no connection
2	cathode[1]
3	anode
tab	cathode

SOT428



IMITING VALUES

ımiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR10		20D	25D	
V_{RRM}	Peak repetitive reverse voltage		-	20	25	V
V_{RWM}	Working peak reverse voltage		-	20	25	V
V_R	Continuous reverse voltage	$T_{mb} \leq 120$ ˚C	-	20	25	V
$I_{F(AV)}$	Average rectified forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 140$ ˚C	-	10		A
I_{FRM}	Repetitive peak forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 140$ ˚C	-	20		A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	100 110		A A
I_{RRM}	Peak repetitive reverse surge current	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

It is not possible to make connection to pin 2 of the SOT428 package.

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-mb}$	Thermal resistance junction to mounting base		-	-	2	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 10 A; T_j = 125˚C	-	0.33	0.41	V
		I_F = 20 A; T_j = 125˚C	-	0.43	0.55	V
		I_F = 20 A	-	0.51	0.6	V
I_R	Reverse current	$V_R = V_{RWM}$	-	1	5	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	22	40	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	700	-	pF

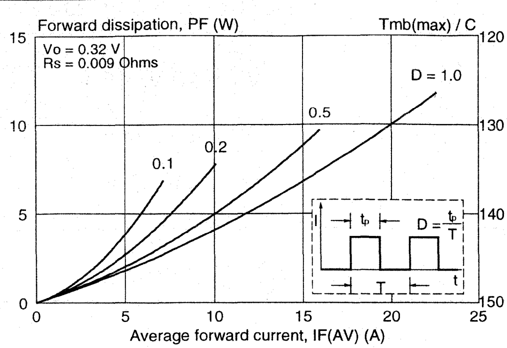


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

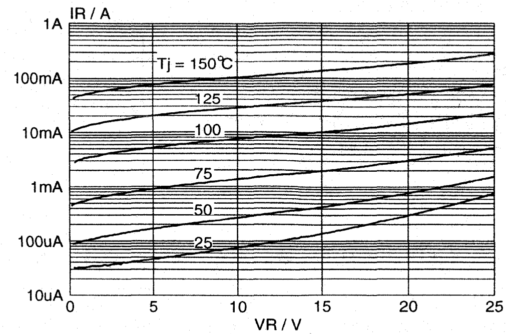


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

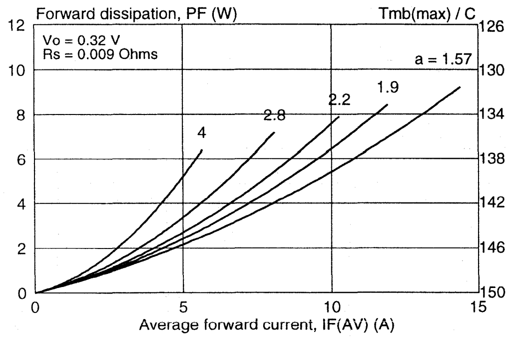


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

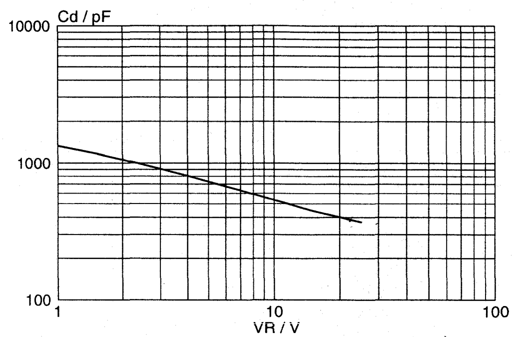


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; $f = 1$ MHz; $T_j = 25^\circ C$ to $125^\circ C$.

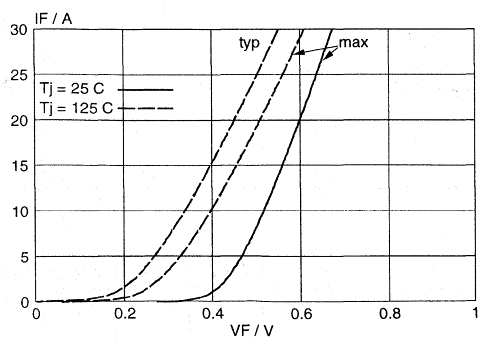


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

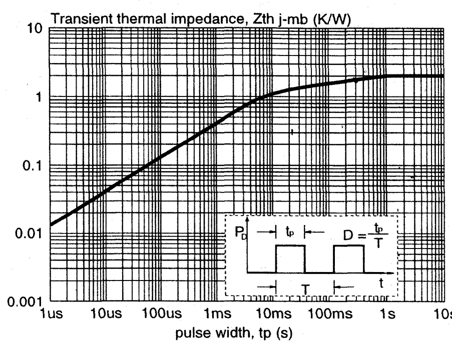


Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

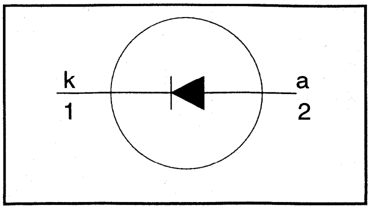
Rectifier diodes Schottky barrier

PBYR1045 series

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 40 V/ 45 V

$I_{F(AV)}$ = 10 A

$V_F \leq$ 0.57 V

GENERAL DESCRIPTION

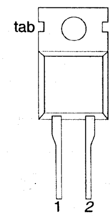
Schottky rectifier diodes in a plastic envelope. Intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYR1045 series is supplied in the conventional leaded SOD59 (TO220AC) package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR10		40	45	
V_{RRM}	Peak repetitive reverse voltage		-	40	45	V
V_{RWM}	Working peak reverse voltage		-	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq$ 113 ˚C	-	40	45	V
$I_{F(AV)}$	Average rectified forward current	square wave; δ = 0.5; $T_{mb} \leq$ 136 ˚C	-	10		A
I_{FRM}	Repetitive peak forward current	square wave; δ = 0.5; $T_{mb} \leq$ 136 ˚C	-	20		A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	135 150		A A
I_{RRM}	Peak repetitive reverse surge current	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\,j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2	K/W
$R_{th\,j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	60	-	K/W

LECTRICAL CHARACTERISTICS

= 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 10 A; T_j = 125˚C	-	0.5	0.57	V
		I_F = 20 A; T_j = 125˚C	-	0.69	0.72	V
		I_F = 20 A	-	0.65	0.84	V
I_R	Reverse current	$V_R = V_{RWM}$	-	0.2	1.3	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	22	35	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	350	-	pF

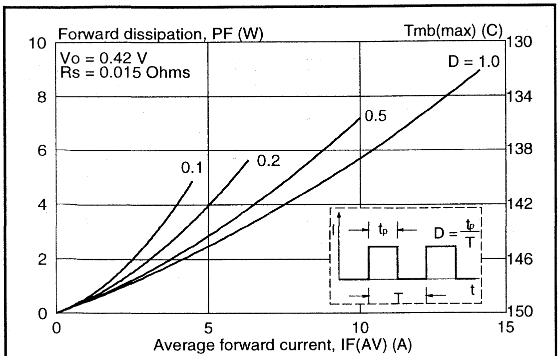


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

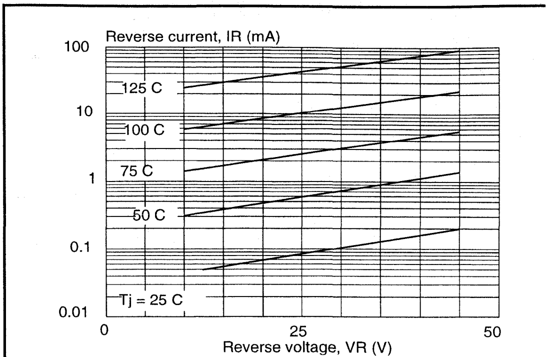


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

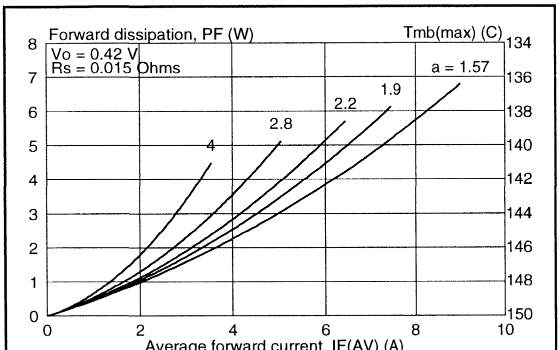


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

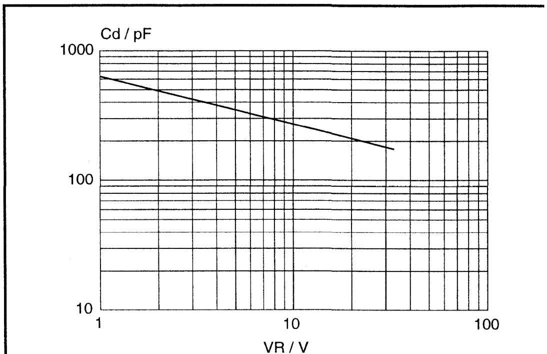


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

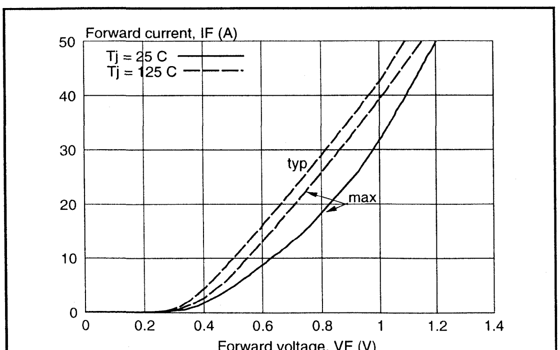


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

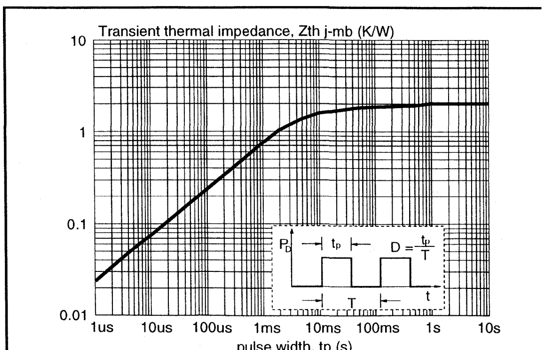


Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

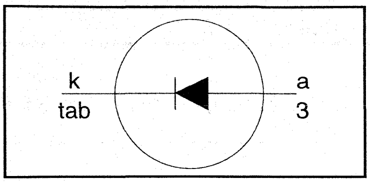
ectifier diodes chottky barrier

PBYR1045B series

EATURES

- .ow forward volt drop
- ast switching
- everse surge capability
- ligh thermal cycling performance
- .ow thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 40 V/ 45 V

$I_{F(AV)}$ = 10 A

$V_F \leq$ 0.57 V

ENERAL DESCRIPTION

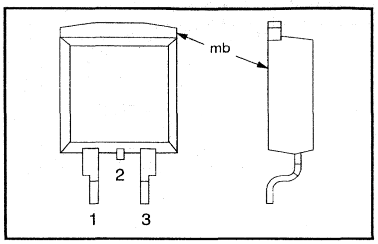
:hottky rectifier diodes in a plastic ivelope. Intended for use as itput rectifiers in low voltage, high equency switched mode power pplies.

ie PBYR1045B series is supplied the surface mounting SOT404 ickage.

PINNING

PIN	DESCRIPTION
1	no connection
2	cathode[1]
3	anode
tab	cathode

SOT404



MITING VALUES

niting values in accordance with the Absolute Maximum System (IEC 134)

YMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR10		40B	45B	
$/_{RRM}$	Peak repetitive reverse voltage		-	40	45	V
$/_{RWM}$	Working peak reverse voltage		-	40	45	V
$/_{R}$	Continuous reverse voltage	$T_{mb} \leq 113$ ˚C	-	40	45	V
$_{F(AV)}$	Average rectified forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 136$ ˚C	-	10		A
$_{FRM}$	Repetitive peak forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 136$ ˚C	-	20		A
$_{FSM}$	Non-repetitive peak forward current	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	135 150		A A
$_{RRM}$	Peak repetitive reverse surge current	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
$_{j}$	Operating junction temperature		-	150		˚C
$_{stg}$	Storage temperature		- 65	175		˚C

It is not possible to make connection to pin 2 of the SOT404 package.

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 10 A; T_j = 125˚C	-	0.5	0.57	V
		I_F = 20 A; T_j = 125˚C	-	0.69	0.72	V
		I_F = 20 A	-	0.65	0.84	V
I_R	Reverse current	$V_R = V_{RWM}$	-	0.2	1.3	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	22	35	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	350	-	pF

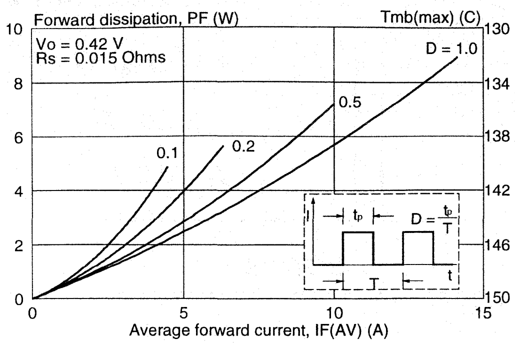


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

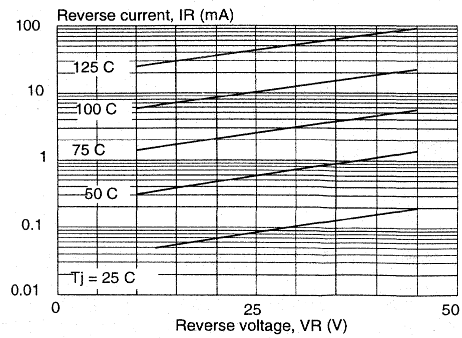


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

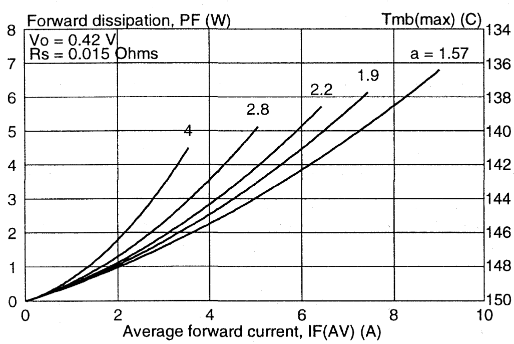


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

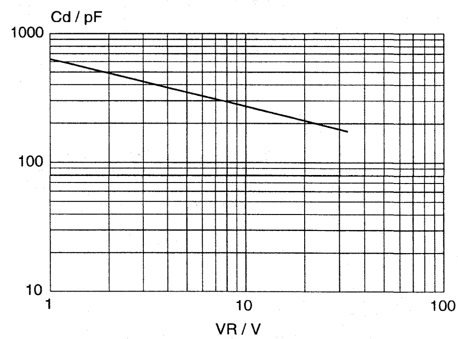


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

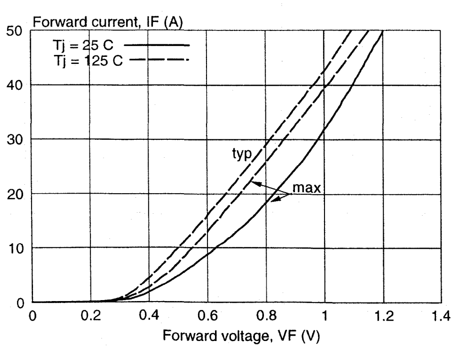


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

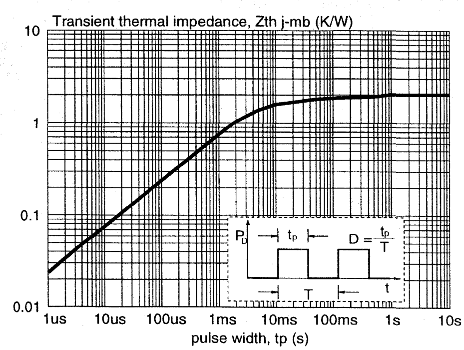


Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

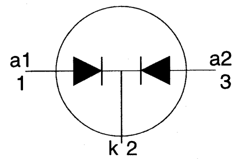
Rectifier diodes Schottky barrier

PBYR1045CTD series

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 40 V/ 45 V

$I_{O(AV)}$ = 10 A

$V_F \leq$ 0.6 V

GENERAL DESCRIPTION

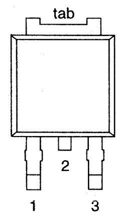
Dual schottky rectifier diodes intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYR1045CTD series is supplied in the SOT428 surface mounting package.

PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode[1]
3	anode 2
tab	cathode

SOT428



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNI
		PBYR10		**40CTD**	**45CTD**	
V_{RRM}	Peak repetitive reverse voltage		-	40	45	V
V_{RWM}	Working peak reverse voltage		-	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq 108$ ˚C	-	40	45	V
$I_{O(AV)}$	Average rectified forward current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{mb} \leq 127$ ˚C	-	10		A
I_{FRM}	Repetitive peak forward current per diode	square wave; $\delta = 0.5$; $T_{mb} \leq 127$ ˚C	-	10		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-	100		A
		t = 8.3 ms	-	110		A
		sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$				
I_{RRM}	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

1 it is not possible to make connection to pin 2 of the SOT428 package

HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	4.5	K/W
		both diodes	-	-	3	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

LECTRICAL CHARACTERISTICS

l characteristics are per diode at T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 5 A; T_j = 125˚C	-	0.52	0.6	V
		I_F = 10 A; T_j = 125˚C	-	0.7	0.77	V
		I_F = 10 A	-	0.72	0.87	V
$_R$	Reverse current	$V_R = V_{RWM}$	-	0.06	0.5	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	6	15	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	155	-	pF

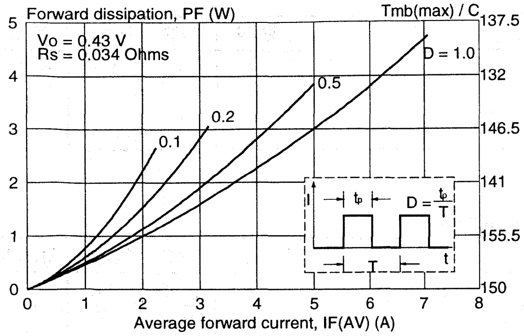


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

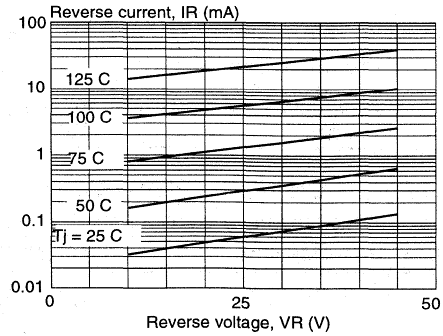


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

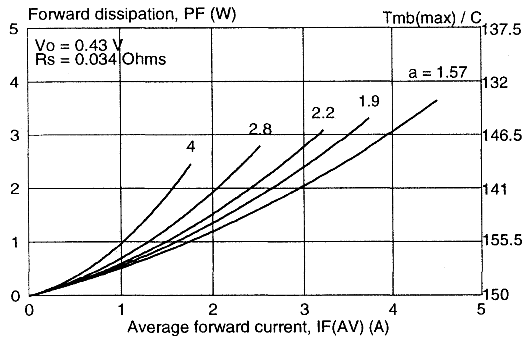


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

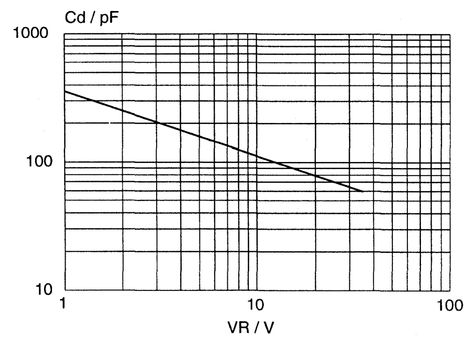


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

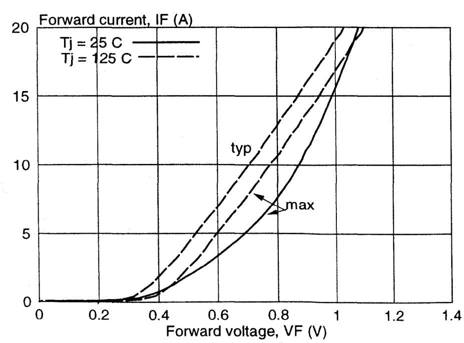


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

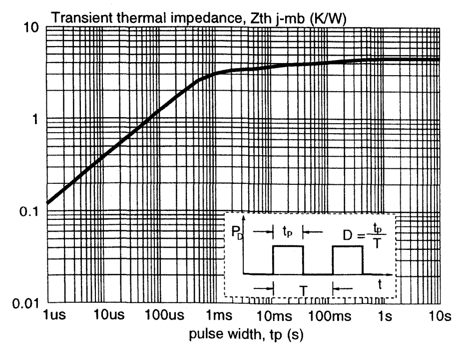


Fig.6. Transient thermal impedance; per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

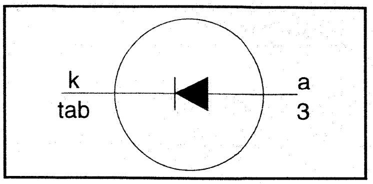
Rectifier diodes Schottky barrier

PBYR1045D series

'EATURES

Low forward volt drop
Fast switching
Reverse surge capability
High thermal cycling performance
Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 40 V/ 45 V

$I_{F(AV)}$ = 10 A

$V_F \leq$ 0.57 V

;ENERAL DESCRIPTION

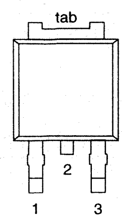
;chottky rectifier diodes in a plastic nvelope. Intended for use as utput rectifiers in low voltage, high 'equency switched mode power upplies.

'he PBYR1045D series is supplied ı the surface mounting SOT428 ackage.

PINNING

PIN	DESCRIPTION
1	no connection
2	cathode[1]
3	anode
tab	cathode

SOT428



.IMITING VALUES

.imiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR10		40D	45D	
V_{RRM}	Peak repetitive reverse voltage		-	40	45	V
V_{RWM}	Working peak reverse voltage		-	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq$ 113 ˚C	-	40	45	V
$I_{F(AV)}$	Average rectified forward current	square wave; δ = 0.5; $T_{mb} \leq$ 134 ˚C	-	10		A
I_{FRM}	Repetitive peak forward current	square wave; δ = 0.5; $T_{mb} \leq$ 134 ˚C	-	20		A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms	-	100		A
		t = 8.3 ms	-	110		A
		sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$				
I_{RRM}	Peak repetitive reverse surge current	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

1 It is not possible to make connection to pin 2 of the SOT428 package.

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 10 A; T_j = 125˚C	-	0.5	0.57	V
		I_F = 20 A; T_j = 125˚C	-	0.74	0.8	V
		I_F = 20 A	-	0.65	0.84	V
I_R	Reverse current	$V_R = V_{RWM}$	-	0.2	1.3	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	22	35	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	350	-	pF

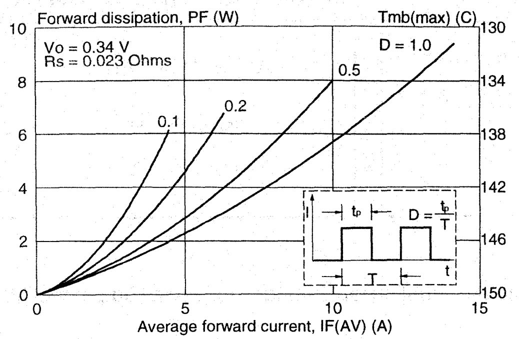


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

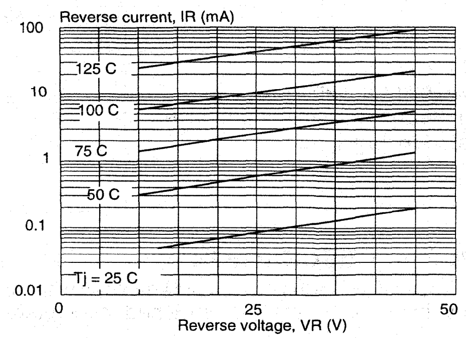


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

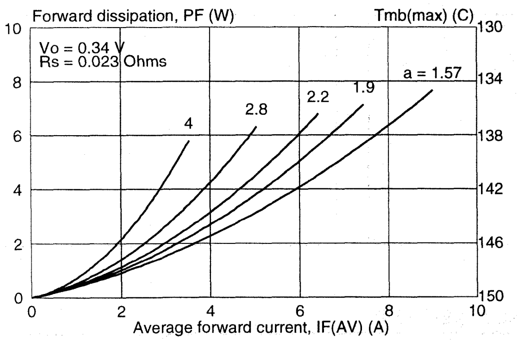


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

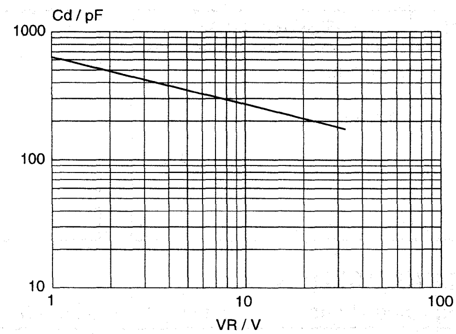


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

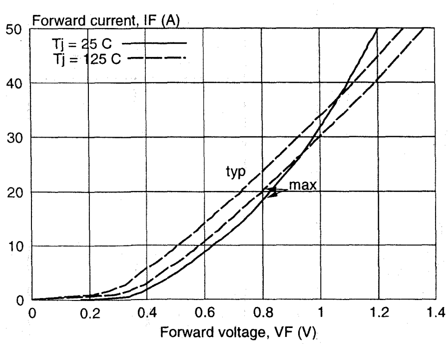


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

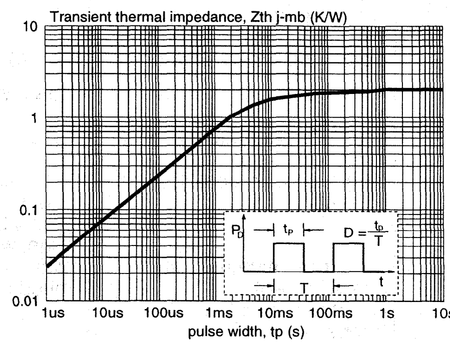


Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

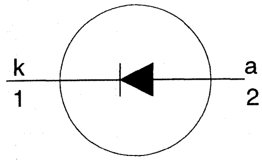
Rectifier diodes Schottky barrier

PBYR1045F, PBYR1045X series

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

V_R = 40 V/ 45 V

$I_{F(AV)}$ = 10 A

$V_F \leq$ 0.59 V

GENERAL DESCRIPTION

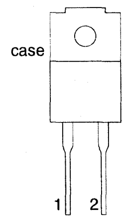
Schottky rectifier diodes in a plastic envelope with electrically isolated mounting tab. Intended for use as output rectifier in low voltage, high frequency switched mode power supplies.

The PBYR1045F series is supplied in the SOD100 package.
The PBYR1045X series is supplied in the SOD113 package.

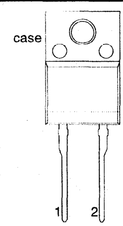
PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	isolated

SOD100



SOD113



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR10 PBYR10		40F 40X	45F 45X	
V_{RRM}	Peak repetitive reverse voltage		-	40	45	V
V_{RWM}	Working peak reverse voltage		-	40	45	V
V_R	Continuous reverse voltage	$T_{hs} \leq 95$ ˚C	-	40	45	V
$I_{F(AV)}$	Average rectified forward current	square wave; $\delta = 0.5$; $T_{hs} \leq 112$ ˚C	-	10		A
I_{FRM}	Repetitive peak forward current	square wave; $\delta = 0.5$; $T_{hs} \leq 112$ ˚C	-	20		A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	100 110		A A
I_{RRM}	Peak repetitive reverse surge current	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

OLATION LIMITING VALUE & CHARACTERISTIC

$_s$ = 25 ˚C unless otherwise specified

YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$_{isol}$	Peak isolation voltage from both terminals to external heatsink	SOD100 package; R.H. ≤ 65%; clean and dustfree	-	-	1500	V
$_{isol}$	R.M.S. isolation voltage from both terminals to external heatsink	SOD113 package; f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65%; clean and dustfree	-	-	2500	V
$_{isol}$	Capacitance from pin 1 to external heatsink	f = 1 MHz	-	10	-	pF

HERMAL RESISTANCES

YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	5.5	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	in free air	-	55	-	K/W

LECTRICAL CHARACTERISTICS

= 25 ˚C unless otherwise specified

YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$_F$	Forward voltage	I_F = 10 A; T_j = 125˚C	-	0.5	0.59	V
		I_F = 20 A; T_j = 125˚C	-	0.69	0.75	V
		I_F = 20 A	-	0.65	0.87	V
R	Reverse current	$V_R = V_{RWM}$	-	0.2	1.3	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	22	35	mA
$_d$	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	350	-	pF

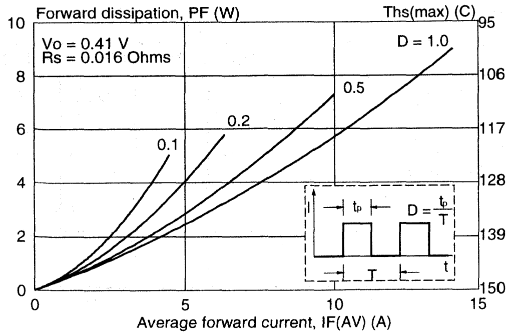


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

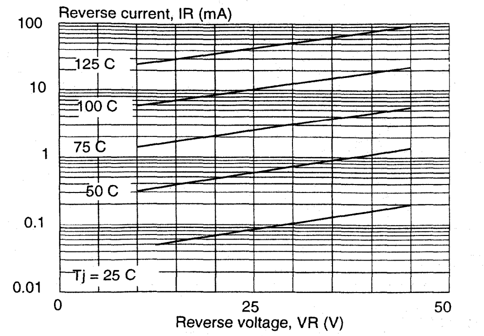


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

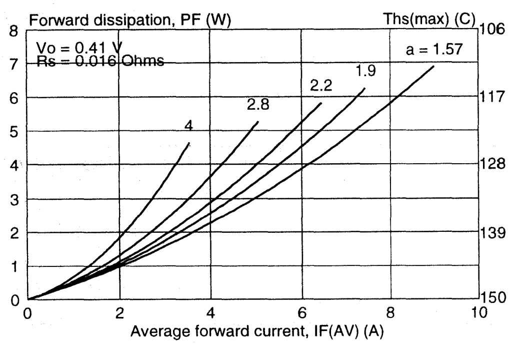


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

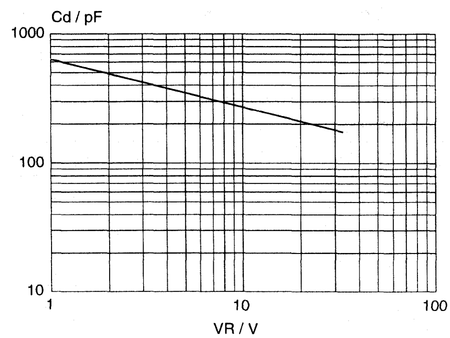


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

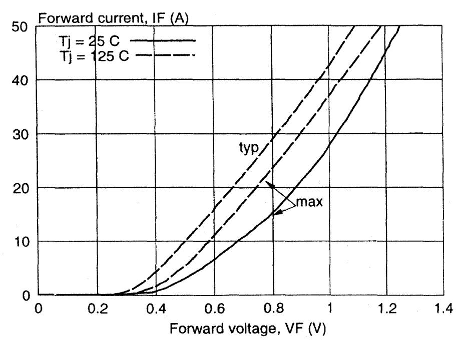


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

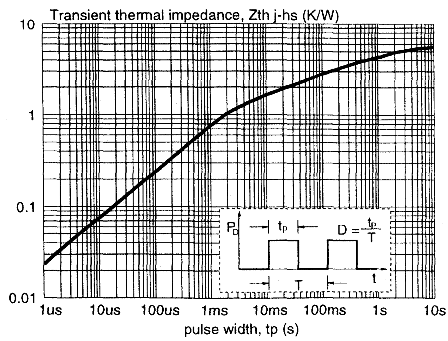


Fig.6. Transient thermal impedance; $Z_{th\ j\text{-}hs} = f(t_p)$.

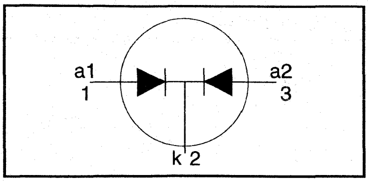
Rectifier diodes Schottky barrier

PBYR1545CT, PBYR1545CTB series

EATURES

Low forward volt drop
Fast switching
Reverse surge capability
High thermal cycling performance
Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

$V_R = 40$ V/ 45 V

$I_{O(AV)} = 15$ A

$V_F \leq 0.57$ V

iENERAL DESCRIPTION

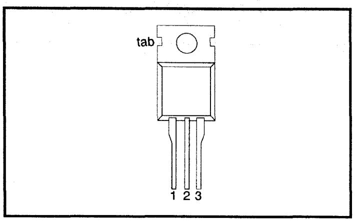
ual, common cathode schottky rectifier diodes in a conventional leaded plastic package and a surface mounting astic package. Intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

he PBYR1545CT series is supplied in the SOT78 conventional leaded package.
he PBYR1545CTB series is supplied in the SOT404 surface mounting package.

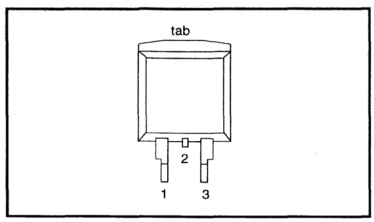
INNING

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k) [1]
3	anode 2 (a)
tab	cathode (k)

SOT78 (TO220AB)



SOT404



IMITING VALUES

miting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR15 PBYR15		40CT 40CTB	45CT 45CTB	
V_{RRM}	Peak repetitive reverse voltage		-	40	45	V
V_{RWM}	Working peak reverse voltage		-	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq 107$ ˚C	-	40	45	V
$I_{O(AV)}$	Average rectified forward current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{mb} \leq 128$ ˚C	-	15		A
I_{FRM}	Repetitive peak forward current (per diode)	square wave; $\delta = 0.5$; $T_{mb} \leq 128$ ˚C	-	15		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	135 150		A A
I_{RRM}	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

. It is not possible to make connection to pin 2 of the SOT404 package.

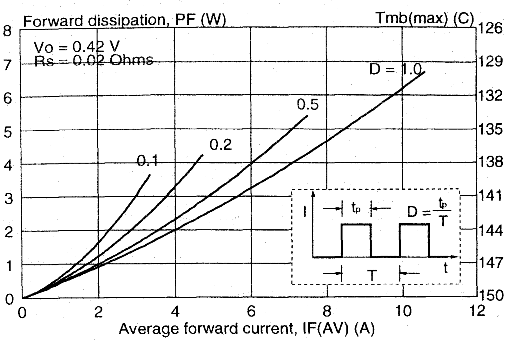
THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	3	K/W
		both diodes	-	-	2	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	SOT78 package in free air	-	60	-	K/W
		SOT404 package, pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage per diode	I_F = 7.5 A; T_j = 125˚C	-	0.44	0.57	V
		I_F = 15 A; T_j = 125˚C	-	0.63	0.72	V
		I_F = 15 A	-	0.62	0.84	V
I_R	Reverse current per diode	$V_R = V_{RWM}$	-	0.22	1	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	18	25	mA
C_d	Junction capacitance per diode	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	270	-	pF



=ig.1. *Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

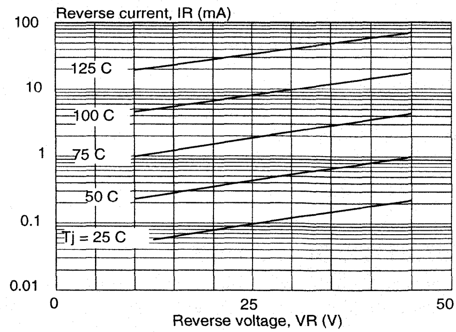
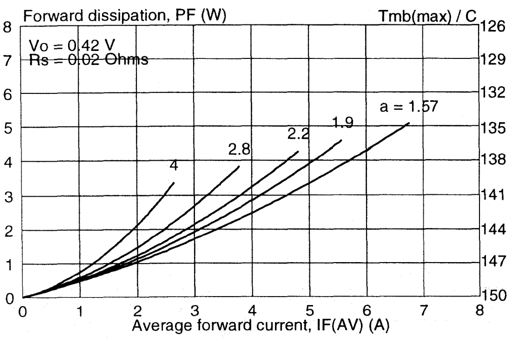


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j



=ig.2. *Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

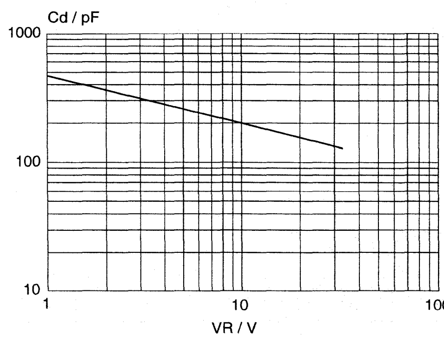


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

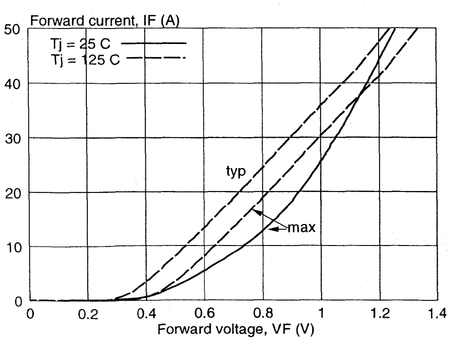


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

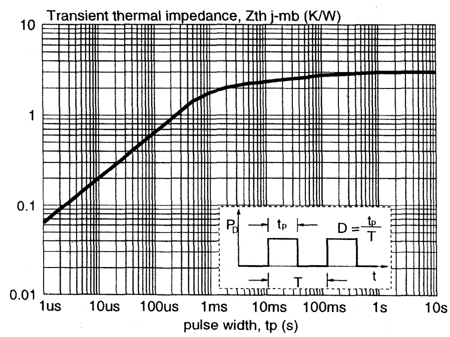


Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

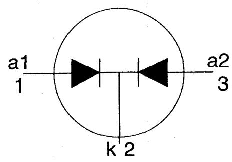
Rectifier diodes Schottky barrier

PBYR1545CTF, PBYR1545CTX serie

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

V_R = 40 V/ 45 V

$I_{O(AV)}$ = 15 A

$V_F \leq$ 0.57V

GENERAL DESCRIPTION

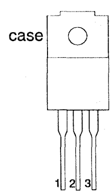
Dual, common cathode schottky rectifier diodes in a plastic envelope with electrically isolated mounting tab. Intend for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYR1545CTF series is supplied in the SOT186 package.
The PBYR1545CTX series is supplied in the SOT186A package.

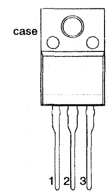
PINNING

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	isolated

SOT186



SOT186A



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNI
		PBYR15 PBYR15		40CTF 40CTX	45CTF 45CTX	
V_{RRM}	Peak repetitive reverse voltage		-	40	45	V
V_{RWM}	Working peak reverse voltage		-	40	45	V
V_R	Continuous reverse voltage	$T_{hs} \leq$ 89 ˚C	-	40	45	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave; δ = 0.5; $T_{hs} \leq$ 93 ˚C	-	15		A
I_{FRM}	Repetitive peak forward current per diode	square wave; δ = 0.5; $T_{hs} \leq$ 93 ˚C	-	15		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	100 110		A A
I_{RRM}	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

OLATION LIMITING VALUE & CHARACTERISTIC

= 25 ˚C unless otherwise specified

YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$_{isol}$	Peak isolation voltage from all terminals to external heatsink	SOT186 package; R.H. ≤ 65%; clean and dustfree	-	-	1500	V
$_{isol}$	R.M.S. isolation voltage from all terminals to external heatsink	SOT186A package; f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65%; clean and dustfree	-	-	2500	V
$_{isol}$	Capacitance from pin 2 to external heatsink	f = 1 MHz	-	10	-	pF

IERMAL RESISTANCES

YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$_{th\ j-hs}$	Thermal resistance junction to heatsink	per diode	-	-	6	K/W
		both diodes (with heatsink compound)	-	-	5.2	K/W
$_{th\ j-a}$	Thermal resistance junction to ambient	in free air	-	55	-	K/W

.ECTRICAL CHARACTERISTICS

= 25 ˚C unless otherwise specified

YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$_F$	Forward voltage	I_F = 7.5 A; T_j = 125˚C	-	0.44	0.57	V
		I_F = 15 A; T_j = 125˚C	-	0.63	0.72	V
		I_F = 15 A	-	0.62	0.84	V
	Reverse current	$V_R = V_{RWM}$	-	0.22	1	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	18	25	mA
$_d$	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	270	-	pF

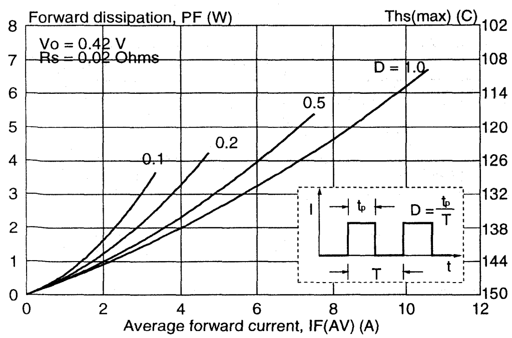


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

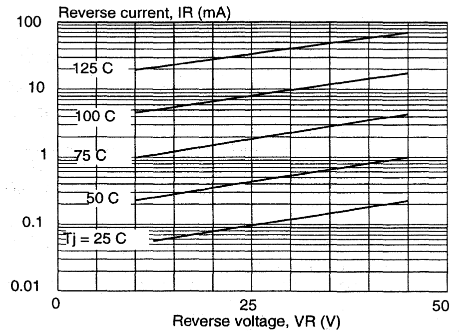


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

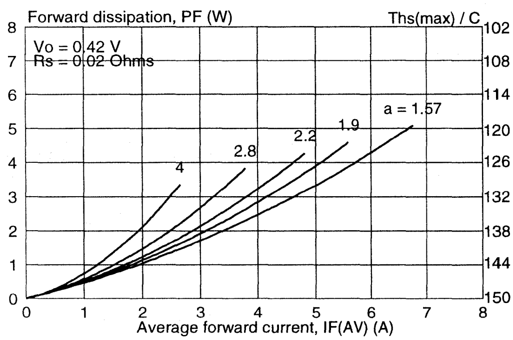


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

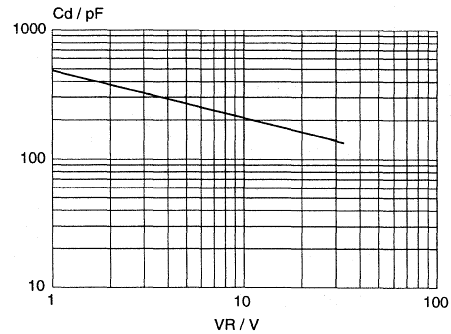


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

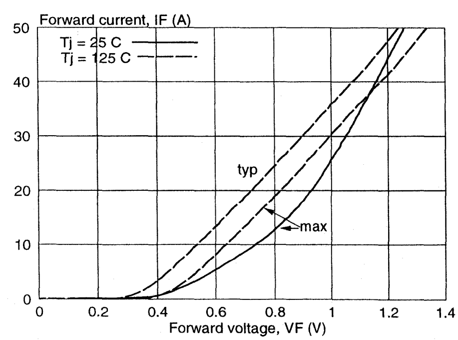


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

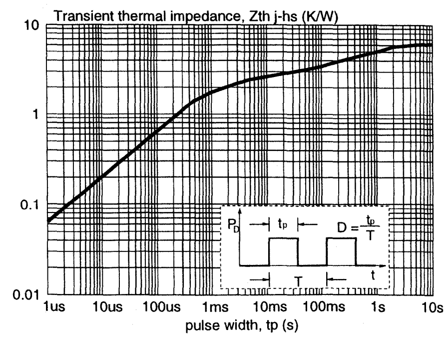


Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.

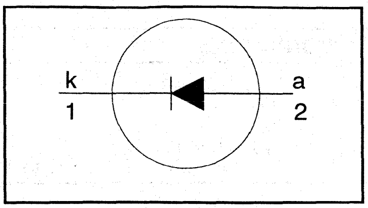
ʇectifier diodes
;chottky barrier

PBYR1645 series

ΞATURES

- .ow forward volt drop
- ᆖast switching
- ʇeverse surge capability
- ɨigh thermal cycling performance
- .ow thermal resistance

SYMBOL



QUICK REFERENCE DATA

$V_R = 40$ V/ 45 V

$I_{F(AV)} = 16$ A

$V_F \leq 0.57$ V

ENERAL DESCRIPTION

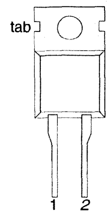
;hottky rectifier diodes in a plastic velope. Intended for use as tput rectifiers in low voltage, high ‹quency switched mode power pplies.

ıe PBYR1645 series is supplied the conventional leaded SOD59 O220AC) package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



MITING VALUES

niting values in accordance with the Absolute Maximum System (IEC 134)

;YMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR16		40	45	
$_{RRM}$	Peak repetitive reverse voltage		-	40	45	V
$_{RWM}$	Working peak reverse voltage		-	40	45	V
$_{R}$	Continuous reverse voltage	$T_{mb} \leq 116$ ˚C	-	40	45	V
$_{(AV)}$	Average rectified forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 131$ ˚C	-	16		A
$_{RM}$	Repetitive peak forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 131$ ˚C	-	32		A
$_{SM}$	Non-repetitive peak forward current	t = 10 ms t = 8.3 ms sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	135 150		A A
$_{RRM}$	Peak repetitive reverse surge current	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
$_{j}$	Operating junction temperature		-	150		˚C
$_{stg}$	Storage temperature		- 65	175		˚C

ɨERMAL RESISTANCES

YMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$_{th\,j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	1.5	K/W
$_{th\,j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	60	-	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 16 A; T_j = 125˚C	-	0.53	0.57	V
		I_F = 16 A	-	0.55	0.63	V
I_R	Reverse current	$V_R = V_{RWM}$	-	0.2	1.7	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	27	40	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	470	-	pF

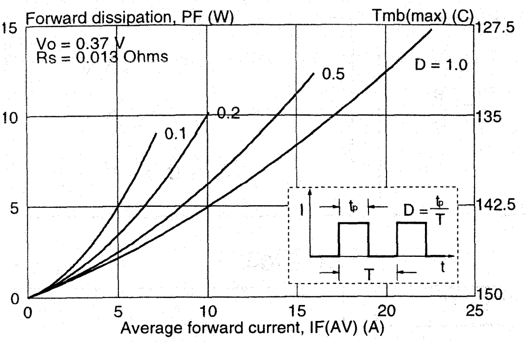


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

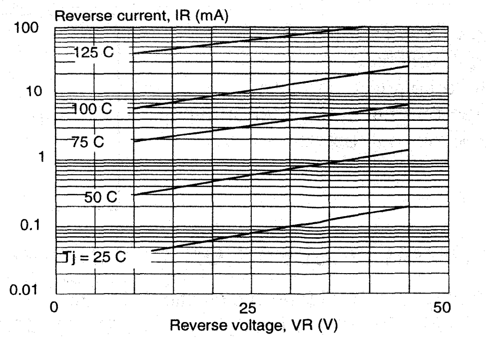


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

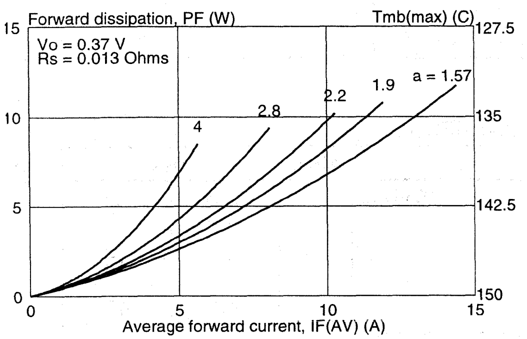


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

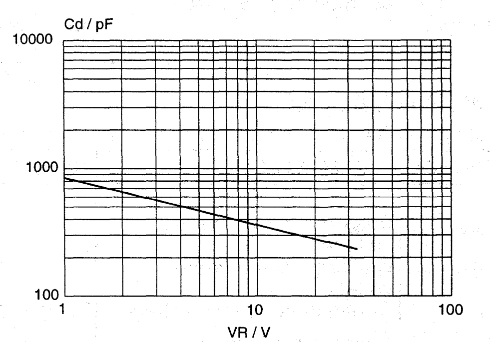


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

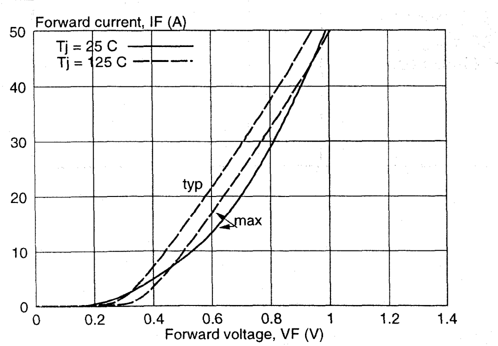


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

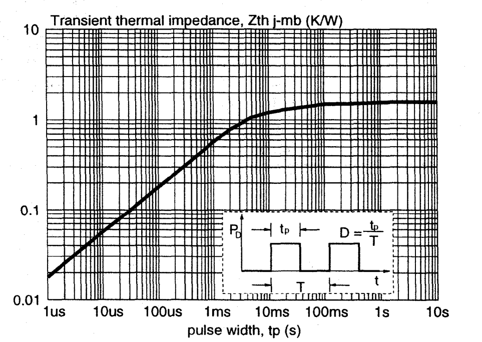


Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

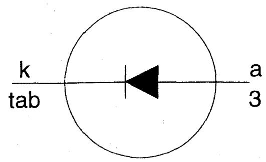
Rectifier diodes Schottky barrier

PBYR1645B series

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 40 V/ 45 V

$I_{F(AV)}$ = 16 A

$V_F \leq$ 0.57 V

GENERAL DESCRIPTION

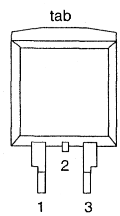
Schottky rectifier diodes in a plastic envelope. Intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYR1645B series is supplied in the surface mounting SOT404 package.

PINNING

PIN	DESCRIPTION
1	no connection
2	cathode[1]
3	anode
tab	cathode

SOT404



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR16		40B	45B	
V_{RRM}	Peak repetitive reverse voltage		-	40	45	V
V_{RWM}	Working peak reverse voltage		-	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq 116$ ˚C	-	40	45	V
$I_{F(AV)}$	Average rectified forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 131$ ˚C	-	16		A
I_{FRM}	Repetitive peak forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 131$ ˚C	-	32		A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms t = 8.3 ms sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	135 150		A A
I_{RRM}	Peak repetitive reverse surge current	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

1 it is not possible to make connection to pin 2 of the SOT404 package.

'HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	1.5	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

:LECTRICAL CHARACTERISTICS

$_j$ = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 16 A; T_j = 125˚C	-	0.53	0.57	V
		I_F = 16 A	-	0.55	0.63	V
I_R	Reverse current	$V_R = V_{RWM}$	-	0.2	1.7	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	27	40	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	470	-	pF

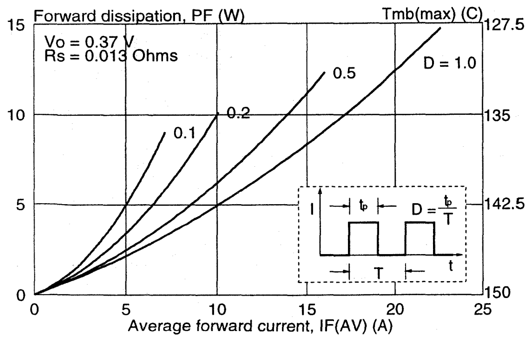


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

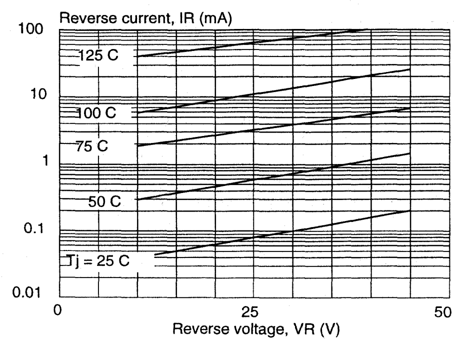


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

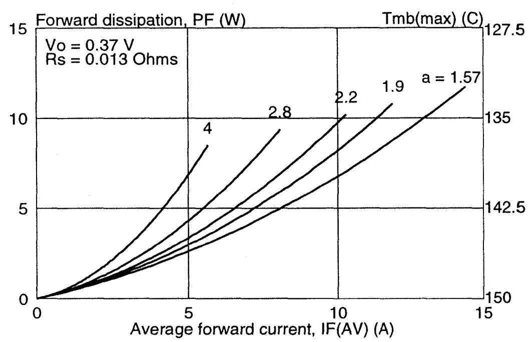


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

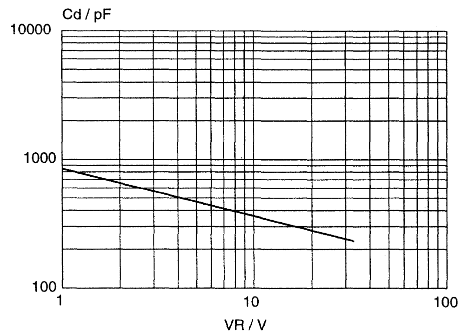


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

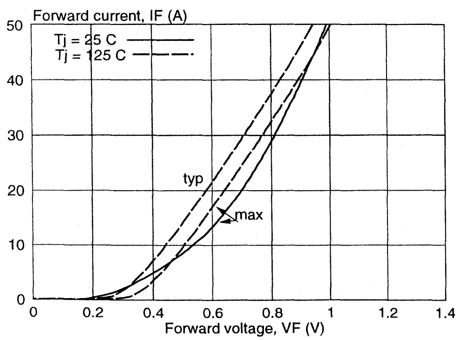


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

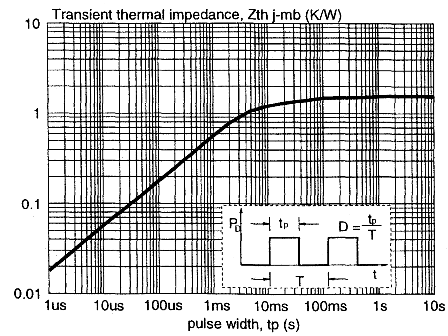


Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

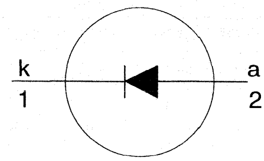
ʒectifier diodes ʒchottky barrier

PBYR1645F, PBYR1645X

EATURES

- _ow forward volt drop
- =ast switching
- ʒeverse surge capability
- ˧igh thermal cycling performance
- solated mounting tab

SYMBOL



QUICK REFERENCE DATA

V_R = 40 V/ 45 V

$I_{F(AV)}$ = 16 A

$V_F \leq$ 0.6 V

ENERAL DESCRIPTION

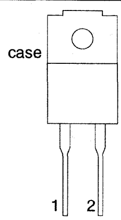
ꜿhottky rectifier diodes in a plastic envelope with electrically isolated mounting tab. Intended for use as output rectifiers low voltage, high frequency switched mode power supplies.

ıe PBYR1645F is supplied in the SOD100 package.
ıe PBYR1645X is supplied in the SOD113 package.

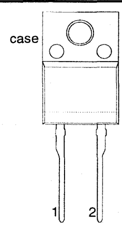
INNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	isolated

SOD100



SOD113



IMITING VALUES

ɿiting values in accordance with the Absolute Maximum System (IEC 134)

ʒYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR16 PBYR16		40F 40X	45F 45X	
$/_{RRM}$	Peak repetitive reverse voltage		-	40	45	V
$/_{RWM}$	Working peak reverse voltage		-	40	45	V
$/_{R}$	Continuous reverse voltage	$T_{hs} \leq 97$ ˚C	-	40	45	V
$=_{(AV)}$	Average rectified forward current	square wave; $\delta = 0.5$; $T_{hs} \leq 95$ ˚C	-	16		A
$=_{RM}$	Repetitive peak forward current	square wave; $\delta = 0.5$; $T_{hs} \leq 95$ ˚C	-	32		A
$=_{SM}$	Non-repetitive peak forward current	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	120 132		A A
$ʒ_{RM}$	Peak repetitive reverse surge current	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
$_{j}$	Operating junction temperature		-	150		˚C
$_{stg}$	Storage temperature		- 65	175		˚C

ISOLATION LIMITING VALUE & CHARACTERISTIC

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Peak isolation voltage from both terminals to external heatsink	SOD100 package; R.H. ≤ 65%; clean and dustfree	-	-	1500	V
V_{isol}	R.M.S. isolation voltage from both terminals to external heatsink	SOD113 package; f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65%; clean and dustfree	-	-	2500	V
C_{isol}	Capacitance from pin 1 to external heatsink	f = 1 MHz	-	10	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	4.2	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	55	-	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 16 A; T_j = 125˚C	-	0.53	0.6	V
		I_F = 16 A	-	0.55	0.68	V
I_R	Reverse current	$V_R = V_{RWM}$	-	0.2	1.7	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	27	40	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	470	-	pF

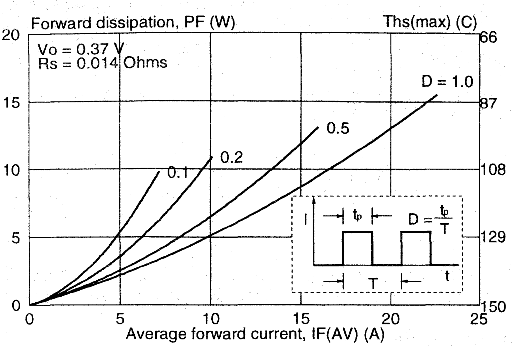


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

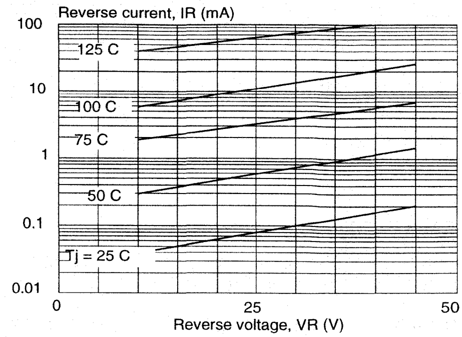


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

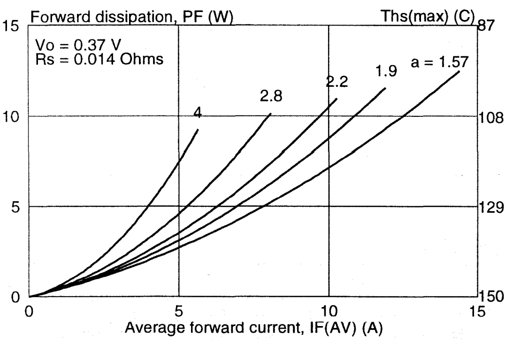


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

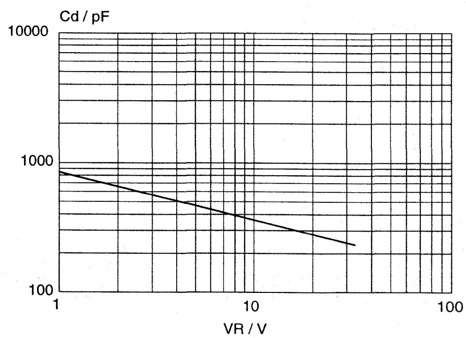


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

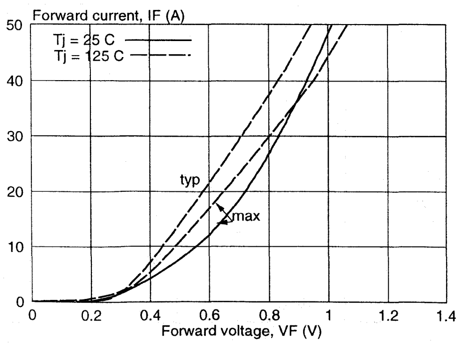


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

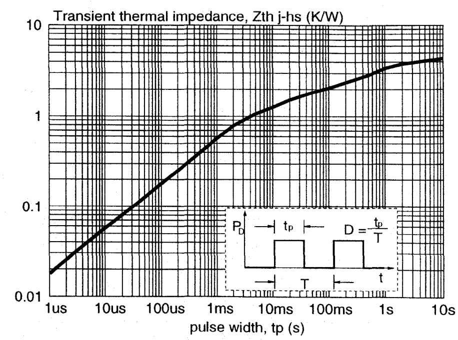


Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}hs} = f(t_p)$.

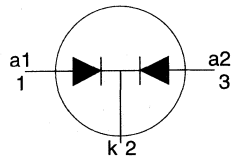
Rectifier diodes Schottky barrier

PBYR2045CT, PBYR2045CTB serie:

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 40 V/ 45 V

$I_{O(AV)}$ = 20 A

$V_F \leq$ 0.57 V

GENERAL DESCRIPTION

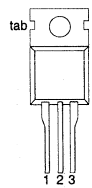
Dual, common cathode schottky rectifier diodes in a conventional leaded plastic package and a surface mountii plastic package. Intended for use as output rectifiers in low voltage, high frequency switched mode power supplies

The PBYR2045CT series is supplied in the SOT78 conventional leaded package.
The PBYR2045CTB series is supplied in the SOT404 surface mounting package.

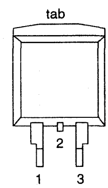
PINNING

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k) [1]
3	anode 2 (a)
tab	cathode (k)

SOT78 (TO220AB)



SOT404



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNI
		PBYR20 PBYR20		40CT 40CTB	45CT 45CTB	
V_{RRM}	Peak repetitive reverse voltage		-	40	45	V
V_{RWM}	Working peak reverse voltage		-	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq$ 106 ˚C	-	40	45	V
$I_{O(AV)}$	Average rectified forward current (both diodes conducting)	square wave; δ = 0.5; $T_{mb} \leq$ 128 ˚C	-	20		A
I_{FRM}	Repetitive peak forward current per diode	square wave; δ = 0.5; $T_{mb} \leq$ 128 ˚C	-	20		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	135 150		A A
I_{RRM}	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

1. It is not possible to make connection to pin 2 of the SOT404 pckage.

HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	2	K/W
		both diodes	-	-	1.5	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	SOT78 package in free air	-	60	-	K/W
		SOT404 package, pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

LECTRICAL CHARACTERISTICS

= 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage per diode	I_F = 10 A; T_j = 125˚C	-	0.45	0.57	V
		I_F = 20 A; T_j = 125˚C	-	0.64	0.72	V
		I_F = 20 A	-	0.64	0.84	V
I_R	Reverse current per diode	$V_R = V_{RWM}$	-	0.3	1.3	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	22	35	mA
C_d	Junction capacitance per diode	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	380	-	pF

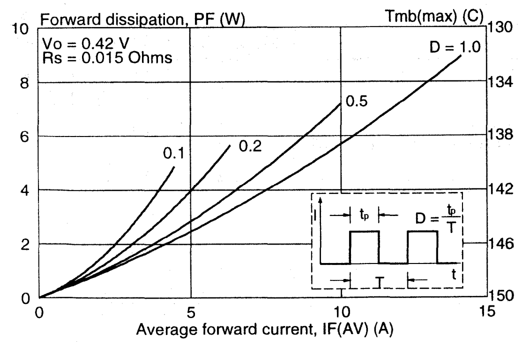


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

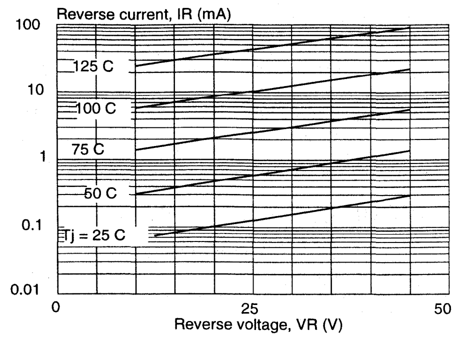


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

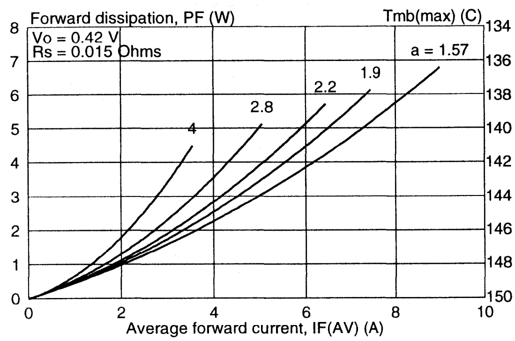


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

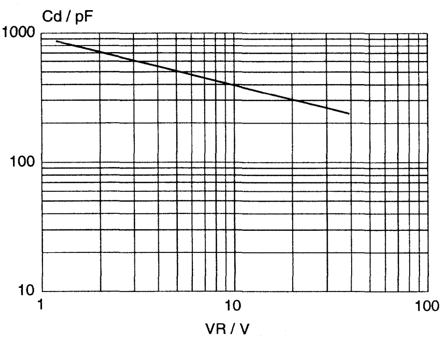


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

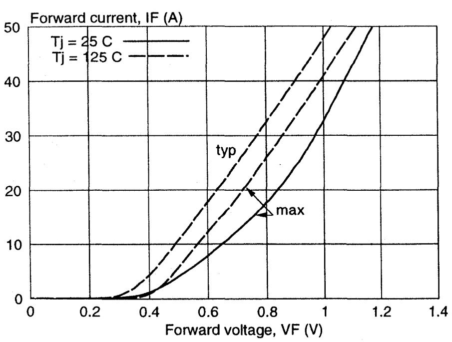


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

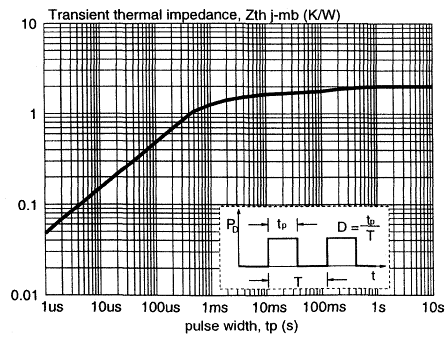
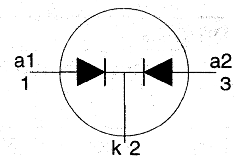


Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

EATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

V_R = 40 V/ 45 V

$I_{O(AV)}$ = 20 A

$V_F \leq$ 0.57V

ıENERAL DESCRIPTION

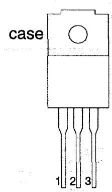
ual, common cathode schottky rectifier diodes in a plastic envelope with electrically isolated mounting tab. Intended ·r use as output rectifiers in low voltage, high frequency switched mode power supplies.

ɿe PBYR2045CTF series is supplied in the SOT186 package.
ɿe PBYR2045CTX series is supplied in the SOT186A package.

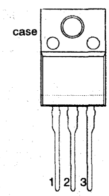
INNING

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	isolated

SOT186



SOT186A



IMITING VALUES

miting values in accordance with the Absolute Maximum System (IEC 134)

ƽYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR20 PBYR20		40CTF 40CTX	45CTF 45CTX	
V_{RRM}	Peak repetitive reverse voltage		-	40	45	V
V_{RWM}	Working peak reverse voltage		-	40	45	V
V_R	Continuous reverse voltage	$T_{hs} \leq$ 84 ˚C	-	40	45	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave; δ = 0.5; $T_{hs} \leq$ 78 ˚C	-	20		A
I_{FRM}	Repetitive peak forward current per diode	square wave; δ = 0.5; $T_{hs} \leq$ 78 ˚C	-	20		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	100 110		A A
I_{RRM}	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

ISOLATION LIMITING VALUE & CHARACTERISTIC

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Peak isolation voltage from all terminals to external heatsink	SOT186 package; R.H. ≤ 65%; clean and dustfree	-	-	1500	V
V_{isol}	R.M.S. isolation voltage from all terminals to external heatsink	SOT186A package; f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65%; clean and dustfree	-	-	2500	V
C_{isol}	Capacitance from pin 2 to external heatsink	f = 1 MHz	-	10	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	per diode	-	-	6	K/W
		both diodes (with heatsink compound)	-	-	5	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	55	-	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 10 A; T_j = 125˚C	-	0.45	0.57	V
		I_F = 20 A; T_j = 125˚C	-	0.64	0.72	V
		I_F = 20 A	-	0.64	0.84	V
I_R	Reverse current	$V_R = V_{RWM}$	-	0.3	1.3	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	22	35	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	380	-	pF

Rectifier diodes Schottky barrier

PBYR2045CTF, PBYR2045CTX series

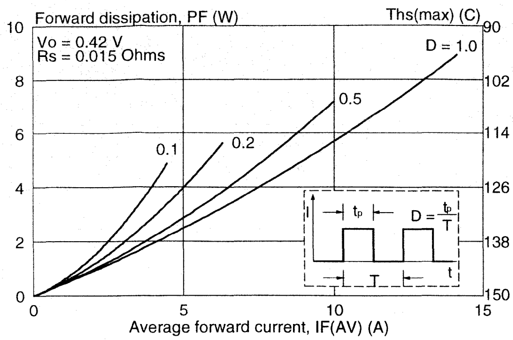


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

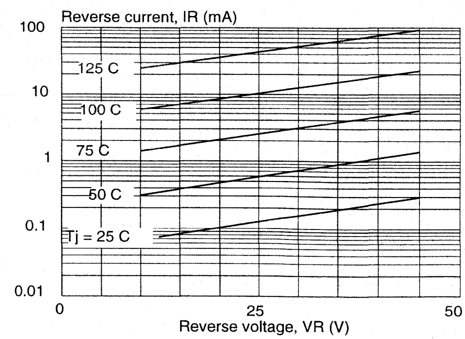


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

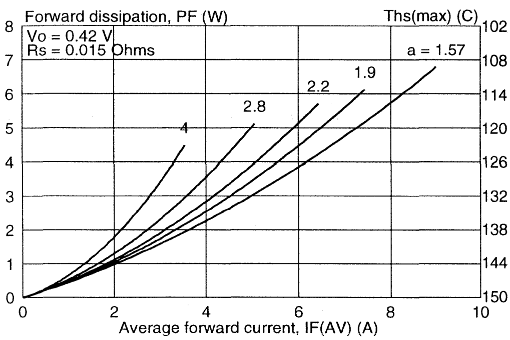


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

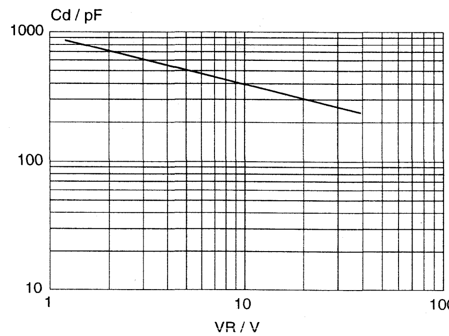


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

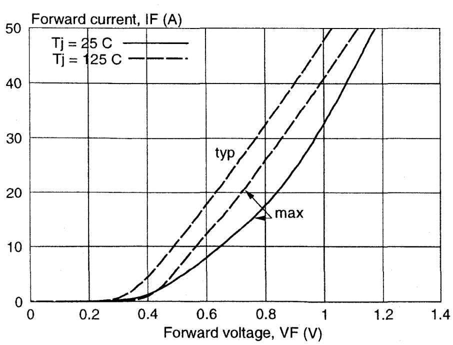


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

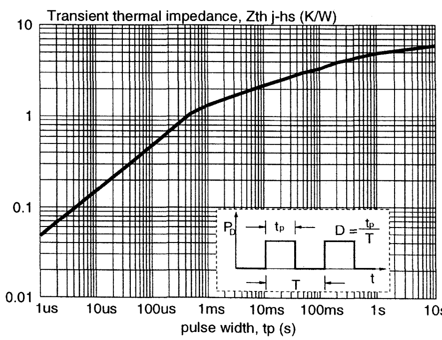


Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.

Schottky barrier double diodes

PBYR2100CT series

FEATURES

- Low switching losses
- High breakdown voltage
- Fast recovery time
- Guard ring protected
- Plastic SMD package.

APPLICATIONS

- Low power, switched-mode power supplies
- Rectification
- Polarity protection.

DESCRIPTION

The PBYR2100CT series consists of Schottky barrier double diodes, fabricated in planar technology, and encapsulated in SOT223 plastic SMD packages.

PINNING

PIN	DESCRIPTION
1	anode (a_1)
2	common cathode
3	anode (a_2)
4	common cathode

MARKING

TYPE NUMBER	MARKING CODE
PBYR280CT	BYR28
PBYR290CT	BYR29
PBYR2100CT	BYR210

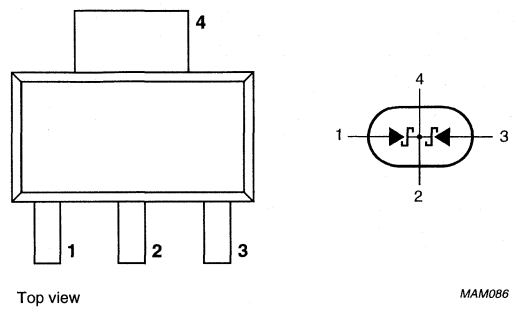


Fig.1 Simplified outline (SOT223), pin configuration and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per diode					
V_R	continuous reverse voltage				
	PBYR280CT		–	80	V
	PBYR290CT		–	90	V
	PBYR2100CT		–	100	V
V_{RRM}	repetitive peak reverse voltage				
	PBYR280CT		–	80	V
	PBYR290CT		–	90	V
	PBYR2100CT		–	100	V
V_{RWM}	crest working reverse voltage				
	PBYR280CT		–	80	V
	PBYR290CT		–	90	V
	PBYR2100CT		–	100	V
$I_{F(AV)}$	average forward current	T_{amb} = 85 °C; see Fig.2; $R_{th\ j-a}$ = 70 K/W; note 1; $V_{R(equiv)}$ = 0.2 V; note 2	–	1	A
I_{FSM}	non-repetitive peak forward current	t = 8.3 ms half sine wave; JEDEC method	–	10	A
I_{RSM}	non-repetitive peak reverse current	t_p = 100 μs	–	0.5	A
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–65	+150	°C
T_{amb}	operating ambient temperature		–	85	°C

Notes

1. Refer to SOT223 standard mounting conditions.
2. For Schottky barrier diodes thermal run-away has to be considered, as in some applications, the reverse power losses P_R are a significant part of the total power losses. Nomograms for determination of the reverse power losses P_R and $I_{F(AV)}$ rating will be available on request.

ELECTRICAL CHARACTERISTICS

T_{amb} = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Per diode						
V_F	forward voltage	see Fig.3				
		I_F = 1 A; note 1	–	–	790	mV
		I_F = 1 A; T_j = 100 °C; note 1	–	–	690	mV
I_R	reverse current	$V_R = V_{RRMmax}$; note 1; see Fig.4	–	–	0.5	mA
		$V_R = V_{RRMmax}$; T_j = 100 °C; note 1; see Fig.4	–	–	5	mA
C_d	diode capacitance	V_R = 4 V; f = 1 MHz; see Fig.5	–	–	100	pF

Note

1. Pulsed test: t_p = 300 µs; δ = 0.02.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	70	K/W

Note

1. Refer to SOT223 standard mounting conditions.

GRAPHICAL DATA

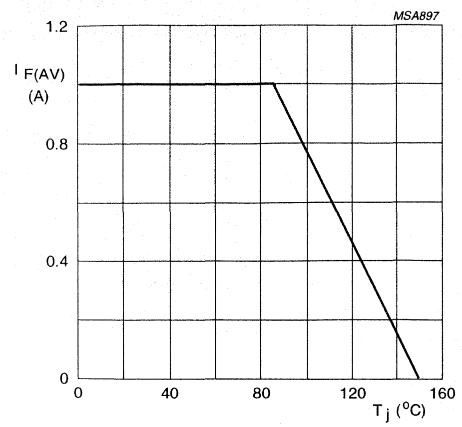
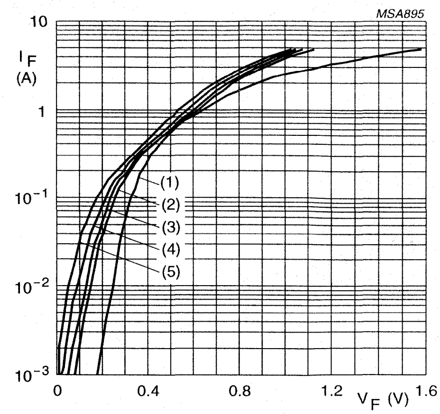
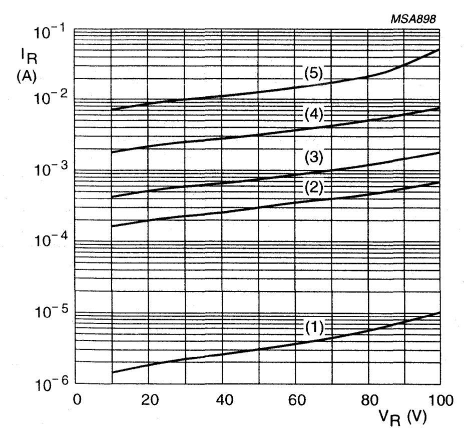


Fig.2 Average forward current derating curve.



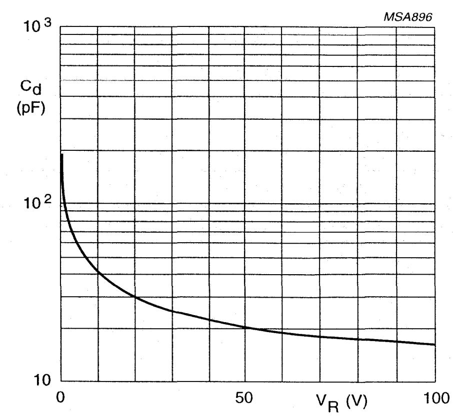
(1) T_{amb} = 25 °C.
(2) T_{amb} = 85 °C.
(3) T_{amb} = 100 °C.
(4) T_{amb} = 125 °C.
(5) T_{amb} = 150 °C.

Fig.3 Forward current as a function of forward voltage; typical values.



(1) T_{amb} = 25 °C.
(2) T_{amb} = 85 °C.
(3) T_{amb} = 100 °C.
(4) T_{amb} = 125 °C.
(5) T_{amb} = 150 °C.

Fig.4 Reverse current as a function of reverse voltage; typical values.



f = 1 MHz.

Fig.5 Diode capacitance as a function of reverse voltage; typical values.

Schottky barrier double diode PBYR2150CT

FEATURES

- Low switching losses
- Low forward voltage
- High breakdown voltage
- Fast recovery time
- Guard ring protected
- Plastic SMD package.

APPLICATIONS

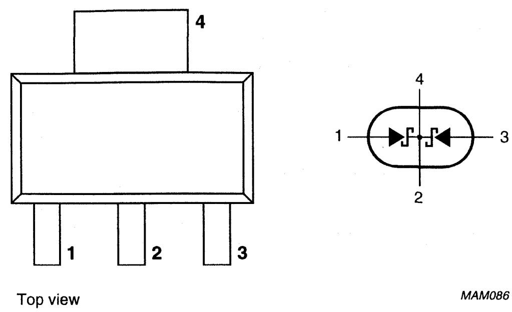
- Low power, switched-mode power supplies
- Rectification
- Polarity protection.

PINNING

PIN	DESCRIPTION
1	anode (a_1)
2	common cathode
3	anode (a_2)
4	common cathode

DESCRIPTION

The PBYR2150CT is a Schottky barrier double diode, fabricated in planar technology, and encapsulated in a SOT223 plastic SMD package.



Marking code: BYR215.

Fig.1 Simplified outline (SOT223), pin configuration and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per diode					
V_R	continuous reverse voltage		–	150	V
V_{RRM}	repetitive peak reverse voltage		–	150	V
V_{RWM}	crest working reverse voltage		–	150	V
$I_{F(AV)}$	average forward current	T_{amb} = 85 °C; $R_{th\ j\text{-}a}$ = 70 K/W; note 1; $V_{R(equiv)}$ = 0.2 V; note 2	–	1	A
I_{FSM}	non-repetitive peak forward current	t = 8.3 ms half sinewave; JEDEC method	–	10	A

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per diode					
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–65	+150	°C
T_{amb}	operating ambient temperature		–	80	°C

Notes

1. Refer to SOT223 standard mounting conditions.
2. For Schottky barrier diodes thermal run-away has to be considered, as in some applications, the reverse power losses P_R are a significant part of the total power losses. Nomograms for determination of the reverse power losses P_R and $I_{F(AV)}$ rating will be available on request.

ELECTRICAL CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
Per diode				
V_F	forward voltage	see Fig.2		
		I_F = 0.1 A; note 1	400	mV
		I_F = 0.5 A; note 1	650	mV
		I_F = 1 A; note 1	850	mV
		I_F = 1 A; T_j = 100 °C; note 1	690	mV
I_R	reverse current	$V_R = V_{RRMmax}$; note 1; see Fig.3	1	mA
		$V_R = V_{RRMmax}$; T_j = 100 °C; note 1; see Fig.3	10	mA
C_d	diode capacitance	V_R = 4 V; f = 1 MHz; see Fig.4	100	pF

Note

1. Pulsed test: t_p = 300 µs; δ = 0.02.

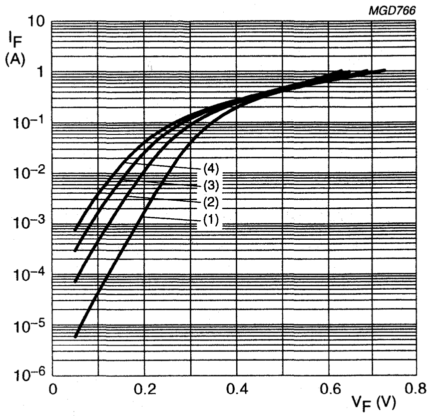
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	70	K/W

Note

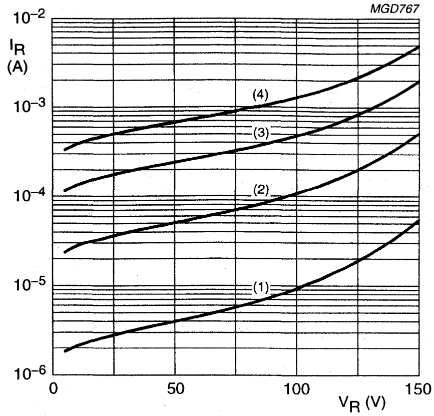
1. Refer to SOT223 standard mounting conditions.

GRAPHICAL DATA



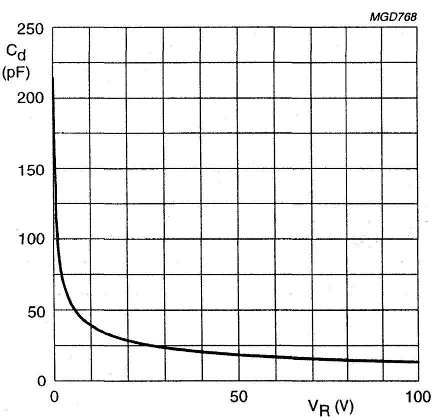
(1) T_{amb} = 25 °C.
(2) T_{amb} = 60 °C.
(3) T_{amb} = 80 °C.
(4) T_{amb} = 100 °C.

Fig.2 Forward current as a function of forward voltage; typical values.



(1) T_{amb} = 25 °C.
(2) T_{amb} = 60 °C.
(3) T_{amb} = 80 °C.
(4) T_{amb} = 100 °C.

Fig.3 Reverse current as a function of reverse voltage; typical values.



f = 1 MHz.

Fig.4 Diode capacitance as a function of reverse voltage; typical values.

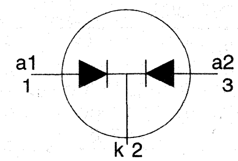
Rectifier diodes Schottky barrier

PBYR2545CT, PBYR2545CTB series

EATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

$V_R = 40\ V/\ 45\ V$

$I_{O(AV)} = 30\ A$

$V_F \leq 0.62\ V$

ENERAL DESCRIPTION

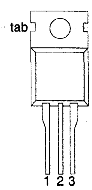
ual, common cathode schottky rectifier diodes in a conventional leaded plastic package and a surface mounting astic package. Intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

he PBYR2545CT series is supplied in the SOT78 conventional leaded package.
he PBYR2545CTB series is supplied in the SOT404 surface mounting package.

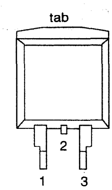
INNING

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k) [1]
3	anode 2 (a)
tab	cathode (k)

SOT78 (TO220AB)



SOT404



IMITING VALUES

imiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR25 PBYR25		40CT 40CTB	45CT 45CTB	
V_{RRM}	Peak repetitive reverse voltage		-	40	45	V
V_{RWM}	Working peak reverse voltage		-	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq 113\ ^\circ C$	-	40	45	V
$I_{O(AV)}$	Average rectified forward current (both diodes conducting)[2]	square wave; $\delta = 0.5$; $T_{mb} \leq 126\ ^\circ C$	-	30		A
I_{FRM}	Repetitive peak forward current per diode	square wave; $\delta = 0.5$; $T_{mb} \leq 126\ ^\circ C$	-	30		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; $T_j = 125\ ^\circ C$ prior to surge; with reapplied $V_{RRM(max)}$	- -	180 200		A A
I_{RRM}	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\ max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

. It is not possible to make connection to pin 2 of the SOT404 package.
. SOT78 package. For output currents greater than 20A the cathode connection should be made to the metal ounting tab.

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\,j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	1.5	K/W
		both diodes	-	-	1	K/W
$R_{th\,j\text{-}a}$	Thermal resistance junction to ambient	SOT78 package in free air	-	60	-	K/W
		SOT404 package, pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage per diode	I_F = 20 A; T_j = 125˚C	-	0.58	0.62	V
		I_F = 30 A; T_j = 125˚C	-	0.72	0.76	V
		I_F = 30 A	-	0.72	0.82	V
I_R	Reverse current per diode	$V_R = V_{RWM}$	-	0.3	2	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	30	40	mA
C_d	Junction capacitance per diode	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	530	-	pF

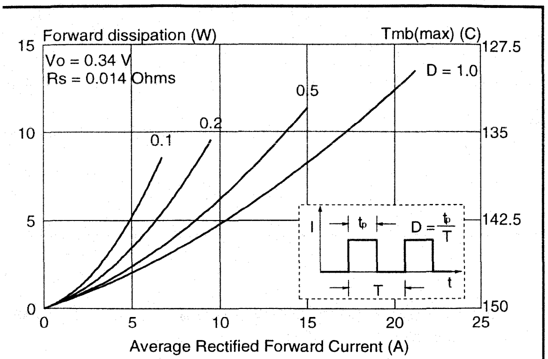


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

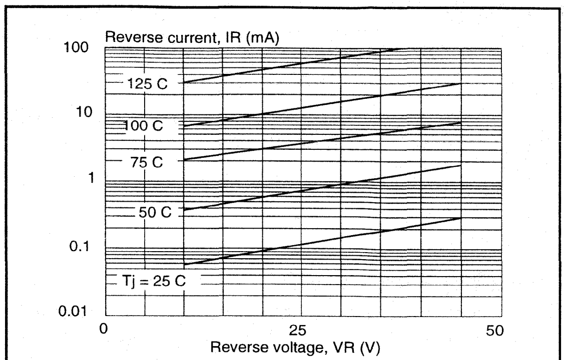


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

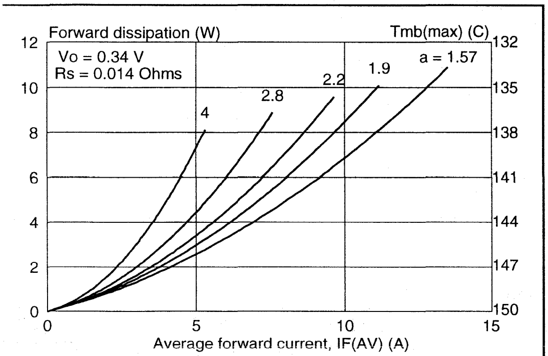


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

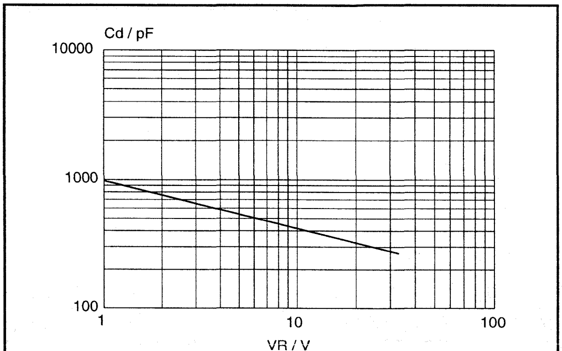


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

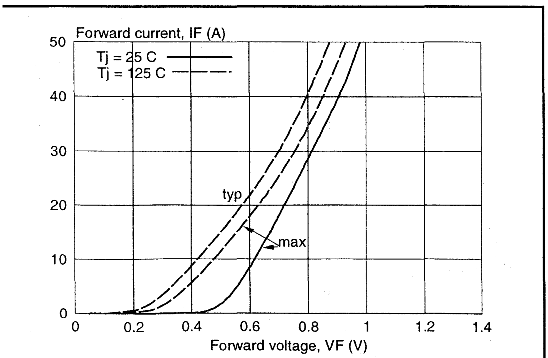


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

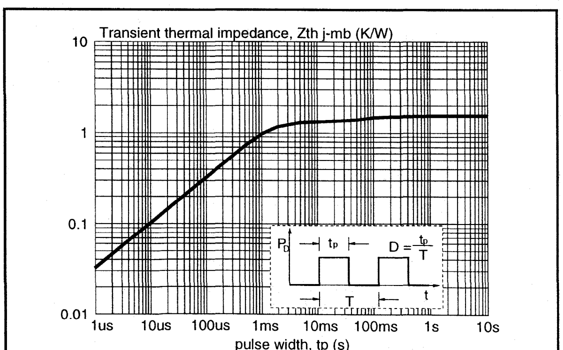


Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

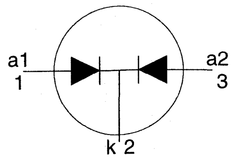
Rectifier diodes Schottky barrier

PBYR2545CTF, PBYR2545CTX

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

V_R = 40 V/ 45 V

$I_{O(AV)}$ = 20 A

$V_F \leq$ 0.65V

GENERAL DESCRIPTION

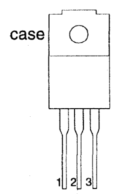
Dual, common cathode schottky rectifier diodes in a plastic envelope with electrically isolated mounting tab. Intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYR2545CTF is supplied in the SOT186 package.
The PBYR2545CTX is supplied in the SOT186A package.

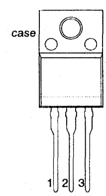
PINNING

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	isolated

SOT186



SOT186A



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR25 PBYR25		40CTF 40CTX	45CTF 45CTX	
V_{RRM}	Peak repetitive reverse voltage		-	40	45	V
V_{RWM}	Working peak reverse voltage		-	40	45	V
V_R	Continuous reverse voltage	$T_{hs} \leq$ 86 ˚C	-	40	45	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave; δ = 0.5; $T_{hs} \leq$ 98 ˚C	-	20		A
I_{FRM}	Repetitive peak forward current per diode	square wave; δ = 0.5; $T_{hs} \leq$ 98 ˚C	-	20		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	135 150		A A
I_{RRM}	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\,max}$	-	1		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

SOLATION LIMITING VALUE & CHARACTERISTIC

$_{s}$ = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Peak isolation voltage from all terminals to external heatsink	SOT186 package; R.H. ≤ 65%; clean and dustfree	-	-	1500	V
V_{isol}	R.M.S. isolation voltage from all terminals to external heatsink	SOT186A package; f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65%; clean and dustfree	-	-	2500	V
C_{isol}	Capacitance from pin 2 to external heatsink	f = 1 MHz	-	10	-	pF

HERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	per diode both diodes (with heatsink compound)	- -	- -	4.8 4	K/W K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	55	-	K/W

LECTRICAL CHARACTERISTICS

= 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage per diode	I_F = 20 A; T_j = 125˚C I_F = 20 A	- -	0.58 0.63	0.65 0.68	V V
I_R	Reverse current per diode	$V_R = V_{RWM}$ $V_R = V_{RWM}$; T_j = 100˚C	- -	0.3 30	2 40	mA mA
C_d	Junction capacitance per diode	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	530	-	pF

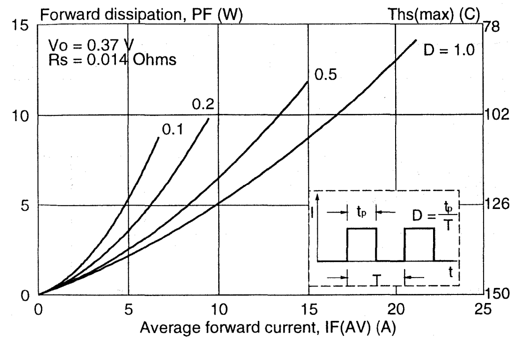


Fig.1. *Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

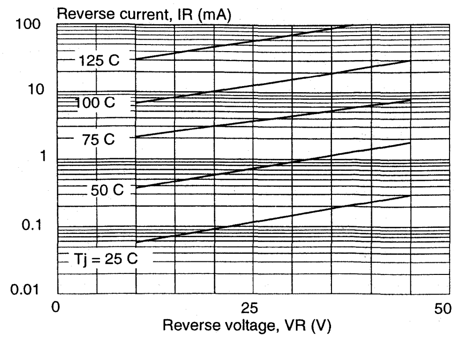


Fig.4. *Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j*

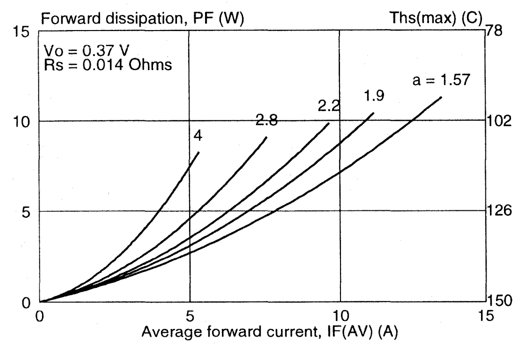


Fig.2. *Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

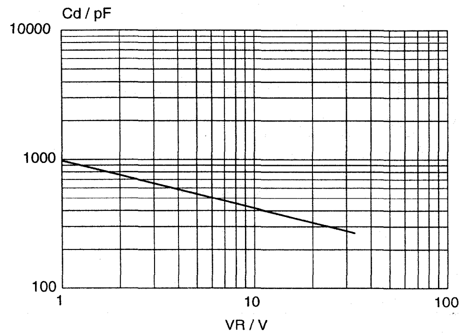


Fig.5. *Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.*

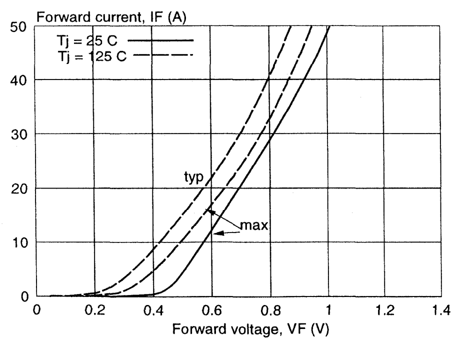


Fig.3. *Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j*

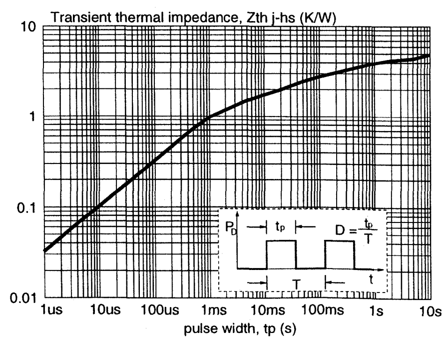


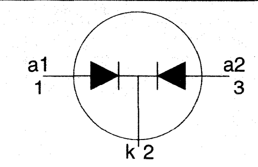
Fig.6. *Transient thermal impedance per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.*

Rectifier diodes Schottky barrier — PBYR3045WT series

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

$V_R = 40\ V/\ 45\ V$

$I_{O(AV)} = 30\ A$

$I_{FSM} = 300\ A$

$V_F \leq 0.6\ V$

GENERAL DESCRIPTION

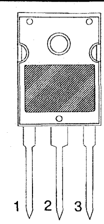
Dual, common cathode schottky rectifier diodes in a plastic envelope. Intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYR3045WT series is supplied in the conventional leaded SOT429 (TO247) package.

PINNING

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode

SOT429 (TO247)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR30		40WT	45WT	
V_{RRM}	Peak repetitive reverse voltage		-	40	45	V
V_{RWM}	Working peak reverse voltage		-	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq 107$ ˚C	-	40	45	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{mb} \leq 124$ ˚C	-	30		A
I_{FRM}	Repetitive peak forward current per diode	square wave; $\delta = 0.5$; $T_{mb} \leq 124$ ˚C	-	30		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	300 330		A A
I_{RRM}	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\,max}$	-	2		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\,j\text{-}mb}$	Thermal resistance junction to mounting base	per diode both diodes	- -	- -	1.6 1.2	K/W K/W
$R_{th\,j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	45	-	K/W

ELECTRICAL CHARACTERISTICS

characteristics are per diode at T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage per diode	I_F = 20 A; T_j = 125˚C	-	0.58	0.6	V
		I_F = 30 A; T_j = 125˚C	-	0.69	0.72	V
		I_F = 30 A	-	0.71	0.76	V
I_R	Reverse current per diode	$V_R = V_{RWM}$	-	0.12	1.5	mA
		$V_R = V_{RWM}$; T_j = 100˚C	-	15	30	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	450	-	pF

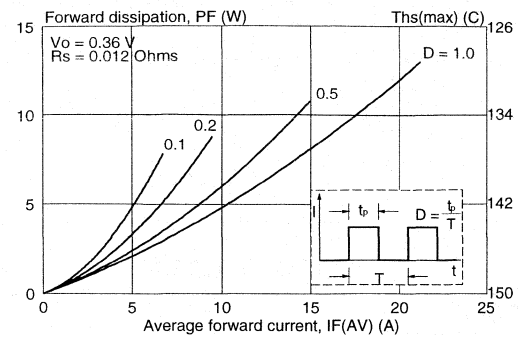


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

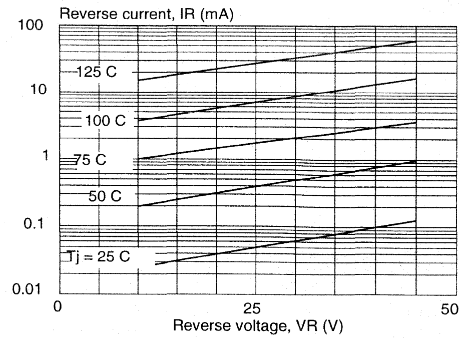


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

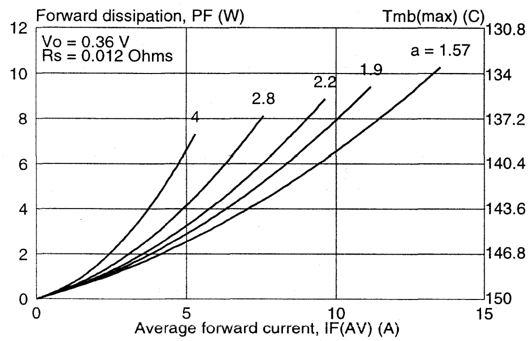


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

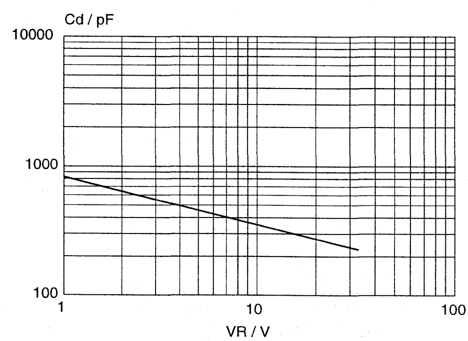


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

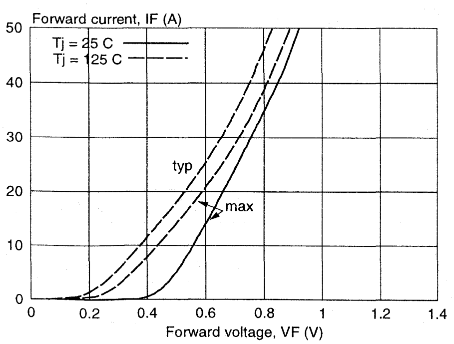


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

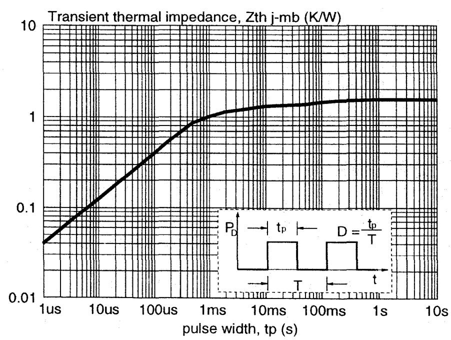


Fig.6. Transient thermal impedance per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.

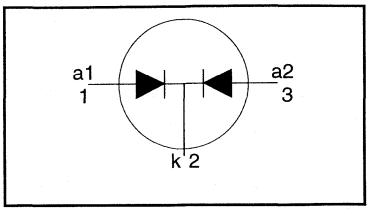
Rectifier diodes schottky barrier

PBYR4025WT series

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 20 V / 25 V

$I_{O(AV)}$ = 40 A

$V_F \leq$ 0.46 V

GENERAL DESCRIPTION

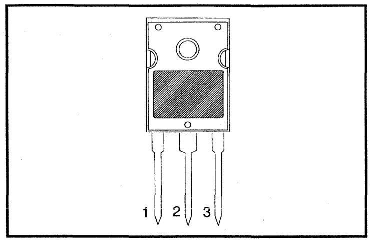
Dual, common cathode schottky rectifier diodes in a plastic envelope. Intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYR4025WT series is supplied in the conventional leaded SOT429 (TO247) package.

PINNING

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode

SOT429 (TO247)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
				-20	-25	
V_{RRM}	Repetitive peak reverse voltage		-	20	25	V
V_{RWM}	Crest working reverse voltage		-	20	25	V
V_R	Continuous reverse voltage	$T_{mb} \leq$ 109 ˚C	-	20	25	V
$I_{O(AV)}$	Average output current (both diodes conducting)	square wave; δ = 0.5; $T_{mb} \leq$ 128 ˚C	-	40		A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; δ = 0.5; $T_{mb} \leq$ 128 ˚C	-	40		A
I_{FSM}	Non-repetitive peak forward current, per diode	t = 10 ms	-	180		A
		t = 8.3 ms sinusoidal T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	-	200		A
I_{RRM}	Repetitive peak reverse current per diode	t_p = 2 µs; δ = 0.001	-	2		A
T_{stg}	Storage temperature		-65	175		˚C
T_j	Operating junction temperature		-	150		˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	1.5	K/W
		both diodes	-	-	1.0	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	45	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage (per diode)	I_F = 20 A; T_j = 125˚C	-	0.40	0.46	V
		I_F = 40 A; T_j = 125˚C	-	0.50	0.54	V
		I_F = 40 A	-	0.60	0.64	V
I_R	Reverse current (per diode)	$V_R = V_{RRM}$	-	2.0	10	mA
		$V_R = V_{RRM}$; T_j = 100 ˚C	-	30	80	mA
C_d	Junction capacitance (per diode)	f = 1MHz; V_R = 5V; T_j = 25 ˚C to 125 ˚C	-	900	-	pF

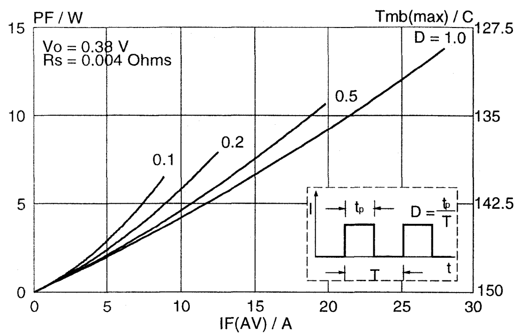


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

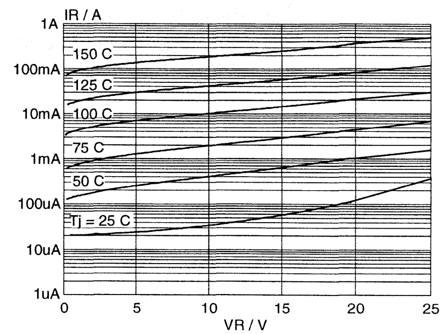


Fig.3. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

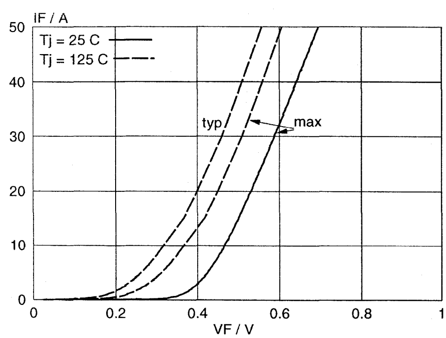


Fig.2. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

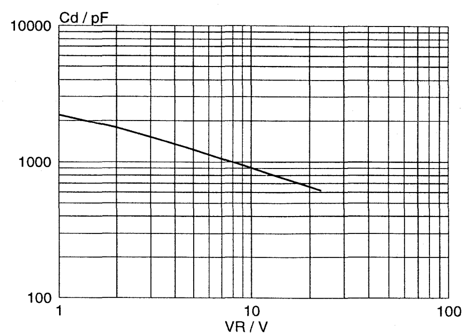


Fig.4. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

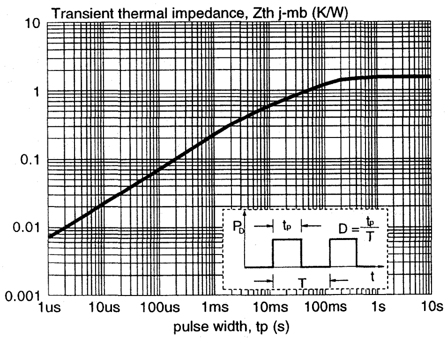


Fig.5. Transient thermal impedance per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

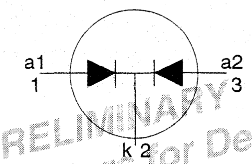
Rectifier diodes Schottky barrier

PBYR4045WT series

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 40 V/ 45 V

$I_{F(AV)}$ = 40 A

$V_F \leq$ 0.6 V

GENERAL DESCRIPTION

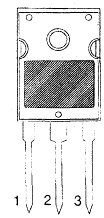
Dual, common cathode schottky rectifier diodes in a plastic envelope. Intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYR4045WT series is supplied in the conventional leaded SOT429 (TO247) package.

PINNING

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode

SOT429 (TO247)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR40		40WT	45WT	
V_{RRM}	Peak repetitive reverse voltage		-	40	45	V
V_{RWM}	Working peak reverse voltage		-	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq$ 109 ˚C	-	40	45	V
$I_{F(AV)}$	Average rectified forward current	square wave; δ = 0.5; $T_{mb} \leq$ 125 ˚C	-	40		A
I_{FRM}	Repetitive peak forward current	square wave; δ = 0.5; $T_{mb} \leq$ 125 ˚C	-	40		A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms	-	180		A
		t = 8.3 ms	-	200		A
		sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$				
I_{RRM}	Peak repetitive reverse surge current	pulse width and repetition rate limited by $T_{j\,max}$	-	2		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\,j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	1	K/W
		both diodes	-	-	0.85	K/W
$R_{th\,j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	45	-	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage per diode	I_F = 20 A; T_j = 125˚C	-	0.57	0.6	V
		I_F = 40 A; T_j = 125˚C	-	0.72	0.75	V
		I_F = 20 A	-	0.67	0.7	V
		I_F = 40 A	-	0.77	0.8	V
I_R	Reverse current per diode	V_R = V_{RWM}	-	0.5	2	mA
		V_R = V_{RWM}; T_j = 100˚C	-	12	50	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	1000	-	pF

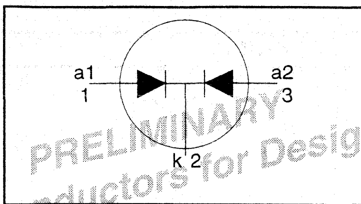
Rectifier diodes Schottky barrier

PBYR6045WT series

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 40 V/ 45 V

$I_{F(AV)}$ = 60 A

$V_F \leq$ 0.6 V

GENERAL DESCRIPTION

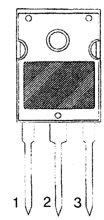
Dual, common cathode schottky rectifier diodes in a plastic envelope. Intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYR6045WT series is supplied in the conventional leaded SOT429 (TO247) package.

PINNING

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode

SOT429 (TO247)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		PBYR60		40WT	45WT	
V_{RRM}	Peak repetitive reverse voltage		-	40	45	V
V_{RWM}	Working peak reverse voltage		-	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq$ 109 ˚C	-	40	45	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave; δ = 0.5; $T_{mb} \leq$ 111 ˚C	-	60		A
I_{FRM}	Repetitive peak forward currentper diode	square wave; δ = 0.5; $T_{mb} \leq$ 111 ˚C	-	60		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	350 384		A A
I_{RRM}	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\,max}$	-	2		A
T_j	Operating junction temperature		-	150		˚C
T_{stg}	Storage temperature		- 65	175		˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\,j\text{-}mb}$	Thermal resistance junction to mounting base	per diode both diodes	- -	- -	1.6 1.4	K/W K/W
$R_{th\,j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	45	-	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage per diode	I_F = 30 A; T_j = 125˚C	-	0.5	0.6	V
		I_F = 60 A; T_j = 125˚C	-	0.72	0.75	V
		I_F = 30 A	-	0.55	0.7	V
		I_F = 60 A	-	0.77	0.8	V
I_R	Reverse current per diode	V_R = V_{RWM}	-	0.5	5	mA
		V_R = V_{RWM}; T_j = 100˚C	-	35	60	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	1000	-	pF

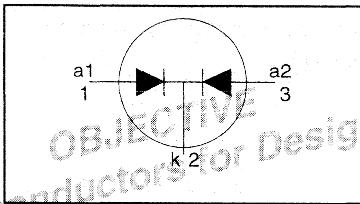
Rectifier diodes schottky barrier

PBYR7025WT series

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 20 V / 25 V

$I_{O(AV)}$ = 70 A

$V_F \leq$ 0.46 V

GENERAL DESCRIPTION

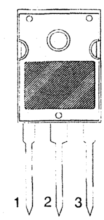
Dual, common cathode schottky rectifier diodes in a plastic envelope. Intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYR7025WT series is supplied in the conventional leaded SOT429 (TO247) package.

PINNING

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode

SOT429 (TO247)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
				-20	-25	
V_{RRM}	Repetitive peak reverse voltage		-	20	25	V
V_{RWM}	Crest working reverse voltage		-	20	25	V
V_R	Continuous reverse voltage	$T_{mb} \leq$ 104 ˚C	-	20	25	V
$I_{O(AV)}$	Average output current (both diodes conducting)	square wave; δ = 0.5; $T_{mb} \leq$ 122 ˚C	-	70		A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; δ = 0.5; $T_{mb} \leq$ 122 ˚C	-	70		A
I_{FSM}	Non-repetitive peak forward current, per diode	t = 10 ms	-	500		A
		t = 8.3 ms sinusoidal T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	-	550		A
I_{RRM}	Repetitive peak reverse current per diode	t_p = 2 µs; δ = 0.001	-	2		A
I_{RSM}	Non-repetitive peak reverse current per diode	t_p = 100 µs	-	2		A
T_{stg}	Storage temperature		-65	175		˚C
T_j	Operating junction temperature		-	150		˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	1.0	K/W
		both diodes	-	-	0.85	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	45	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage (per diode)	I_F = 35 A; T_j = 125˚C	-	0.40	0.46	V
		I_F = 70 A; T_j = 125˚C	-	0.50	0.54	V
		I_F = 70 A	-	0.60	0.64	V
I_R	Reverse current (per diode)	V_R = V_{RRM}	-	3.0	15	mA
		V_R = V_{RRM}; T_j = 100 ˚C	-	45	120	mA
C_d	Junction capacitance (per diode)	f = 1MHz; V_R = 5V; T_j = 25 ˚C to 125 ˚C	-	1400	-	pF

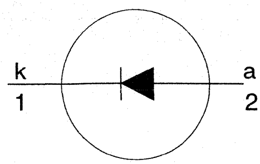
Rectifier diodes Schottky barrier

PBYR10100 series

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 60 V/ 80 V/ 100 V

$I_{F(AV)}$ = 10 A

$V_F \leq$ 0.7 V

GENERAL DESCRIPTION

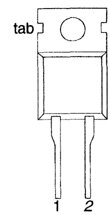
Schottky rectifier diodes in a plastic envelope. Intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYR10100 series is supplied in the conventional leaded SOD59 (TO220AC) package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	cathode

SOD59 (TO220AC)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
		PBYR10		60	80	100	
V_{RRM}	Peak repetitive reverse voltage		-	60	80	100	V
V_{RWM}	Working peak reverse voltage		-	60	80	100	V
V_R	Continuous reverse voltage	$T_{mb} \leq 139$ ˚C	-	60	80	100	V
$I_{F(AV)}$	Average rectified forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 133$ ˚C	-	10			A
I_{FRM}	Repetitive peak forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 133$ ˚C	-	20			A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	135 150			A A
I_{RRM}	Peak repetitive reverse surge current	pulse width and repetition rate limited by $T_{j\,max}$	-	1			A
T_j	Operating junction temperature		-	150			˚C
T_{stg}	Storage temperature		- 65	175			˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\,j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2	K/W
$R_{th\,j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	60	-	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 10 A; T_j = 125˚C	-	0.61	0.7	V
		I_F = 20 A; T_j = 125˚C	-	0.74	0.85	V
		I_F = 20 A	-	0.88	0.95	V
I_R	Reverse current	$V_R = V_{RWM}$	-	5	150	µA
		$V_R = V_{RWM}$; T_j = 125˚C	-	5	15	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	420	-	pF

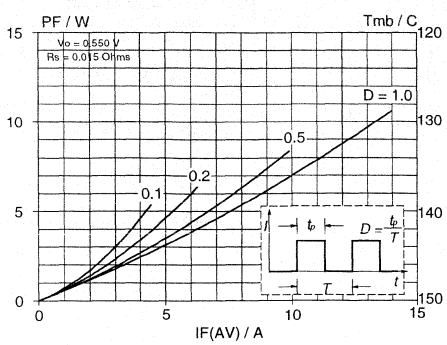


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

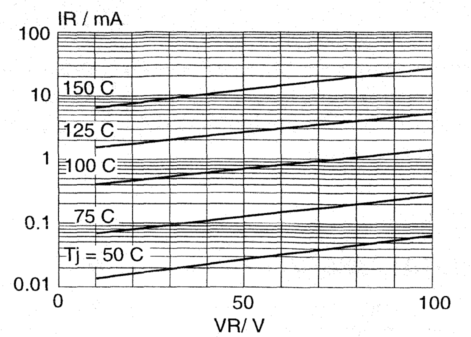


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

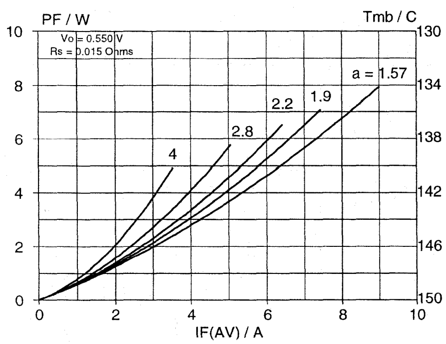


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

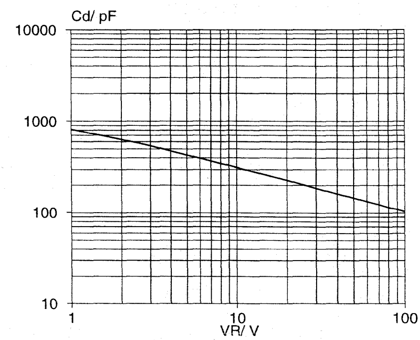


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

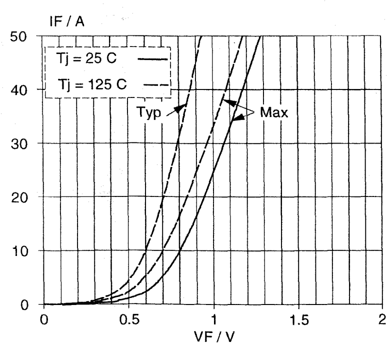


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

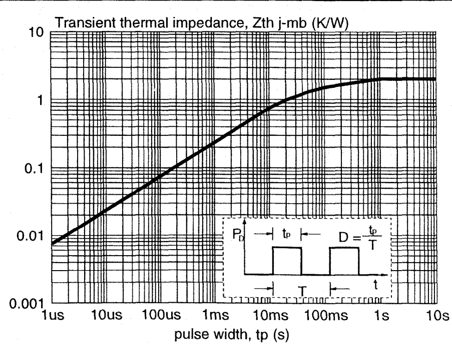


Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

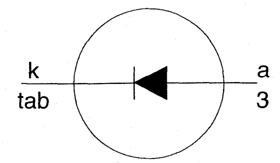
Rectifier diodes Schottky barrier

PBYR10100B series

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 60 V/ 80 V/ 100 V

$I_{F(AV)}$ = 10 A

$V_F \leq 0.7$ V

GENERAL DESCRIPTION

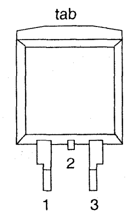
Schottky rectifier diodes in a plastic envelope. Intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYR10100B series is supplied in the surface mounting SOT404 package.

PINNING

PIN	DESCRIPTION
1	no connection
2	cathode[1]
3	anode
tab	cathode

SOT404



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
		PBYR10		60B	80B	100B	
V_{RRM}	Peak repetitive reverse voltage		-	60	80	100	V
V_{RWM}	Working peak reverse voltage		-	60	80	100	V
V_R	Continuous reverse voltage	$T_{mb} \leq 139$ ˚C	-	60	80	100	V
$I_{F(AV)}$	Average rectified forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 133$ ˚C	-	10			A
I_{FRM}	Repetitive peak forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 133$ ˚C	-	20			A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	135 150			A A
I_{RRM}	Peak repetitive reverse surge current	pulse width and repetition rate limited by $T_{j\,max}$	-	1			A
T_j	Operating junction temperature		-	150			˚C
T_{stg}	Storage temperature		- 65	175			˚C

1 It is not possible to make connection to pin 2 of the SOT404 package

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 10 A; T_j = 125˚C	-	0.61	0.7	V
		I_F = 20 A; T_j = 125˚C	-	0.74	0.85	V
		I_F = 20 A	-	0.88	0.95	V
I_R	Reverse current	$V_R = V_{RWM}$	-	5	150	µA
		$V_R = V_{RWM}$; T_j = 125˚C	-	5	15	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	420	-	pF

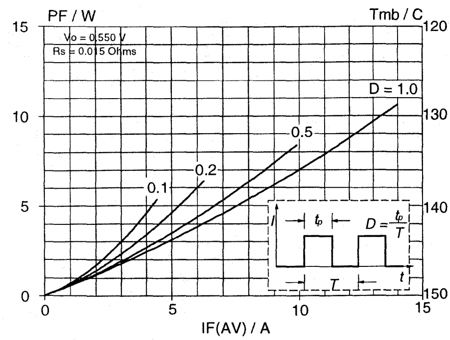


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

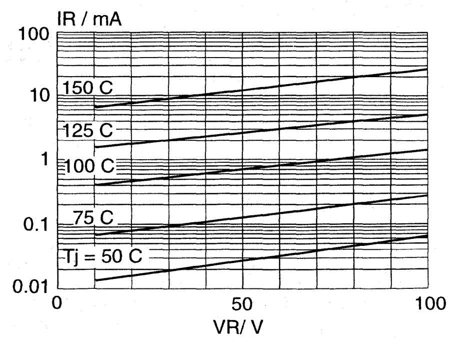


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

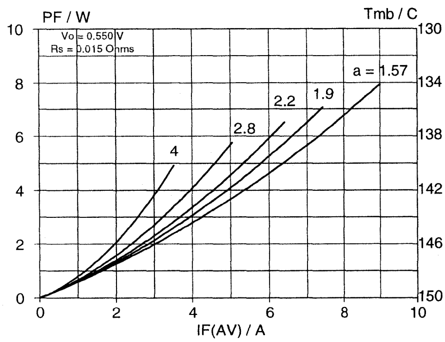


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

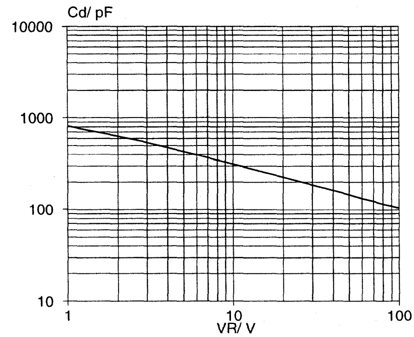


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

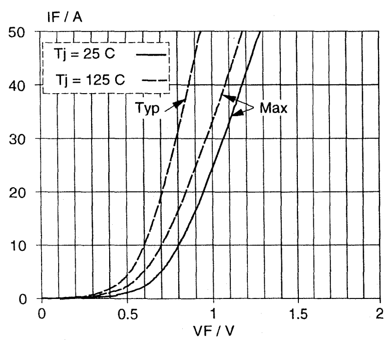


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

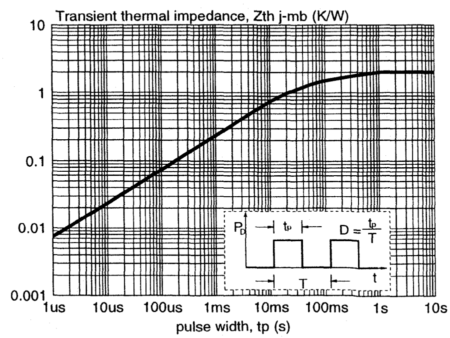


Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

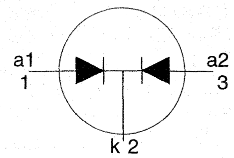
Rectifier diodes Schottky barrier

PBYR20100CT, PBYR20100CTB series

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 60 V/ 80 V/ 100 V

$I_{O(AV)}$ = 20 A

$V_F \leq 0.7$ V

GENERAL DESCRIPTION

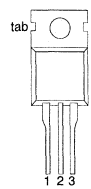
Dual, common cathode schottky rectifier diodes in a conventional leaded plastic package and a surface mounting plastic package. Intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYR20100CT series is supplied in the SOT78 conventional leaded package.
The PBYR20100CTB series is supplied in the SOT404 surface mounting package.

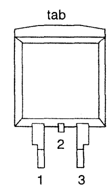
PINNING

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k) [1]
3	anode 2 (a)
tab	cathode (k)

SOT78 (TO220AB)



SOT404



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
		PBYR20 PBYR20		60CT 60CTB	80CT 80CTB	100CT 100CTB	
V_{RRM}	Peak repetitive reverse voltage		-	60	80	100	V
V_{RWM}	Working peak reverse voltage		-	60	80	100	V
V_R	Continuous reverse voltage	$T_{mb} \leq 139$ ˚C	-	60	80	100	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{mb} \leq 133$ ˚C	-	20			A
I_{FRM}	Repetitive peak forward current per diode	square wave; $\delta = 0.5$; $T_{mb} \leq 133$ ˚C	-	20			A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	135 150			A A
I_{RRM}	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\,max}$	-	1			A
T_j	Operating junction temperature		-	150			˚C
T_{stg}	Storage temperature		- 65	175			˚C

1. It is not possible to make connection to pin 2 of the SOT404 package.

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\,j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	2	K/W
		both diodes	-	-	1	K/W
$R_{th\,j\text{-}a}$	Thermal resistance junction to ambient	SOT78 package in free air	-	60	-	K/W
		SOT404 package, pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

ELECTRICAL CHARACTERISTICS

All characteristics are per diode at $T_j = 25$ ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	$I_F = 10$ A; $T_j = 125$˚C	-	0.61	0.7	V
		$I_F = 20$ A; $T_j = 125$˚C	-	0.74	0.85	V
		$I_F = 20$ A	-	0.88	0.95	V
I_R	Reverse current	$V_R = V_{RWM}$	-	5	150	µA
		$V_R = V_{RWM}$; $T_j = 125$˚C	-	5	15	mA
C_d	Junction capacitance	$V_R = 5$ V; f = 1 MHz, $T_j = 25$˚C to 125˚C	-	420	-	pF

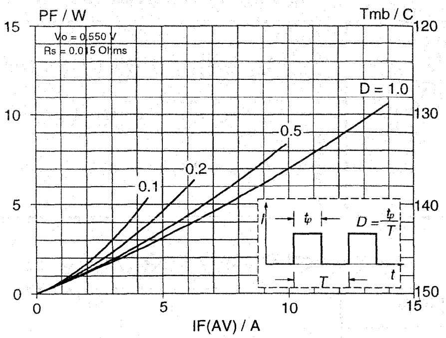


Fig.1. *Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

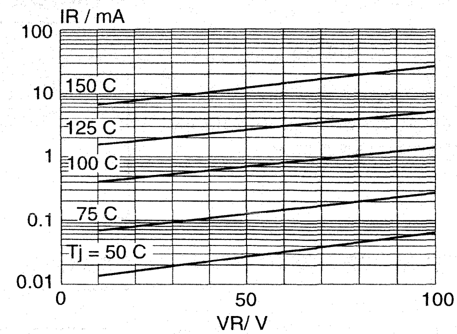


Fig.4. *Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j*

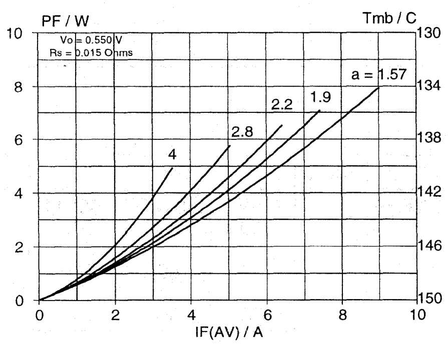


Fig.2. *Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

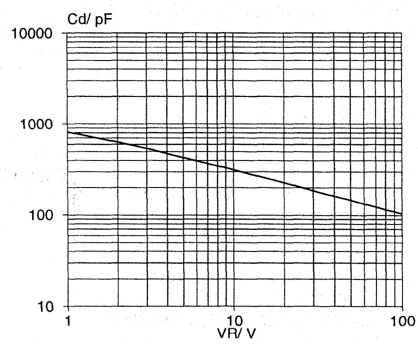


Fig.5. *Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.*

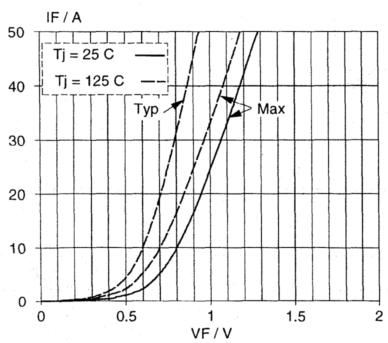


Fig.3. *Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j*

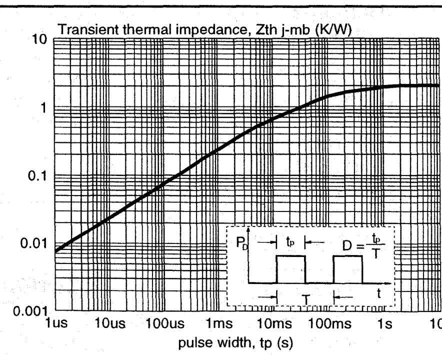


Fig.6. *Transient thermal impedance per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.*

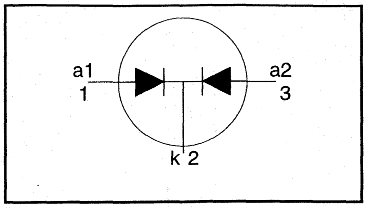
Rectifier diodes Schottky barrier

PBYR30100WT series

FEATURES

- Low forward volt drop
- Fast switching
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 60 V/ 80 V/ 100 V

$I_{O(AV)}$ = 30 A

$V_F \leq$ 0.7 V

GENERAL DESCRIPTION

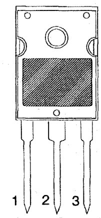
Schottky rectifier diodes in a plastic envelope. Intended for use as output rectifiers in low voltage, high frequency switched mode power supplies.

The PBYR30100WT series is supplied in the conventional leaded SOT429 (TO247) package.

PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode
3	anode 2
mounting base	cathode

SOT429 (TO247)



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
		PBYR30		60WT	80WT	100WT	
V_{RRM}	Peak repetitive reverse voltage		-	60	80	100	V
V_{RWM}	Working peak reverse voltage		-	60	80	100	V
V_R	Continuous reverse voltage	$T_{mb} \leq 139$ ˚C	-	60	80	100	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{mb} \leq 124$ ˚C	-	30			A
I_{FRM}	Repetitive peak forward current per diode	square wave; $\delta = 0.5$; $T_{mb} \leq 124$ ˚C	-	30			A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms t = 8.3 ms sinusoidal; T_j = 125 ˚C prior to surge; with reapplied $V_{RRM(max)}$	- -	180 200			A A
I_{RRM}	Peak repetitive reverse surge current per diode	pulse width and repetition rate limited by $T_{j\,max}$	-	1			A
T_j	Operating junction temperature		-	150			˚C
T_{stg}	Storage temperature		- 65	175			˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\,j\text{-}mb}$	Thermal resistance junction to mounting base	per diode both diodes	- -	- -	1.4 1	K/W K/W
$R_{th\,j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	45	-	K/W

ELECTRICAL CHARACTERISTICS

characteristics are per diode at T_j = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 15 A; T_j = 125˚C	-	0.61	0.7	V
		I_F = 30 A; T_j = 125˚C	-	0.74	0.85	V
		I_F = 15 A	-	0.77	0.85	V
I_R	Reverse current	$V_R = V_{RWM}$	-	5	150	µA
		$V_R = V_{RWM}$; T_j = 125˚C	-	5	15	mA
C_d	Junction capacitance	V_R = 5 V; f = 1 MHz, T_j = 25˚C to 125˚C	-	600	-	pF

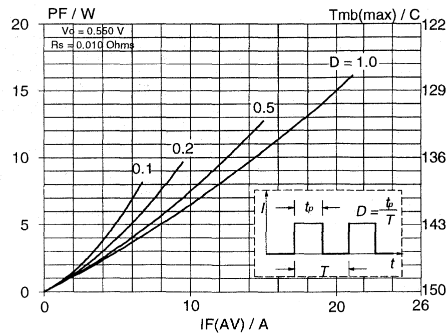


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

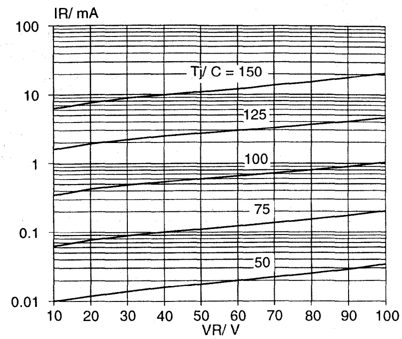


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

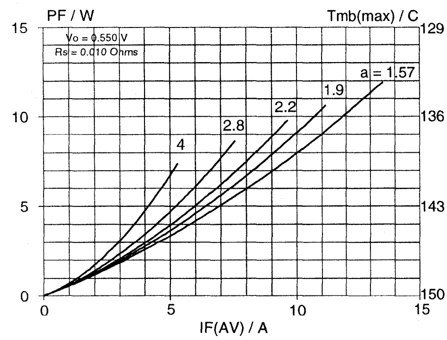


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

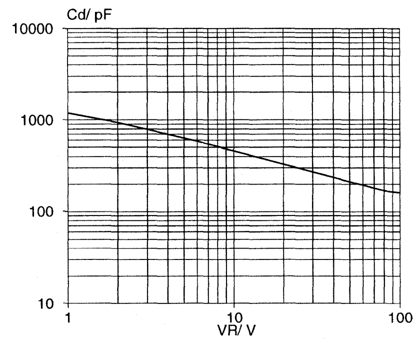


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

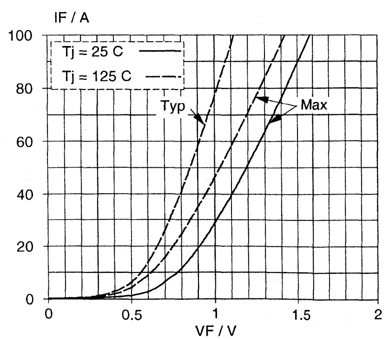


Fig.3. Typical and maximum forward characteristic per diode; $I_F = f(V_F)$; parameter T_j

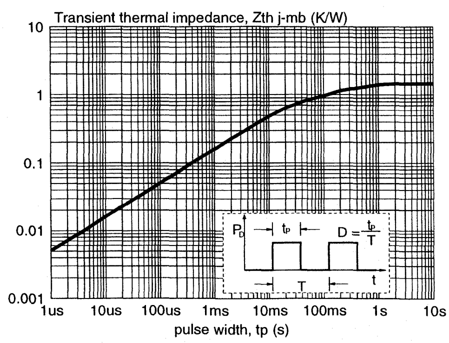


Fig.6. Transient thermal impedance per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.

Rectifiers PRLL4001; PRLL4002

FEATURES

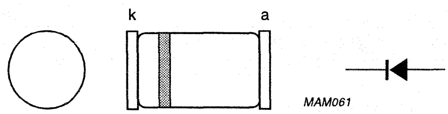
- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Shipped in 8 mm embossed tape
- Smallest surface mount rectifier outline.

DESCRIPTION

Cavity free cylindrical glass package through Implotec™(1) technology.

(1) Implotec is a trademark of Philips.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.



Marking code PRLL4001: 4001.
Marking code PRLL4002: 4002.

Fig.1 Simplified outline (SOD87) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	PRLL4001		–	50	V
	PRLL4002		–	100	V
V_R	continuous reverse voltage				
	PRLL4001		–	50	V
	PRLL4002		–	100	V
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; T_{tp} = 105 °C	–	1.60	A
		averaged over any 20 ms period; T_{amb} = 65 °C; see Fig.2	–	0.68	A
I_{FRM}	repetitive peak forward current		–	10	A
I_{FSM}	non-repetitive peak forward current	half sinewave; 60 Hz	–	20	A
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; see Fig.3	1.1	V
$V_{F(AV)}$	full-cycle average forward voltage	$I_{F(AV)}$ = 1 A	0.8	V
I_R	reverse current	$V_R = V_{Rmax}$	10	μA
		$V_R = V_{Rmax}$; T_{amb} = 100 °C	50	μA
$I_{R(AV)}$	full-cycle average reverse current	$V_R = V_{RRMmax}$; T_{amb} = 75 °C	30	μA

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point		30	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	150	K/W

Note

1. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 μm, see Fig.4. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA

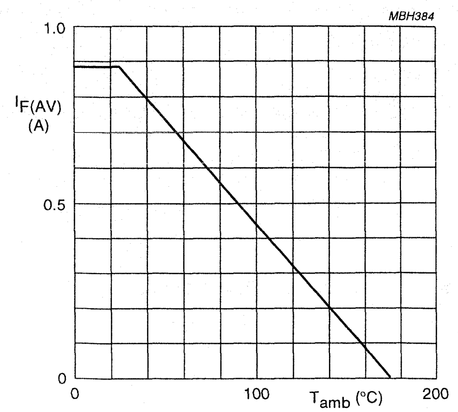
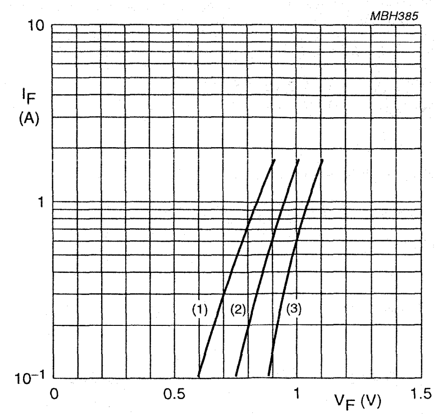
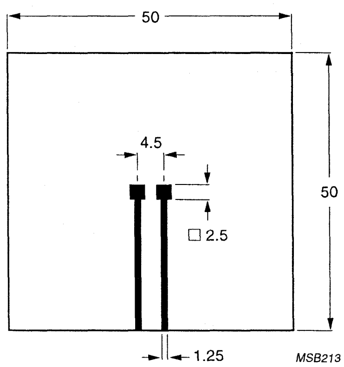


Fig.2 Maximum average forward current as a function of ambient temperature.



(1) T_{amb} = 100 °C.
(2) T_{amb} = 20 °C.
(3) T_{amb} = −50 °C.

Fig.3 Forward current as a function of forward voltage; typical values.



Dimensions in mm.

Fig.4 Printed-circuit board for surface mounting.

Schottky barrier diodes — PRLL5817; PRLL5818; PRLL5819

FEATURES

- Low switching losses
- Fast recovery time
- Guard ring protected
- Hermetically sealed glass SMD package.

APPLICATIONS

- Low power, switched-mode power supplies
- Rectifying
- Polarity protection.

DESCRIPTION

The PRLL5817 to PRLL5819 types are Schottky barrier diodes fabricated in planar technology, and encapsulated in SOD87 hermetically sealed glass SMD packages incorporating Implotec[TM(1)] technology.

(1) Implotec is a trademark of Philips.

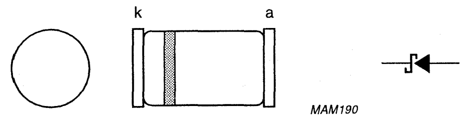


Fig.1 Simplified outline (SOD87) and symbol.

MARKING

TYPE NUMBER	MARKING CODE
PRLL5817	817 PH
PRLL5818	818 PH
PRLL5819	819 PH

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_R	continuous reverse voltage				
	PRLL5817		–	20	V
	PRLL5818		–	30	V
	PRLL5819		–	40	V
V_{RSM}	non-repetitive peak reverse voltage				
	PRLL5817		–	24	V
	PRLL5818		–	36	V
	PRLL5819		–	48	V
V_{RRM}	repetitive peak reverse voltage				
	PRLL5817		–	20	V
	PRLL5818		–	30	V
	PRLL5819		–	40	V
V_{RWM}	crest working reverse voltage				
	PRLL5817		–	20	V
	PRLL5818		–	30	V
	PRLL5819		–	40	V
$I_{F(AV)}$	average forward current	T_{amb} = 60 °C	–	1	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge: $V_R = 0$	–	25	A
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature		–	125	°C

ELECTRICAL CHARACTERISTICS

T_{amb} = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	see Fig.2				
	PRLL5817	I_F = 0.1 A	–	–	320	mV
		I_F = 1 A	–	–	450	mV
		I_F = 3 A	–	–	750	mV
V_F	forward voltage	see Fig.2				
	PRLL5818	I_F = 0.1 A	–	–	330	mV
		I_F = 1 A	–	–	550	mV
		I_F = 3 A	–	–	875	mV
V_F	forward voltage	see Fig.2				
	PRLL5819	I_F = 0.1 A	–	–	340	mV
		I_F = 1 A	–	–	600	mV
		I_F = 3 A	–	–	900	mV
I_R	reverse current	$V_R = V_{RRMmax}$; note 1	–	0.5	1	mA
		$V_R = V_{RRMmax}$; T_j = 100 °C	–	5	10	mA
C_d	diode capacitance	V_R = 4 V; f = 1 MHz				
	PRLL5817		–	70	–	pF
	PRLL5818		–	50	–	pF
	PRLL5819		–	50	–	pF

Note

1. Pulsed test: t_p = 300 μs; δ = 0.02.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	150	K/W

Note

1. Refer to SOD87 standard mounting conditions.

GRAPHICAL DATA

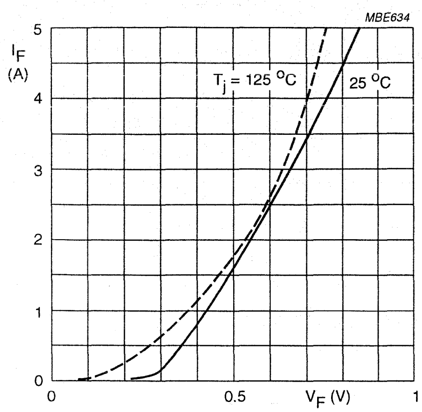


Fig.2 Typical forward voltage.

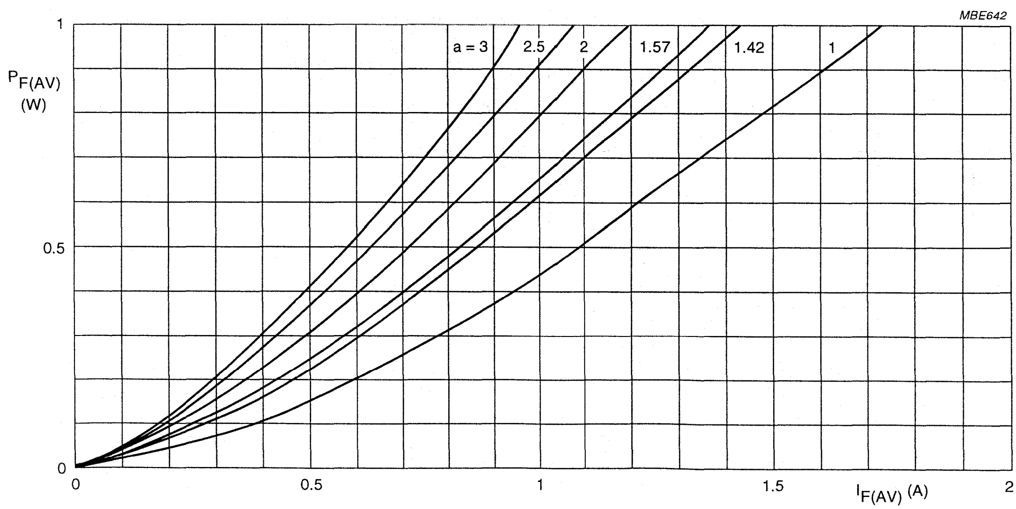


Fig.3 PRLL817. Maximum values steady state forward power dissipation as a function of the average forward current; $a = I_{F(RMS)}/I_{F(AV)}$.

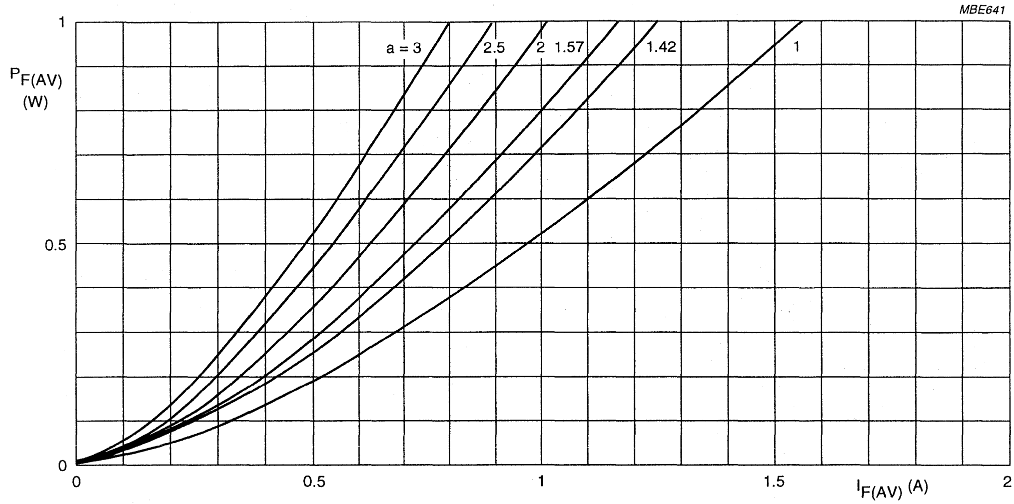


Fig.4 PRLL5818. Maximum values steady state forward power dissipation as a function of the average forward current; $a = I_{F(RMS)}/I_{F(AV)}$.

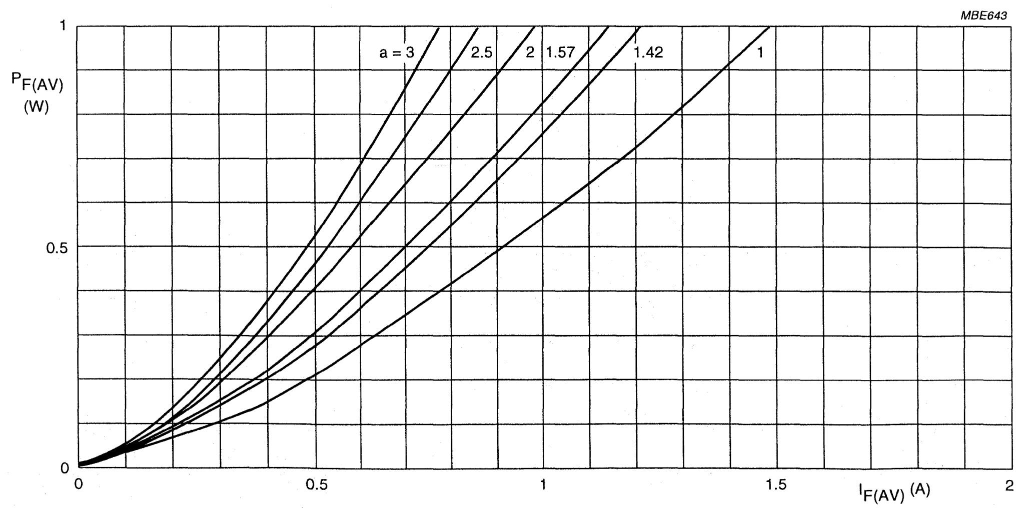


Fig.5 PRLL5819. Maximum values steady state forward power dissipation as a function of the average forward current; $a = I_{F(RMS)}/I_{F(AV)}$.

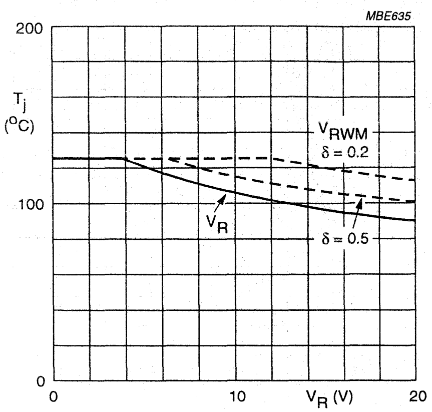


Fig.6 PRLL5817. Maximum permissible junction temperature as a function of reverse voltage; device mounted; refer to SOD87 standard mounting conditions.

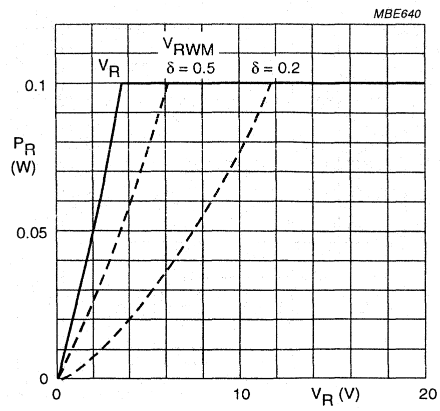


Fig.7 PRLL5817. Reverse power dissipation as a function of reverse voltage (max. values); device mounted; refer to SOD87 standard mounting conditions.

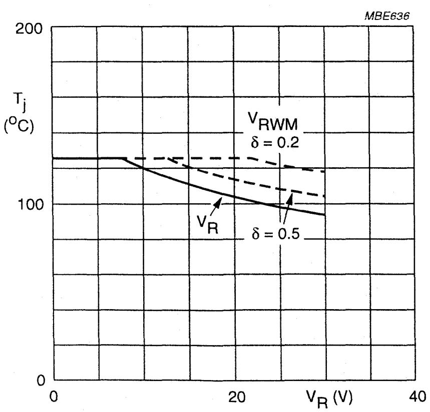


Fig.8 PRLL5818. Maximum permissible junction temperature as a function of reverse voltage; device mounted; refer to SOD87 standard mounting conditions.

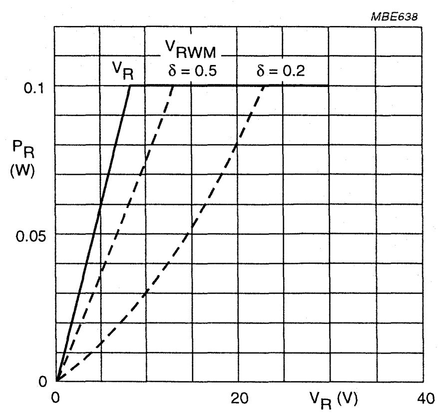


Fig.9 PRLL5818. Reverse power dissipation as a function of reverse voltage (max. values); device mounted; refer to SOD87 standard mounting conditions.

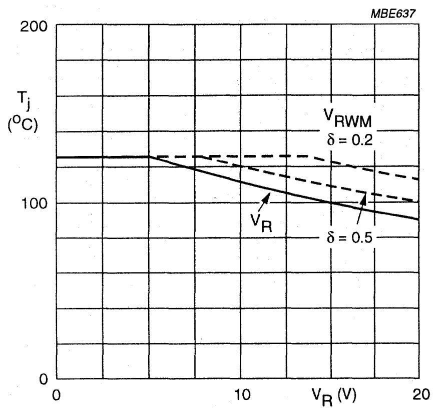


Fig.10 PRLL5819. Maximum permissible junction temperature as a function of reverse voltage; device mounted; refer to SOD87 standard mounting conditions.

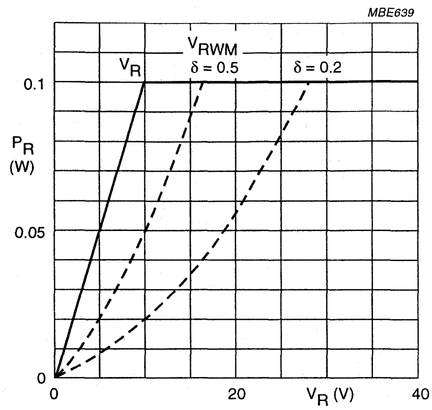


Fig.11 PRLL5819. Reverse power dissipation as a function of reverse voltage (max. values); device mounted; refer to SOD87 standard mounting conditions.

Transient voltage suppressor diodes | PSMA8.5A to PSMA78A

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- UL 94V-O classified plastic package
- Transient suppressor stand-off voltage range: 8.5 to 78 V for 26 types
- Supplied in 12 mm embossed tape.

DESCRIPTION

DO-214AC surface mountable package with glass passivated chip.

The well-defined void-free case is of a transfer-moulded thermo-setting plastic.

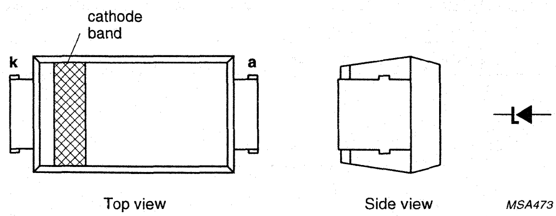


Fig.1 Simplified outline (DO-214AC; SOD106) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
P_{RSM}	non-repetitive peak reverse power dissipation	10/1000 µs exponential pulse; T_j = 25 °C prior to surge; see Figs.3 and 4	400	W

ELECTRICAL CHARACTERISTICS

Total series

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_F	forward voltage	I_F = 0.5 A	–	1.2	V
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+175	°C

Per type

T_j = 25 °C unless otherwise specified.

DEVICE (note 1)	REVERSE STAND-OFF VOLTAGE	BREAKDOWN VOLTAGE		REVERSE VOLTAGE (max) @ I_{RSM} (CLAMPING VOLTAGE)	REVERSE SURGE CURRENT (max)	REVERSE LEAKAGE CURRENT (max) @ V_{RWM}
	V_{RWM} (V)	V_{BR} min. (V)	I_T (mA)	V_{RSM} (V)	I_{RSM} (A)	I_R (μA)
PSMA8.5A	8.5	9.44	1	14.4	27.8	5.0
PSMA9.0A	9.0	10.0	1	15.4	26.0	2.5
PSMA10A	10	11.1	1	17.0	23.5	2.5
PSMA11A	11	12.2	1	18.2	22.0	2.5
PSMA12A	12	13.3	1	19.9	20.1	2.5
PSMA13A	13	14.4	1	21.5	18.6	2.5
PSMA14A	14	15.6	1	23.2	17.2	2.5
PSMA15A	15	16.7	1	24.4	16.4	2.5
PSMA16A	16	17.8	1	26.0	15.4	2.5
PSMA17A	17	18.9	1	27.6	14.5	2.5
PSMA18A	18	20.0	1	29.2	13.7	2.5
PSMA20A	20	22.2	1	32.4	12.3	2.5
PSMA22A	22	24.4	1	35.5	11.3	2.5
PSMA24A	24	26.7	1	38.9	10.3	2.5
PSMA26A	26	28.9	1	42.1	9.5	2.5
PSMA28A	28	31.1	1	45.4	8.8	2.5
PSMA30A	30	33.3	1	48.4	8.3	2.5
PSMA33A	33	36.7	1	53.3	7.5	2.5

DEVICE (note 1)	REVERSE STAND-OFF VOLTAGE	BREAKDOWN VOLTAGE		REVERSE VOLTAGE (max) @ I_{RSM} (CLAMPING VOLTAGE)	REVERSE SURGE CURRENT (max)	REVERSE LEAKAGE CURRENT (max) @ V_{RWM}
	V_{RWM} (V)	V_{BR} min. (V)	I_T (mA)	V_{RSM} (V)	I_{RSM} (A)	I_R (μA)
PSMA36A	36	40.0	1	58.1	6.9	2.5
PSMA40A	40	44.4	1	64.5	6.2	2.5
PSMA43A	43	47.8	1	69.4	5.8	2.5
PSMA45A	45	50.0	1	72.2	5.5	2.5
PSMA48A	48	53.3	1	77.4	5.2	2.5
PSMA51A	51	56.7	1	82.4	4.9	2.5
PSMA54A	54	60.0	1	87.1	4.6	2.5
PSMA58A	58	64.4	1	93.6	4.3	2.5
PSMA60A	60	66.7	1	96.8	4.1	2.5
PSMA64A	64	71.1	1	103.0	3.9	2.5
PSMA70A	70	77.8	1	113.0	3.5	2.5
PSMA75A	75	83.3	1	121.0	3.3	2.5
PSMA78A	78	86.7	1	126.0	3.2	2.5

Note

1. Tolerance and Voltage Designation: Tolerance designation - The type number listed indicates a tolerance of ±.5%

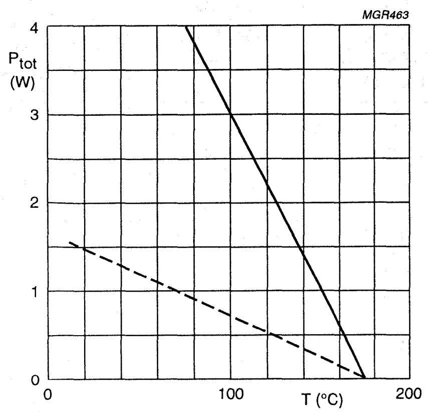
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point		25	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W
		note	150	K/W

Notes

1. Device mounted on an Al_2O_3 printed-circuit board, 0.7 mm thick; thickness of Cu-layer ≥35 μm, see Fig.4.
2. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.4. For more information please refer to the *'General part of the associated handbook'*.

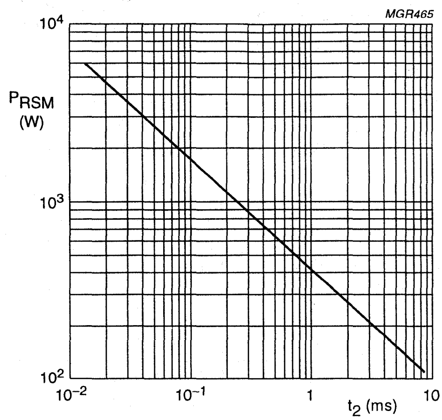
GRAPHICAL DATA



Solid line: tie-point temperature.

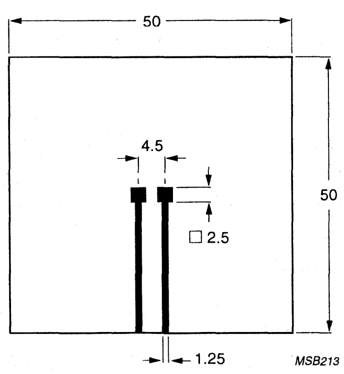
Dotted line: ambient temperature; device mounted on an Al_2O_3 printed-circuit board as shown in Fig.4.

Fig.2 Maximum total power dissipation as a function of temperature.



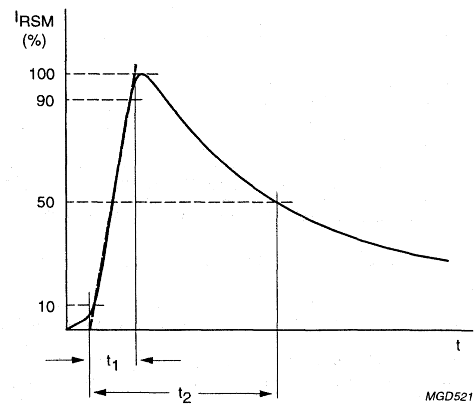
T_j = 25 °C prior to surge.

Fig.3 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (exponential pulse).



Dimensions in mm.

Fig.4 Printed-circuit board for surface mounting.



In accordance with *"IEC 60-1, Section 8"*.

t_1 = 10 µs.

t_2 = 1000 µs.

Fig.5 Non-repetitive peak reverse current pulse definition.

Voltage regulator diodes — PSMA5925B to PSMA5945B

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- UL 94V-O classified plastic package
- Zener working voltage range: 10 to 68 V for 21 types
- Supplied in 12 mm embossed tape.

DESCRIPTION

DO-214AC surface mountable package with glass passivated chip.

The well-defined void-free case is of a transfer-moulded thermo-setting plastic.

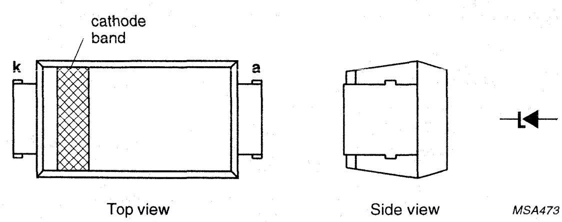


Fig.1 Simplified outline (DO-214AC; SOD106) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
P_{tot}	total power dissipation	T_{tp} = 75 °C; see Fig.2	–	4.0	W
		T_{amb} = 25 °C; see Fig.2; device mounted on an Al_2O_3 printed-circuit board; see Fig.5	–	1.5	W
P_{ZSM}	non-repetitive peak reverse power dissipation	t_p = 100 μs; square pulse; T_j = 25 °C prior to surge; see Fig.3	–	600	W
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature		−65	+175	°C

ELECTRICAL CHARACTERISTICS

Total series

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 0.5 A	1.2	V

Per type

T_j = 25 °C unless otherwise specified.

DEVICE (note 1)	NOMINAL ZENER VOLTAGE	TEST CURRENT	ZENER IMPEDANCE (max)			REVERSE LEAKAGE CURRENT (max)		
	V_Z @ I_{ZT} (V)	I_{ZT} (mA)	Z_{ZT} @ I_{ZT} (Ω)	Z_{ZK} (Ω)	I_{ZK} (mA)	I_R (μA)	V_R (V)	Max DC Zener Current I_{ZM} (mAdc)
PSMA5925B	10	37.5	4.5	500	0.25	10.0	8.0	150
PSMA5926B	11	34.1	5.5	550	0.25	4.0	8.4	136
PSMA5927B	12	31.2	6.5	550	0.25	3.0	9.1	125
PSMA5928B	13	28.8	8.0	600	0.25	1.0	9.9	115
PSMA5929B	15	25.0	9.0	650	0.25	0.5	11.4	100
PSMA5930B	16	23.4	10	650	0.25	0.5	12.2	94
PSMA5931B	18	20.8	12	650	0.25	0.5	13.7	83
PSMA5932B	20	18.7	14	650	0.25	0.5	15.2	75
PSMA5933B	22	17.0	17.5	650	0.25	0.5	16.7	68
PSMA5934B	24	15.6	19	700	0.25	0.5	18.2	63
PSMA5935B	27	13.9	23	700	0.25	0.5	20.6	56
PSMA5936B	30	12.5	26	750	0.25	0.5	22.8	50
PSMA5937B	33	11.4	33	800	0.25	0.5	25.1	45
PSMA5938B	36	10.4	38	850	0.25	0.5	27.4	42
PSMA5939B	39	9.6	45	900	0.25	0.5	29.7	38
PSMA5940B	43	8.7	53	950	0.25	0.5	32.7	35
PSMA5941B	47	8.0	67	1000	0.25	0.5	35.8	32
PSMA5942B	51	7.3	70	1100	0.25	0.5	38.8	29
PSMA5943B	56	6.7	86	1300	0.25	0.5	42.6	27
PSMA5944B	62	6.0	100	1500	0.25	0.5	47.1	24
PSMA5945B	68	5.5	120	1700	0.25	0.5	51.7	22

Note

1. Tolerance and Voltage Designation: Tolerance designation - The type number listed indicates a tolerance of ±5%.

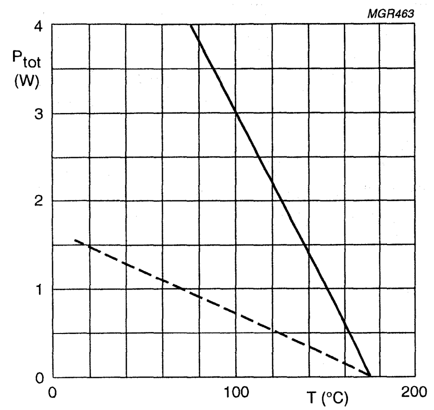
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point		25	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W
		note 2	150	K/W

Notes

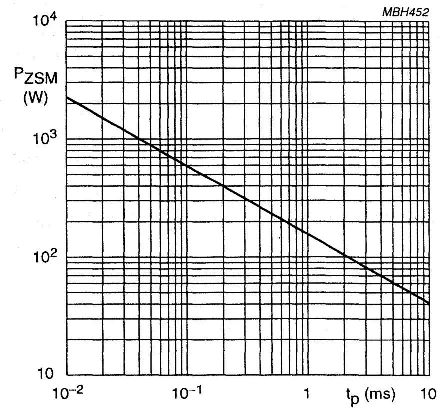
1. Device mounted on an Al_2O_3 printed-circuit board, 0.7 mm thick; thickness of Cu-layer ≥35 μm, see Fig.5.
2. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.5. For more information please refer to the *'General part of the associated handbook'*.

GRAPHICAL DATA



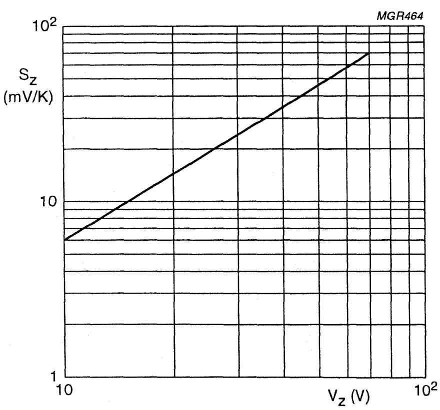
Solid line: tie-point temperature.
Dotted line: ambient temperature; device mounted on an Al_2O_3 printed-circuit board as shown in Fig.5.

Fig.2 Maximum total power dissipation as a function of temperature.



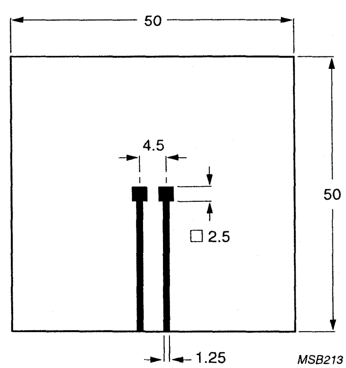
T_j = 25 °C prior to surge.

Fig.3 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (square pulse).



V_Z at I_{ZT}.

Fig.4 Temperature coefficiënt as a function of zener voltage; typical values.



Dimensions in mm.

Fig.5 Printed-circuit board for surface mounting.

NPN transistor/Schottky-diode module PZTM1101

FEATURES

- Low output capacitance
- Fast switching time
- Integrated Schottky protection diode.

APPLICATIONS

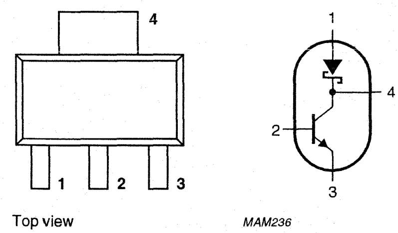
- High-speed switching for industrial applications.

PINNING

PIN	DESCRIPTION
1	anode Schottky
2	base
3	emitter
4	collector, cathode Schottky

DESCRIPTION

Combination of an NPN transistor and a Schottky barrier diode in a plastic SOT223 package. PNP complement: PZTM1102.



Marking code: TM1101.

Fig.1 Simplified outline (SOT223) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
NPN transistor					
V_{CBO}	collector-base voltage	open emitter	–	60	V
V_{CES}	collector-emitter voltage	$V_{BE} = 0$	–	40	V
V_{EBO}	emitter-base voltage	open collector	–	6	V
I_C	collector current (DC)		–	200	mA
Schottky barrier diode					
V_R	continuous reverse voltage		–	40	V
I_F	forward current (DC)		–	1	A
$I_{F(AV)}$	average forward current		–	1	A
T_j	junction temperature	reverse current applied	–	125	°C
		forward current applied	–	150	°C
Combined device					
P_{tot}	total power dissipation	up to $T_{amb} = 25$ °C	–	1.2	W
T_{amb}	operating ambient temperature		–55	+150	°C
T_{stg}	storage temperature		–55	+150	°C
T_j	junction temperature		–	150	°C

ELECTRICAL CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
NPN transistor					
$V_{(BR)CBO}$	collector-base breakdown voltage	open emitter; I_C = 10 μA; I_E = 0; T_{amb} = −55 to +150 °C; note 1	60	–	V
$V_{(BR)CES}$	collector-emitter breakdown voltage	open base; I_C = 1 mA; V_{BE} = 0; T_{amb} = −55 to +150 °C; note 1	40	–	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	open collector; I_E = 10 μA; I_C = 0; T_{amb} = −55 to +150 °C; note 1	6	–	V
I_{CES}	collector-emitter cut-off current	V_{CE} = 20 V; V_{BE} = 0	–	100	nA
		V_{CE} = 20 V; V_{BE} = 0; T_{amb} = −55 to +150 °C	–	50	μA
I_{EBO}	emitter-base cut-off current	V_{EB} = 6 V; I_C = 0	–	50	nA
		V_{EB} = 6 V; I_C = 0; T_{amb} = −55 to +150 °C	–	10	μA
V_{CEsat}	collector-emitter saturation voltage	note 1			
		I_C = 10 mA; I_B = 1 mA	–	200	mV
		I_C = 50 mA; I_B = 3.2 mA	–	300	mV
V_{CEsat}	collector-emitter saturation voltage	T_{amb} = −55 to +150 °C; note 1			
		I_C = 10 mA; I_B = 1 mA	–	250	mV
		I_C = 50 mA; I_B = 3.2 mA	–	350	mV
V_{BEsat}	base-emitter saturation voltage	note 1			
		I_C = 10 mA; I_B = 1 mA	–	850	mV
		I_C = 50 mA; I_B = 5 mA	–	950	mV
V_{BEsat}	base-emitter saturation voltage	T_{amb} = −55 to +150 °C; note 1			
		I_C = 10 mA; I_B = 1 mA	–	1000	mV
		I_C = 50 mA; I_B = 5 mA	–	1100	mV
C_{ob}	output capacitance	$I_E = i_e$ = 0; V_{CB} = 5 V; f = 1 MHz	–	4	pF
C_{ib}	input capacitance	$I_C = i_c$ = 0; V_{EB} = 0.5 V; f = 1 MHz	–	8	pF
f_T	transition frequency	I_C = 10 mA; V_{CE} = 20 V; f = 100 MHz	300	–	MHz
h_{FE}	DC current gain	V_{CE} = 1 V; note 1			
		I_C = 0.1 mA	40	–	
		I_C = 1 mA	70	–	
		I_C = 10 mA	100	300	
		I_C = 100 mA	30	–	
h_{FE}	DC current gain	V_{CE} = 1 V; T_{amb} = −55 to +150 °C; note 1			
		I_C = 10 mA	60	500	
		I_C = 100 mA	15	–	
SWITCHING TIMES (see Figs 2 and 3)					
t_d	delay time	V_{CC} = 5 V	1	5	ns
t_r	rise time	I_C = 50 mA	16	31	ns
t_s	storage time	V_i = 0 to 5 V	110	310	ns
t_f	fall time		70	100	ns

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Schottky barrier diode					
V_F	forward voltage	I_F = 100 mA; note 1	–	330	mV
		I_F = 100 mA; T_{amb} = –55 to +150 °C; note 1	–	400	mV
		I_F = 1 A; note 1	–	500	mV
		I_F = 1 A; T_{amb} = –55 to +150 °C; note 1	–	560	mV
I_R	reverse current	V_R = 40 V; note 1	–	300	μA
		V_R = 40 V; T_j = 125 °C; T_{amb} = –55 to +150 °C; note 1	–	35[2]	mA
I_R	reverse current	V_R = 10 V; note 1	–	40	μA
		V_R = 10 V; T_j = 125 °C; T_{amb} = –55 to +150 °C; note 1	–	15[2]	mA
C_j	junction capacitance	V_R = 0 V; f = 1 MHz	–	250	pF

Notes

1. Measured under pulsed conditions: $t_p \leq 300$ μs; $\delta \leq 0.01$.
2. Limiting value for T_j = 125 °C; T_j = 150 °C with reverse current applied is not allowed as this may cause thermal runaway leading to thermal destruction of the diode. A peak junction temperature of T_j = 150 °C is only allowed with forward voltage applied.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient (combined device)	note 1	100	K/W

Note

1. Refer to SOT223 standard mounting conditions.

GRAPHICAL DATA

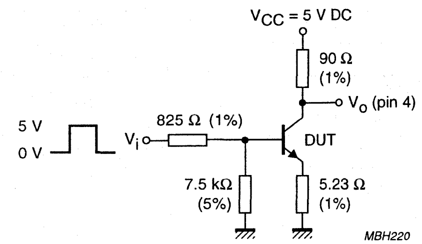
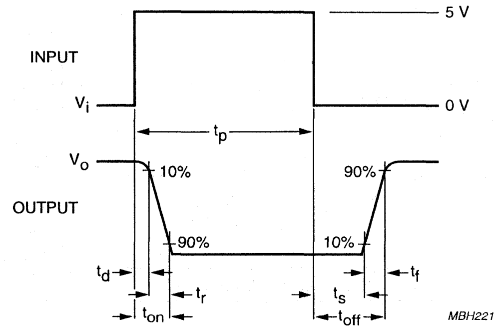


Fig.2 Switching times test circuit.



t_r < 5 ns (10% to 90%); t_p = 1 µs; δ = 0.02; Z_i = 50 Ω.
$t_{on} = t_d + t_r$; $t_{off} = t_s + t_f$.

Fig.3 Input and output waveforms.

PNP transistor/Schottky-diode module PZTM1102

FEATURES

- Low output capacitance
- Fast switching time
- Integrated Schottky protection diode.

APPLICATIONS

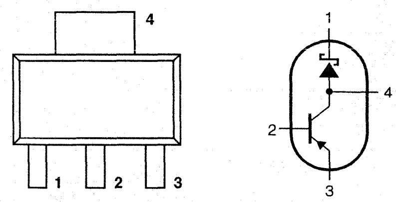
- High-speed switching for industrial applications.

PINNING

PIN	DESCRIPTION
1	cathode Schottky
2	base
3	emitter
4	collector, anode Schottky

DESCRIPTION

Combination of a PNP transistor and a Schottky barrier diode in a plastic SOT223 package. NPN complement: PZTM1101.



Top view

MAM237

Marking code: TM1102.

Fig.1 Simplified outline (SOT223) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
PNP transistor					
V_{CBO}	collector-base voltage	open emitter	–	–40	V
V_{CES}	collector-emitter voltage	$V_{BE} = 0$	–	–40	V
V_{EBO}	emitter-base voltage	open collector	–	–6	V
I_C	collector current (DC)		–	–200	mA
Schottky barrier diode					
V_R	continuous reverse voltage		–	40	V
I_F	forward current (DC)		–	1	A
$I_{F(AV)}$	average forward current		–	1	A
P	power dissipation	up to T_{amb} = 25 °C; note 1	–	0.5	W
T_j	junction temperature	reverse current applied	–	125	°C
		forward current applied	–	150	°C
Combined device					
P_{tot}	total power dissipation	up to T_{amb} = 25 °C; note 2	–	1.2	W
T_{amb}	operating ambient temperature		–55	+150	°C
T_{stg}	storage temperature		–55	+150	°C
T_j	junction temperature		–	150	°C

Notes

1. An additional copper area of >20 mm^2 is required for pin 1, if power dissipation in the Schottky die is >0.5 W.
2. It is not allowed to dissipate the total power of 1.2 W in the Schottky die only.

ELECTRICAL CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
NPN transistor					
$V_{(BR)CBO}$	collector-base breakdown voltage	open emitter; I_C = –10 μA; I_E = 0; T_{amb} = –55 to +150 °C; note 1	–40	–	V
$V_{(BR)CES}$	collector-emitter breakdown voltage	open base; I_C = –1 mA; V_{BE} = 0; T_{amb} = –55 to +150 °C; note 1	–40	–	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	open collector; I_E = –10 μA; I_C = 0; T_{amb} = –55 to +150 °C; note 1	–6	–	V
I_{CES}	collector-emitter cut-off current	V_{CE} = –20 V; V_{BE} = 0	–	100	nA
		V_{CE} = –20 V; V_{BE} = 0; T_{amb} = –55 to +150 °C	–	50	μA
I_{EBO}	emitter-base cut-off current	V_{EB} = –6 V; I_C = 0	–	50	nA
		V_{EB} = –6 V; I_C = 0; T_{amb} = –55 to +150 °C	–	10	μA
V_{CEsat}	collector-emitter saturation voltage	note 1			
		I_C = –10 mA; I_B = –1 mA	–	–200	mV
		I_C = –50 mA; I_B = –3.2 mA	–	–300	mV
V_{CEsat}	collector-emitter saturation voltage	T_{amb} = –55 to +150 °C; note 1			
		I_C = –10 mA; I_B = –1 mA	–	–250	mV
		I_C = –50 mA; I_B = –3.2 mA	–	–350	mV
V_{BEsat}	base-emitter saturation voltage	note 1			
		I_C = –10 mA; I_B = –1 mA	–	–850	mV
		I_C = –50 mA; I_B = –5 mA	–	–950	mV
V_{BEsat}	base-emitter saturation voltage	T_{amb} = –55 to +150 °C; note 1			
		I_C = –10 mA; I_B = –1 mA	–	–1.0	V
		I_C = –50 mA; I_B = –5 mA	–	–1.1	V
C_{ob}	output capacitance	$I_E = i_e$ = 0; V_{CB} = –5 V; f = 1 MHz	–	4.5	pF
C_{ib}	input capacitance	$I_C = i_c$ = 0; V_{EB} = –0.5 V; f = 1 MHz	–	10	pF
f_T	transition frequency	I_C = –10 mA; V_{CE} = –20 V; f = 100 MHz	250	–	MHz
h_{FE}	DC current gain	V_{CE} = –1 V; note 1			
		I_C = –0.1 mA	40	–	
		I_C = –1 mA	70	–	
		I_C = –10 mA	100	300	
		I_C = –100 mA	30	–	
h_{FE}	DC current gain	V_{CE} = –1 V; T_{amb} = –55 to +150 °C; note 1			
		I_C = –10 mA	60	500	
		I_C = –100 mA	15	–	
SWITCHING TIMES (see Figs 2 and 3)					
t_d	delay time	V_{CC} = 5 V	3	7	ns
t_r	rise time	I_C = 50 mA	13	23	ns
t_s	storage time	V_i = 0 to 5 V	200	380	ns
t_f	fall time		50	80	ns

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Schottky barrier diode					
V_F	forward voltage	I_F = 100 mA; note 1	–	330	mV
		I_F = 100 mA; T_{amb} = –55 to +150 °C; note 1	–	400	mV
		I_F = 1 A; note 1	–	500	mV
		I_F = 1 A; T_{amb} = –55 to +150 °C; note 1	–	560	mV
I_R	reverse current	V_R = 40 V; note 1	–	300	μA
		V_R = 40 V; T_j = 125 °C; T_{amb} = –55 to +150 °C; note 1	–	35(2)	mA
I_R	reverse current	V_R = 10 V; note 1	–	40	μA
		V_R = 10 V; T_j = 125 °C; T_{amb} = –55 to +150 °C; note 1	–	15(2)	mA
C_j	junction capacitance	V_R = 0 V; f = 1 MHz	–	250	pF

Notes

1. Measured under pulsed conditions: $t_p \leq 300$ μs; $\delta \leq 0.01$.
2. Limiting value for T_j = 125 °C; T_j = 150 °C with reverse current applied is not allowed as this may cause thermal runaway leading to thermal destruction of the diode. A peak junction temperature of T_j = 150 °C is only allowed with forward voltage applied.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient (for the transistor)	note 1	100	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient (for the Schottky diode)	note 1	250	K/W

Note

1. Refer to SOT223 standard mounting conditions.

GRAPHICAL DATA

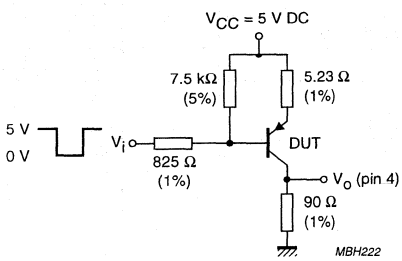
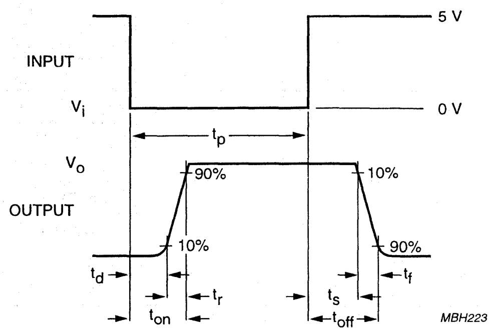


Fig.2 Switching times test circuit.



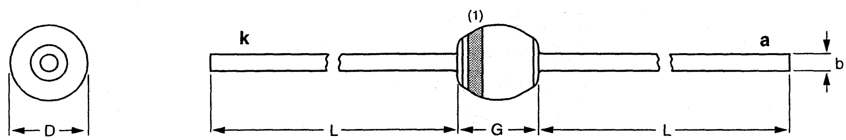
t_r < 5 ns (10% to 90%); t_p = 1 μs; δ = 0.02; Z_i = 50 Ω.
$t_{on} = t_d + t_r$; $t_{off} = t_s + t_f$.

Fig.3 Input and output waveforms.

PACKAGE OUTLINES

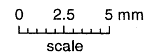
Hermetically sealed glass package; axial leaded; 2 leads

SOD57



DIMENSIONS (mm are the original dimensions)

UNIT	b max.	D max.	G max.	L min.
mm	0.81	3.81	4.57	28

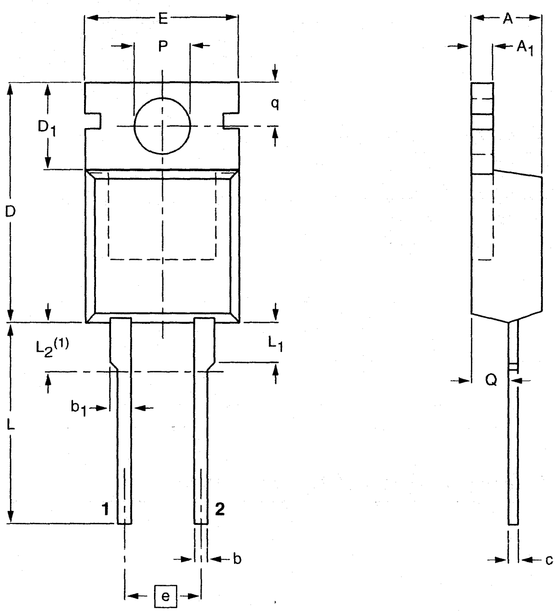


Note

1. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD57						97-10-14

Plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220 **SOD59**



DIMENSIONS (mm are the original dimensions)

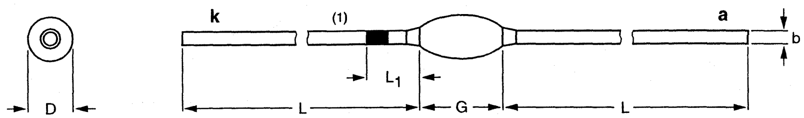
UNIT	A	A_1	b	b_1	c	D	D_1	E	e	L	L_1	$L_2^{(1)}$	P	q	Q
mm	4.5 4.1	1.39 1.27	0.9 0.7	1.3 1.0	0.7 0.4	15.8 15.2	6.4 5.9	10.3 9.7	5.08	15.0 13.5	3.30 2.79	3.0	3.8 3.6	3.0 2.7	2.6 2.2

Note

1. Terminals in this zone are not tinned.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD59		2-lead TO-220				97-06-11

Hermetically sealed glass package; axial leaded; 2 leads SOD61A



DIMENSIONS (mm are the original dimensions)

UNIT	b	D max.	G max.	L min.	L_1 max.
mm	0.6	2.5	4.9	32.5	3

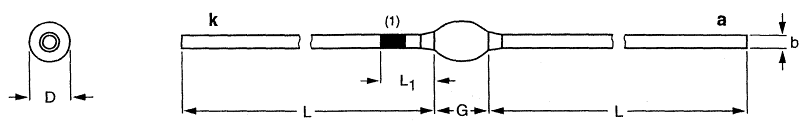
0 2.5 5 mm
scale

Note

1. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD61A						97-06-09

Miniature hermetically sealed glass package; axial leaded; 2 leads SOD61H2



DIMENSIONS (mm are the original dimensions)

UNIT	b	D max.	G max.	L min.	L_1 max.
mm	0.6	2.2	3	32.5	3

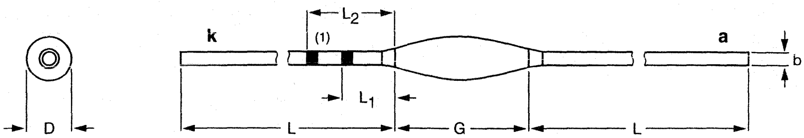
0 2.5 5 mm
scale

Note

1. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD61H2						97-06-09

Hermetically sealed glass package; axial leaded; 2 leads SOD61AB to AK

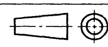


DIMENSIONS (mm are the original dimensions)

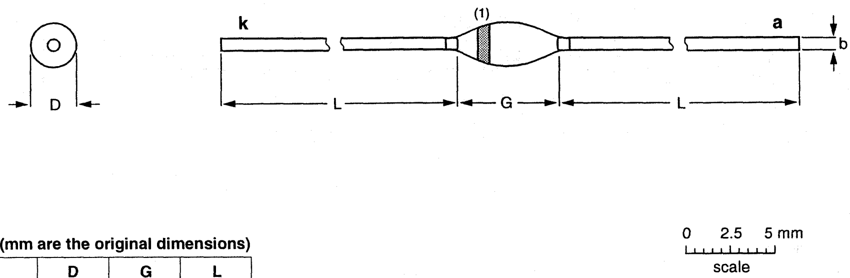
OUTLINE VERSION	UNIT	b	D max.	G max.	L min.	L_1 max.	L_2 max.
SOD61AB	mm	0.6	2.5	5.5	31.8	3	5
SOD61AC	mm	0.6	2.5	8.3	30.4	3	5
SOD61AD	mm	0.6	2.5	8.7	30.2	3	5
SOD61AE	mm	0.6	2.5	9.1	30.0	3	5
SOD61AF	mm	0.6	2.5	9.5	29.8	3	5
SOD61AG	mm	0.6	2.5	9.9	29.6	3	5
SOD61AH	mm	0.6	2.5	10.5	29.3	3	5
SOD61AI	mm	0.6	2.5	11.5	28.8	3	5
SOD61AJ	mm	0.6	2.5	12.5	28.3	3	5
SOD61AK	mm	0.6	2.5	13.5	27.8	3	n.a

Note

1. The marking bands indicate the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD61AB to AK						97-06-20

Hermetically sealed glass package; axial leaded; 2 leads SOD61AB2

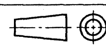


DIMENSIONS (mm are the original dimensions)

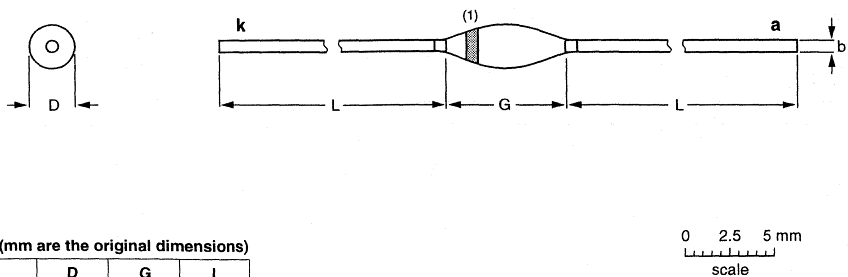
UNIT	b	D max.	G max.	L min.
mm	0.6	2.5	5.5	31.8

Note

1. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD61AB2						98-12-04

Hermetically sealed glass package; axial leaded; 2 leads SOD61AC2

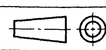


DIMENSIONS (mm are the original dimensions)

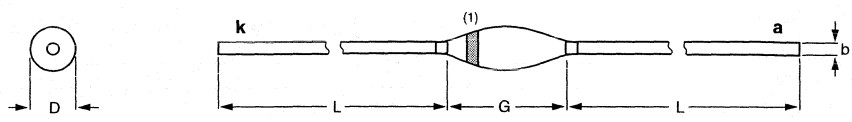
UNIT	b	D max.	G max.	L min.
mm	0.6	2.5	8.3	30.4

Note

1. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD61AC2						98-12-04

Hermetically sealed glass package; axial leaded; 2 leads — SOD61AD2

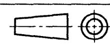


DIMENSIONS (mm are the original dimensions)

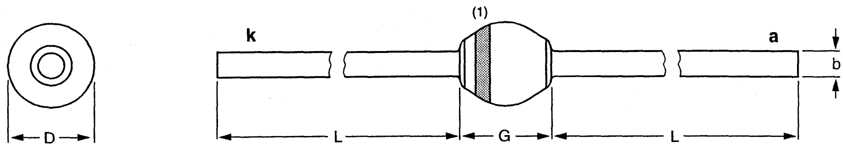
UNIT	b	D max.	G max.	L min.
mm	0.6	2.5	8.7	30.2

Note

1. The marking band indicates the cathode.

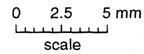
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD61AD2						97-08-29

Hermetically sealed glass package; axial leaded; 2 leads — SOD64



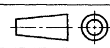
DIMENSIONS (mm are the original dimensions)

UNIT	b max.	D max.	G max.	L min.
mm	1.35	4.5	5.0	28

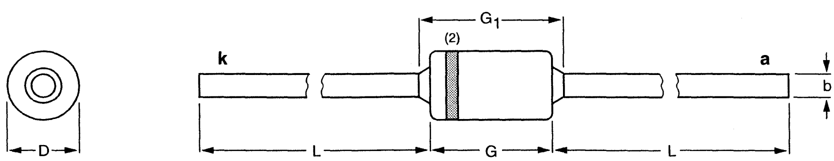


Note

1. The marking band indicates the cathode.

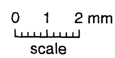
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD64						97-10-14

Hermetically sealed glass package; Implotec$^{TM(1)}$ technology; axial leaded; 2 leads — SOD81



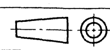
DIMENSIONS (mm are the original dimensions)

UNIT	b max.	D max.	G max.	G_1 max.	L min.
mm	0.81	2.15	3.8	5	28

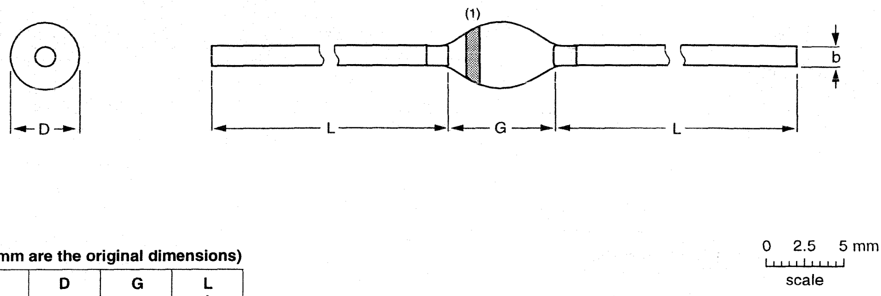


Notes

1. Implotec is a trademark of Philips.
2. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD81						97-06-20

Hermetically sealed glass package; axial leaded; 2 leads SOD83A



DIMENSIONS (mm are the original dimensions)

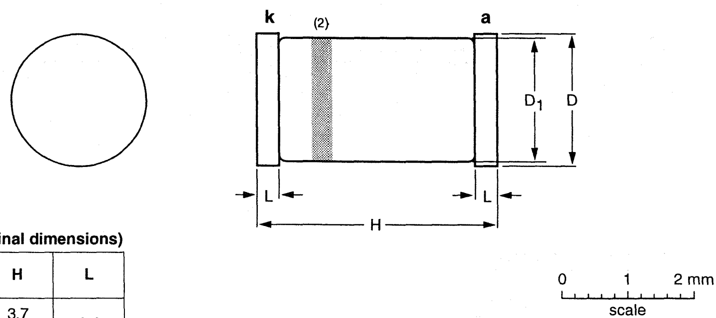
UNIT	b max.	D max.	G max.	L min.
mm	1.35	4.5	7.5	30.7

Note

1. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD83A						97-06-11

Hermetically sealed glass surface mounted package; 2 connectors; Implotec$^{TM(1)}$ technology SOD87



DIMENSIONS (mm are the original dimensions)

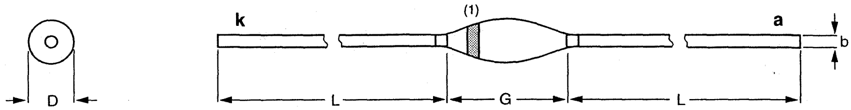
UNIT	D	D1	H	L
mm	2.1 2.0	2.0 1.8	3.7 3.3	0.3

Notes

1. Implotec is a trademark of Philips.
2. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD87	100H03					98-11-25

Hermetically sealed glass package; axial leaded; 2 leads — SOD88A



0 2.5 5 mm
scale

DIMENSIONS (mm are the original dimensions)

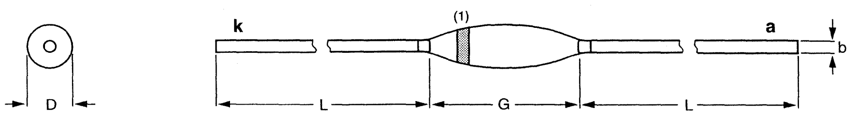
UNIT	b max.	D max.	G max.	L min.
mm	0.81	3.8	8	30.5

Note

1. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD88A						97-06-20

Hermetically sealed glass package; axial leaded; 2 leads — SOD88B



0 2.5 5 mm
scale

DIMENSIONS (mm are the original dimensions)

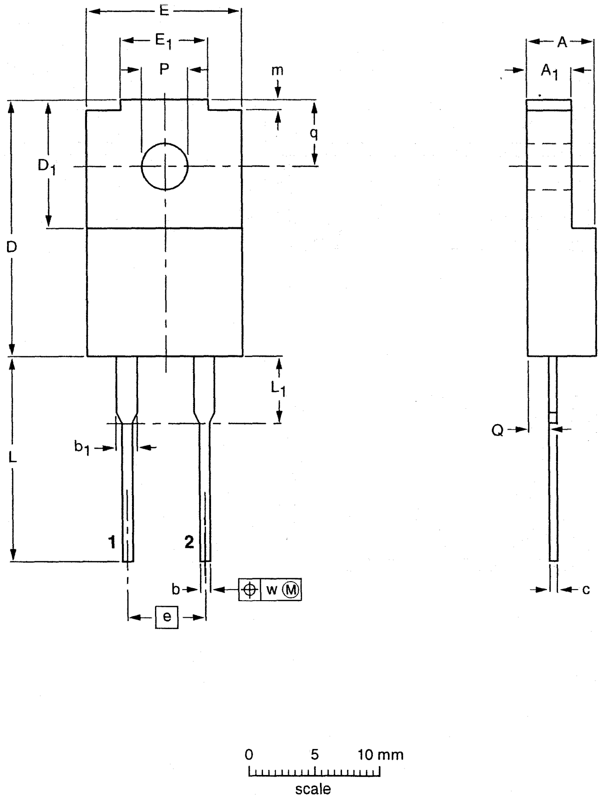
UNIT	b max.	D max.	G max.	L min.
mm	0.81	3.8	11	29

Note

1. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD88B						97-06-20

Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2-lead TO-220F exposed tabs **SOD100**



DIMENSIONS (mm are the original dimensions)

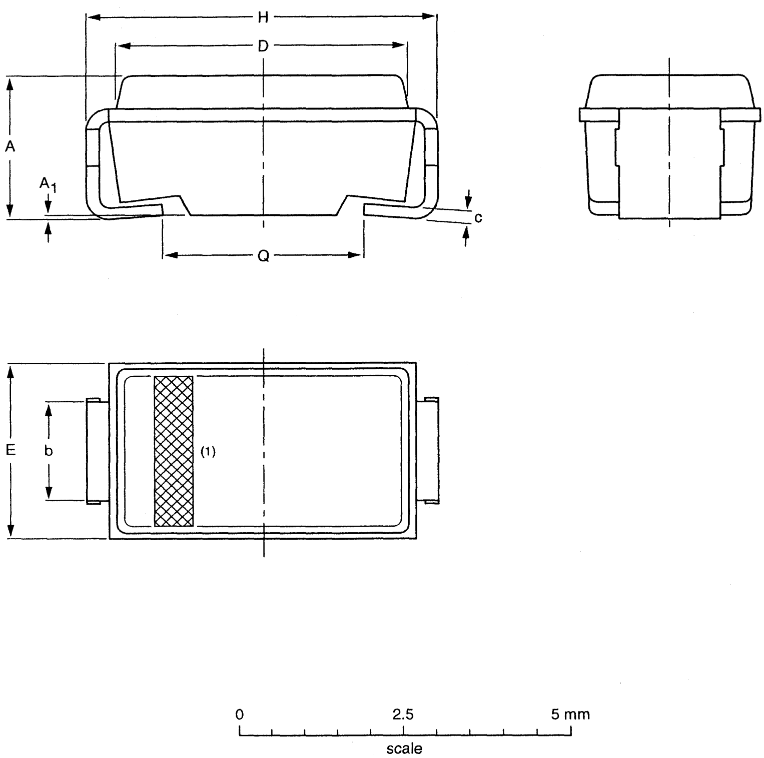
UNIT	A	A_1	b	b_1	c	D	D_1	E	E_1	e	L	L_1(1)	m	P	Q	q	w
mm	4.4 4.0	2.9 2.5	0.9 0.7	1.5 1.3	0.55 0.38	17.0 16.4	7.9 7.5	10.2 9.6	5.7 5.3	5.08	14.3 13.5	4.8 4.0	0.9 0.5	3.2 3.0	1.4 1.2	4.4 4.0	0.4

Note

1. Terminal dimensions within this zone are uncontrolled. Terminals in this zone are not tinned.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD100		2-lead TO-220F				97-06-11

Transfer-moulded thermo-setting plastic small rectangular surface mounted package; 2 connectors **SOD106**



DIMENSIONS (mm are the original dimensions)

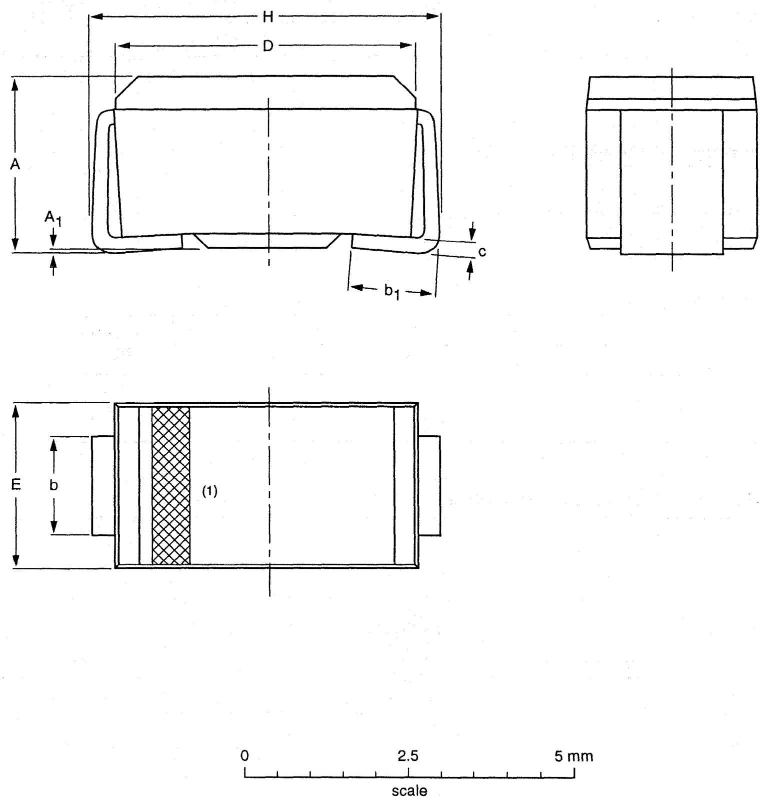
UNIT	A	A_1	b	c	D	E	H	Q
mm	2.3 2.0	0.05	1.6 1.4	0.2	4.5 4.3	2.8 2.4	5.5 5.1	3.3 2.7

Note

1. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD106		DO-214AC				97-06-09

Transfer-moulded thermo-setting plastic small rectangular surface mounted package; 2 connectors **SOD106A**



DIMENSIONS (mm are the original dimensions)

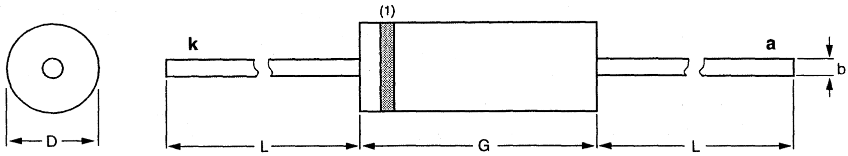
UNIT	A max.	A_1	b	b_1	c	D max.	E	H
mm	2.65	0.1	1.5	1.5 1.2	0.2	4.57	2.5	5.5 5.1

Note

1. The marking band indicates the cathode.

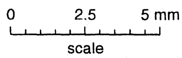
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD106A		DO-214AC				97-06-09

Hermetically sealed plastic package; axial leaded; 2 leads — SOD107A



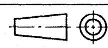
DIMENSIONS (mm are the original dimensions)

UNIT	b	D	G	L min.
mm	0.6	3.1 2.9	8.5 7.5	30

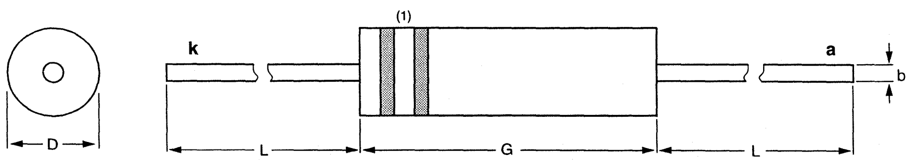


Note

1. The marking band indicates the cathode.

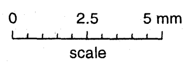
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD107A						98-08-04

Hermetically sealed plastic package; axial leaded; 2 leads — SOD107B



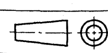
DIMENSIONS (mm are the original dimensions)

UNIT	b	D	G	L min.
mm	0.6	3.1 2.9	10.5 9.5	29

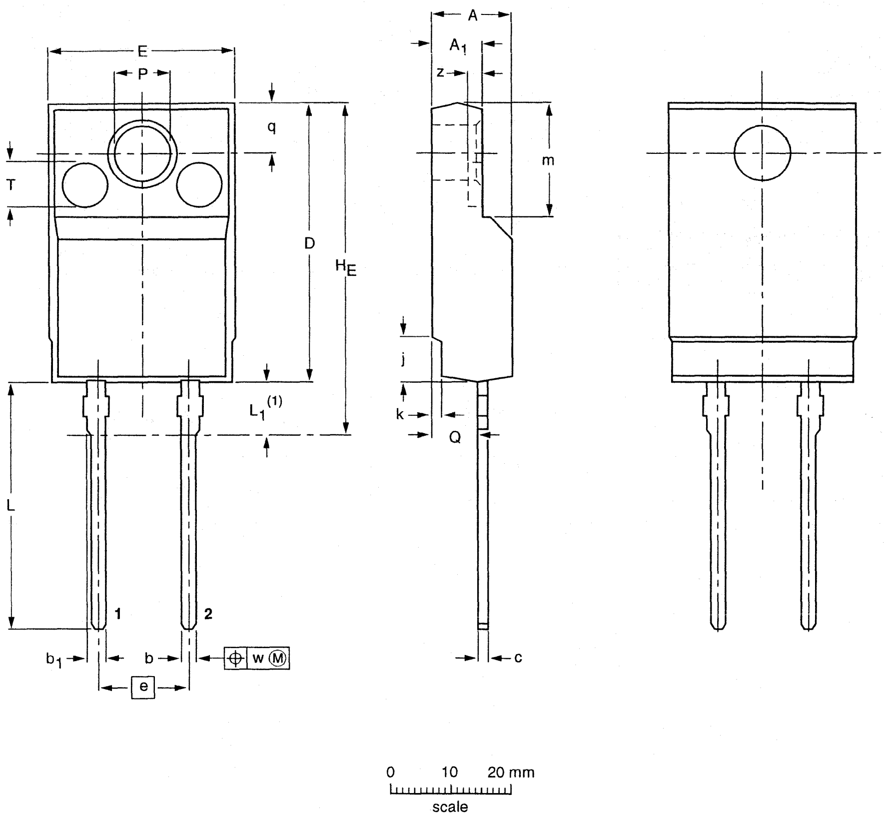


Note

1. The marking bands indicate the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD107B						98-08-05

Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2-leads TO-220 'full pack' **SOD113**



DIMENSIONS (mm are the original dimensions)

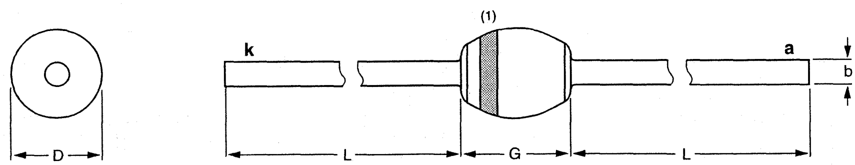
UNIT	A	A_1	b	b_1	c	D	E	e	H_E max.	j	k	L	$L_1^{(1)}$	m	P	Q	q	T	w	$z^{(2)}$
mm	4.6 4.0	2.9 2.5	0.9 0.7	1.1 0.9	0.7 0.4	15.8 15.2	10.3 9.7	5.08	19.0	2.7 2.3	0.6 0.4	14.4 13.5	3.3 2.8	6.5 6.3	3.2 3.0	2.6 2.3	2.6	2.55	0.4	0.8

Notes

1. Terminals are uncontrolled within zone L_1.
2. z is depth of T.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD113		2-lead TO-220				97-06-11

Hermetically sealed glass package; axial leaded; 2 leads SOD115



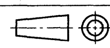
DIMENSIONS (mm are the original dimensions)

UNIT	b max.	D max.	G max.	L min.
mm	1.35	5.5	6.0	27

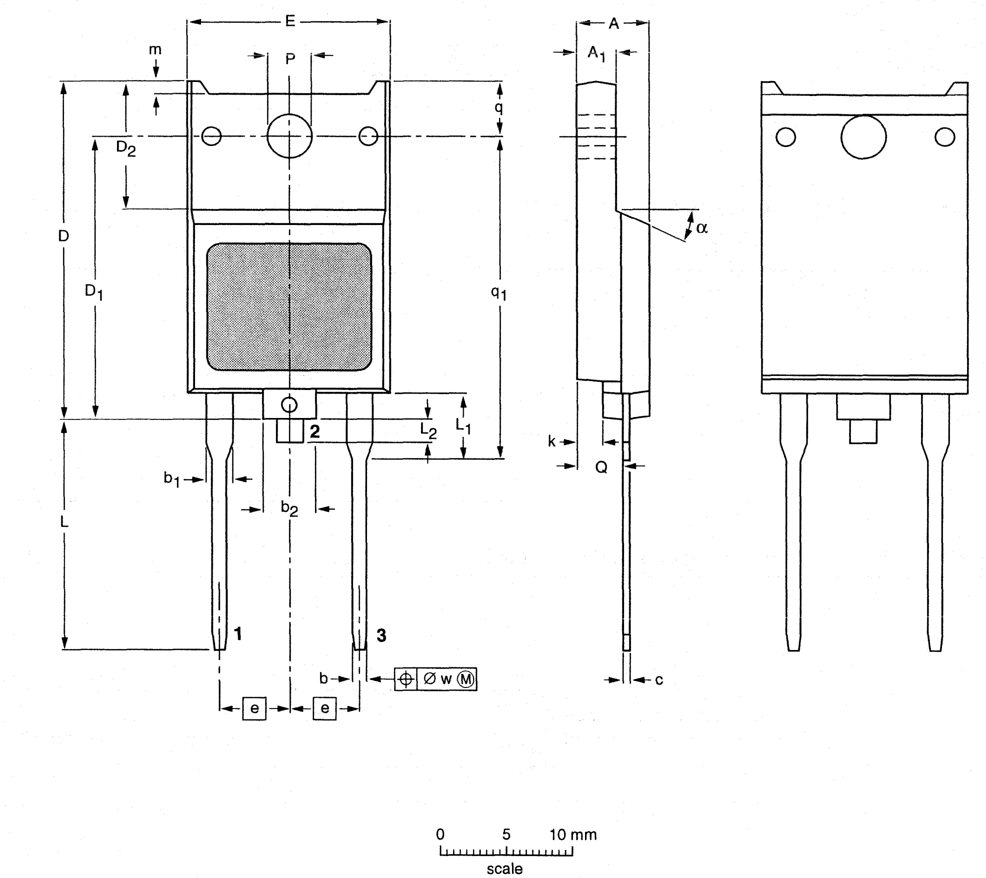
0 2.5 5 mm
scale

Note

1. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD115						97-10-14

Plastic single-ended through-hole package; mountable to heatsink; 1 mounting hole; 3 in-line leads (one lead cropped) **SOD117**



DIMENSIONS (mm are the original dimensions)

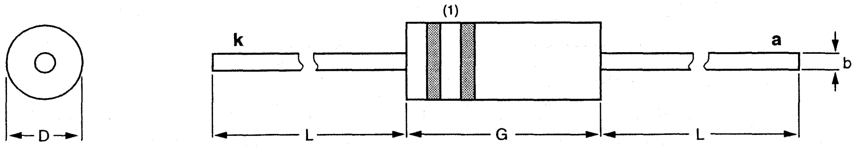
UNIT	A	A_1	b	b_1	b_2	c	D	D_1	D_2	E	e	k	L	L_1(1)	L_2	m	P	Q	q	q_1	w	α
mm	5.8 4.8	3.3 2.7	1.2 0.9	2.2 1.8	4.7 4.2	0.9 0.6	27 26	22.5 21.5	10.2 9.9	16 15	5.45	2.2 1.8	19.1 18.1	5.4 4.8	3.0 1.0	0.8 0.6	3.4 3.1	3.4 3.2	4.7 4.3	25.7 25.1	0.4	27° 23°

Note

1. Tinning of terminals are uncontrolled within zone L_1.

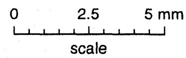
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD117						98-11-06

Hermetically sealed plastic package; axial leaded; 2 leads SOD118A



DIMENSIONS (mm are the original dimensions)

UNIT	b	D	G	L min.
mm	0.5	2.6 2.4	6.7 6.3	31

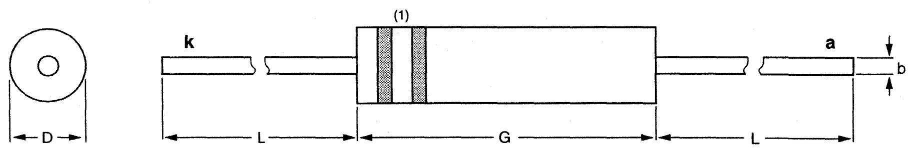


Note

1. The marking bands indicate the cathode.

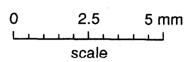
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD118A						98-05-28

Hermetically sealed plastic package; axial leaded; 2 leads SOD118B



DIMENSIONS (mm are the original dimensions)

UNIT	b	D	G	L min.
mm	0.5	2.6 2.4	10.5 9.5	29

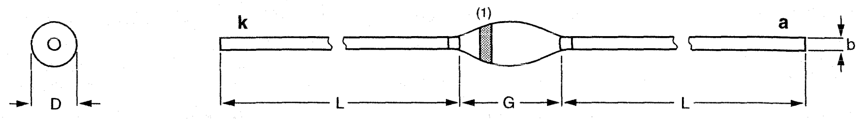


Note

1. The marking bands indicate the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD118B						98-05-28

Hermetically sealed glass package; axial leaded; 2 leads — SOD119AB



DIMENSIONS (mm are the original dimensions)

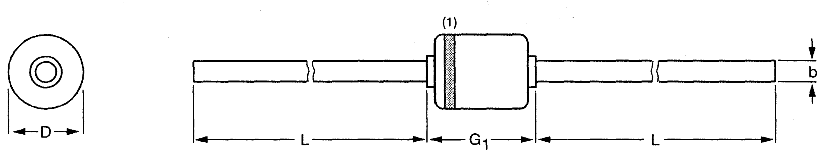
UNIT	b	D max.	G max.	L min.
mm	0.8	2.5	5.5	31.8

Note

1. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD119AB						98-12-04

Hermetically sealed glass package; axial leaded; 2 leads — SOD120



DIMENSIONS (mm are the original dimensions)

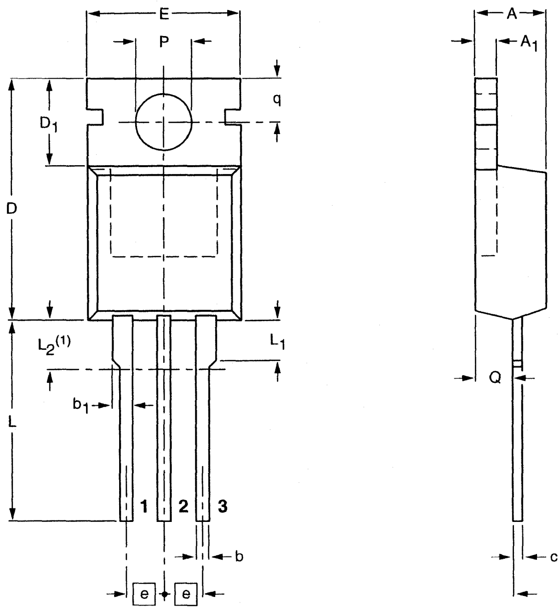
UNIT	b	D max.	G_1 max.	L min.
mm	0.6	2.15	3.0	28

Note

1. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD120						98-05-25

Plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB **SOT78**

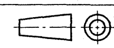


DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b	b_1	c	D	D_1	E	e	L	L_1	$L_2^{(1)}$ max.	P	q	Q
mm	4.5 4.1	1.39 1.27	0.9 0.7	1.3 1.0	0.7 0.4	15.8 15.2	6.4 5.9	10.3 9.7	2.54	15.0 13.5	3.30 2.79	3.0	3.8 3.6	3.0 2.7	2.6 2.2

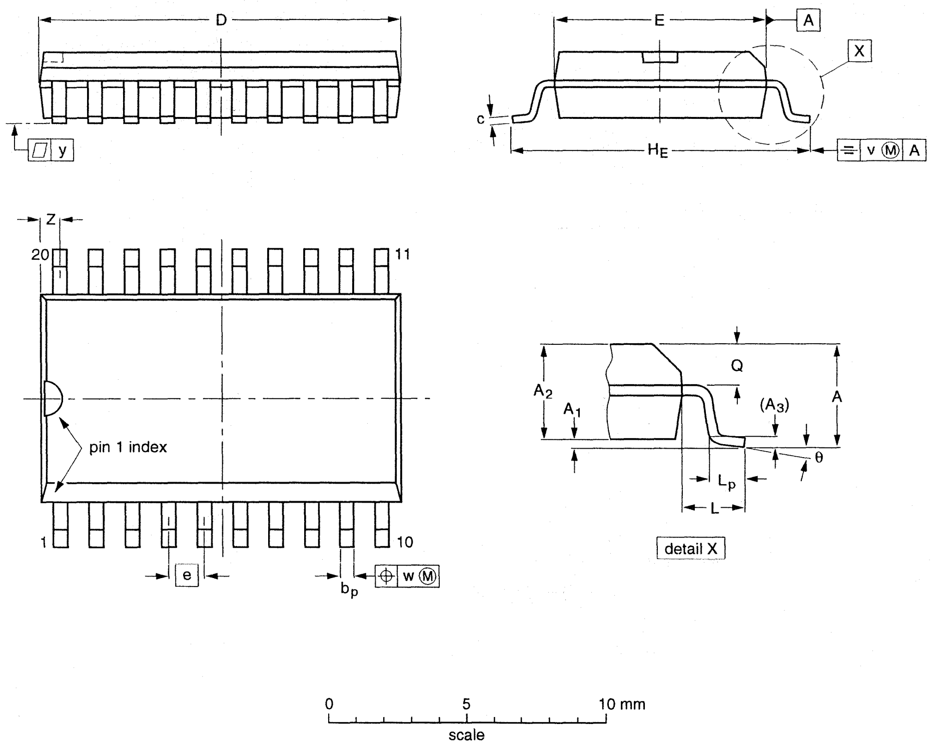
Note

1. Terminals in this zone are not tinned.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT78		TO-220AB				97-06-11

SO20: plastic small outline package; 20 leads; body width 7.5 mm

SOT163-1



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

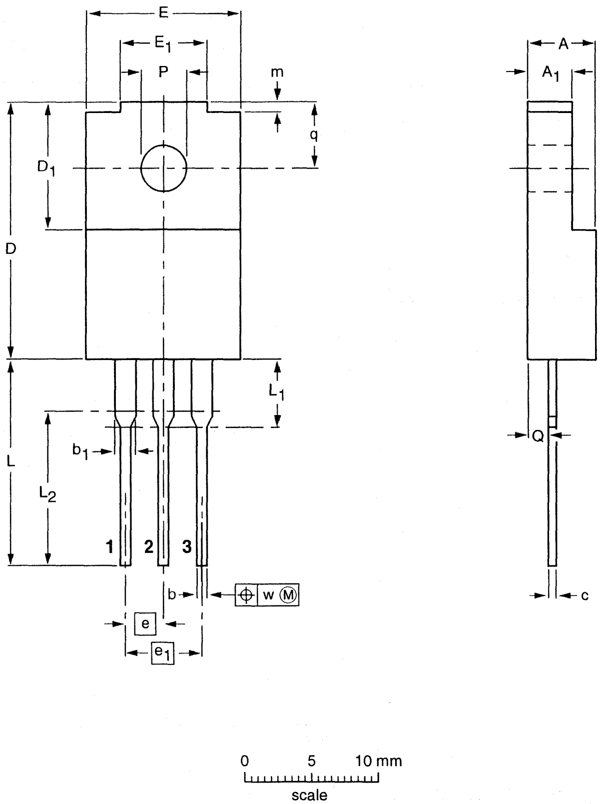
UNIT	A max.	A_1	A_2	A_3	b_p	c	D[(1)]	E[(1)]	e	H_E	L	L_p	Q	v	w	y	Z[(1)]	θ
mm	2.65	0.30 0.10	2.45 2.25	0.25	0.49 0.36	0.32 0.23	13.0 12.6	7.6 7.4	1.27	10.65 10.00	1.4	1.1 0.4	1.1 1.0	0.25	0.25	0.1	0.9 0.4	8° 0°
inches	0.10	0.012 0.004	0.096 0.089	0.01	0.019 0.014	0.013 0.009	0.51 0.49	0.30 0.29	0.050	0.419 0.394	0.055	0.043 0.016	0.043 0.039	0.01	0.01	0.004	0.035 0.016	

Note

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT163-1	075E04	MS-013AC				~~95-01-24~~ 97-05-22

Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3 lead TO-220 exposed tabs **SOT186**



DIMENSIONS (mm are the original dimensions)

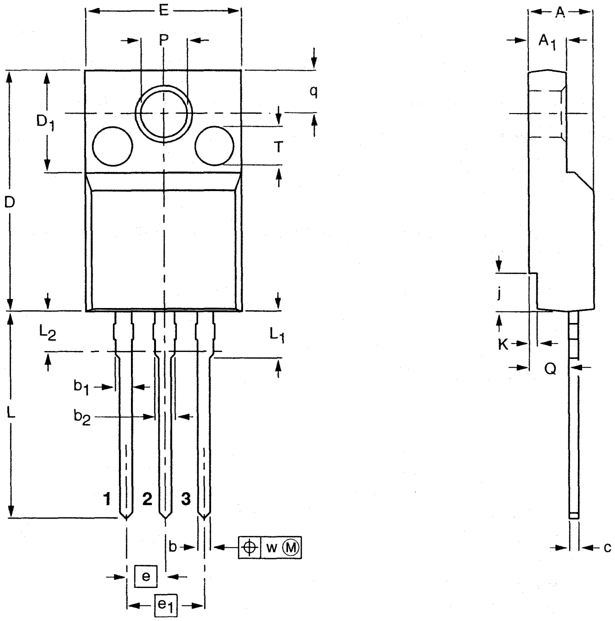
UNIT	A	A_1	b	b_1	c	D	D_1	E	E_1	e	e_1	L	$L_1^{(1)}$	L_2	m	P	Q	q	w
mm	4.4 4.0	2.9 2.5	0.9 0.7	1.5 1.3	0.55 0.38	17.0 16.4	7.9 7.5	10.2 9.6	5.7 5.3	2.54	5.08	14.3 13.5	4.8 4.0	10	0.9 0.5	3.2 3.0	1.4 1.2	4.4 4.0	0.4

Note

1. Terminal dimensions within this zone are uncontrolled. Terminals in this zone are not tinned.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT186		TO-220				97-06-11

Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3 lead TO-220 **SOT186A**

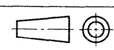


DIMENSIONS (mm are the original dimensions)

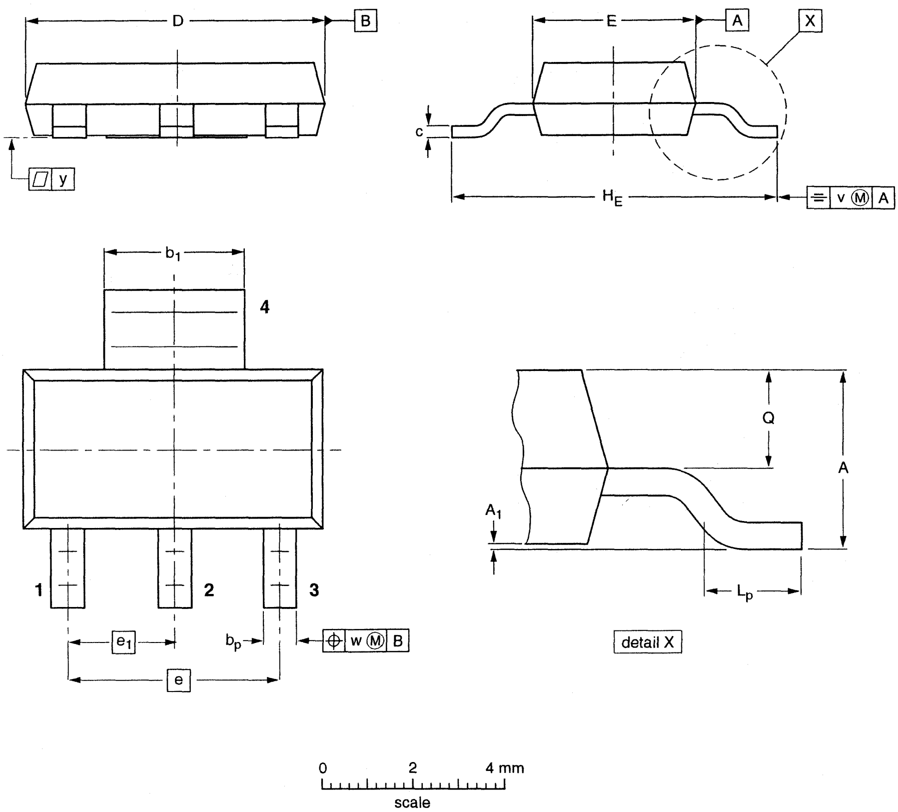
UNIT	A	A_1	b	b_1	b_2	c	D	D_1	E	e	e_1	j	K	L	L_1	$L_2^{(1)}$ max.	P	Q	q	$T^{(2)}$	w
mm	4.6 4.0	2.9 2.5	0.9 0.7	1.1 0.9	1.4 1.2	0.7 0.4	15.8 15.2	6.5 6.3	10.3 9.7	2.54	5.08	2.7 2.3	0.6 0.4	14.4 13.5	3.30 2.79	3	3.2 3.0	2.6 2.3	3.0 2.6	2.5	0.4

Notes

1. Terminal dimensions within this zone are uncontrolled. Terminals in this zone are not tinned.
2. Both recesses are ∅ 2.5 × 0.8 max. depth

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT186A		TO-220				97-06-11

Plastic surface mounted package; collector pad for good heat transfer; 4 leads **SOT223**

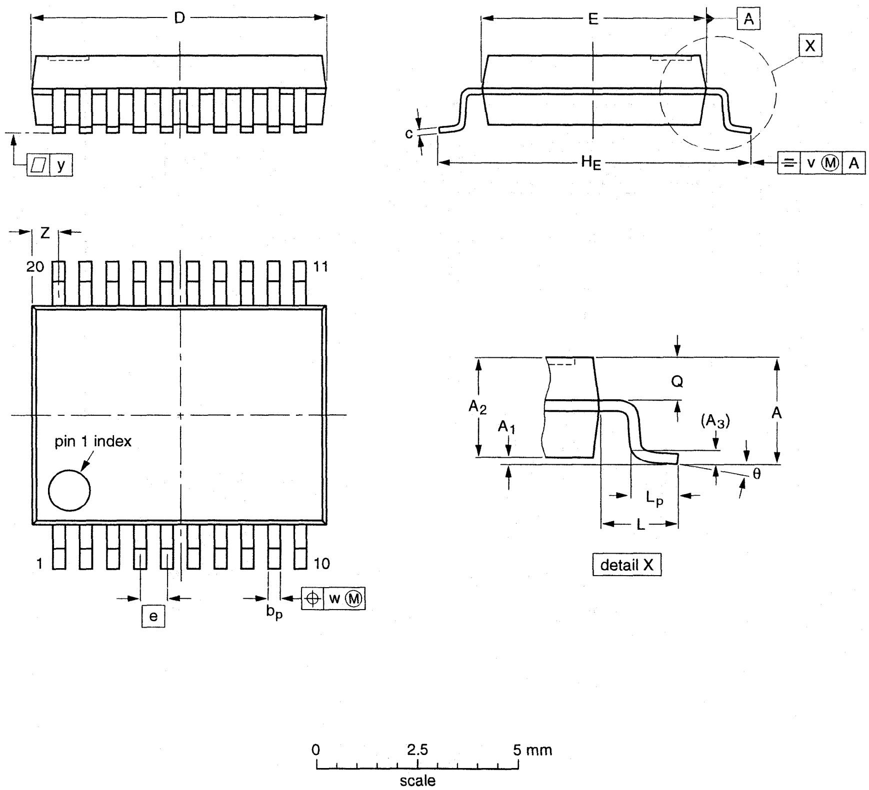


DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b_p	b_1	c	D	E	e	e_1	H_E	L_p	Q	v	w	y
mm	1.8 1.5	0.10 0.01	0.80 0.60	3.1 2.9	0.32 0.22	6.7 6.3	3.7 3.3	4.6	2.3	7.3 6.7	1.1 0.7	0.95 0.85	0.2	0.1	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT223						~~96-11-11~~ 97-02-28

SSOP20: plastic shrink small outline package; 20 leads; body width 5.3 mm — SOT339-1



DIMENSIONS (mm are the original dimensions)

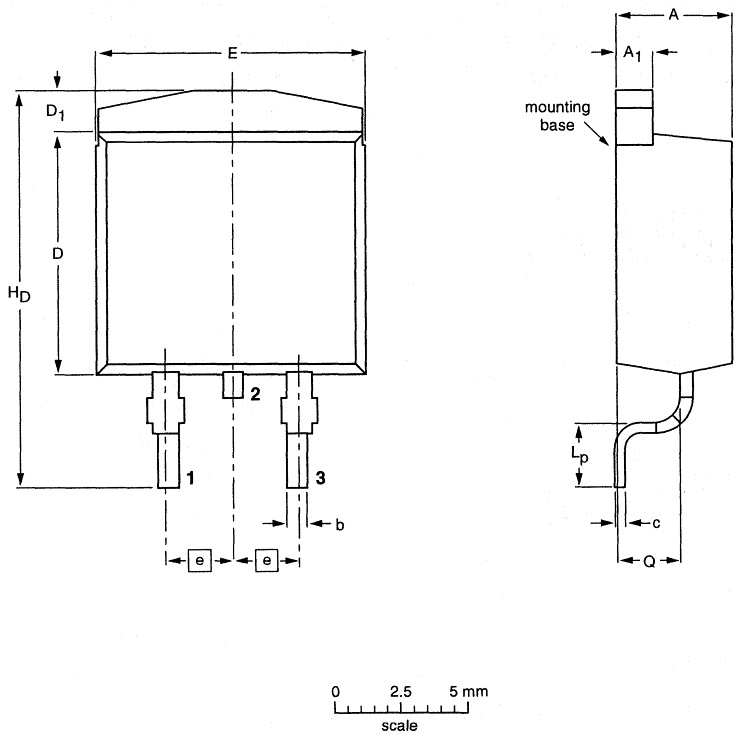
UNIT	A max.	A_1	A_2	A_3	b_p	c	D[1]	E[1]	e	H_E	L	L_p	Q	v	w	y	Z[1]	θ
mm	2.0	0.21 0.05	1.80 1.65	0.25	0.38 0.25	0.20 0.09	7.4 7.0	5.4 5.2	0.65	7.9 7.6	1.25	1.03 0.63	0.9 0.7	0.2	0.13	0.1	0.9 0.5	8° 0°

Note

1. Plastic or metal protrusions of 0.20 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT339-1		MO-150AE				~~93-09-08~~ 95-02-04

Plastic single-ended surface mounted package (Philips version of D2-PAK); 3 leads (one lead cropped) **SOT404**

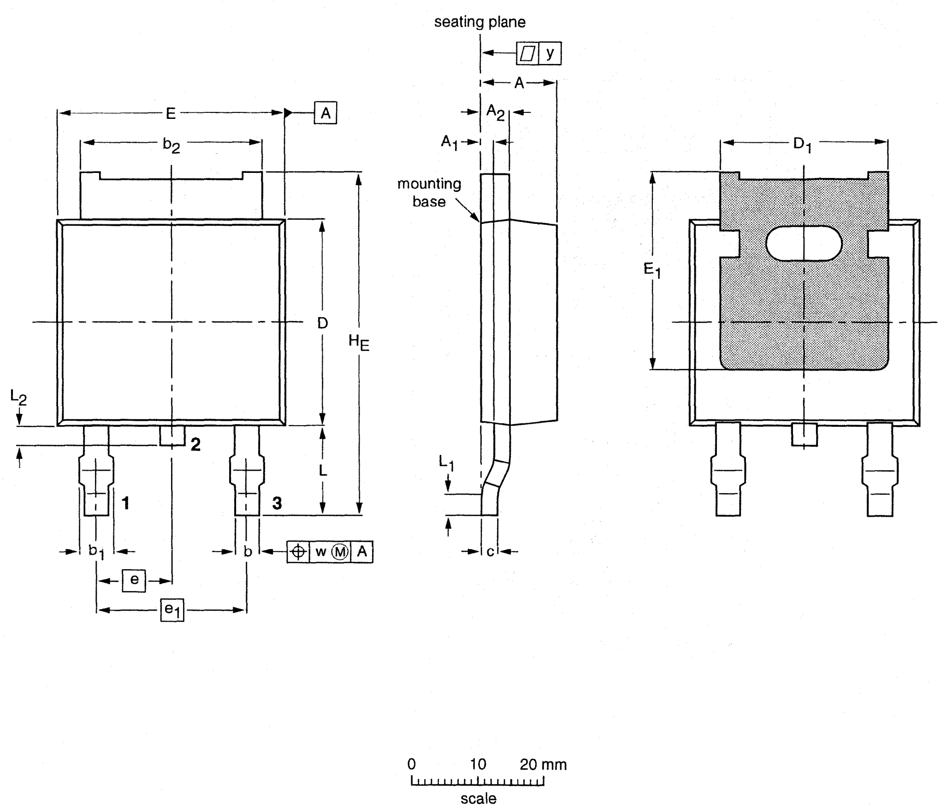


DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b	c	D	D_1	E	e	L_p	H_D	Q
mm	4.5 4.1	1.40 1.27	0.85 0.60	0.64 0.46	9.65 8.65	1.6 1.2	10.3 9.7	2.54	2.9 2.1	15.4 14.8	2.60 2.20

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT404						98-11-23

Plastic single-ended surface mounted package (Philips version of D-PAK); 3 leads (one lead cropped) — SOT428



DIMENSIONS (mm are the original dimensions)

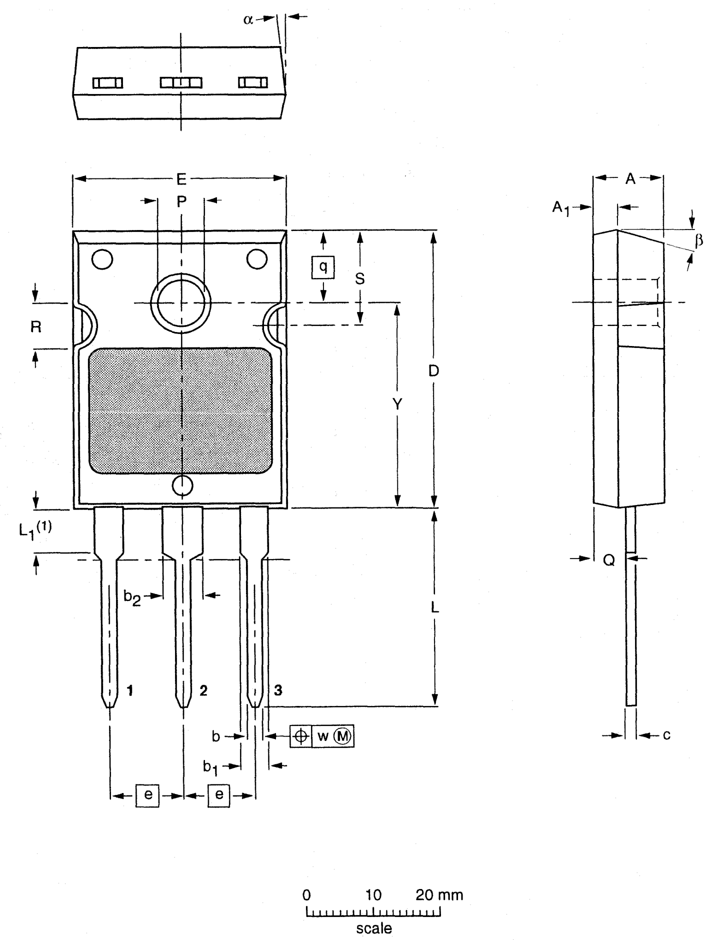
UNIT	A max.	A_1(1)	A_2	b	b_1 max.	b_2	c	D max.	D_1 max.	E max.	E_1 min.	e	e_1	H_E max.	L	L_1 min.	L_2	w	y max.
mm	2.38 2.22	0.65 0.45	0.89 0.71	0.89 0.71	1.1 0.9	5.36 5.26	0.4 0.2	6.22 5.98	4.81 4.45	6.73 6.47	4.0	2.285	4.57	10.4 9.6	2.95 2.55	0.5	0.7 0.5	0.2	0.2

Note

1. Measured from heatsink back to lead.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT428						98-04-07

Plastic single-ended through-hole package; heatsink mounted; 1 mounting hole; 3-lead TO-247 **SOT429**



DIMENSIONS (mm are the original dimensions)

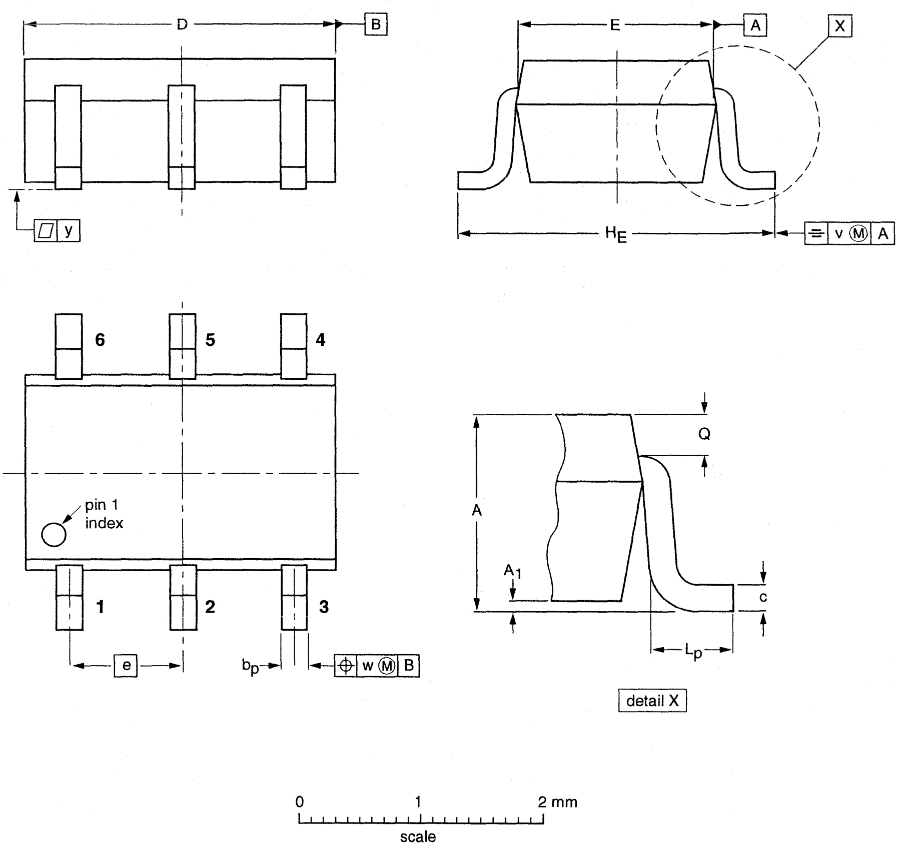
UNIT	A	A_1	b	b_1	b_2	c	D	E	e	L	L_1[(1)]	P	Q	q	R	S	w	Y	α	β
mm	5.3 4.7	1.9 1.7	1.2 0.9	2.2 1.8	3.2 2.8	0.9 0.6	21 20	16 15	5.45	16 15	4.0 3.6	3.7 3.3	2.6 2.4	5.3	3.5 3.3	7.5 7.1	0.4	15.7 15.3	6° 4°	17° 13°

Note

1. Tinning of terminals are uncontrolled within zone L_1.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT429		TO-247				98-04-07

Plastic surface mounted package; 6 leads **SOT457**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b_p	c	D	E	e	H_E	L_p	Q	v	w	y
mm	1.1 0.9	0.1 0.013	0.40 0.25	0.26 0.10	3.1 2.7	1.7 1.3	0.95	3.0 2.5	0.6 0.2	0.33 0.23	0.2	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT457			SC-74			97-02-28

MOUNTING AND SOLDERING INSTRUCTIONS

MOUNTING AND SOLDERING INSTRUCTIONS

Philips Semiconductors also maintains product information on the World-Wide-Web.
Our home page can be located at:

http://www.semiconductors.philips.com

GENERAL DATA AND INSTRUCTIONS FOR SOD59, SOD100, SOD113, TO220AB (SOT78), SOT186, SOT186

General rules

1. Fasten the device to the heatsink before soldering the leads.
2. Avoid stress to the leads.
3. Keep mounting tool (e.g. screwdriver) clear of the plastic body.
4. The rectangular washer may only touch the plastic part of the body; it should not exert any force on that part (screw mounting).

Mounting methods

CLIP MOUNTING

Mounting by means of spring clip offers:

1. A good thermal contact under the crystal area, and slightly lower thermal resistance than screw mounting.
2. Safe insulation for mains operation.

Minimum force for good heat transfer is 10 N.

Maximum force to avoid damaging the device is 80 N.

M3 SCREW MOUNTING

It is recommended that the rectangular spacing washer is inserted between screw head and mounting tab.

Do not use self-tapping screws.

Mounting torque for screw mounting:

For thread-forming screws these are final values.

Minimum torque for good heat transfer is 0.55 Nm.

Maximum torque to avoid damaging the device is 0.80 Nm.

When a nut or screw is driven directly against the tab, the torques are as follows:

Minimum torque for good heat transfer is 0.40 Nm.

Maximum torque to avoid damaging the device is 0.60 Nm.

RIVET MOUNTING NON-INSULATED

The device should not be pop-riveted to the heatsink. It is permissible to press-rivet the metal tab providing that eyelet rivets of soft material are used, and the press forces are slowly and carefully controlled.

This method is not permitted for full-pack envelopes because it will damage the plastic encapsulation.

Heatsink requirements

Flatness in the mounting area: 0.02 mm maximum per 10 mm. Mounting holes must be deburred, for further information see clip and screw mounting instructions.

Heatsink compound

The thermal resistance from mounting base to heatsink ($R_{th\ mb-h}$) can be reduced by applying a metallic oxide compound between the contact surfaces. Values given in the following table are of thermal resistance using this type of compound. Dow Corning 340 Heat sink compound is recommended. For insulated mounting, the compound should be applied to the bottom of both device and insulator.

Thermal data for heatsink mounting methods (SOD59 and SOT78)

Typical figures, for exact figures see data for each device type. Additional insulators are generally not required when mounting the full-pack (SOD100, SOD113, SOT186, and SOT186A) outlines.

$R_{th\ mb\text{-}h}$	Thermal resistance from mounting base to heatsink	K/W	
Mounting method		Clip	Screw
direct with heatsink compound		0.3	0.5
direct without heatsink compound		1.4	1.4
with heatsink compound and 0.1 mm maximum mica insulator		2.2	–
with heatsink compound and 0.25 mm maximum alumina insulator		0.8	–
with heatsink compound and 0.05 mm mica insulator			
insulated up to 500 V		–	1.4
insulated up to 800 V/1000 V		–	1.6
without heatsink compound and 0.05 mm mica insulator			
insulated up to 500 V		–	3.0
insulated up to 800 V/1000 V		–	4.5

Soldering

Recommendation for devices with a maximum junction temperature rating ≤175 °C:

DIP OR WAVE SOLDERING

Maximum permissible solder temperature is 260 °C at a distance from the body of >5 mm and for a total contact time with soldering bath or waves of <7 s.

HAND SOLDERING

Maximum permissible temperature is 275 °C at a distance from the body of >3 mm and for a total contact time with the soldering iron of <5 s.

The body of the device must not touch anything with a temperature >200 °C.

It is not permitted to solder the metal tab of the device to a heatsink, otherwise the junction temperature rating will be exceeded.

Avoid any force on body and leads during or after soldering; do not correct the position of the device or of its leads after soldering.

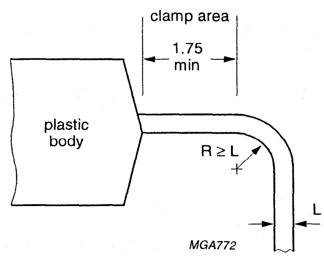
Lead bending

Maximum permissible tensile force on the body for 5 seconds is 20 N.

The leads can be bent, twisted or straightened. To keep forces within the above mentioned limits the leads should always be clamped rigidly near the body during bending. This is also to prevent damage to the seal of the leads within the plastic body.

Leads can be bent as near to the body as required, but adequate length should always be allowed for clamping. This is a minimum of 1.75 mm from the body to the start of a bend radius.

The internal radius of bend should never be less than the thickness of the lead. A minimum radius of at least 1.5 × lead thickness is preferred. See Fig.1. Surface cracks in the dip tin coating on the lead are common when a radius less than 1.5 × lead thickness is used. Although exposing the copper material, these cracks do not affect the mechanical strength of the lead. Lead forming by Philips is available as an option on all products supplied in these outlines.

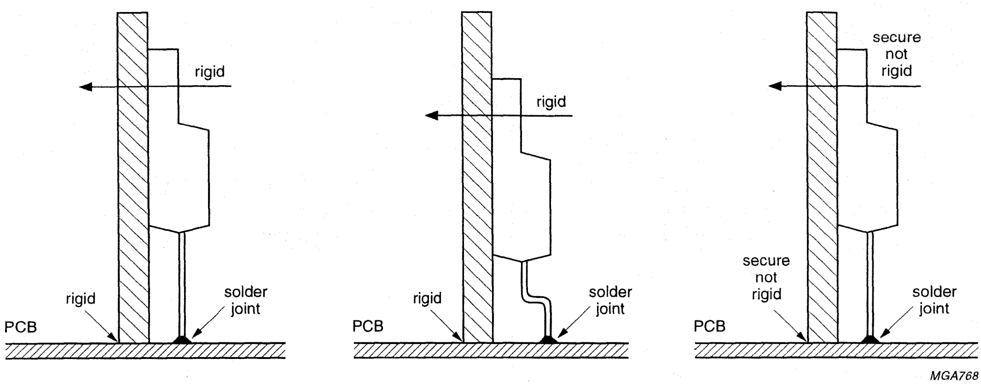


Dimensions in mm.

Fig.1 Minimum lead bend radius.

Additional guide-lines

It is recommended that where a device is rigidly secured to a heatsink which is in turn rigidly secured to a PCB, that a bend is put in the leads to act as an expansion loop. This will prevent differential expansion of the mounting parts transferring stress to the soldering joint, as shown in Fig.2. This is only necessary where the device is mounted so rigidly that expansion forces are transmitted through the assembly.



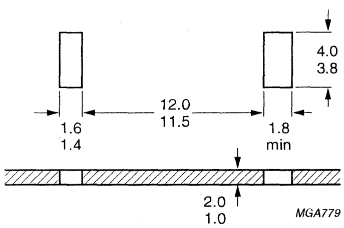
(a) **Incorrect** **(b) Correct** (c) **Correct**

Fig.2 Printed circuit board and heatsink mounting.

INSTRUCTIONS FOR CLIP MOUNTING

Direct mounting with clip

1. Apply heatsink compound to the mounting base, then place the device on the heatsink.
2. Push the short end of the clip into the narrow slot in the heatsink with the clip at an angle of 10° to 30° to the vertical. See Figs.3 and 4.
3. Push down the clip over the device until the long end of the clip snaps into the wide slot in the heatsink. The clip should bear on the plastic body, not on the tab. See Fig.5.



Dimensions in mm.

Fig.3 Heatsink requirements.

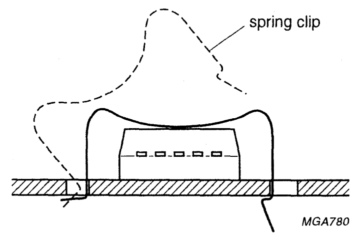


Fig.4 Mounting.

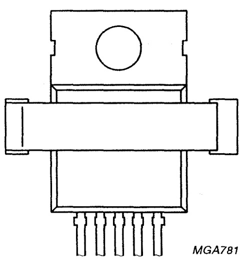
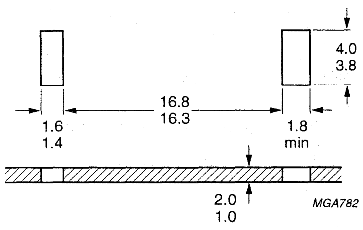


Fig.5 Position of device (top view).

Insulated mounting with clip

With the insulators up to 2 kV insulation is obtained.

1. Apply heatsink compound to the bottom of both device and insulator, then place the device with the insulator on the heatsink.
2. Push the short end of the clip into the narrow slot in the heatsink with the clip at an angle of 10° to 30° to the vertical. See Figs 6, 7 and 8.
3. Push down the clip over the device until the long end of the clip snaps into the wide slot in the heatsink. The clip should bear on the plastic body, not on the tab. Ensure that the device is centred on the mica insulator to prevent unwanted movement.



Dimensions in mm.

Fig.6 Heatsink requirements.

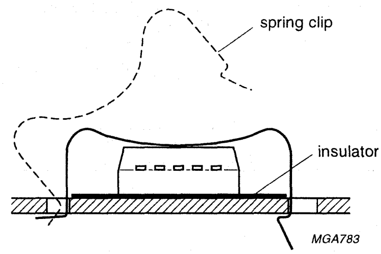


Fig.7 Mounting.

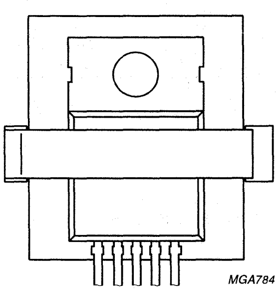


Fig.8 Position of device (top view).

INSTRUCTIONS FOR SCREW MOUNTING

Direct mounting with screw and spacing washer

THROUGH HEATSINK WITH NUT

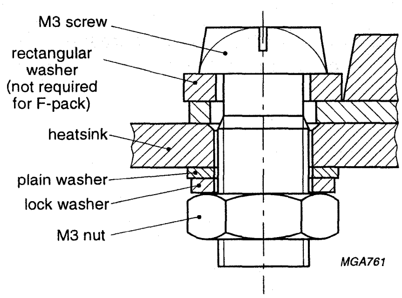
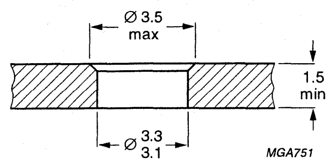


Fig.9 Assembly.



Dimensions in mm.

Fig.10 Heatsink requirements.

INTO TAPPED HEATSINK

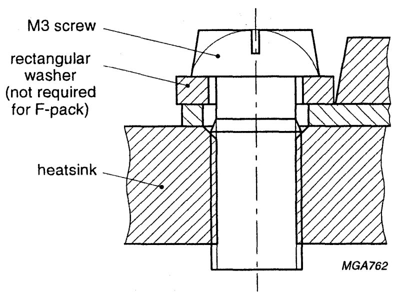
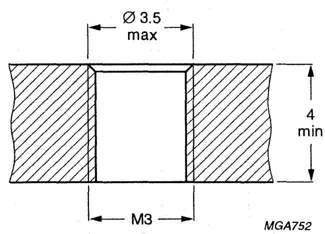


Fig.11 Assembly.



Dimensions in mm.

Fig.12 Heatsink requirements.

Insulated mounting with screw and spacing washer

Not recommended where mounting tab is on mains voltage. Not applicable for F-pack.

THROUGH HEATSINK WITH NUT

Known as a 'bottom mounting'.

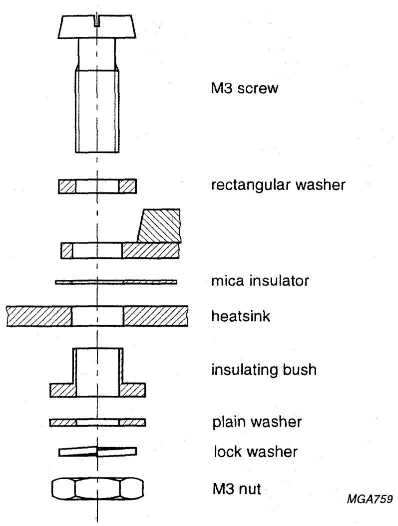
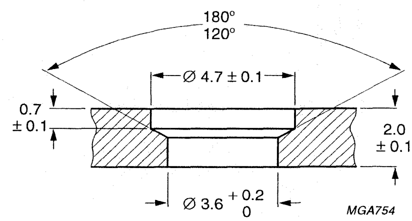


Fig.13 Insulated screw mounting with rectangular washer.



Dimension in mm.

Fig.14 Heatsink requirements for 500 V insulation.

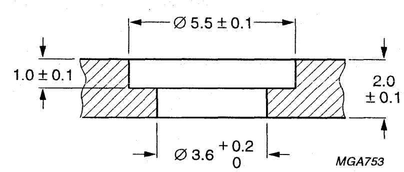


Fig.15 Heatsink requirements for 800 V insulation.

INTO TAPPED HEATSINK

Known as a ‘top mounting’.

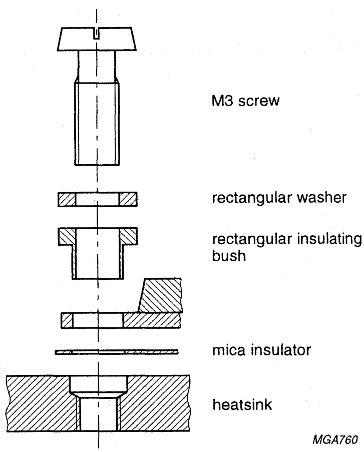
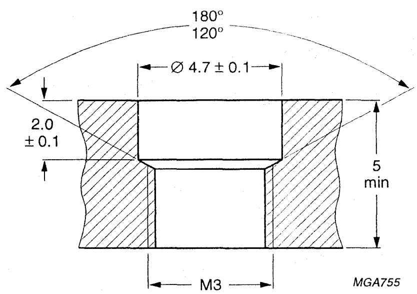
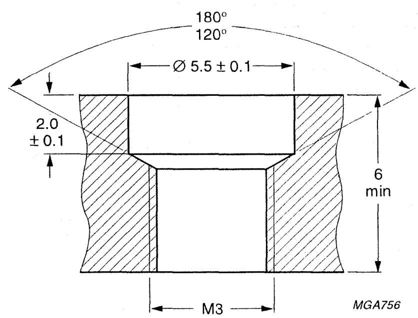


Fig.16 Insulated screw mounting with rectangular washer into tapped heatsink.



Dimension in mm.

Fig.17 Heatsink requirements for 500 V insulation.



Dimension in mm.

Fig.18 Heatsink requirements for 1 000 V insulation.

GENERAL DATA AND INSTRUCTIONS FOR SOT223; SOT428; SOT404

Scope

This chapter summarises important data and recommendations for using power semiconductors in the SOT223, SOT428 and SOT404 envelopes. Please refer to Data Handbook SC18 for a more detailed analysis of placing, soldering and reworking surface mounted components. The References section at the end of this chapter list this and other Philips publications on the subject of surface mounted power semiconductors.

SOT223

The SOT223 envelope is optimized for low cost, high volume, surface mounted assembly. It is the easiest and most versatile power package to surface mount because it is the only one that can either be wave or reflow soldered. This is advantageous when there is a mixture of through-hole mounted and surface mounted components on the PCB, because wave soldering can safely be used to solder both component types in a single soldering process.

The design of the package means that all solder joints remain exposed on its periphery after assembly. This is the reason why wave soldering can be used. It also means that the joints can be visually inspected for quality. SOT223 is supplied on 180 mm x 12 mm or 330 mm x 12 mm reels for use with high speed pick-and-place machines. The device quantities per reel are 1000 and 4000 respectively.

Thermal management

Most of the heat generated in the die is conducted along the main central tab at the top of the package. A little will also be conducted along the centre leg which is electrically connected to the main tab. A very small proportion of the heat will be conducted down the two outer legs. The main PCB pad must conduct the heat away from the device; the larger the pad area, the higher the permitted power dissipation.

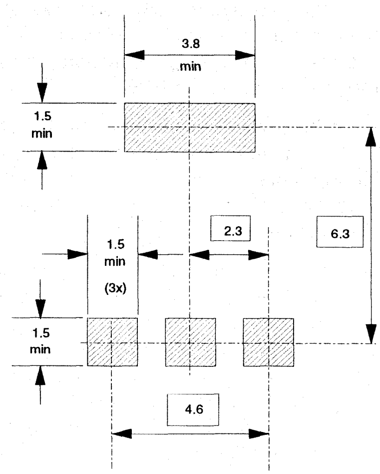
As the assembly heats and cools during operation, there will be relative movement between the PCB and device due to differing coefficients of expansion between the printed circuit board and the device, as is common when using low cost glass/epoxy or paper/epoxy substrates. The SOT223 leadform accommodates the thermal expansion stresses, thus minimising the risk of fatigue fracture of the solder joints and stress fracture of the die.

Thermal data for various PCB arrangements

For SOT223 we always quote the junction-to-solder point thermal resistance ($R_{th\ j\text{-}sp}$) because it is an accurately defined parameter which is easy to measure. As its name implies, the solder point is the point on the copper pad at the edge of the device tab. We also quote junction-to-ambient thermal resistance ($R_{th\ j\text{-}a}$) for different PCB arrangements.

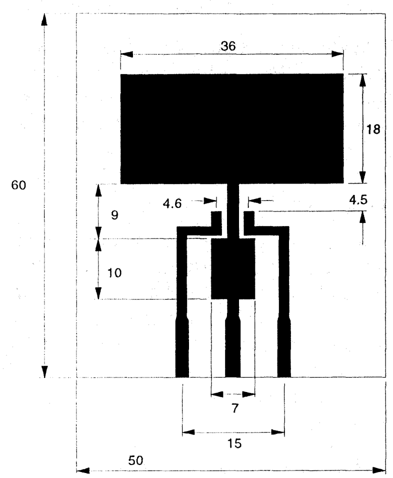
Because the $R_{th\ j\text{-}sp}$ and $R_{th\ j\text{-}a}$ values are much greater than the internal thermal resistance between the junction and copper leadframe, they tend to mask any small variations that might occur in this internal thermal resistance from one device type to another. Therefore the thermal resistances effectively remain the same for all of our power semiconductors in SOT223. These are shown in the table below.

$R_{th\ j\text{-}sp}$	**Thermal resistance from junction to solder point**	**K/W**
		15 max.
$R_{th\ j\text{-}a}$	**Thermal resistance from junction to ambient**	**K/W**
FR4 glass-epoxy board, 1.6 mm thick, minimum footprint as in Fig.19		156 typ.
FR4 glass-epoxy board, 1.6 mm thick, pad area as in Fig.20		70 typ.



Dimensions in mm.

Fig.19 SOT223 minimum footprint.



Dimensions in mm.
PCB: FR4 epoxy glass 1.6 mm thick; copper laminate 35 µm thick.

Fig.20 PCB for thermal resistance and power rating for SOT223.

SOT428

SOT428 is Philips' version of DPAK. This outline occupies an area on the PCB which is similar to that occupied by SOT223; it can be soldered to a common SOT223/SOT428 pad layout. However, unlike SOT223, SOT428 has a metal base which is soldered directly to the PCB. This forms the "centre leg connection", since there is no centre leg to connect to the PCB.

The design of the package means that the solder joint remains hidden underneath the device after assembly. A reflow soldering process must be used. Wave soldering is unsuitable because it is not guaranteed to heat the joint sufficiently to achieve full wetting of the joint.

The amount of solder paste on the mounting base land must be carefully controlled because an excess will cause the device top edge to rise up and float on a meniscus of solder. Conversely, too little solder will result in an imperfect joint with voids. Both faults will increase the thermal resistance. Furthermore, a defect, especially too little solder, might not be visible after soldering since it will be hidden underneath the device.

SOT428 is supplied on 330 mm x 24 mm reels for use with high speed pick-and-place machines. The device quantity per reel is 2500.

Thermal management

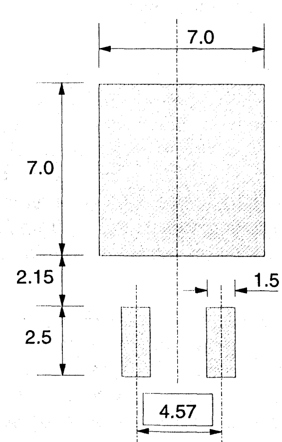
The SOT428 envelope is designed to minimise the thermal resistance between the die and the printed circuit board, enabling more power to be dissipated. Heat generated in the die is extracted across the copper header to the PCB pad underneath the device. Because of the low thermal resistance between the junction and the main PCB pad, relatively little heat will be extracted down the two leads to the small PCB pads.

In order to achieve optimum power dissipation from such a small power package, the SOT428 needs to be used in conjunction with a circuit board material and a heatsink capable of conducting heat away efficiently from the mounting base of the device.

Thermal data for various PCB arrangements

For SOT428 we quote the junction-to-mounting base thermal resistance ($R_{th\ j\text{-}mb}$). This is inherently a low figure which will vary according to which die is housed within the package. $R_{th\ j\text{-}mb}$ data is therefore quoted separately for each SOT428 device. We also quote junction-to-ambient thermal resistance ($R_{th\ j\text{-}a}$) for PCB mounting. This is shown in the table below.

$R_{th\ j\text{-}a}$	Thermal resistance from junction to ambient	K/W
FR4 glass-epoxy board, 1.6 mm thick, minimum footprint as in Fig.21		75 typ.



Dimensions in mm.

Fig.21 SOT428 minimum footprint.

SOT404

SOT404 is Philips' version of D^2PAK. It is the same size and shape as a SOT78 (TO220) package, but it has no tab and its three leads are formed for surface mounting. Despite its similarity to SOT78, it is manufactured differently. A different leadframe without a tab is used. Also, unlike SOT78, all exposed metal surfaces are lead tin plated for good solderability.

The design of the package means that the solder joint remains hidden underneath the device after assembly. A reflow soldering process must be used. Wave soldering is unsuitable because it is not guaranteed to heat the joint sufficiently to achieve full wetting of the joint.

The amount of solder paste on the mounting base land must be carefully controlled because an excess will cause the device top edge to rise up and float on a meniscus of solder. Conversely, too little solder will result in an imperfect joint with voids. Both faults will increase the thermal resistance. Furthermore, a defect, especially too little solder, might not be visible after soldering since it will be hidden underneath the device.

SOT404 is supplied on 330 mm x 24 mm reels for use with high speed pick-and-place machines. The device quantity per reel is 800.

Thermal Management

Inside the SOT404 envelope, the die is bonded to a large copper header which conducts the heat from the chip directly to the main pad on the printed circuit board. SOT404 has the same thermal resistance as SOT78 and hence can handle the same power. However, in order to dissipate the same power as a well heatsunk SOT78 package, the printed circuit substrate material and the copper traces must conduct heat away efficiently from the mounting base to a heatsink.

Thermal data for various PCB arrangements

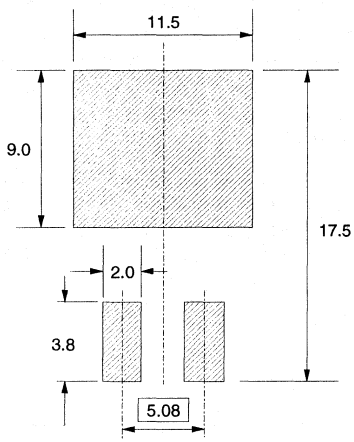
For SOT404 we quote the junction-to-mounting base thermal resistance ($R_{th\ j\text{-}mb}$). This is inherently a low figure due to the envelope design. It will vary according to which die is housed inside, so it is quoted separately for each SOT404 device. We also quote junction-to-ambient thermal resistance ($R_{th\ j\text{-}a}$) for PCB mounting. This is shown in the following table.

Also shown in the table is mounting base-to-heatsink thermal resistance ($R_{th\ mb\text{-}h}$) for different printed circuit board substrate materials. The figures are representative of a single-sided PCB measuring 60 mm x 40 mm, with the surface mounted power components and copper traces on the top side. The board is fastened to a heatsink with machine screws and a layer of heatsink compound, or a thermally conducting pad is placed between the printed circuit board and the heatsink to improve thermal contact.

The figures are typical only. The thermal resistance of individual designs will depend upon the overall size of the printed circuit board, the packing density of the power devices, and the width of the copper traces. The total junction-to-heatsink thermal resistance is obtained by adding the relevant $R_{th\ mb\text{-}h}$ figure to the $R_{th\ j\text{-}mb}$ value from the data sheet.

$R_{th\ j\text{-}a}$	**Thermal resistance from junction to ambient**	**K/W**
FR4 glass-epoxy board, 1.6 mm thick, minimum footprint as in Fig.22		55 typ.
$R_{th\ mb\text{-}h}$	**Thermal resistance from mounting base to heatsink**	**K/W**
FR4 glass-epoxy board, 1.6 mm thick; land size as in Fig.22		50 typ.
FR4 glass-epoxy board, 1.6 mm thick, 2.5 cm square mounting land		40 typ.
FR4 glass-epoxy board, 1.6 mm thick, land size as in Fig.22, with pattern of 18 x 0.5 mm dia plated through holes filled with solder		8 typ.
FR4 glass-epoxy board, 0.8 mm thick, land size as in Fig.22, with pattern of 18 x 0.5 mm dia plated through holes filled with solder		4 typ.
Alumina substrate, 0.8 mm thick, land size as in Fig.22		2 typ.
Aluminium clad substrate, 1.6 mm thick, land size as in Fig.22		1 typ.

Figure 22 shows the recommended land design for SOT404. When used in conjunction with a heatsink, increasing the dimensions of the mounting land will improve the thermal conduction between the mounting base and the heatsink.



Dimensions in mm.

Fig.22 SOT404 minimum footprint.

References

1. Data Handbook SC18 - Discrete Semiconductor Packages.

   Issued 1997. Order code: 9397 750 02418.

2. Product Application Information - Surface Mounted Triacs and Thyristors.

   Issued 1997. Order code: 9397 750 02622.

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LEADFORM OPTIONS

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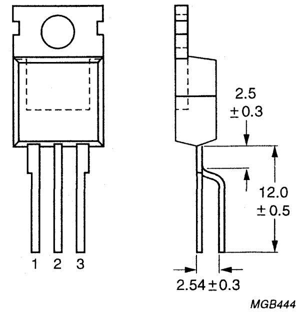
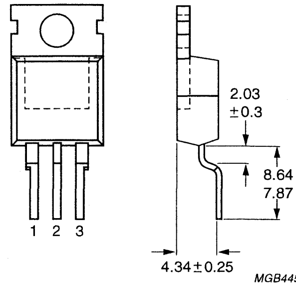


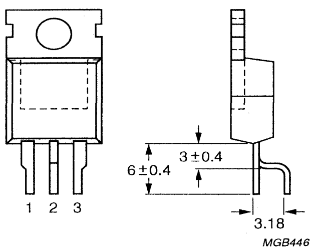
SOT78 (TO-220)

Fig.1 Leadform 78-02.



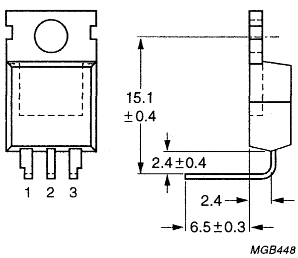
SOT78 (TO-220)

Fig.2 Leadform 78-05W.



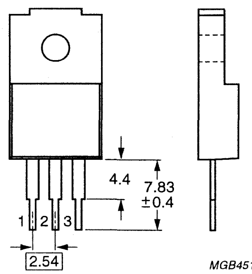
SOT78 (TO-220)

Fig.3 Leadform 78-13.



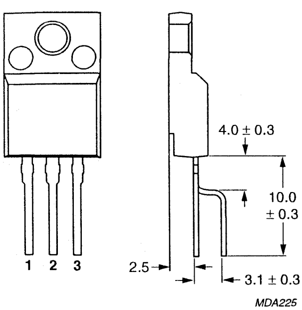
SOT78 (TO-220)

Fig.4 Leadform 78-15.



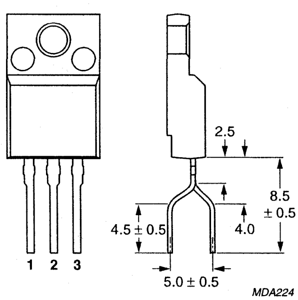
SOT186

Fig.5 Leadform 186-02.



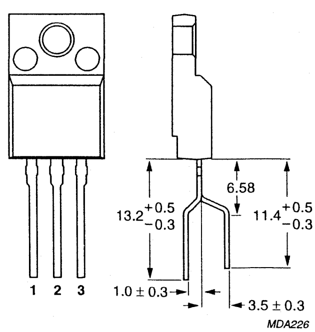
SOT186

Fig.6 Leadform 186A-02.



SOT186

Fig.7 Leadform 186A-03.



SOT186

Fig.8 Leadform 186A-04.

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