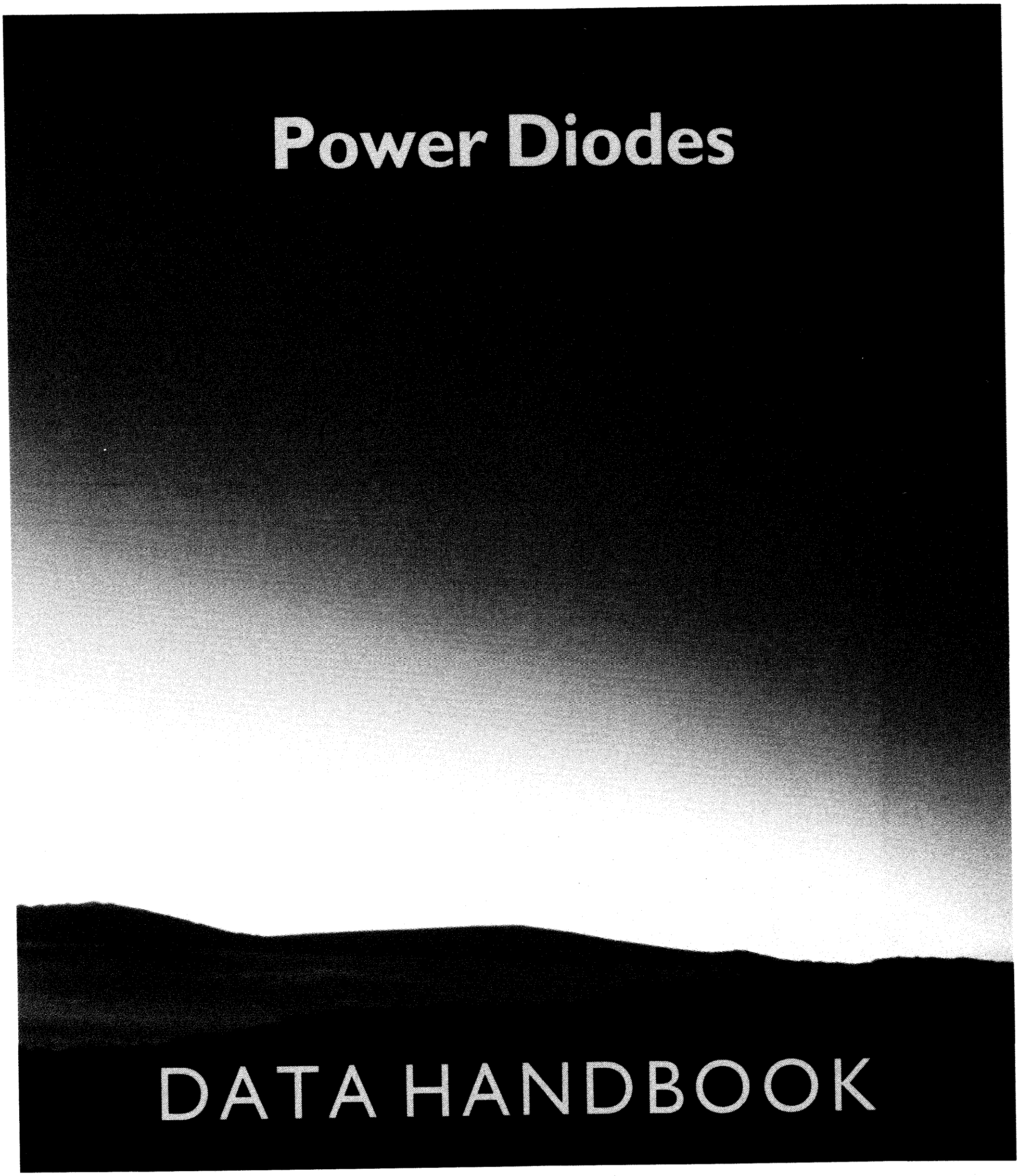
Power Diodes

DATA HANDBOOK



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QUALITY ASSURED

Our quality system focuses on the continuing high quality of our components and the best possible service for our customers. We have a three-sided quality strategy: we apply a system of total quality control and assurance; we operate customer-oriented dynamic improvement programmes; and we promote a partnering relationship with our customers and suppliers.

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.

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SELECTION GUIDE

GENERAL PURPOSE DIODES

$I_{O(AV)}$ (A)	V_{RRM} (V)	V_F (V)	SINGLE/ DUAL	TYPE NUMBER	ENVELOPE
7	300 600	1.05 @ 5 A, 150˚C	SINGLE	BY249-300 BY249-600	TO220AC

SCHOTTKY DIODES

$I_{O(AV)}$ (A)	V_{RRM} (V)	V_F (V)	SINGLE/ DUAL	TYPE NUMBER	ENVELOPE
2	35 40 45	0.45 @ 1 A, 150˚C	DUAL	PBYR235CT PBYR240CT PBYR245CT	SOT223
7.5	35 40 45	0.57 @ 7.5 A, 125˚C	SINGLE	PBYR735 PBYR740 PBYR745	TO220AC
7.5	35 40 45	0.57 @ 7.5 A, 125˚C	SINGLE	PBYR735F PBYR740F PBYR745F	SOD100
10	35 40 45	0.6 @ 5 A, 150˚C	DUAL	BYV118-35 BYV118-40 BYV118-45	TO220AB
10	35 40 45	0.6 @ 5 A, 150˚C	DUAL	BYV118F-35 BYV118F-40 BYV118F-45	SOT186
10	35 40 45	0.6 @ 5 A, 150˚C	DUAL	PBYR635CT PBYR640CT PBYR645CT	SOT82
10	35 40 45	0.57 @ 10 A, 125˚C	SINGLE	PBYR1035 PBYR1040 PBYR1045	TO220AC
10	35 40 45	0.59 @ 10 A, 125˚C	SINGLE	PBYR1035F PBYR1040F PBYR1045F	SOD100
10	60 80 100	0.7 @ 10 A, 125˚C	SINGLE	PBYR1060 PBYR1080 PBYR10100	TO220AC
15	35 40 45	0.57 @ 7.5 A, 125˚C	DUAL	PBYR1535CT PBYR1540CT PBYR1545CT	TO220AB
15	35 40 45	0.57 @ 7.5 A, 125˚C	DUAL	PBYR1535CTF PBYR1540CTF PBYR1545CTF	SOT186
16	35 40 45	0.57 @ 16 A, 125˚C	SINGLE	PBYR1635 PBYR1640 PBYR1645	TO220AC
16	35 40 45	0.60 @ 16 A, 125˚C	SINGLE	PBYR1635F PBYR1640F PBYR1645F	SOD100

SCHOTTKY DIODES (CONT'D)

$I_{O(AV)}$ (A)	V_{RRM} (V)	V_F (V)	SINGLE/ DUAL	TYPE NUMBER	ENVELOPE
20	35 40 45	0.6 @ 7 A, 150°C	DUAL	BYV133-35 BYV133-40 BYV133-45	TO220AB
20	35 40 45	0.6 @ 7 A, 150°C	DUAL	BYV133F-35 BYV133F-40 BYV133F-45	SOT186
20	35 40 45	0.62 @ 15 A, 150°C	DUAL	BYV143F-35 BYV143F-40 BYV143F-45	SOT186
20	35 40 45	0.57 @ 10 A, 125°C	DUAL	PBYR2035CT PBYR2040CT PBYR2045CT	TO220AB
20	35 40 45	0.57 @ 10 A, 125°C	DUAL	PBYR2035CTF PBYR2040CTF PBYR2045CTF	SOT186
20	35 40 45	0.65 @ 20 A, 125°C	DUAL	PBYR2535CTF PBYR2540CTF PBYR2545CTF	SOT186
20	35 40 45	0.65 @ 20 A, 125°C	DUAL	PBYR3035PTF PBYR3040PTF PBYR3045PTF	SOT199
20	60 80 100	0.7 @ 10 A, 125°C	DUAL	PBYR2060CT PBYR2080CT PBYR20100CT	TO220AB
30	35 40 45	0.6 @ 15 A, 150°C	DUAL	BYV143-35 BYV143-40 BYV143-45	TO220AB
30	35 40 45	0.62 @ 20 A, 125°C	DUAL	PBYR2535CT PBYR2540CT PBYR2545CT	TO220AB
30	35 40 45	0.6 @ 20 A, 125°C	DUAL	PBYR3035PT PBYR3040PT PBYR3045PT	SOT93
30	60 80 100	0.7 @ 15 A, 125°C	DUAL	PBYR3060PT PBYR3080PT PBYR30100PT	SOT93

ULTRAFAST DIODES

$I_{F(AV)}$ (A)	V_{RRM} (V)	V_F (V)	t_{rr} (ns)	SINGLE/ DUAL	TYPE NUMBER	ENVELOPE
1.5	100 150 200	0.7 @ 0.5 A, 150˚C	25	DUAL	BYV40-100 BYV40-150 BYV40-200	SOT223
8	100 150 200	0.895 @ 8 A, 150˚C	25	SINGLE	BYW29-100 BYW29-150 BYW29-200	TO220AC
8	100 150 200	0.895 @ 8 A, 150˚C	25	SINGLE	BYW29E-100 BYW29E-150 BYW29E-200	TO220AC
8	100 150 200	0.895 @ 8 A, 150˚C	25	SINGLE	BYW29F-100 BYW29F-150 BYW29F-200	SOD100
8	500 600 700	1.5 @ 8 A, 150˚C	75	SINGLE	BYR29-500 BYR29-600 BYR29-700	TO220AC
8	500 600 700	1.5 @ 8 A, 150˚C	75	SINGLE	BYR29F-500 BYR29F-600 BYR29F-700	SOD100
9	300 400 500	1.05 @ 5 A, 150˚C	60	SINGLE	BYV29-300 BYV29-400 BYV29-500	TO220AC
9	300 400 500	1.05 @ 5 A, 150˚C	60	SINGLE	BYV29F-300 BYV29F-400 BYV29F-500	SOD100
10	100 150 200	0.895 @ 5 A, 150˚C	20	DUAL	BYQ28-100 BYQ28-150 BYQ28-200	TO220AB
10	100 150 200	0.895 @ 5 A, 150˚C	25	DUAL	BYQ28E-100 BYQ28E-150 BYQ28E-200	TO220AB
10	100 150 200	0.895 @ 5 A, 150˚C	20	DUAL	BYQ28F-100 BYQ28F-150 BYQ28F-200	SOT186
10	300 400 500	1.05 @ 5 A, 150˚C	60	DUAL	BYT28-300 BYT28-400 BYT28-500	TO220AB
12	100 150 200	0.85 @ 8 A, 150˚C	25	DUAL	BYV32F-100 BYV32F-150 BYV32F-200	SOT186

ULTRAFAST DIODES (CONT'D)

$I_{F(AV)}$ (A)	V_{RRM} (V)	V_F (V)	t_{rr} (ns)	SINGLE/ DUAL	TYPE NUMBER	ENVELOPE
14	100 150 200	0.90 @ 14 A, 150˚C	30	SINGLE	BYV79-100 BYV79-150 BYV79-200	TO220AC
14	100 150 200	0.90 @ 14 A, 150˚C	30	SINGLE	BYV79E-100 BYV79E-150 BYV79E-200	TO220AC
14	300 400 500	1.05 @ 15 A, 150˚C	60	DUAL	BYT79-300 BYT79-400 BYT79-500	TO220AB
20	100 150 200	0.85 @ 8 A, 150˚C	25	DUAL	BYV32-100 BYV32-150 BYV32-200	TO220AB
20	100 150 200	0.85 @ 8 A, 150˚C	25	DUAL	BYV32E-100 BYV32E-150 BYV32E-200	TO220AB
20	100 150 200	0.90 @ 15 A, 150˚C	28	DUAL	BYV72F-100 BYV72F-150 BYV72F-200	SOT199
20	300 400 500	0.93 @ 10 A, 150˚C	60	DUAL	BYV34-300 BYV34-400 BYV34-500	TO220AB
20	300 400 500	1.05 @ 15 A, 150˚C	60	DUAL	BYV74F-300 BYV74F-400 BYV74F-500	SOT199
30	100 150 200	0.85 @ 15 A, 150˚C	28	DUAL	BYV42-100 BYV42-150 BYV42-200	TO220AB
30	100 150 200	0.85 @ 15 A, 150˚C	28	DUAL	BYV42E-100 BYV42E-150 BYV42E-200	TO220AB
30	100 150 200	0.90 @ 15 A, 150˚C	28	DUAL	BYV72-100 BYV72-150 BYV72-200	SOT93
30	100 150 200	0.90 @ 15 A, 150˚C	28	DUAL	BYV72E-100 BYV72E-150 BYV72E-200	SOT93
30	300 400 500	1.05 @ 15 A, 150˚C	60	DUAL	BYV44-300 BYV44-400 BYV44-500	TO220AB
30	300 400 500	1.05 @ 15 A, 150˚C	60	DUAL	BYV74-300 BYV74-400 BYV74-500	SOT93

FAST DIODES

$I_{F(AV)}$ (A)	V_{RRM} (V)	V_F (V)	t_{rr} (ns)	SINGLE/ DUAL	TYPE NUMBER	ENVELOPE
8	200 400 600 800	1.85 @ 20 A, 25˚C	135	SINGLE	BY229-200 BY229-400 BY229-600 BY229-800	TO220AC
8	200 400 600 800	1.85 @ 20 A, 25˚C	135	SINGLE	BY229F-200 BY229F-400 BY229F-600 BY229F-800	SOD100
8	800 1000 1200	1.85 @ 20 A, 25˚C	135	SINGLE	BY329-800 BY329-1000 BY329-1200	TO220AC
10	1500	1.5 @ 10 A, 150˚C	600	SINGLE	BY359-1500	TO220AC
10	1500	1.5 @ 10 A, 150˚C	600	SINGLE	BY359F-1500	SOD100
10	1500	1.5 @ 10 A, 150˚C	600	SINGLE	BY359X-1500	SOD113
10	1500	1.2 @ 6.5 A, 125˚C	350	SINGLE	BY459-1500	TO220AC
10	1500	1.2 @ 6.5 A, 125˚C	350	SINGLE	BY459F-1500	SOD100

BREAKOVER DIODES

$V_{(BO)}$ (V)	I_H (mA)	I_{TSM} (A)	V_T (V)	SINGLE/ DUAL	TYPE NUMBER	ENVELOPE
100 120 140 160 180 200 220 240 260 280	150	40	2.5 @ 2 A, 25˚C	SINGLE	BR211-100 BR211-120 BR211-140 BR211-160 BR211-180 BR211-200 BR211-220 BR211-240 BR211-260 BR211-280	SOD84

INTRODUCTION

NEW PRODUCTS

Philips Semiconductors are working intensively on bringing new products to the market to meet the requirements of existing and new developing applications areas. These are the new products and technologies that appear for the first time in this data handbook.

100V SCHOTTKY DIODES

Low leakage, platinum barrier schottky diodes with low forward voltage drop and absence of stored charge, rated up to 100V. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. They are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important. Types: PBYR10100, PBYR20100CT, PBYR30100PT.

DEFLECTION DIODES

An improved and extended range of fast, high voltage rectifier diodes intended for use in television and multisync monitor deflection circuits up to 82 kHz. These devices feature fast forward recovery time and low forward recovery voltage. Types: BY359-1500, BY359F-1500, BY359X-1500, BY459-1500, BY459F-1500.

RUGGED 200V DIODES

A range of 200V, ultra fast recovery diodes with guaranteed reverse surge capability. Features include low forward voltage drop, ultra-fast recovery time and soft recovery characteristic. Intended for use in switched mode power supples. Types: BYQ28E, BYV32E, BYV42E, BYV72E, BYV79E, BYW29E.

SURFACE MOUNT POWER DIODES

A low voltage, dual schottky diode and a 200V, dual ultrafast diode now available in a SOT223 envelope suitable for surface mounting. Types: PBYR245CT, BYV40.

PRELIMINARY INFORMATION - LOW VOLTAGE (25V) SCHOTTKY DIODES

A range of low voltage schottky diodes rated at up to 25 V, featuring extremely low forward voltage and ultra fast switching. These products are intended for use in switched mode power supply designs in low voltage applications, (e.g. 3.0/3.3 V outputs) and will appear in the next edition of this data handbook. Contact your Regional or National Sales Office for further details. Types: PBYR1025, PBYR1525CT, PBYR2025CT.

APPLICATIONS

Application information for Power Diodes and other Philips power products is published in Philips Power Semiconductor Applications Handbook. (Order code: 9398-651-40011)

POWER DIODE CHARACTERISTICS

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} = 150V) 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 efficiencies 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.

These values are chosen by the device manufacturer to provide acceptable serviceability of the device, taking into 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 and of all other electronic devices in the equipment.

The equipment manufacturer should design so that, initially and throughout the life of the device, no absolute maximum value for the intended service is exceed with any device, under the worst probable operating conditions with respect to supply voltage variation, equipment component variation, equipment control adjustment, load variations, signal variation, environmental conditions and variations in characteristics of the device under consideration and of all other devices in the equipment.

VOLTAGE RATINGS

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

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

V_{RWM} Crest working reverse voltage. The maximum allowable instantaneous reverse voltage which may be applied every cycle, excluding all repetitive and non-repetitive transients; duration $\leq$ 10 ms.

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 d.c. 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 reapplied 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.

Graphs in the published data show the transient thermal impedance as a function of pulse width for rectangular pulses. 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.

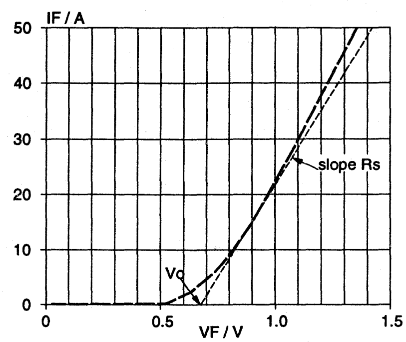


Fig. 1. Piecewise linear approximation to diode forward characteristic.

Power diode characteristics

A characteristic is an inherent and measurable property of a device. Such a property may be electrical, mechanical, thermal, hydraulic, electromagnetic or nuclear and can be expressed as a value for stated or recognized 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 400Hz 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.

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:

a. Steady-state forward current (I_F); high currents increase recovery time.

b. Reverse bias voltage (V_R); low reverse voltage increases recovery time.

c. Rate of fall of anode current (dI_F/dt); high rates of fall reduce recovery time, but increase stored charge.

d. Junction temperature (T_j); high temperatures increase both recovery time and stored charge.

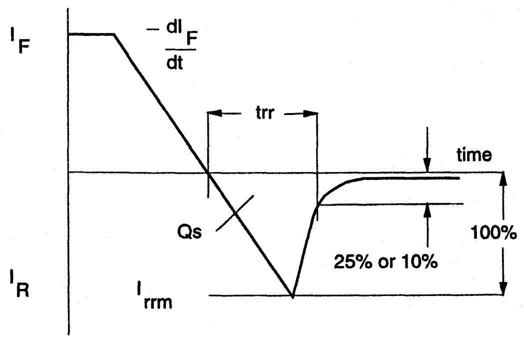


Fig.2. Definition of t_{rr}, Q_s and I_{rrm}

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. When stored charges are very low, e.g. For epitaxial and Schottky-barrier rectifier diodes, this softness characteristic can be ignored.

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:

a. Forward current (I_F); high currents increase switching losses.

b. 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.

c. Frequency (f); high frequency means high losses.

d. Reverse bias voltage (V_R); high reverse bias means high losses.

e. Junction temperature (T_j); high temperature means high losses.

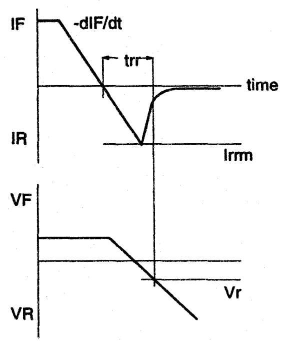


Fig.3. Waveforms showing the origin of reverse switching losses.

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 5V or 2V) 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:

a. Forward current (I_F); high currents give high recovery voltages.

b. Current pulse rise time (t_r); short rise times give high recovery voltages.

c. Junction temperature (T_j); The influence of temperature is slight.

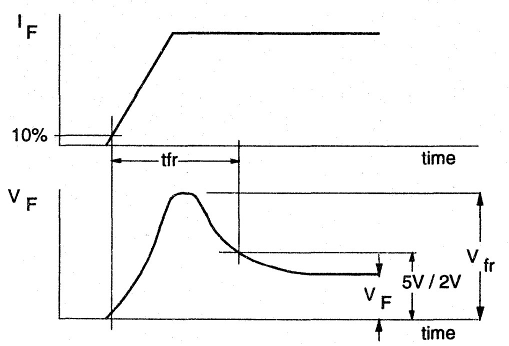


Fig.4. Definition of V_{fr} and t_{fr}

Breakover diodes

Breakover diodes (BOD's) are two terminal devices that operate in either an off (non-conducting) or an on (conducting) state. A BOD will remain in the off state until the maximum breakover voltage is applied across its terminals. A BOD will then conduct with a low on-state voltage until the current is reduced below the minimum holding current.

BOD's are available as single symmetric (operation in 1st and 3rd quadrants) in a hermetically sealed, axial leaded SOD84 envelope. BOD's are graded according to breakover voltage.

BREAKOVER DIODE CHARACTERISTICS

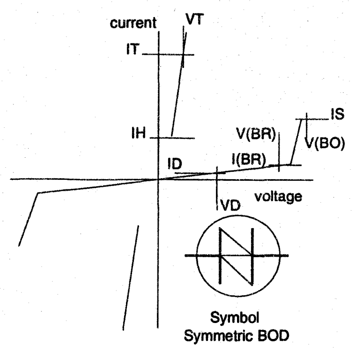


Fig.5. Breakover diode symbol and characteristics.

The main characteristics are illustrated in fig:5. These characteristics are:-

- $V_{(BO)}$ Breakover voltage, the maximum voltage appearing across the BOD before switching to the on-state.
- V_D Stand-off voltage, maximum normal operating voltage.
- I_D Off-state current, normally quoted at V_D.
- $V_{(BR)}$ Breakdown voltage, below which the BOD will not go into avalanche breakdown.
- $I_{(BR)}$ Breakdown current, with $V_{(BR)}$ applied.
- I_S Switching current, the avalanche current required to switch the BOD to the on-state.
- I_T On-state current.
- V_T On-state voltage, specified at a given I_T.
- I_H Holding current, the minimum current at which the BOD will remain in the on-state.

USE OF BREAKOVER DIODES

BOD's are primarily designed to protect electronic equipment connected to transmission lines against transient overvoltages. However, there are many uses for BOD's as breakover switches.

In designing BOD circuits the following must be considered:-

Off-state conditions

- V_D Must not be exceeded in normal off-state operation. In the off-state the BOD will not pass more current than I_D.
- dV_D/dt The rate of rise of voltage must not exceed that quoted for the device. If this is exceeded the BOD may switch to the on-state.

$V_{(BR)}$ To ensure the BOD remains in the off-state, the voltage must remain below $V_{(BR)\,min}$. If this is exceeded, the BOD will either clip the voltage or switch to the on-state.

I_S If $V_{(BR)}$ is exceeded but the current limited to below I_S minimum, the BOD is prevented from switching to the on-state.

C_j The off-state capacitance across the BOD. In transmission line protection applications this will be across the termination of the line.

Switching conditions

$V_{(BO)}$ A transient voltage greater than $V_{(BO)\,max}$ is required to switch the BOD. $V_{(BO)}$ may be greater than the voltage across the BOD when it is passing a current of $I_{S\,max}$.

I_S To enable the BOD to switch to the on-state a current greater than I_S maximum is required.

On-state conditions

V_T The on-state voltage is quoted for a given I_T

I_H To enable the BOD to switch to the off-state the current must fall below I_H minimum.

I_{TSM} I_{TSM} specifies the rate of rise and duration of a transient peak on-state current. The waveshape is defined according to CCITT Rec. K17, illustrated in Fig:6. The waveform is referred to as 10/700 µs waveform.

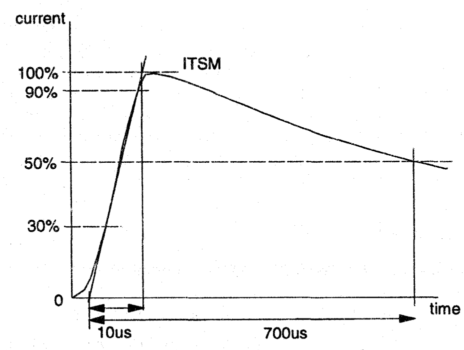


Fig.6. Definition of I_{TSM} waveform.

Thermal conditions

R_{th} For extended on-state operation (> 0.1 ms) the steady-state thermal resistance should be considered. Total thermal resistance to ambient should be sufficiently low to dissipate the heat generated by the device.

Z_{th} If the BOD is used only during transient overvoltages then the transient thermal impedance to ambient should be considered.

QUALITY

Total Quality Management

Philips Semiconductors is committed to be a world class, customer driven, volume supplier of semiconductors.

To achieve this, we operate a Total Quality Management (TQM) system, based on Continuous Improvement and Quality Assurance in all our business activities, and Partnerships with our customers and suppliers.

The top priority throughout the company is Continuous Improvement.

To focus on this we will:

- Work closely with key customers, as our partners.
- Monitor progress, using customer-driven data, of our product and services.
- Benchmark against the best.

Furthermore, all parts of the organisation must always demonstrate:

- The presence of a strong, management-led improvement structure.
- Commitment and participation in all areas.
- Measurable progress towards our Quality Improvement goals.

Organisation

An organisation is in place which ensures that personnel with the necessary organisational freedom and authority can identify and solve quality problems, prevent occurrence of product non-conformity and protect the customer from non-conforming product.

Design control

A comprehensive design and development procedure is in place which ensures that the requirements of good design practice are met.

Particular emphasis is placed on ensuring that the initial specification is agreed by the Customer and the Marketing and Development functions.

There are regular formal reviews of design progress to ensure that the initial specification will be met by the design.

Detailed measurements are made on initial samples to ensure that the initial specification has been met.

Process control

All processes which directly affect quality are carried out under controlled conditions. Documented work instructions are available for all production processes and the appropriate environmental controls are in place to ensure consistent processing. Monitoring of the product, processes and the environment takes place during production.

Approval exercises are run to ensure that new processes and new equipment perform at an acceptable level.

Written, photographic or visual standards are available at the appropriate points in the production processes.

Corrective action

Non-conforming product found in process is investigated and the causes identified. Changes to product or process are then introduced to prevent recurrence of the problem.

Quality assurance

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

Partnerships with customers

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

Partnerships with suppliers

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

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's for the highest built-in product reliability. Highly accelerated tests are applied in order to evaluate the product reliability. Rejects from reliability tests and from customer complaints are submitted to failure analysis and the results applied to improve the product or process.

Customer responses

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

Recognition

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

DEVICE DATA

in alphanumeric sequence

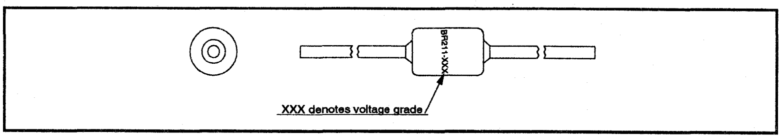
GENERAL DESCRIPTION

A range of bidirectional, breakover diodes in an axial, hermetically sealed, glass envelope. These devices feature controlled breakover voltage and high holding current together with high peak current handling capability. Typical applications include transient overvoltage protection in telecommunications equipment.

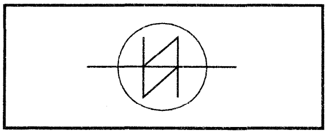
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
	BR211-100 to 280			
$V_{(BO)}$	Breakover voltage	100	280	V
I_H	Holding current	150	-	mA
I_{TSM}	Non-repetitive peak current	-	40	A

OUTLINE - SOD84



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_D	Continuous voltage		-	75% of $V_{(BO)typ}$	V
I_{TSM1}	Non repetitive peak current	10/320 µs impulse equivalent to 10/700 µs, 1.6 kV voltage impulse (CCITT K17)	-	40	A
I_{TSM2}	Non repetitive on-state current	half sine wave; t = 10 ms; T_j = 70 ˚C prior to surge	-	15	A
I^2t	I^2t for fusing	t_p = 10 ms	-	1.1	A^2s
dI_T/dt	Rate of rise of on-state current after $V_{(BO)}$ turn-on	t_p = 10 µs	-	50	A/µs
P_{tot}	Continuous dissipation	T_a = 25˚C	-	1.2	W
P_{TM}	Peak dissipation	t_p = 1 ms; T_a = 25˚C	-	50	W
T_{stg}	Storage temperature		-65	150	˚C
T_a	Operating ambient temperature	off-state	-	70	˚C
T_{vj}	Overload junction temperature	on-state	-	150	˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}e}$	Thermal resistance junction to envelope		-	22	-	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	mounted as fig:12	-	105		K/W
$Z_{th\ j\text{-}a}$	Thermal impedance junction to ambient	t_p = 1 ms	-	2.62	-	K/W
$R_{th\ e\text{-}tp}$	Thermal resistance envelope to tie point	lead length = 5 mm	-	15	-	K/W
		lead length = 10 mm	-	30	-	K/W
$R_{th\ e\text{-}a}$	Thermal resistance envelope to ambient	lead length = 5 mm	-	440	-	K/W
		lead length = 10 mm	-	350	-	K/W
$R_{th\ tp\text{-}a}$	Thermal resistance tie point to ambient	mounted as fig:12	-	70	-	K/W
		mounted with 1 cm^2 copper laminate per lead.	-	55	-	K/W
		mounted with 2.25 cm2 copper laminate per lead	-	45	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{TM} [1]	On-state voltage	I_{TM} = 2 A	-	-	2.5	V
$V_{(BR)}$	Avalanche voltage (min)	$I_{(BR)}$ = 10_{mA}				
$V_{(BO)}$	Breakover voltage (max)	$I \leq I_S$, t_p = 100 µs				
		BR211-100	88	100	112	V
		BR211-120	105	120	135	V
		BR211-140	123	140	157	V
		BR211-160	140	160	180	V
		BR211-180	158	180	202	V
		BR211-200	176	200	224	V
		BR211-220	193	220	247	V
		BR211-240	211	240	269	V
		BR211-260	228	260	292	V
		BR211-280	246	280	314	V
$S_{(br)}$	Temperature coefficient of $V_{(BR)}$		-	+0.1	-	%/K
I_H [2]	Holding current	T_j = 25˚C	150	-	-	mA
		T_j = 70˚C	100	-	-	mA
I_S [3]	Switching current	t_p = 100 µs	10	200	1000	mA
I_D [4]	Off-state current	V_D = 85% $V_{(BR)min}$, T_j = 70˚C	-	-	10	µA

1 Measured under pulsed conditions to avoid excessive dissipation

2 The minimum current at which the diode will remain in the on-state

3 The avalanche current required to switch the diode to the on-state

4 Measured at maximum recommended continuous voltage. Illuminance ≤ 500 lux (daylight); relative humidity < 65%.

DYNAMIC CHARACTERISTICS

T_j = 25 °C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
dV_D/dt	Linear rate of rise of off-state voltage that will not trigger any device	$V_{(DM)}$ = 85% $V_{(BR)min}$; T_j = 70 °C	-	-	2000	V/µs
C_j	Off-state capacitance	V_D = 0 V; f = 1 kHz to 1 MHz	-	-	100	pF

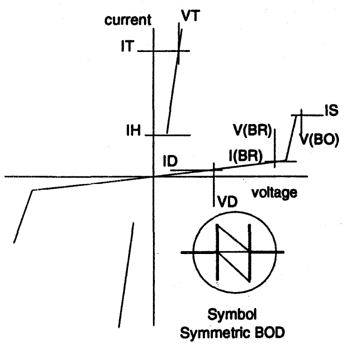


Fig.1. Definition of breakover diode characteristics.

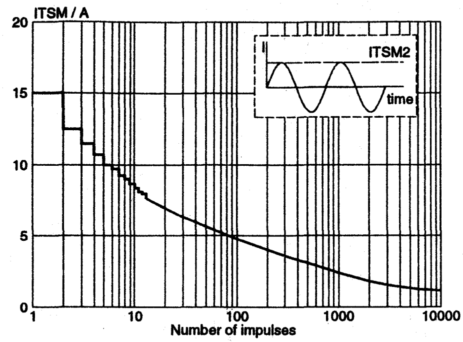


Fig.3. Maximum permissible non-repetitive on-state current based on sinusoidal currents; f = 50 Hz; device triggered at the start of each pulse; T_j = 70°C prior to surge.

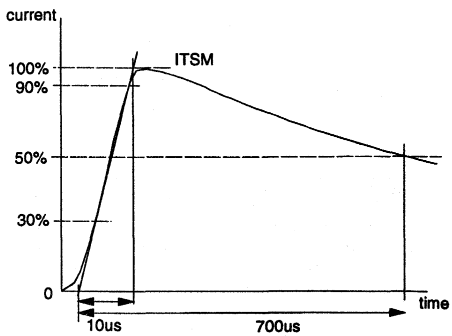


Fig.2. Test waveform for high voltage impulse (I_{TSM1}) according to CCITT vol IX-Rec K17.

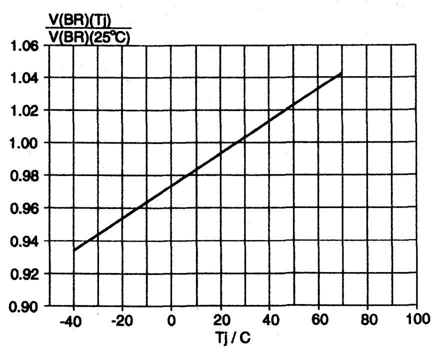


Fig.4. Normalised avalanche breakdown voltage $V_{(BR)}$ and $V_{(BO)}$ as a function of temperature.

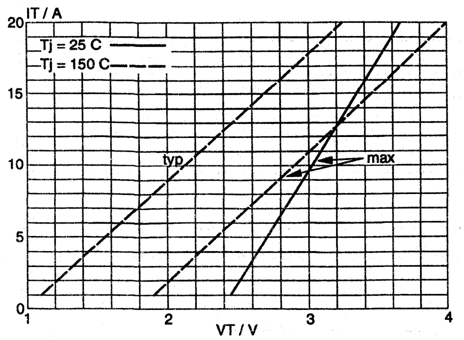


Fig.5. On-state current as a function of on-state voltage; t_p = 200 µs to avoid excessive dissipation.

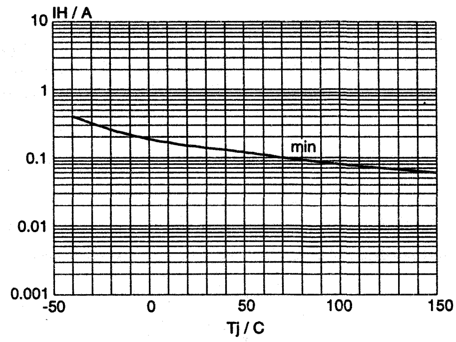


Fig.8. Minimum holding current as a function of temperature.

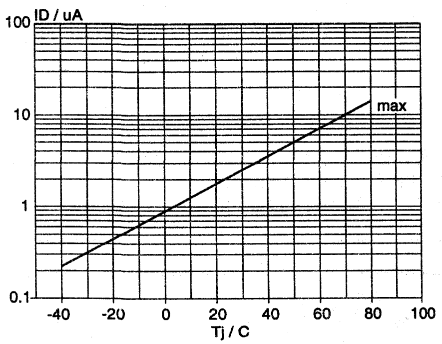


Fig.6. Maximum off-state current as a function of temperature.

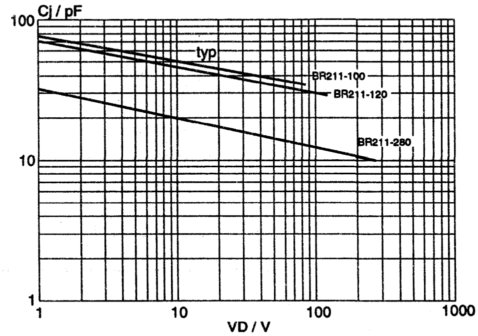


Fig.9. Typical junction capacitance as a function of off-state voltage, f = 1 MHz; T_j = 25˚C.

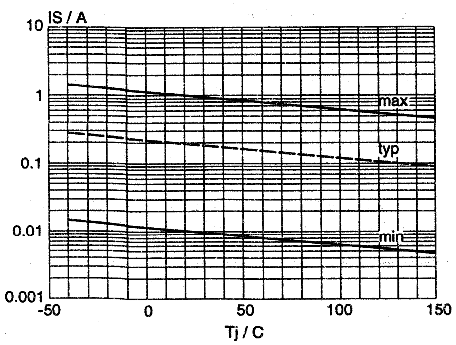


Fig.7. Switching current as a function of junction temperature.

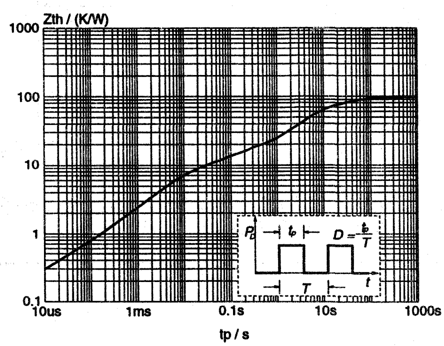


Fig.10. Transient thermal impedance. $Z_{th\ j\text{-}a} = f(t_p)$.

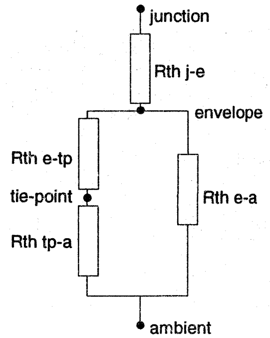


Fig.11. Components of thermal resistance,

$$Rth\,j-a = Rth\,j-e + \frac{Rth\,e-a.(Rth\,e-tp + Rth\,tp-a)}{(Rth\,e-a + Rth\,e-tp + Rth\,tp-a)}$$

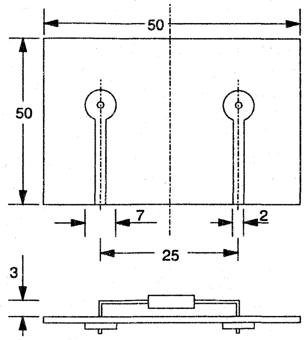


Fig.12. Mounting on pcb used for R_{th} measurement.

GENERAL DESCRIPTION

Glass-passivated double diffused rectifier diodes in a plastic envelope 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.

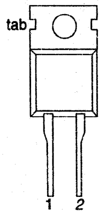
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	MAX.	UNIT
	BY229	-200	-400	-600	-800	
V_{RRM}	Repetitive peak reverse voltage	200	400	600	800	V
$I_{F(AV)}$	Average forward current	8	8	8	8	A
I_{FSM}	Non-repetitive peak forward current	60	60	60	60	A
t_{rr}	Reverse recovery time	135	135	135	135	ns

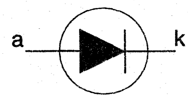
PINNING - TO220AC

PIN	DESCRIPTION
1	cathode (k)
2	anode (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.				UNIT
				-200	-400	-600	-800	
V_{RSM}	Non-repetitive peak reverse voltage		-	200	400	600	800	V
V_{RRM}	Repetitive peak 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	-	66				A
		sinusoidal; $T_j = 150$ °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

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

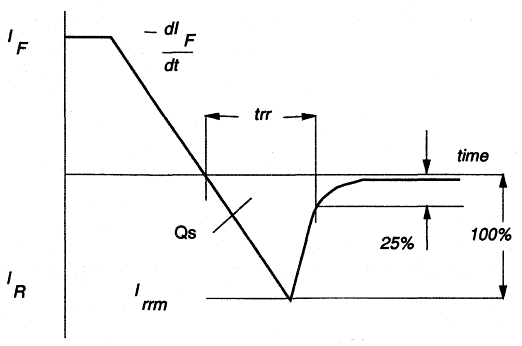


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

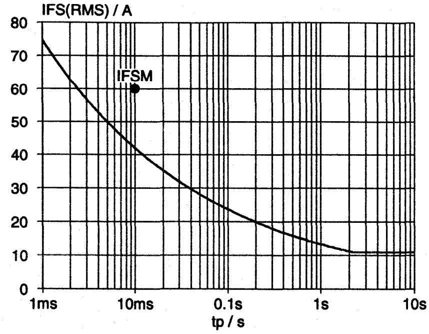


Fig.4. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j = 150^\circ C$ prior to surge with reapplied V_{RWM}.

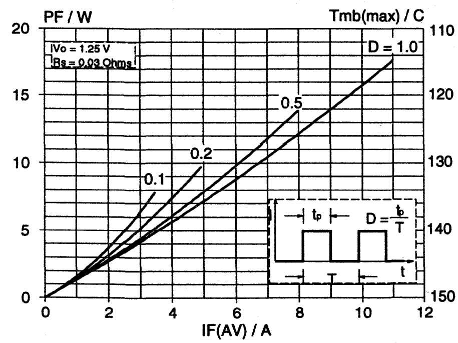


Fig.2. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; square wave current waveform; parameter D = duty cycle = t_p/T.

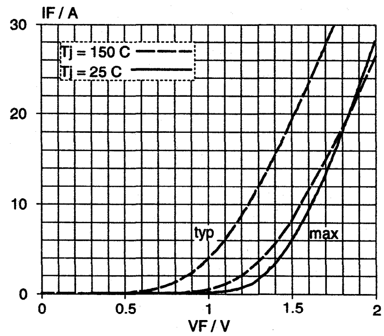


Fig.5. Typical and maximum forward characteristic; $I_F = f(V_F)$; parameter T_j

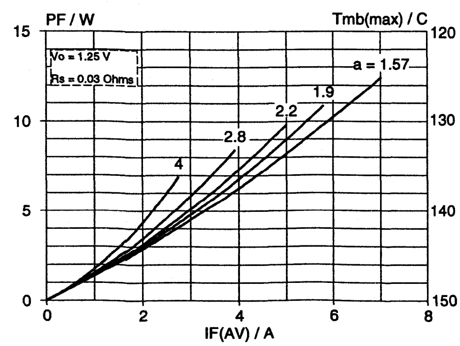


Fig.3. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; sinusoidal current waveform; parameter a = form factor = $I_{F(RMS)}/I_{F(AV)}$.

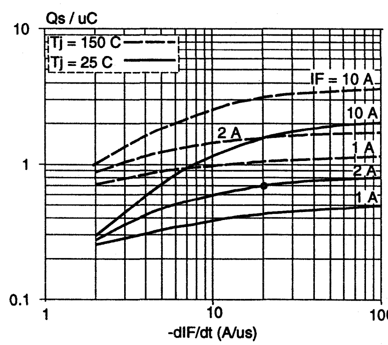


Fig.6. Maximum Q_s at $T_j = 25^\circ C$ and $150^\circ C$

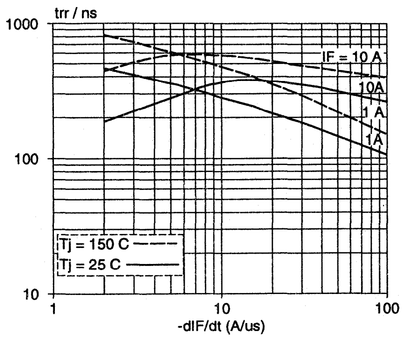


Fig.7. Maximum t_{rr} measured to 25% of I_{rrm}; $T_j = 25^{\circ}C$ and $150^{\circ}C$

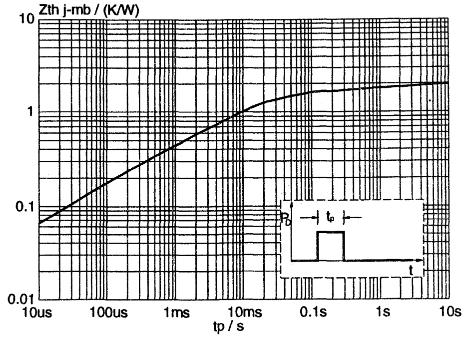


Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$

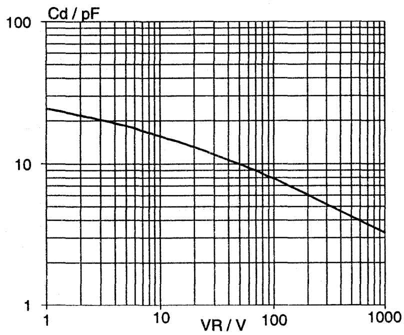


Fig.8. Typical junction capacitance C_d at f = 1 MHz; $T_j = 25^{\circ}C$

Rectifier diodes fast, soft-recovery

BY229F series

GENERAL DESCRIPTION

Glass-passivated double diffused rectifier diodes in a plastic full pack envelope 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.

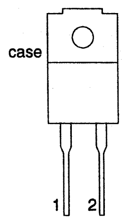
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	MAX.	UNIT
	BY229F	-200	-400	-600	-800	
V_{RRM}	Repetitive peak reverse voltage	200	400	600	800	V
$I_{F(AV)}$	Average forward current	8	8	8	8	A
I_{FSM}	Non-repetitive peak forward current	60	60	60	60	A
t_{rr}	Reverse recovery time	135	135	135	135	ns

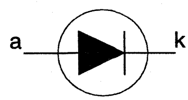
PINNING - SOD100

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.				UNIT
				-200	-400	-600	-800	
V_{RSM}	Non-repetitive peak reverse voltage		-	200	400	600	800	V
V_{RRM}	Repetitive peak 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; $\delta = 0.5$; $T_{hs} \leq 83$ °C	-	8				A
		sinusoidal; $a = 1.57$; $T_{hs} \leq 90$ °C	-	7				A
$I_{F(RMS)}$	RMS forward current		-	11				A
I_{FRM}	Repetitive peak forward current	$t = 25$ µs; $\delta = 0.5$; $T_{hs} \leq 83$ °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.

ISOLATION

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

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

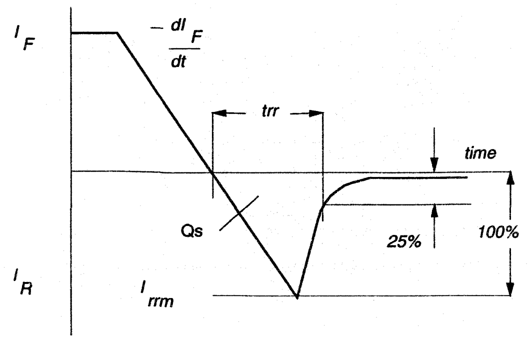


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

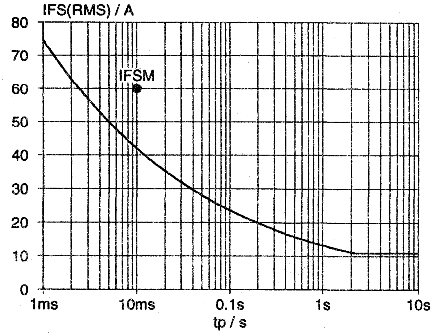


Fig.4. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; T_j = 150˚C prior to surge with reapplied V_{RWM}.

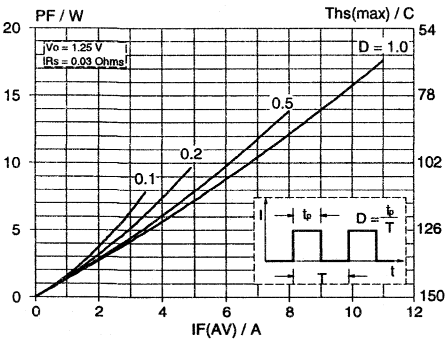


Fig.2. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; square wave current waveform; parameter D = duty cycle = t_p/T.

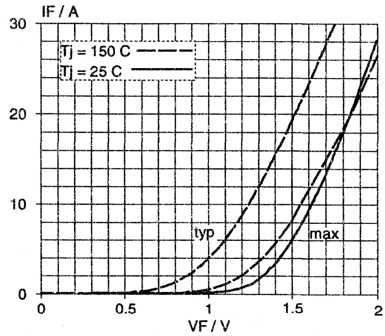


Fig.5. Typical and maximum forward characteristic; $I_F = f(V_F)$; parameter T_j

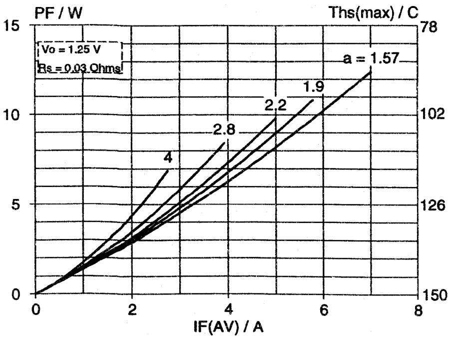


Fig.3. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; sinusoidal current waveform; parameter a = form factor = $I_{F(RMS)}/I_{F(AV)}$.

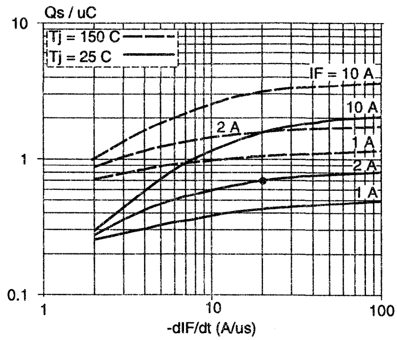


Fig.6. Maximum Q_s at T_j = 25˚C and 150˚C

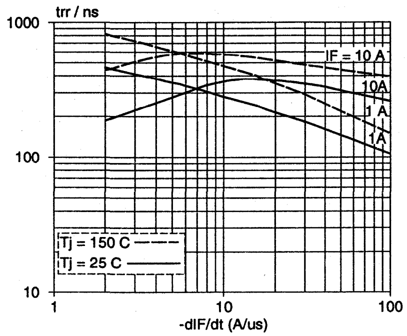


Fig.7. Maximum t_{rr} measured to 25% of I_{rrm}; T_j = 25˚C and 150˚C

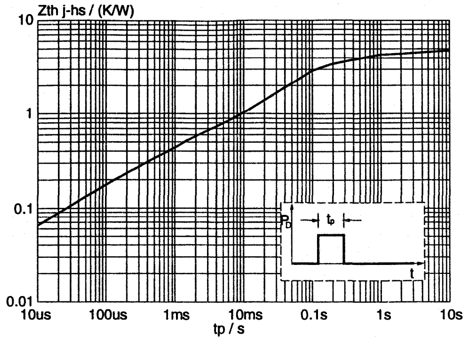


Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$

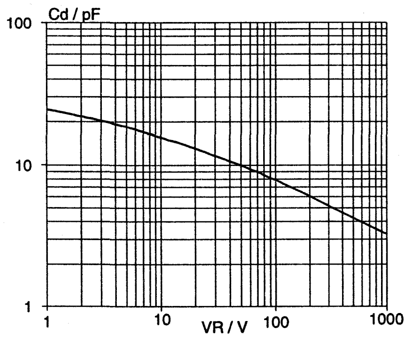


Fig.8. Typical junction capacitance C_d at f = 1 MHz; T_j = 25˚C

Rectifier diodes general purpose | BY249 series

GENERAL DESCRIPTION

Glass-passivated double diffused rectifier diodes in a plastic envelope. The devices are intended for low frequency power rectifier applications.

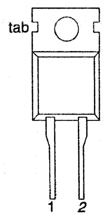
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	UNIT
	BY249	**-300**	**-600**	
V_{RRM}	Repetitive peak reverse voltage	300	600	V
$I_{F(AV)}$	Average forward current	7	7	A
I_{FSM}	Non-repetitive peak forward current	60	60	A

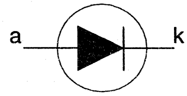
PINNING - TO220AC

PIN	DESCRIPTION
1	cathode (k)
2	anode (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	MAX.	UNIT
				-300	**-600**	
V_{RSM}	Non-repetitive peak reverse voltage		-	300	600	V
V_{RRM}	Repetitive peak reverse voltage		-	300	600	V
V_{RWM}	Crest working reverse voltage		-	200	500	V
V_R	Continuous reverse voltage		-	200	500	V
$I_{F(AV)}$	Average forward current[1]	sinusoidal; a = 1.57; $T_{mb} \leq 131$ ˚C	-	7		A
$I_{F(RMS)}$	RMS forward current		-	11		A
I_{FRM}	Repetitive peak forward current	sinusoidal; a = 1.57;	-	60		A
I_{FSM}	Non-repetitive peak forward current.	t = 10 ms	-	60		A
		t = 8.3 ms	-	66		A
		sinusoidal; T_j = 150 ˚C prior to surge; with reapplied $V_{RWM(max)}$				
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

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

1 Neglecting switching and reverse current losses.

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

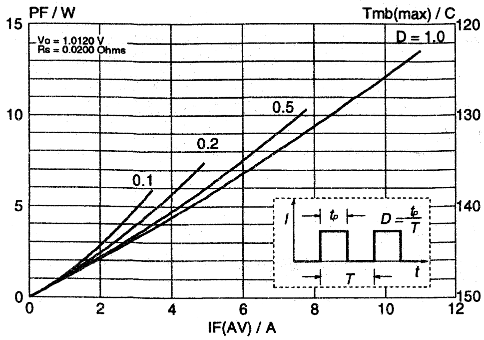


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

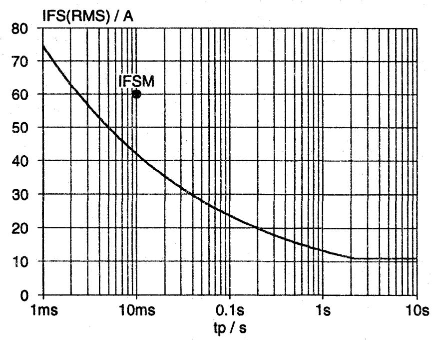


Fig.3. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j = 150^\circ C$ prior to surge with reapplied V_{RWM}.

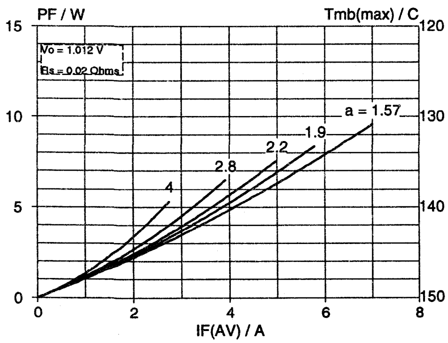


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

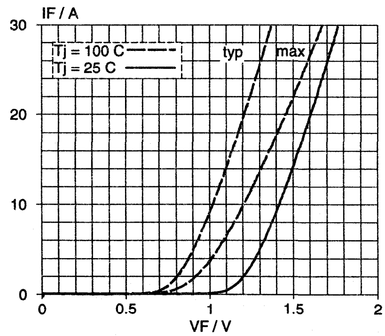


Fig.4. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

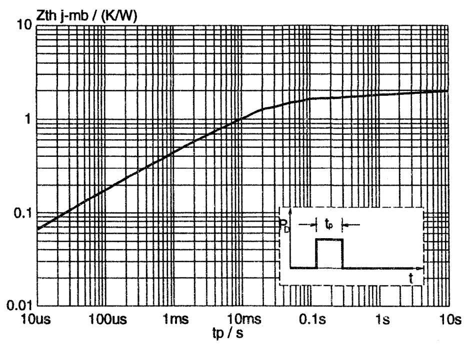


Fig.5. Transient thermal impedance $Z_{th} = f(t_p)$

GENERAL DESCRIPTION

Glass-passivated double diffused rectifier diodes in a plastic envelope 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.

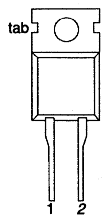
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BY329	-800	-1000	-1200	
V_{RRM}	Repetitive peak reverse voltage	800	1000	1200	V
$I_{F(AV)}$	Average forward current	8	8	8	A
I_{FSM}	Non-repetitive peak forward current	75	75	75	A
t_{rr}	Reverse recovery time	135	135	135	ns

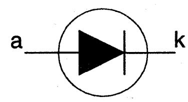
PINNING - TO220AC

PIN	DESCRIPTION
1	cathode (k)
2	anode (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-800	-1000	-1200	
V_{RSM}	Non-repetitive peak reverse voltage		-	800	1000	1200	V
V_{RRM}	Repetitive peak 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.

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	1.0	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

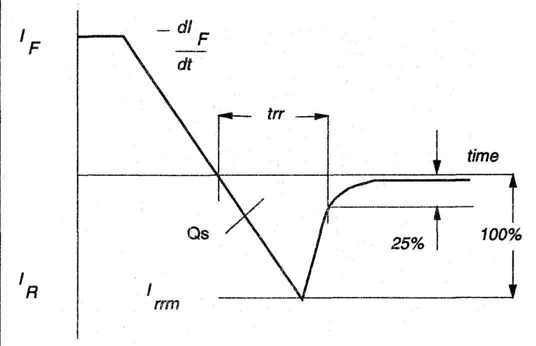


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

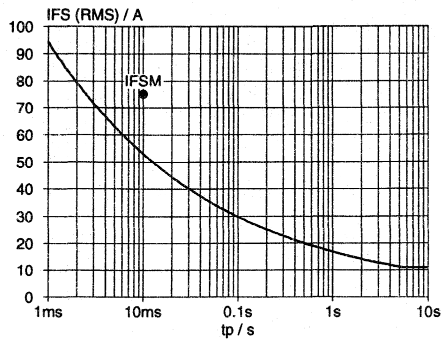


Fig.4. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j = 150$°C prior to surge with reapplied V_{RWM}.

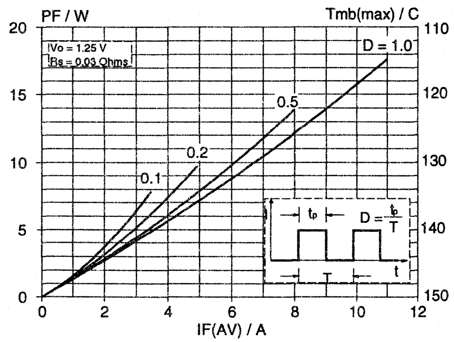


Fig.2. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; square wave current waveform; parameter D = duty cycle = t_p/T.

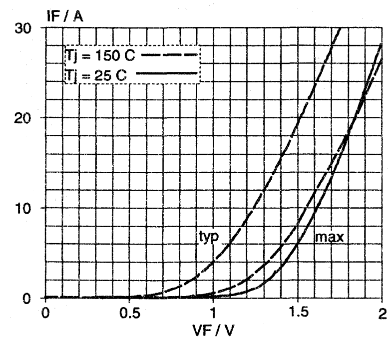


Fig.5. Typical and maximum forward characteristic; $I_F = f(V_F)$; parameter T_j

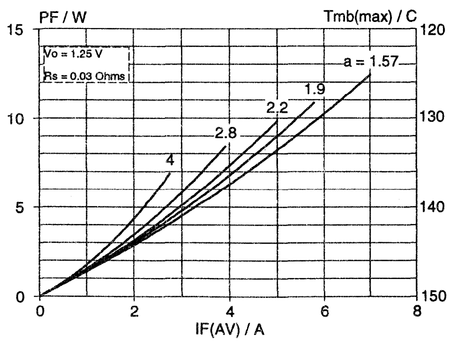


Fig.3. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; sinusoidal current waveform; parameter a = form factor = $I_{F(RMS)}/I_{F(AV)}$.

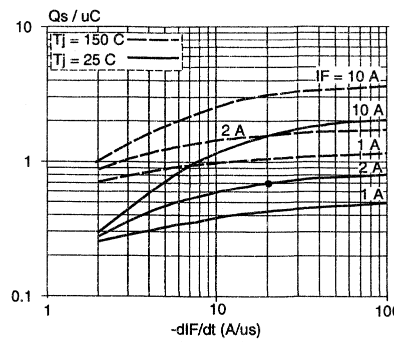


Fig.6. Maximum Q_s at T_j = 25°C and 150°C

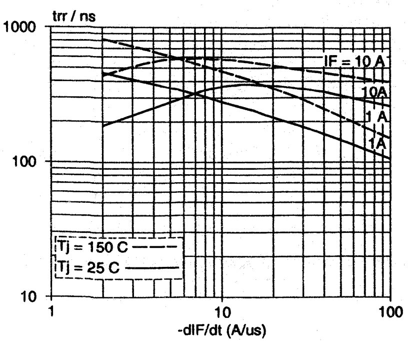


Fig.7. Maximum t_{rr} measured to 25% of I_{rrm}; $T_j = 25˚C$ and 150˚C

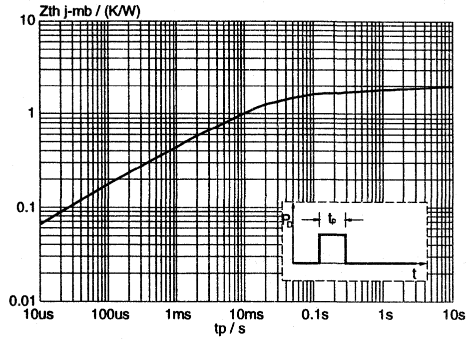


Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$

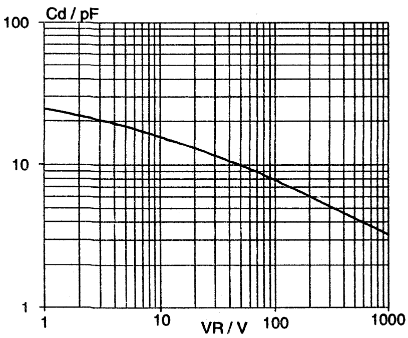


Fig.8. Typical junction capacitance C_d at f = 1 MHz; $T_j = 25˚C$

Rectifier diode fast, high-voltage

BY359-1500

GENERAL DESCRIPTION

Glass-passivated double diffused rectifier diode in a plastic envelope 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.

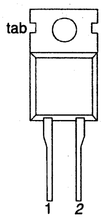
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V_{RRM}	Repetitive peak reverse voltage	1500	V
V_F	Forward voltage	1.5	V
$I_{F(AV)}$	Average forward current	10	A
I_{FSM}	Non-repetitive peak forward current	60	A
t_{rr}	Reverse recovery time	0.6	µs

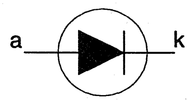
PINNING - TO220AC

PIN	DESCRIPTION
1	cathode (k)
2	anode (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum 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_{RWM}	Crest working reverse voltage		-	1300	V
$I_{F(AV)}$	Average forward current[1]	sinusoidal; a = 1.57; $T_{mb} \leq 110$ ˚C	-	10	A
$I_{F(RMS)}$	RMS forward current		-	15.7	A
I_{FRM}	Repetitive peak forward current	sinusoidal; a = 1.57	-	60	A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms	-	60	A
		t = 8.3 ms	-	66	A
		sinusoidal; T_j = 150 ˚C prior to surge; with reapplied $V_{RWM(max)}$			
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

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

1 Neglecting switching and reverse current losses.

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

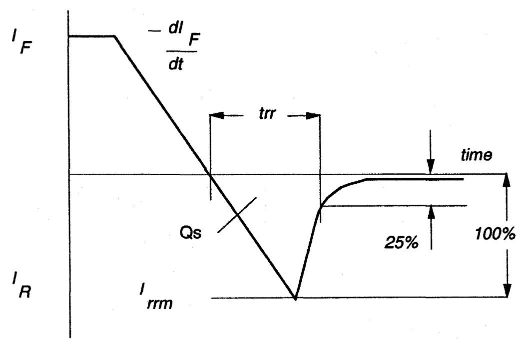


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

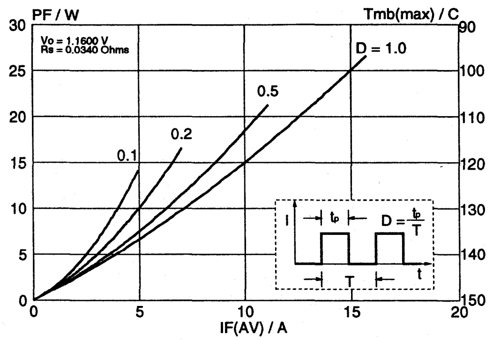


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

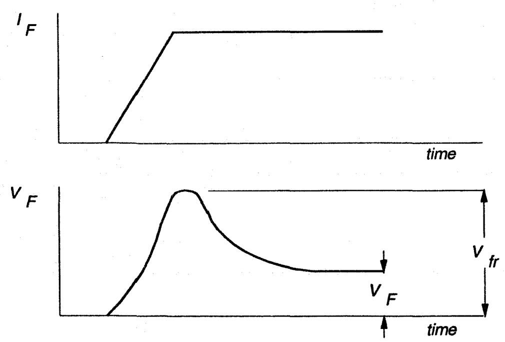


Fig.2. Definition of V_{fr}

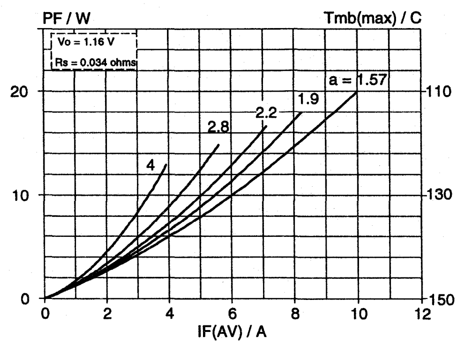


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

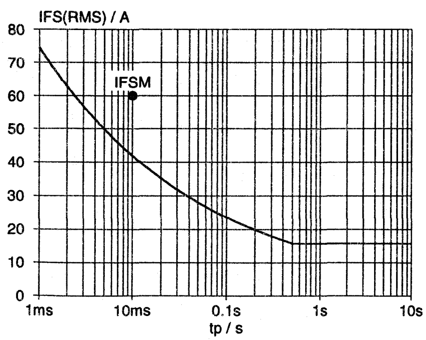


Fig.5. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j = 150˚C$ prior to surge with reapplied V_{RWM}.

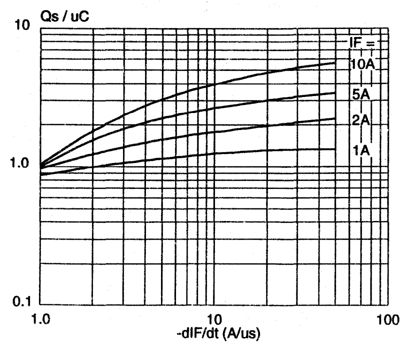


Fig.8. Maximum reverse recovery charge $Q_s = f(dI_F/dt)$; parameter T_j

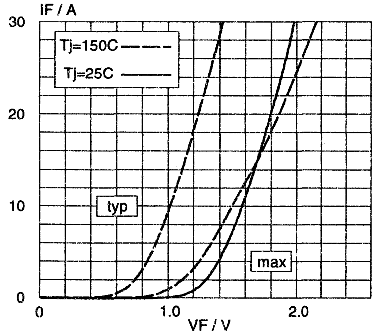


Fig.6. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

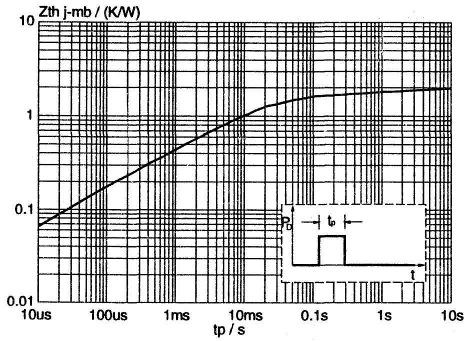


Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$

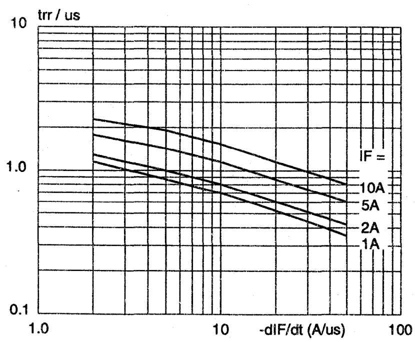


Fig.7. Maximum reverse recovery time $t_{rr} = f(dI_F/dt)$; parameter T_j

Rectifier diode fast, high-voltage

BY359F-1500

GENERAL DESCRIPTION

Glass-passivated double diffused rectifier diode in a full pack plastic envelope 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.

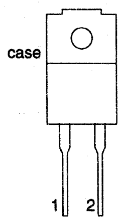
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V_{RRM}	Repetitive peak reverse voltage	1500	V
V_F	Forward voltage	1.5	V
$I_{F(AV)}$	Average forward current	10	A
I_{FSM}	Non-repetitive peak forward current	60	A
t_{rr}	Reverse recovery time	0.6	µs

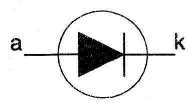
PINNING - SOD100

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.	UNIT
V_{RSM}	Non-repetitive peak reverse voltage		-	1500	V
V_{RRM}	Repetitive peak reverse voltage		-	1500	V
V_{RWM}	Crest working reverse voltage		-	1300	V
$I_{F(AV)}$	Average forward current[1]	sinusoidal; a = 1.57; $T_{hs} \leq 54$ ˚C	-	10	A
$I_{F(RMS)}$	RMS forward current		-	15.7	A
I_{FRM}	Repetitive peak forward current	sinusoidal; a = 1.57	-	60	A
I_{FSM}	Non-repetitive peak 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

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	-	-	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 = 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

Rectifier diode fast, high-voltage

BY359F-1500

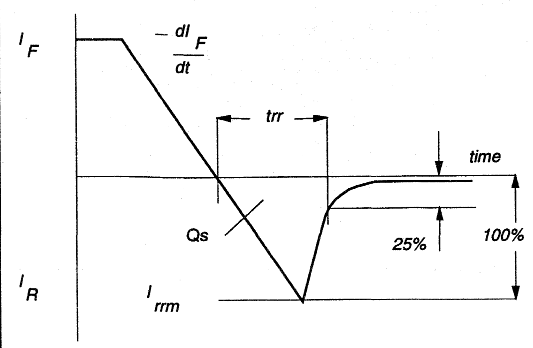


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

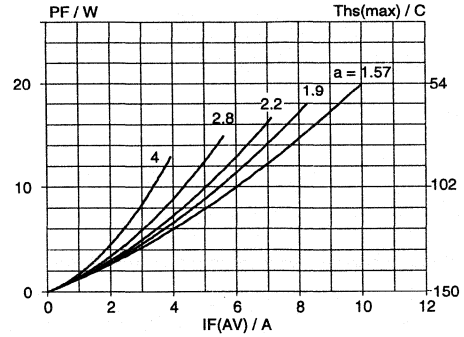


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)}$ / $I_{F(AV)}$.

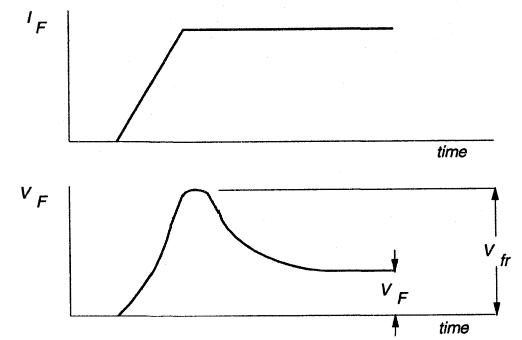


Fig.2. Definition of V_{fr}

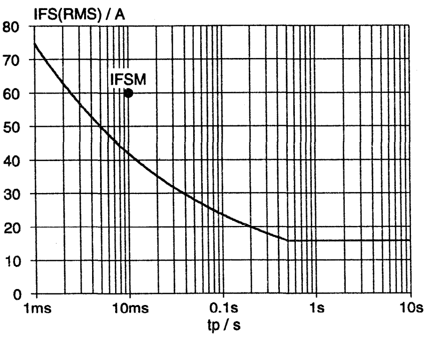


Fig.5. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; T_j = 150˚C prior to surge with reapplied V_{RWM}.

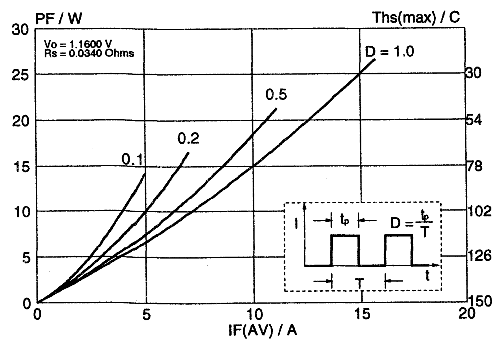


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

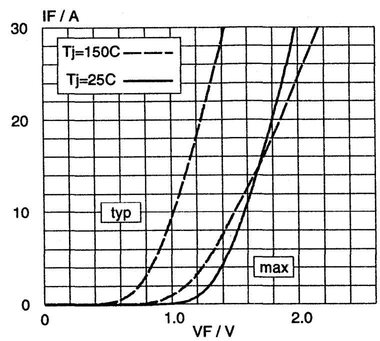


Fig.6. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

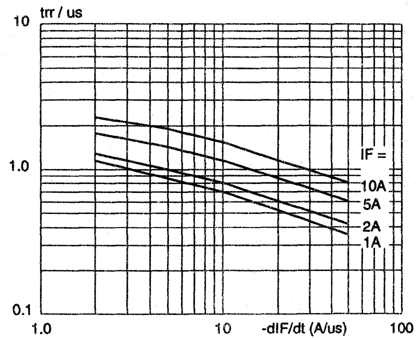


Fig.7. Maximum reverse recovery time $t_{rr} = f(dI_F/dt)$; parameter T_j

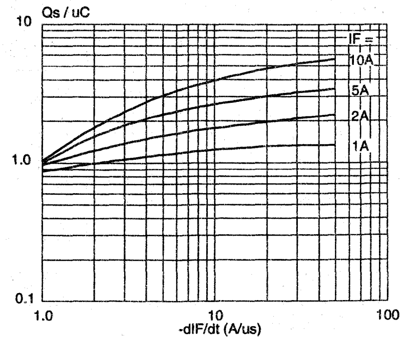


Fig.8. Maximum reverse recovery charge $Q_s = f(dI_F/dt)$; parameter T_j

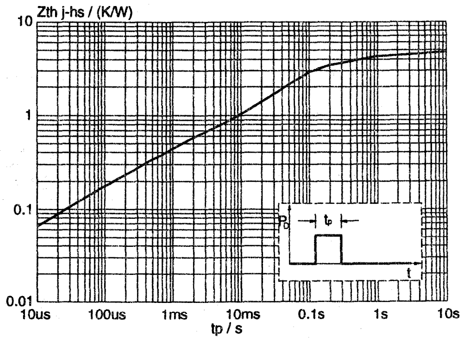


Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$

Rectifier diode fast, high-voltage

BY359X-1500

GENERAL DESCRIPTION

Glass-passivated double diffused rectifier diode in a full pack plastic envelope 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.

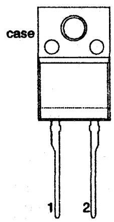
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V_{RRM}	Repetitive peak reverse voltage	1500	V
V_F	Forward voltage	1.5	V
$I_{F(AV)}$	Average forward current	10	A
I_{FSM}	Non-repetitive peak forward current	60	A
t_{rr}	Reverse recovery time	0.6	µs

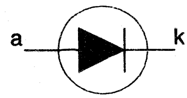
PINNING - SOD113

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
V_{RSM}	Non-repetitive peak reverse voltage		-	1500	V
V_{RRM}	Repetitive peak reverse voltage		-	1500	V
V_{RWM}	Crest working reverse voltage		-	1300	V
$I_{F(AV)}$	Average forward current	sinusoidal; a = 1.57; $T_{hs} \leq 54$ ˚C	-	10	A
$I_{F(RMS)}$	RMS forward current		-	15.7	A
I_{FRM}	Repetitive peak forward current	sinusoidal; a = 1.57	-	60	A
I_{FSM}	Non-repetitive peak 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

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{isol(rms)}$	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_{RMS}
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 = 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

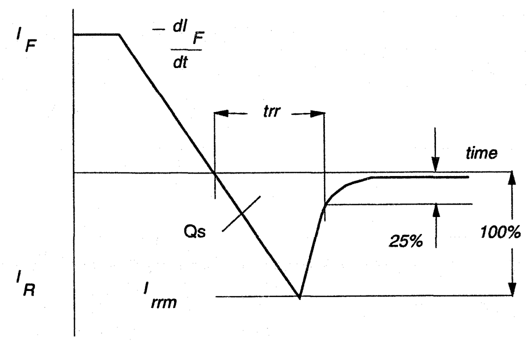


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

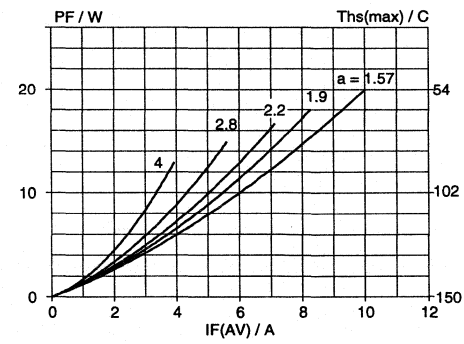


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

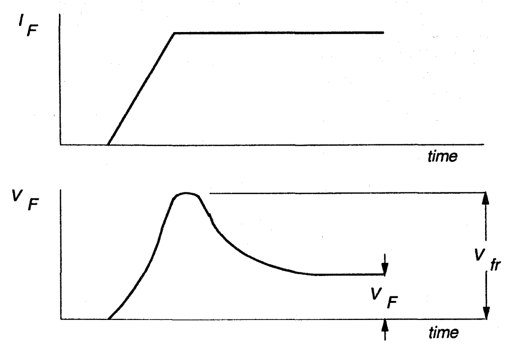


Fig.2. Definition of V_{fr}

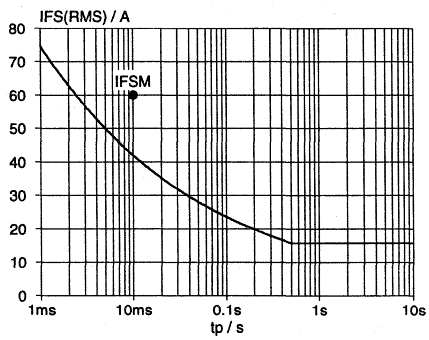


Fig.5. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; T_j = 150˚C prior to surge with reapplied V_{RWM}.

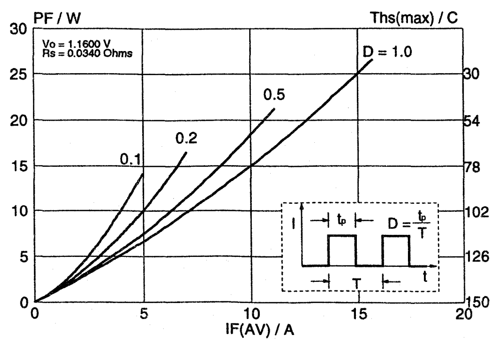


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

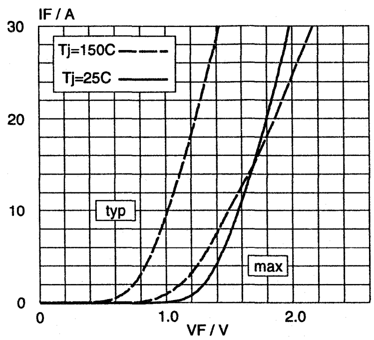


Fig.6. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

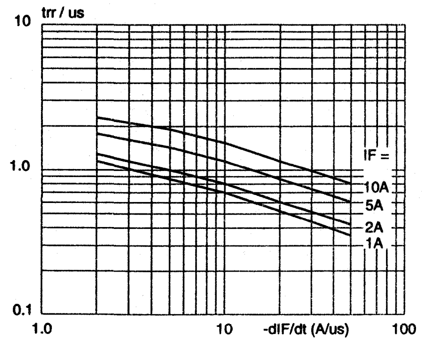


Fig.7. Maximum reverse recovery time $t_{rr} = f(dI_F/dt)$; parameter T_j

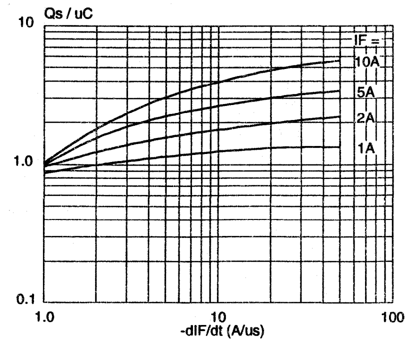


Fig.8. Maximum reverse recovery charge $Q_s = f(dI_F/dt)$; parameter T_j

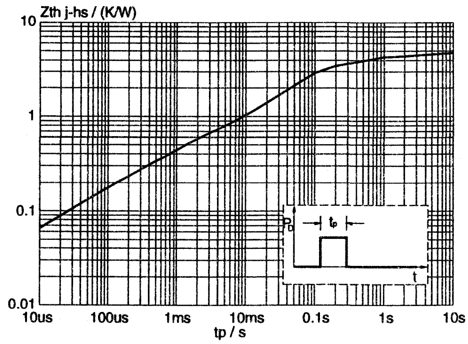


Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$

Rectifier diode fast, high-voltage

BY459-1500

GENERAL DESCRIPTION

Glass-passivated double diffused rectifier diode in a plastic envelope, featuring fast forward recovery and low forward recovery voltage. The device is intended for use in multi-sync monitor deflection circuits up to 82kHz.

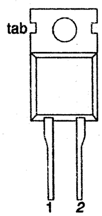
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V_{RRM}	Repetitive peak reverse voltage	1500	V
V_F	Forward voltage	1.2	V
$I_{F(AV)}$	Average forward current	10	A
I_{FSM}	Non-repetitive peak forward current	100	A
t_{fr}	Forward recovery time	250	ns
V_{fr}	Forward recovery voltage	14	V

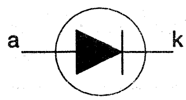
PINNING - TO220AC

PIN	DESCRIPTION
1	cathode (k)
2	anode (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum 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_{RWM}	Crest working reverse voltage		-	1300	V
$I_{F(AV)}$	Average forward current[1]	sinusoidal; a = 1.57; $T_{mb} \leq 125$ ˚C	-	10	A
$I_{F(RMS)}$	RMS forward current		-	15.7	A
I_{FRM}	Repetitive peak forward current	sinusoidal; a = 1.57	-	100	A
I_{FSM}	Non repetitive peak forward current	t = 10 ms	-	100	A
		t = 8.3 ms	-	110	A
		sinusoidal; T_j = 150 ˚C prior to surge; with reapplied $V_{RWM(max)}$			
I^2t	I^2t for fusing	t = 10 ms	-	50	A^2s
T_{stg}	Storage temperature		-40	150	˚C
T_j	Operating junction temperature		-	150	˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-mb}$	Thermal resistance junction to mounting base		-	-	1.5	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	in free air	-	60	-	K/W

1 Neglecting switching and reverse current losses.

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	-	8	14	V
t_{fr}	Forward recovery time	I_F = 6.5 A; dI_F/dt = 50 A/µs; V_F = 5 V	-	170	250	ns
		I_F = 6.5 A; dI_F/dt = 50 A/µs; V_F = 2 V	-	350	-	ns
t_{rr}	Reverse recovery time	I_F = 1 A; $-dI_F/dt$ = 50 A/µs; $V_R \geq$ 30 V	-	250	350	ns

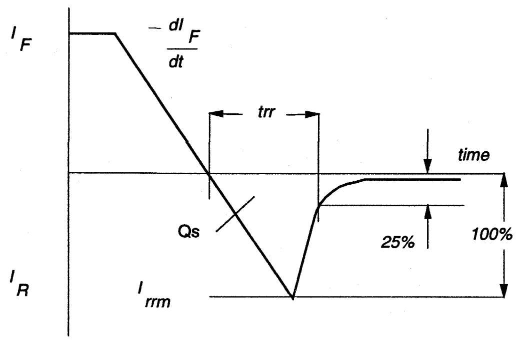


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

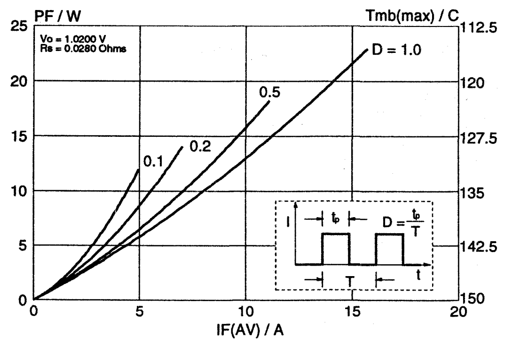


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

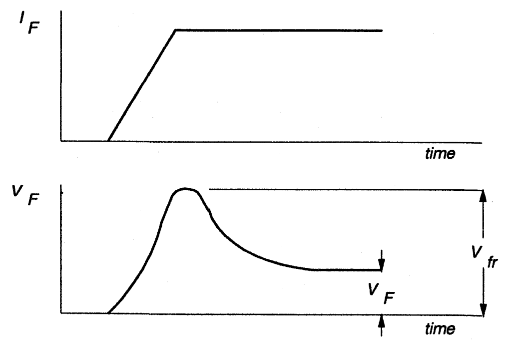


Fig.2. Definition of V_{fr}

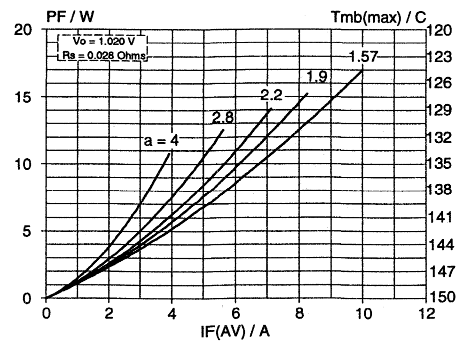


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

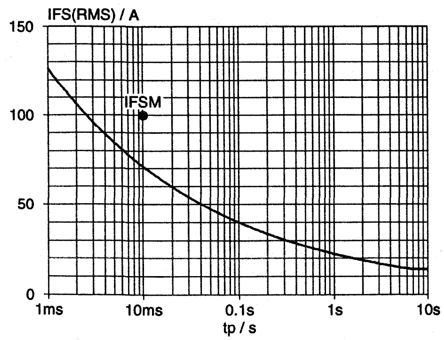


Fig.5. *Maximum non-repetitive rms forward current.* $I_F = f(t_p)$*; sinusoidal current waveform;* $T_j = 150^{\circ}C$ *prior to surge with reapplied* V_{RWM}.

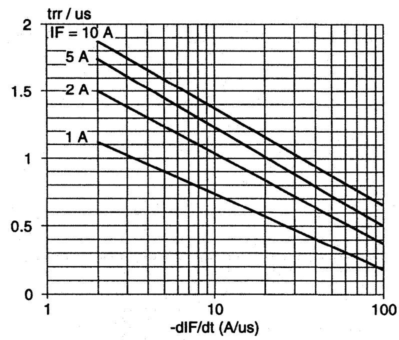


Fig.8. *Maximum reverse recovery time* $t_{rr} = f(dI_F/dt)$*; parameter* T_j

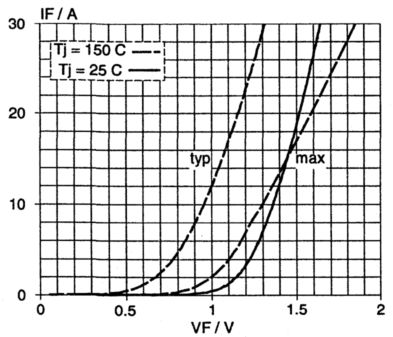


Fig.6. *Typical and maximum forward characteristic* $I_F = f(V_F)$*; parameter* T_j

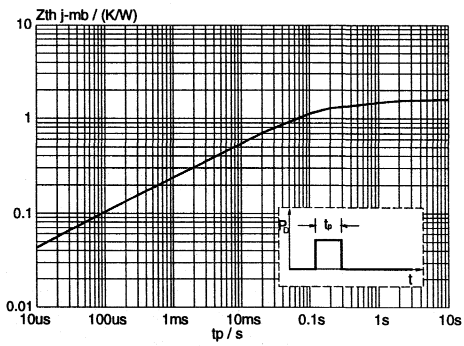


Fig.9. *Transient thermal impedance* $Z_{th} = f(t_p)$

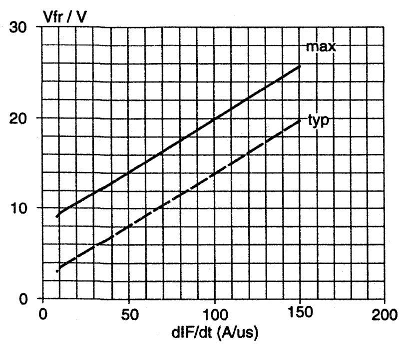


Fig.7. *Typical and maximum* $V_{fr} = f(dI_F/dt)$*;* $T_j = 25^{\circ}C$

Rectifier diode fast, high-voltage
BY459F-1500

GENERAL DESCRIPTION

Glass-passivated double diffused rectifier diode in a full pack plastic envelope, featuring fast forward recovery and low forward recovery voltage. The device is intended for use in multi-sync monitor deflection circuits up to 82kHz.

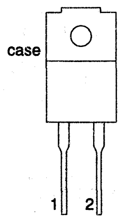
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V_{RRM}	Repetitive peak reverse voltage	1500	V
V_F	Forward voltage	1.2	V
$I_{F(AV)}$	Average forward current	10	A
I_{FSM}	Non-repetitive peak forward current	100	A
t_{fr}	Forward recovery time	250	ns
V_{fr}	Forward recovery voltage	14	V

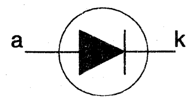
PINNING - SOD100

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.	UNIT
V_{RSM}	Non repetitive peak reverse voltage		-	1500	V
V_{RRM}	Repetitive peak reverse voltage		-	1500	V
V_{RWM}	Crest working reverse voltage		-	1300	V
$I_{F(AV)}$	Average forward current	sinusoidal; $T_{hs} \leq 68$ ˚C	-	10	A
$I_{F(RMS)}$	RMS forward current		-	15.7	A
I_{FRM}	Repetitive peak forward current	sinusoidal; a = 1.57	-	100	A
I_{FSM}	Non repetitive peak forward current	t = 10 ms	-	100	A
		t = 8.3 ms	-	110	A
		sinusoidal; T_j = 150 ˚C prior to surge; with reapplied $V_{RWM(max)}$			
I^2t	I^2t for fusing	t = 10 ms	-	50	A^2s
T_{stg}	Storage temperature		-40	150	˚C
T_j	Operating junction temperature		-	150	˚C

ISOLATION

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

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	-	8	14	V
t_{fr}	Forward recovery time	I_F = 6.5 A; dI_F/dt = 50 A/µs; V_F = 5 V	-	170	250	ns
		I_F = 6.5 A; dI_F/dt = 50 A/µs; V_F = 2 V	-	350	-	ns
t_{rr}	Reverse recovery time	I_F = 1 A; $-dI_F/dt$ = 50 A/µs; $V_R \geq 30$ V	-	250	350	ns

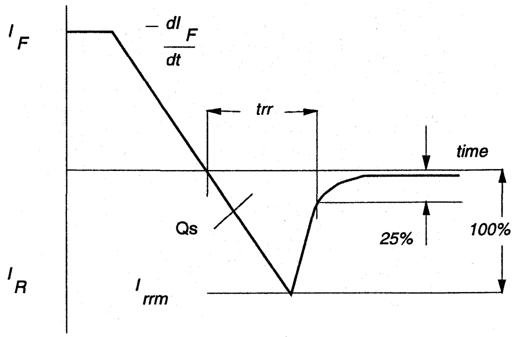


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

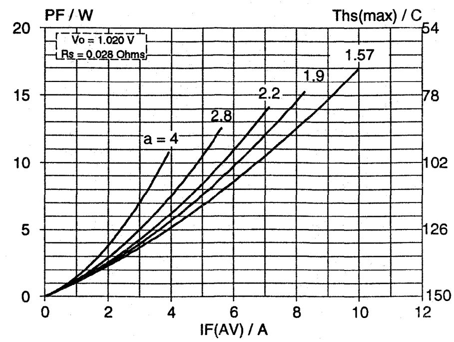


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

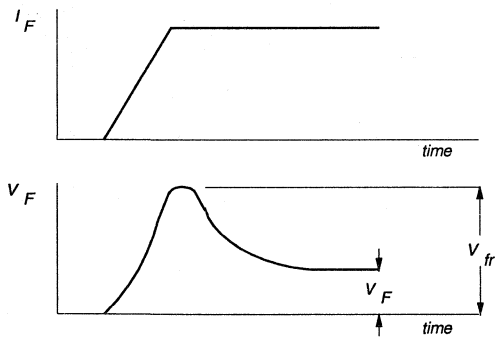


Fig.2. Definition of V_{fr}

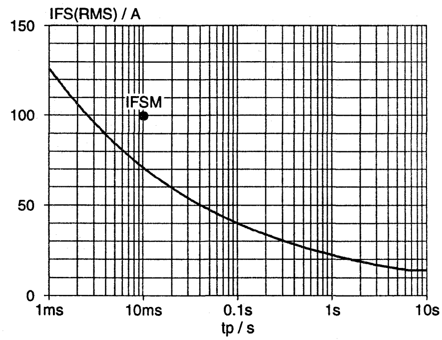


Fig.5. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; T_j = 150˚C prior to surge with reapplied V_{RWM}.

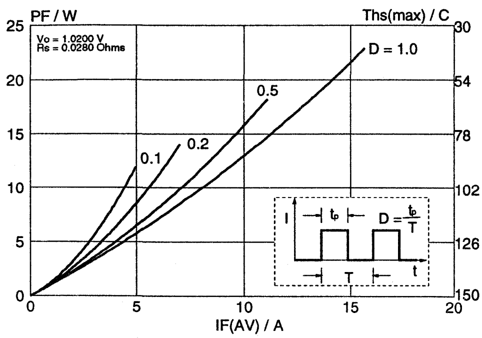


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

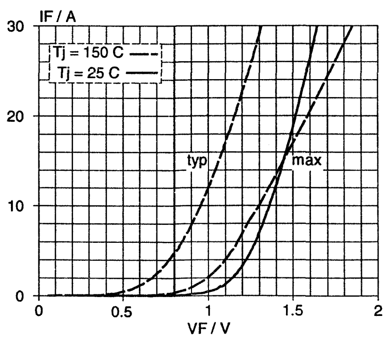


Fig.6. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

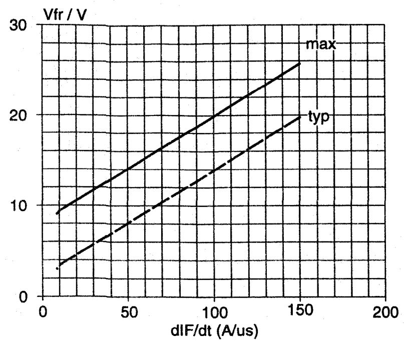


Fig.7. Typical and maximum $V_{fr} = f(dI_F/dt)$; $T_j = 25^{\circ}C$

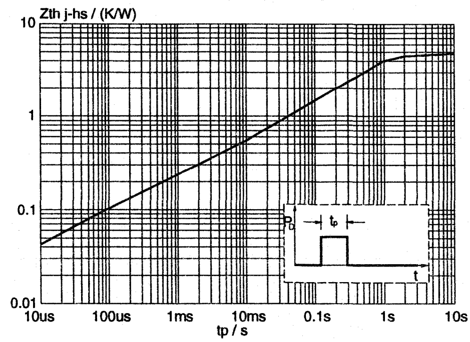


Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$

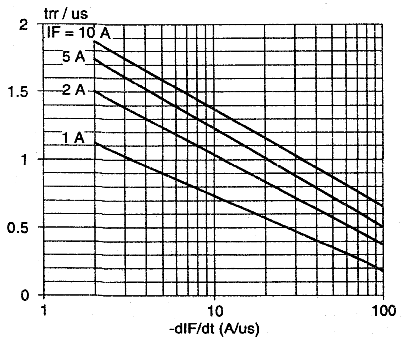


Fig.8. Maximum reverse recovery time $t_{rr} = f(dI_F/dt)$; parameter T_j

Rectifier diodes ultrafast

BYQ28 series

GENERAL DESCRIPTION

Glass passivated, dual, high efficiency rectifier diodes in a plastic envelope, 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.

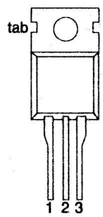
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYQ28-	**100**	**150**	**200**	
V_{RRM}	Repetitive peak reverse voltage	100	150	200	V
V_F	Forward voltage	0.895	0.895	0.895	V
$I_{O(AV)}$	Output current (both diodes conducting)	10	10	10	A
t_{rr}	Reverse recovery time	20	20	20	ns

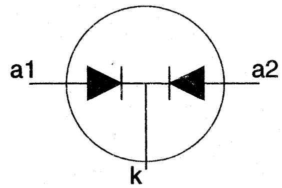
PINNING - TO220AB

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-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		-	100	150	200	V
$I_{O(AV)}$	Output current (both diodes conducting)[1]	square wave; $\delta = 0.5$; $T_{mb} \leq 119$ ˚C	-	10			A
		sinusoidal; a = 1.57; $T_{mb} \leq 121$ ˚C	-	9			A
$I_{O(RMS)}$	RMS forward current		-	14			A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 119$ ˚C	-	10			A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-	50			A
		t = 8.3 ms	-	55			A
		sinusoidal; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-	12.5			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 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

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage (per diode)	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 (per diode)	$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.1	0.2	mA
		$V_R = V_{RWM}$	-	2	10	µA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_s	Reverse recovery charge (per diode)	I_F = 2 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 20 A/µs	-	4	5.5	nC
t_{rr}	Reverse recovery time (per diode)	I_F = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 100 A/µs	-	15	20	ns
I_{rrm}	Peak reverse recovery current (per diode)	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 (per diode)	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

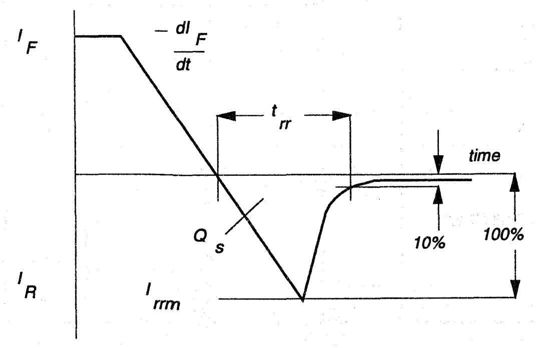


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

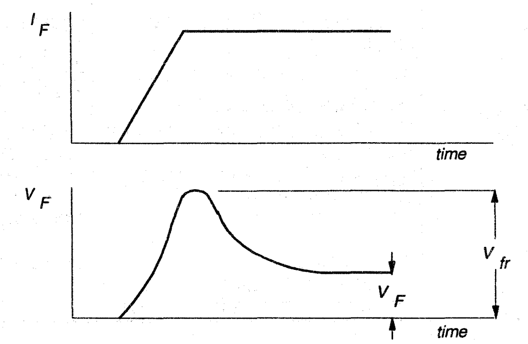


Fig.2. Definition of V_{fr}

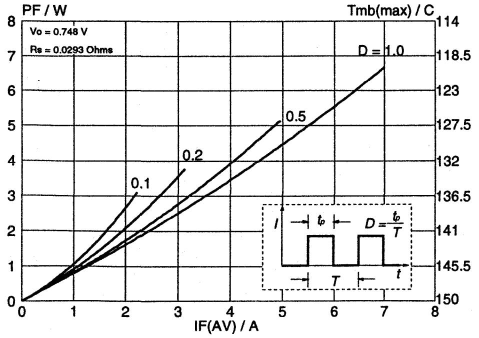


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

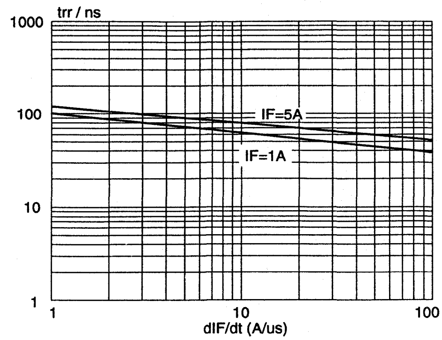


Fig.6. Maximum t_{rr} at $T_j = 100$ ˚C; per diode

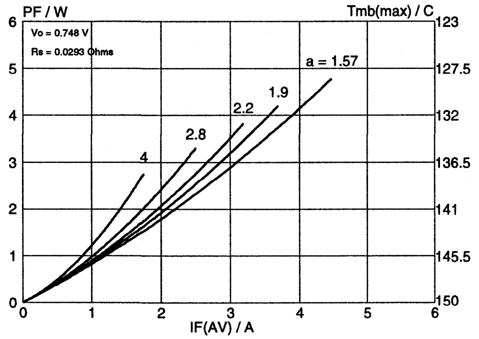


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

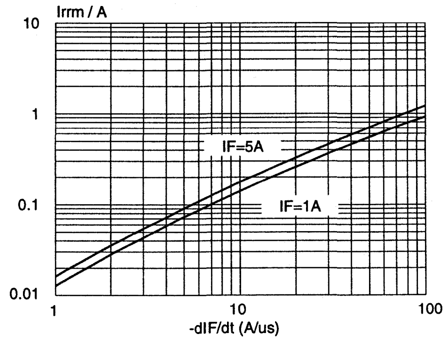


Fig.7. Maximum I_{rrm} at $T_j = 25$ ˚C; per diode

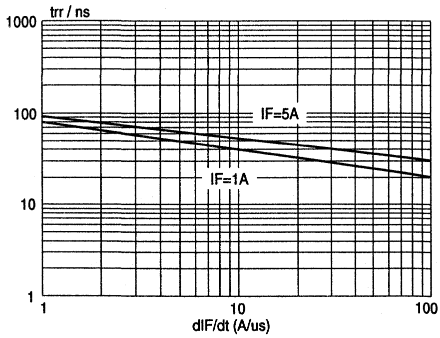


Fig.5. Maximum t_{rr} at $T_j = 25$ ˚C; per diode

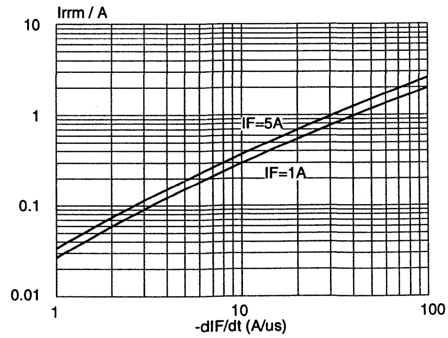


Fig.8. Maximum I_{rrm} at $T_j = 100$ ˚C; per diode

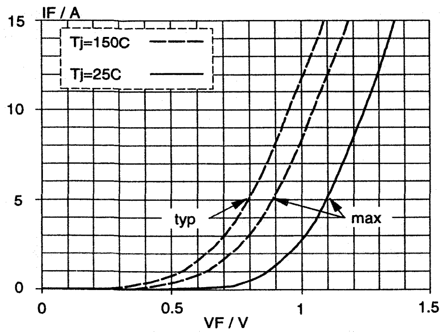


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

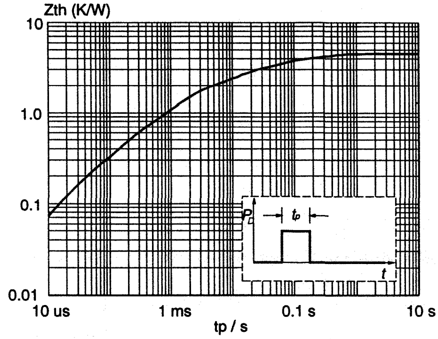


Fig.11. Transient thermal impedance; per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

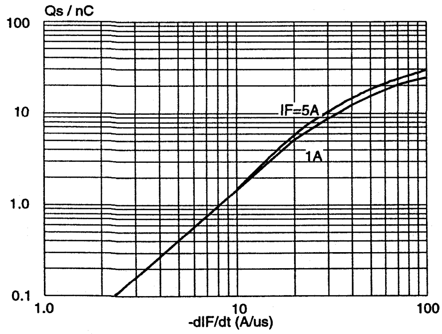


Fig.10. Maximum Q_s at $T_j = 25$ ˚C; per diode

Rectifier diodes ultrafast, rugged

BYQ28E series

GENERAL DESCRIPTION

Glass passivated high efficiency rugged dual rectifier diodes in a plastic envelope, featuring low forward voltage drop, ultra-fast recovery times and soft recovery characteristic. These devices can withstand reverse voltage transients and have 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.

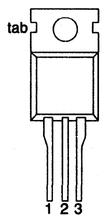
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYQ28E-	**100**	**150**	**200**	
V_{RRM}	Repetitive peak reverse voltage	100	150	200	V
V_F	Forward voltage	0.895	0.895	0.895	V
$I_{O(AV)}$	Output current (both diodes conducting)	10	10	10	A
t_{rr}	Reverse recovery time	25	25	25	ns
I_{RRM}	Repetitive peak reverse current per diode	0.2	0.2	0.2	A

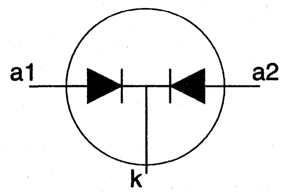
PINNING - TO220AB

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-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		-	100	150	200	V
$I_{O(AV)}$	Output current (both diodes conducting)[1]	square wave $\delta = 0.5$; $T_{mb} \leq 119$ ˚C	-	10			A
		sinusoidal $a = 1.57$; $T_{mb} \leq 121$ ˚C	-	9			A
$I_{O(RMS)}$	RMS forward current		-	14			A
I_{FRM}	Repetitive peak forward current per diode	$t = 25$ µs; $\delta = 0.5$; $T_{mb} \leq 119$ ˚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^2t	I^2t for fusing	$t = 10$ ms	-	12.5			A^2s
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

THERMAL 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 conducting	-	-	3.0	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 (per diode)	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 (per diode)	$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.1	0.2	mA
		$V_R = V_{RWM}$	-	2	10	µA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_s	Reverse recovery charge (per diode)	I_F = 2 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 20 A/µs	-	4	9	nC
t_{rr1}	Reverse recovery time (per diode)	I_F = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 100 A/µs	-	15	25	ns
t_{rr2}	Reverse recovery time (per diode)	I_F = 0.5 A to I_R = 1 A; I_{rec} = 0.25 A	-	10	20	ns
V_{fr}	Forward recovery voltage (per diode)	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

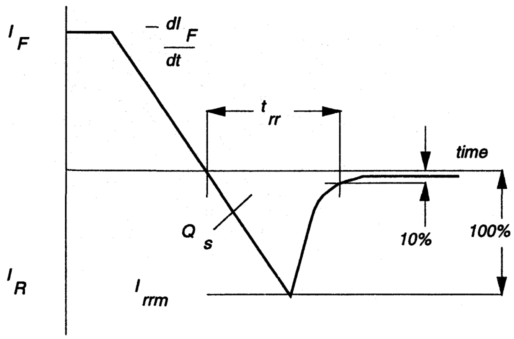


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

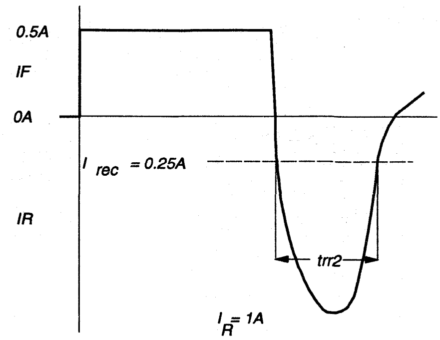


Fig.4. Definition of t_{rr2}

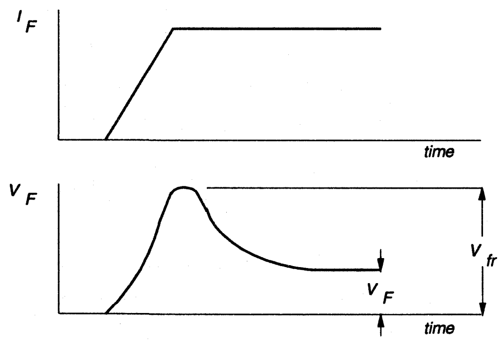


Fig.2. Definition of V_{fr}

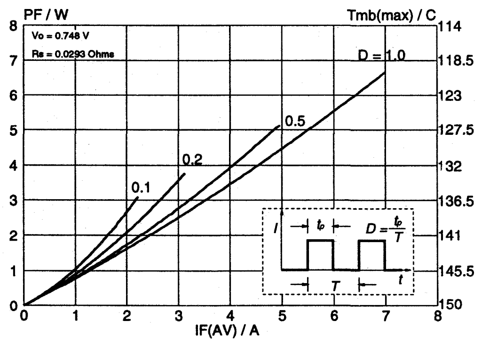


Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

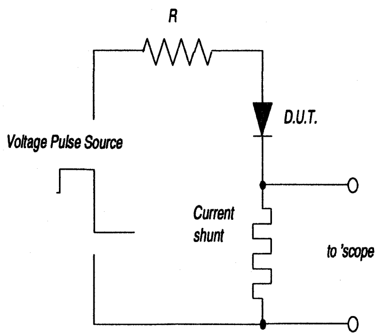


Fig.3. Circuit schematic for t_{rr2}

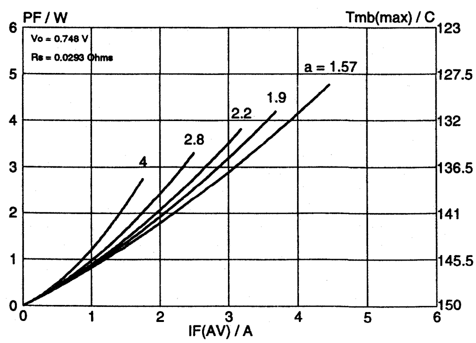


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

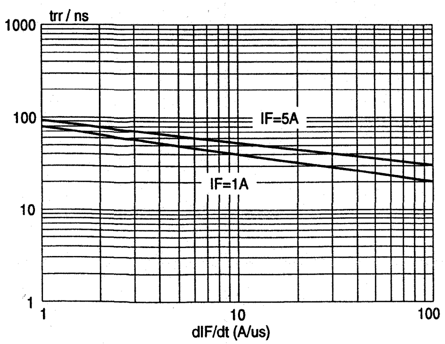


Fig.7. Maximum t_{rr} at T_j = 25 ˚C; per diode

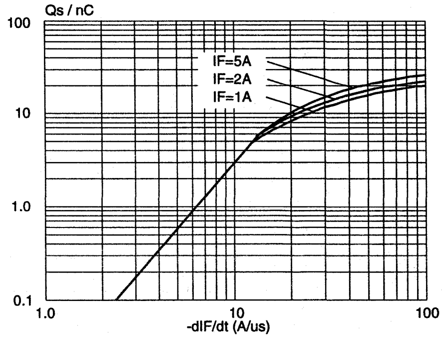


Fig.10. Maximum Q_s at T_j = 25 ˚C; per diode

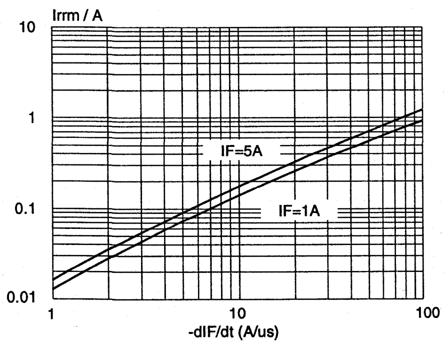


Fig.8. Maximum I_{rrm} at T_j = 25 ˚C; per diode

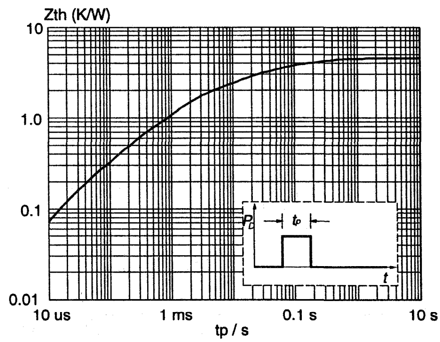


Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.

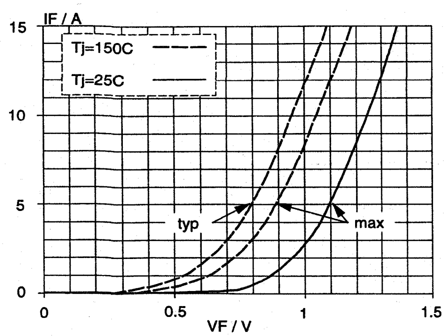


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

Rectifier diodes ultrafast

GENERAL DESCRIPTION

Glass passivated high efficiency dual rectifier diodes in a full pack plastic envelope, 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.

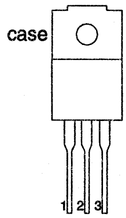
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYQ28F-	**100**	**150**	**200**	
V_{RRM}	Repetitive peak reverse voltage	100	150	200	V
V_F	Forward voltage	0.895	0.895	0.895	V
$I_{O(AV)}$	Output current (both diodes conducting)	10	10	10	A
t_{rr}	Reverse recovery time	20	20	20	ns

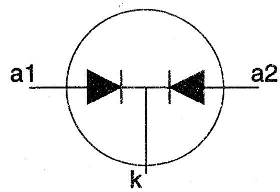
PINNING - SOT186

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-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
$I_{O(AV)}$	Output current (both diodes conducting)[2]	square wave; $\delta = 0.5$; $T_{hs} \leq 92$ ˚C	-	10			A
		sinusoidal; a = 1.57; $T_{hs} \leq 95$ ˚C	-	9			A
$I_{O(RMS)}$	RMS forward current		-	14			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^2t	I^2t for fusing	t = 10 ms	-	12.5			A^2s
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

1 $T_{hs} \leq 148$˚C for thermal stability.

2 Neglecting switching and reverse current losses

ISOLATION

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Repetitive peak voltage from all three terminals to external heatsink	R.H. ≤ 65% ; clean and dustfree	-	-	1500	V
C_{isol}	Capacitance from T2 to external heatsink	f = 1 MHz	-	12	-	pF

THERMAL 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

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage (per diode)	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 (per diode)	$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.1	0.2	mA
		$V_R = V_{RWM}$	-	2	10	µA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_s	Reverse recovery charge (per diode)	I_F = 2 A; V_R ≥ 30 V; -dI_F/dt = 20 A/µs	-	4	5.5	nC
t_{rr}	Reverse recovery time (per diode)	I_F = 1 A; V_R ≥ 30 V; -dI_F/dt = 100 A/µs	-	15	20	ns
I_{rrm}	Peak reverse recovery current (per diode)	I_F = 5 A; V_R ≥ 30 V; -dI_F/dt = 50 A/µs	-	0.5	0.7	A
V_{fr}	Forward recovery voltage (per diode)	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

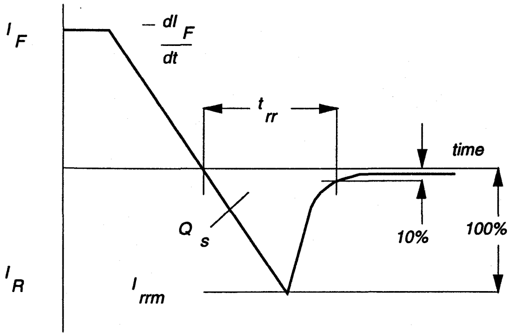


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

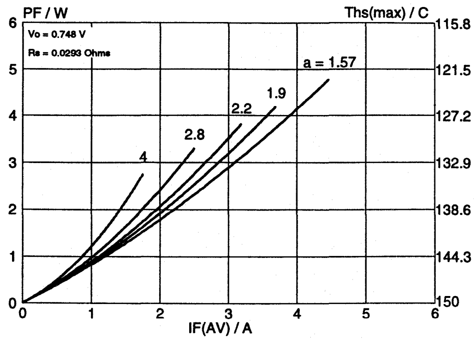


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

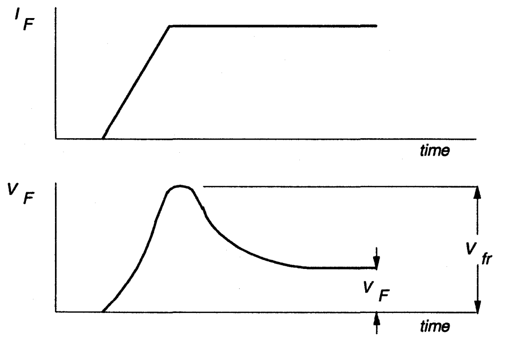


Fig.2. Definition of V_{fr}

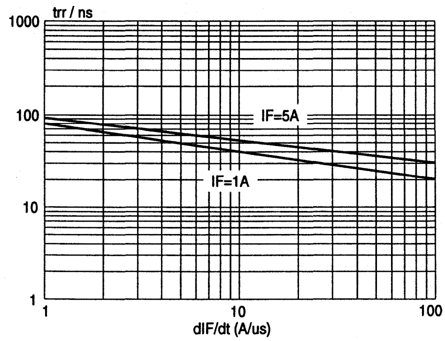


Fig.5. Maximum t_{rr} at T_j = 25 ˚C; per diode

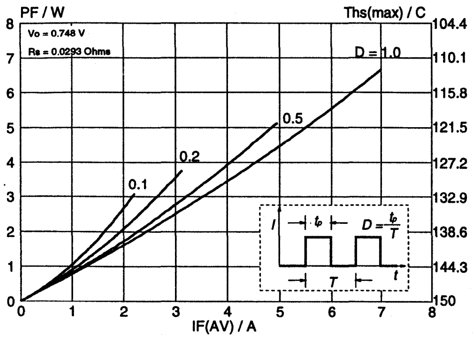


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

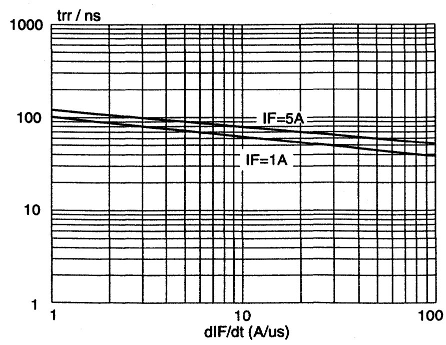


Fig.6. Maximum t_{rr} at T_j = 100 ˚C; per diode

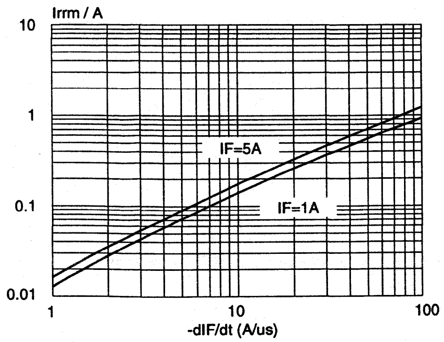


Fig.7. Maximum I_{rrm} at T_j = 25 ˚C; per diode

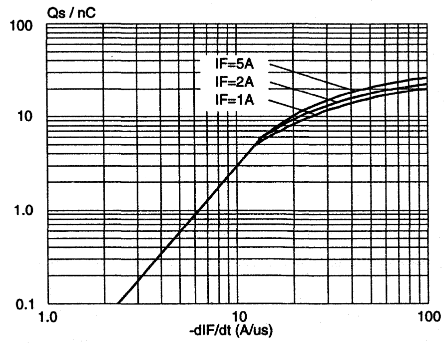


Fig.10. Maximum Q_s at T_j = 25 ˚C; per diode

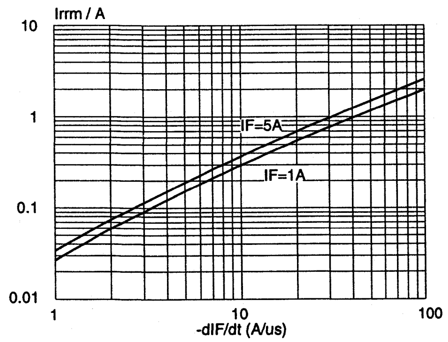


Fig.8. Maximum I_{rrm} at T_j = 100 ˚C; per diode

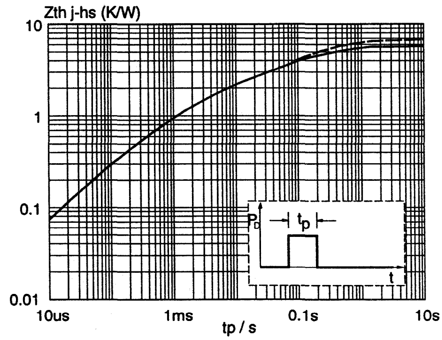


Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}hs} = f(t_p)$.

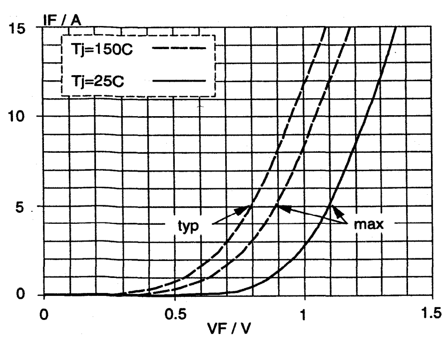


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

Rectifier diodes ultrafast

BYR29 series

GENERAL DESCRIPTION

Glass passivated, high efficiency, rugged rectifier diodes in a plastic envelope, featuring low forward voltage drop, ultra fast reverse recovery times and soft recovery characteristic. They are intended for use in switched mode power supplies and high frequency circuits in general, where both low conduction losses and low switching losses are essential.

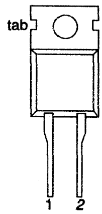
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYR29-	**500**	**600**	**700**	
V_{RRM}	Repetitive peak reverse voltage	500	600	700	V
V_F	Forward voltage	1.5	1.5	1.5	V
$I_{F(AV)}$	Forward current	8	8	8	A
t_{rr}	Reverse recovery time	75	75	75	ns

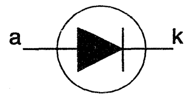
PINNING - TO220AC

PIN	DESCRIPTION
1	cathode (k)
2	anode (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-500	**-600**	**-700**	
V_{RRM}	Repetitive peak reverse voltage		-	500	600	700	V
V_{RWM}	Crest working reverse voltage		-	400	500	500	V
V_R	Continuous reverse voltage		-	400	500	500	V
$I_{F(AV)}$	Average forward current[1]	square wave; $\delta = 0.5$; $T_{mb} \leq 115\ ^\circ C$	-	8			A
		sinusoidal; a = 1.57; $T_{mb} \leq 115\ ^\circ C$	-	7.2			A
$I_{F(RMS)}$	RMS forward current		-	11.3			A
I_{FRM}	Repetitive peak forward current	$t = 25\ \mu s$; $\delta = 0.5$; $T_{mb} \leq 115\ ^\circ C$	-	16			A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms	-	60			A
		t = 8.3 ms	-	66			A
		sinusoidal; 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

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		-	-	2.5	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	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	$V_R = V_{RWM}$	-	1.0	10	µA
		$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.1	0.2	mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
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

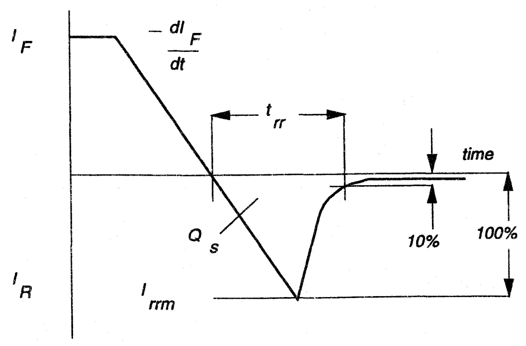


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

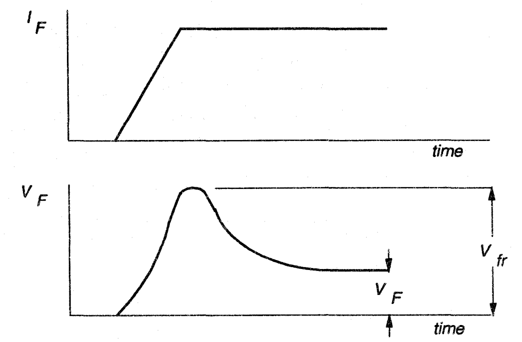


Fig.2. Definition of V_{fr}

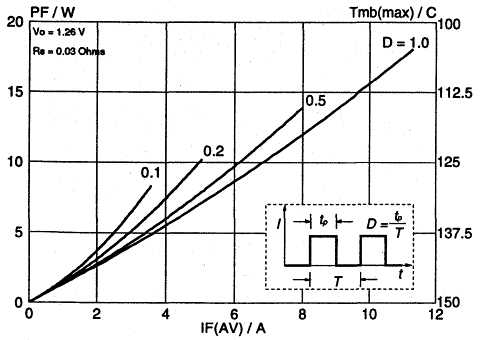


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

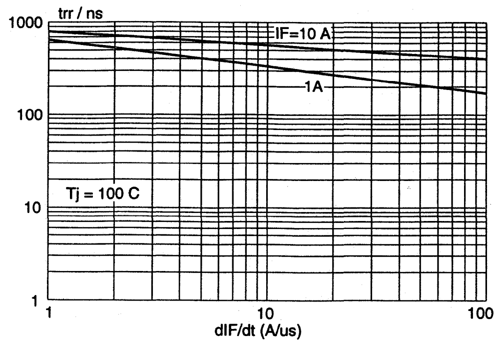


Fig.6. Maximum t_{rr} at $T_j = 100˚C$

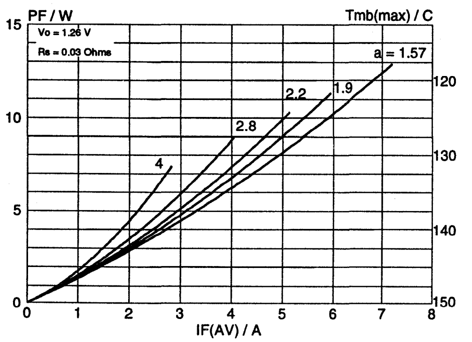


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

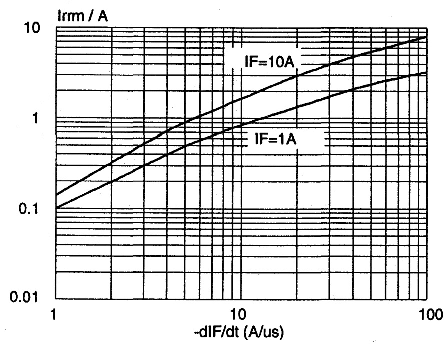


Fig.7. Maximum I_{rrm} at $T_j = 25˚C$.

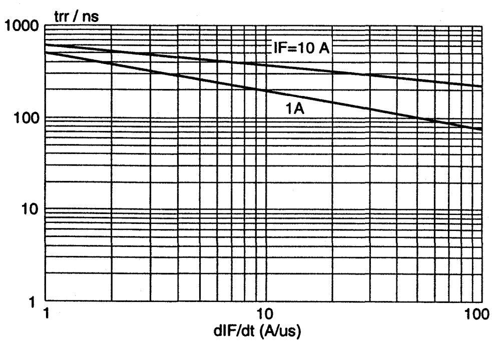


Fig.5. Maximum t_{rr} at $T_j = 25˚C$

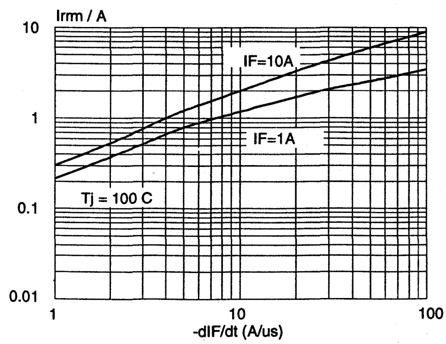


Fig.8. Maximum I_{rrm} at $T_j = 100˚C$.

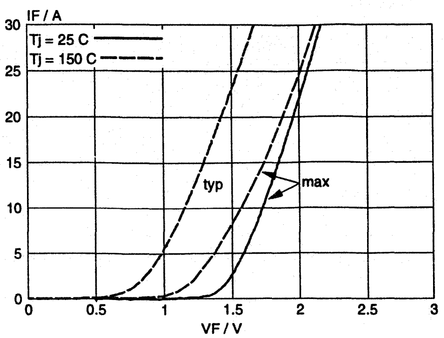


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

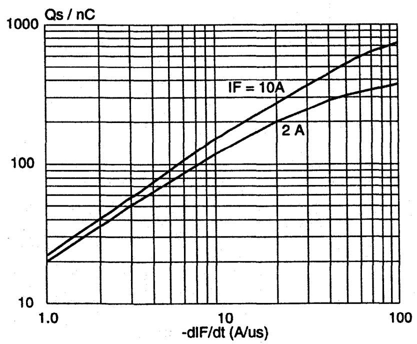


Fig.10. Maximum Q_s at $T_j = 25^{\circ}C$

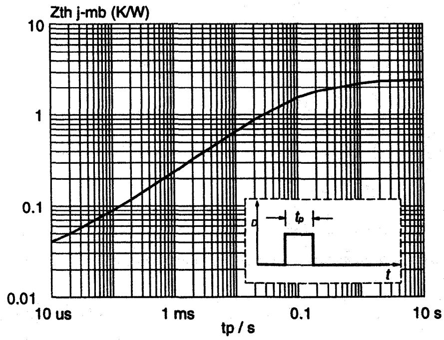


Fig.11. Transient thermal impedance $Z_{th} = f(t_p)$

Rectifier diodes ultrafast

BYR29F series

GENERAL DESCRIPTION

Glass passivated, high efficiency rectifier diodes in a full pack, plastic envelope, featuring low forward voltage drop, ultra fast reverse recovery times and soft recovery characteristic. They are intended for use in switched mode power supplies and high frequency circuits in general, where both low conduction losses and low switching losses are essential.

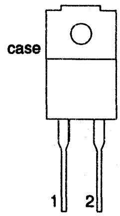
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYR29F-	**500**	**600**	**700**	
V_{RRM}	Repetitive peak reverse voltage	500	600	700	V
V_F	Forward voltage	1.5	1.5	1.5	V
$I_{F(AV)}$	Forward current	8	8	8	A
t_{rr}	Reverse recovery time	75	75	75	ns

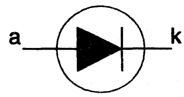
PINNING - SOD100

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.			UNIT
				-500	**-600**	**-700**	
V_{RRM}	Repetitive peak reverse voltage		-	500	600	700	V
V_{RWM}	Crest working reverse voltage		-	400	500	500	V
V_R	Continuous reverse voltage[1]		-	400	500	500	V
$I_{F(AV)}$	Average forward current[2]	square wave; $\delta = 0.5$; $T_{hs} \leq 73$ °C	-	8			A
		sinusoidal; a = 1.57; $T_{hs} \leq 79$ °C	-	7.2			A
$I_{F(RMS)}$	RMS forward current		-	11.3			A
I_{FRM}	Repetitive peak forward current	t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 73$ °C	-	16			A
I_{FSM}	Non-repetitive peak forward current.	t = 10 ms	-	60			A
		t = 8.3 ms	-	66			A
		sinusoidal; 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

1 $T_{hs} \leq 138$°C for thermal stability.

2 Neglecting switching and reverse current losses

ISOLATION

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

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	5.5	K/W
		without heatsink compound	-	-	7.2	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

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	$V_R = V_{RWM}$	-	1.0	10	µA
		$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.1	0.2	mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_s	Reverse recovery charge	I_F = 2 A to V_R ≥ 30 V; dI_F/dt = 20 A/µs	-	150	200	nC
t_{rr}	Reverse recovery time	I_F = 1 A to V_R ≥ 30 V; dI_F/dt = 100 A/µs	-	60	75	ns
I_{rrm}	Peak reverse recovery current	I_F = 10 A to V_R ≥ 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

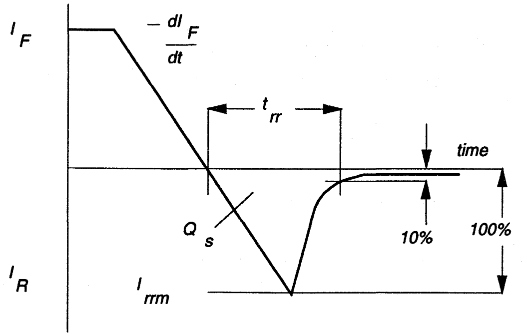


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

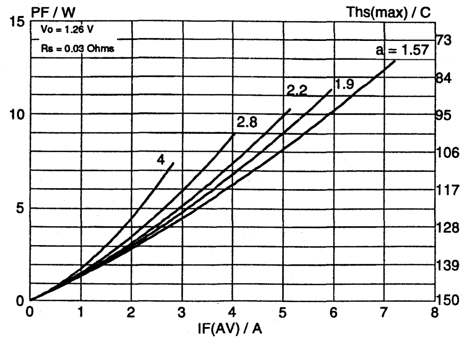


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)}$ / $I_{F(AV)}$.

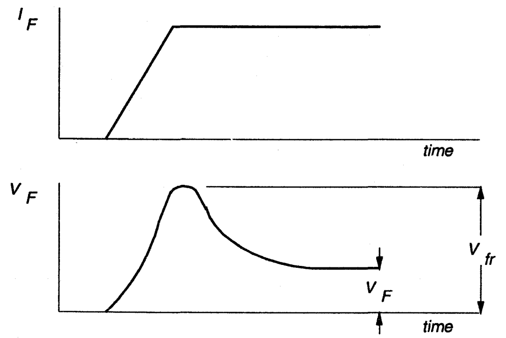


Fig.2. Definition of V_{fr}

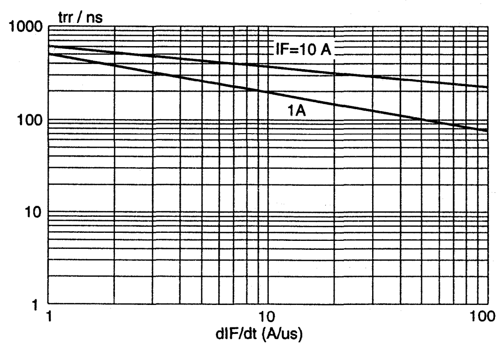


Fig.5. Maximum t_{rr} at T_j = 25˚C

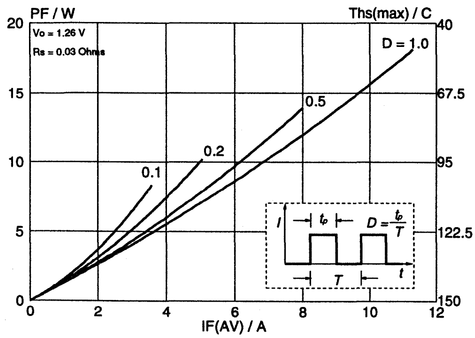


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

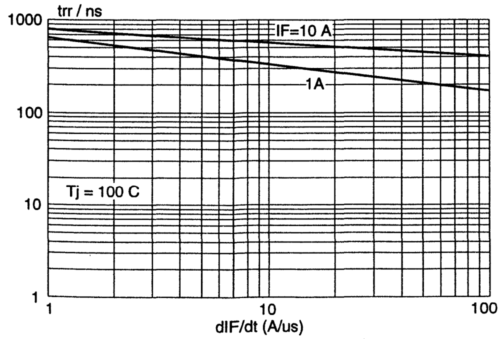


Fig.6. Maximum t_{rr} at T_j = 100˚C

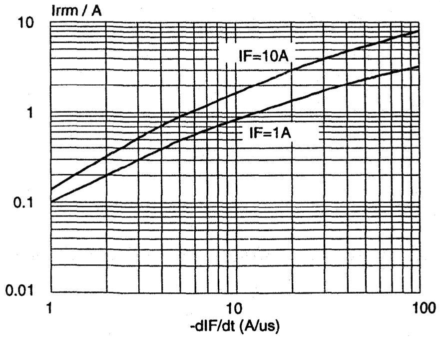


Fig.7. Maximum I_{rrm} at $T_j = 25˚C$.

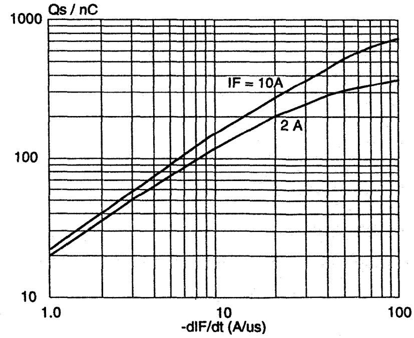


Fig.10. Maximum Q_s at $T_j = 25˚C$

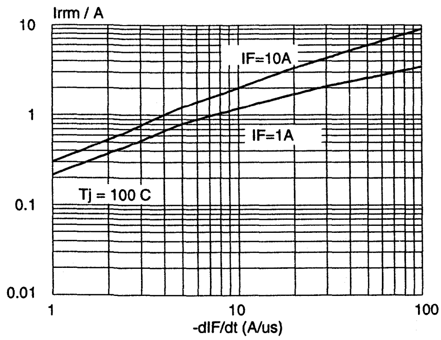


Fig.8. Maximum I_{rrm} at $T_j = 100˚C$.

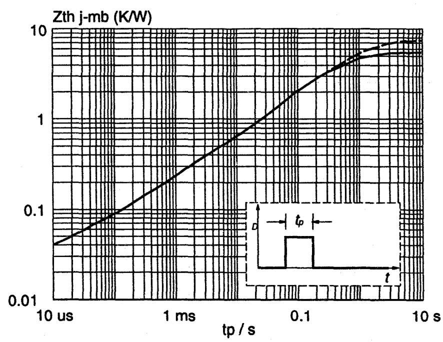


Fig.11. Transient thermal impedance $Z_{th} = f(t_p)$

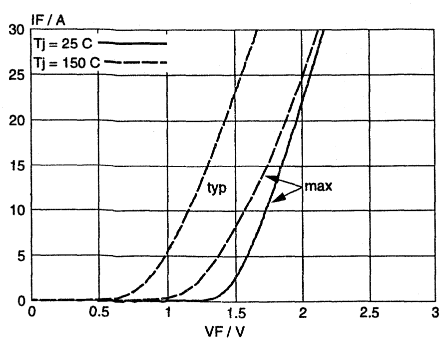


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

GENERAL DESCRIPTION

Glass passivated, high efficiency rectifier diodes in a plastic envelope, featuring low forward voltage drop, ultra fast reverse recovery times and soft recovery characteristic. They are intended for use in switched mode power supplies and high frequency circuits in general, where both low conduction losses and low switching losses are essential.

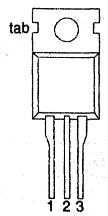
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYT28-	**300**	**400**	**500**	
V_{RRM}	Repetitive peak reverse voltage	300	400	500	V
V_F	Forward voltage	1.05	1.05	1.05	V
$I_{O(AV)}$	Output current (both diodes conducting)	10	10	10	A
t_{rr}	Reverse recovery time	60	60	60	ns

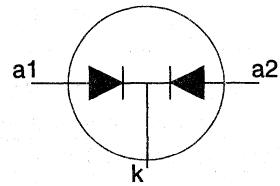
PINNING - TO220AB

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-300	-400	-500	
V_{RRM}	Repetitive peak reverse voltage		-	300	400	500	V
V_{RWM}	Crest working reverse voltage		-	200	300	400	V
V_R	Continuous reverse voltage[1]		-	200	300	400	V
$I_{O(AV)}$	Output current (both diodes conducting)[2]	square wave; $\delta = 0.5$; $T_{mb} \leq 115$ ˚C	-	10			A
		sinusoidal; a = 1.57; $T_{mb} \leq 119$ ˚C	-	9			A
$I_{O(RMS)}$	RMS forward current		-	14			A
I_{FRM}	Repetitive peak forward current per diode	$t = 25$ µs; $\delta = 0.5$; $T_{mb} \leq 115$ ˚C	-	10			A
I_{FSM}	Non-repetitive peak forward current per diode.	t = 10 ms	-	50			A
		t = 8.3 ms	-	55			A
		sinusoidal; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-	12.5			A^2s
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

1 $T_{mb} \leq 147$˚C for thermal stability.

2 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	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

STATIC 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	-	0.95	1.05	V
		I_F = 15 A	-	1.30	1.40	V
I_R	Reverse current	$V_R = V_{RWM}$	-	2.0	10	µA
		$V_R = V_{RWM}$; T_j = 100 °C	-	10	200	µA

DYNAMIC CHARACTERISTICS

T_j = 25 °C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
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

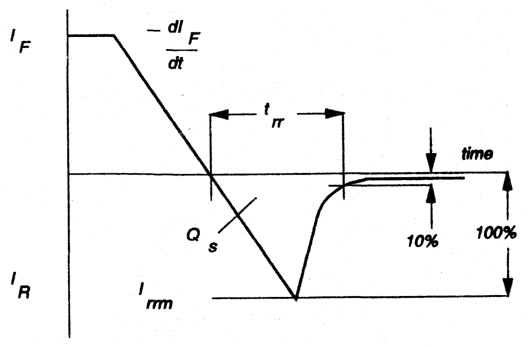


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

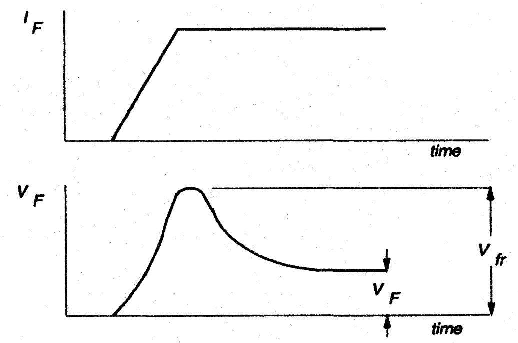


Fig.2. Definition of V_{fr}

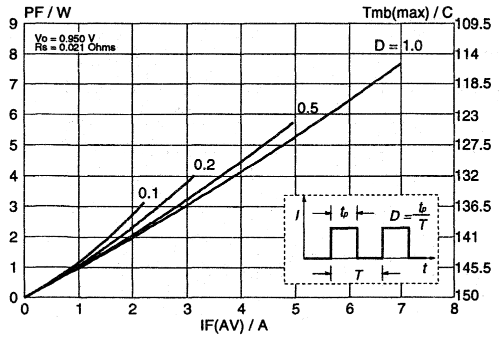


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

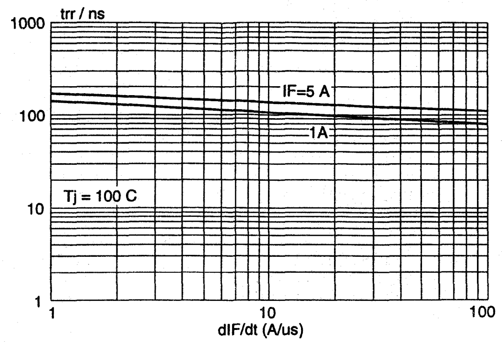


Fig.6. Maximum t_{rr} at $T_j = 100˚C$; per diode

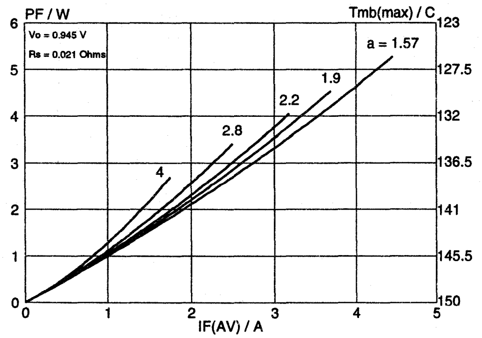


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

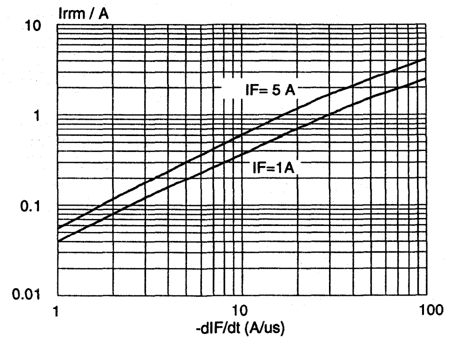


Fig.7. Maximum I_{rrm} at $T_j = 25˚C$; per diode.

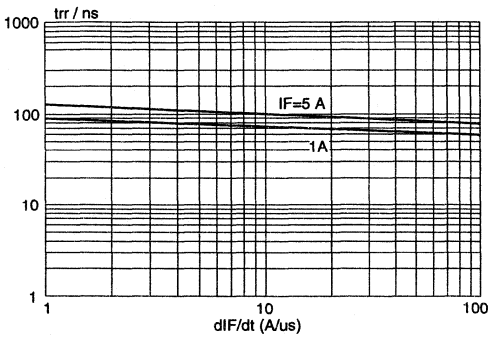


Fig.5. Maximum t_{rr} at $T_j = 25˚C$; per diode

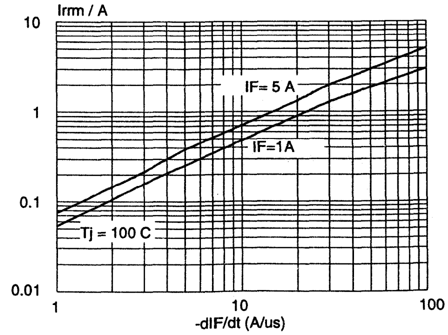


Fig.8. Maximum I_{rrm} at $T_j = 100˚C$; per diode.

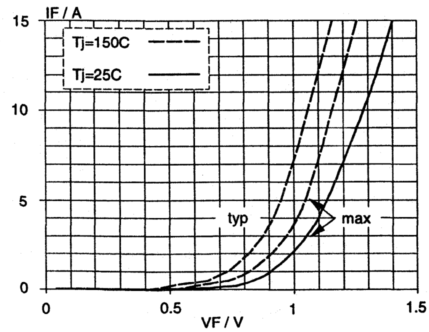


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

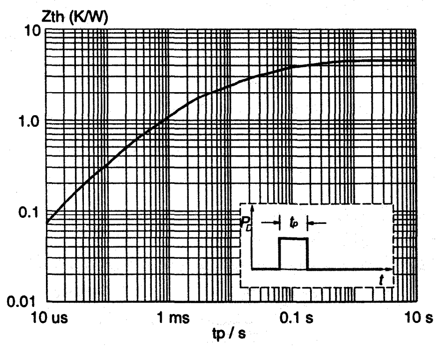


Fig.11. Transient thermal impedance per diode $Z_{th} = f(t_p)$

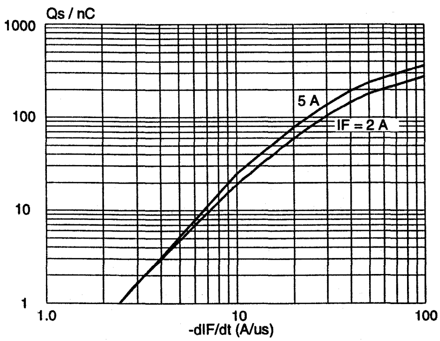


Fig.10. Maximum Q_s at $T_j = 25˚C$; per diode.

GENERAL DESCRIPTION

Glass passivated, high efficiency rectifier diodes in a plastic envelope featuring low forward voltage drop, ultra fast reverse recovery times and soft recovery characteristic. They are intended for use in switched mode power supplies and high frequency circuits in general, where both low conduction losses and low switching losses are essential.

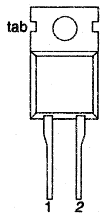
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYT79-	**300**	**400**	**500**	
V_{RRM}	Repetitive peak reverse voltage	300	400	500	V
V_F	Forward voltage	1.05	1.05	1.05	V
$I_{F(AV)}$	Forward current	14	14	14	A
t_{rr}	Reverse recovery time	60	60	60	ns

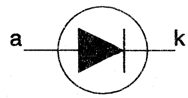
PINNING - TO220AC

PIN	DESCRIPTION
1	cathode (k)
2	anode (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-300	-400	-500	
V_{RRM}	Repetitive peak reverse voltage		-	300	400	500	V
V_{RWM}	Crest working reverse voltage		-	200	300	400	V
V_R	Continuous reverse voltage[1]		-	200	300	400	V
$I_{F(AV)}$	Average forward current[2]	square wave; $\delta = 0.5$; $T_{mb} \leq 117$ ˚C	-	14			A
		sinusoidal; a = 1.57; $T_{mb} \leq 119$ ˚C	-	12.5			A
$I_{F(RMS)}$	RMS forward current		-	20			A
I_{FRM}	Repetitive peak forward current	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 117$ ˚C	-	28			A
I_{FSM}	Non-repetitive peak forward current.	t = 10 ms	-	130			A
		t = 8.3 ms	-	143			A
		sinusoidal; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-	85			A^2s
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

1 $T_{mb} \leq 147$˚C for thermal stability.

2 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 = 15 A; T_j = 150˚C	-	0.90	1.05	V
		I_F = 50 A	-	1.30	1.40	V
I_R	Reverse current	$V_R = V_{RWM}$	-	5.0	50	µA
		$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.2	0.8	mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
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

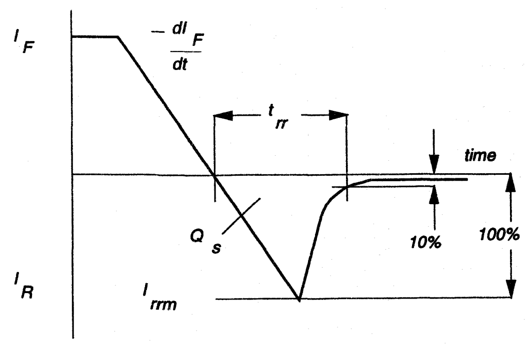


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

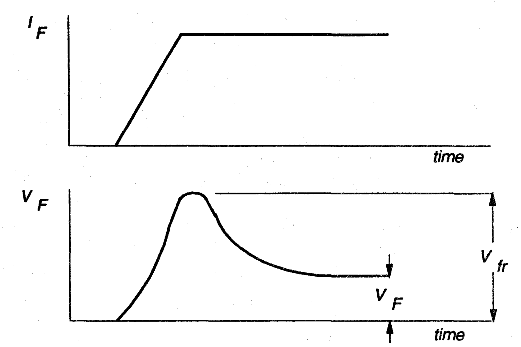


Fig.2. Definition of V_{fr}

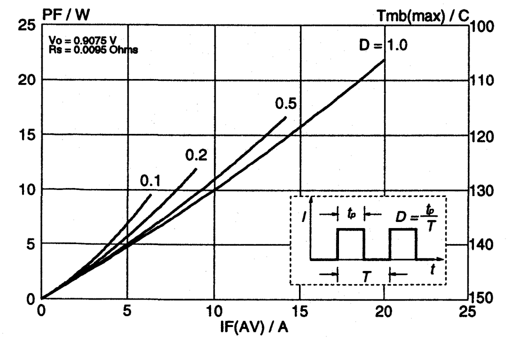


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

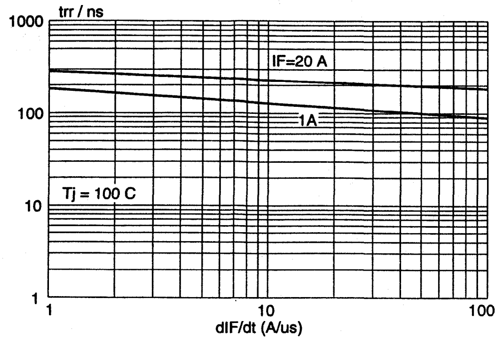


Fig.6. Maximum t_{rr} at $T_j = 100˚C$

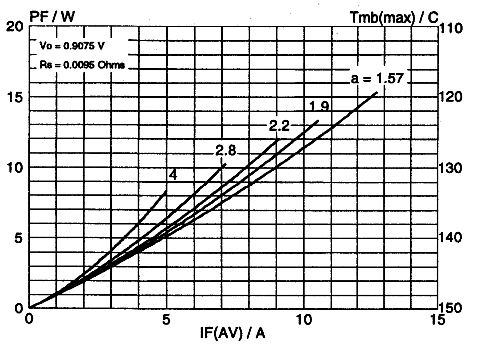


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

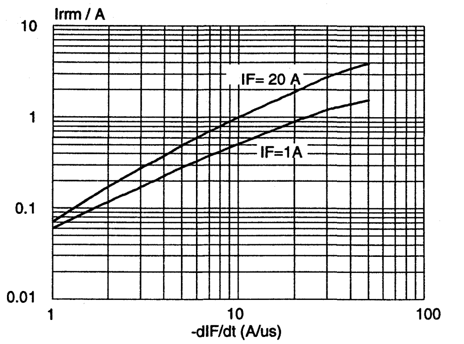


Fig.7. Maximum I_{rrm} at $T_j = 25˚C$.

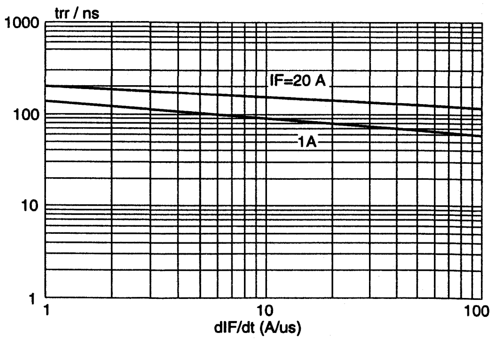


Fig.5. Maximum t_{rr} at $T_j = 25˚C$

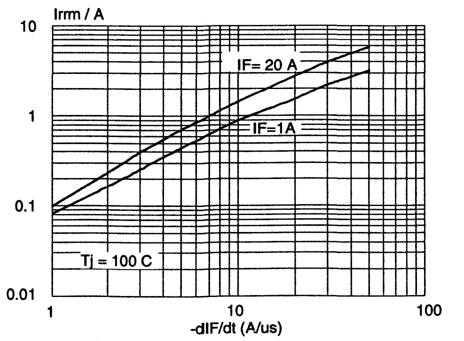


Fig.8. Maximum I_{rrm} at $T_j = 100˚C$.

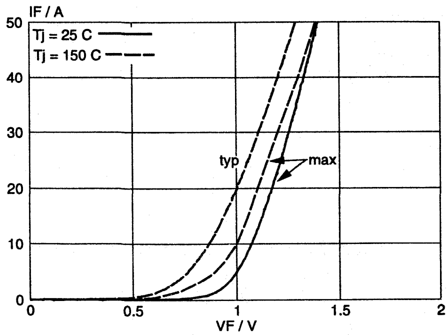


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

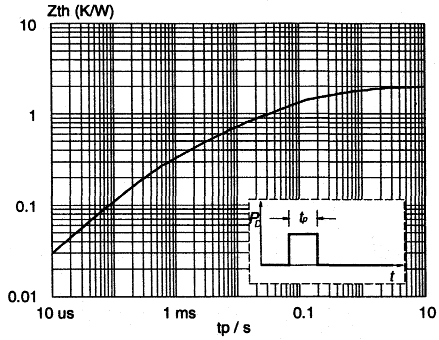


Fig.11. Transient thermal impedance $Z_{th} = f(t_p)$

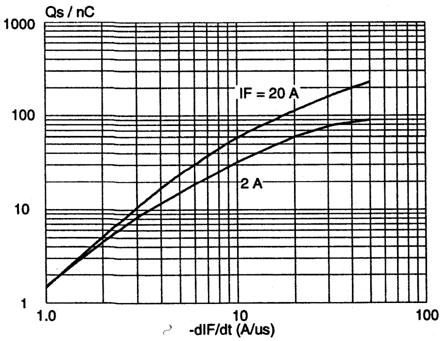


Fig.10. Maximum Q_s at $T_j = 25^\circ C$

GENERAL DESCRIPTION

Glass passivated, high efficiency, rectifier diodes in a plastic envelope featuring low forward voltage drop, ultra fast reverse recovery times and soft recovery characteristic. They are intended for use in switched mode power supplies and high frequency circuits in general, where both low conduction losses and low switching losses are essential.

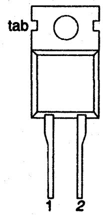
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV29-	**300**	**400**	**500**	
V_{RRM}	Repetitive peak reverse voltage	300	400	500	V
V_F	Forward voltage	1.05	1.05	1.05	V
$I_{F(AV)}$	Forward current	9	9	9	A
t_{rr}	Reverse recovery time	60	60	60	ns

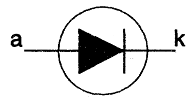
PINNING - TO220AC

PIN	DESCRIPTION
1	cathode (k)
2	anode (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-300	-400	-500	
V_{RRM}	Repetitive peak reverse voltage		-	300	400	500	V
V_{RWM}	Crest working reverse voltage		-	200	300	400	V
V_R	Continuous reverse voltage		-	200	300	400	V
$I_{F(AV)}$	Average forward current[1]	square wave; $\delta = 0.5$; $T_{mb} \leq 121$ °C	-	9			A
		sinusoidal; a = 1.57; $T_{mb} \leq 123$ °C	-	8			A
$I_{F(RMS)}$	RMS forward current		-	13			A
I_{FRM}	Repetitive peak forward current	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 121$ °C	-	18			A
I_{FSM}	Non-repetitive peak forward current.	t = 10 ms	-	70			A
		t = 8.3 ms	-	77			A
		sinusoidal; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-	25			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		-	-	2.5	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	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 5 A; T_j = 150˚C	-	0.83	1.03	V
		I_F = 20 A	-	1.30	1.40	V
I_R	Reverse current	$V_R = V_{RWM}$	-	2.0	10	µA
		$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.1	0.35	mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
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	5.5	A
V_{fr}	Forward recovery voltage	I_F = 10 A; dI_F/dt = 10 A/µs	-	2.5	-	V

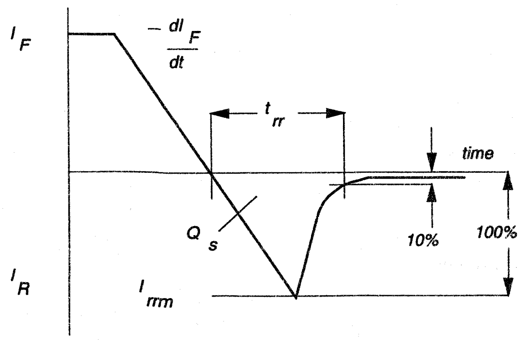


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

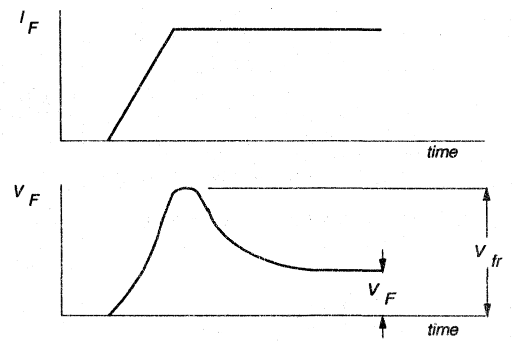


Fig.2. Definition of V_{fr}

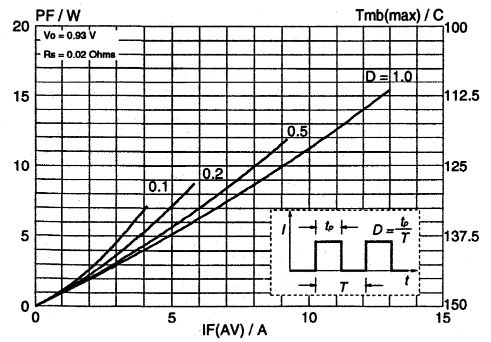


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

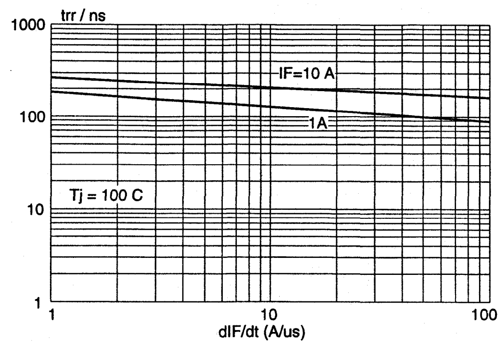


Fig.6. Maximum t_{rr} at $T_j = 100^{\circ}C$

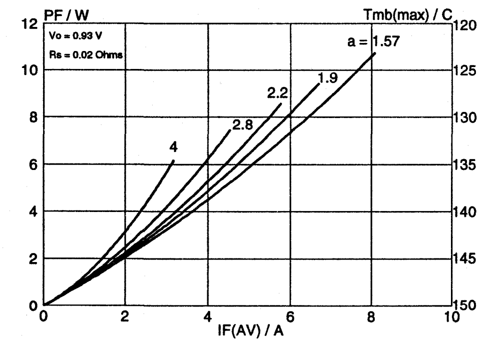


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

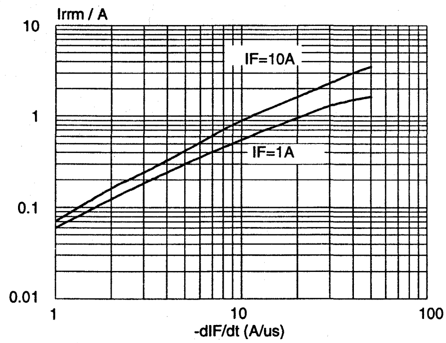


Fig.7. Maximum I_{rrm} at $T_j = 25^{\circ}C$.

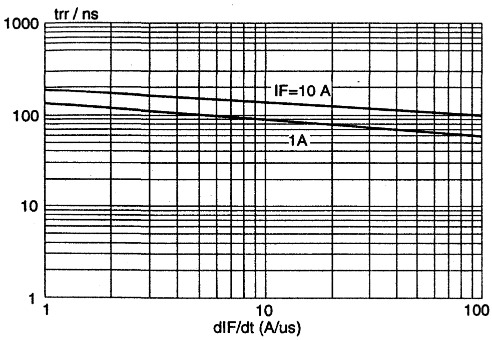


Fig.5. Maximum t_{rr} at $T_j = 25^{\circ}C$

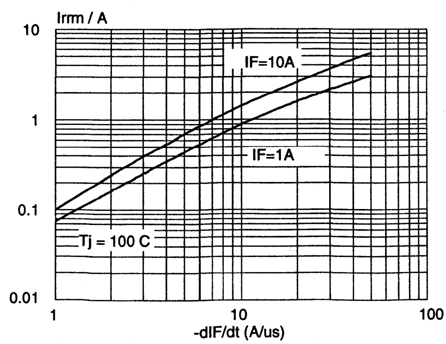


Fig.8. Maximum I_{rrm} at $T_j = 100^{\circ}C$.

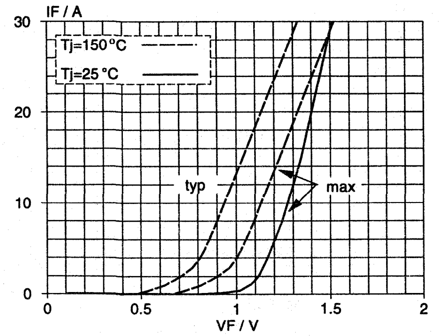


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

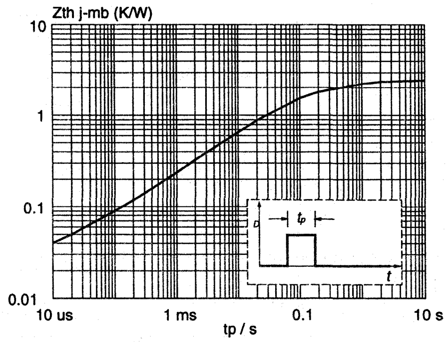


Fig.11. Transient thermal impedance $Z_{th} = f(t_p)$

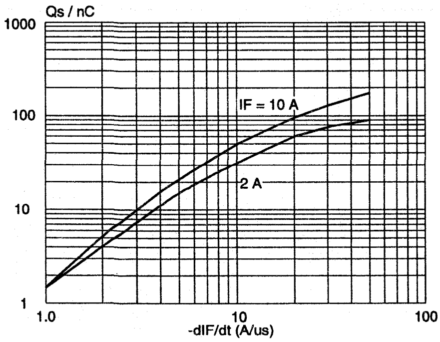


Fig.10. Maximum Q_s at $T_j = 25˚C$

Rectifier diodes ultrafast

BYV29F series

GENERAL DESCRIPTION

Glass passivated, high efficiency rectifier diodes in a full pack plastic envelope, featuring low forward voltage drop, ultra fast reverse recovery times and soft recovery characteristic. They are intended for use in switched mode power supplies and high frequency circuits in general, where both low conduction losses and low switching losses are essential.

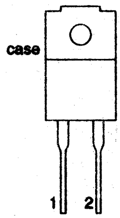
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV29F-	**300**	**400**	**500**	
V_{RRM}	Repetitive peak reverse voltage	300	400	500	V
V_F	Forward voltage	1.05	1.05	1.05	V
$I_{F(AV)}$	Forward current	9	9	9	A
t_{rr}	Reverse recovery time	60	60	60	ns

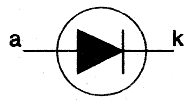
PINNING - SOD100

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.			UNIT
				-300	**-400**	**-500**	
V_{RRM}	Repetitive peak reverse voltage		-	300	400	500	V
V_{RWM}	Crest working reverse voltage		-	200	300	400	V
V_R	Continuous reverse voltage[1]		-	200	300	400	V
$I_{F(AV)}$	Average forward current[2]	square wave; $\delta = 0.5$; $T_{hs} \leq 87$ ˚C	-	9			A
		sinusoidal; a = 1.57; $T_{hs} \leq 91$ ˚C	-	8			A
$I_{F(RMS)}$	RMS forward current		-	13			A
I_{FRM}	Repetitive peak forward current	t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 87$ ˚C	-	18			A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms	-	70			A
		t = 8.3 ms	-	77			A
		sinusoidal; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-	25			A^2s
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

1 $T_{hs} \leq 138$˚C for thermal stability.

2 Neglecting switching and reverse current losses

ISOLATION

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

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	5.5	K/W
		without heatsink compound	-	-	7.2	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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 5 A; T_j = 150˚C	-	0.83	1.03	V
		I_F = 20 A	-	1.30	1.40	V
I_R	Reverse current	$V_R = V_{RWM}$	-	2.0	10	µA
		$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.1	0.35	mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_s	Reverse recovery charge	I_F = 2 A to V_R ≥ 30 V; dI_F/dt = 20 A/µs	-	50	60	nC
t_{rr}	Reverse recovery time	I_F = 1 A to V_R ≥ 30 V; dI_F/dt = 100 A/µs	-	50	60	ns
I_{rrm}	Peak reverse recovery current	I_F = 10 A to V_R ≥ 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

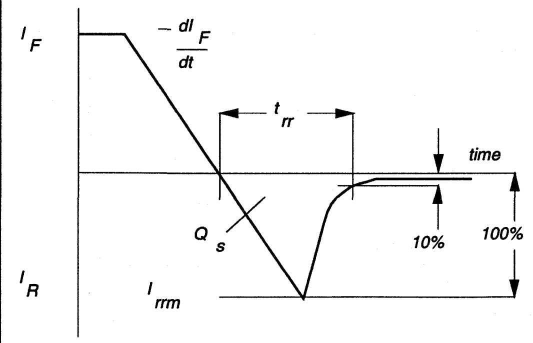


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

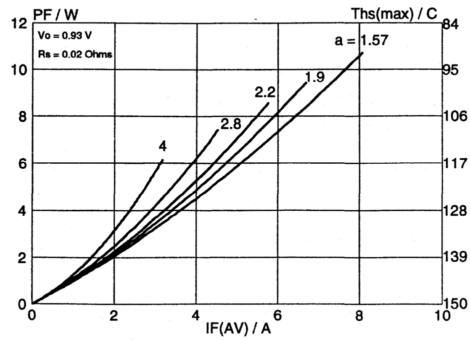


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

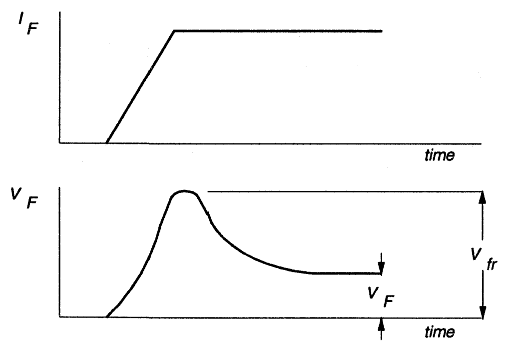


Fig.2. Definition of V_{fr}

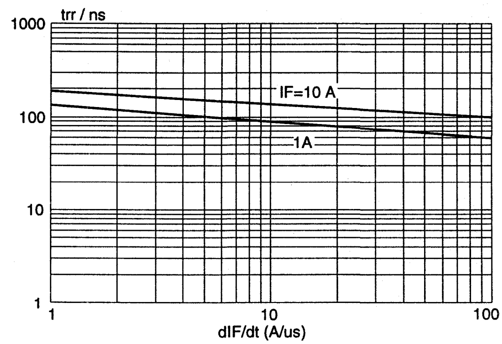


Fig.5. Maximum t_{rr} at $T_j = 25^{\circ}C$

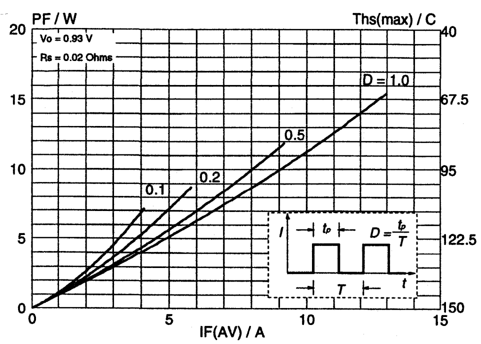


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

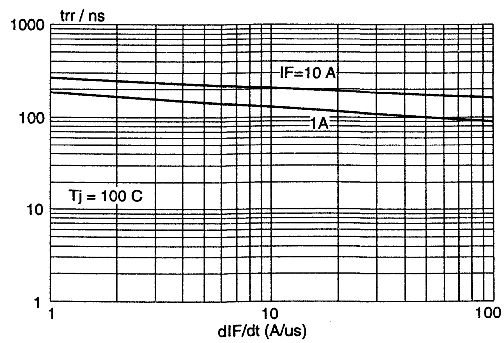


Fig.6. Maximum t_{rr} at $T_j = 100^{\circ}C$

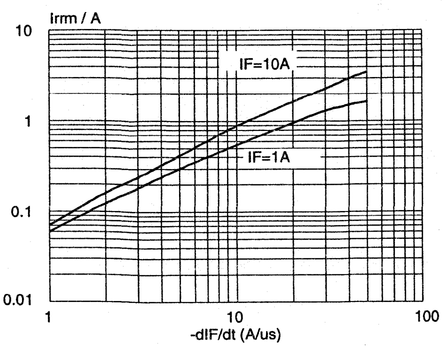


Fig.7. Maximum I_{rrm} at $T_j = 25^\circ C$.

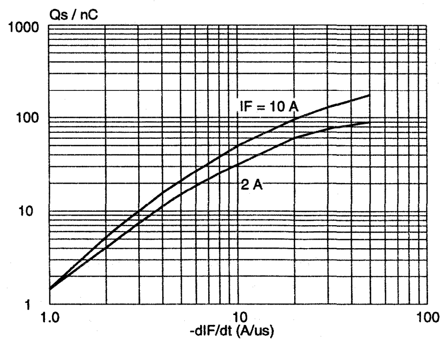


Fig.10. Maximum Q_s at $T_j = 25^\circ C$

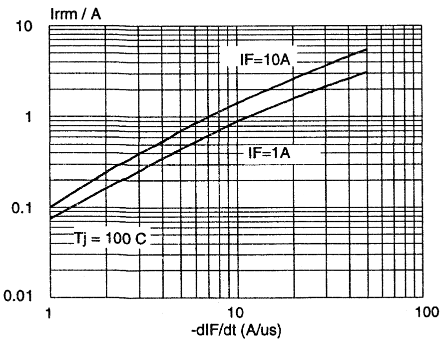


Fig.8. Maximum I_{rrm} at $T_j = 100^\circ C$.

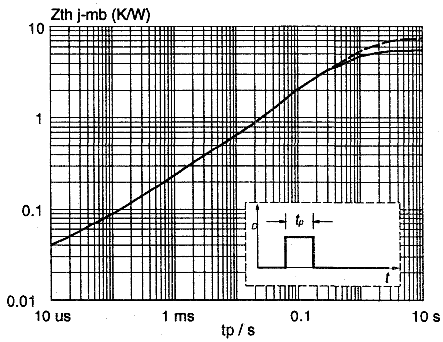


Fig.11. Transient thermal impedance $Z_{th} = f(t_p)$

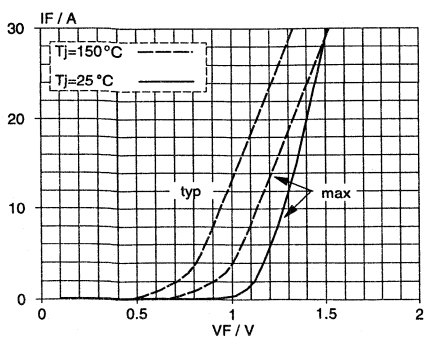


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

Rectifier diodes ultrafast

BYV32 series

GENERAL DESCRIPTION

Glass passivated high efficiency dual rectifier diodes in a plastic envelope, 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.

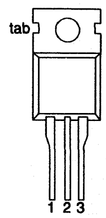
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV32-	**100**	**150**	**200**	
V_{RRM}	Repetitive peak reverse voltage	100	150	200	V
V_F	Forward voltage	0.85	0.85	0.85	V
$I_{O(AV)}$	Output current (both diodes conducting)	20	20	20	A
t_{rr}	Reverse recovery time	25	25	25	ns

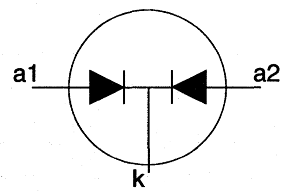
PINNING - TO220AB

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-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		-	100	150	200	V
$I_{O(AV)}$	Output current (both diodes conducting)[1]	square wave $\delta = 0.5$; $T_{mb} \leq 115$ ˚C	-	20			A
		sinusoidal $a = 1.57$; $T_{mb} \leq 118$ ˚C	-	18			A
$I_{O(RMS)}$	RMS forward current		-	28			A
I_{FRM}	Repetitive peak forward current per diode	$t = 25$ µs; $\delta = 0.5$; $T_{mb} \leq 115$ ˚C	-	20			A
I_{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
I^2t	I^2t for fusing	$t = 10$ ms	-	78			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	per diode	-	-	2.4	K/W
		both diodes conducting	-	-	1.6	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 (per diode)	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 (per diode)	$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.2	0.6	mA
		$V_R = V_{RWM}$	-	6	30	µA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_s	Reverse recovery charge (per diode)	I_F = 2 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 20 A/µs	-	8	12.5	nC
t_{rr}	Reverse recovery time (per diode)	I_F = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 100 A/µs	-	20	25	ns
I_{rrm}	Peak reverse recovery current (per diode)	I_F = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 50 A/µs; T_j = 100 ˚C	-	1.5	2	A
V_{fr}	Forward recovery voltage (per diode)	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

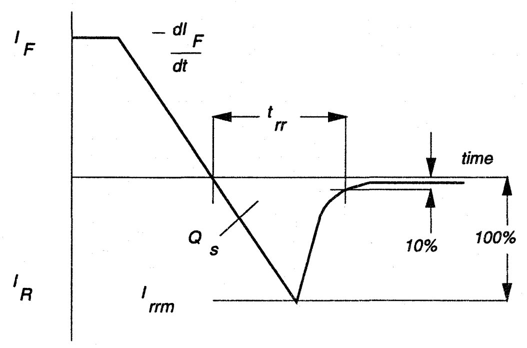


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

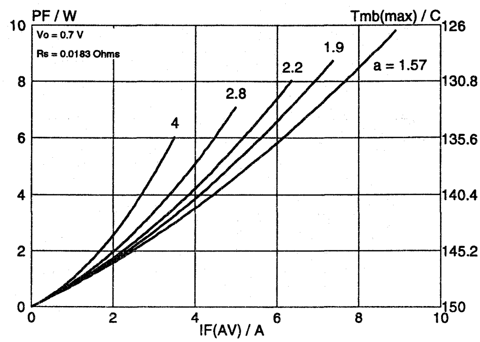


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)}$ / $I_{F(AV)}$.

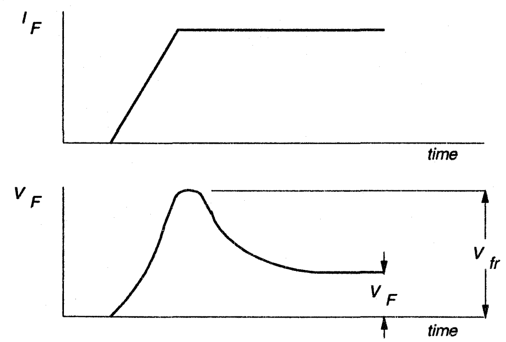


Fig.2. Definition of V_{fr}

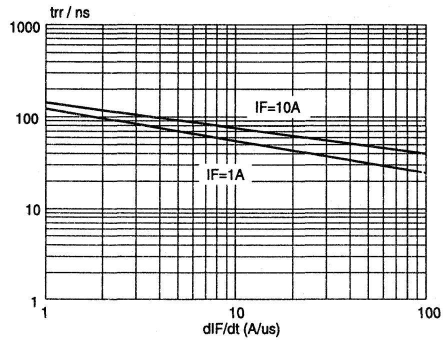


Fig.5. Maximum t_{rr} at T_j = 25 ˚C; per diode

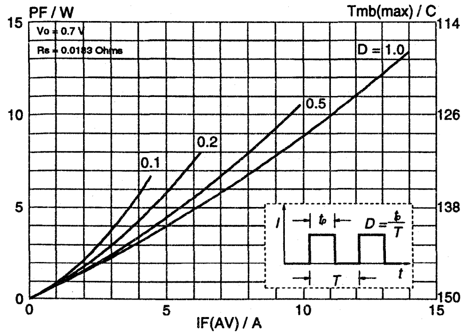


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

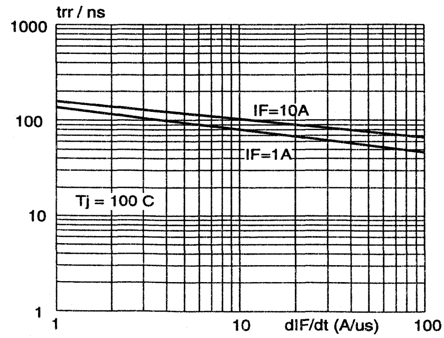


Fig.6. Maximum t_{rr} at T_j = 100 ˚C; per diode

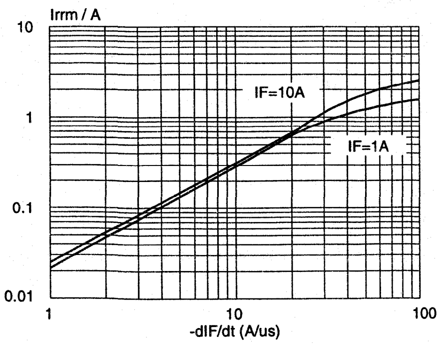


Fig.7. Maximum I_{rrm} at T_j = 25 ˚C; per diode

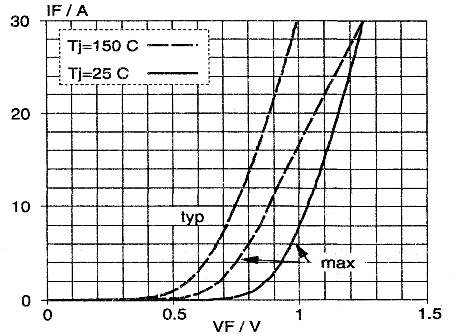


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

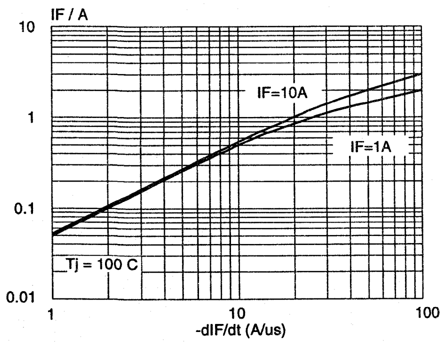


Fig.8. Maximum I_{rrm} at T_j = 100 ˚C; per diode

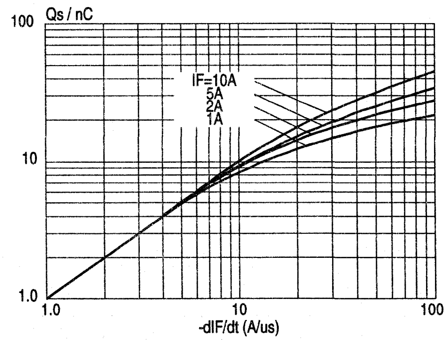


Fig.10. Maximum Q_s at T_j = 25 ˚C; per diode

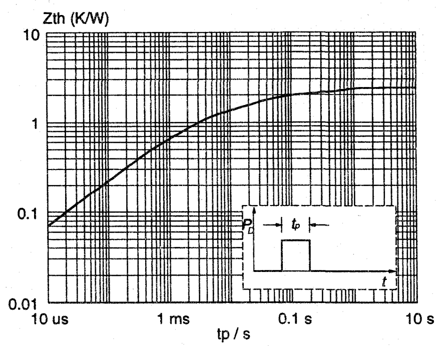


Fig.11. Transient thermal impedance; per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

Rectifier diodes ultrafast, rugged

BYV32E series

GENERAL DESCRIPTION

Glass passivated high efficiency rugged dual rectifier diodes in a plastic envelope, featuring low forward voltage drop, ultra-fast recovery times and soft recovery characteristic. These devices can withstand reverse voltage transients and have 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.

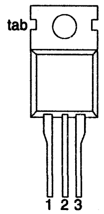
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV32E-	**100**	**150**	**200**	
V_{RRM}	Repetitive peak reverse voltage	100	150	200	V
V_F	Forward voltage	0.85	0.85	0.85	V
$I_{O(AV)}$	Output current (both diodes conducting)	20	20	20	A
t_{rr}	Reverse recovery time	25	25	25	ns
I_{RRM}	Repetitive peak reverse current per diode	0.2	0.2	0.2	A

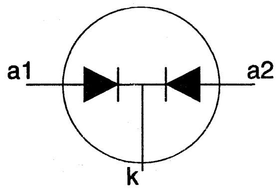
PINNING - TO220AB

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-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		-	100	150	200	V
$I_{O(AV)}$	Output current (both diodes conducting)[1]	square wave $\delta = 0.5$; $T_{mb} \leq 115$ ˚C	-		20		A
		sinusoidal $a = 1.57$; $T_{mb} \leq 118$ ˚C	-		18		A
$I_{O(RMS)}$	RMS forward current		-		28		A
I_{FRM}	Repetitive peak forward current per diode	$t = 25$ µs; $\delta = 0.5$; $T_{mb} \leq 115$ ˚C	-		20		A
I_{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
I^2t	I^2t for fusing	$t = 10$ ms	-		78		A^2s
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

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\,j-mb}$	Thermal resistance junction to mounting base	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

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage (per diode)	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 (per diode)	$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.2	0.6	mA
		$V_R = V_{RWM}$	-	6	30	µA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_s	Reverse recovery charge (per diode)	I_F = 2 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 20 A/µs	-	8	12.5	nC
t_{rr1}	Reverse recovery time (per diode)	I_F = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 100 A/µs	-	20	25	ns
t_{rr2}	Reverse recovery time (per diode)	I_F = 0.5 A to I_R = 1 A; I_{rec} = 0.25 A	-	10	20	ns
V_{fr}	Forward recovery voltage (per diode)	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

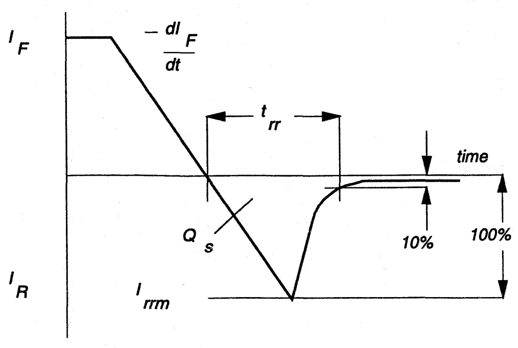


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

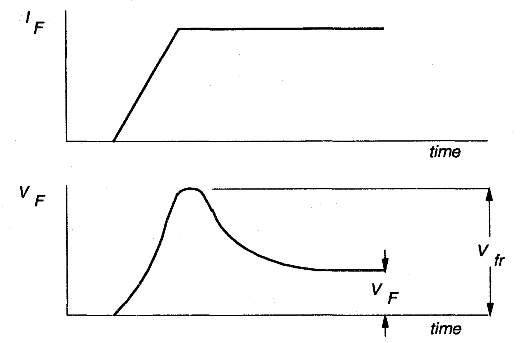


Fig.2. Definition of V_{fr}

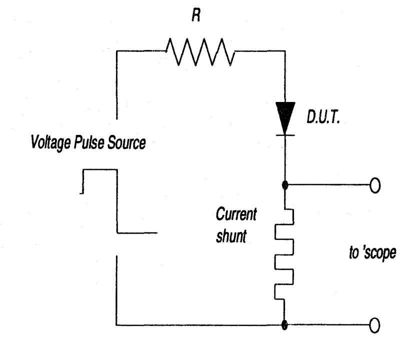


Fig.3. Circuit schematic for t_{rr2}

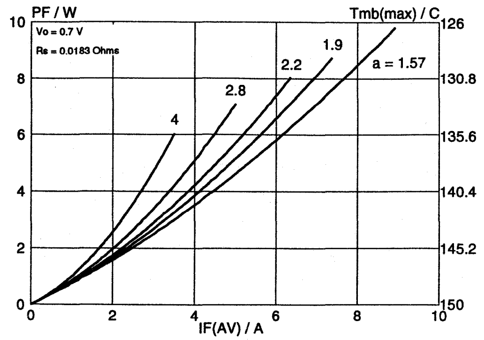


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

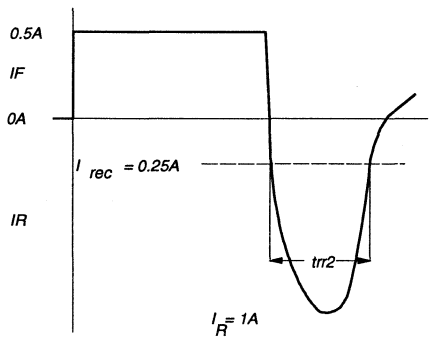


Fig.4. Definition of t_{rr2}

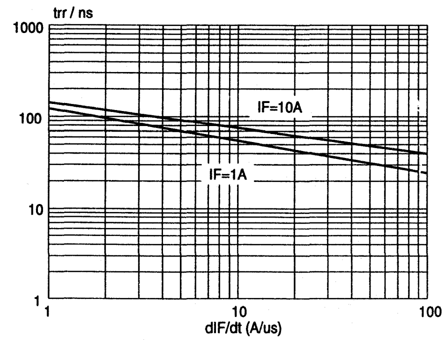


Fig.7. Maximum t_{rr} at T_j = 25 ˚C; per diode

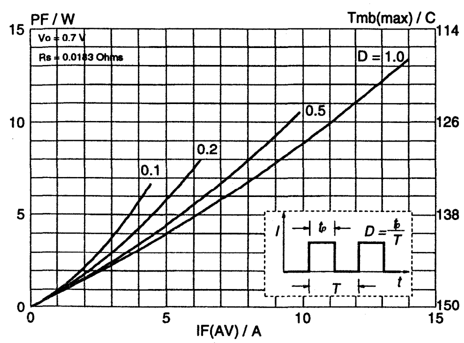


Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

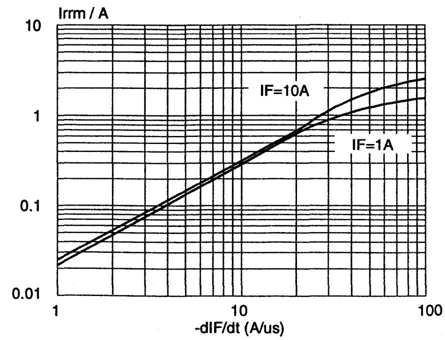


Fig.8. Maximum I_{rrm} at T_j = 25 ˚C; per diode

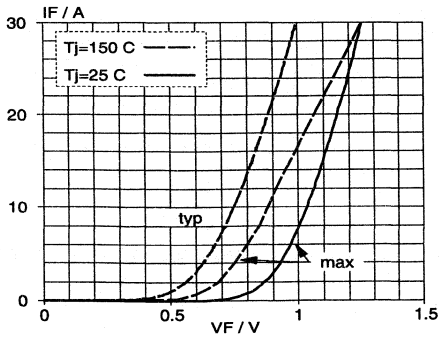


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

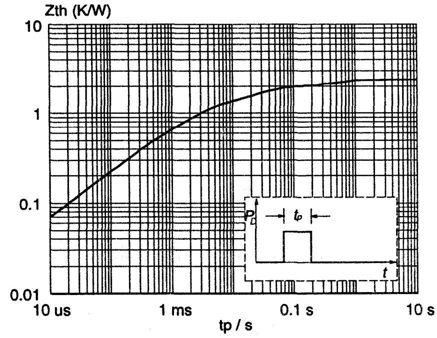


Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.

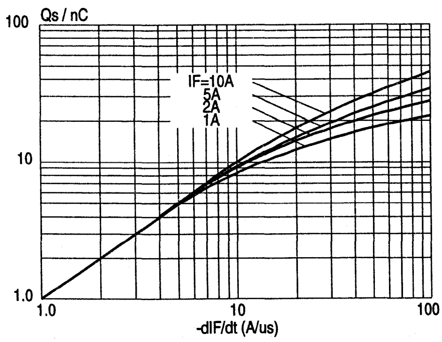


Fig.10. Maximum Q_s at T_j = 25 ˚C; per diode

Rectifier diodes ultrafast

BYV32F series

GENERAL DESCRIPTION

Glass passivated, high efficiency, dual, rectifier diodes in a full pack, plastic envelope, 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.

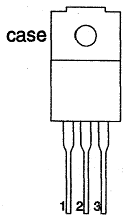
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV32F-	**100**	**150**	**200**	
V_{RRM}	Repetitive peak reverse voltage	100	150	200	V
V_F	Forward voltage	0.85	0.85	0.85	V
$I_{O(AV)}$	Output current (both diodes conducting)	12	12	12	A
t_{rr}	Reverse recovery time	25	25	25	ns

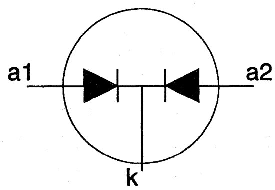
PINNING - SOT186

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-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
$I_{O(AV)}$	Output current (both diodes conducting)[2]	square wave; $\delta = 0.5$; $T_{hs} \leq 95$ ˚C	-	12			A
		sinusoidal; a = 1.57; $T_{hs} \leq 91$ ˚C	-	12			A
$I_{O(RMS)}$	RMS forward current		-	20			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^2t	I^2t for fusing	t = 10 ms	-	78			A^2s
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

1 $T_{hs} \leq 130$˚C for thermal stability.

2 Neglecting switching and reverse current losses

ISOLATION

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Repetitive peak voltage from all three terminals to external heatsink	R.H. ≤ 65% ; clean and dustfree	-	-	1500	V
C_{isol}	Capacitance from T2 to external heatsink	f = 1 MHz	-	12	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\,j\text{-}hs}$	Thermal resistance junction to heatsink	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

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage (per diode)	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 (per diode)	$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.2	0.6	mA
		$V_R = V_{RWM}$	-	6	30	µA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_s	Reverse recovery charge (per diode)	I_F = 2 A; V_R ≥ 30 V; $-dI_F/dt$ = 20 A/µs	-	8	12.5	nC
t_{rr}	Reverse recovery time (per diode)	I_F = 1 A; V_R ≥ 30 V; $-dI_F/dt$ = 100 A/µs	-	20	25	ns
I_{rrm}	Peak reverse recovery current (per diode)	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 (per diode)	I_F = 1 A; dI_F/dt = 10 A/µs	-	0.9	-	V

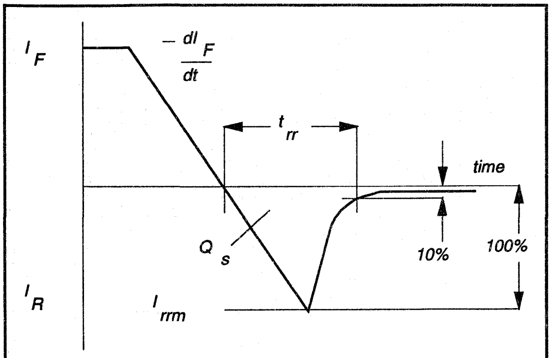


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

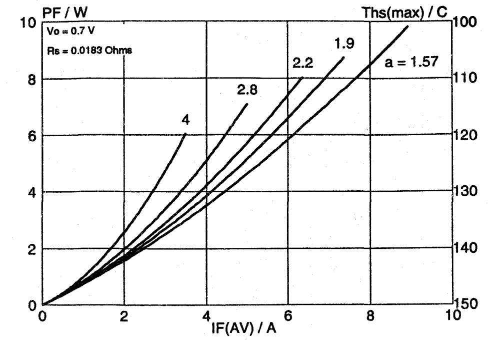


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)}$ / $I_{F(AV)}$.

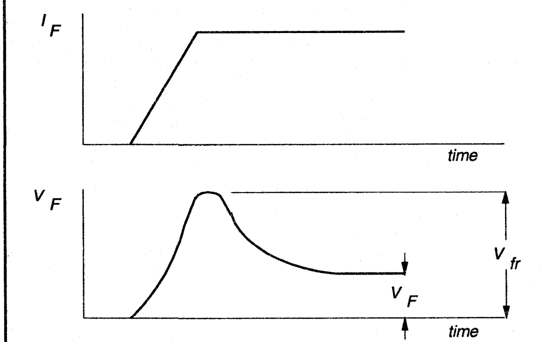


Fig.2. Definition of V_{fr}

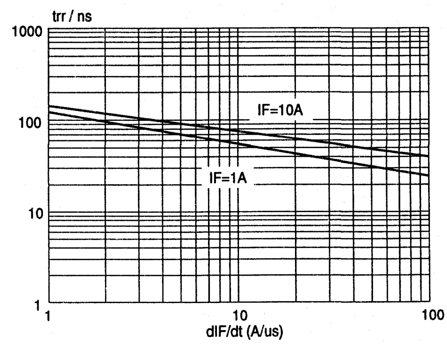


Fig.5. Maximum t_{rr} at T_j = 25 ˚C; per diode

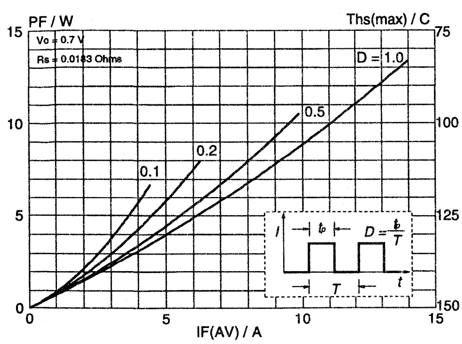


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

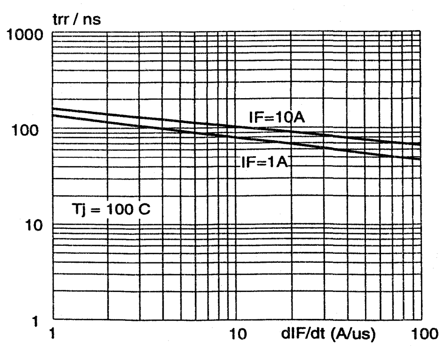


Fig.6. Maximum t_{rr} at T_j = 100 ˚C; per diode

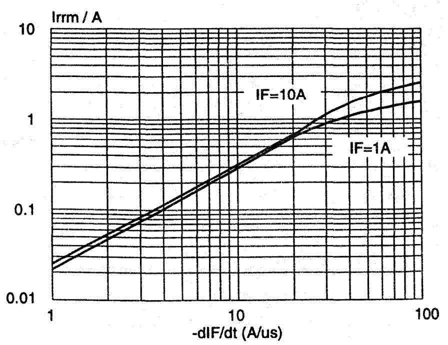


Fig.7. Maximum I_{rrm} at $T_j = 25$ ˚C; per diode

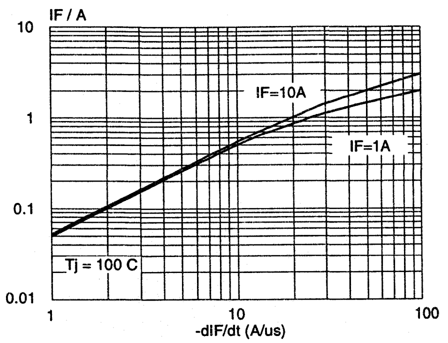


Fig.8. Maximum I_{rrm} at $T_j = 100$ ˚C; per diode

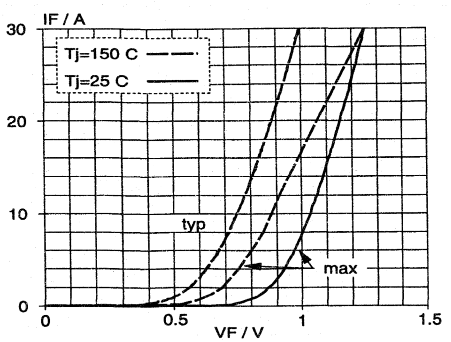


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

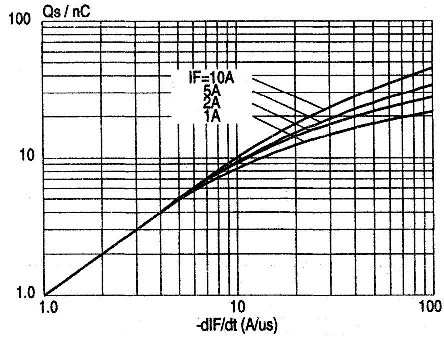


Fig.10. Maximum Q_s at $T_j = 25$ ˚C; per diode

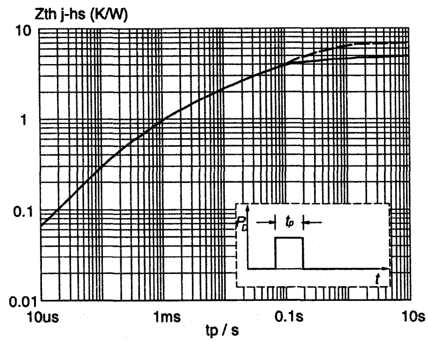


Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}hs} = f(t_p)$.

GENERAL DESCRIPTION

Glass passivated, high efficiency rectifier diodes in a plastic envelope featuring low forward voltage drop, ultra fast reverse recovery times and soft recovery characteristic. They are intended for use in switched mode power supplies and high frequency circuits in general, where both low conduction losses and low switching losses are essential.

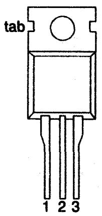
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV34-	**300**	**400**	**500**	
V_{RRM}	Repetitive peak reverse voltage	300	400	500	V
V_F	Forward voltage	0.93	0.93	0.93	V
$I_{O(AV)}$	Output current (both diodes conducting)	20	20	20	A
t_{rr}	Reverse recovery time	60	60	60	ns

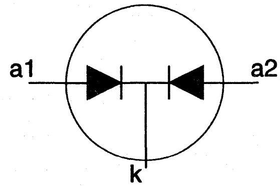
PINNING - TO220AB

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-300	**-400**	**-500**	
V_{RRM}	Repetitive peak reverse voltage		-	300	400	500	V
V_{RWM}	Crest working reverse voltage		-	200	300	400	V
V_R	Continuous reverse voltage[1]		-	200	300	400	V
$I_{O(AV)}$	Output current (both diodes conducting)[2]	square wave; $\delta = 0.5$; $T_{mb} \leq 118$ ˚C	-	20			A
		sinusoidal; a = 1.57; $T_{mb} \leq 120$ ˚C	-	18			A
$I_{O(RMS)}$	RMS forward current		-	28			A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 118$ ˚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 $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-	72			A^2s
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

1 $T_{mb} \leq 138$˚C for thermal stability.

2 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	per diode	-	-	2.4	K/W
		both diodes conducting	-	-	1.6	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; T_j = 150˚C	-	0.80	0.93	V
		I_F = 30 A	-	1.30	1.40	V
I_R	Reverse current	$V_R = V_{RWM}$	-	10	50	µA
		$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.2	0.6	mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
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

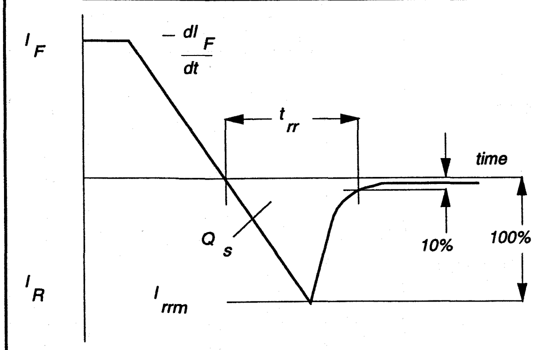


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

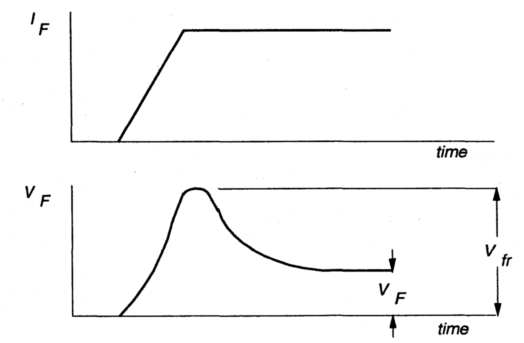


Fig.2. Definition of V_{fr}

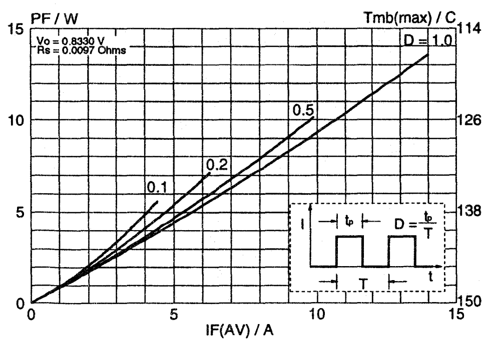


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

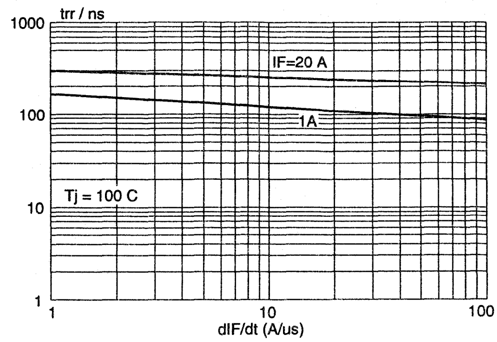


Fig.6. Maximum t_{rr} at $T_j = 100˚C$; per diode

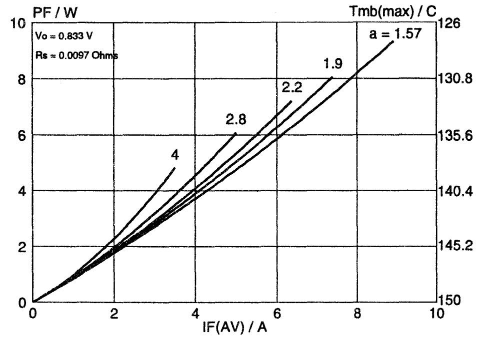


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

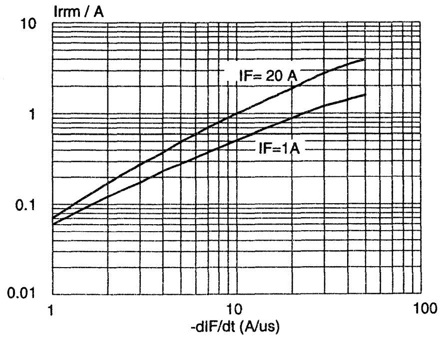


Fig.7. Maximum I_{rrm} at $T_j = 25˚C$; per diode.

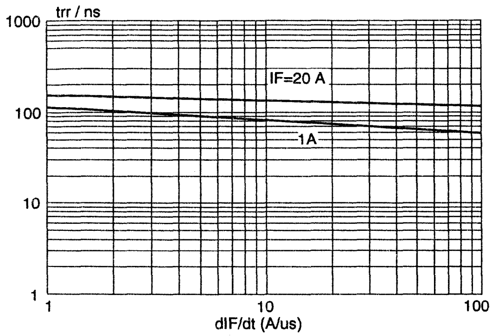


Fig.5. Maximum t_{rr} at $T_j = 25˚C$; per diode

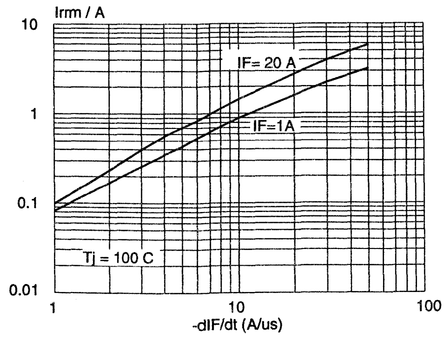


Fig.8. Maximum I_{rrm} at $T_j = 100˚C$; per diode.

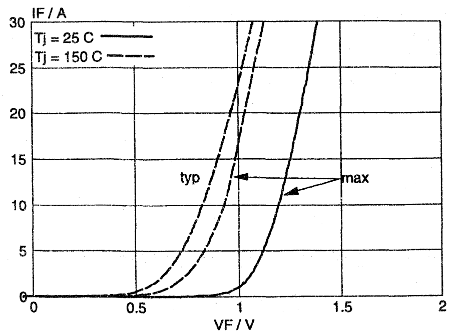


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

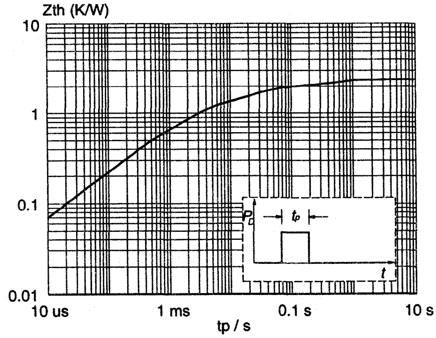


Fig.11. Transient thermal impedance per diode $Z_{th} = f(t_p)$

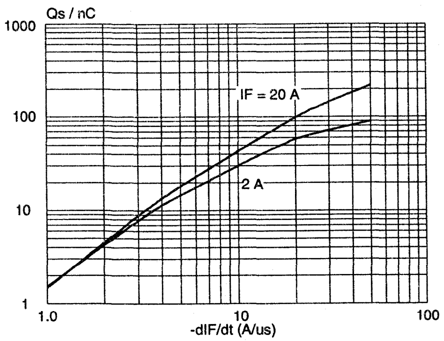


Fig.10. Maximum Q_s at $T_j = 25°C$; per diode.

Rectifier diodes ultrafast

BYV40 series

GENERAL DESCRIPTION

Glass passivated high efficiency dual rectifier diodes in a plastic envelope suitable for surface mounting, 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.

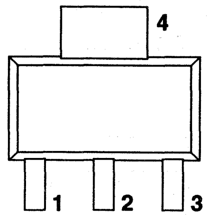
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV40-	**100**	**150**	**200**	
V_{RRM}	Repetitive peak reverse voltage	100	150	200	V
V_F	Forward voltage	0.7	0.7	0.7	V
$I_{O(AV)}$	Output current (both diodes conducting)	1.5	1.5	1.5	A
t_{rr}	Reverse recovery time	25	25	25	ns

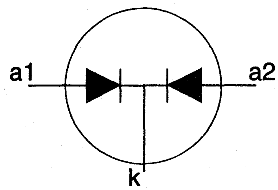
PINNING - SOT223

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
4	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-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
$I_{O(AV)}$	Output current (both diodes conducting)[2]	square wave; $\delta = 0.5$; $T_b \leq 115$˚C	-	1.5			A
		sinusoidal; a = 1.57; $T_b \leq 118$˚C	-	1.35			A
$I_{O(RMS)}$	RMS forward current		-	2.1			A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_b \leq 115$ ˚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^2t	I^2t for fusing	t = 10 ms	-	0.18			A^2s
T_{stg}	Storage temperature		-65	150			˚C
T_j	Operating junction temperature		-	150			˚C

1 $T_b \leq 110$˚C for thermal stability.

2 Neglecting switching and reverse current losses

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}b}$	Thermal resistance junction to board	one or both diodes; PCB mounted; see fig:9; temperature measured 1-3 mm from tab	-	-	30	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	PCB mounted, see fig:9	-	70	-	K/W

STATIC CHARACTERISTICS

$T_j = 25$ ˚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

DYNAMIC CHARACTERISTICS

$T_j = 25$ ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_s	Reverse recovery charge	$I_F = 2$ A; $V_R \geq 30$ V; $-dI_F/dt = 20$ A/µs	-	-	11	nC
t_{rr}	Reverse recovery time	$I_F = 1$ A; $V_R \geq 30$ V; $-dI_F/dt = 100$ A/µs	-	-	25	ns
V_{fr}	Forward recovery voltage	$I_F = 2$ A; $dI_F/dt = 20$ A/µs	-	3	-	V

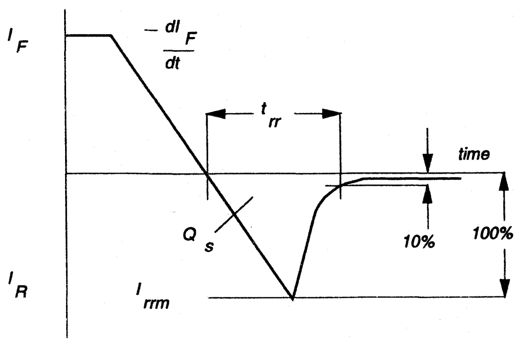


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

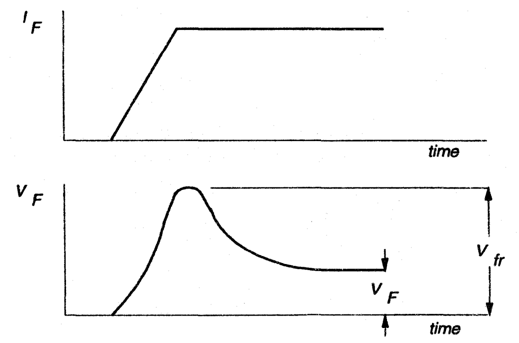


Fig.2. Definition of V_{fr}

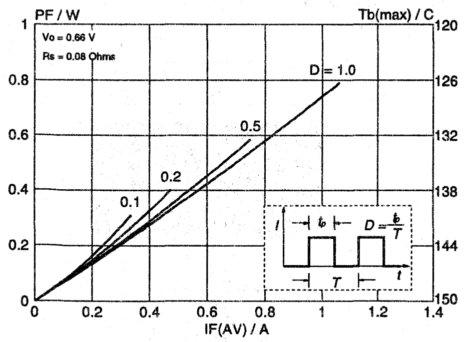


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

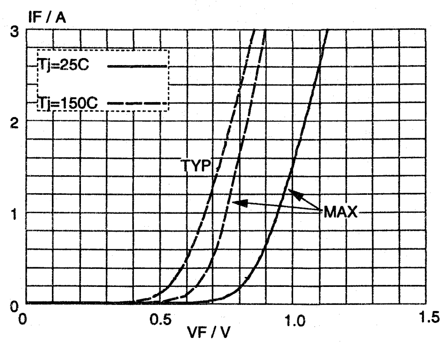


Fig.6. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

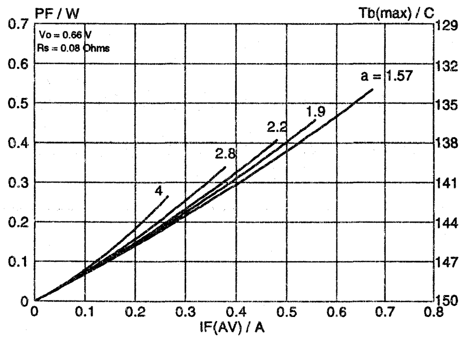


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

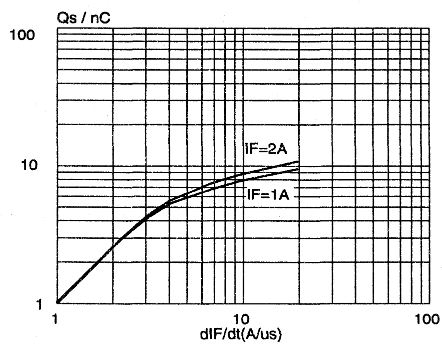


Fig.7. Maximum Q_s at $T_j = 25$ ˚C; per diode

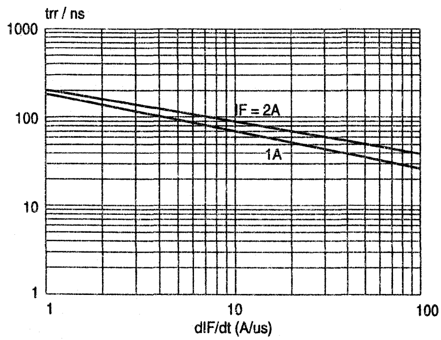


Fig.5. Maximum t_{rr} at $T_j = 25$ ˚C; per diode

MOUNTING INSTRUCTIONS

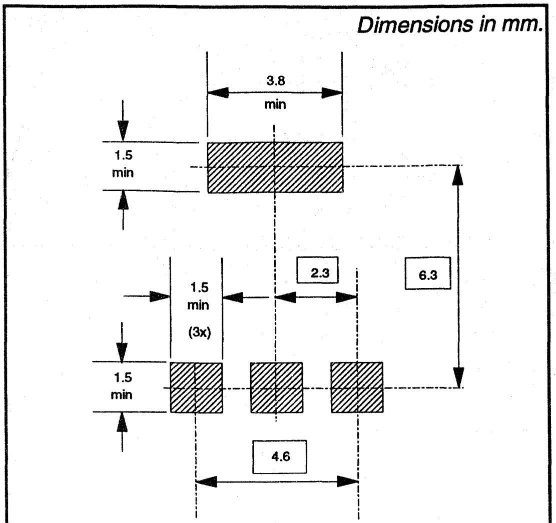


Fig.8. soldering pattern for surface mounting SOT223.

PRINTED CIRCUIT BOARD

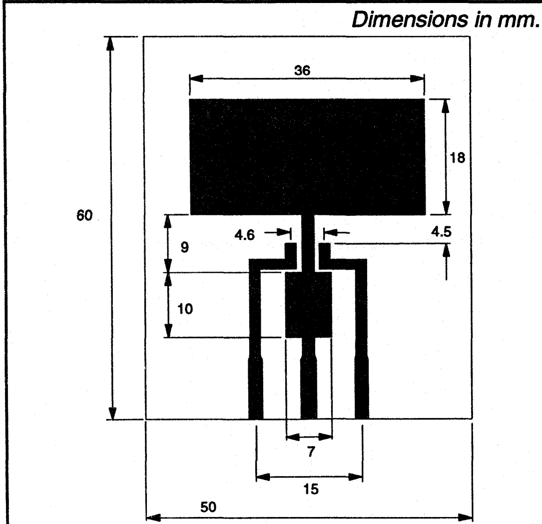


Fig.9. PCB for thermal resistance and power rating for SOT223.
PCB: FR4 epoxy glass (1.6 mm thick), copper laminate (35 µm thick).

Rectifier diodes ultrafast

BYV42 series

GENERAL DESCRIPTION

Glass passivated high efficiency dual rectifier diodes in a plastic envelope, 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.

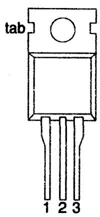
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV42-	**100**	**150**	**200**	
V_{RRM}	Repetitive peak reverse voltage	100	150	200	V
V_F	Forward voltage	0.85	0.85	0.85	V
$I_{O(AV)}$	Output current (both diodes conducting)	30	30	30	A
t_{rr}	Reverse recovery time	28	28	28	ns

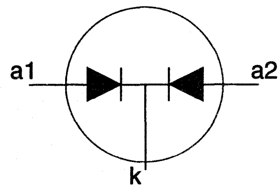
PINNING - TO220AB

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-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
$I_{O(AV)}$	Output current (both diodes conducting)[2]	square wave; $\delta = 0.5$; $T_{mb} \leq 108$ ˚C	-		30		A
		sinusoidal; a = 1.57; $T_{mb} \leq 111$ ˚C	-		27		A
$I_{O(RMS)}$	RMS forward current		-		43		A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 108$ ˚C	-		30		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-		150		A
		t = 8.3 ms	-		160		A
		sinusoidal; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-		112		A^2s
T_{stg}	Storage temperature		-40		150		˚C
T_j	Operating junction temperature		-		150		˚C

1 $T_{mb} \leq 144$˚C for thermal stability.

2 Neglecting switching and reverse current losses.
For output currents in excess of 20 A, connection should be made to the exposed metal mounting base.

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	-	60	-	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 = 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 (per diode)	$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.5	1	mA
		$V_R = V_{RWM}$	-	10	100	µA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_s	Reverse recovery charge (per diode)	I_F = 2 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 20 A/µs	-	6	15	nC
t_{rr}	Reverse recovery time (per diode)	I_F = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 100 A/µs	-	20	28	ns
I_{rrm}	Peak reverse recovery current (per diode)	I_F = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 50 A/µs; T_j = 100 ˚C	-	2.0	2.4	A
V_{fr}	Forward recovery voltage (per diode)	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

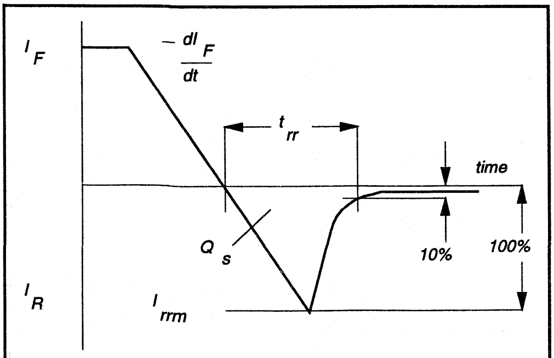


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

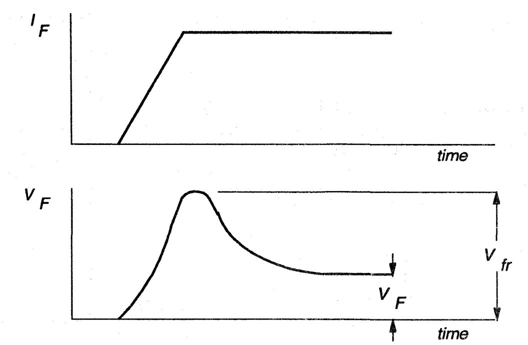


Fig.2. Definition of V_{fr}

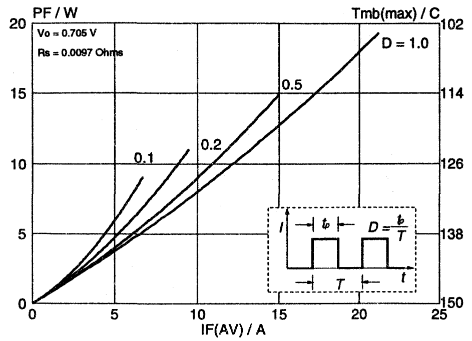


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

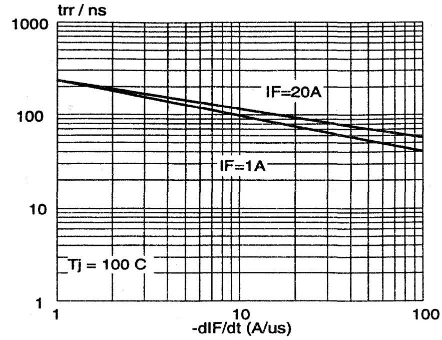


Fig.6. Maximum t_{rr} at T_j = 100 ˚C; per diode

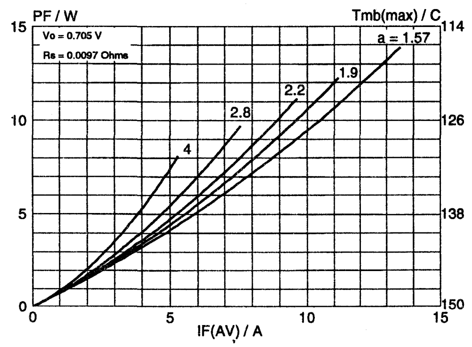


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

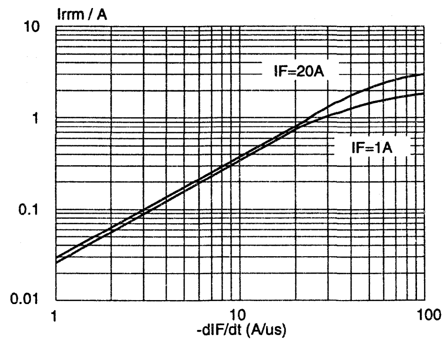


Fig.7. Maximum I_{rrm} at T_j = 25 ˚C; per diode

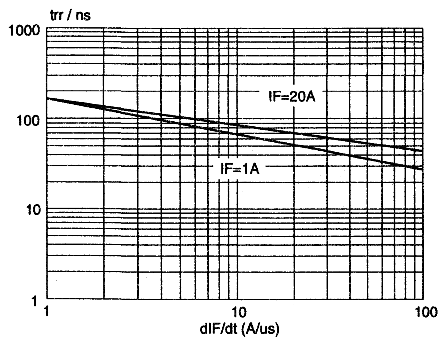


Fig.5. Maximum t_{rr} at T_j = 25 ˚C; per diode

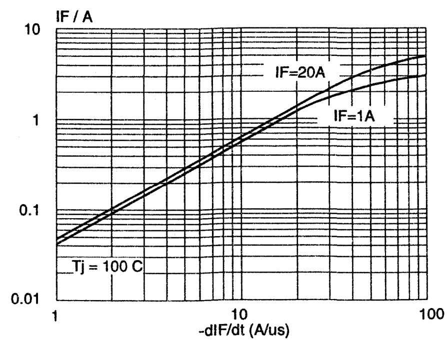


Fig.8. Maximum I_{rrm} at T_j = 100 ˚C; per diode

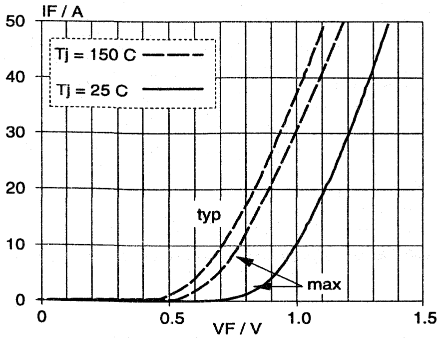


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; *parameter* T_j

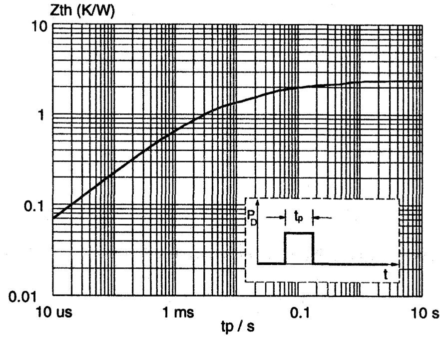


Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.

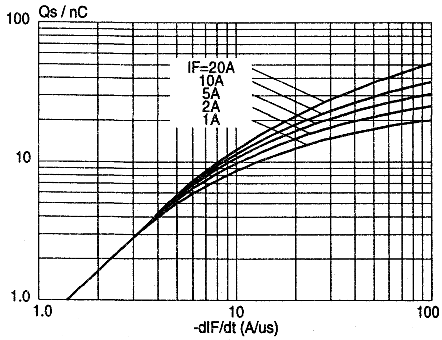


Fig.10. Maximum Q_s *at* T_j = 25 ˚C; *per diode*

Rectifier diodes ultrafast, rugged

BYV42E series

GENERAL DESCRIPTION

Glass passivated high efficiency rugged dual rectifier diodes in a plastic envelope, featuring low forward voltage drop, ultra-fast recovery times and soft recovery characteristic. These devices can withstand reverse voltage transients and have 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.

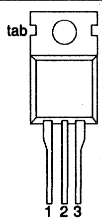
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV42E-	**100**	**150**	**200**	
V_{RRM}	Repetitive peak reverse voltage	100	150	200	V
V_F	Forward voltage	0.85	0.85	0.85	V
$I_{O(AV)}$	Output current (both diodes conducting)	30	30	30	A
t_{rr}	Reverse recovery time	28	28	28	ns
I_{RRM}	Repetitive peak reverse current per diode	0.2	0.2	0.2	A

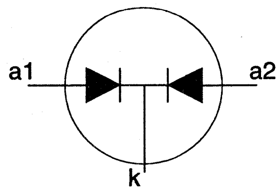
PINNING - TO220AB

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-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
$I_{O(AV)}$	Output current (both diodes conducting)[2]	square wave $\delta = 0.5$; $T_{mb} \leq 108$ ˚C	-		30		A
		sinusoidal $a = 1.57$; $T_{mb} \leq 111$ ˚C	-		27		A
$I_{O(RMS)}$	RMS forward current		-		43		A
I_{FRM}	Repetitive peak forward current per diode	$t = 25\ \mu s$; $\delta = 0.5$; $T_{mb} \leq 108$ ˚C	-		30		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-		150		A
		t = 8.3 ms	-		160		A
		sinusoidal; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-		112		A^2s
I_{RRM}	Repetitive peak reverse current per diode	$t_p = 2\ \mu s$; $\delta = 0.001$	-		0.2		A
I_{RSM}	Non-repetitive peak reverse current per diode	$t_p = 100\ \mu s$	-		0.2		A
T_{stg}	Storage temperature		-40		150		˚C
T_j	Operating junction temperature		-		150		˚C

1 $T_{mb} \leq 144$˚C for thermal stability.
2 Neglecting switching and reverse current losses.
For output currents in excess of 20 A, connection should be made to the exposed metal mounting base.

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 conducting	-	-	1.4	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 (per diode)	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 (per diode)	$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.5	1	mA
		$V_R = V_{RWM}$	-	10	100	µA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_s	Reverse recovery charge (per diode)	I_F = 2 A; $V_R \geq 30$ V; $-dI_F/dt$ = 20 A/µs	-	6	15	nC
t_{rr1}	Reverse recovery time (per diode)	I_F = 1 A; $V_R \geq 30$ V; $-dI_F/dt$ = 100 A/µs	-	20	28	ns
t_{rr2}	Reverse recovery time (per diode)	I_F = 0.5 A to I_R = 1 A; I_{rec} = 0.25 A	-	13	22	ns
V_{fr}	Forward recovery voltage (per diode)	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

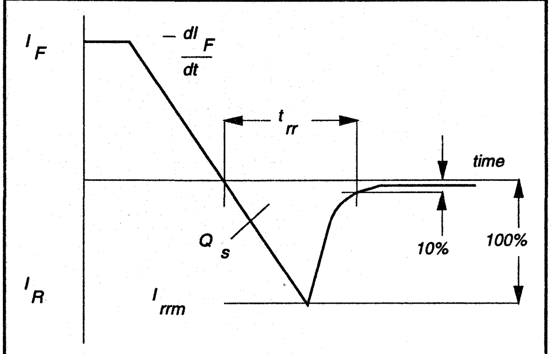


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

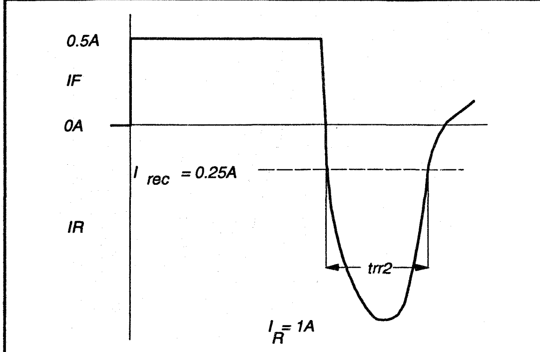


Fig.4. Definition of t_{rr2}

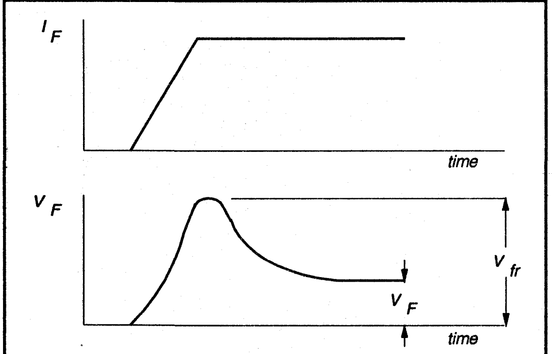


Fig.2. Definition of V_{fr}

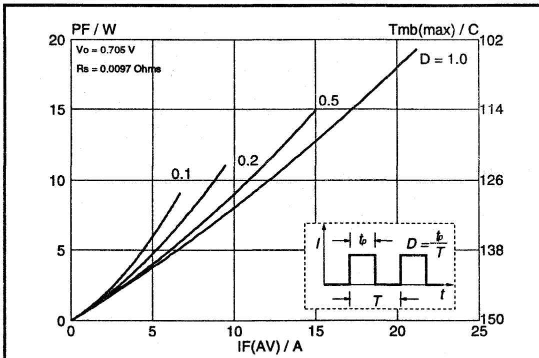


Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

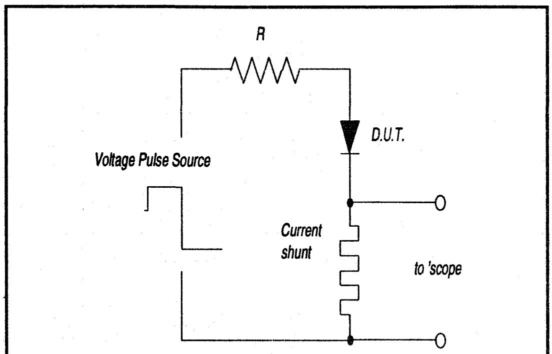


Fig.3. Circuit schematic for t_{rr2}

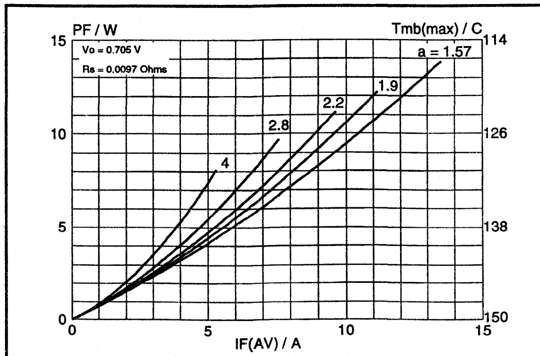


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

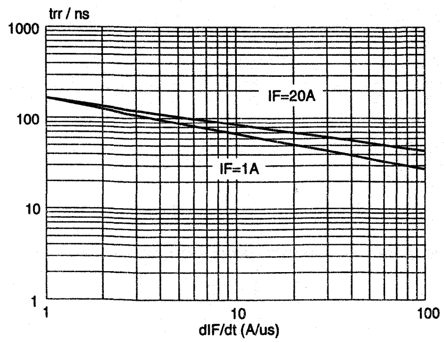


Fig.7. Maximum t_{rr} at T_j = 25 ˚C; per diode

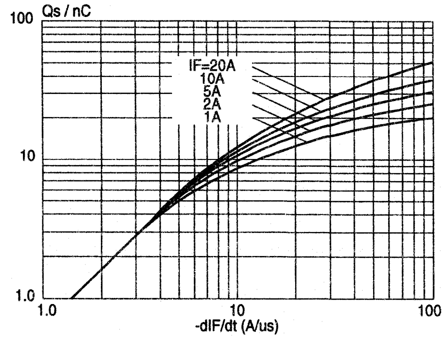


Fig.10. Maximum Q_s at T_j = 25 ˚C; per diode

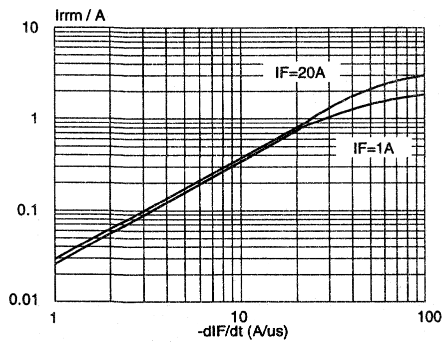


Fig.8. Maximum I_{rrm} at T_j = 25 ˚C; per diode

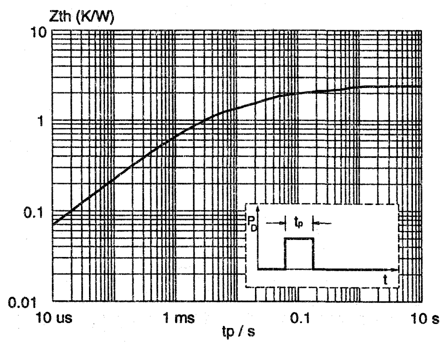


Fig.11. Transient thermal impedance; per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

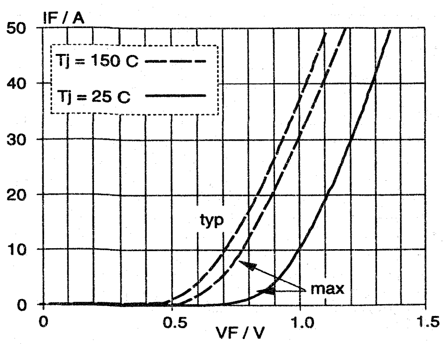


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

GENERAL DESCRIPTION

Glass passivated, high efficiency rectifier diodes in a plastic envelope featuring low forward voltage drop, ultra fast reverse recovery times and soft recovery characteristic. They are intended for use in switched mode power supplies and high frequency circuits in general, where both low conduction losses and low switching losses are essential.

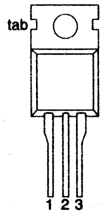
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV44-	**300**	**400**	**500**	
V_{RRM}	Repetitive peak reverse voltage	300	400	500	V
V_F	Forward voltage	1.05	1.05	1.05	V
$I_{O(AV)}$	Output current (both diodes conducting)	30	30	30	A
t_{rr}	Reverse recovery time	60	60	60	ns

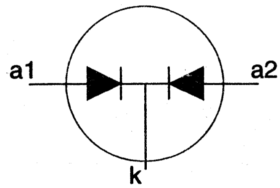
PINNING - TO220AB

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-300	**-400**	**-500**	
V_{RRM}	Repetitive peak reverse voltage		-	300	400	500	V
V_{RWM}	Crest working reverse voltage		-	200	300	400	V
V_R	Continuous reverse voltage[1]		-	200	300	400	V
$I_{O(AV)}$	Output current (both diodes conducting)[2]	square wave; $\delta = 0.5$; $T_{mb} \leq 100$ °C	-	30			A
		sinusoidal; a = 1.57; $T_{mb} \leq 104$ °C	-	27			A
$I_{O(RMS)}$	RMS forward current		-	43			A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 100$ °C	-	30			A
I_{FSM}	Non-repetitive peak forward current per diode.	t = 10 ms	-	130			A
		t = 8.3 ms sinusoidal; with reapplied $V_{RWM(max)}$	-	143			A
I^2t	I^2t for fusing	t = 10 ms	-	85			A^2s
T_{stg}	Storage temperature		-40	150			°C
T_j	Operating junction temperature		-	150			°C

1 $T_{mb} \leq 136$°C for thermal stability.

2 Neglecting switching and reverse current losses.
For output currents in excess of 20 A, connection should be made to the exposed metal mounting base.

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

STATIC 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	-	0.95	1.05	V
		I_F = 50 A	-	1.30	1.40	V
I_R	Reverse current	$V_R = V_{RWM}$	-	10	50	µA
		$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.3	0.8	mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
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	-	4.2	5.2	A
V_{fr}	Forward recovery voltage	I_F = 10 A; dI_F/dt = 10 A/µs	-	2.5	-	V

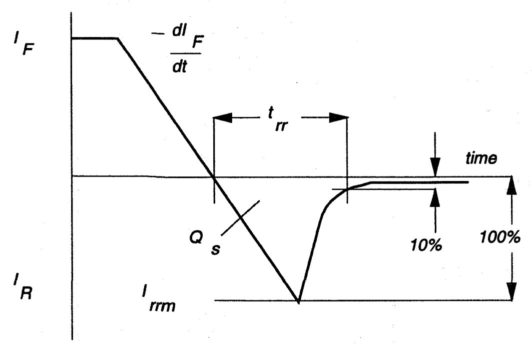


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

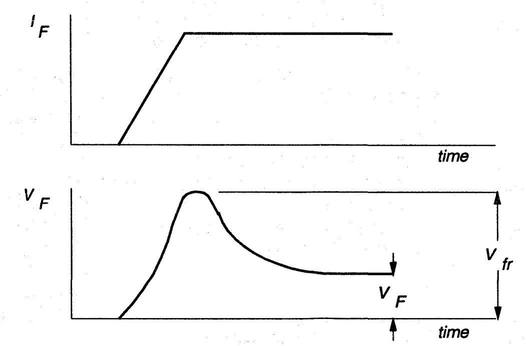


Fig.2. Definition of V_{fr}

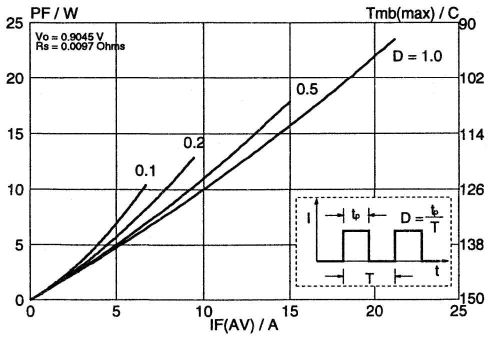


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

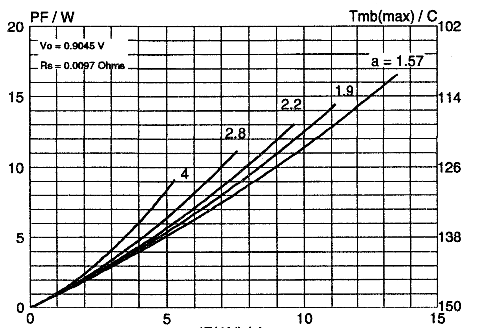


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

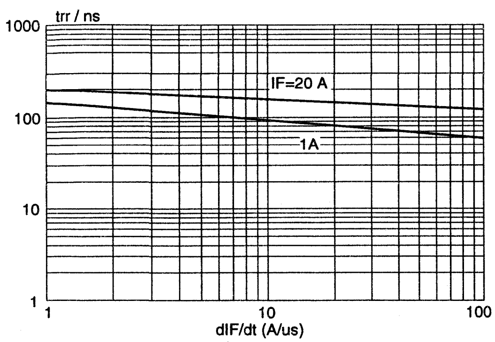


Fig.5. Maximum t_{rr} at $T_j = 25˚C$; per diode

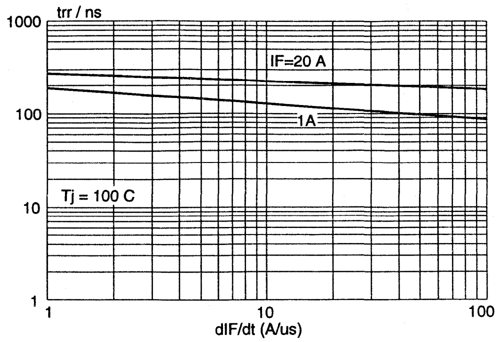


Fig.6. Maximum t_{rr} at $T_j = 100˚C$; per diode

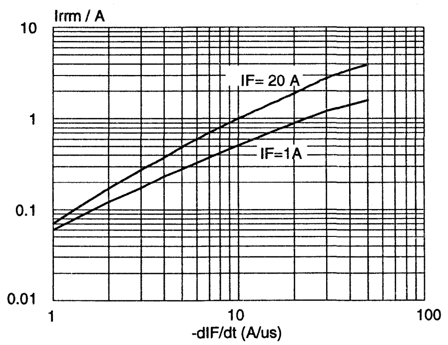


Fig.7. Maximum I_{rrm} at $T_j = 25˚C$; per diode

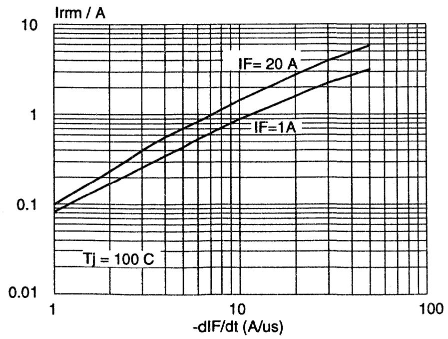


Fig.8. Maximum I_{rrm} at $T_j = 100˚C$; per diode.

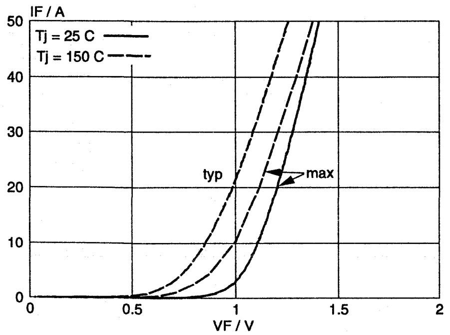


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; *parameter* T_j

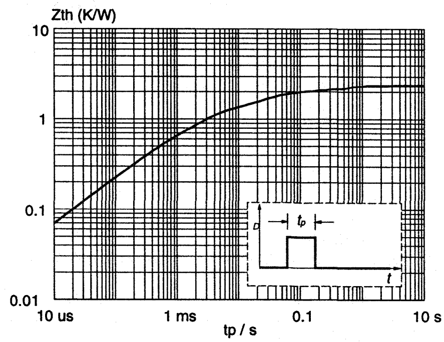


Fig.11. Transient thermal impedance per diode $Z_{th} = f(t_p)$

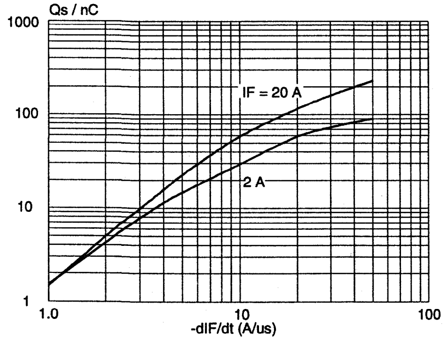


Fig.10. Maximum Q_s *at* $T_j = 25^{\circ}C$; *per diode*

GENERAL DESCRIPTION

Glass passivated, high efficiency, dual, rectifier diodes in a plastic envelope, 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.

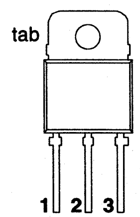
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV72-	**100**	**150**	**200**	
V_{RRM}	Repetitive peak reverse voltage	100	150	200	V
V_F	Forward voltage	0.90	0.90	0.90	V
$I_{O(AV)}$	Output current (both diodes conducting)	30	30	30	A
t_{rr}	Reverse recovery time	28	28	28	ns

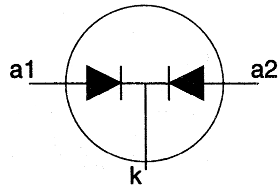
PINNING - SOT93

PIN	DESCRIPTION
1	Anode 1 (a)
2	Cathode (k)
3	Anode 2 (a)
tab	Cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-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
$I_{O(AV)}$	Output current (both diodes conducting)[2]	square wave; $\delta = 0.5$; $T_{mb} \leq 108$ ˚C	-	30			A
		sinusoidal; a = 1.57; $T_{mb} \leq 111$ ˚C	-	27			A
$I_{O(RMS)}$	RMS forward current		-	43			A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 108$ ˚C	-	30			A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-	150			A
		t = 8.3 ms	-	160			A
		sinusoidal; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-	112			A^2s
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

1 $T_{mb} \leq 144$˚C for thermal stability.

2 Neglecting switching and reverse current losses.
For output currents in excess of 20 A, connection should be made to the exposed metal mounting base.

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

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage (per diode)	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 (per diode)	$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.5	1	mA
		$V_R = V_{RWM}$	-	10	100	µA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_s	Reverse recovery charge (per diode)	I_F = 2 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 20 A/µs	-	6	15	nC
t_{rr}	Reverse recovery time (per diode)	I_F = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 100 A/µs	-	20	28	ns
I_{rrm}	Peak reverse recovery current (per diode)	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 (per diode)	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

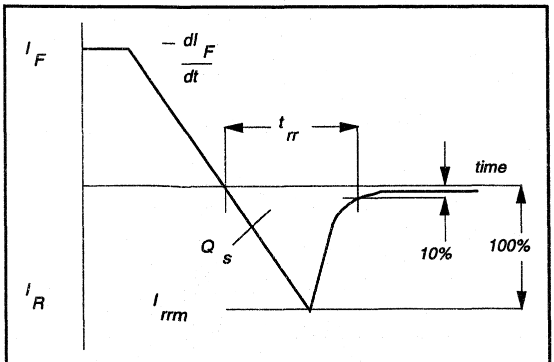


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

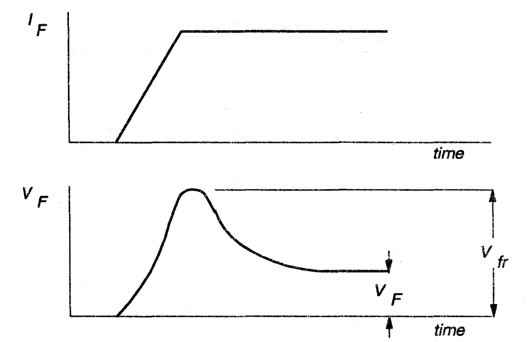


Fig.2. Definition of V_{fr}

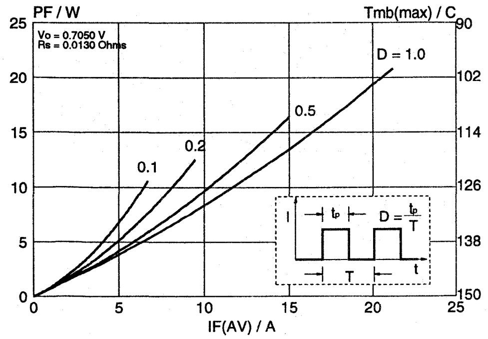


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

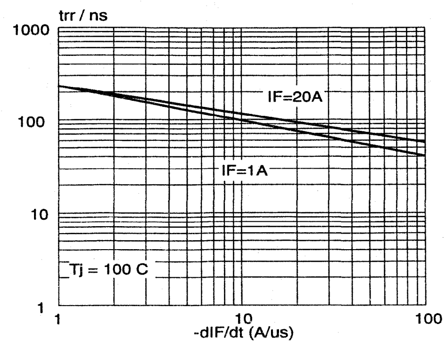


Fig.6. Maximum t_{rr} at $T_j = 100$ ˚C; per diode

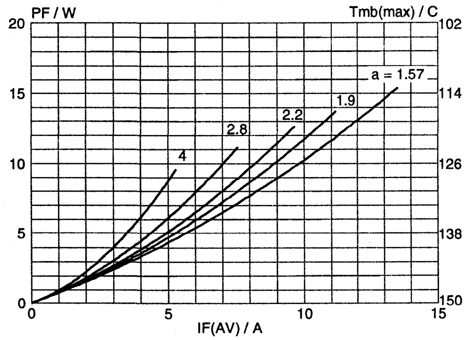


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

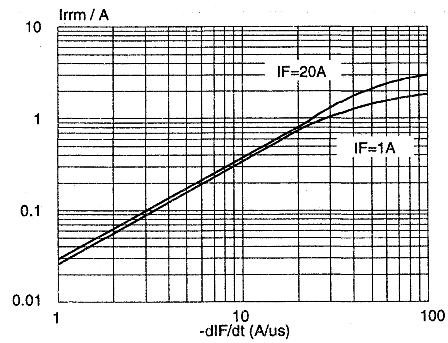


Fig.7. Maximum I_{rrm} at $T_j = 25$ ˚C; per diode

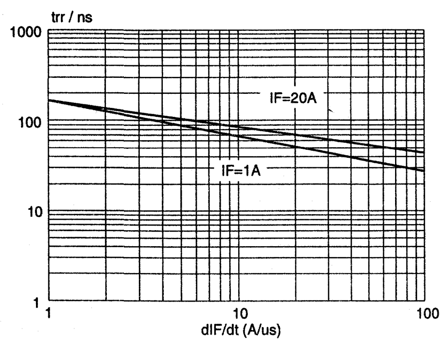


Fig.5. Maximum t_{rr} at $T_j = 25$ ˚C; per diode

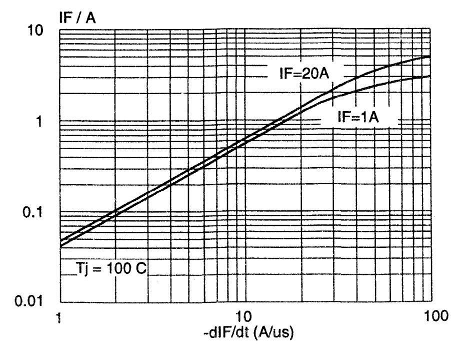


Fig.8. Maximum I_{rrm} at $T_j = 100$ ˚C; per diode

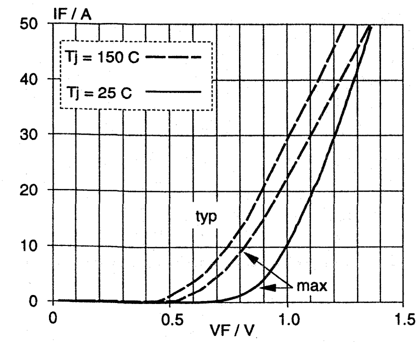


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$*; parameter* T_j

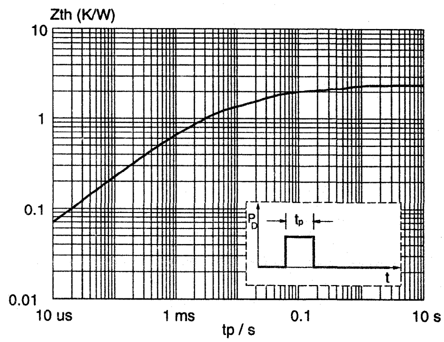


Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.

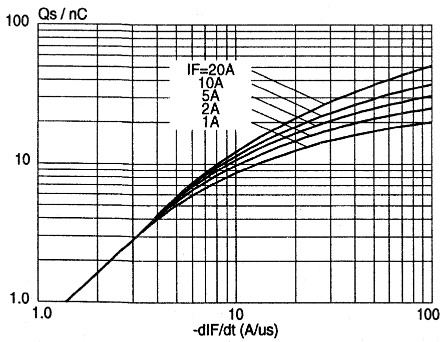


Fig.10. Maximum Q_s *at* $T_j = 25\ ^\circ C$*; per diode*

Rectifier diodes ultrafast, rugged

BYV72E series

GENERAL DESCRIPTION

Glass passivated high efficiency rugged dual rectifier diodes in a plastic envelope, featuring low forward voltage drop, ultra-fast recovery times and soft recovery characteristic. These devices can withstand reverse voltage transients and have 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.

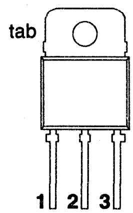
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV72E-	**100**	**150**	**200**	
V_{RRM}	Repetitive peak reverse voltage	100	150	200	V
V_F	Forward voltage	0.90	0.90	0.90	V
$I_{O(AV)}$	Output current (both diodes conducting)	30	30	30	A
t_{rr}	Reverse recovery time	28	28	28	ns
I_{RRM}	Repetitive peak reverse current per diode	0.2	0.2	0.2	A

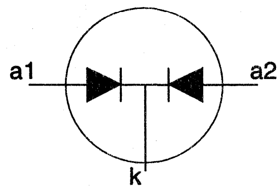
PINNING - SOT93

PIN	DESCRIPTION
1	Anode 1 (a)
2	Cathode (k)
3	Anode 2 (a)
tab	Cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-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
$I_{O(AV)}$	Output current (both diodes conducting)[2]	square wave $\delta = 0.5$; $T_{mb} \leq 104$ °C	-	30			A
		sinusoidal; a = 1.57; $T_{mb} \leq 107$ °C	-	27			A
$I_{O(RMS)}$	RMS forward current		-	43			A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 104$ °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^2t	I^2t for fusing	t = 10 ms	-	112			A^2s
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 $T_{mb} \leq 144$°C for thermal stability.
2 Neglecting switching and reverse current losses.
For output currents in excess of 20 A, connection should be made to the exposed metal mounting base.

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 conducting	-	-	1.4	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 = 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 (per diode)	$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.5	1	mA
		$V_R = V_{RWM}$	-	10	100	µA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_s	Reverse recovery charge (per diode)	I_F = 2 A; $V_R \geq 30$ V; $-dI_F/dt$ = 20 A/µs	-	6	15	nC
t_{rr1}	Reverse recovery time (per diode)	I_F = 1 A; $V_R \geq 30$ V; $-dI_F/dt$ = 100 A/µs	-	20	28	ns
t_{rr2}	Reverse recovery time (per diode)	I_F = 0.5 A to I_R = 1 A; I_{rec} = 0.25 A	-	13	22	ns
V_{fr}	Forward recovery voltage (per diode)	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

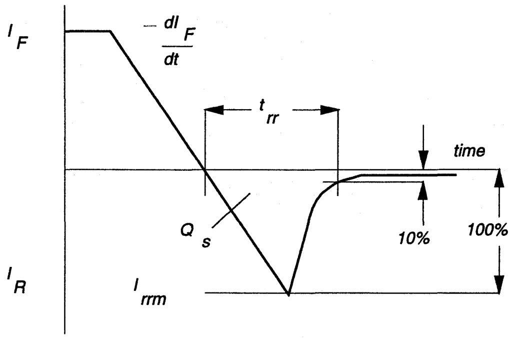


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

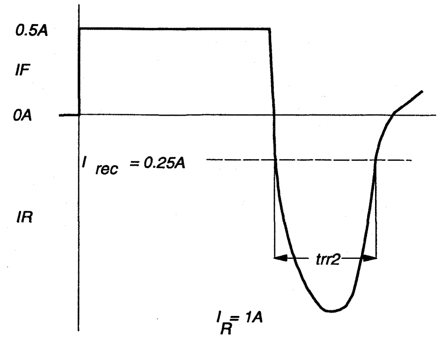


Fig.4. Definition of t_{rr2}

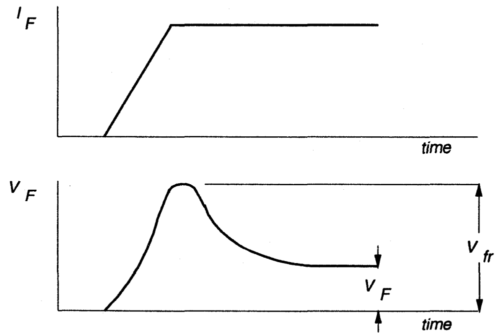


Fig.2. Definition of V_{fr}

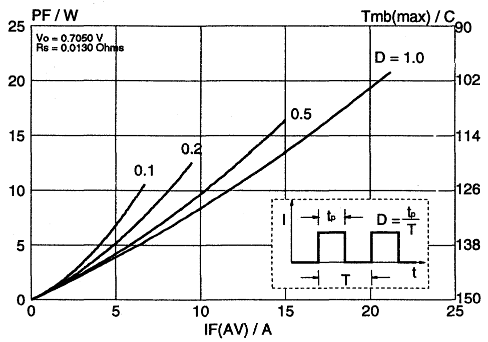


Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

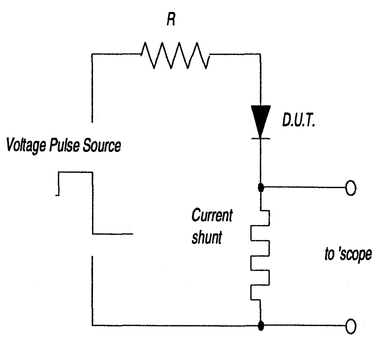


Fig.3. Circuit schematic for t_{rr2}

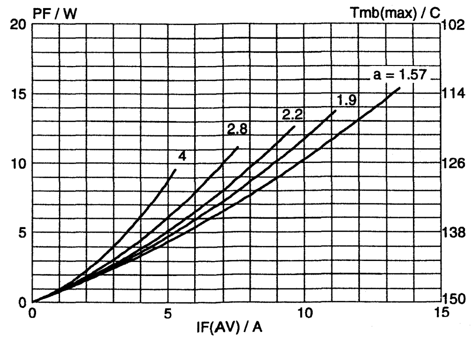


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

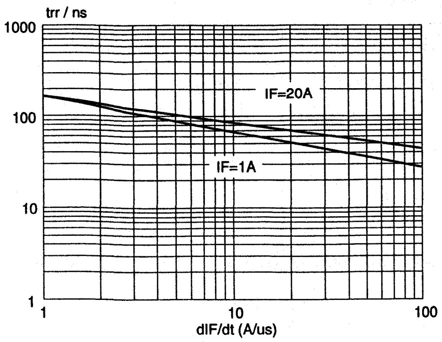


Fig.7. Maximum t_{rr} at T_j = 25 ˚C; per diode

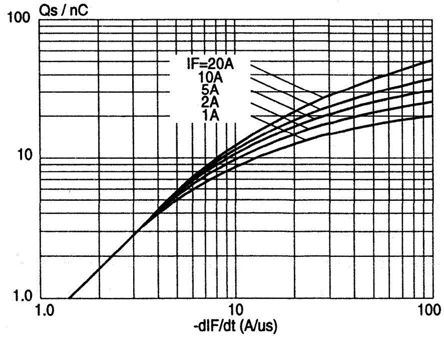


Fig.10. Maximum Q_s at T_j = 25 ˚C; per diode

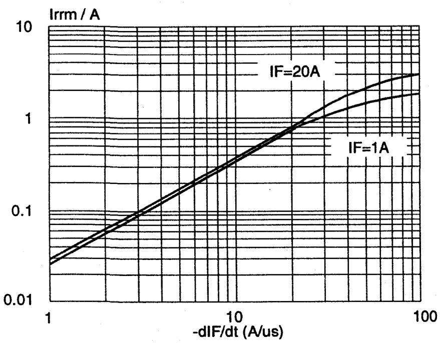


Fig.8. Maximum I_{rrm} at T_j = 25 ˚C; per diode

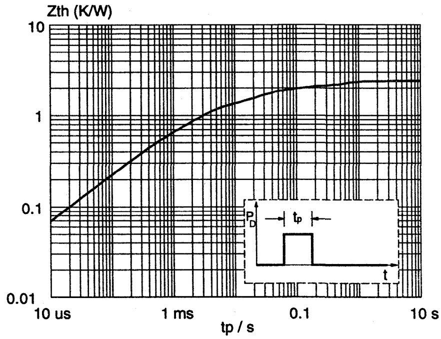


Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.

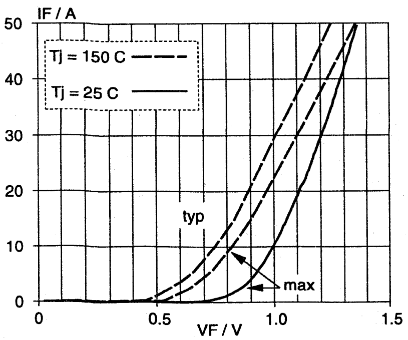


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

GENERAL DESCRIPTION

Glass passivated, high efficiency, dual, rectifier diodes in a full pack, plastic envelope, 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.

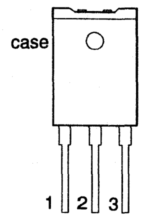
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV72F-	**100**	**150**	**200**	
V_{RRM}	Repetitive peak reverse voltage	100	150	200	V
V_F	Forward voltage	0.90	0.90	0.90	V
$I_{O(AV)}$	Output current (both diodes conducting)	20	20	20	A
t_{rr}	Reverse recovery time	28	28	28	ns

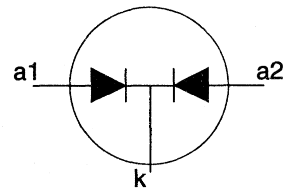
PINNING - SOT199

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-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
$I_{O(AV)}$	Output current (both diodes conducting)[2]	square wave; $\delta = 0.5$; $T_{hs} \leq 78$ ˚C	-	20			A
		sinusoidal; a = 1.57; $T_{hs} \leq 78$ ˚C	-	20			A
$I_{O(RMS)}$	RMS forward current		-	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	-	160			A
		sinusoidal; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-	112			A^2s
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

1 $T_{hs} \leq 125$˚C for thermal stability.

2 Neglecting switching and reverse current losses.

ISOLATION

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Repetitive peak voltage from all three terminals to external heatsink	R.H. ≤ 65 % ; clean and dustfree	-	-	2500	V
C_{isol}	Capacitance from T2 to external heatsink	f = 1 MHz	-	22	-	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	-	35	-	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 = 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 (per diode)	$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.5	1	mA
		$V_R = V_{RWM}$	-	10	100	µA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_s	Reverse recovery charge (per diode)	I_F = 2 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 20 A/µs	-	6	15	nC
t_{rr}	Reverse recovery time (per diode)	I_F = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 100 A/µs	-	20	28	ns
I_{rrm}	Peak reverse recovery current (per diode)	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 (per diode)	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

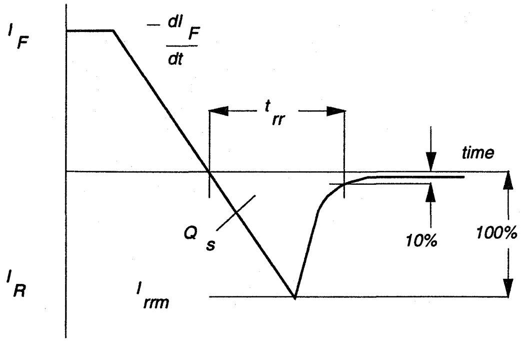


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

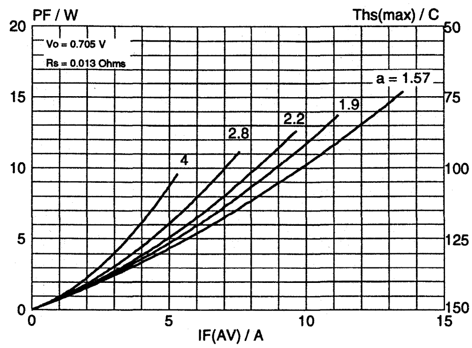


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)}$ / $I_{F(AV)}$.

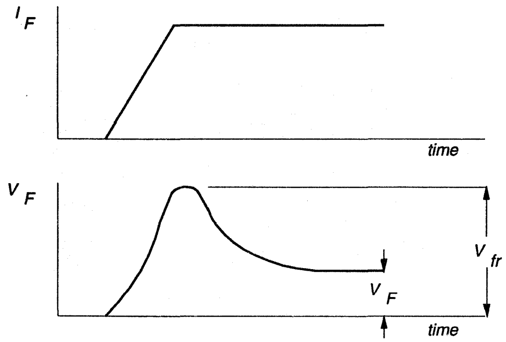


Fig.2. Definition of V_{fr}

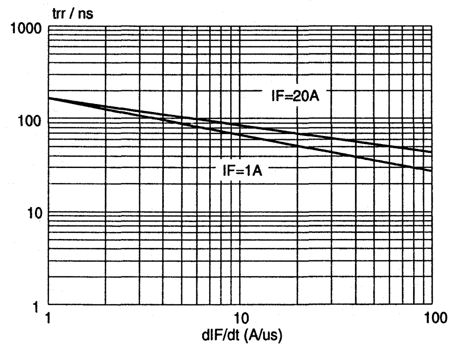


Fig.5. Maximum t_{rr} at T_j = 25 ˚C; per diode

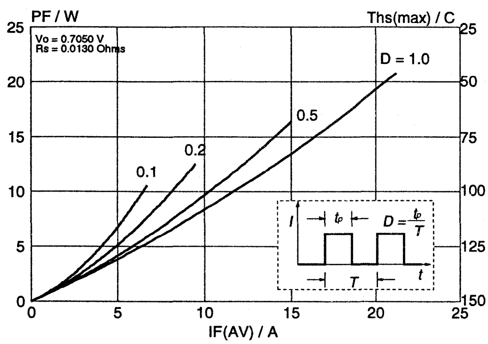


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

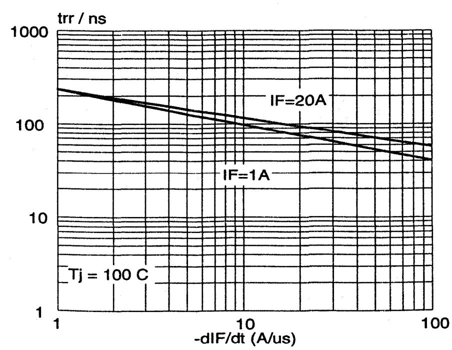


Fig.6. Maximum t_{rr} at T_j = 100 ˚C; per diode

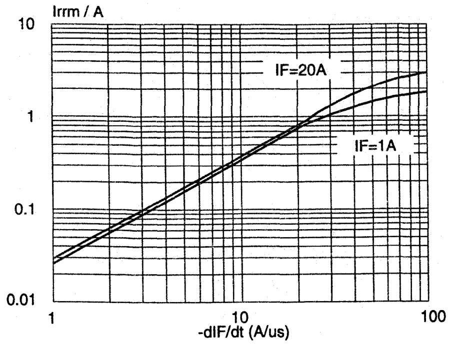


Fig.7. Maximum I_{rrm} at T_j = 25 ˚C; per diode

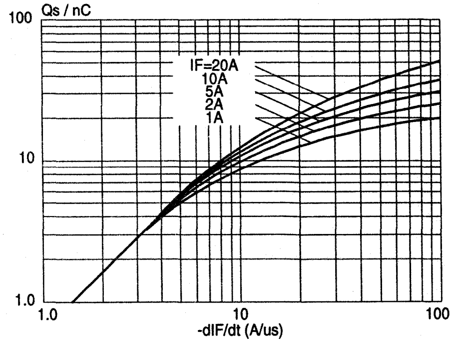


Fig.10. Maximum Q_s at T_j = 25 ˚C; per diode

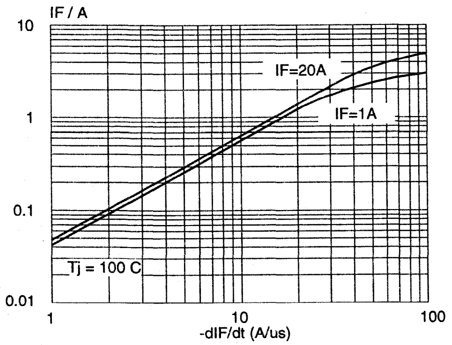


Fig.8. Maximum I_{rrm} at T_j = 100 ˚C; per diode

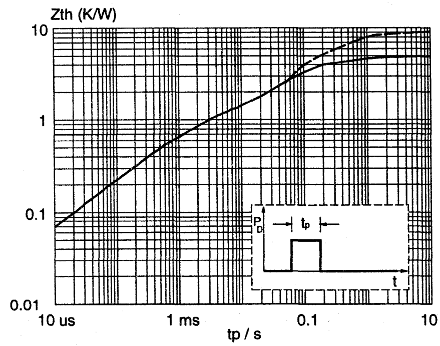


Fig.11. Transient thermal impedance; per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.

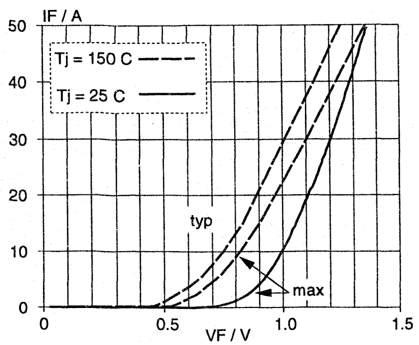


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

Dual rectifier diodes ultrafast

BYV74 series

GENERAL DESCRIPTION

Glass passivated, high efficiency rectifier diodes in a plastic envelope featuring low forward voltage drop, ultra fast reverse recovery times and soft recovery characteristic. They are intended for use in switched mode power supplies and high frequency circuits in general, where both low conduction losses and low switching losses are essential.

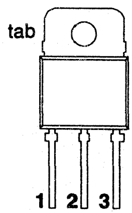
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV74-	**300**	**400**	**500**	
V_{RRM}	Repetitive peak reverse voltage	300	400	500	V
V_F	Forward voltage	1.05	1.05	1.05	V
$I_{O(AV)}$	Output current (both diodes conducting)	30	30	30	A
t_{rr}	Reverse recovery time	60	60	60	ns

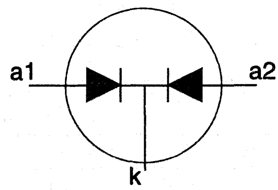
PINNING - SOT93

PIN	DESCRIPTION
1	Anode 1 (a)
2	Cathode (k)
3	Anode 2 (a)
tab	Cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-300	-400	-500	
V_{RRM}	Repetitive peak reverse voltage		-	300	400	500	V
V_{RWM}	Crest working reverse voltage		-	200	300	400	V
V_R	Continuous reverse voltage[1]		-	200	300	400	V
$I_{O(AV)}$	Output current (both diodes conducting)[2]	square wave; $\delta = 0.5$; $T_{mb} \leq 100$ ˚C	-	30			A
		sinusoidal; a = 1.57; $T_{mb} \leq 104$ ˚C	-	27			A
$I_{O(RMS)}$	RMS forward current		-	43			A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 100$ ˚C	-	30			A
I_{FSM}	Non-repetitive peak forward current per diode.	t = 10 ms	-	130			A
		t = 8.3 ms sinusoidal; with reapplied $V_{RWM(max)}$	-	143			A
I^2t	I^2t for fusing	t = 10 ms	-	85			A^2s
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

1 $T_{mb} \leq 136$˚C for thermal stability.

2 Neglecting switching and reverse current losses.
For output currents in in excess of 20 A, connection should be made to the exposed metal mounting base.

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.	-	45	-	K/W

STATIC 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	-	0.95	1.05	V
		I_F = 50 A	-	1.30	1.60	V
I_R	Reverse current	$V_R = V_{RWM}$	-	10	50	µA
		$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.3	0.8	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 to $V_R \geq$ 30 V; dI_F/dt = 100 A/µs	-	50	60	ns
Q_s	Reverse recovery charge	I_F = 2 A to $V_R \geq$ 30 V; dI_F/dt = 20 A/µs	-	50	60	nC
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

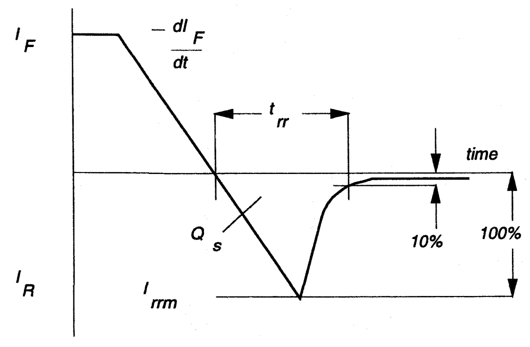


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

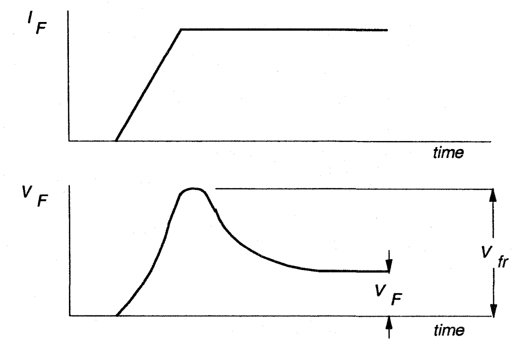


Fig.2. Definition of V_{fr}

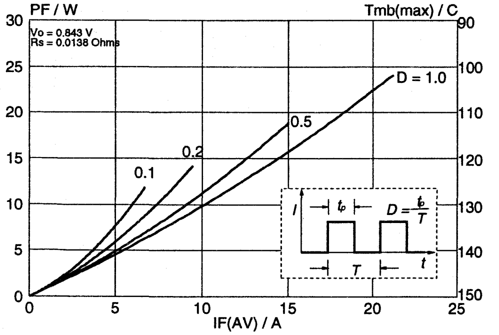


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

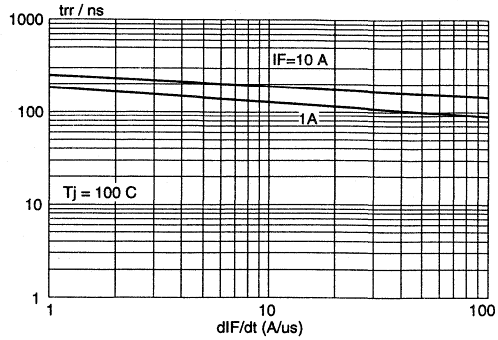


Fig.6. Maximum t_{rr} at $T_j = 100^{\circ}C$; per diode

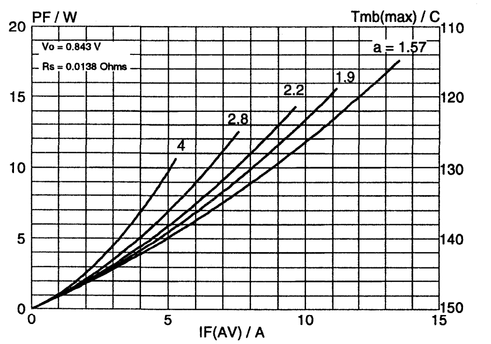


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

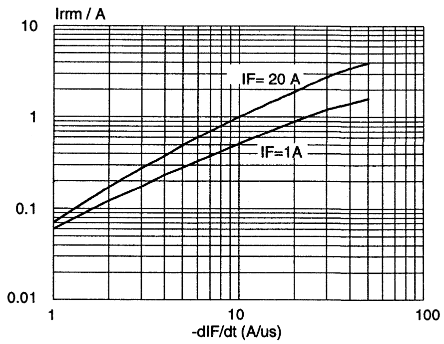


Fig.7. Maximum I_{rrm} at $T_j = 25^{\circ}C$; per diode.

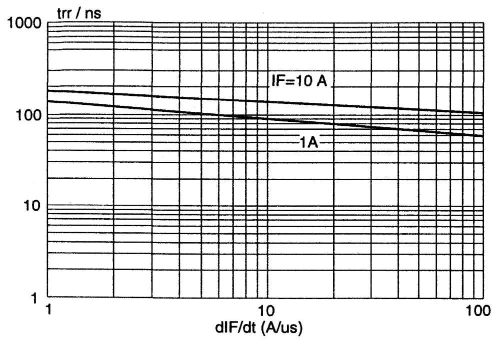


Fig.5. Maximum t_{rr} at $T_j = 25^{\circ}C$; per diode

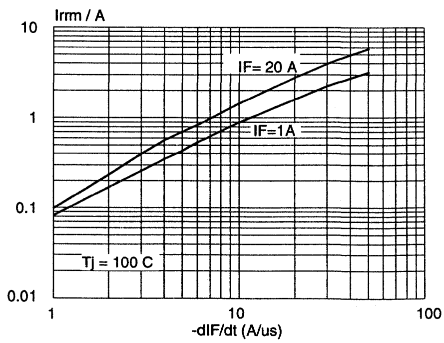


Fig.8. Maximum I_{rrm} at $T_j = 100^{\circ}C$; per diode.

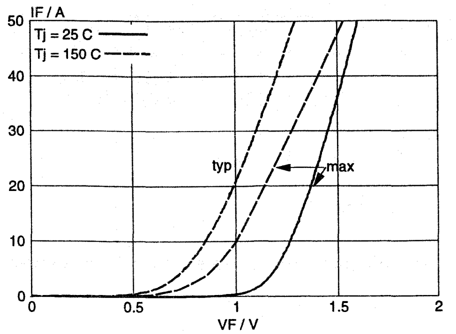


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$*; parameter* T_j

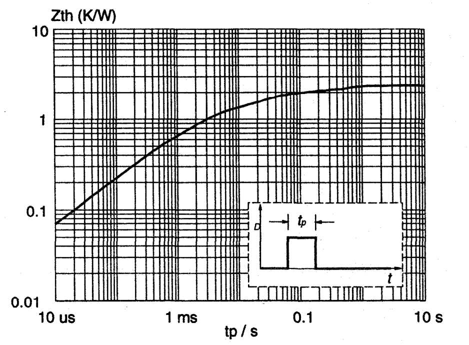


Fig.11. Transient thermal impedance per diode $Z_{th} = f(t_p)$

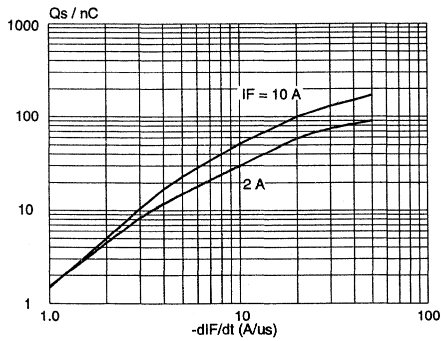


Fig.10. Maximum Q_s *at* $T_j = 25^{\circ}C$*; per diode*

GENERAL DESCRIPTION

Glass passivated, high efficiency rectifier diodes in a full pack plastic envelope featuring low forward voltage drop, ultra fast reverse recovery times and soft recovery characteristic. They are intended for use in switched mode power supplies and high frequency circuits in general, where both low conduction losses and low switching losses are essential.

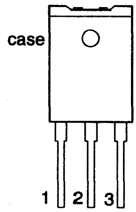
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV74F-	**300**	**400**	**500**	
V_{RRM}	Repetitive peak reverse voltage	300	400	500	V
V_F	Forward voltage	1.05	1.05	1.05	V
$I_{O(AV)}$	Output current (both diodes conducting)	20	20	20	A
t_{rr}	Reverse recovery time	60	60	60	ns

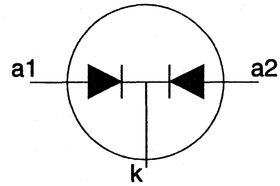
PINNING - SOT199

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX. -300	MAX. -400	MAX. -500	UNIT
V_{RRM}	Repetitive peak reverse voltage		-	300	400	500	V
V_{RWM}	Crest working reverse voltage		-	200	300	400	V
V_R	Continuous reverse voltage[1]		-	200	300	400	V
$I_{O(AV)}$	Output current (both diodes conducting)[2]	square wave; $\delta = 0.5$; $T_{hs} \leq 62$ ˚C	-	20			A
		sinusoidal; a = 1.57; $T_{mb} \leq 56$ ˚C	-	20			A
$I_{O(RMS)}$	RMS forward current		-	20			A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 62$ ˚C	-	30			A
I_{FSM}	Non-repetitive peak forward current per diode.	t = 10 ms	-	130			A
		t = 8.3 ms	-	143			A
		sinusoidal; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-	85			A^2s
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

1 $T_{hs} \leq 117$˚C for thermal stability.

2 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	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.	-	35	-	K/W

STATIC 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	-	0.95	1.05	V
		I_F = 50 A	-	1.30	1.60	V
I_R	Reverse current	$V_R = V_{RWM}$	-	10	50	µA
		$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.3	0.8	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 to $V_R \geq$ 30 V; dI_F/dt = 100 A/µs	-	50	60	ns
Q_s	Reverse recovery charge	I_F = 2 A to $V_R \geq$ 30 V; dI_F/dt = 20 A/µs	-	50	60	nC
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

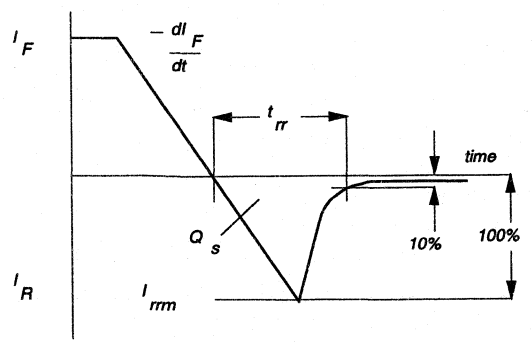


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

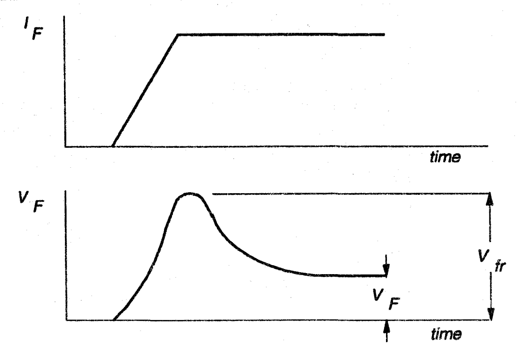


Fig.2. Definition of V_{fr}

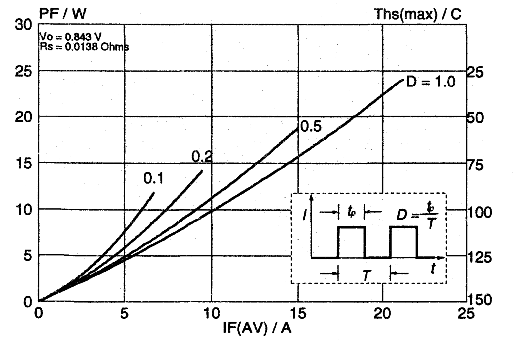


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

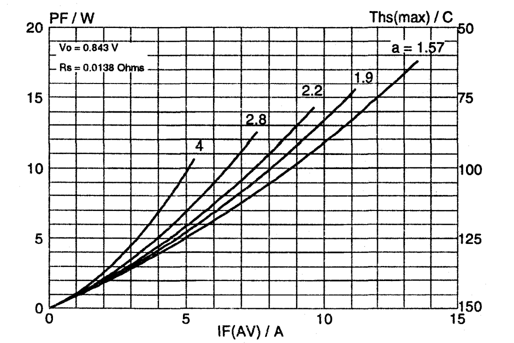


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

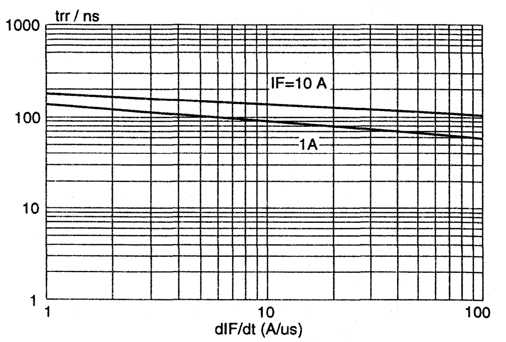


Fig.5. Maximum t_{rr} at $T_j = 25^\circ C$; per diode

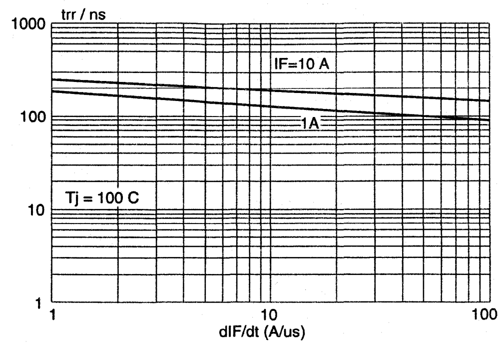


Fig.6. Maximum t_{rr} at $T_j = 100^\circ C$; per diode

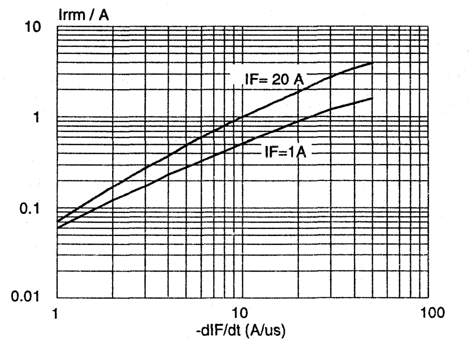


Fig.7. Maximum I_{rrm} at $T_j = 25^\circ C$; per diode.

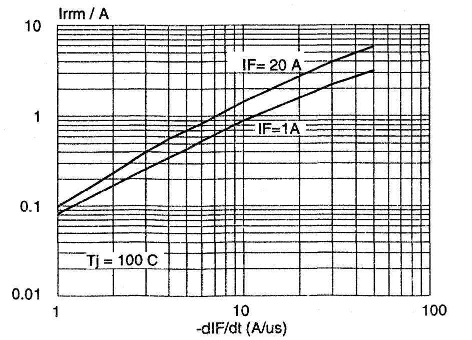


Fig.8. Maximum I_{rrm} at $T_j = 100^\circ C$; per diode.

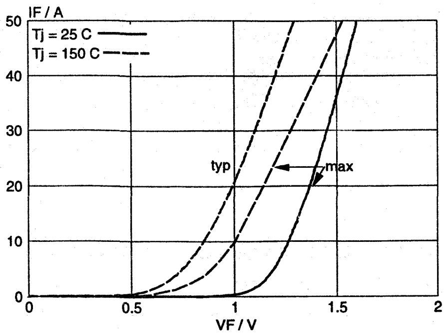


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

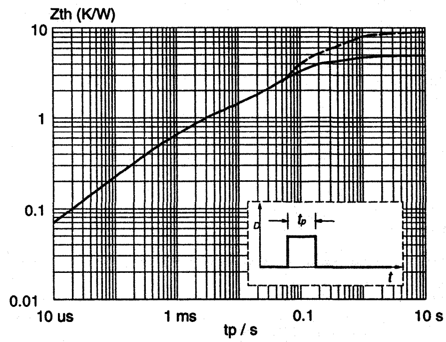


Fig.11. Transient thermal impedance per diode $Z_{th} = f(t_p)$

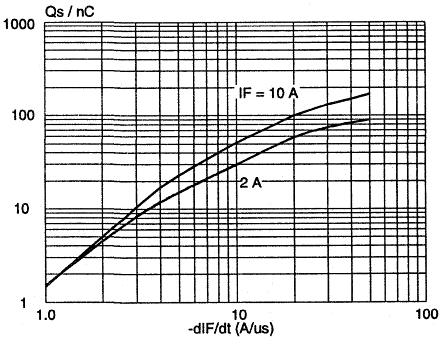


Fig.10. Maximum Q_s at $T_j = 25^{\circ}C$; per diode

GENERAL DESCRIPTION

Glass passivated high efficiency rectifier diodes in a plastic envelope, 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.

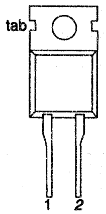
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV79-	**100**	**150**	**200**	
V_{RRM}	Repetitive peak reverse voltage	100	150	200	V
V_F	Forward voltage	0.9	0.9	0.9	V
$I_{F(AV)}$	Forward current	14	14	14	A
t_{rr}	Reverse recovery time	30	30	30	ns

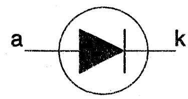
PINNING - TO220AC

PIN	DESCRIPTION
1	cathode (k)
2	anode (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-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; $\delta = 0.5$; $T_{mb} \leq 120$ ˚C	-	14			A
		sinusoidal; a = 1.57; $T_{mb} \leq 122$ ˚C	-	12.7			A
$I_{F(RMS)}$	RMS forward current		-	20			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^2t	I^2t for fusing	t = 10 ms	-	112			A^2s
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

1 $T_{mb} \leq 145$˚C for thermal stability.

2 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 = 14 A; T_j = 150˚C	-	0.83	0.90	V
		I_F = 14 A	-	0.95	1.05	V
		I_F = 50 A	-	1.20	1.30	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

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_s	Reverse recovery charge	I_F = 2 A; $V_R \geq$ 30 V; -dI_F/dt = 20 A/µs	-	6	15	nC
t_{rr}	Reverse recovery time	I_F = 1 A; $V_R \geq$ 30 V; -dI_F/dt = 100 A/µs	-	20	30	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	-	3	4	A
V_{fr}	Forward recovery voltage	I_F = 10 A; dI_F/dt = 10 A/µs	-	1	-	V

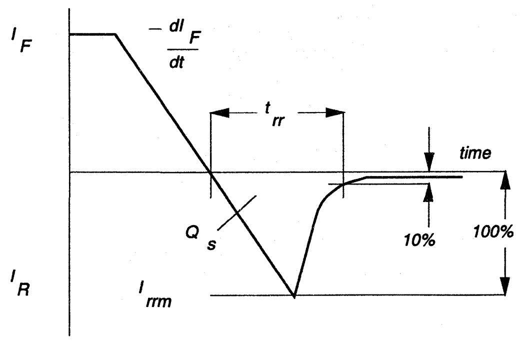


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

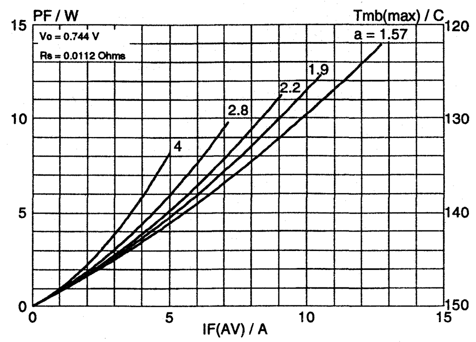


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

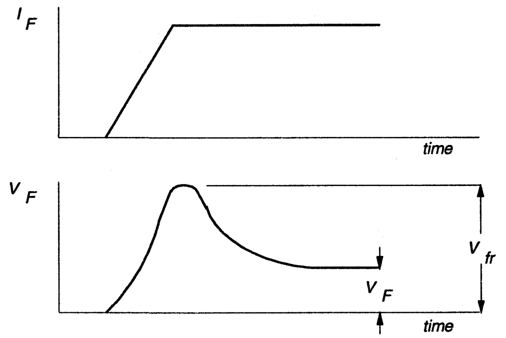


Fig.2. Definition of V_{fr}

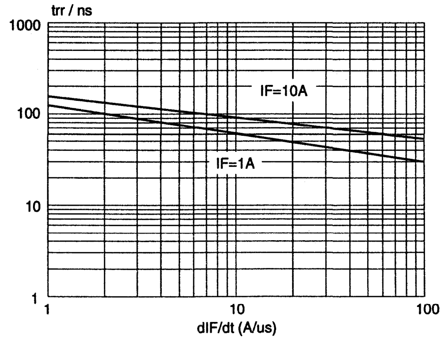


Fig.5. Maximum t_{rr} at T_j = 25 ˚C.

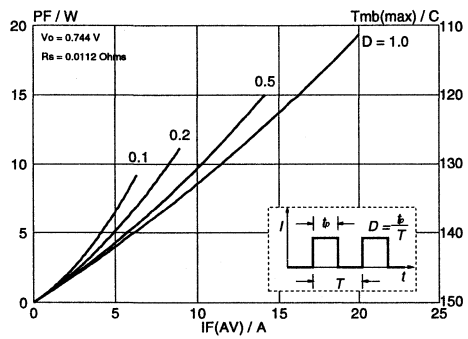


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

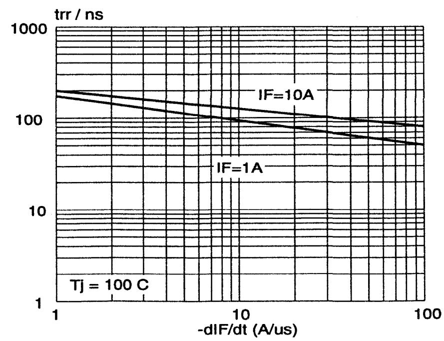


Fig.6. Maximum t_{rr} at T_j = 100 ˚C.

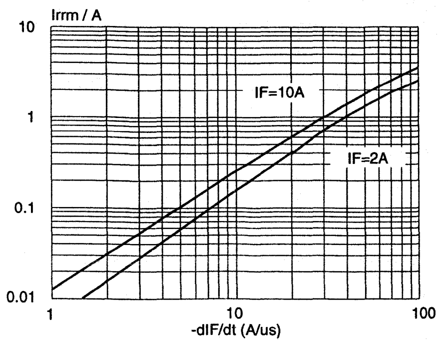


Fig.7. Maximum I_{rrm} at T_j = 25 ˚C.

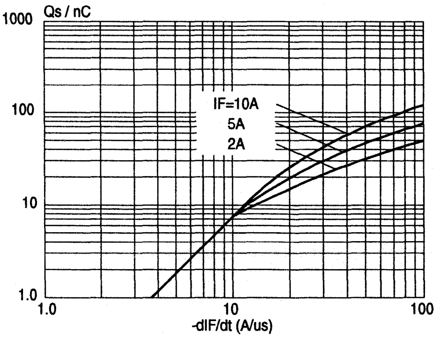


Fig.10. Maximum Q_s at T_j = 25 ˚C.

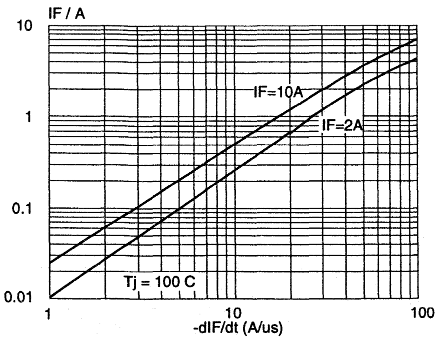


Fig.8. Maximum I_{rrm} at T_j = 100 ˚C.

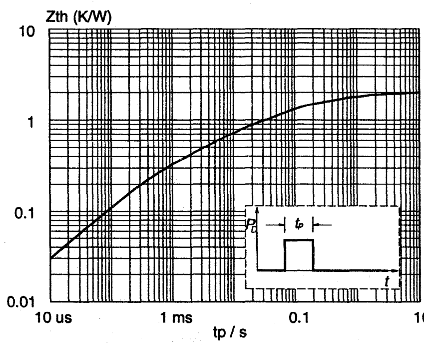


Fig.11. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

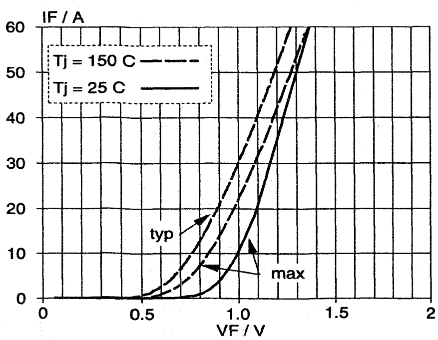


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

Rectifier diodes ultrafast, rugged

BYV79E series

GENERAL DESCRIPTION

Glass passivated high efficiency rugged rectifier diodes in a plastic envelope, featuring low forward voltage drop, ultra-fast recovery times and soft recovery characteristic. These devices can withstand reverse voltage transients and have 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.

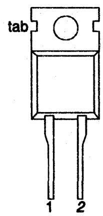
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV79E-	**100**	**150**	**200**	
V_{RRM}	Repetitive peak reverse voltage	100	150	200	V
V_F	Forward voltage	0.9	0.9	0.9	V
$I_{F(AV)}$	Forward current	14	14	14	A
t_{rr}	Reverse recovery time	30	30	30	ns
I_{RRM}	Repetitive peak reverse current	0.2	0.2	0.2	A

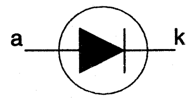
PINNING - TO220AC

PIN	DESCRIPTION
1	cathode (k)
2	anode (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-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 $\delta = 0.5$; $T_{mb} \leq 120$ ˚C	-	14			A
		sinusoidal $a = 1.57$; $T_{mb} \leq 122$ ˚C	-	12.7			A
$I_{F(RMS)}$	RMS forward current		-	20			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 sinusoidal; with reapplied $V_{RWM(max)}$	-	160			A
I^2t	I^2t for fusing	$t = 10$ ms	-	112			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 $T_{mb} \leq 145$˚C for thermal stability.
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	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

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
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

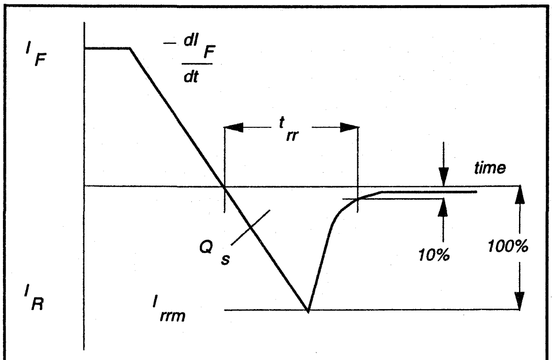


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

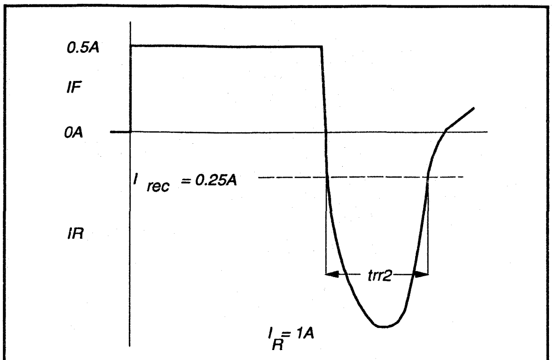


Fig.4. Definition of t_{rr2}

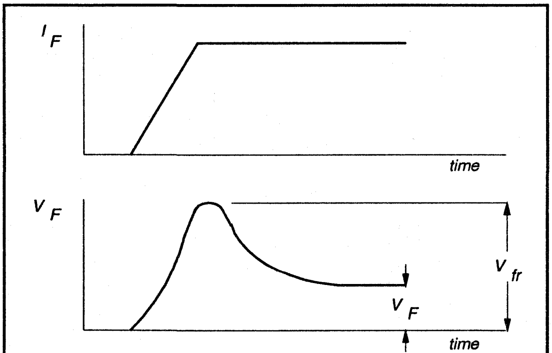


Fig.2. Definition of V_{fr}

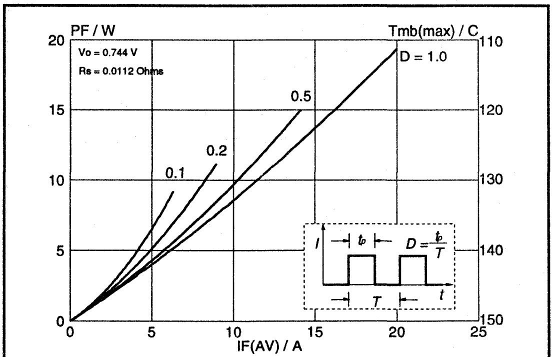


Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

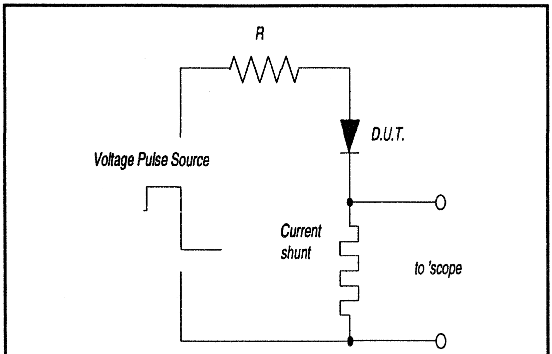


Fig.3. Circuit schematic for t_{rr2}

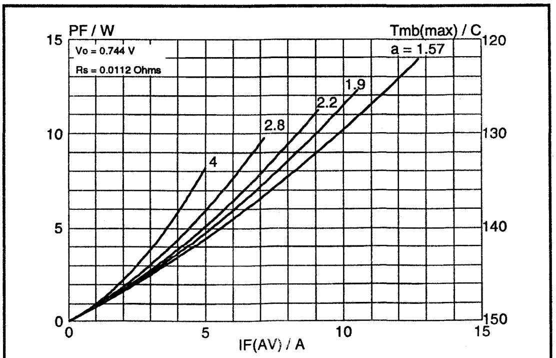


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

Rectifier diodes ultrafast, rugged

BYV79E series

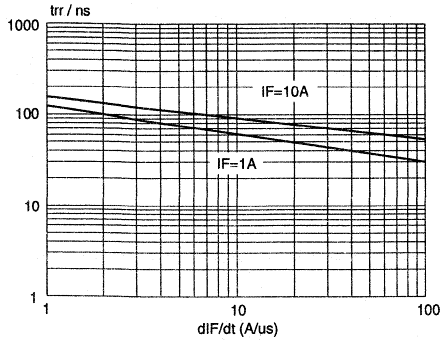


Fig.7. Maximum t_{rr} at $T_j = 25$ ˚C.

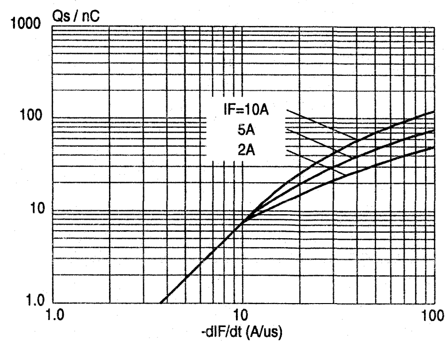


Fig.10. Maximum Q_s at $T_j = 25$ ˚C.

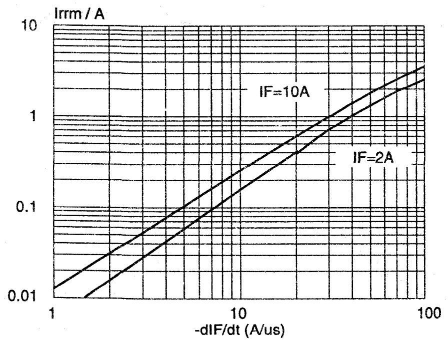


Fig.8. Maximum I_{rrm} at $T_j = 25$ ˚C.

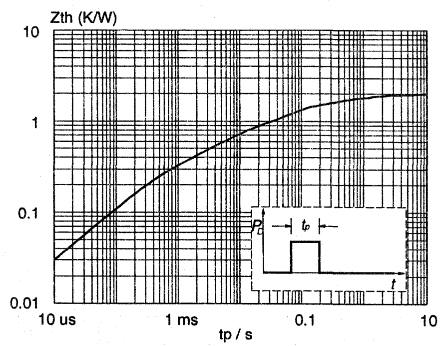


Fig.11. Transient thermal impedance; $Z_{th\ j\text{-}mb} = f(t_p)$.

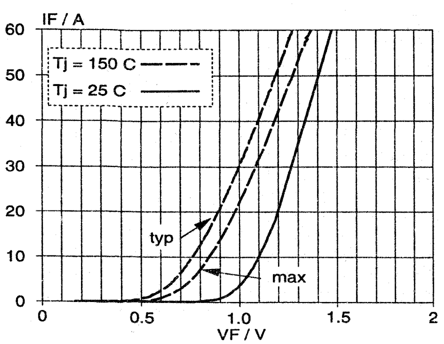


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

Rectifier diodes schottky barrier

BYV118 series

GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky rectifier diodes in a plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

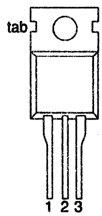
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV118-	**35**	**40**	**45**	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.6	0.6	0.6	V
$I_{O(AV)}$	Output current (both diodes conducting)	10	10	10	A

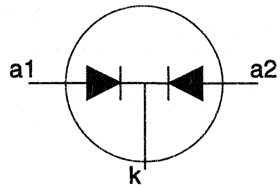
PINNING - TO220AB

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-35	-40	-45	
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq 144˚C$	-	35	40	45	V
$I_{O(AV)}$	Output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{mb} \leq 138˚C$	-	10			A
		sinusoidal; a = 1.57; $T_{mb} \leq 139˚C$	-	9			A
$I_{O(RMS)}$	RMS forward current		-	14			A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 138$ ˚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 $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-	50			A^2s
I_{RRM}	Repetitive peak reverse current per diode.	$t_p = 2$ µs; $\delta = 0.001$	-	1			A
I_{RSM}	Non-repetitive peak reverse current per diode.	$t_p = 100$ µs	-	1			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	-	-	2.7	K/W
		both diodes	-	-	1.7	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 (per diode)	I_F = 5 A; T_j = 150˚C	-	0.50	0.60	V
		I_F = 10 A	-	0.74	0.87	V
I_R	Reverse current (per diode)	$V_R = V_{RWM}$	-	50	100	µA
		$V_R = V_{RWM}$; T_j = 125 ˚C	-	2.5	15	mA
C_d	Junction capacitance (per diode)	f = 1MHz; V_R = 5V; T_j = 25 ˚C to 125 ˚C	-	200	-	pF

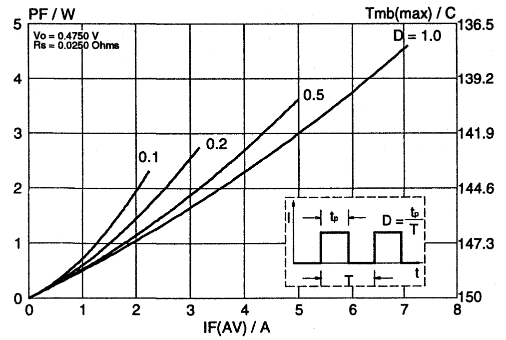


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

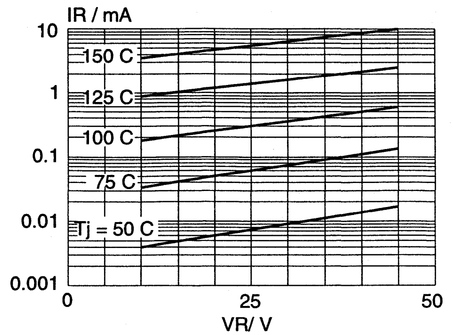


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

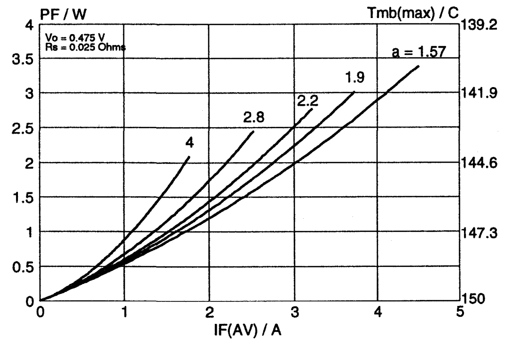


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

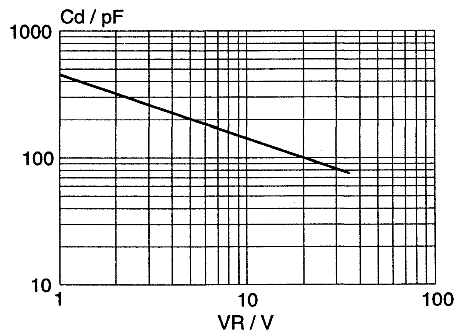


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

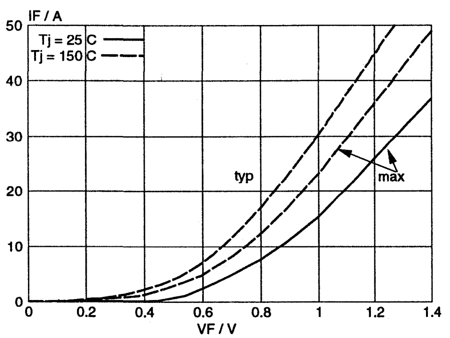


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

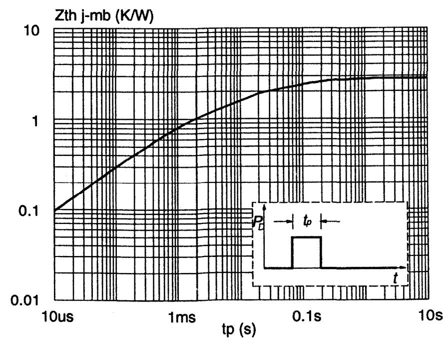


Fig.6. Transient thermal impedance; per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

Rectifier diodes schottky barrier

BYV118F series

GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky barrier rectifier diodes in a full pack plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

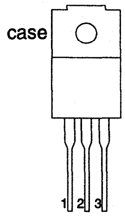
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV118F-	**35**	**40**	**45**	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.6	0.6	0.6	V
$I_{O(AV)}$	Output current (both diodes conducting)	10	10	10	A

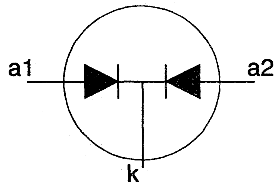
PINNING - SOT186

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-35	-40	-45	
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_{hs} \leq 123$ ˚C	-	35	40	45	V
$I_{O(AV)}$	Output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{hs} \leq 110$ ˚C	-	10			A
		sinusoidal; a = 1.57; $T_{hs} \leq 113$ ˚C	-	9			A
$I_{O(RMS)}$	RMS forward current		-	14			A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 110$ ˚C	-	10			A
I_{FSM}	Non-repetitive peak forward current per diode.	t = 10 ms	-	100			A
		t = 8.3 ms sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$	-	110			A
I^2t	I^2t for fusing	t = 10 ms	-	50			A^2s
I_{RRM}	Repetitive peak reverse current per diode.	$t_p = 2$ µs; $\delta = 0.001$	-	1			A
I_{RSM}	Non-repetitive peak reverse current per diode.	$t_p = 100$ µs	-	1			A
T_{stg}	Storage temperature		-65	175			˚C
T_j	Operating junction temperature		-	150			˚C

ISOLATION

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Repetitive peak voltage from all three terminals to external heatsink	R.H. ≤ 65% ; clean and dustfree	-	-	1500	V
C_{isol}	Capacitance from T2 to external heatsink	f = 1 MHz	-	12	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	per diode	-	-	6.5	K/W
		both diodes (with heatsink compound)	-	-	5.5	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 (per diode)	I_F = 5 A; T_j = 150˚C	-	0.50	0.60	V
		I_F = 10 A	-	0.74	0.87	V
I_R	Reverse current (per diode)	$V_R = V_{RWM}$	-	50	100	µA
		$V_R = V_{RWM}$; T_j = 125 ˚C	-	2.5	15	mA
C_d	Junction capacitance (per diode)	f = 1 MHz; V_R = 5V; T_j = 25 ˚C to 125 ˚C	-	200	-	pF

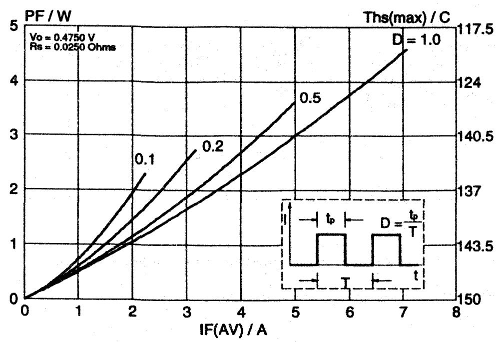


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

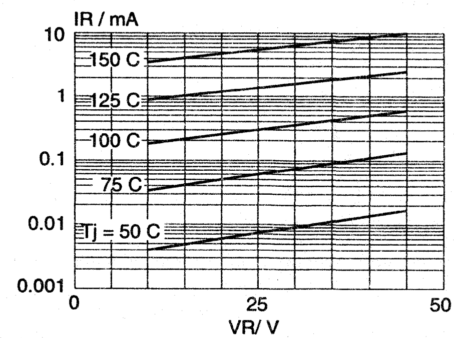


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

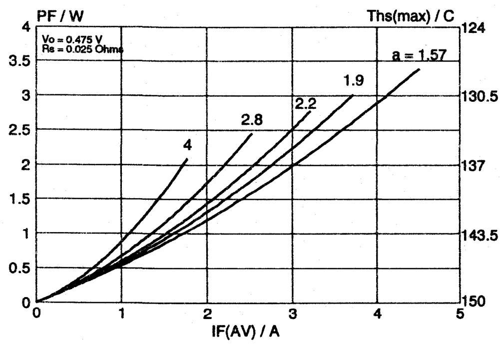


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

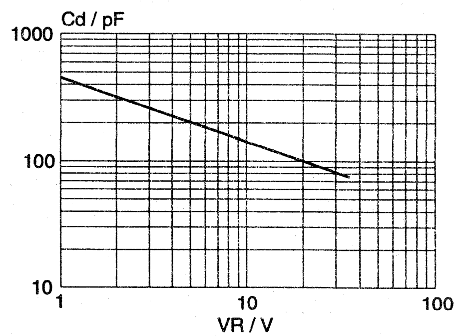


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

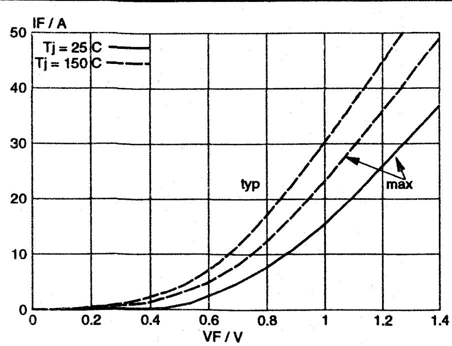


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

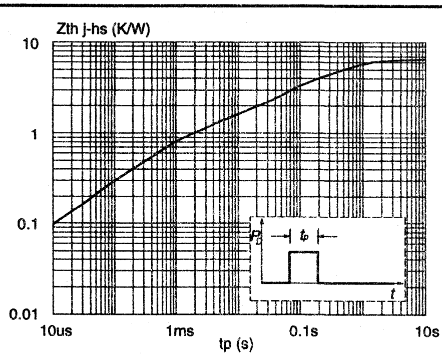


Fig.6. Transient thermal impedance; per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.

Rectifier diodes schottky barrier

BYV133 series

GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky rectifier diodes in a plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

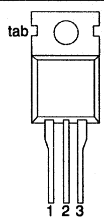
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV133-	**35**	**40**	**45**	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.60	0.60	0.60	V
$I_{O(AV)}$	Output current (both diodes conducting)	20	20	20	A

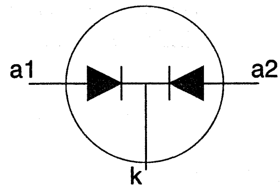
PINNING - TO220AB

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-35	-40	-45	
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq 145$ ˚C	-	35	40	45	V
$I_{O(AV)}$	Output current (both diodes conducting)[1]	square wave; $\delta = 0.5$; $T_{mb} \leq 122$ ˚C	-	20			A
		sinusoidal; a = 1.57; $T_{mb} \leq 123$ ˚C	-	18			A
$I_{O(RMS)}$	RMS forward current		-	28			A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 122$ ˚C	-	20			A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-	100			A
		t = 8.3 ms sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$	-	110			A
I^2t	I^2t for fusing	t = 10 ms	-	50			A^2s
I_{RRM}	Repetitive peak reverse current per diode.	$t_p = 2$ µs; $\delta = 0.001$	-	1			A
I_{RSM}	Non-repetitive peak reverse current per diode.	$t_p = 100$ µs	-	1			A
T_{stg}	Storage temperature		-65	175			˚C
T_j	Operating junction temperature		-	150			˚C

1 For output currents in excess of 20A, connection should be made to the exposed metal mounting base.

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	2.6	K/W
		both diodes	-	-	1.6	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 (per diode)	I_F = 7 A; T_j = 150˚C	-	0.55	0.60	V
		I_F = 20 A	-	0.88	0.94	V
I_R	Reverse current (per diode)	$V_R = V_{RWM}$	-	50	100	µA
		$V_R = V_{RWM}$; T_j = 125 ˚C	-	4	15	mA
C_d	Junction capacitance (per diode)	f = 1 MHz; V_R = 5 V; T_j = 25 ˚C to 125 ˚C	-	300	-	pF

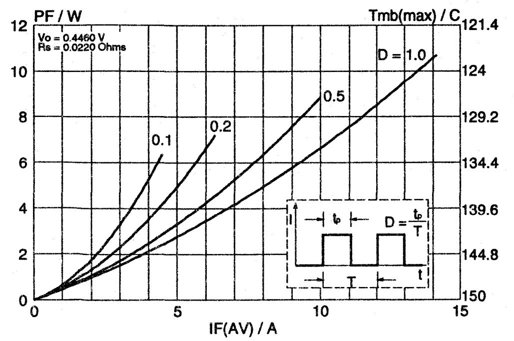


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

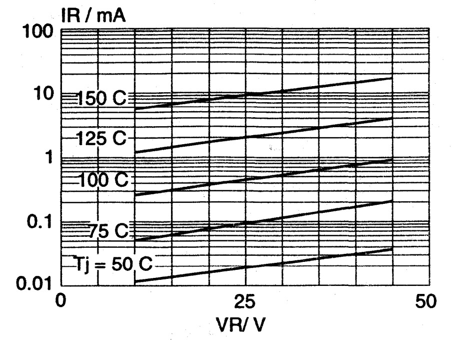


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

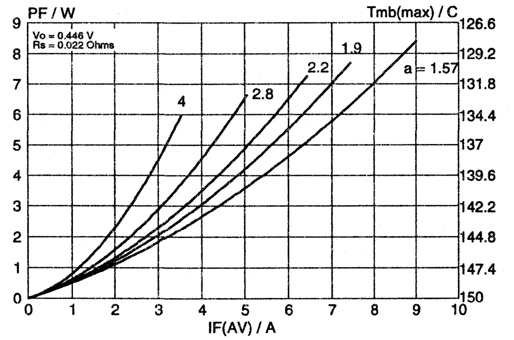


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

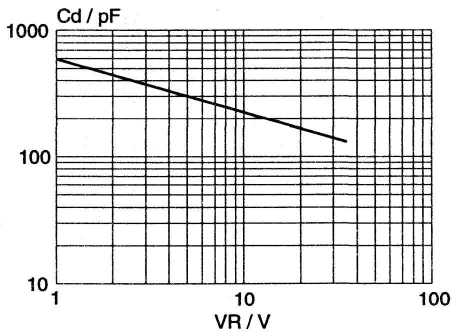


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

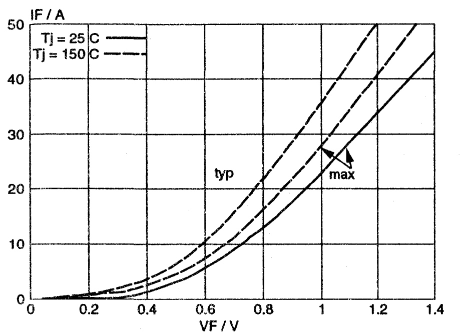


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

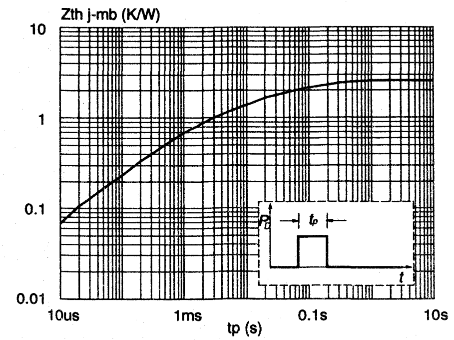


Fig.6. Transient thermal impedance; per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.

Rectifier diodes schottky barrier

BYV133F series

GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky barrier rectifier diodes in a full pack, plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

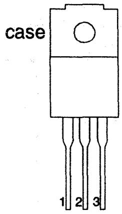
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV133-	**35**	**40**	**45**	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.60	0.60	0.60	V
$I_{O(AV)}$	Output current (both diodes conducting)	20	20	20	A

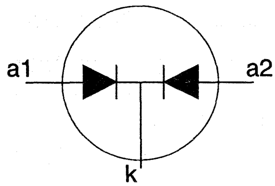
PINNING - SOT186

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-35	-40	-45	
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_{hs} \leq 124$˚C	-	35	40	45	V
$I_{O(AV)}$	Output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{hs} \leq 61$ ˚C	-	20			A
		sinusoidal; a = 1.57; $T_{hs} \leq 66$ ˚C	-	18			A
$I_{O(RMS)}$	RMS forward current		-	20			A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 61$ ˚C	-	20			A
I_{FSM}	Non-repetitive peak forward current per diode.	t = 10 ms	-	100			A
		t = 8.3 ms sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$	-	110			A
I^2t	I^2t for fusing	t = 10 ms	-	50			A^2s
I_{RRM}	Repetitive peak reverse current per diode.	$t_p = 2$ µs; $\delta = 0.001$	-	1			A
I_{RSM}	Non-repetitive peak reverse current per diode.	$t_p = 100$ µs	-	1			A
T_{stg}	Storage temperature		-65	175			˚C
T_j	Operating junction temperature		-	150			˚C

ISOLATION

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Repetitive peak voltage from all three terminals to external heatsink	R.H. ≤ 65% ; clean and dustfree	-	-	1500	V
C_{isol}	Capacitance from T2 to external heatsink	f = 1 MHz	-	12	-	pF

THERMAL 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)	- -	- -	6.0 5.0	K/W 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 (per diode)	I_F = 7 A; T_j = 150˚C I_F = 20 A	- -	0.55 0.88	0.60 0.94	V V
I_R	Reverse current (per diode)	$V_R = V_{RWM}$ $V_R = V_{RWM}$; T_j = 125 ˚C	- -	50 4	100 15	µA mA
C_d	Junction capacitance (per diode)	f = 1 MHz; V_R = 5 V; T_j = 25 ˚C to 125 ˚C	-	300	-	pF

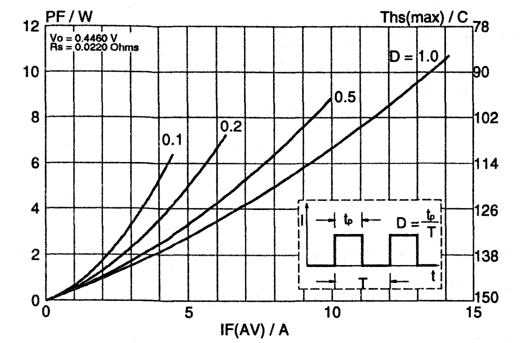


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

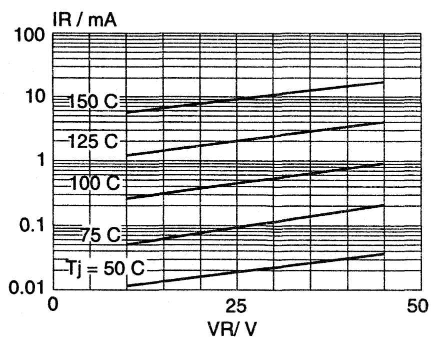


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

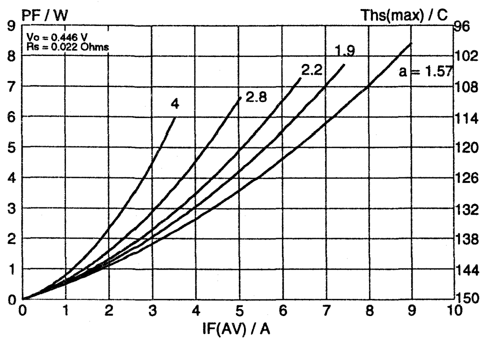


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

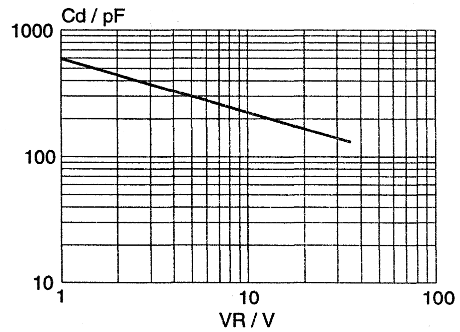


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

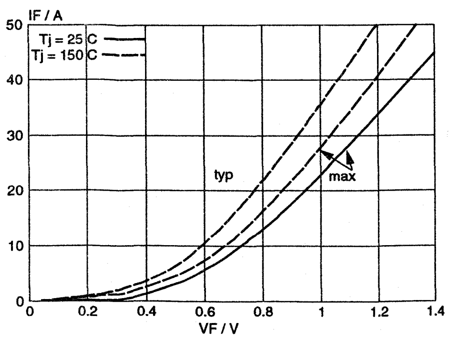


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

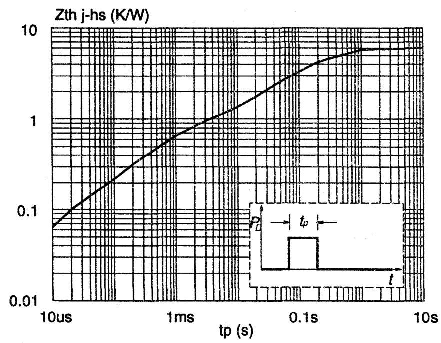


Fig.6. Transient thermal impedance; per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.

Rectifier diodes schottky barrier

BYV143 series

GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky rectifier diodes in a plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

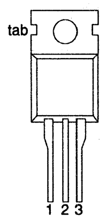
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV143-	**35**	**40**	**45**	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.60	0.60	0.60	V
$I_{O(AV)}$	Output current (both diodes conducting)	30	30	30	A

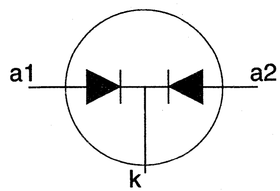
PINNING - TO220AB

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX. -35	MAX. -40	MAX. -45	UNIT
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq 135$ °C	-	35	40	45	V
$I_{O(AV)}$	Output current (both diodes conducting)[1]	square wave; $\delta = 0.5$; $T_{mb} \leq 117$ °C	-		30		A
		sinusoidal; a = 1.57; $T_{mb} \leq 119$ °C	-		27		A
$I_{F(RMS)}$	RMS forward current		-		43		A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 117$ °C	-		30		A
I_{FSM}	Non-repetitive peak forward current, both diodes conducting.	t = 10 ms	-		200		A
		t = 8.3 ms	-		220		A
		sinusoidal $T_j = 125$ °C prior to surge; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-		200		A^2s
I_{RRM}	Repetitive peak reverse current per diode.	$t_p = 2$ µs; $\delta = 0.001$	-		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

1 For output currents in excess of 20A, connection should be made to the exposed metal mounting base.

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\,j-mb}$	Thermal resistance junction to mounting base	per diode	-	-	2.3	K/W
		both diodes	-	-	1.4	K/W
$R_{th\,j-a}$	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 (per diode)	I_F = 15 A; T_j = 150˚C	-	0.55	0.60	V
		I_F = 20 A	-	0.71	0.77	V
I_R	Reverse current (per diode)	$V_R = V_{RWM}$	-	10	200	µA
		$V_R = V_{RWM}$; T_j = 125 ˚C	-	10	30	mA
C_d	Junction capacitance (per diode)	f = 1 MHz; V_R = 5 V; T_j = 25 ˚C to 125 ˚C	-	500	-	pF

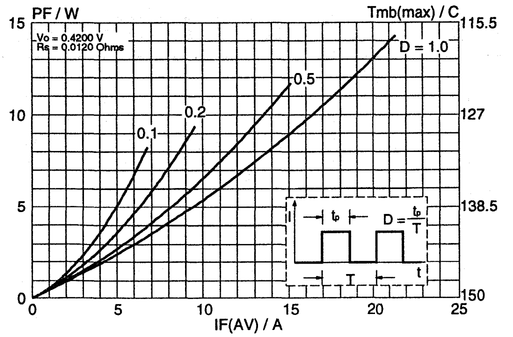


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

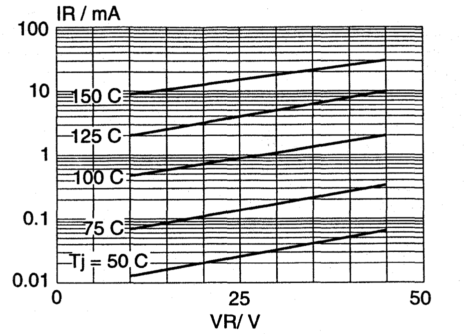


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

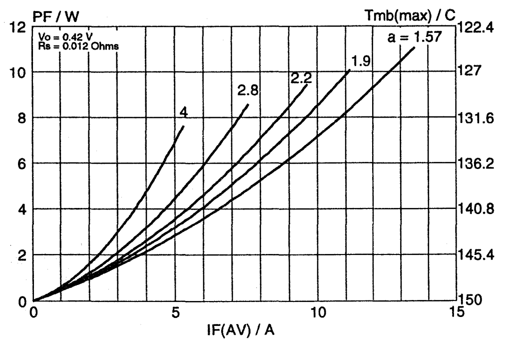


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

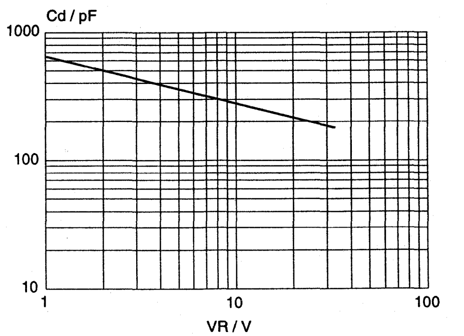


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

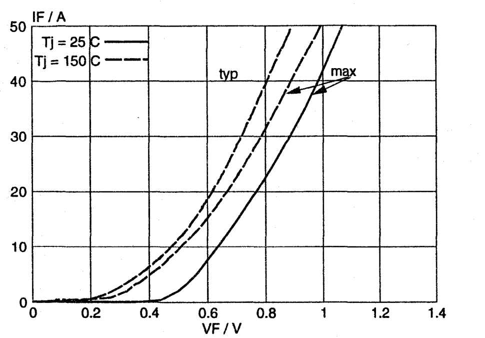


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

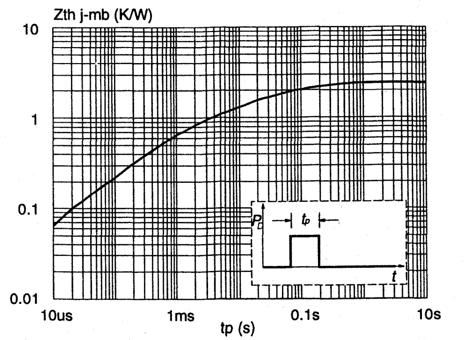


Fig.6. Transient thermal impedance; per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky barrier rectifier diodes in a full pack, plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

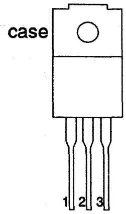
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV143-	**35**	**40**	**45**	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.62	0.62	0.62	V
$I_{O(AV)}$	Output current (both diodes conducting)	20	20	20	A

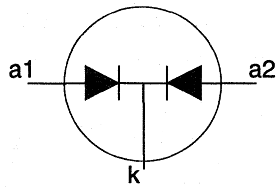
PINNING - SOT186

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX. -35	MAX. -40	MAX. -45	UNIT
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_{hs} \leq 112$°C	-	35	40	45	V
$I_{O(AV)}$	Output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{hs} \leq 85$°C	-		20		A
		sinusoidal; a = 1.57; $T_{hs} \leq 81$°C	-		20		A
$I_{O(RMS)}$	RMS forward current		-		20		A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 85$ °C	-		30		A
I_{FSM}	Non-repetitive peak forward current per diode.	t = 10 ms	-		100		A
		t = 8.3 ms sinusoidal; $T_j = 125$ °C prior to surge; with reapplied $V_{RWM(max)}$	-		110		A
I^2t	I^2t for fusing	t = 10 ms	-		50		A^2s
I_{RRM}	Repetitive peak reverse current per diode.	$t_p = 2$ µs; $\delta = 0.001$	-		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

ISOLATION

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Repetitive peak voltage from all three terminals to external heatsink	R.H. ≤ 65% ; clean and dustfree	-	-	1500	V
C_{isol}	Capacitance from T2 to external heatsink	f = 1 MHz	-	12	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	per diode	-	-	5.7	K/W
		both diodes (with heatsink compound)	-	-	4.8	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 (per diode)	I_F = 15 A; T_j = 150˚C	-	0.55	0.62	V
		I_F = 20 A	-	0.76	0.80	V
I_R	Reverse current (per diode)	$V_R = V_{RWM}$	-	10	200	µA
		$V_R = V_{RWM}$; T_j = 125 ˚C	-	10	30	mA
C_d	Junction capacitance (per diode)	f = 1 MHz; V_R = 5 V; T_j = 25 ˚C to 125 ˚C	-	500	-	pF

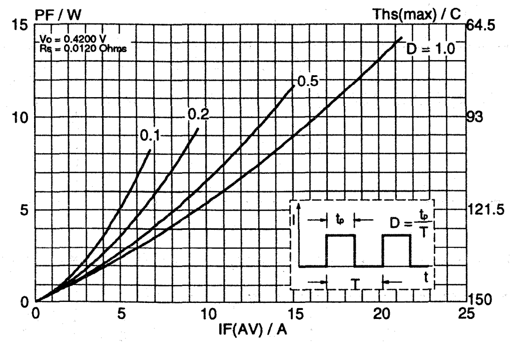


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

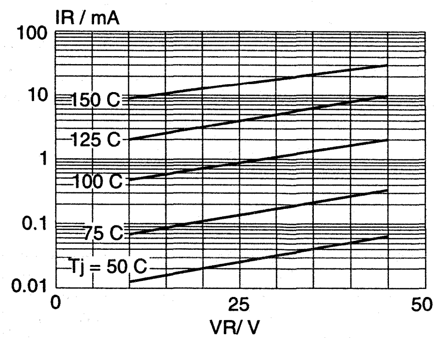


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

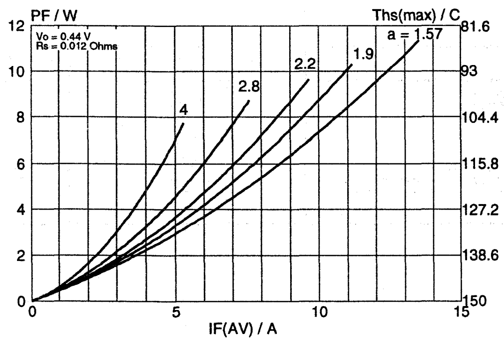


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

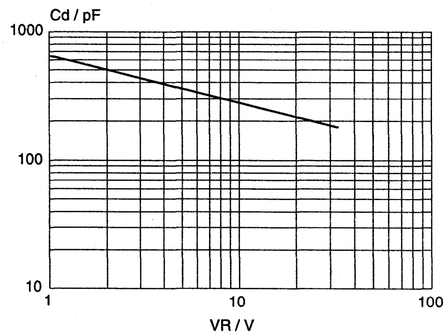


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

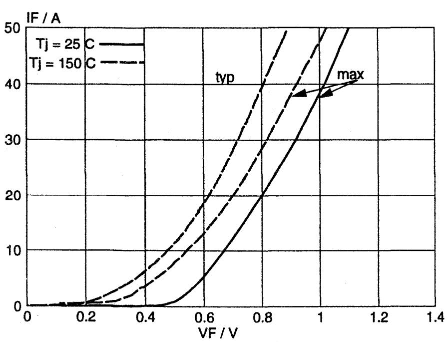


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

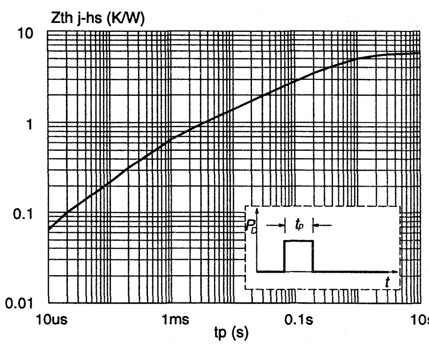


Fig.6. Transient thermal impedance; per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.

Rectifier diodes ultrafast

BYW29 series

GENERAL DESCRIPTION

Glass passivated high efficiency rectifier diodes in a plastic envelope, 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.

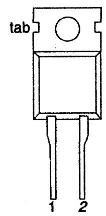
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYW29-	**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

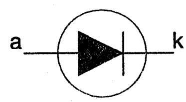
PINNING - TO220AC

PIN	DESCRIPTION
1	cathode (k)
2	anode (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-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		-	100	150	200	V
$I_{F(AV)}$	Average forward current[1]	square wave; $\delta = 0.5$; $T_{mb} \leq 128$ ˚C	-	8			A
		sinusoidal; a = 1.57; $T_{mb} \leq 130$ ˚C	-	7.3			A
$I_{F(RMS)}$	RMS forward current		-	11.3			A
I_{FRM}	Repetitive peak forward current	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 128$ ˚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 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		-	-	2.7	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	$I_F = 8$ 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

DYNAMIC CHARACTERISTICS

$T_j = 25$ °C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_s	Reverse recovery charge	$I_F = 2$ A; $V_R \geq 30$ V; $-dI_F/dt = 20$ A/µs	-	4	11	nC
t_{rr}	Reverse recovery time	$I_F = 1$ A; $V_R \geq 30$ V; $-dI_F/dt = 100$ A/µs	-	20	25	ns
I_{rrm}	Peak reverse recovery current	$I_F = 10$ A; $V_R \geq 30$ 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

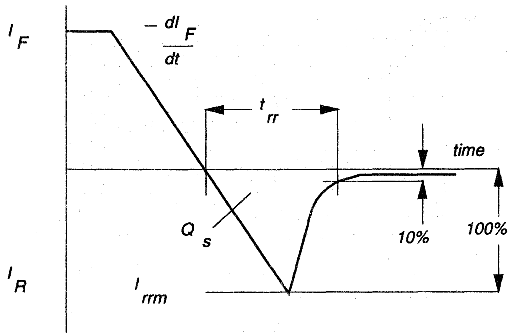


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

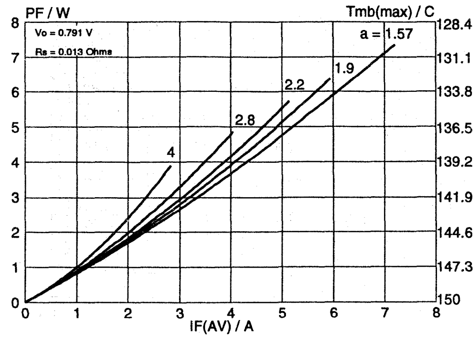


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)}$ / $I_{F(AV)}$.

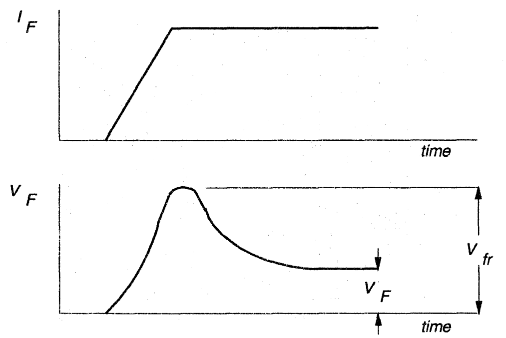


Fig.2. Definition of V_{fr}

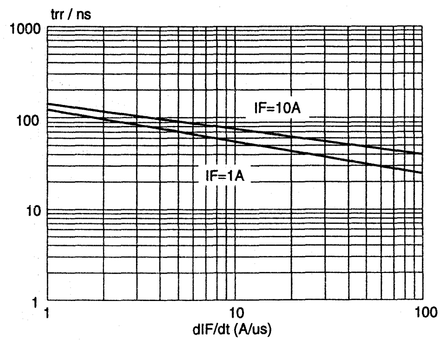


Fig.5. Maximum t_{rr} at T_j = 25 ˚C.

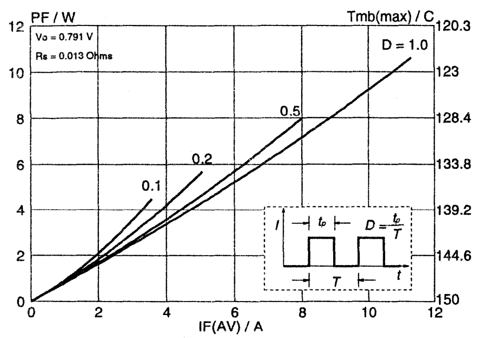


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

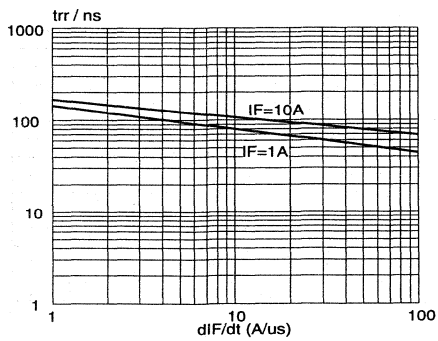


Fig.6. Maximum t_{rr} at T_j = 100 ˚C.

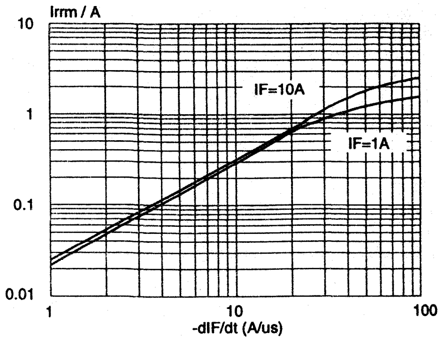


Fig.7. Maximum I_{rrm} at $T_j = 25$ °C.

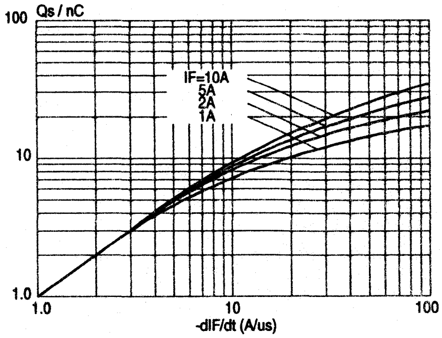


Fig.10. Maximum Q_s at $T_j = 25$ °C.

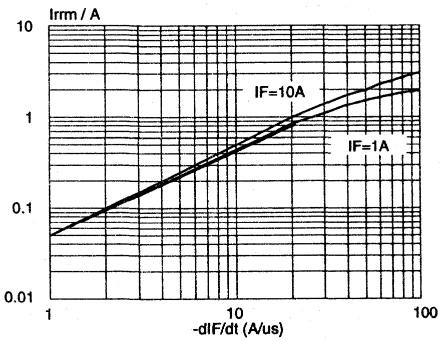


Fig.8. Maximum I_{rrm} at $T_j = 100$ °C.

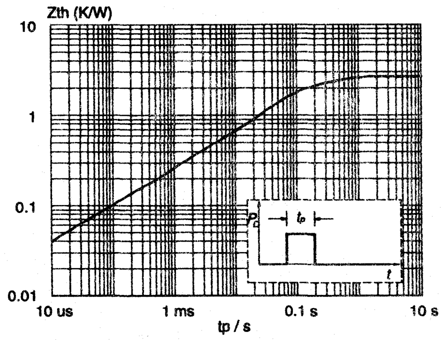


Fig.11. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

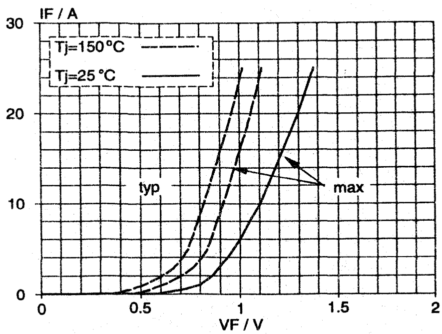


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

Rectifier diodes ultrafast, rugged

BYW29E series

GENERAL DESCRIPTION

Glass passivated high efficiency rugged rectifier diodes in a plastic envelope, featuring low forward voltage drop, ultra-fast recovery times and soft recovery characteristic. These devices can withstand reverse voltage transients and have 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.

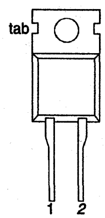
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYW29E-	**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
I_{RRM}	Repetitive peak reverse current	0.2	0.2	0.2	A

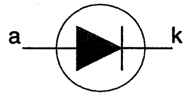
PINNING - TO220AC

PIN	DESCRIPTION
1	cathode (k)
2	anode (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-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		-	100	150	200	V
$I_{F(AV)}$	Average forward current[1]	square wave; $\delta = 0.5$; $T_{mb} \leq 128$ ˚C	-	8			A
		sinusoidal; $a = 1.57$; $T_{mb} \leq 130$ ˚C	-	7.3			A
$I_{F(RMS)}$	RMS forward current		-	11.3			A
I_{FRM}	Repetitive peak forward current	$t = 25$ µs; $\delta = 0.5$; $T_{mb} \leq 128$ ˚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

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		-	-	2.7	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 = 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	-	0.2	0.6	mA
		$V_R = V_{RWM}$	-	2	10	µA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_s	Reverse recovery 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

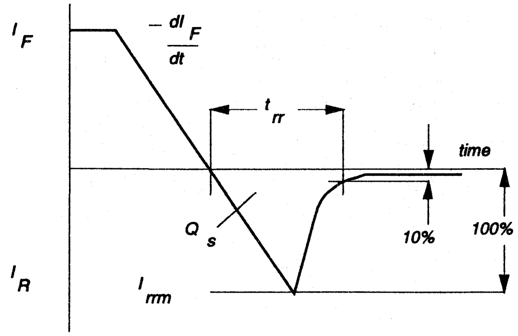


Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

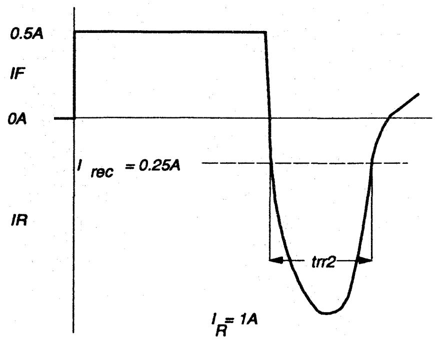


Fig.4. Definition of t_{rr2}

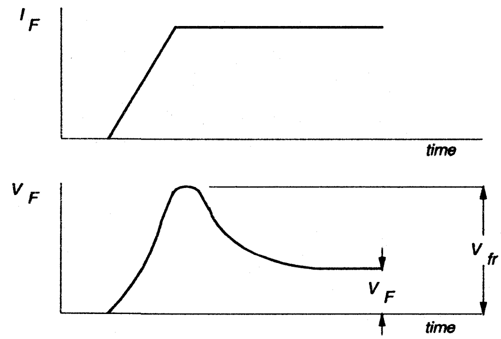


Fig.2. Definition of V_{fr}

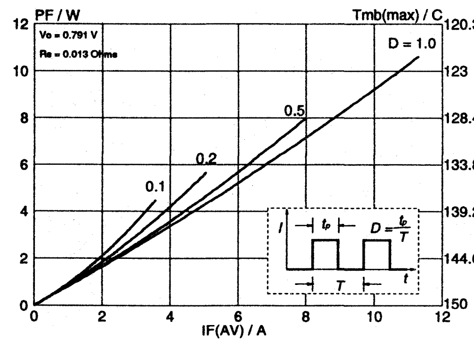


Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

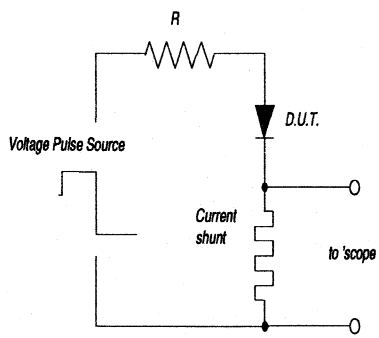


Fig.3. Circuit schematic for t_{rr2}

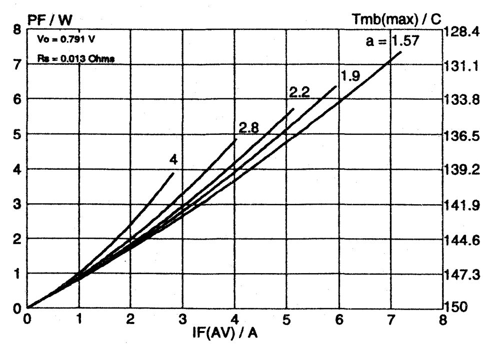


Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

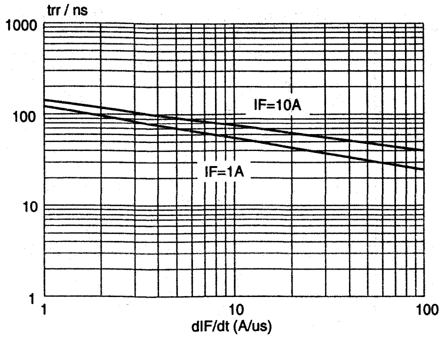


Fig.7. Maximum t_{rr} at $T_j = 25$ ˚C.

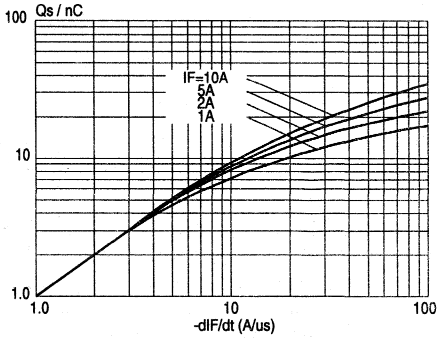


Fig.10. Maximum Q_s at $T_j = 25$ ˚C.

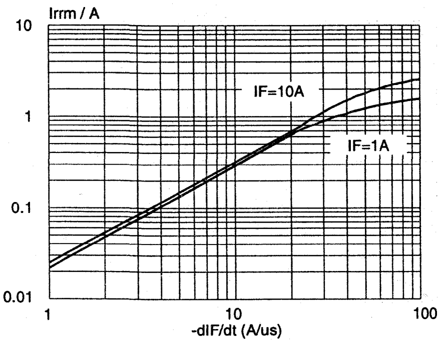


Fig.8. Maximum I_{rrm} at $T_j = 25$ ˚C.

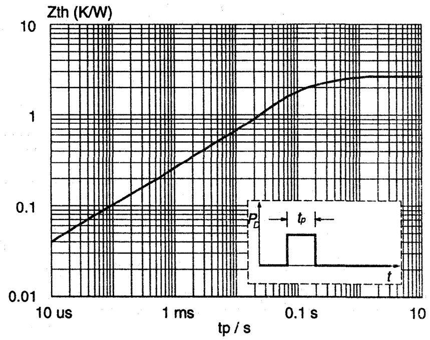


Fig.11. Transient thermal impedance; $Z_{th\ j\text{-}mb} = f(t_p)$.

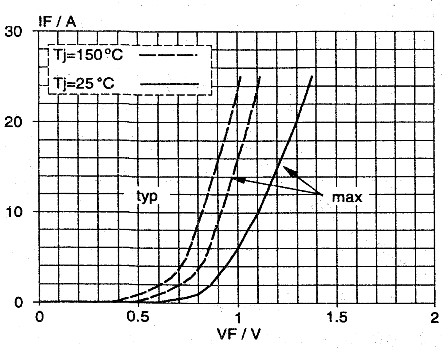


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

Rectifier diodes ultrafast

BYW29F series

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.

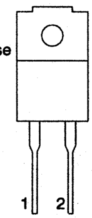
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	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

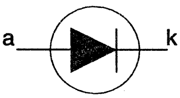
PINNING - SOD100

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.			UNIT
				-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

ISOLATION

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

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-hs}$	Thermal resistance junction to mounting base	with heatsink compound	-	-	5.5	K/W
		without heatsink compound	-	-	7.2	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

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

DYNAMIC CHARACTERISTICS

T_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_{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

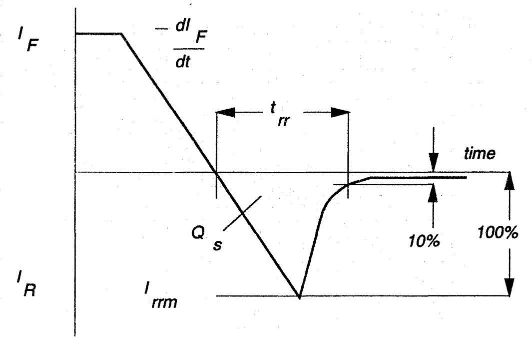


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

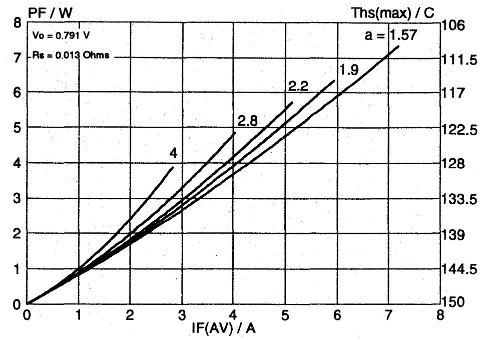


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

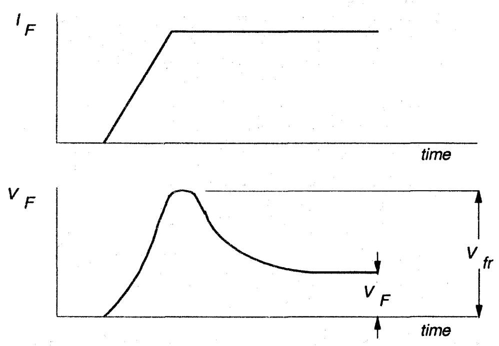


Fig.2. Definition of V_{fr}

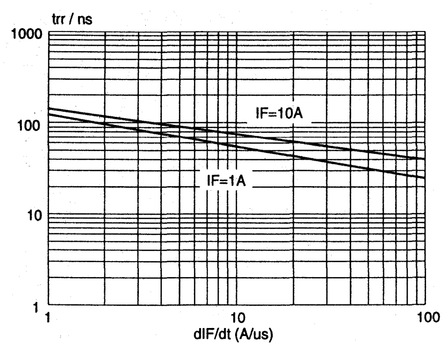


Fig.5. Maximum t_{rr} at $T_j = 25$ ˚C.

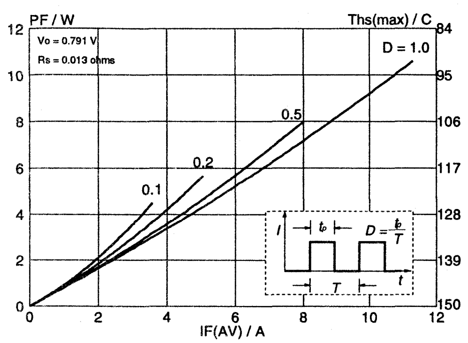


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

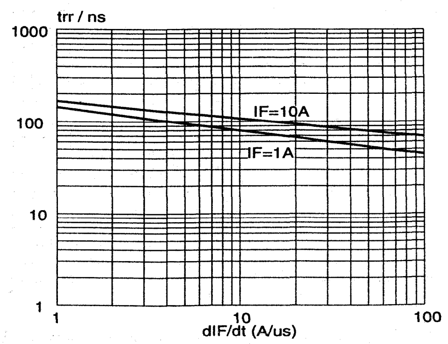


Fig.6. Maximum t_{rr} at $T_j = 100$ ˚C.

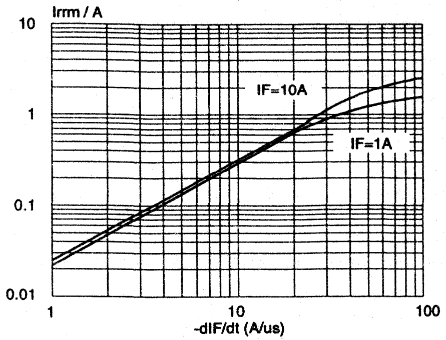


Fig.7. Maximum I_{rrm} at $T_j = 25$ ˚C.

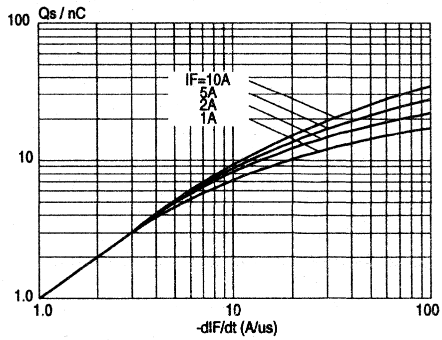


Fig.10. Maximum Q_s at $T_j = 25$ ˚C.

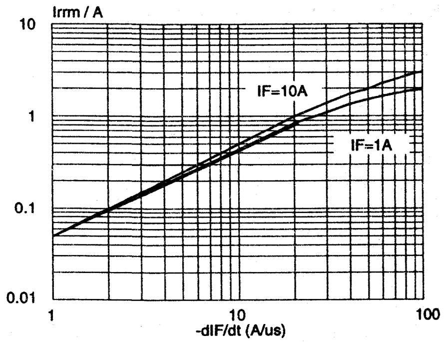


Fig.8. Maximum I_{rrm} at $T_j = 100$ ˚C.

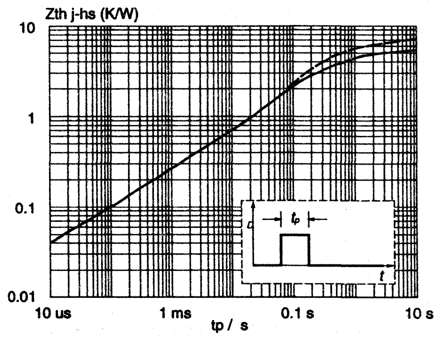


Fig.11. Transient thermal impedance; $Z_{th\,j\text{-}hs} = f(t_p)$.

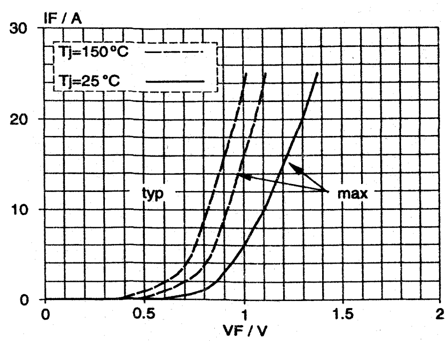


Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

Rectifier diodes schottky barrier

PBYR245CT series

GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky rectifier diodes in a plastic envelope suitable for surface mounting, featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

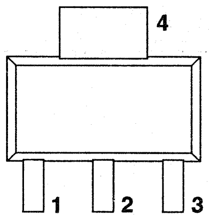
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	PBYR2-	**35CT**	**40CT**	**45CT**	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.45	0.45	0.45	V
$I_{O(AV)}$	Output current (both diodes conducting)	2	2	2	A

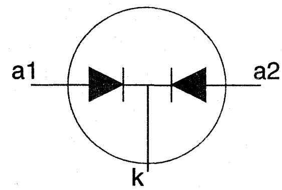
PINNING - SOT223

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
4	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-35	**-40**	**-45**	
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_b \leq 99$ ˚C	-	35	40	45	V
$I_{O(AV)}$	Output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_b \leq 118$ ˚C	-	2			A
$I_{O(RMS)}$	RMS forward current		-	2.8			A
I_{FRM}	Repetitive forward peak current per diode	$t = 25\mu s$; $\delta = 0.5$; $T_b \leq 118$ ˚C	-	2			A
I_{FSM}	Non-repetitive peak forward current per diode.	t = 10 ms	-	6			A
		t = 8.3 ms sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$	-	6.6			A
I^2t	I^2t for fusing	t = 10 ms	-	0.18			A^2s
I_{RRM}	Repetitive peak reverse current per diode.	$t_p = 2\ \mu s$; $\delta = 0.001$	-	1			A
I_{RSM}	Non-repetitive peak reverse current per diode.	$t_p = 100\ \mu s$	-	1			A
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}b}$	Thermal resistance junction to board	one or both diodes; PCB mounted, see fig:8; temperature measured 1-3 mm from tab.	-	-	30	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	PCB mounted, see fig:8	-	70	-	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 = 1 A; T_j = 150˚C	-	0.40	0.45	V
		I_F = 2 A	-	0.61	0.70	V
I_R	Reverse current (per diode)	$V_R = V_{RWM}$	-	50	100	µA
		$V_R = V_{RWM}$; T_j = 125 ˚C	-	3.5	10	mA
C_d	Junction capacitance (per diode)	f = 1MHz; V_R = 5V; T_j = 25 ˚C to 125 ˚C	-	100	-	pF

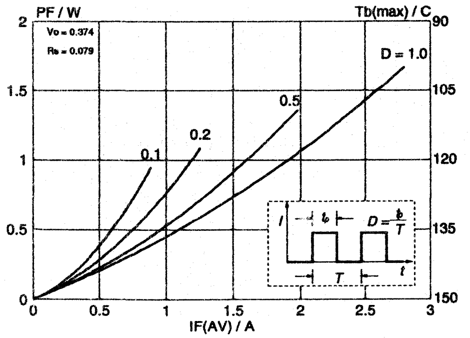


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

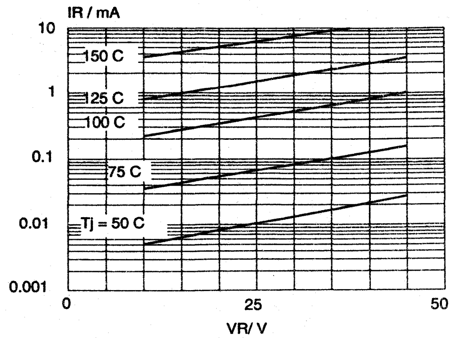


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

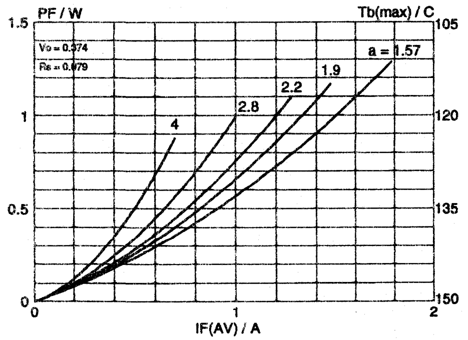


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

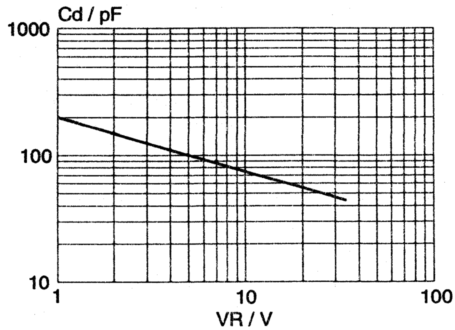


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

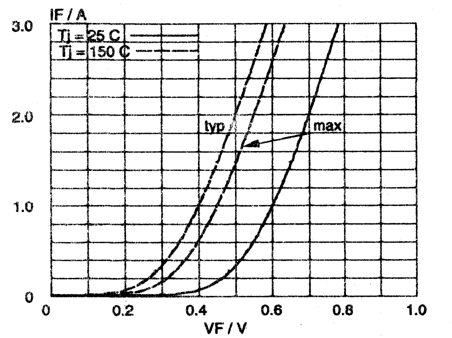


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

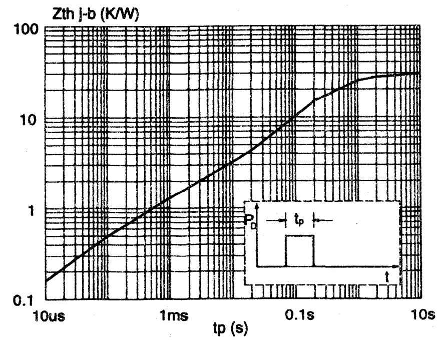


Fig.6. Transient thermal impedance; per diode; $Z_{th\,j\text{-}b} = f(t_p)$.

MOUNTING INSTRUCTIONS

Dimensions in mm.

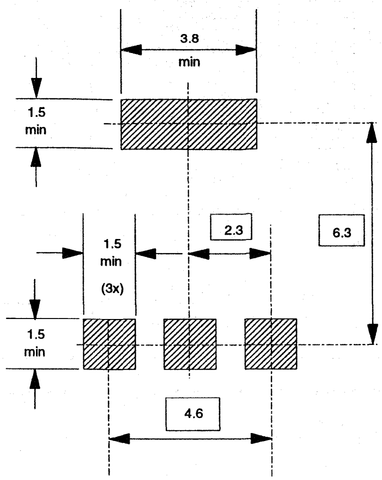


Fig.7. soldering pattern for surface mounting SOT223.

PRINTED CIRCUIT BOARD

Dimensions in mm.

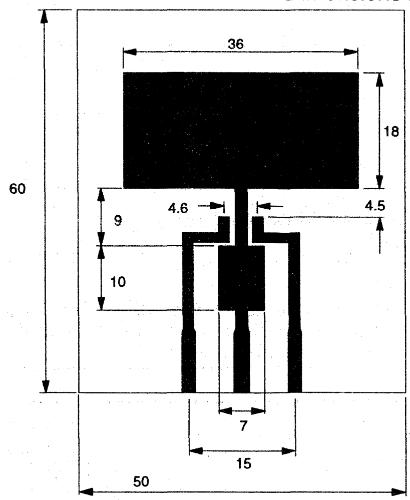


Fig.8. PCB for thermal resistance and power rating for SOT223.
PCB: FR4 epoxy glass (1.6 mm thick), copper laminate (35 µm thick).

Rectifier diodes schottky barrier

PBYR645CT series

GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky rectifier diodes in a plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

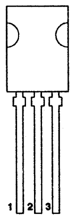
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	PBYR6-	35CT	40CT	45CT	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.6	0.6	0.6	V
$I_{O(AV)}$	Output current (both diodes conducting)	10	10	10	A

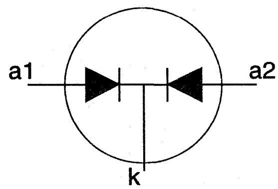
PINNING - SOT82

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-35	-40	-45	
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq 128$ ˚C	-	35	40	45	V
$I_{O(AV)}$	Output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{mb} \leq 121$ ˚C	-	10			A
$I_{O(RMS)}$	RMS forward current		-	14			A
I_{FRM}	Repetitive peak forward current per diode	$t = 25$ µs; $\delta = 0.5$; $T_{mb} \leq 121$ ˚C	-	10			A
I_{FSM}	Non-repetitive peak forward current per diode.	t = 10 ms	-	80			A
		t = 8.3 ms	-	88			A
		sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-	32			A^2s
I_{RRM}	Repetitive peak reverse current per diode.	$t_p = 2$ µs; $\delta = 0.001$	-	1			A
I_{RSM}	Non-repetitive peak reverse current per diode.	$t_p = 100$ µs	-	1			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	per diode	-	-	5.0	K/W
		both diodes	-	-	4.0	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	100	-	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 = 5 A; T_j = 150˚C	-	0.52	0.60	V
		I_F = 10 A	-	0.76	0.87	V
I_R	Reverse current (per diode)	$V_R = V_{RWM}$	-	50	100	µA
		$V_R = V_{RWM}$; T_j = 125 ˚C	-	2.5	15	mA
C_d	Junction capacitance (per diode)	f = 1MHz; V_R = 5V; T_j = 25 ˚C to 125 ˚C	-	200	-	pF

Rectifier diodes schottky barrier

PBYR645CT series

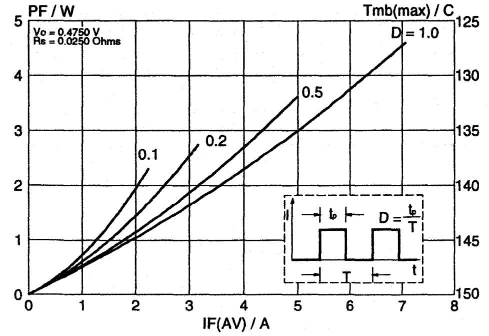


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

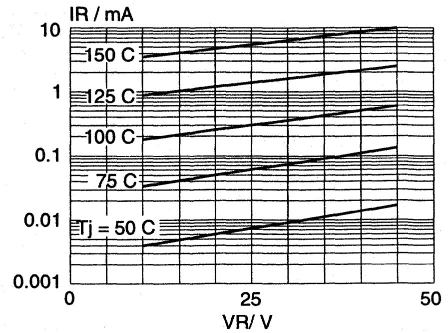


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

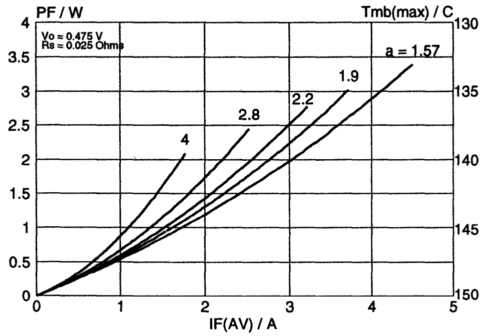


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

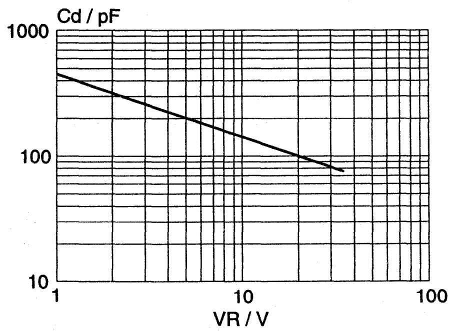


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

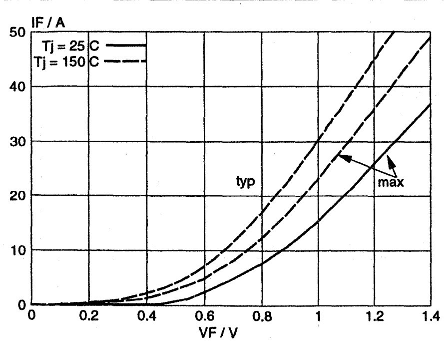


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

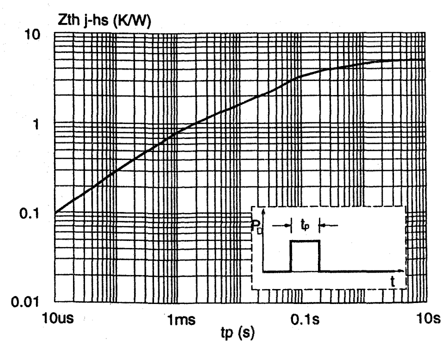


Fig.6. Transient thermal impedance; per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

Rectifier diodes schottky barrier

PBYR745 series

GENERAL DESCRIPTION

Low leakage, platinum barrier schottky rectifier diodes in a plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

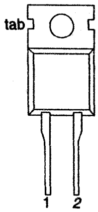
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	PBYR7-	**35**	**40**	**45**	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.57	0.57	0.57	V
$I_{F(AV)}$	Forward current	7.5	7.5	7.5	A

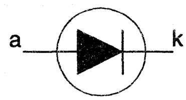
PINNING - TO220AC

PIN	DESCRIPTION
1	cathode (k)
2	anode (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-35	**-40**	**-45**	
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq 139$ ˚C	-	35	40	45	V
$I_{F(AV)}$	Average forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 136$ ˚C	-	7.5			A
$I_{F(RMS)}$	RMS forward current		-	10.6			A
I_{FRM}	Repetitive peak forward current	$t = 25$ µs; $\delta = 0.5$; $T_{mb} \leq 136$ ˚C	-	15			A
I_{FSM}	Non-repetitive peak forward current	$t = 10$ ms	-	135			A
		$t = 8.3$ ms	-	150			A
		sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	$t = 10$ ms	-	91			A^2s
I_{RRM}	Repetitive peak reverse current	$t_p = 2$ µs; $\delta = 0.001$	-	1			A
I_{RSM}	Non-repetitive peak reverse current	$t_p = 100$ µs	-	1			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		-	-	3.0	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 = 7.5 A; T_j = 125˚C	-	0.50	0.57	V
		I_F = 15 A; T_j = 125˚C	-	0.62	0.72	V
		I_F = 15 A	-	0.74	0.84	V
I_R	Reverse current	$V_R = V_{RWM}$	-	50	100	µA
		$V_R = V_{RWM}$; T_j = 125 ˚C	-	12	22	mA
C_d	Junction capacitance	f = 1MHz; V_R = 5V; T_j = 25 ˚C to 125 ˚C	-	350	-	pF

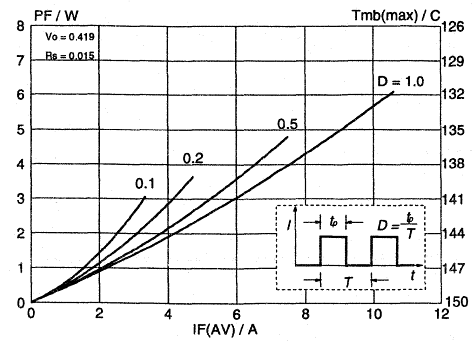


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

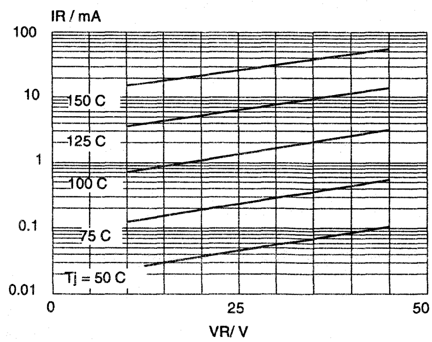


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

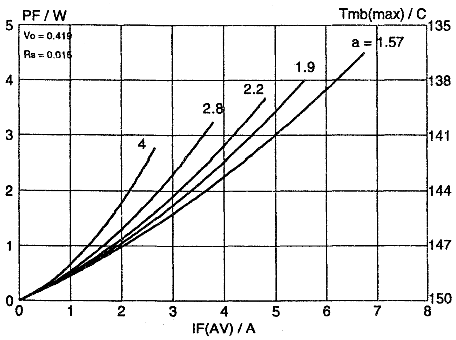


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

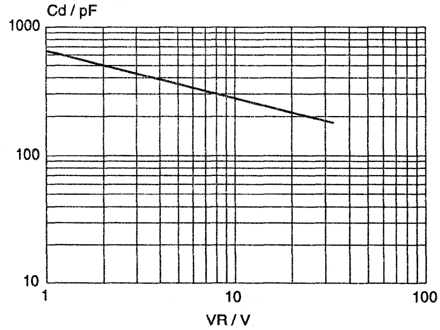


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

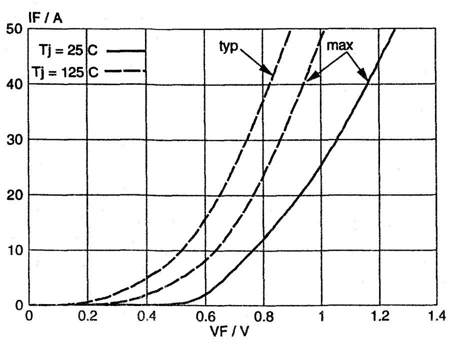


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

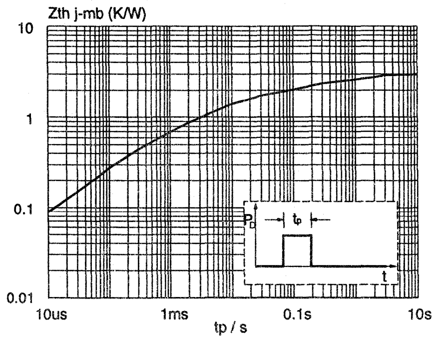


Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

Rectifier diodes schottky barrier

PBYR745F series

GENERAL DESCRIPTION

Low leakage, platinum barrier, schottky rectifier diodes in a full pack, plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

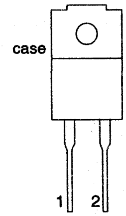
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	PBYR7-	35F	40F	45F	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.57	0.57	0.57	V
$I_{F(AV)}$	Forward current	7.5	7.5	7.5	A

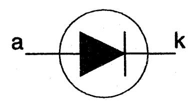
PINNING - SOD100

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.			UNIT
				-35	-40	-45	
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_{hs} \leq 128$ ˚C	-	35	40	45	V
$I_{F(AV)}$	Average forward current	square wave; $\delta = 0.5$; $T_{hs} \leq 123$ ˚C	-	7.5			A
$I_{F(RMS)}$	RMS forward current		-	10.6			A
I_{FRM}	Repetitive peak forward current	$t = 25\ \mu s$; $\delta = 0.5$; $T_{hs} \leq 123$ ˚C	-	15			A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms	-	100			A
		t = 8.3 ms sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$	-	110			A
I^2t	I^2t for fusing	t = 10 ms	-	50			A^2s
I_{RRM}	Repetitive peak reverse current	$t_p = 2\ \mu s$; $\delta = 0.001$	-	1			A
I_{RSM}	Non-repetitive peak reverse current	$t_p = 100\ \mu s$	-	1			A
T_{stg}	Storage temperature		-65	175			˚C
T_j	Operating junction temperature		-	150			˚C

ISOLATION

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

THERMAL RESISTANCES

SYMBOL	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

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 7.5 A; T_j = 125˚C	-	0.50	0.57	V
		I_F = 15 A; T_j = 125˚C	-	0.62	0.72	V
		I_F = 15 A	-	0.78	0.84	V
I_R	Reverse current	$V_R = V_{RWM}$	-	50	100	µA
		$V_R = V_{RWM}$; T_j = 125 ˚C	-	12	22	mA
C_d	Junction capacitance	f = 1MHz; V_R = 5V; T_j = 25 ˚C to 125 ˚C	-	350	-	pF

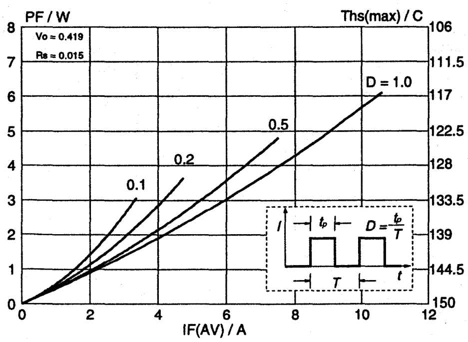


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

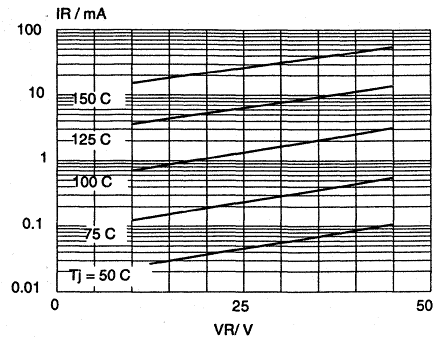


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

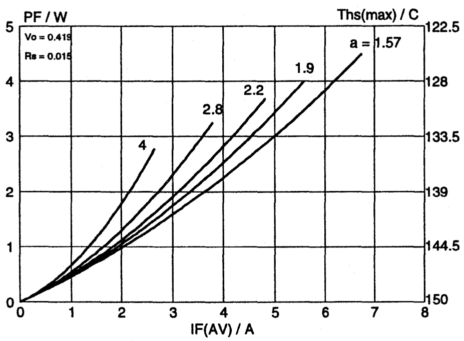


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

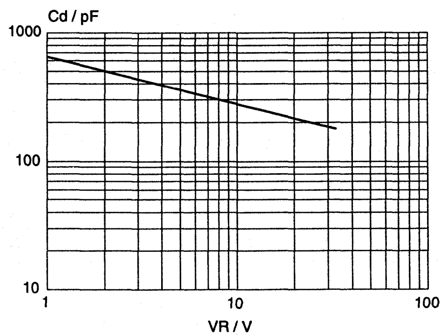


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

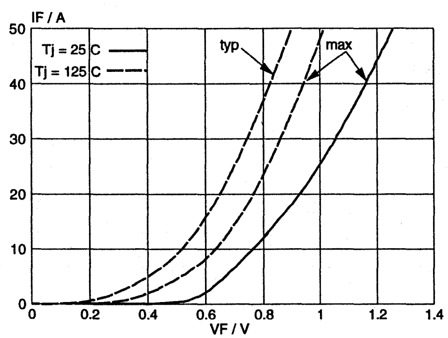


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

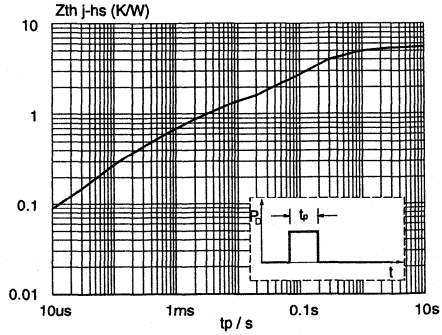


Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}hs} = f(t_p)$.

GENERAL DESCRIPTION

Low leakage, platinum barrier schottky rectifier diodes in a plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

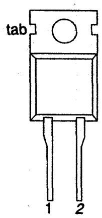
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	PBYR10-	**35**	**40**	**45**	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.57	0.57	0.57	V
$I_{F(AV)}$	Forward current	10	10	10	A

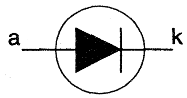
PINNING - TO220AC

PIN	DESCRIPTION
1	cathode (k)
2	anode (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-35	**-40**	**-45**	
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq 143$ ˚C	-	35	40	45	V
$I_{F(AV)}$	Average forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 136$ ˚C	-	10			A
$I_{F(RMS)}$	RMS forward current		-	14			A
I_{FRM}	Repetitive peak forward current	$t = 25\ \mu s$; $\delta = 0.5$; $T_{mb} \leq 136$ ˚C	-	20			A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms	-	135			A
		t = 8.3 ms	-	150			A
		sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-	91			A^2s
I_{RRM}	Repetitive peak reverse current	$t_p = 2\ \mu s$; $\delta = 0.001$	-	1			A
I_{RSM}	Non-repetitive peak reverse current	$t_p = 100\ \mu s$	-	1			A
T_{stg}	Storage temperature		-65	175			˚C
T_j	Operating junction temperature		-	150			˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-mb}$	Thermal resistance junction to mounting base		-	-	2.0	K/W
$R_{th\ j-a}$	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; T_j = 125˚C	-	0.50	0.57	V
		I_F = 20 A; T_j = 125˚C	-	0.62	0.72	V
		I_F = 20 A	-	0.74	0.84	V
I_R	Reverse current	$V_R = V_{RWM}$	-	50	100	µA
		$V_R = V_{RWM}$; T_j = 125 ˚C	-	13	26	mA
C_d	Junction capacitance	f = 1MHz; V_R = 5V; T_j = 25 ˚C to 125 ˚C	-	400	-	pF

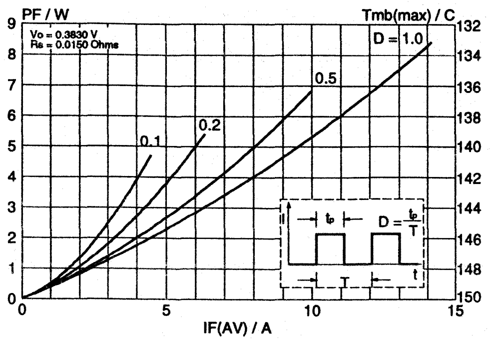


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

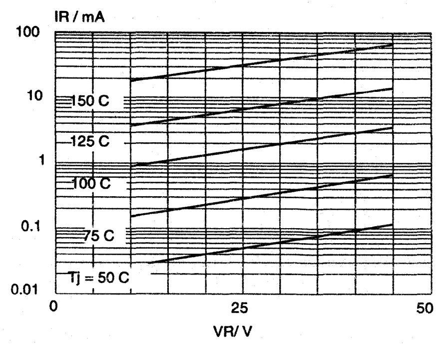


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

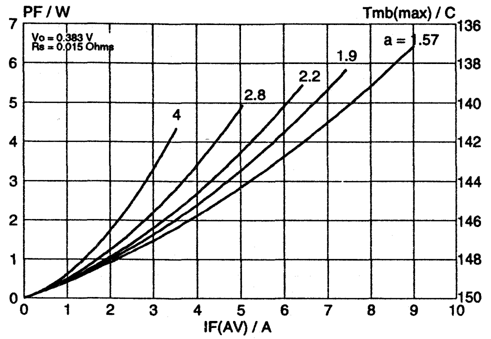


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

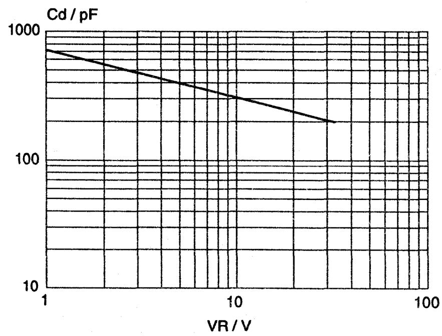


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

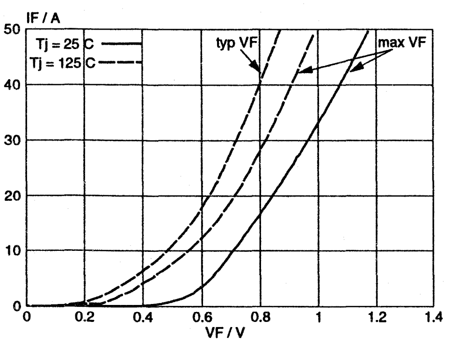


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

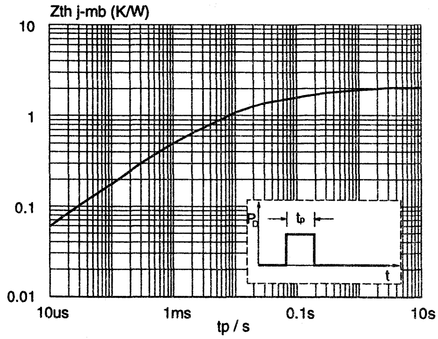


Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

GENERAL DESCRIPTION

Low leakage, platinum barrier, schottky rectifier diodes in a full pack, plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

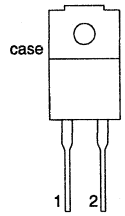
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	PBYR10-	35F	40F	45F	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.59	0.59	0.59	V
$I_{F(AV)}$	Forward current	10	10	10	A

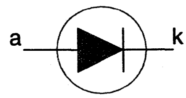
PINNING - SOD100

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.			UNIT
				-35	-40	-45	
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_{hs} \leq 125$ ˚C	-	35	40	45	V
$I_{F(AV)}$	Average forward current	square wave; $\delta = 0.5$; $T_{hs} \leq 112$ ˚C	-	10			A
$I_{F(RMS)}$	RMS forward current		-	14			A
I_{FRM}	Repetitive peak forward current	t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 112$ ˚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 $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-	50			A^2s
I_{RRM}	Repetitive peak reverse current	t_p = 2 µs; $\delta = 0.001$	-	1			A
I_{RSM}	Non-repetitive peak reverse current	t_p = 100 µs	-	1			A
T_{stg}	Storage temperature		-65	175			˚C
T_j	Operating junction temperature		-	150			˚C

ISOLATION

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

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

STATIC 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 = 125˚C	-	0.50	0.59	V
		I_F = 20 A; T_j = 125˚C	-	0.62	0.75	V
		I_F = 20 A	-	0.78	0.87	V
I_R	Reverse current	$V_R = V_{RWM}$	-	50	100	µA
		$V_R = V_{RWM}$; T_j = 125 ˚C	-	13	26	mA
C_d	Junction capacitance	f = 1MHz; V_R = 5V; T_j = 25 ˚C to 125 ˚C	-	400	-	pF

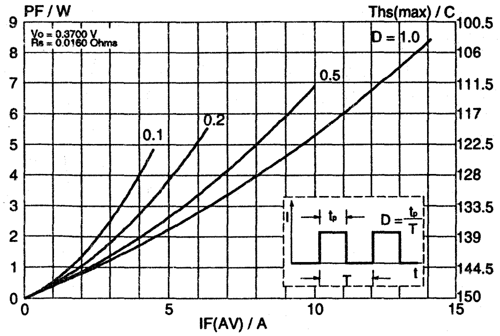


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

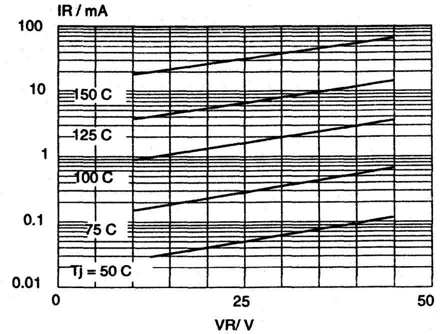


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

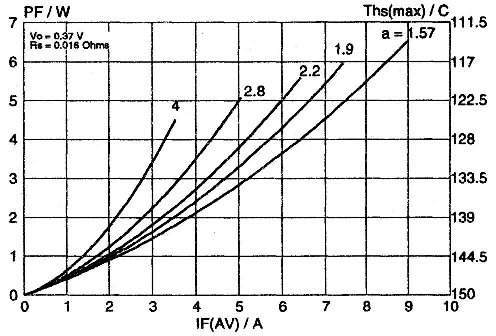


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

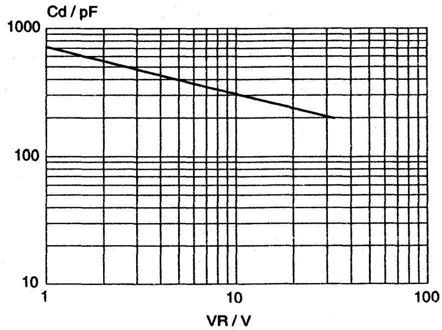


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

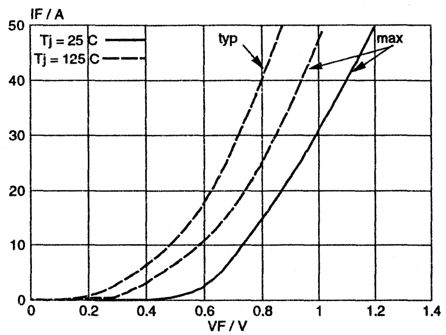


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

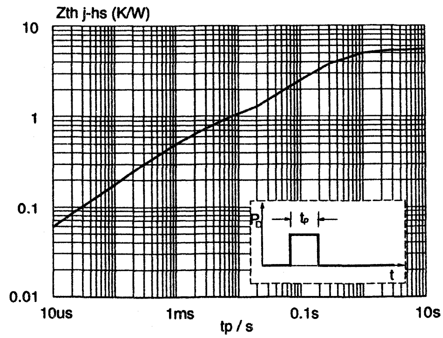


Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}hs} = f(t_p)$.

Rectifier diodes schottky barrier

PBYR10100 series

GENERAL DESCRIPTION

Low leakage, platinum barrier schottky rectifier diodes in a plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

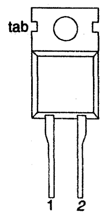
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	PBYR10-	**60**	**80**	**100**	
V_{RRM}	Repetitive peak reverse voltage	60	80	100	V
V_F	Forward voltage	0.7	0.7	0.7	V
$I_{F(AV)}$	Forward current	10	10	10	A

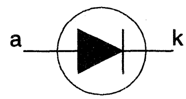
PINNING - TO220AC

PIN	DESCRIPTION
1	cathode (k)
2	anode (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-60	**-80**	**-100**	
V_{RRM}	Repetitive peak reverse voltage		-	60	80	100	V
V_{RWM}	Crest working reverse voltage		-	60	80	100	V
V_R	Continuous reverse voltage	$T_{mb} \leq 139$ ˚C	-	60	80	100	V
$I_{F(AV)}$	Average forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 133$ ˚C	-	10			A
I_{FRM}	Repetitive peak forward current	$t = 25$ µs; $\delta = 0.5$; $T_{mb} \leq 133$ ˚C	-	20			A
I_{FSM}	Non-repetitive peak forward current	$t = 10$ ms	-	135			A
		$t = 8.3$ ms	-	150			A
		sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	$t = 10$ ms	-	91			A^2s
I_{RRM}	Repetitive peak reverse current	$t_p = 2$ µs; $\delta = 0.001$	-	1			A
I_{RSM}	Non-repetitive peak reverse current	$t_p = 100$ µs	-	1			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		-	-	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 = 10 A; T_j = 125˚C	-	0.61	0.70	V
		I_F = 20 A; T_j = 125˚C	-	0.74	0.85	V
		I_F = 20 A; T_j = 25˚C	-	0.88	0.95	V
I_R	Reverse current	V_R = V_{RWM}; T_j = 25 ˚C	-	5.0	150	µA
		V_R = V_{RWM}; T_j = 125 ˚C	-	5.0	15	mA
C_d	Junction capacitance	f = 1MHz; V_R = 5V; T_j = 25 ˚C to 125 ˚C	-	420	-	pF

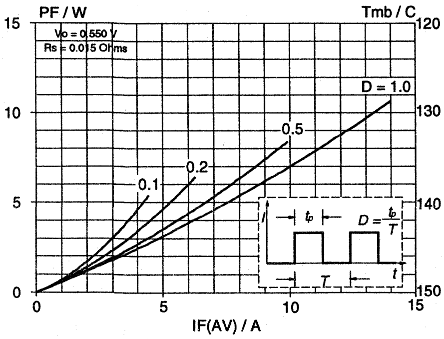


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

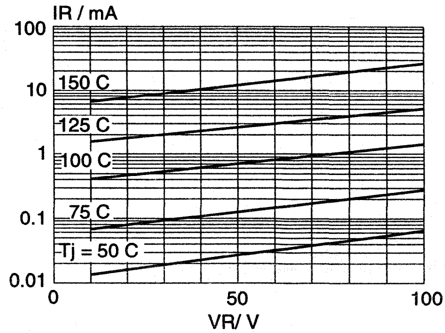


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

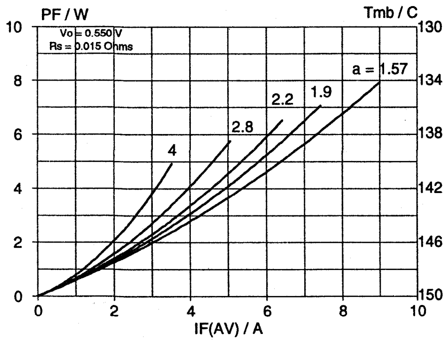


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

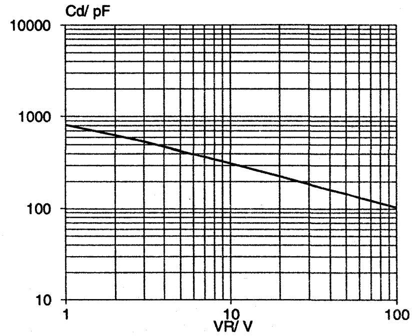


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

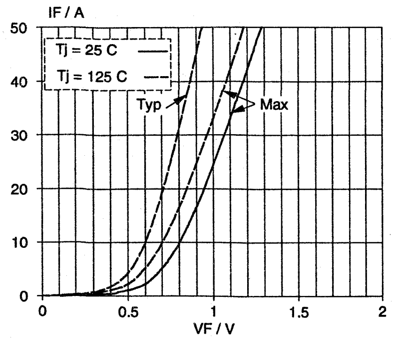


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

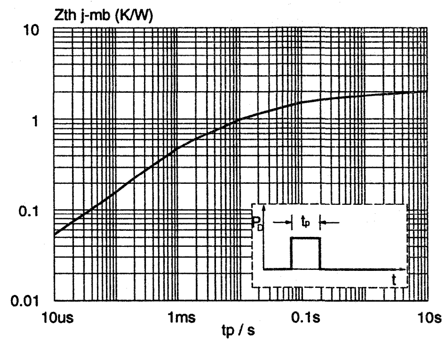


Fig.6. Transient thermal impedance; $Z_{th\ j\text{-}mb} = f(t_p)$.

Rectifier diodes schottky barrier

PBYR1545CT series

GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky rectifier diodes in a plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

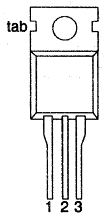
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	PBYR15-	35CT	40CT	45CT	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.57	0.57	0.57	V
$I_{O(AV)}$	Output current (both diodes conducting)	15	15	15	A

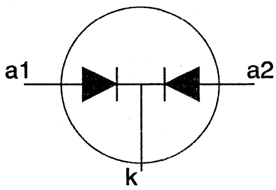
PINNING - TO220AB

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-35	-40	-45	
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq 134$ ˚C	-	35	40	45	V
$I_{O(AV)}$	Output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{mb} \leq 131$ ˚C	-	15			A
$I_{O(RMS)}$	RMS forward current		-	21			A
I_{FRM}	Repetitive peak forward current per diode	$t = 25$ µs; $\delta = 0.5$; $T_{mb} \leq 131$ ˚C	-	15			A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-	135			A
		t = 8.3 ms; sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$	-	150			A
I^2t	I^2t for fusing	t = 10 ms	-	91			A^2s
I_{RRM}	Repetitive peak reverse current per diode.	$t_p = 2$ µs; $\delta = 0.001$	-	1			A
I_{RSM}	Non-repetitive peak reverse current per diode.	$t_p = 100$ µs	-	1			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	-	-	3.0	K/W
		both diodes	-	-	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 (per diode)	I_F = 7.5 A; T_j = 125˚C	-	0.50	0.57	V
		I_F = 15 A; T_j = 125˚C	-	0.62	0.72	V
		I_F = 15 A	-	0.74	0.84	V
I_R	Reverse current (per diode)	$V_R = V_{RWM}$	-	50	100	µA
		$V_R = V_{RWM}$; T_j = 125 ˚C	-	12	22	mA
C_d	Junction capacitance (per diode)	f = 1MHz; V_R = 5V; T_j = 25 ˚C to 125 ˚C	-	350	-	pF

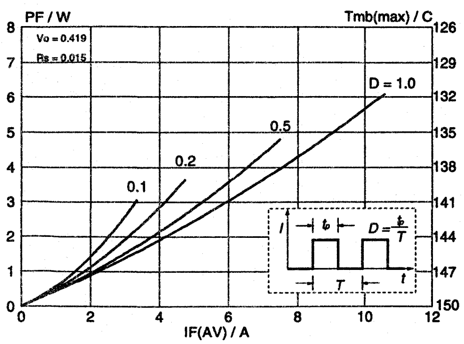


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

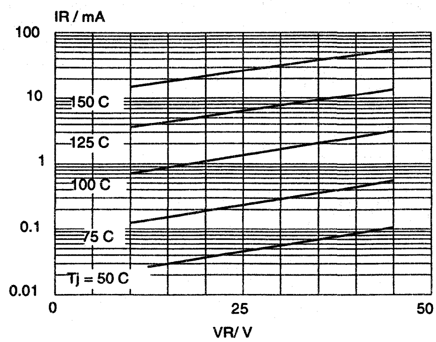


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

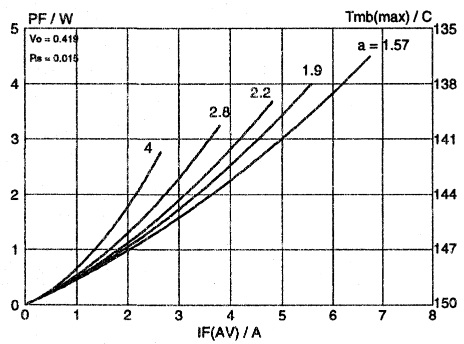


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

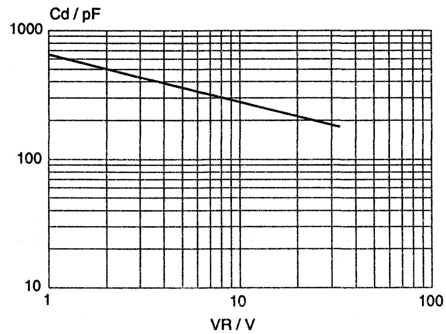


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

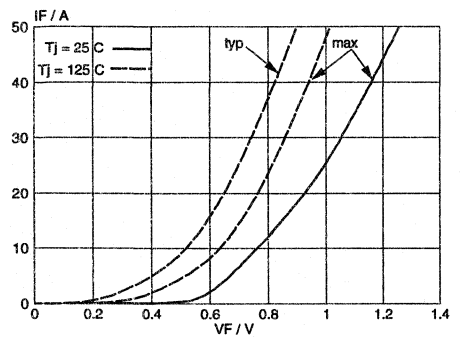


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

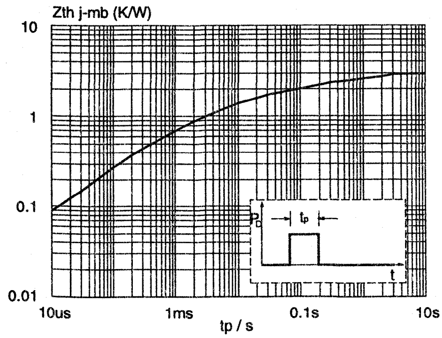


Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

Rectifier diodes schottky barrier

PBYR1545CTF series

GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky barrier rectifier diodes in a full pack, plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

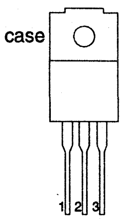
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	PBYR15F-	35CTF	40CTF	45CTF	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.57	0.57	0.57	V
$I_{O(AV)}$	Output current (both diodes conducting)	15	15	15	A

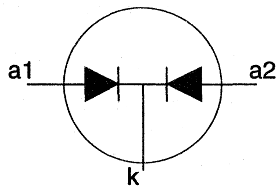
PINNING - SOT186

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-35	-40	-45	
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_{hs} \leq 117$ ˚C	-	35	40	45	V
$I_{O(AV)}$	Output current) both diodes conducting)	square wave; $\delta = 0.5$; $T_{hs} \leq 100$ ˚C	-	15			A
$I_{O(RMS)}$	RMS forward current		-	21			A
I_{FRM}	Repetitive peak forward current per diode	$t = 25$ µs; $\delta = 0.5$; $T_{hs} \leq 100$ ˚C	-	15			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 $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-	50			A^2s
I_{RRM}	Repetitive peak reverse current per diode.	$t_p = 2$ µs; $\delta = 0.001$	-	1			A
I_{RSM}	Non-repetitive peak reverse current per diode.	$t_p = 100$ µs	-	1			A
T_{stg}	Storage temperature		-65	175			˚C
T_j	Operating junction temperature		-	150			˚C

ISOLATION

T_{hs} = 25 °C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Repetitive peak voltage from all three terminals to external heatsink	R.H. ≤ 65% ; clean and dustfree	-	-	1500	V
C_{isol}	Capacitance from T2 to external heatsink	f = 1 MHz	-	12	-	pF

THERMAL 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)	- -	- -	6.1 5.2	K/W 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 (per diode)	I_F = 7.5 A; T_j = 125°C I_F = 15 A; T_j = 125°C I_F = 15 A	- - 	0.50 0.62 0.74	0.57 0.72 0.84	V V
I_R	Reverse current (per diode)	$V_R = V_{RWM}$ $V_R = V_{RWM}$; T_j = 125 °C	- -	50 12	100 22	µA mA
C_d	Junction capacitance (per diode)	f = 1MHz; V_R = 5V; T_j = 25 °C to 125 °C	-	350	-	pF

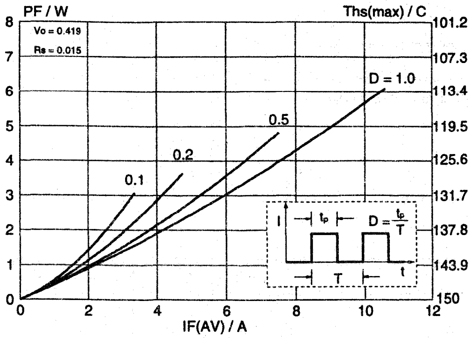


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

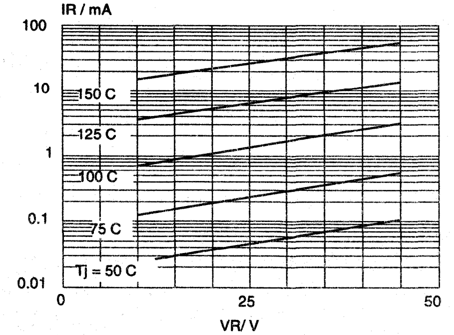


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

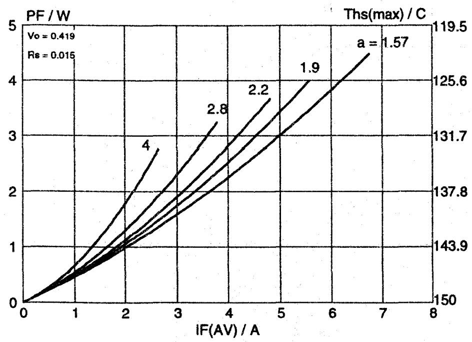


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

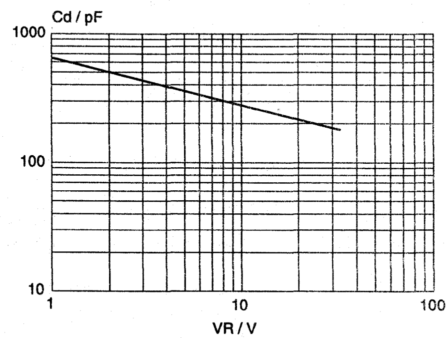


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

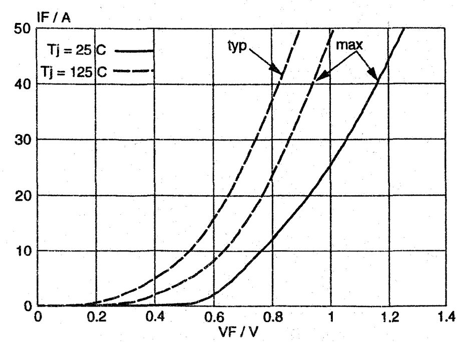


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

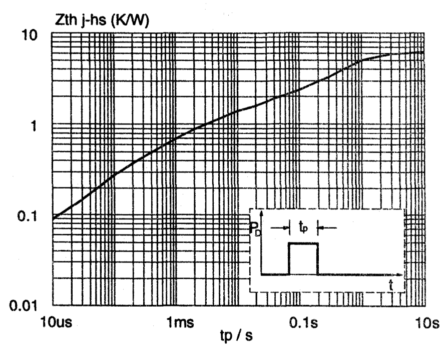


Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.

Rectifier diodes schottky barrier

PBYR1645 series

GENERAL DESCRIPTION

Low leakage, platinum barrier schottky rectifier diodes in a plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

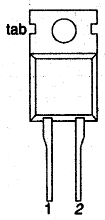
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	PBYR16-	**35**	**40**	**45**	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.57	0.57	0.57	V
$I_{F(AV)}$	Forward current	16	16	16	A

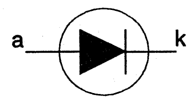
PINNING - TO220AC

PIN	DESCRIPTION
1	cathode (k)
2	anode (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-35	-40	-45	
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq 141$ ˚C	-	35	40	45	V
$I_{F(AV)}$	Average forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 134$ ˚C	-	16			A
$I_{F(RMS)}$	RMS forward current		-	22.6			A
I_{FRM}	Repetitive peak forward current	$t = 25$ µs; $\delta = 0.5$; $T_{mb} \leq 134$ ˚C	-	32			A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms	-	135			A
		t = 8.3 ms	-	150			A
		sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-	91			A^2s
I_{RRM}	Repetitive peak reverse current	$t_p = 2$ µs; $\delta = 0.001$	-	1			A
I_{RSM}	Non-repetitive peak reverse current	$t_p = 100$ µs	-	1			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		-	-	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	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 16 A; T_j = 125˚C	-	0.50	0.57	V
		I_F = 16 A	-	0.58	0.63	V
I_R	Reverse current	$V_R = V_{RWM}$	-	100	200	µA
		$V_R = V_{RWM}$; T_j = 125 ˚C	-	12	40	mA
C_d	Junction capacitance	f = 1MHz; V_R = 5V; T_j = 25 ˚C to 125 ˚C	-	800	-	pF

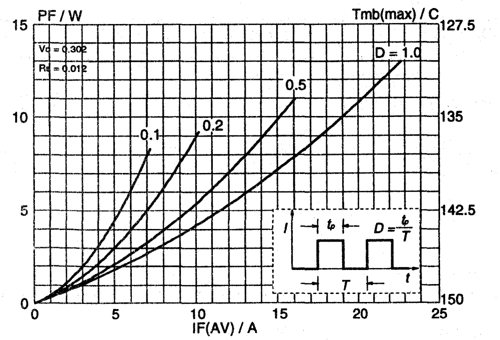


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

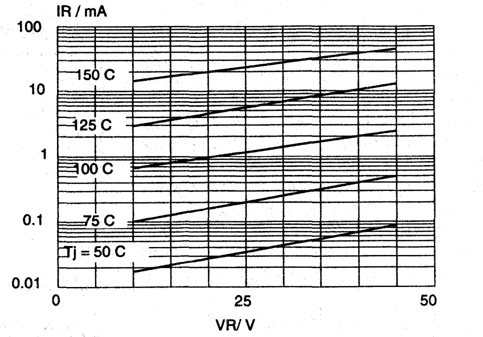


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

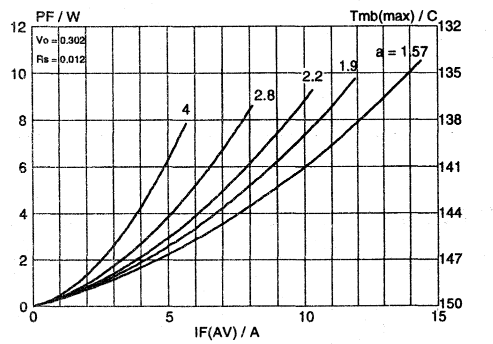


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

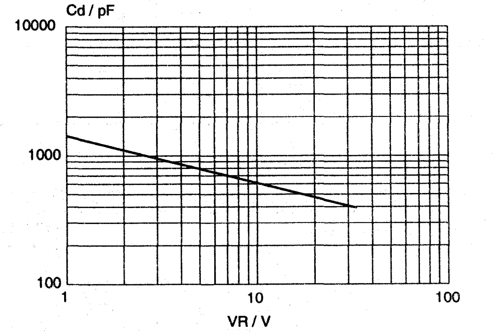


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

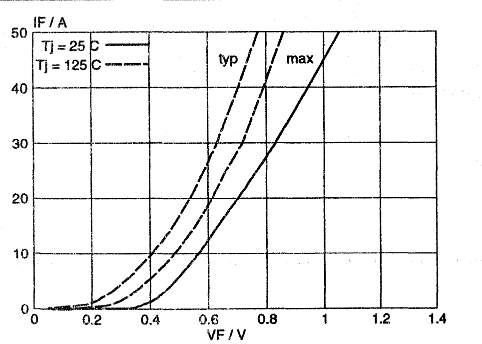


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

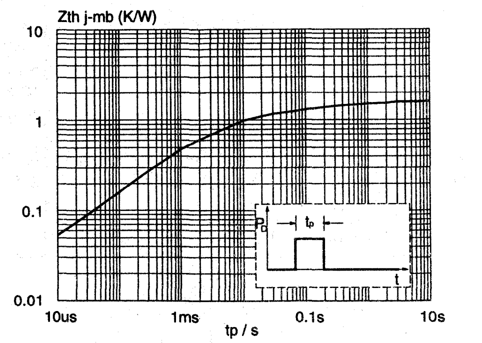


Fig.6. Transient thermal impedance; $Z_{th\ j\text{-}mb} = f(t_p)$.

Rectifier diodes schottky barrier

PBYR1645F series

GENERAL DESCRIPTION

Low leakage, platinum barrier, schottky rectifier diodes in a full pack, plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

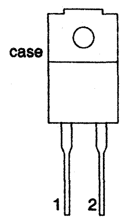
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	PBYR16-	35F	40F	45F	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.6	0.6	0.6	V
$I_{F(AV)}$	Forward current	16	16	16	A

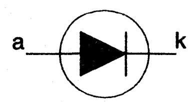
PINNING - SOD100

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.			UNIT
				-35	-40	-45	
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_{hs} \leq 122$ ˚C	-	35	40	45	V
$I_{F(AV)}$	Average forward current	square wave; $\delta = 0.5$; $T_{hs} \leq 100$ ˚C	-	16			A
$I_{F(RMS)}$	RMS forward current		-	22.6			A
I_{FRM}	Repetitive peak forward current	t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 100$ ˚C	-	32			A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms	-	120			A
		t = 8.3 ms	-	132			A
		sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-	72			A^2s
I_{RRM}	Repetitive peak reverse current	$t_p = 2$ µs; $\delta = 0.001$	-	1			A
I_{RSM}	Non-repetitive peak reverse current	$t_p = 100$ µs	-	1			A
T_{stg}	Storage temperature		-65	175			˚C
T_j	Operating junction temperature		-	150			˚C

ISOLATION

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

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	4.2	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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 16 A; T_j = 125˚C	-	0.53	0.60	V
		I_F = 16 A	-	0.63	0.68	V
I_R	Reverse current	$V_R = V_{RWM}$	-	100	200	µA
		$V_R = V_{RWM}$; T_j = 125 ˚C	-	12	40	mA
C_d	Junction capacitance	f = 1MHz; V_R = 5V; T_j = 25 ˚C to 125 ˚C	-	800	-	pF

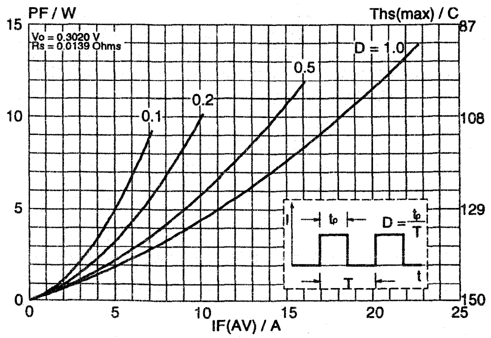


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

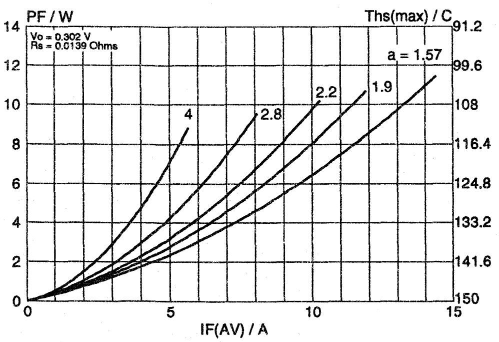


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

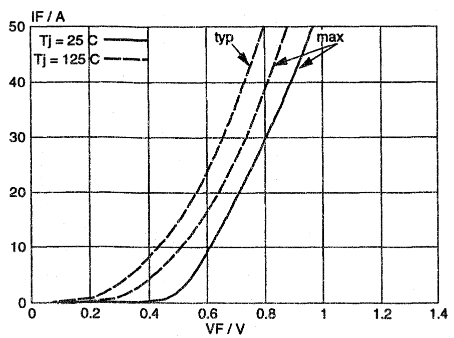


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

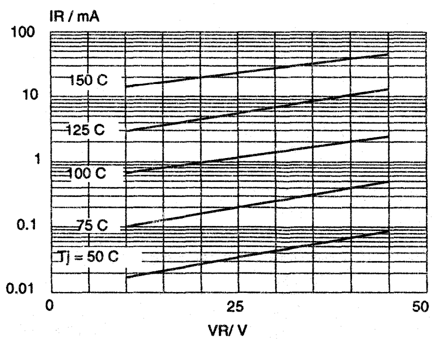


Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter T_j

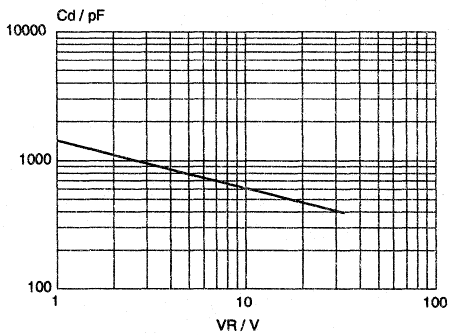


Fig.5. Typical junction capacitance; $C_d = f(V_R)$; $f = 1$ MHz; $T_j = 25°C$ to $125°C$.

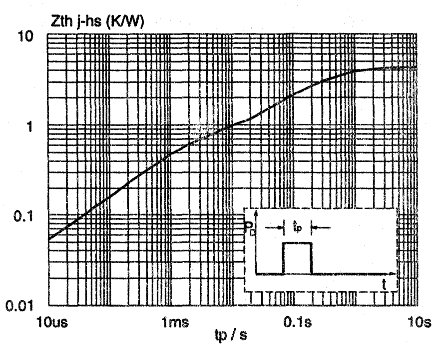


Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}hs} = f(t_p)$.

Rectifier diodes schottky barrier

PBYR2045CT series

GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky rectifier diodes in a plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

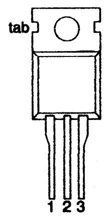
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	PBYR20-	35CT	40CT	45CT	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.57	0.57	0.57	V
$I_{O(AV)}$	Output current (both diodes conducting)	20	20	20	A

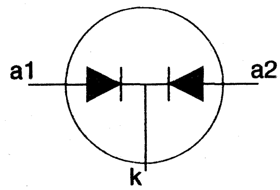
PINNING - TO220AB

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-35	-40	-45	
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq 143$ ˚C	-	35	40	45	V
$I_{O(AV)}$	Output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{mb} \leq 136$ ˚C	-	20			A
$I_{O(RMS)}$	RMS forward current		-	28			A
I_{FRM}	Repetitive peak forward current per diode	$t = 25$ µs; $\delta = 0.5$; $T_{mb} \leq 136$ ˚C	-	20			A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-	135			A
		t = 8.3 ms	-	150			A
		sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-	91			A^2s
I_{RRM}	Repetitive peak reverse current per diode.	$t_p = 2$ µs; $\delta = 0.001$	-	1			A
I_{RSM}	Non-repetitive peak reverse current per diode.	$t_p = 100$ µs	-	1			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 both diodes	- -	- -	2.0 1.0	K/W 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 (per diode)	I_F = 10 A; T_j = 125˚C I_F = 20 A; T_j = 125˚C I_F = 20 A	- - -	0.50 0.65 0.78	0.57 0.72 0.84	V V
I_R	Reverse current (per diode)	$V_R = V_{RWM}$ $V_R = V_{RWM}$; T_j = 125 ˚C	- -	50 13	100 26	µA mA
C_d	Junction capacitance (per diode)	f = 1MHz; V_R = 5V; T_j = 25 ˚C to 125 ˚C	-	400	-	pF

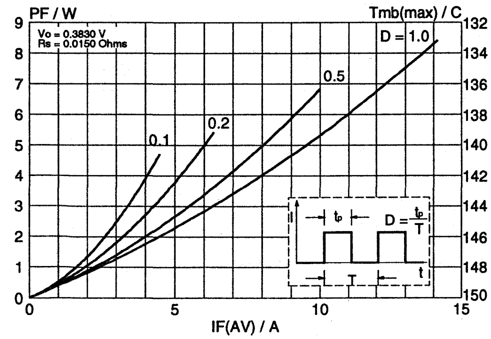


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

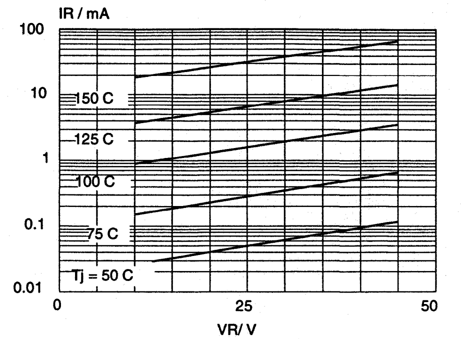


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

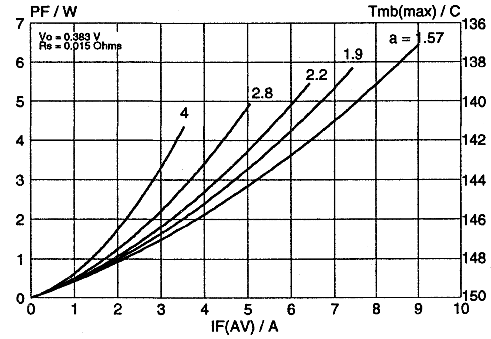


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

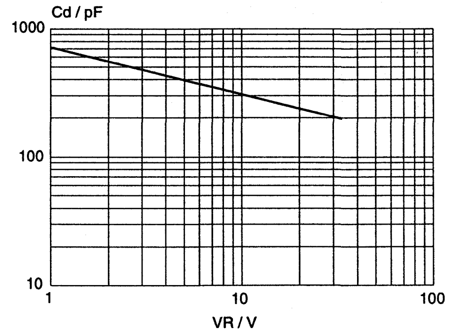


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

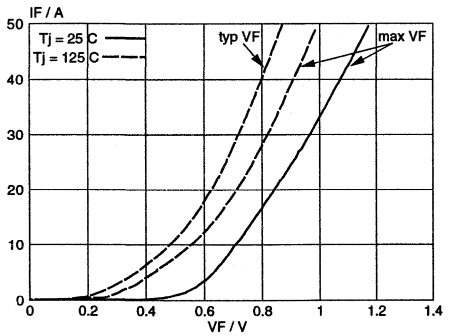


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

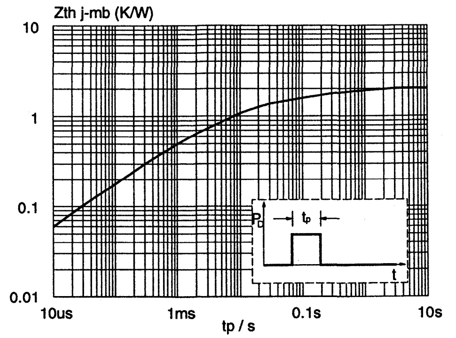


Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

Rectifier diodes schottky barrier

PBYR2045CTF series

GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky barrier rectifier diodes in a full pack, plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

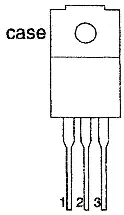
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	PBYR20-	**35CTF**	**40CTF**	**45CTF**	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.57	0.57	0.57	V
$I_{O(AV)}$	Output current (both diodes conducting)	20	20	20	A

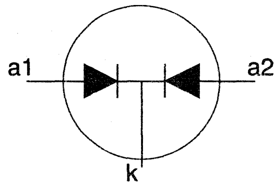
PINNING - SOT186

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-35	**-40**	**-45**	
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_{hs} \leq 114$ ˚C	-	35	40	45	V
$I_{O(AV)}$	Output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{hs} \leq 82$ ˚C	-		20		A
$I_{O(RMS)}$	RMS forward current		-		28		A
I_{FRM}	Repetitive peak forward current per diode	$t = 25$ µs; $\delta = 0.5$; $T_{hs} \leq 82$ ˚C	-		20		A
I_{FSM}	Non-repetitive peak forward current per diode	$t = 10$ ms	-		100		A
		$t = 8.3$ ms sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$	-		110		A
I^2t	I^2t for fusing	$t = 10$ ms	-		50		A^2s
I_{RRM}	Repetitive peak reverse current per diode.	$t_p = 2$ µs; $\delta = 0.001$	-		1		A
I_{RSM}	Non-repetitive peak reverse current per diode.	$t_p = 100$ µs	-		1		A
T_{stg}	Storage temperature		-65		175		˚C
T_j	Operating junction temperature		-		150		˚C

ISOLATION

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Repetitive peak voltage from all three terminals to external heatsink	R.H. ≤ 65% ; clean and dustfree	-	-	1500	V
C_{isol}	Capacitance from T2 to external heatsink	f = 1 MHz	-	12	-	pF

THERMAL 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)	- -	- -	5.9 5.0	K/W 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 (per diode)	I_F = 10 A; T_j = 125˚C I_F = 20 A; T_j = 125˚C I_F = 20 A	- - 	0.51 0.67 0.79	0.57 0.72 0.84	V V
I_R	Reverse current (per diode)	$V_R = V_{RWM}$ $V_R = V_{RWM}$; T_j = 125 ˚C	- -	50 13	100 26	µA mA
C_d	Junction capacitance (per diode)	f = 1MHz; V_R = 5V; T_j = 25 ˚C to 125 ˚C	-	400	-	pF

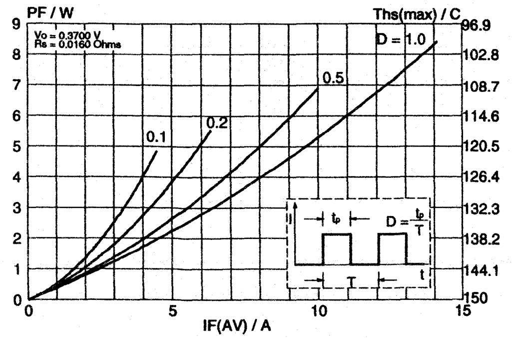


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

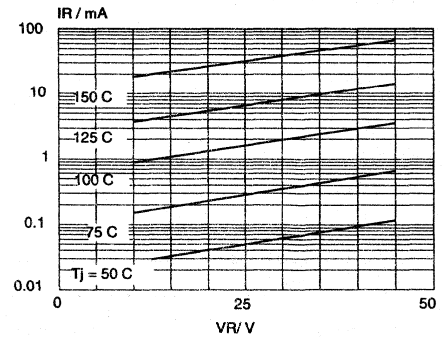


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

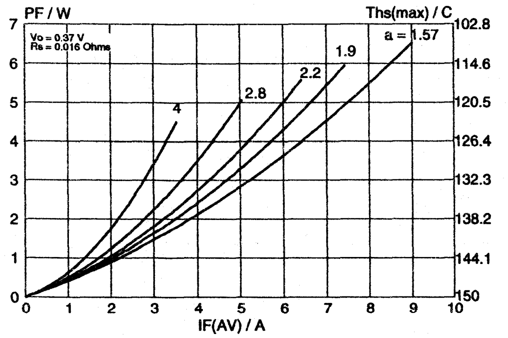


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

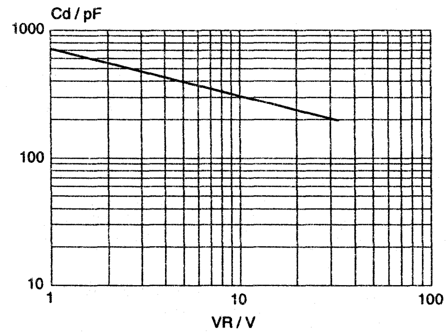


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

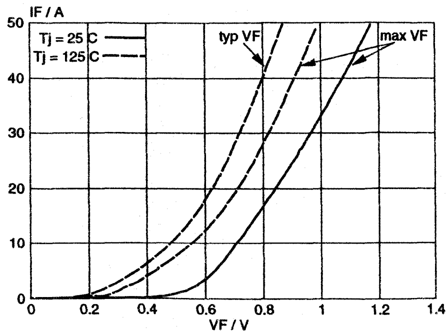


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

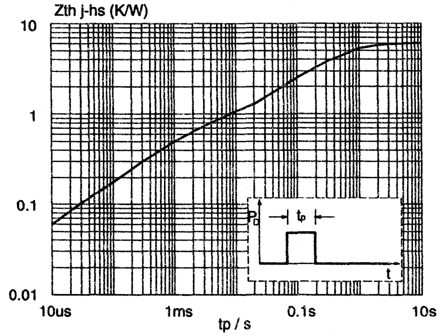


Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.

Rectifier diodes schottky barrier

PBYR20100CT series

GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky rectifier diodes in a plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

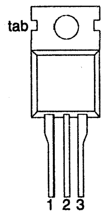
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	PBYR20-	60CT	80CT	100CT	
V_{RRM}	Repetitive peak reverse voltage	60	80	100	V
V_F	Forward voltage	0.7	0.7	0.7	V
$I_{O(AV)}$	Output current (both diodes conducting)	20	20	20	A

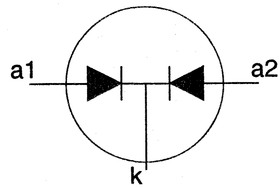
PINNING - TO220AB

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-60	-80	-100	
V_{RRM}	Repetitive peak reverse voltage		-	60	80	100	V
V_{RWM}	Crest working reverse voltage		-	60	80	100	V
V_R	Continuous reverse voltage	$T_{mb} \leq 139$ ˚C	-	60	80	100	V
$I_{O(AV)}$	Output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{mb} \leq 133$ ˚C	-		20		A
$I_{O(RMS)}$	RMS forward current		-		28		A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 133$ ˚C	-		20		A
I_{FSM}	Non-repetitive peak forward current per diode.	t = 10 ms	-		135		A
		t = 8.3 ms	-		150		A
		sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-		91		A^2s
I_{RRM}	Repetitive peak reverse current per diode.	$t_p = 2$ µs; $\delta = 0.001$	-		1		A
I_{RSM}	Non-repetitive peak reverse current per diode.	$t_p = 100$ µs	-		1		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	-	-	2.0	K/W
		both diodes	-	-	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 (per diode)	I_F = 10 A; T_j = 125˚C	-	0.61	0.70	V
		I_F = 20 A; T_j = 125˚C	-	0.74	0.85	V
		I_F = 20 A; T_j = 25˚C	-	0.88	0.95	V
I_R	Reverse current (per diode)	$V_R = V_{RWM}$; T_j = 25 ˚C	-	5.0	150	µA
		$V_R = V_{RWM}$; T_j = 125 ˚C	-	5.0	15	mA
C_d	Junction capacitance (per diode)	f = 1MHz; V_R = 5V; T_j = 25 ˚C to 125 ˚C	-	420	-	pF

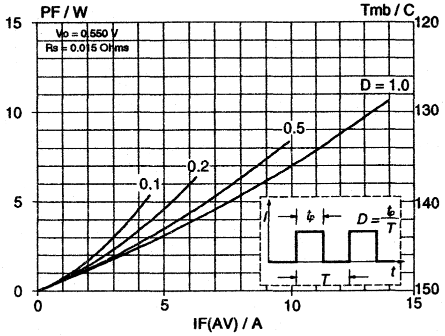


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

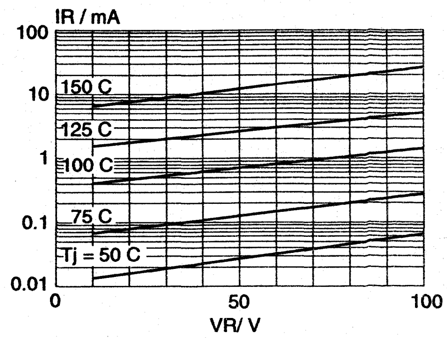


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

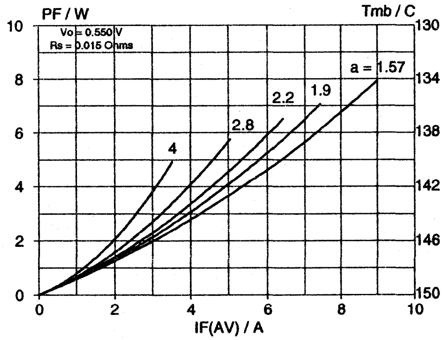


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

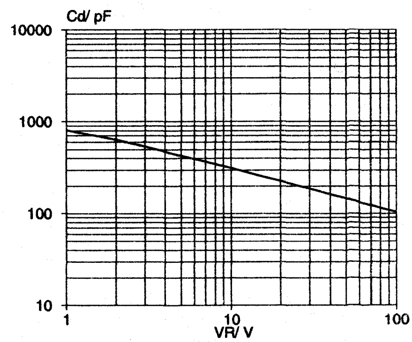


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

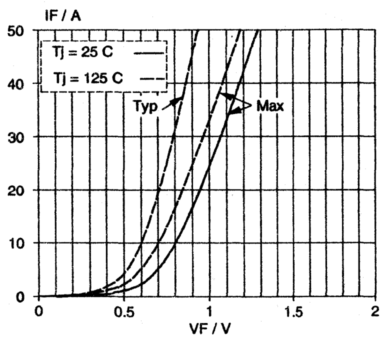


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

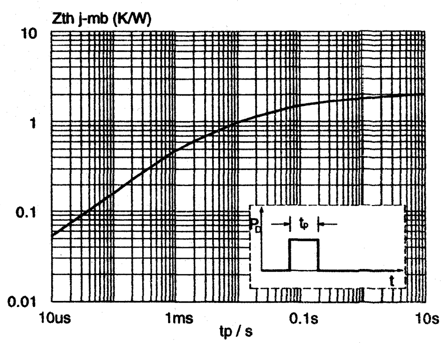


Fig.6. Transient thermal impedance per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.

GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky rectifier diodes in a plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

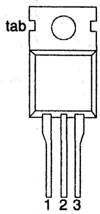
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	PBYR25-	35CT	40CT	45CT	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.62	0.62	0.62	V
$I_{O(AV)}$	Output current (both diodes conducting)	30	30	30	A

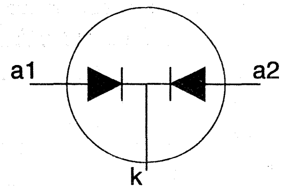
PINNING - TO220AB

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-35	-40	-45	
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq 136$ ˚C	-	35	40	45	V
$I_{O(AV)}$	Output current (both diodes conducting)[1]	square wave; $\delta = 0.5$; $T_{mb} \leq 130$ ˚C	-	30			A
$I_{O(RMS)}$	RMS forward current		-	43			A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 130$ ˚C	-	30			A
I_{FSM}	Non-repetitive peak forward current, per diode	t = 10 ms	-	135			A
		t = 8.3 ms	-	150			A
		sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-	91			A^2s
I_{RRM}	Repetitive peak reverse current per diode.	$t_p = 2$ µs; $\delta = 0.001$	-	1			A
I_{RSM}	Non-repetitive peak reverse current per diode.	$t_p = 100$ µs	-	1			A
T_{stg}	Storage temperature		-65	175			˚C
T_j	Operating junction temperature		-	150			˚C

1 For output currents in excess of 20 A, connection should be made to the exposed metal mounting base.

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.	-	60	-	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 = 30 A; T_j = 125˚C	-	0.65	0.73	V
		I_F = 20 A; T_j = 125˚C	-	0.53	0.62	V
		I_F = 30 A	-	0.77	0.82	V
I_R	Reverse current (per diode)	$V_R = V_{RWM}$	-	100	200	µA
		$V_R = V_{RWM}$; T_j = 125 ˚C	-	12	40	mA
C_d	Junction capacitance (per diode)	f = 1MHz; V_R = 5V; T_j = 25 ˚C to 125 ˚C	-	800	-	pF

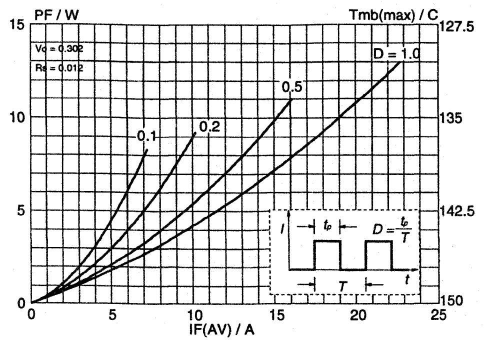


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

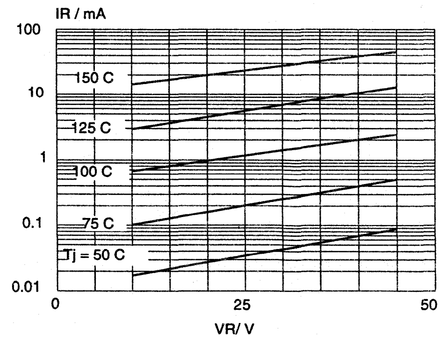


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

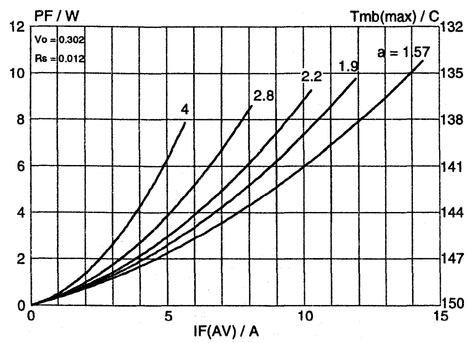


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

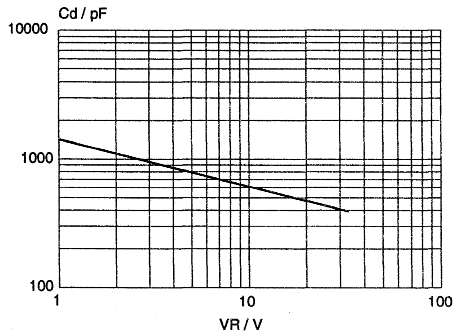


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

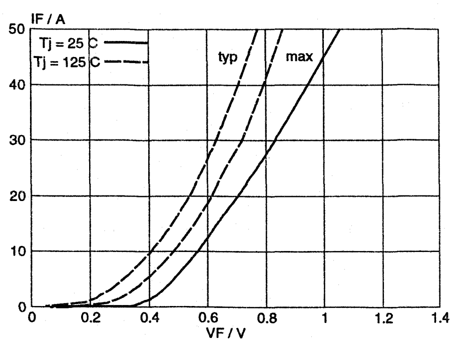


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

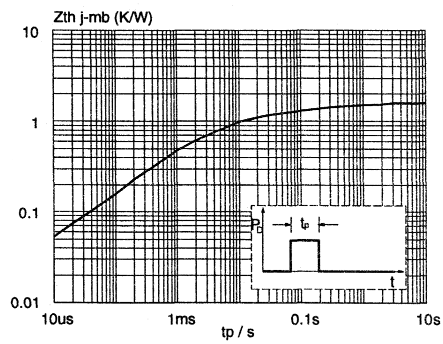


Fig.6. Transient thermal impedance per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.

Rectifier diodes schottky barrier

PBYR2545CTF series

GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky barrier rectifier diodes in a full pack, plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

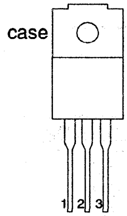
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	PBYR25-	35CTF	40CTF	45CTF	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.65	0.65	0.65	V
$I_{O(AV)}$	Output current (both diodes conducting)	20	20	20	A

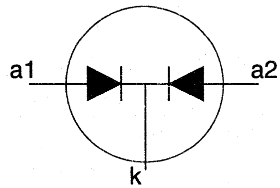
PINNING - SOT186

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-35	-40	-45	
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_{hs} \leq 111$ ˚C	-	35	40	45	V
$I_{O(AV)}$	Output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{hs} \leq 104$ ˚C	-	20			A
$I_{O(RMS)}$	RMS forward current		-	20			A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 104$ ˚C	-	20			A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-	135			A
		t = 8.3 ms sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$	-	150			A
I^2t	I^2t for fusing	t = 10 ms	-	91			A^2s
I_{RRM}	Repetitive peak reverse current per diode.	$t_p = 2$ µs; $\delta = 0.001$	-	1			A
I_{RSM}	Non-repetitive peak reverse current per diode.	$t_p = 100$ µs	-	1			A
T_{stg}	Storage temperature		-65	175			˚C
T_j	Operating junction temperature		-	150			˚C

ISOLATION

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Repetitive peak voltage from all three terminals to external heatsink	R.H. ≤ 65% ; clean and dustfree	-	-	1500	V
C_{isol}	Capacitance from T2 to external heatsink	f = 1 MHz	-	12	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	per diode	-	-	4.8	K/W
		both diodes (with heatsink compound)	-	-	4.0	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 (per diode)	I_F = 20 A; T_j = 125˚C	-	0.58	0.65	V
		I_F = 20 A	-	0.63	0.68	V
I_R	Reverse current (per diode)	$V_R = V_{RWM}$	-	100	200	µA
		$V_R = V_{RWM}$; T_j = 125 ˚C	-	12	40	mA
C_d	Junction capacitance (per diode)	f = 1MHz; V_R ≐ 5V; T_j = 25 ˚C to 125 ˚C	-	800	-	pF

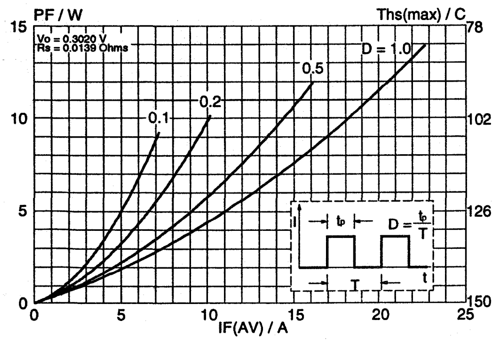


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

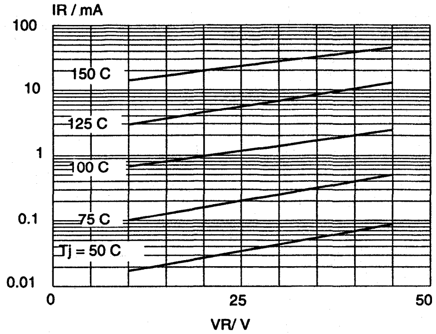


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

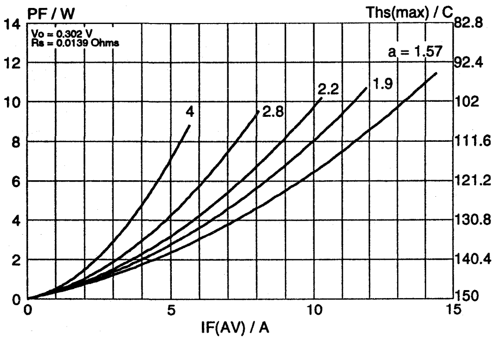


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

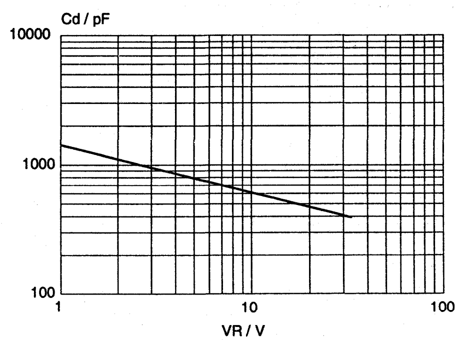


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

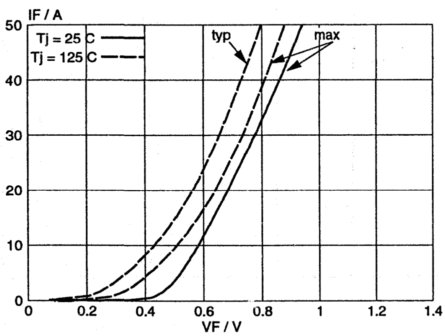


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

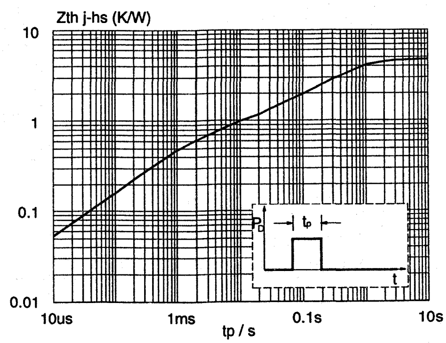


Fig.6. Transient thermal impedance per diode; $Z_{th\ j\text{-}hs} = f(t_p)$.

Rectifier diodes schottky barrier

PBYR3045PT series

GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky rectifier diodes in a plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

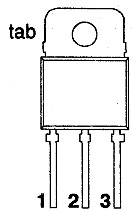
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	PBYR30-	35CT	40CT	45CT	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.60	0.60	0.60	V
$I_{O(AV)}$	Output current (both diodes conducting)	30	30	30	A

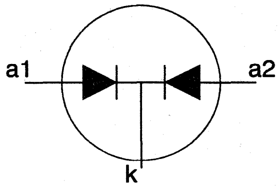
PINNING - SOT93

PIN	DESCRIPTION
1	Anode 1 (a)
2	Cathode (k)
3	Anode 2 (a)
tab	Cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-35	-40	-45	
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_{mb} \leq 136$ ˚C	-	35	40	45	V
$I_{O(AV)}$	Output current (both diodes conducting)[1]	square wave; $\delta = 0.5$; $T_{mb} \leq 130$ ˚C	-	30			A
$I_{O(RMS)}$	RMS forward current		-	43			A
I_{FRM}	Repetitive peak forward current per diode	$t = 25$ µs; $\delta = 0.5$; $T_{mb} \leq 130$ ˚C	-	30			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 $V_{RWM(max)}$	-	200			A
I^2t	I^2t for fusing	$t = 10$ ms	-	162			A^2s
I_{RRM}	Repetitive peak reverse current per diode.	$t_p = 2$ µs; $\delta = 0.001$	-	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

1 For output currents in excess of 20 A connection should be made to the exposed metal mounting base.

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	1.4	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	-	0.55	0.60	V
		I_F = 30 A; T_j = 125˚C	-	0.67	0.72	V
		I_F = 30 A	-	0.71	0.76	
I_R	Reverse current (per diode)	$V_R = V_{RWM}$	-	100	200	µA
		$V_R = V_{RWM}$; T_j = 125 ˚C	-	12	40	mA
C_d	Junction capacitance (per diode)	f = 1MHz; V_R = 5V; T_j = 25 ˚C to 125 ˚C	-	800	-	pF

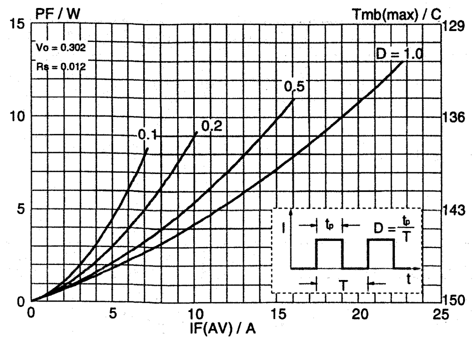


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

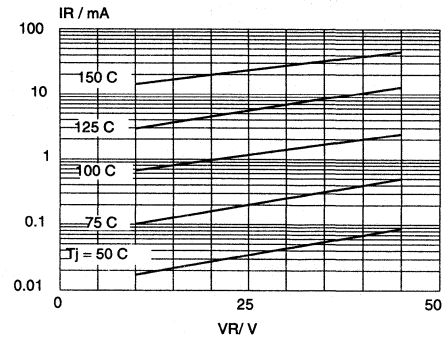


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

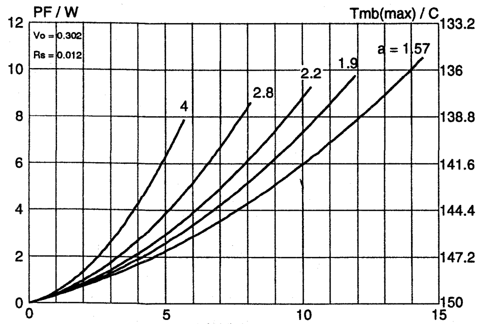


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

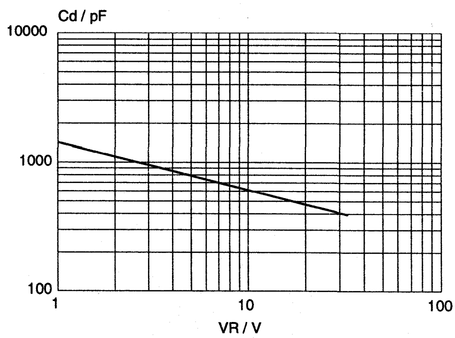


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

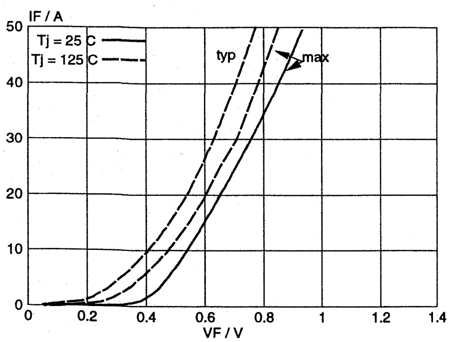


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

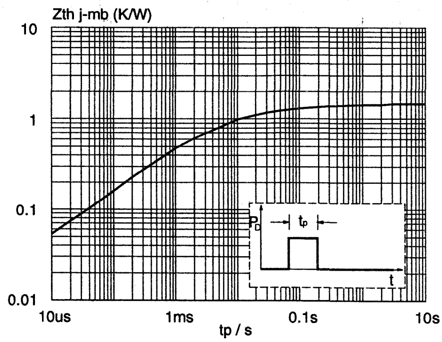


Fig.6. Transient thermal impedance per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.

Rectifier diodes schottky barrier

PBYR3045PTF series

GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky barrier rectifier diodes in a full pack, plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

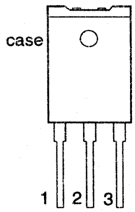
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	PBYR30-	35CTF	40CTF	45CTF	
V_{RRM}	Repetitive peak reverse voltage	35	40	45	V
V_F	Forward voltage	0.65	0.65	0.65	V
$I_{O(AV)}$	Output current (both diodes conducting)	20	20	20	A

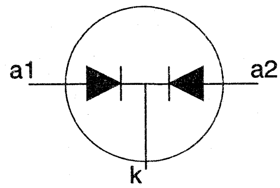
PINNING - SOT199

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-35	-40	-45	
V_{RRM}	Repetitive peak reverse voltage		-	35	40	45	V
V_{RWM}	Crest working reverse voltage		-	35	40	45	V
V_R	Continuous reverse voltage	$T_{hs} \leq 113$ ˚C	-	35	40	45	V
$I_{O(AV)}$	Output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{hs} \leq 109$ ˚C	-	20			A
$I_{O(RMS)}$	RMS forward current		-	20			A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 109$ ˚C	-	30			A
I_{FSM}	Non-repetitive peak forward current per diode.	t = 10 ms	-	135			A
		t = 8.3 ms sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$	-	150			A
I^2t	I^2t for fusing	t = 10 ms	-	91			A^2s
I_{RRM}	Repetitive peak reverse current per diode.	$t_p = 2$ µs; $\delta = 0.001$	-	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

ISOLATION

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Repetitive peak voltage from all three terminals to external heatsink	R.H. ≤ 65 % ; clean and dustfree	-	-	2500	V
C_{isol}	Capacitance from T2 to external heatsink	f = 1 MHz	-	22	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	per diode	-	-	4.0	K/W
		both diodes (with heatsink compound)	-	-	3.5	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	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage (per diode)	I_F = 30 A; T_j = 125˚C	-	0.70	0.75	V
		I_F = 20 A; T_j = 125˚C	-	0.58	0.65	V
		I_F = 30 A	-	0.75	0.80	V
I_R	Reverse current (per diode)	$V_R = V_{RWM}$	-	100	200	µA
		$V_R = V_{RWM}$; T_j = 125 ˚C	-	12	40	mA
C_d	Junction capacitance (per diode)	f = 1MHz; V_R = 5V; T_j = 25 ˚C to 125 ˚C	-	800	-	pF

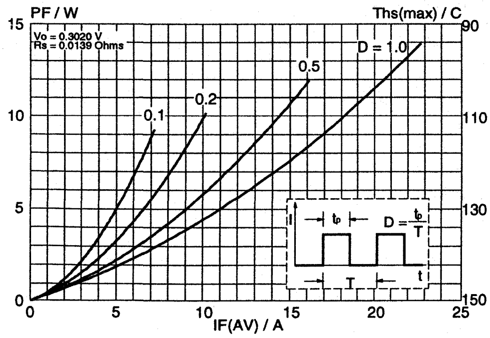


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

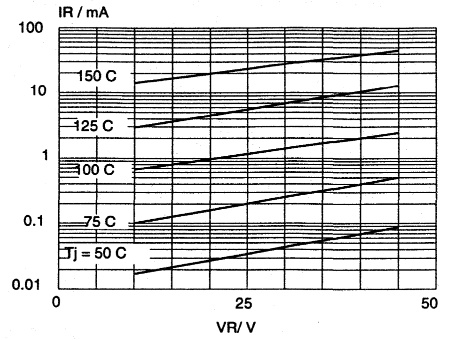


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

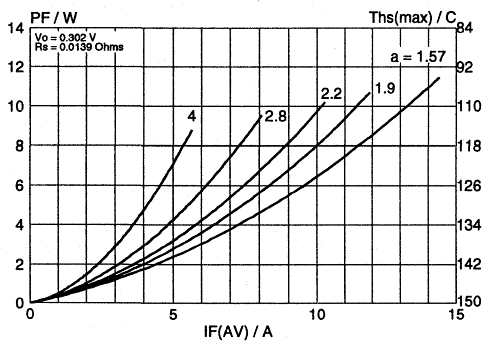


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

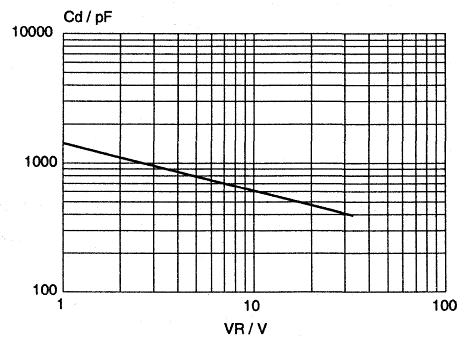


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

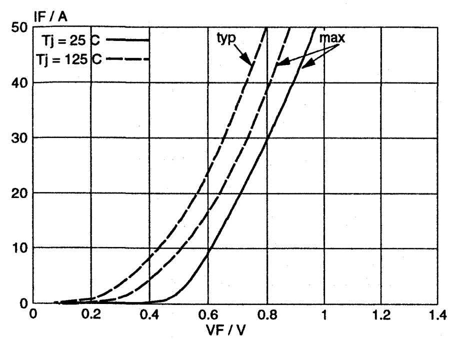


Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

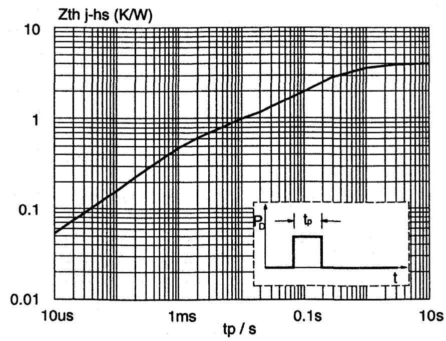


Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.

Rectifier diodes schottky barrier

PBYR30100PT series

GENERAL DESCRIPTION

Dual, low leakage, platinum barrier schottky rectifier diodes in a plastic envelope featuring low forward voltage drop and absence of stored charge. These devices can withstand reverse voltage transients and have guaranteed reverse surge capability. The devices are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and zero switching losses are important.

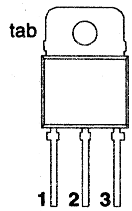
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	PBYR30-	60PT	80PT	100PT	
V_{RRM}	Repetitive peak reverse voltage	60	80	100	V
V_F	Forward voltage	0.7	0.7	0.7	V
$I_{O(AV)}$	Output current (both diodes conducting)	30	30	30	A

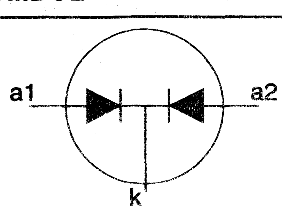
PINNING - SOT93

PIN	DESCRIPTION
1	Anode 1 (a)
2	Cathode (k)
3	Anode 2 (a)
tab	Cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-60	-80	-100	
V_{RRM}	Repetitive peak reverse voltage		-	60	80	100	V
V_{RWM}	Crest working reverse voltage		-	60	80	100	V
V_R	Continuous reverse voltage	$T_{mb} \leq 139$ ˚C	-	60	80	100	V
$I_{O(AV)}$	Output current (both diodes conducting)[1]	square wave; $\delta = 0.5$; $T_{mb} \leq 124$ ˚C	-	30			A
$I_{O(RMS)}$	RMS forward current		-	43			A
I_{FRM}	Repetitive peak forward current per diode	$t = 25$ µs; $\delta = 0.5$; $T_{mb} \leq 124$ ˚C	-	30			A
I_{FSM}	Non-repetitive peak forward current per diode.	t = 10 ms	-	180			A
		t = 8.3 ms	-	200			A
		sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$					
I^2t	I^2t for fusing	t = 10 ms	-	162			A^2s
I_{RRM}	Repetitive peak reverse current per diode.	$t_p = 2$ µs; $\delta = 0.001$	-	1			A
I_{RSM}	Non-repetitive peak reverse current per diode.	$t_p = 100$ µs	-	1			A
T_{stg}	Storage temperature		-65	175			˚C
T_j	Operating junction temperature		-	150			˚C

1 For output currents in excess of 20 A connection should be made to the exposed metal mounting base.

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	1.4	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 = 15 A; T_j = 125˚C	-	0.61	0.70	V
		I_F = 30 A; T_j = 125˚C	-	0.74	0.85	V
		I_F = 15 A; T_j = 25˚C	-	0.77	0.85	V
I_R	Reverse current (per diode)	$V_R = V_{RWM}$; T_j = 25 ˚C	-	5.0	150	µA
		$V_R = V_{RWM}$; T_j = 125 ˚C	-	5.0	15	mA
C_d	Junction capacitance (per diode)	f = 1MHz; V_R = 5V; T_j = 25 ˚C to 125 ˚C	-	600	-	pF

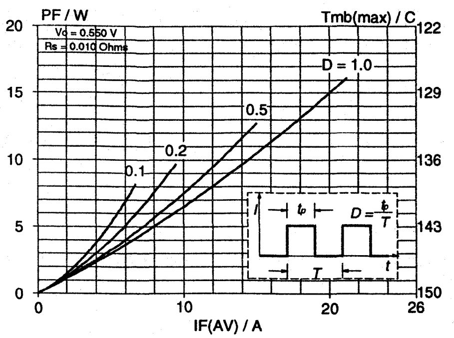


Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

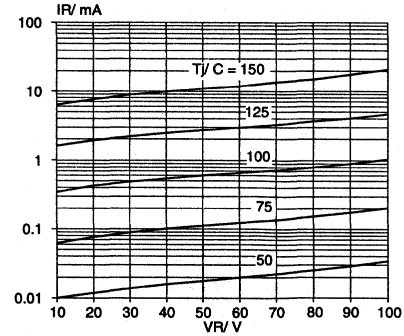


Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter T_j

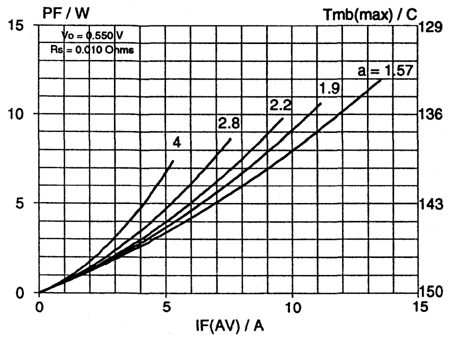


Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

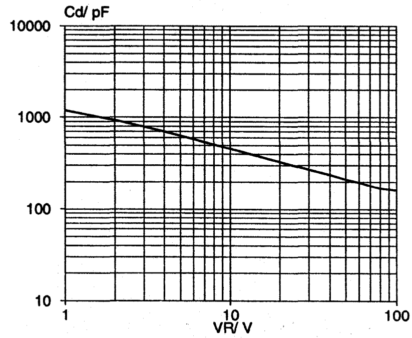


Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; T_j = 25˚C to 125 ˚C.

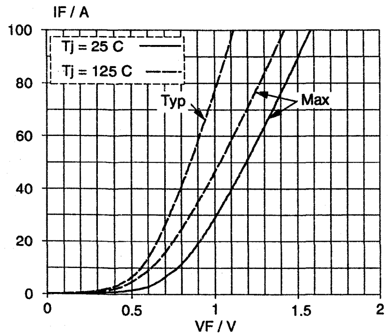


Fig.3. Typical and maximum forward characteristic per diode; $I_F = f(V_F)$; parameter T_j

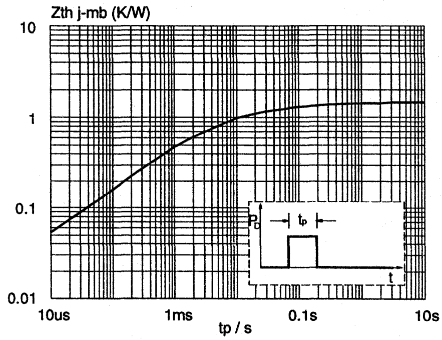


Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

MECHENICAL DATA

SOD84

Dimensions in mm

Net Mass: 0.35 g

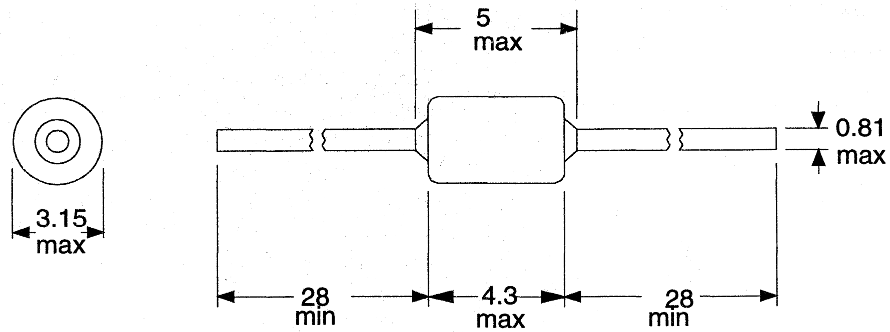


Fig.1. SOD84.

Dimensions in mm

IEC 286-1.

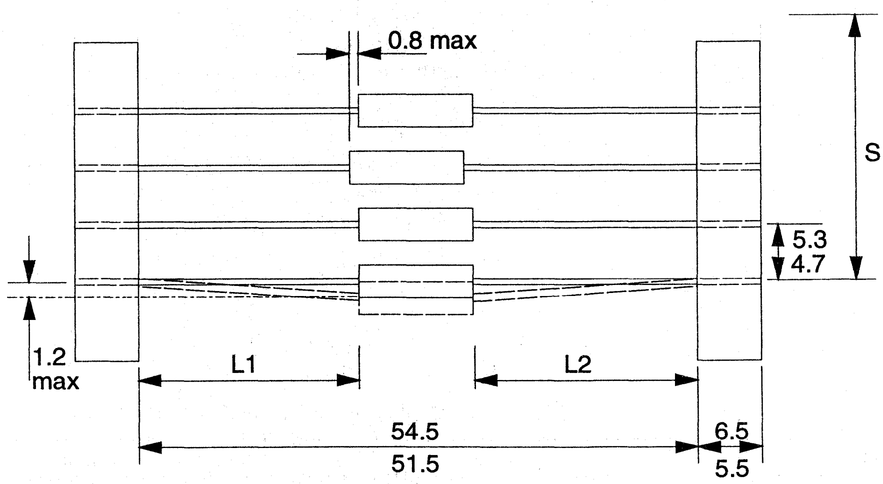


Fig.2. SOD84.

Notes

1. For packing details see mounting instructions for SOD84 envelopes.
2. The cumulative space (S) measured over 10 spacings = 50 ±2.
3. The diodes are centred so that $|L_1 - L_2| \leq 1.2$ mm
4. A black marker is printed on the white tape of the bandolier every 50 diodes.
5. The axial taping specification described above fulfills the requirements of IEC 286-1 (Tape packaging of components with axial leads on continuous tapes) and is compatible with automatic insertion equipment as manufactured by Universal, U.S.M. (Dynapert) and M.E.I. (Panasert).

SOD94

Dimensions in mm

Net Mass: 1.5 g

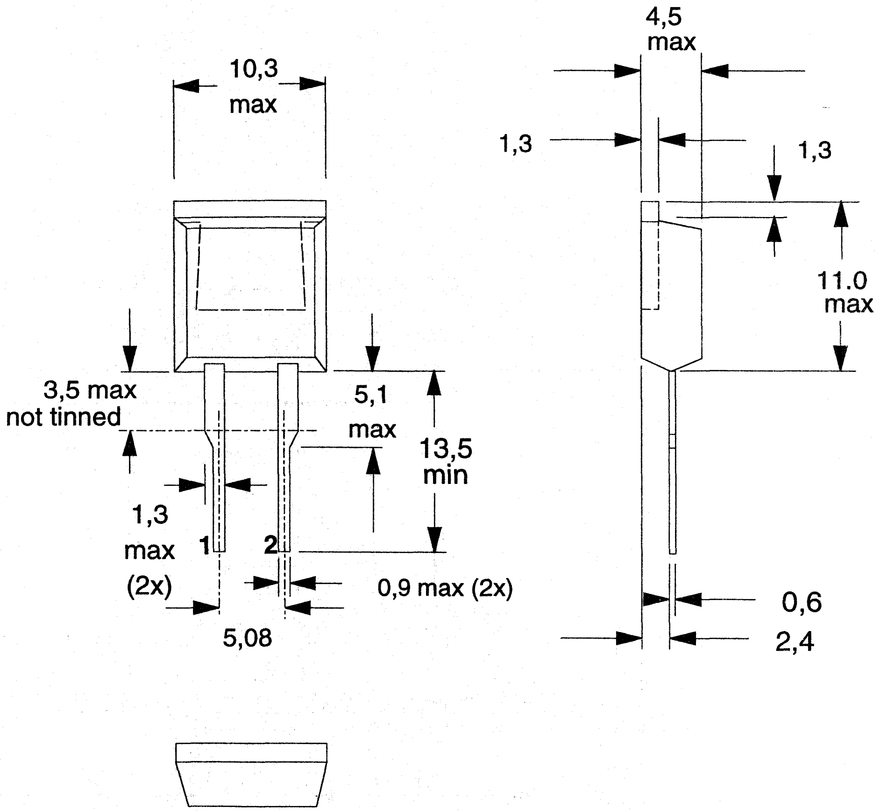


Fig.3. SOD94; Low profile version of TO220AC; Pin 1 connected to mounting base.

Notes

1. Accessories supplied on request. Refer to mounting instructions for TO220 envelopes.
2. Low profile versions of most devices assembled in TO220AC are available as SOD94. Devices assembled in this outline have the same electrical ratings and characteristics as the TO220AC versions and are suitable for free air mounting on circuit boards with limited clearance.
3. Low profile versions are identified by a /CR suffix added to the normal TO220 device type code. For example a BY359-1500 in a low profile outline is a BY359-1500/CR in SOD94.
4. Epoxy meets UL94 V0 at 1/8".

SOD100

Dimensions in mm

Net Mass: 2 g

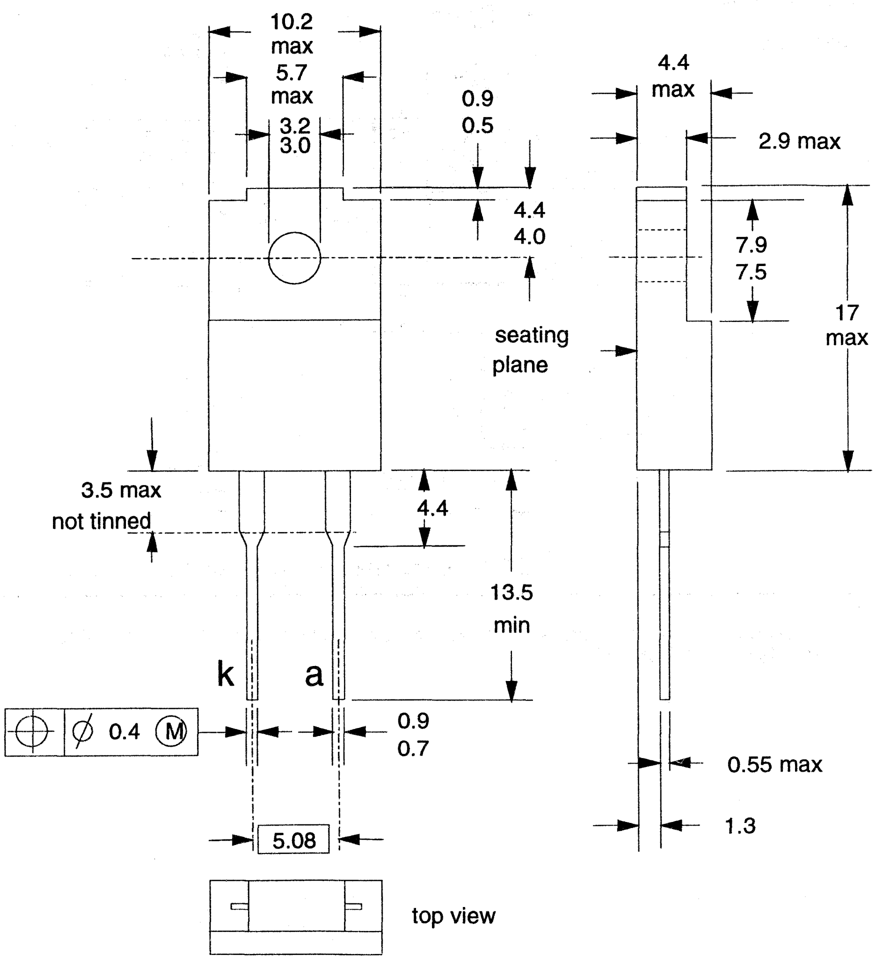


Fig.4. SOD100; The seating plane is electrically isolated from all terminals.

Notes

1. Accessories supplied on request: refer to mounting instructions for SOT186 envelopes.
2. Epoxy meets UL94 V0 at 1/8".

SOD113

Dimensions in mm

Net Mass: 2 g

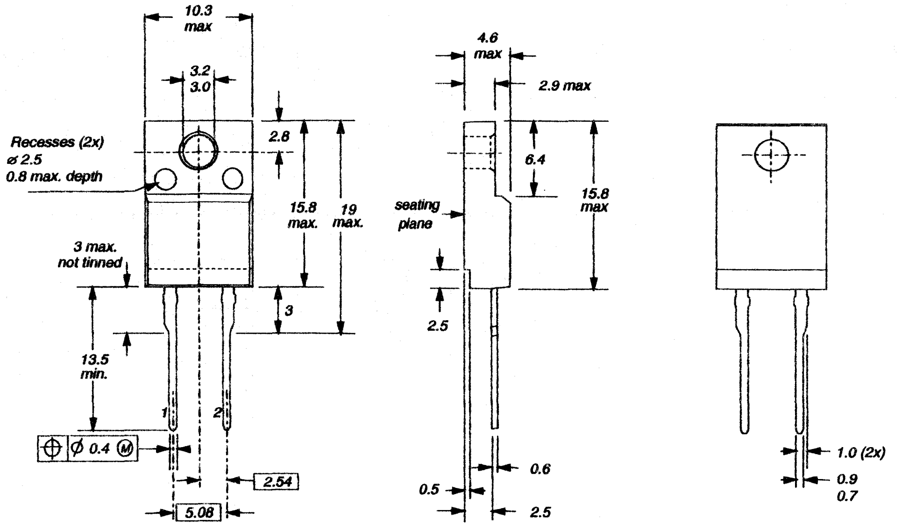


Fig.5. SOD113; The seating plane is electrically isolated from all terminals.

Notes
1. Accessories supplied on request: refer to mounting instructions for SOT186A envelopes.
2. Epoxy meets UL94 V0 at 1/8".

SOT82

Dimensions in mm

Net Mass: 0.8 g

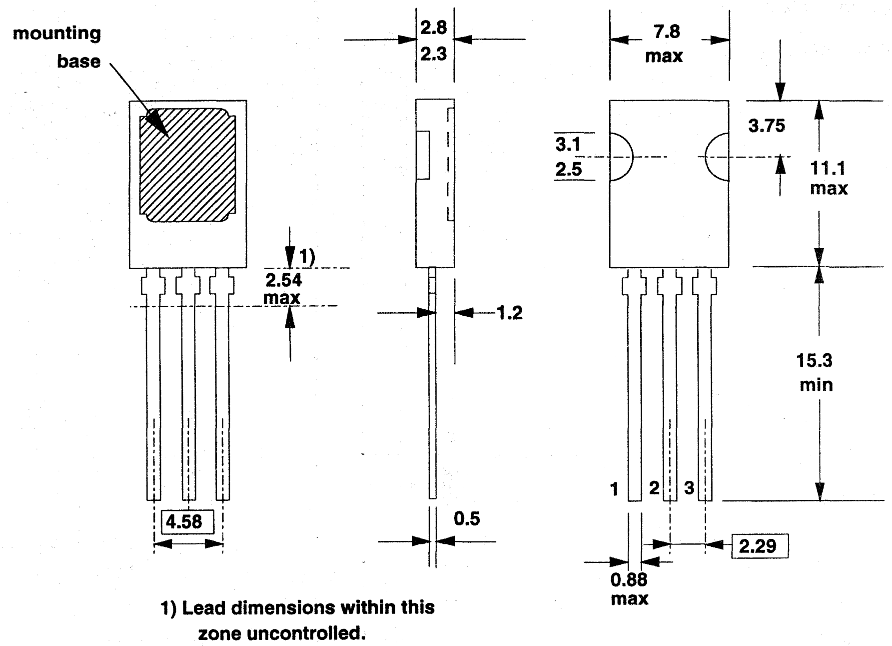


Fig.6. SOT82; Pin 2 connected to mounting base.

Notes

1. Accessories supplied on request: refer to mounting instructions for SOT82 envelopes.
2. Epoxy meets UL94 V0 at 1/8".

SOT93

Dimensions in mm

Net Mass: 5 g

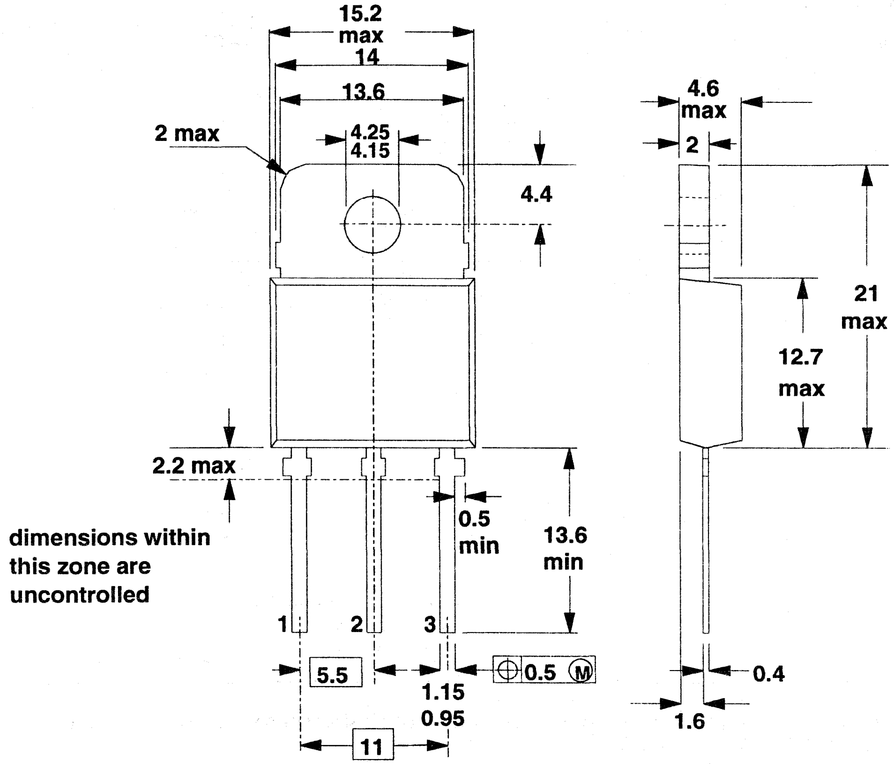


Fig.7. SOT93; pin 2 connected to mounting base.

Notes

1. Accessories supplied on request: refer to mounting instructions for SOT93 envelopes.
2. Epoxy meets UL94 V0 at 1/8".

SOT186

Dimensions in mm

Net Mass: 2 g

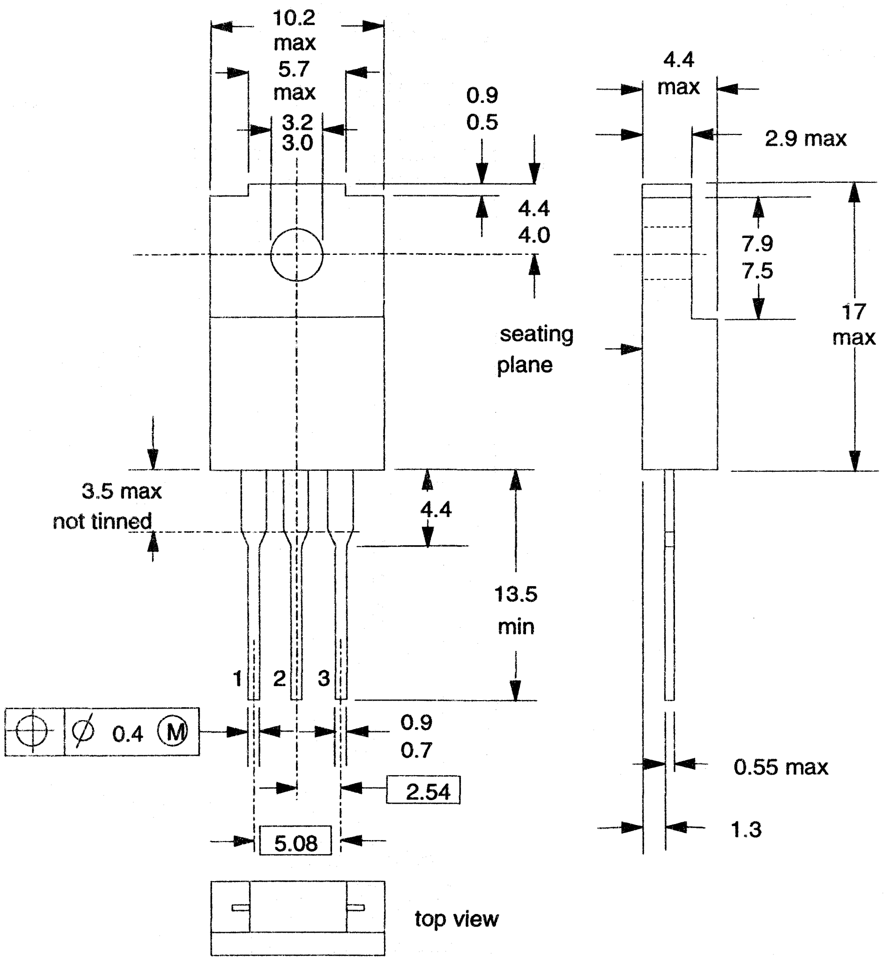


Fig.8. SOT186; The seating plane is electrically isolated from all terminals.

Notes

1. Accessories supplied on request: refer to mounting instructions for SOT186 envelopes.
2. Epoxy meets UL94 V0 at 1/8".

SOT199

Dimensions in mm

Net Mass: 5 g

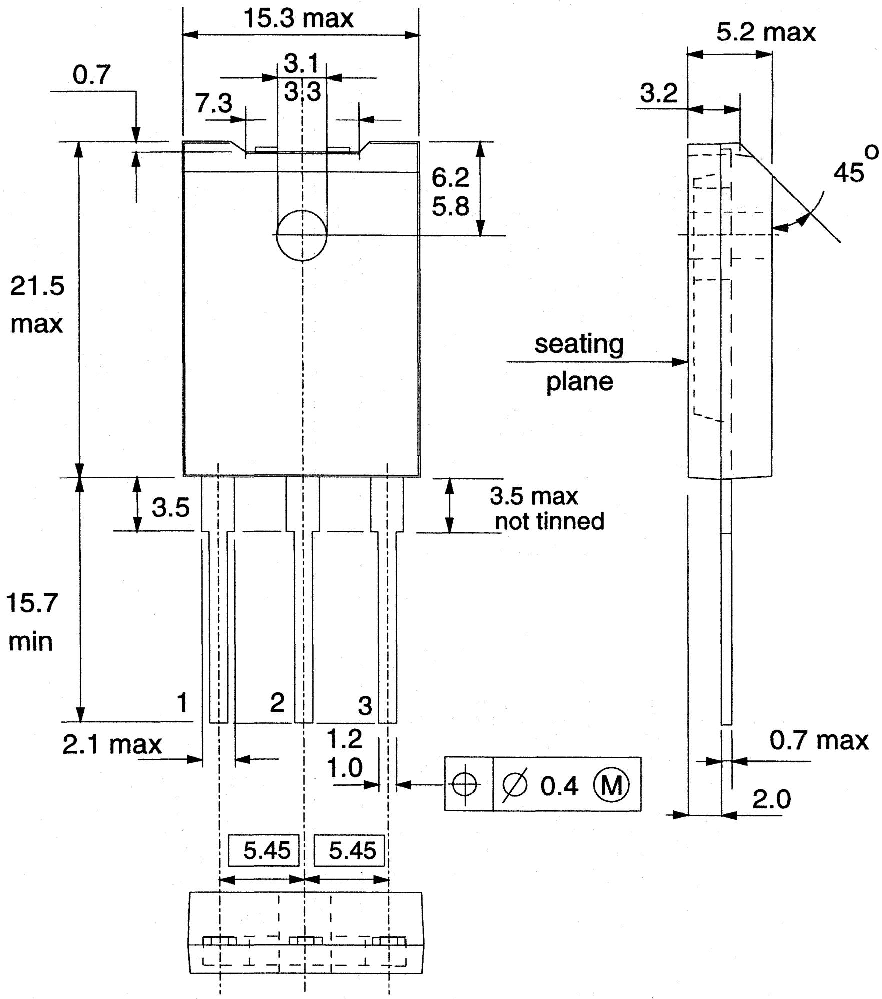


Fig.9. SOT199; The seating plane is electrically isolated from all terminals.

Notes

1. Accessories supplied on request: refer to mounting instructions for SOT199 envelopes.
2. Epoxy meets UL94 V0 at 1/8".

SOT223

Dimensions in mm

Net Mass: 0.11 g

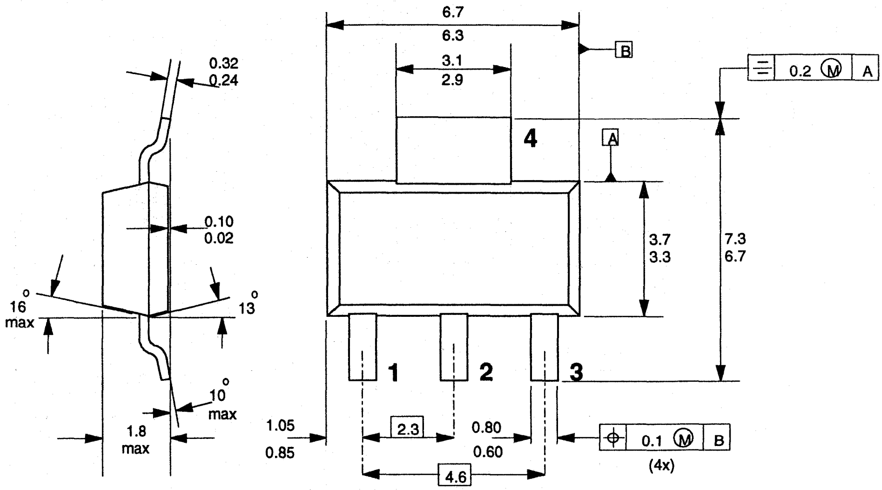


Fig.10. SOT223; surface mounting envelope. Pin 2 connected to tab.

Notes
1. Refer to soldering and mounting instructions for SOT223 envelopes.
2. Epoxy meets UL94 V0 at 1/8".

SOT226

Dimensions in mm

Net Mass: 1.5 g

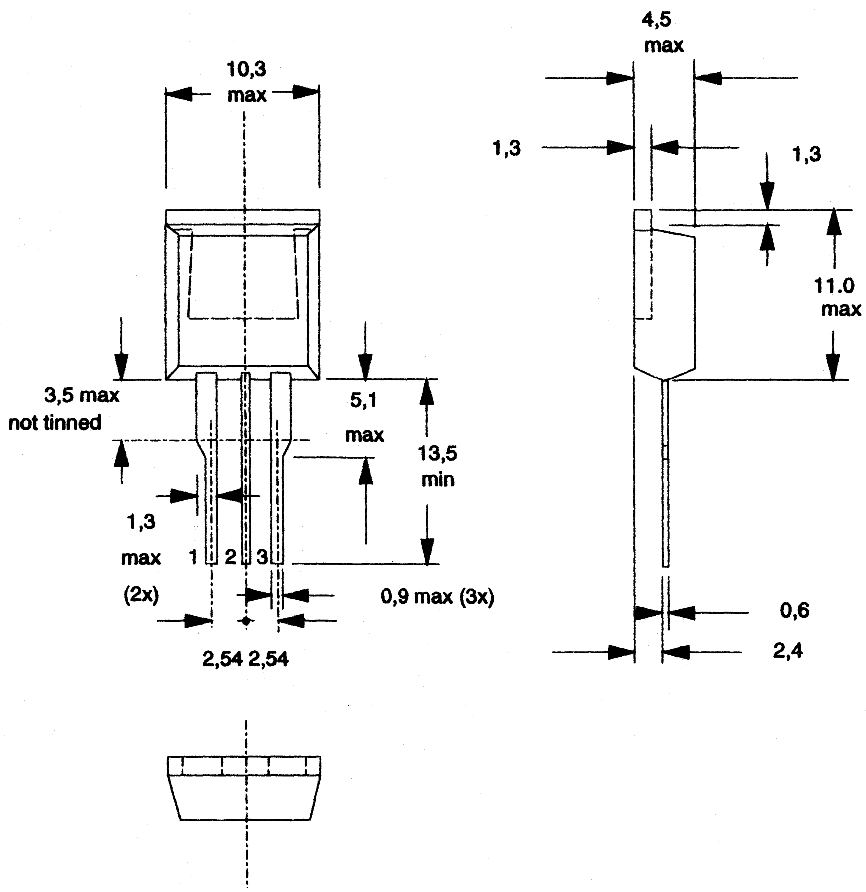


Fig.11. SOT226 Low profile version of TO220AB; Pin 2 connected to mounting base.

Notes

1. Accessories supplied on request. Refer to mounting instructions for TO220 envelopes.
2. Low profile versions of most devices assembled in TO220AB are available as SOT226. Devices assembled in this outline have the same electrical ratings and characteristics as the TO220AB versions and are suitable for free air mounting on circuit boards with limited clearance.
3. Low profile versions are identified by a /CR suffix added to the normal TO220 device type code. For example a PBYR2045CT in a low profile outline is a PBYR2045CT/CR in SOT226.
4. Epoxy meets UL94 V0 at 1/8".

TO220AB/ SOT78AB

Dimensions in mm

Net Mass: 2 g

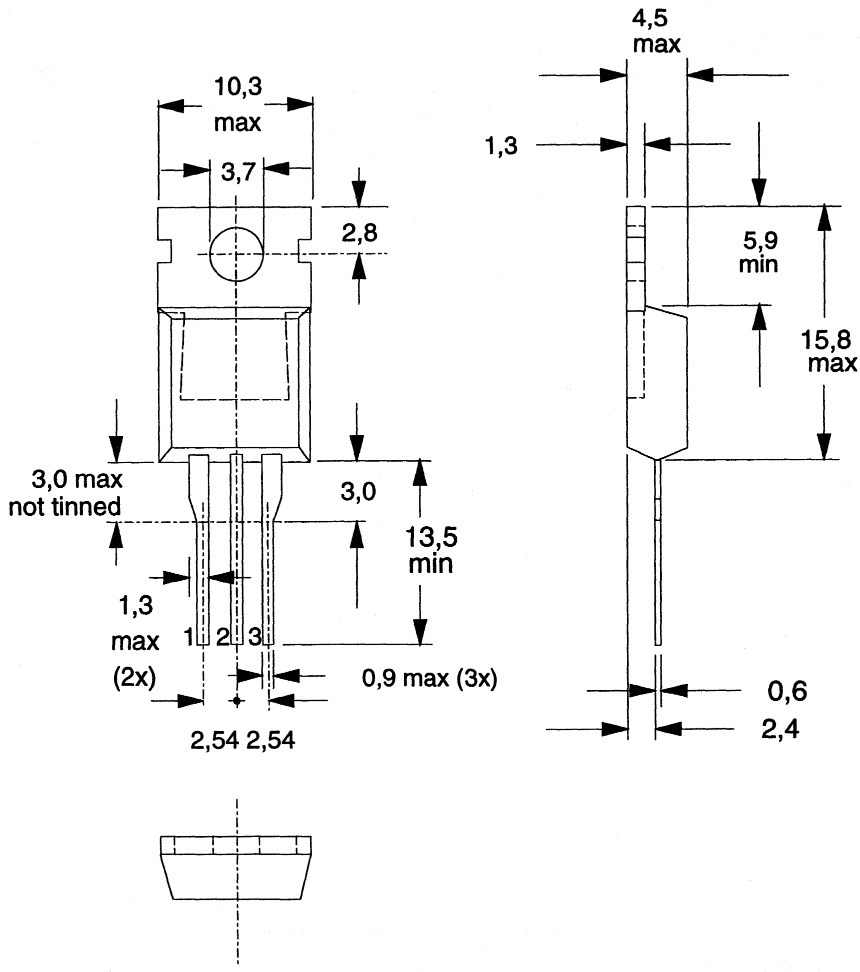


Fig.12. TO220AB; Pin2 connected to mounting base.

Notes
1. Accessories supplied on request. Refer to mounting instructions for TO220 envelopes.
2. Epoxy meets UL94 V0 at 1/8".

TO220AC/ SOT78AC

Dimensions in mm

Net Mass: 2 g

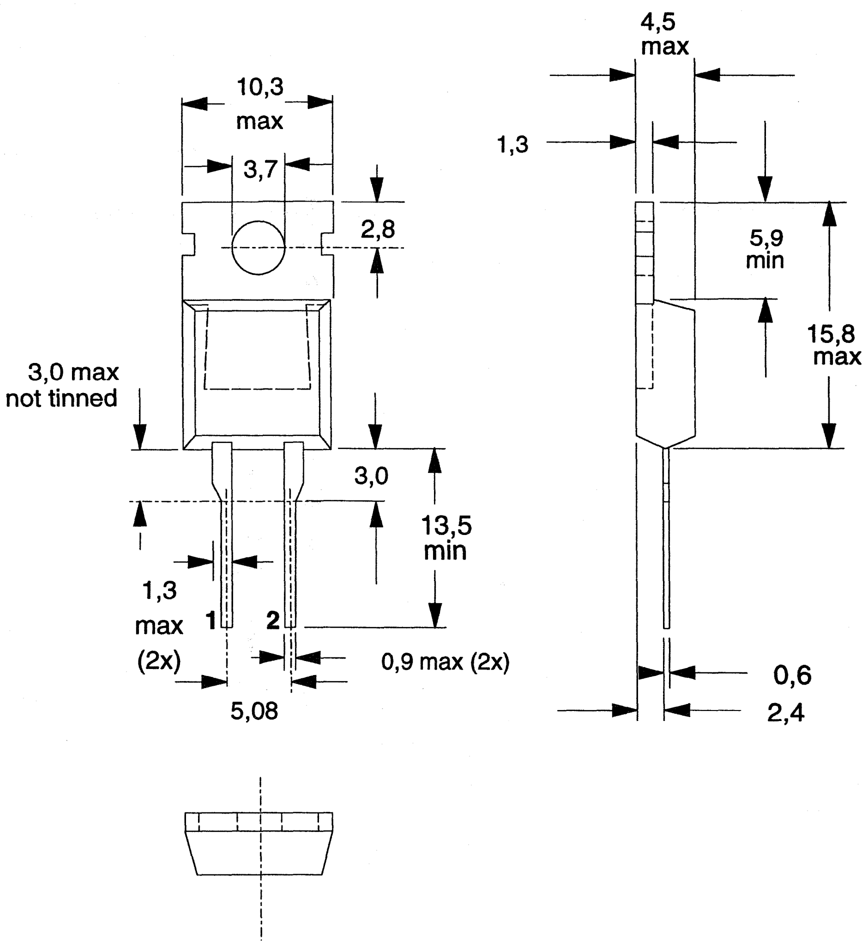


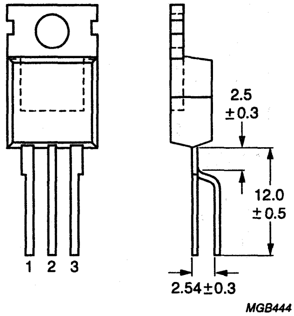
Fig.13. TO220AC; Pin 1 connected to mounting base.

Notes
1. Accessories supplied on request. Refer to mounting instructions for TO220 envelopes.
2. Epoxy meets UL94 V0 at 1/8".

LEADFORM OPTIONS

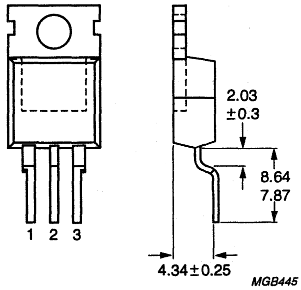
LEADFORM OPTIONS

- These options require a special part number before ordering.
- Contact your local Philips Semiconductors representative for pricing, minimum order quantities and part number.



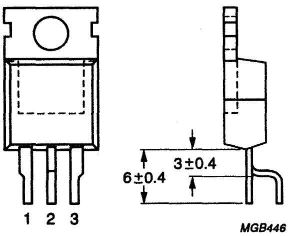
SOT78 (TO-220)

Fig.1 Leadform 78-02.



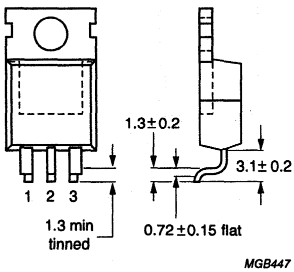
SOT78 (TO-220)

Fig.2 Leadform 78-05W.



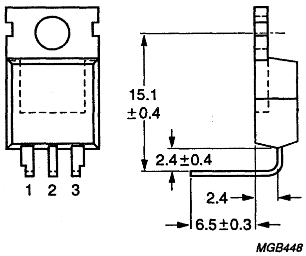
SOT78 (TO-220)

Fig.3 Leadform 78-13.



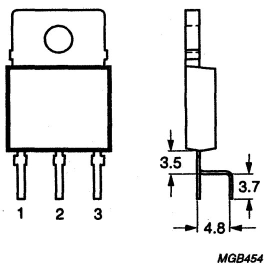
SOT78 (TO-220)

Fig.4 Leadform 78-14.



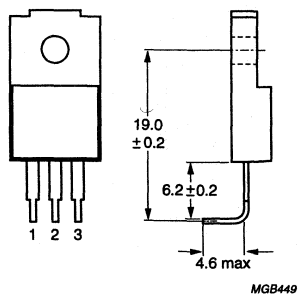
SOT78 (TO-220)

Fig.5 Leadform 78-15.



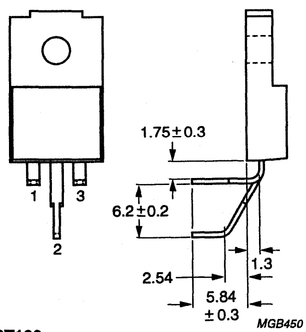
SOT93

Fig.6 Leadform 93-01.



SOT186

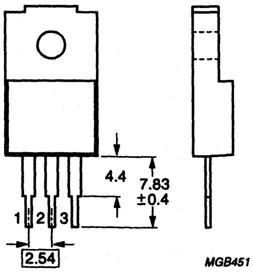
Fig.7 Leadform 186-01A.



SOT186

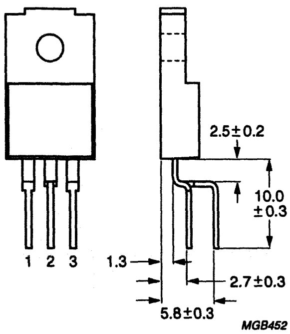
Fig.8 Leadform 186-01B.

Leadform options



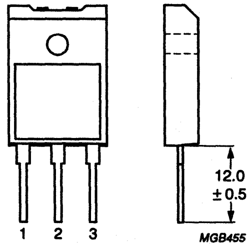
SOT186

Fig.9 Leadform 186-02.



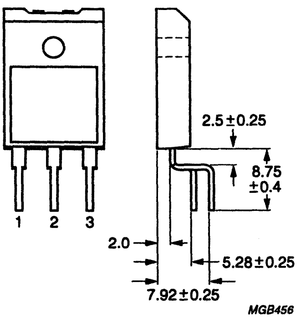
SOT186

Fig.10 Leadform 186A-02.



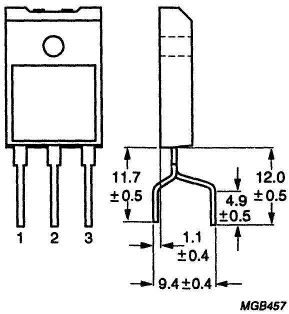
SOT199

Fig.11 Leadform 199-01.



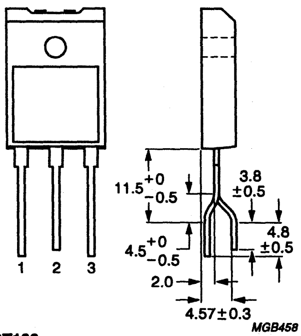
SOT199

Fig.12 Leadform 199-02.



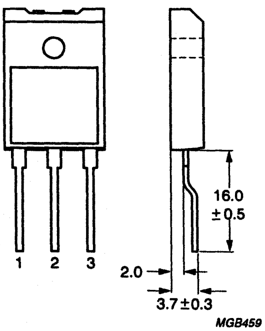
SOT199

Fig.13 Leadform 199-04.



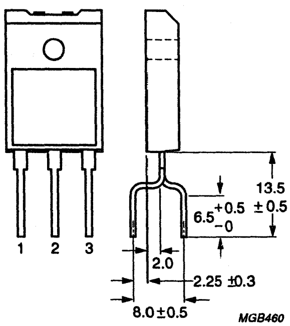
SOT199

Fig.14 Leadform 199-05.



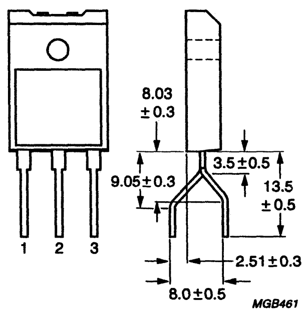
SOT199

Fig.15 Leadform 199-06.



SOT199

Fig.16 Leadform 199-08.



SOT199

Fig.17 Leadform 199-09.

MOUNTING INSTRUCTIONS

GENERAL DATA AND INSTRUCTIONS

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.

Mounting methods

CLIP MOUNTING (TO126 AND SOT82)

Mounting with a spring clip gives:

a) A good thermal contact under the crystal area, and slightly lower thermal resistance than screw mounting.

b) Safe insulation for mains operation.

Minimum force for good heat transfer is 10 N.

Maximum force to avoid damaging the device is 80 N.

M2.5 AND M3 SCREW MOUNTING (TO126 ONLY)

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:

Minimum torque for good heat transfer is 0.40 Nm.

Maximum torque to avoid damaging the device is 0.60 Nm.

When the driven nut is in direct contact with a toothed lock washer the torques are as follows:

Minimum torque for good heat transfer is 0.55 Nm.

Maximum torque to avoid damaging the device is 0.80 Nm.

BODY MOUNTING (SOT82)

The SOT82 envelope can be adhesive mounted or soldered onto a hybrid circuit.
For soldering, a copper plate or an anodised aluminium plate with a copper layer is recommended.

The device may be adhesive mounted directly onto a ceramic substrate.

Heatsink requirements

Minimum thickness: 2 mm.

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 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

Typical figures, for exact figures see data for each device type.

$R_{th\ mb-h}$	Thermal resistance from mounting base to heatsink	K/W	
Mounting method		**clip**	**screw**
TO126, direct with heatsink compound		1.0	0.5
TO126, direct without heatsink compound		3.0	1.0
TO126 with heatsink compound and 0.1 mm maximum mica insulator		3.0	3.0
TO126 without heatsink compound and 0.1 mm maximum mica insulator		6.0	6.0
SOT82, direct with heatsink compound		0.4	-
SOT82, direct without heatsink compound		2.0	-
SOT82 with heatsink compound and 0.1 mm maximum mica insulator		2.0	-
SOT82 without heatsink compound and 0.1 mm maximum mica insulator		5.0	-

Soldering

Recommendations for devices with a maximum junction temperature rating < 150 °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.

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.

MOUNTING BASE SOLDERING.

Recommended metal-alloy of solder [aste (85% metal weight)
62 Sn/36 Pb/2 Ag or 60 Sn/ 40 Pb.
Maximum soldering temperature 200°C (tab temperature)
Maximum soldering cycle duration including preheating 30 s.

For good soldering and to avoid damage to the encapsulation, pre-heating at $\leq$ 165°C for $\leq$ 10 s max is recommended.

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 x lead thickness is preferred. See figure 1. Surface cracks in the dip tin coating on the lead are common when a radius less than 1.5 x 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.

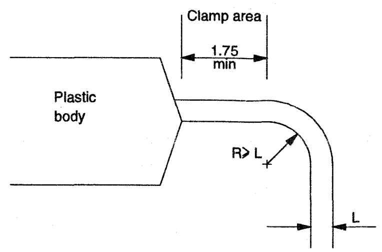


Fig 1. Minimum lead bend radius.

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 figure 2 below. This is only necessary where the device is mounted so rigidly that expansion forces are transmitted through the assembly.

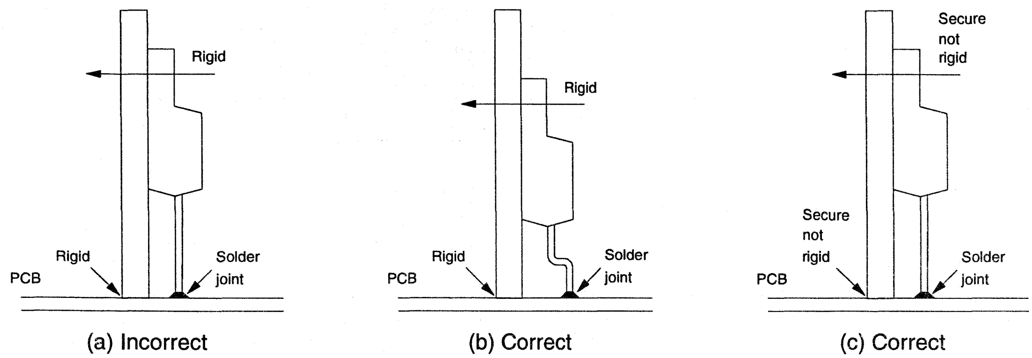


Fig 2. Printed circuit board and heatsink mounting.

INSTRUCTIONS FOR CLIP MOUNTING

Direct mounting with clip 56353

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 figures 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 figure 5.

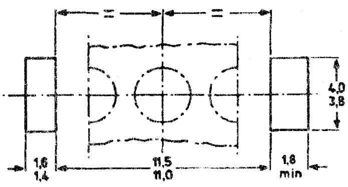


Fig 3. Heatsink requirements.

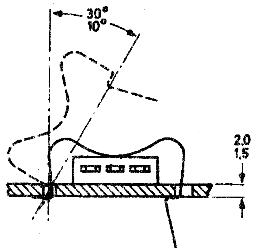


Fig 4. Mounting.
(1) spring clip 56353.

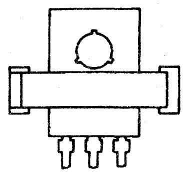


Fig 5. Position of device (top view).

Insulated mounting with clip 56353 and insulator 56354

With the insulator 56354 insulation up to 1 kV 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 figures 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.

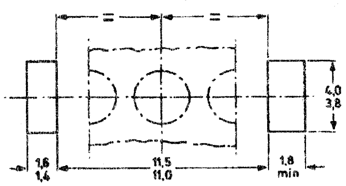


Fig 6. Heatsink requirements.

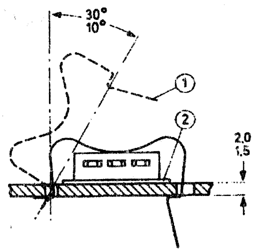


Fig 7. Mounting.
(1) spring clip 56353.
(2) insulator 56354.

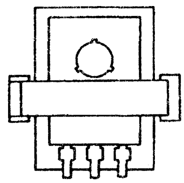


Fig 8. Position of device (top view).

INSTRUCTIONS FOR SCREW MOUNTING (TO126 ONLY)

Direct mounting with screw and spacing washer

THROUGH HEATSINK WITH NUT

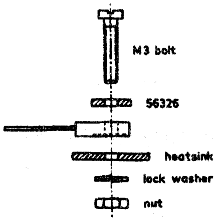


Fig 9. Assembly

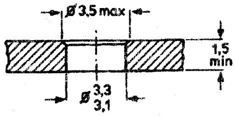


Fig 10. Heatsink requirements.

INTO TAPPED HEATSINK

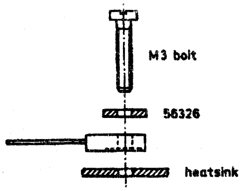


Fig 11. Assembly.

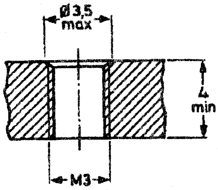


Fig 12. Heatsink requirements.

Insulated mounting with screw and spacing washer

Not recommended where mounting tab is on mains voltage.

THROUGH HEATSINK WITH NUT

Known as a "bottom mounting".

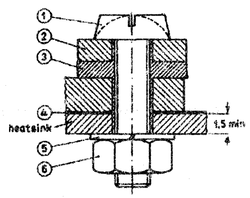


Fig 13. Insulated screw mounting with rectangular washer.

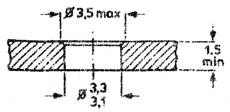


Fig 14. Heatsink requirements for 300 V insulation.

(1) M2.5 screw
(2) metal washer 56326
(3) insulating bush 56387b
(4) mica washer 56387a
(5) lock washer
(6) M2.5 nut

INTO TAPPED HEATSINK

Known as a "top mounting".

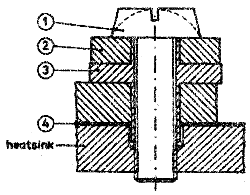


Fig 15. Insulated screw mounting with rectangular washer into tapped heatsink.

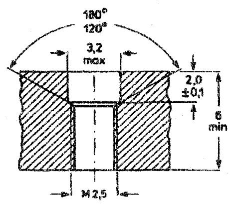


Fig 16. Heatsink requirements for 300 V insulation.

(1) M2.5 screw
(2) metal washer 56326
(3) insulating bush 56387b
(4) mica washer 56387a

GENERAL DATA AND INSTRUCTIONS

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 with a spring clip gives:

a) A good thermal contact under the crystal area, and slightly lower thermal resistance than screw mounting.

b) 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-rivetted 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 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 (TO220 only)

Typical figures, for exact figures see data for each device type.

$R_{th\ mb-h}$	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

Additional insulators are generally not required when mounting the full-pack outlines.

Soldering

Recommendations 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 x lead thickness is preferred. See figure 1. Surface cracks in the dip tin coating on the lead are common when a radius less than 1.5 x 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.

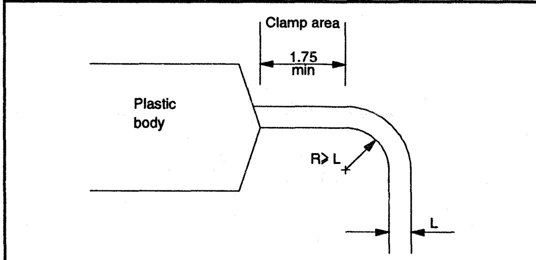


Fig 1. Minimum lead bend radius.

Additional guidelines

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 figure 2 below. This is only necessary where the device is mounted so rigidly that expansion forces are transmitted through the assembly.

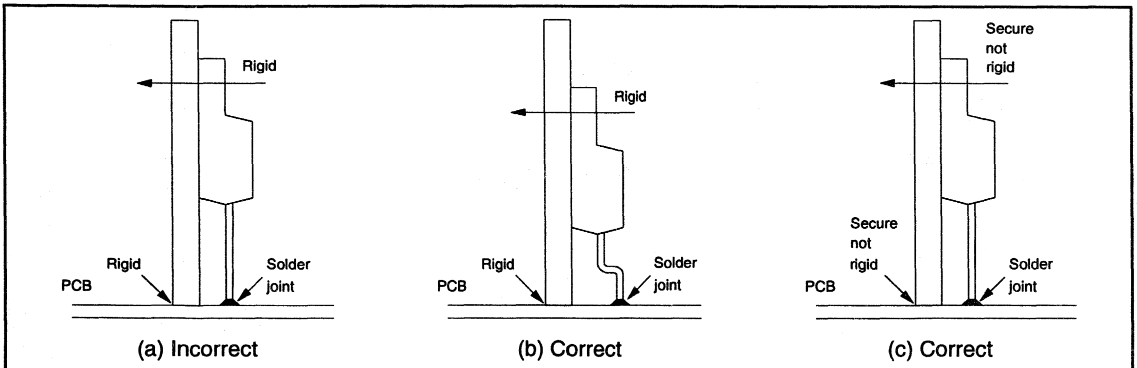


Fig 2. Printed circuit board and heatsink mounting.

INSTRUCTIONS FOR CLIP MOUNTING

Direct mounting with clip 56363

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 figures 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 figure 5.

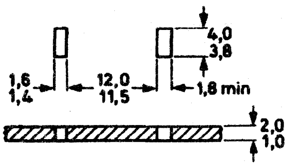


Fig 3. Heatsink requirements.

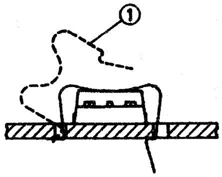


Fig 4. Mounting.
(1) spring clip 56363.

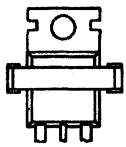


Fig 5. Position of device (top view).

Insulated mounting with clip 56364

With the insulators 56367 or 56369 insulation up to 2 kV 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 figures 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.

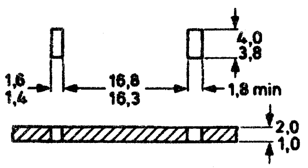


Fig 6. Heatsink requirements.

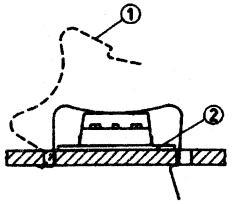


Fig 7. Mounting.
(1) spring clip 56364.
(2) insulator 56369 or 56367.

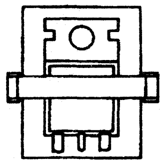


Fig 8. Position of device (top view).

INSTRUCTIONS FOR SCREW MOUNTING

Direct mounting with screw and spacing washer

THROUGH HEATSINK WITH NUT

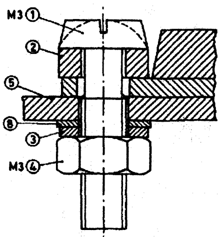


Fig 9. Assembly

(1) M3 screw
(2) rectangular washer (56360a)
(3) lock washer
(4) M3 nut
(5) heatsink
(8) plain washer

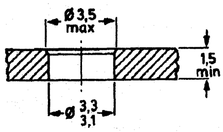


Fig 10. Heatsink requirements.

Item (2) not required for F-pack

INTO TAPPED HEATSINK

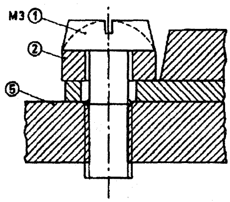


Fig 11. Assembly.

(1) M3 screw
(2) rectangular washer 56360a
(5) heatsink

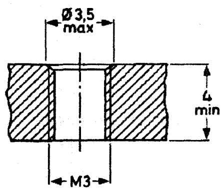


Fig 12. Heatsink requirements.

Item (2) not required for F-pack

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".

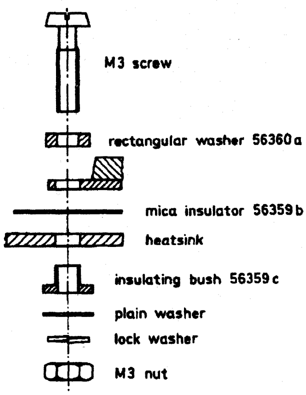


Fig 13. Insulated screw mounting with rectangular washer.

Dimensions in mm.

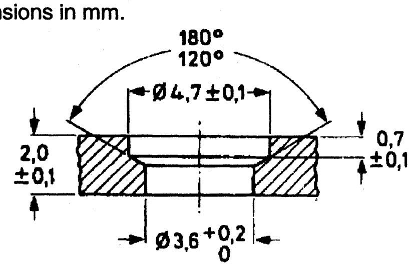


Fig 14. Heatsink requirements for 500 V insulation.

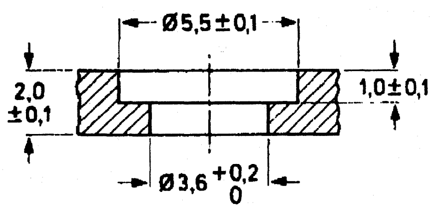


Fig 15. Heatsink requirements for 800 V insulation.

INTO TAPPED HEATSINK

Known as a "top mounting".

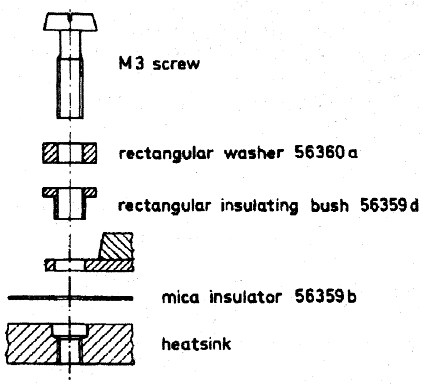


Fig 16. Insulated screw mounting with rectangular washer into tapped heatsink.

Dimensions in mm.

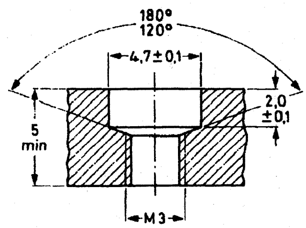


Fig 17. Heatsink requirements for 500 V insulation.

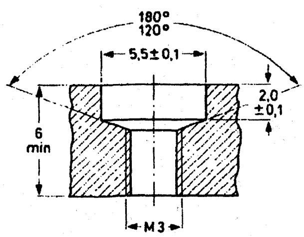


Fig 18. Heatsink requirements for 1000 V insulation.

GENERAL DATA AND INSTRUCTIONS

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 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 with a spring clip gives:

a) A good thermal contact under the crystal area.

b) Safe insulation for mains operation.

Minimum force for good heat transfer is 10 N.

Maximum force to avoid damaging the device is 80 N.

MOUNTING TORQUES

For M3 screw (insulated mounting):

Minimum torque for good heat transfer is 0.4 Nm.

Maximum torque to avoid damaging the device is 0.6 Nm.

For M4 screw (direct mounting only):

Minimum torque for good heat transfer is 0.4 Nm.

Maximum torque to avoid damaging the device is 1.0 Nm.

The M4 screw head should not touch the plastic part of the envelope.

RIVET MOUNTING NON-INSULATED

The device should not be pop-rivetted to the heatsink. It is permissible to press-rivet SOT93 providing that eyelet rivets of soft material are used, and the press forces are slowly and carefully controlled.

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 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

Typical figures, for exact figures see data for each device type.

$R_{th\ mb-h}$	Thermal resistance from mounting base to heatsink	K/W	
Mounting method		**clip**	**screw**
direct with heatsink compound		0.3	0.3
direct without heatsink compound		1.5	0.8
with heatsink compound and 0.05 mm maximum mica insulator		0.8	0.8
without heatsink compound and 0.05 mm maximum mica insulator		3.0	2.2

Mica washers are generally not required when mounting the SOT199 outline.

Soldering

Recommendations 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 x lead thickness is preferred. See figure 1 Surface cracks in the dip tin coating on the lead are common when a radius less than 1.5 x 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.

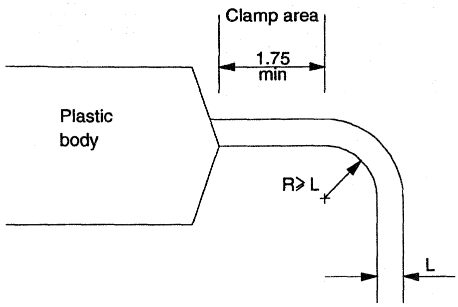
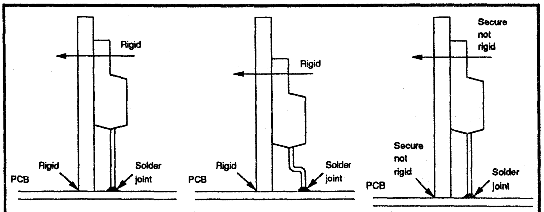


Fig 1. Minimum lead bend radius.

Additional guidelines

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 figure 2 below. 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 56379

1. Place the device on the heatsink, applying heatsink compound to the mounting base.
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 figures 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 figure 5.

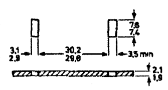


Fig 3. Heatsink requirements

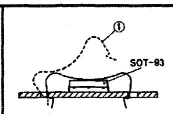


Fig 4. Mounting (1) spring clip 56379

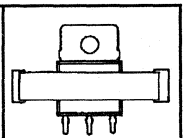


Fig 5. Position of the device.

Insulated mounting with clip 56379

With the mica 56378 insulation up to 1500 V is obtained.

1. Place the device with the insulator on the heatsink, applying heatsink compound to the bottom of both device and insulator.
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 figures 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. There should be a minimum of 3 mm distance between the device and the edge of the insulator for adequate creepage distance.

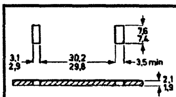


Fig 6. Heatsink requirements

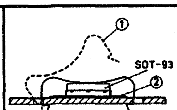


Fig 7. Mounting (1) spring clip 56379 (2) insulator 56378

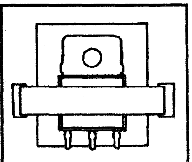


Fig 8. Position of the device.

INSTRUCTIONS FOR SCREW MOUNTING

Direct mounting through heatsink with nut

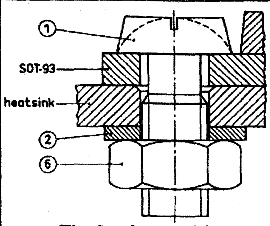


Fig 9. Assembly

(1) M4 screw
(2) plain washer
(6) M4 nut.

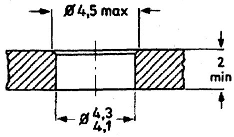


Fig 10. Heatsink requirements

When screw mounting the SOT93 envelope, it is particularly important to apply a thin, even layer of heatsink compound to the mounting base, and to apply torque to the screw slowly so that the compound has time to flow and the mounting base is not deformed. Most SOT93 envelopes contain a crystal larger than that in the other plastic envelopes, and it is more likely to crack if the mounting base is deformed.

Where vibrations are to be expected the use of a lock washer or of a curved spring washer is recommended with a plain washer between aluminium heatsink and spring washer.

Insulated screw mounting upto 800V isolation

Axial deviation requirements must be adhered.

THROUGH HEATSINK WITH NUT

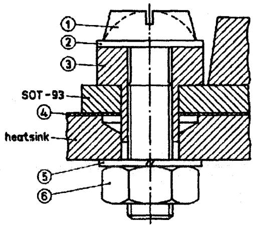


Fig 11. Assembly

(1) M3 screw
(2) plain washer
(3) insulating bush (56368b)
(4) mica insulator (56368c)
(5) lock washer
(6) M3 nut

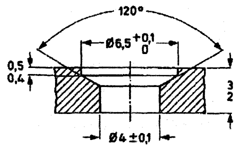


Fig 12. Heatsink requirements up to 800V.

INTO TAPPED HEATSINK

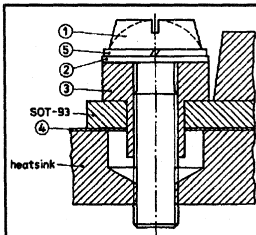


Fig 13. Assembly

(1) M3 screw
(2) plain washer
(3) insulating bush (56368b)
(4) mica insulator (56368c)
(5) lock washer

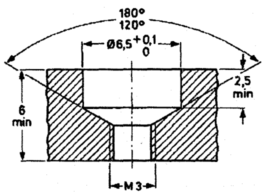


Fig 14. Heatsink requirements up to 800V

Insulated screw mounting with insert nut; up to 500V

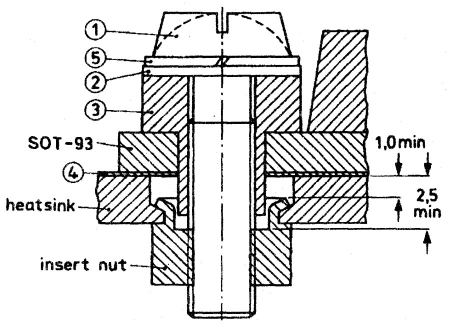


Fig 15. Assembly and heatsink requirements for 500V insulation. See also figures 9 and 10.
(1) M3 screw
(2) plain washer
(3) insulating bush (56368b)
(4) mica insulator (56368c)
(5) lock washer

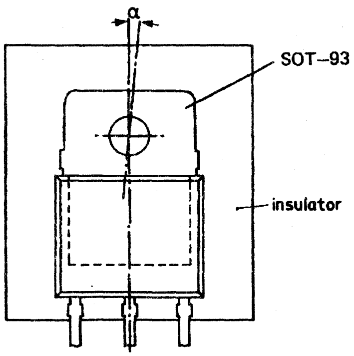
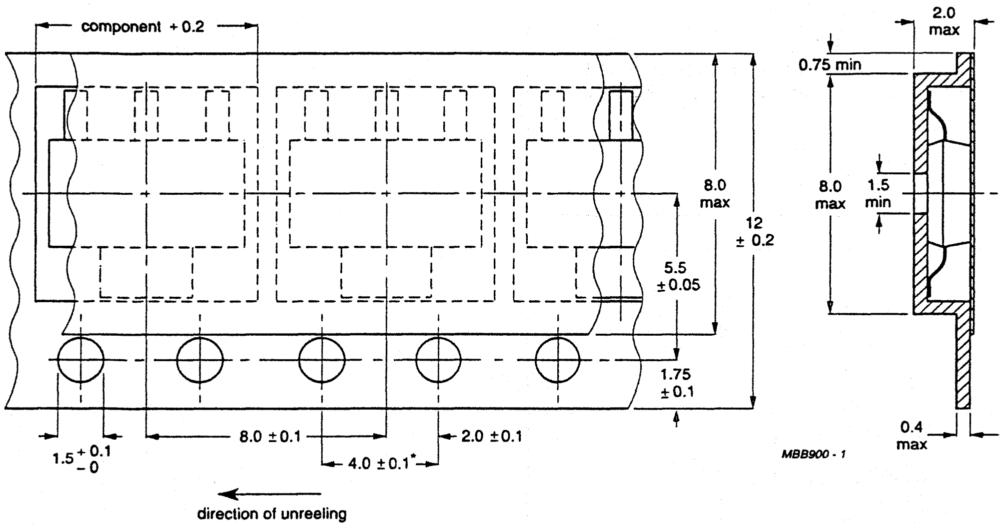


Fig 16. Mica insulator
The axial deviation (α) between package and mica should not exceed 5°

TAPE and REEL PACKING (SOT223)

Tape and reel packing meets the feed requirements of automatic pick and place equipment (packing conforms to IEC publication 286). The tape is an ideal shipping container, making handling easy and providing secure blister cavities in which the transistors are sealed with peel-off cover tape.

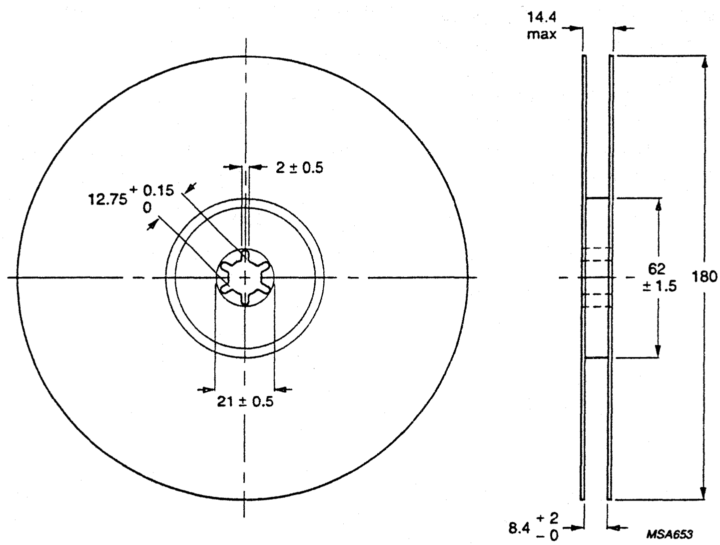
Packing quantities for SOT223 are 1000 pieces per 7-inch (180 mm) reel.



Dimensions in mm.

Tolerance over any 10 pitches: ±0.2 mm.

Fig.1 Specification for 12 mm tape, 7-inch reel (SOT223).



Dimensions in mm.

Fig.2 Reel for blister tape.

MOUNTING AND SOLDERING (SOT223)

Mounting methods

There are two basic forms of electronic component construction, those with leads for through-hole mounting and microminiature types for surface mounting (SMD). Through-hole mounting gives a very rugged construction and uses well established soldering methods. Surface mounting has the advantages of high packing density plus high-speed automated assembly. Surface mounting techniques are complex and this chapter gives only a simplified overview of the subject.

Not all electronic components are available as surface mounting types and this often leads to the mixing of through-hole with surface mounting components on one substrate (a mixed print). The mix of components affects the soldering methods that can be applied. A substrate having SMDs mounted on one or both sides but no through-hole components is likely to be suitable for reflow or wave soldering. A double-sided mixed print that has through-hole components and some SMDs on one side and densely packed SMDs on the other normally undergoes a sequential combination of reflow and wave soldering. When the mixed print has only through-hole components on one side and all SMDs on the other, wave soldering is usually applied.

Reflow soldering

This is the preferred soldering technique for SOT223 components.

SOLDER PASTE

Most reflow soldering techniques utilize a paste that is a mixture of flux and solder. The solder paste is applied to the substrate before the components are placed. It is of sufficient viscosity to hold the components in place and, therefore, an application of adhesive is not required. Drying of the solder paste by preheating increases the viscosity and prevents any tendency for the components to become displaced during the soldering process. Preheating also minimizes thermal shock and drives off flux solvents.

Screen printing

This is the best high-volume production method of solder paste application. An emulsion-coated, fine mesh screen with apertures etched in the emulsion to coincide with the surfaces to be soldered is placed over the substrate. A squeegee is passed across the screen to force solder paste through the apertures and on to the substrate. The layer thickness of screened solder paste is usually between 150 and 200 µm.

Stencilling

In this method a stencil with etched holes to pass the paste is used. The thickness of the stencil determines the amount of amount of solder paste that is deposited on the substrate. This method is also suited to high-volume work.

Dispensing

A computer-controlled pressure syringe dispenses small doses of paste to where it is required. This method is mainly suitable for small production runs and laboratory use.

Pin transfer

A pin picks up a droplet of solder paste from a reservoir and transfers it to the surface of the substrate or component. A multi-pin arrangement with pins positioned to match the substrate is possible and this speeds up the process time.

REFLOW TECHNIQUES

Thermal conduction

The prepared substrates are carried on a conveyor belt, first through a preheating stage and then through a soldering stage. Heat is transferred to the substrate by conduction through the belt. Figure 3 shows a theoretical time/temperature relationship for thermal conduction reflow soldering. This method is particularly suited to thick film substrates and is often combined with infrared heating.

Infrared

An infrared oven has several heating elements giving a broad spectrum of infrared radiation, normally above and below a closed loop belt system. There are separate zones for preheating, soldering and cooling. Dwell time in the soldering zone is kept as short as possible to prevent damage to components and substrate. A typical heating profile is shown in Fig.4. This reflow method is often applied in double-sided prints.

Vapour phase

A substrate is immersed in the vapours of a suitable boiling liquid. The vapours transfer latent heat of condensation to the substrate and solder reflow takes place. Temperature is controlled precisely by the boiling point of the liquid at a given pressure. Some systems employ two vapour zones, one above the other. An elevator tray, suspended from a hoist mechanism passes the substrate vertically through the first vapour zone into the secondary soldering zone and then hoists it out of the vapour to be cooled. A theoretical time/temperature relationship for this method is shown in Fig.5.

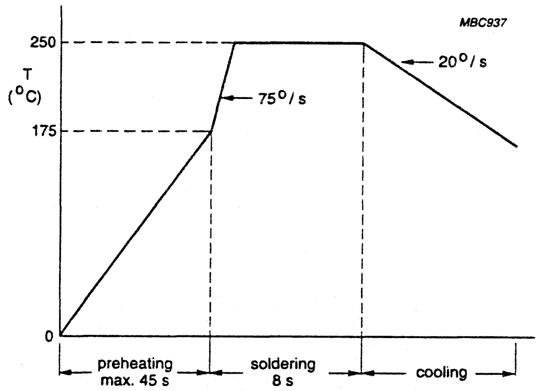


Fig.3 Theoretical time/temperature curve for a typical thermal conduction reflow cycle.

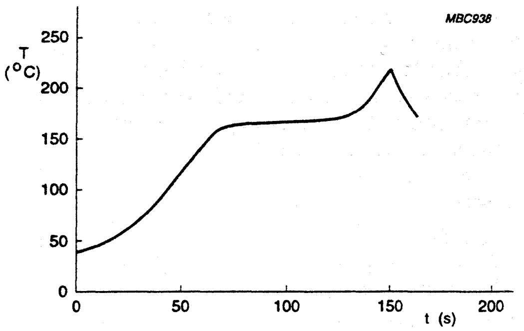


Fig.4 Typical temperature profile of an infrared oven operating at a belt speed of 0.41 m/min.

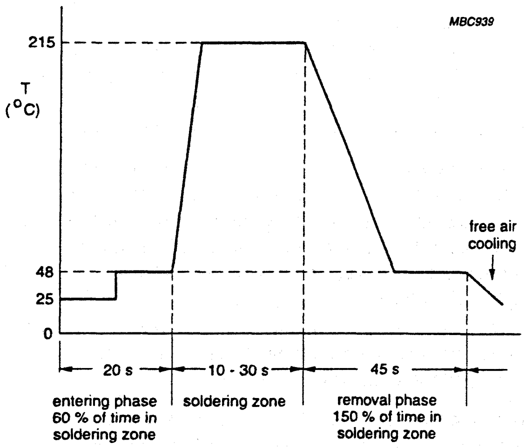


Fig.5 Theoretical time/temperature curve relationship for dual vapour reflow soldering.

Wave soldering

This soldering technique can be applied to SOT223 components.

ADHESIVE APPLICATION

Since there are no connecting wires to retain them, leadless and short-leaded components are held in place with adhesive for wave soldering. A spot of adhesive is carefully placed between each SMD and the substrate. The adhesive is then heat-cured to withstand the forces of the soldering process, during which the components are fully immersed in solder. There are several methods of adhesive application.

Pin transfer method

A pin is used to transfer a droplet of adhesive from a reservoir to a precise position on the surface where it is required. The size of the droplet depends on pin diameter, depth to which the pin is dipped in the reservoir, rheology of the adhesive, and the temperature of adhesive and surrounds. The pin can be part of a pin array (bed of nails) that corresponds exactly with the required adhesive positions on the substrate. With this method, adhesive can be applied to the whole of one side of a substrate in one operation and is therefore suitable for high-volume production and can be used with pre-loaded mixed prints.

Alternatively, pins can be used to transfer adhesive to the components before they are placed on the substrate. This adds flexibility to production runs where variations in layout must be accommodated.

Screen printing method

A fine mesh screen is coated with emulsion except in the positions where the adhesive is required to pass. The screen is placed on the substrate and a squeegee passing across it forces adhesive through the uncoated parts of the screen. The amount of adhesive printed-through depends on the size of the uncoated screen areas, the thickness of the screen coating, the rheology of the adhesive and various machine parameters. With this method, the substrate must be flat and pre-loaded mixed prints cannot be accommodated.

Pressure syringe method

A computer-controlled syringe dispenses adhesive from an enclosed reservoir by means of pulses of compressed air. The adhesive dot size depends on the size of the syringe nozzle, the duration and pressure of the pulsed air and the viscosity of the adhesive. This method is most suited to low volume production. An advantage is the flexibility provided by computer programmability.

Fluxing

The quality of the soldered connections between components and substrate is critical for circuit performance and reliability. Flux promotes solderability of the connecting surfaces and is chosen for the following attributes:

- Removal of surface oxides
- Prevention of reoxidation
- Transference of heat from source to joint area
- Residue that is non-corrosive or, if residue is corrosive, should be easy to clean away after soldering
- Ability to improve wettability (readiness of a metal surface to form an alloy at its interface with the solder) to ensure strong joints with low electrical resistance
- Suitability for the desired method of flux application.

In wave soldering, liquified flux is usually applied as a foam, a spray or in a wave.

Foam

Flux foam is made by forcing low-pressure, water-free clean air through an aerator immersed in liquid flux. Fine bubbles of flux are directed onto the substrate/component surfaces where they burst and form a thin, even layer. The flux also penetrates any plated-through holes. The flux has to be chosen for its foaming capabilities.

Spray

Several methods of spray fluxing exist, the most common involves a mesh drum rotating in liquid flux. Air is blown into the drum which, when passing through the fine mesh, directs a spray of flux onto the underside of the substrate. The amount of flux deposited is controllable by the speed of the substrate passing through the spray, the speed of rotation of the drum and the density of the flux.

Wave

A wave fluxer creates a double flowing wave of liquid flux which adheres to the surface as the substrate passes through. Wave height control is essential and a soft wipe-off brush is usually incorporated to remove excess flux from the substrate.

Pre-heating

Pre-heating of the substrate and components is performed immediately before soldering. This reduces thermal shock as the substrate enters the soldering process, causes the flux to become more viscous and accelerates the chemical action of the flux and so speeds up the soldering action.

Soldering

Wave soldering is usually the best method to use when high throughput rates are required. The single-wave soldering principle (Fig.6) is the most straight forward method and can be used on simple substrates with two-terminal SMD components. More complex substrates with increased circuit density and closer spacing of conductors can pose the problems of nonwetting (dry joints) and solder bridging. Bridging can occur across the closely spaced leads of multi-leaded devices as well as across adjacent leads on neighbouring components. Nonwetting is usually caused by components with plastic bodies. The plastic is not wetted by solder and creates a depression in the solder wave, which is augmented by surface tension. This can cause a shadow behind the component and prevent solder from reaching the joint surfaces. A smooth laminar solder wave is required to avoid bridging and a high pressure wave is needed to completely cover the areas that are difficult to wet. These conflicting demands are difficult to attain in a single wave but dual wave techniques go a long way in overcoming the problem.

In a dual wave machine (Fig.7), the substrate first comes into contact with a turbulent wave which has a high vertical velocity. This ensures good solder contact with both edges of the components and prevents joints from being missed. The second smooth laminar wave completes the formation of the solder fillet, removes excess solder and prevents bridging. Figure 8 indicates the time/temperature relationship measured at the soldering site in dual wave soldering.

New methods of wave soldering are developing continually. For example, the Omega System is a single wave agitated by pulses, which combines the functions of smoothness and turbulence. In another, a lambda wave injects air bubbles in the final part of the wave. A further innovation is the hollow jet wave in which the solder wave flows in the opposite direction to the substrate.

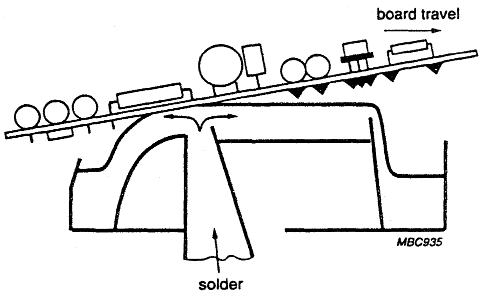


Fig.6 Single wave soldering principle.

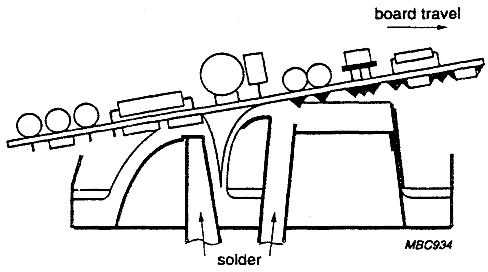


Fig.7 Dual wave soldering principle.

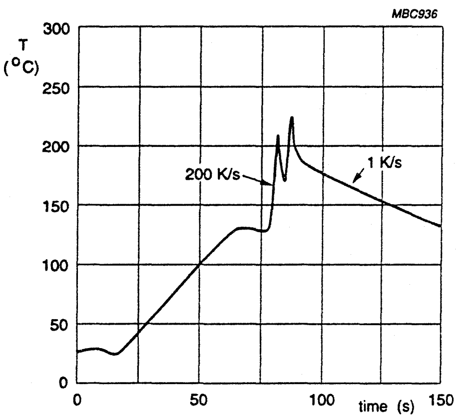


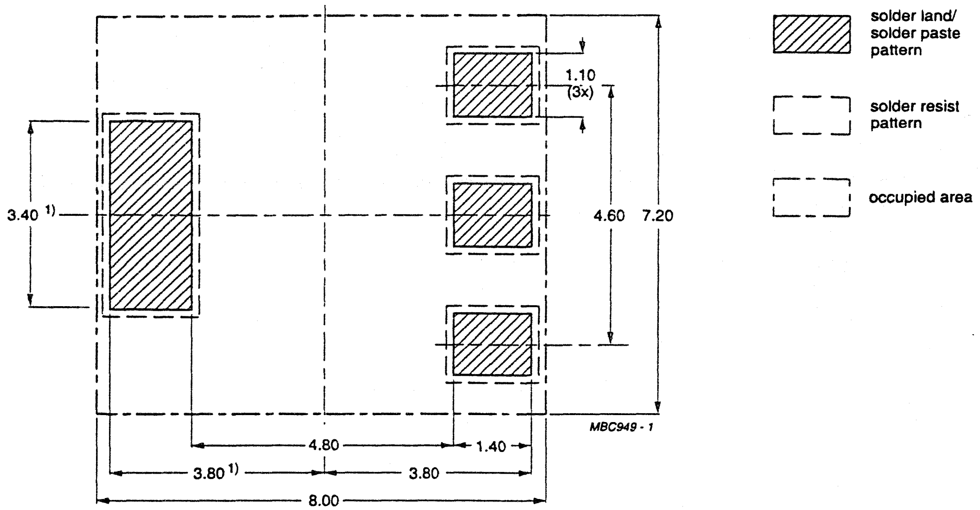
Fig.8 Typical time-temperature curve measured at the soldering site.

Footprint design

The footprint design of a component for surface mounting is influenced by many factors:

- Features of the component, its dimensions and tolerances
- Circuit board manufacturing processes
- Desired component density
- Minimum spacing between components
- Circuit tracks under the component
- Component orientation (if wave soldering)
- Positional accuracy of solder resist to solder lands
- Positional accuracy of solder paste to solder lands (if reflow soldering)
- Component placement accuracy
- Soldering process parameters
- Solder joint reliability parameters.

SOT223 FOOTPRINTS

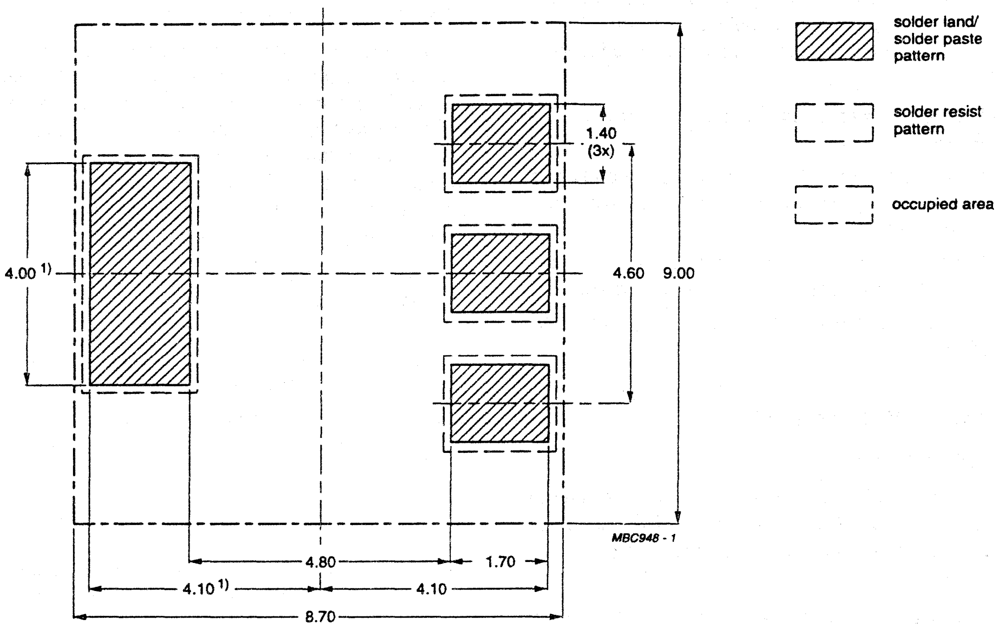


Dimensions in mm.

Placement accuracy: ±0.25 mm.

1) To improve the power dissipation the marked dimensions may be enlarged without changing the solder resist cut out of the footprint.

Fig.9 Reflow soldering footprint for SOT223; typical dimensions.



Dimensions in mm.

Placement accuracy: ±0.25 mm.

1) To improve power dissipation the marked dimensions may be enlarged without changing the solder resist cut out of the footprint.

Fig.10 Wave soldering footprint for SOT223; typical dimensions.

Hand soldering microminiature components

It is possible to solder microminiature components with a light-weight hand-held soldering iron, but this method has obvious drawbacks and should be restricted to laboratory use and/or incidental repairs on production circuits:

- Hand-soldering is time-consuming and therefore expensive
- The component cannot be positioned accurately and the connecting tags may come into contact with the substrate and damage it
- There is a risk of breaking the substrate and internal connections in the component could be damaged
- The component envelope could be damaged by the soldering iron.

THERMAL CONSIDERATIONS

Thermal resistance

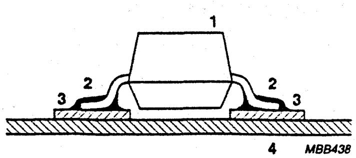
Circuit performance and long-term reliability are affected by the temperature of the transistor die. Normally, both are improved by keeping the die temperature (junction temperature) low.

Electrical power dissipated in any semiconductor device is a source of heat. This increases the temperature of the die about some reference point, normally an ambient temperature of 25 °C in still air. The size of the increase in temperature depends on the amount of power dissipated in the circuit and the net thermal resistance between the heat source and the reference point.

Devices lose most of their heat by conduction when mounted on a substrate. Referring to Fig.11, heat conducts from its source (the junction) via the envelope leads and soldered connections to the substrate. Some heat radiates from the envelope 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.

The elements of thermal resistance shown in Fig.12 are defined as follows:

$R_{th\ j\text{-}mb}$	thermal resistance from junction to mounting base
$R_{th\ j\text{-}c}$	thermal resistance from junction to case
$R_{th\ j\text{-}s}$	thermal resistance from junction to soldering point
$R_{th\ s\text{-}a}$	thermal resistance from soldering point to ambient
$R_{th\ c\text{-}a}$	thermal resistance from case to ambient ($R_{th\ s\text{-}a}$ and $R_{th\ c\text{-}a}$ are the same for most envelopes)
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient.



Heat radiates from the envelope (1) to ambient.

Heat conducts via leads (2), solder joints (3) to the substrate (4).

Fig.11 Heat losses.

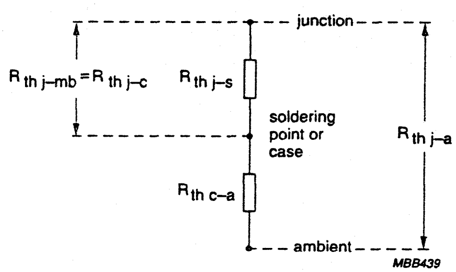


Fig.12 Representation of thermal resistance paths of a device mounted on a substrate or printed board.

The temperature at the junction depends on the ability of the envelope and its mounting to transfer heat from the junction region to the ambient environment. The basic relationship between junction temperature and power dissipation is:

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

where

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

T_{amb} is the ambient temperature

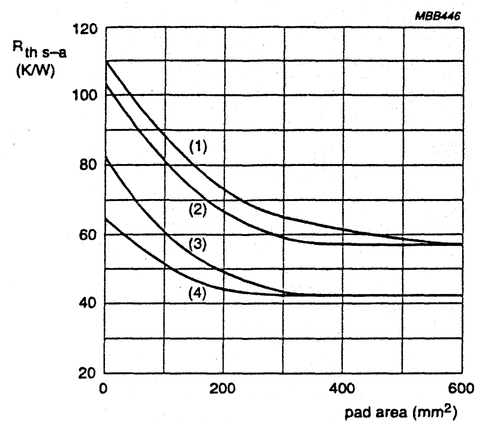
$P_{tot\,max}$ is the maximum power handling capability of the device, including the effects of external loads when applicable.

In the expression for $T_{j\,max}$, only T_{amb} and $R_{th\,s\text{-}a}$ can be varied by the user. The package mounting technique and the flow of cooling air are factors that affect $R_{th\,s\text{-}a}$. The device power dissipation can be controlled to a limited extent but under recommended usage, the supply voltage and circuit loading dictate a fixed power maximum. The $R_{th\,j\text{-}s}$ value is essentially independent of external mounting method and cooling air; but is sensitive to the materials used in the envelope construction, the die bonding method and the die area, all of which are fixed.

Values of $T_{j\,max}$ and $R_{th\,j\text{-}s}$ or $R_{th\,j\text{-}c}$ are given in the device data sheets. For applications where the temperature of the case is stabilized by a large or temperature-controlled heatsink, the junction temperature can be calculated from $T_j = T_{case} + P_{tot} \times R_{th\,j\text{-}c}$ or, using the soldering point definition, from $T_j = T_{solder} + P_{tot} \times R_{th\,j\text{-}s}$.

Thermal resistance ($R_{th\,s\text{-}a}$ and $R_{th\,c\text{-}a}$)

The thermal resistance from soldering point to ambient and that from case to ambient depends on the shape and material of the tracks and substrate as illustrated in Figs 13 and 14. Standard mounting conditions to set the maximum power ratings of the SOT223 envelope are shown in Fig.15. This shows single-sided 35 µm copper-clad epoxy fibre-glass print, 1.5 mm thick. the tracks are fully solder-tinned and the shaded areas shown are copper.



(1) single-sided, unplated
(2) single-sided, plated
(3) double-sided, unplated
(4) double-sided, plated.

Fig.13 Thermal resistance ($R_{th\,s\text{-}a}$) as a function of pad area on different configurations of FR4 epoxy fibre-glass circuit board.

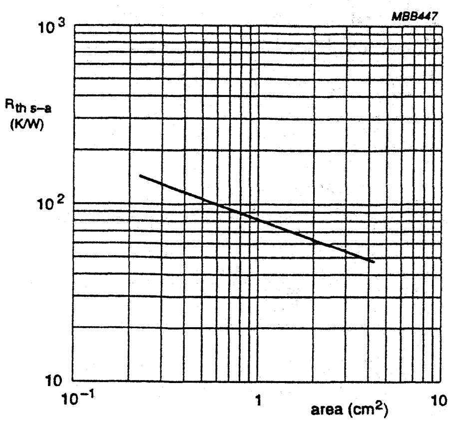


Fig.14 Thermal resistance ($R_{th\ s\text{-}a}$) as a function of area of ceramic substrate.

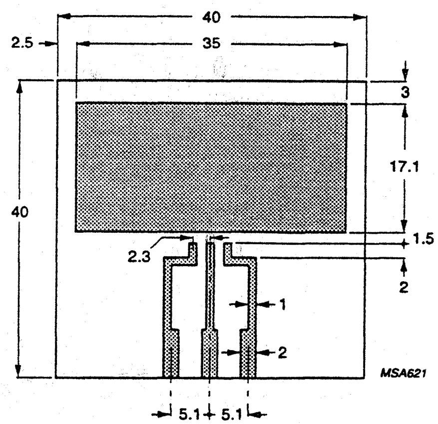


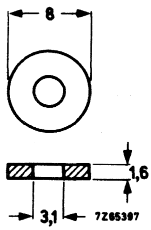
Fig.15 Test circuit for SOT223.

ACCESSORIES

SURVEY OF ACCESSORIES

TYPE NUMBER	DESCRIPTION	ENVELOPE
56326	metal washer	TO-126
56353	spring clip	TO-126, SOT82
56354	mica washer	TO-126, SOT82
56359b	mica washer (up to 1000 V)	TO-220
56359c	insulating bush (up to 800 V)	TO-220
56359d	rectangular insulating bush (up to 1000 V)	TO-220
56360a	rectangular washer	TO-220
56363	spring clip (direct mounting)	TO-220, SOT186
56364	spring clip (insulated mounting)	TO-220
56367	alumina insulator (up to 2000 V)	TO-220
56368b	insulating bush (up to 800 V)	SOT93
56368c	mica insulator (up to 800 V)	SOT93
56369	mica insulator (up to 2000 V)	TO-220
56378	mica insulator (up to 1500 V)	SOT93
56379	spring clip	SOT93, SOT199
56387a	mica insulator (up to 300 V)	TO-126
56387b	insulating bush (up to 300 V)	TO-126

ACCESSORIES FOR TO-126 ENVELOPES

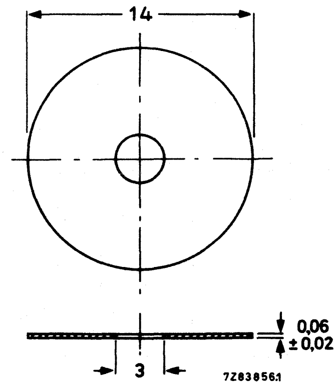


Dimensions in mm.

Material: brass, nickel plated.

Part no. 56326, for direct mounting of TO-126 envelopes.

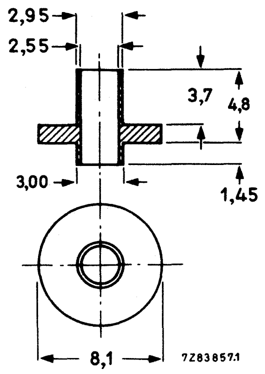
Fig.1 Metal washer.



Dimensions in mm.

Part no. 56387a, for insulated screw mounting of TO-126 envelopes up to 300 V.

Fig.2 Mica insulator.



Dimensions in mm.

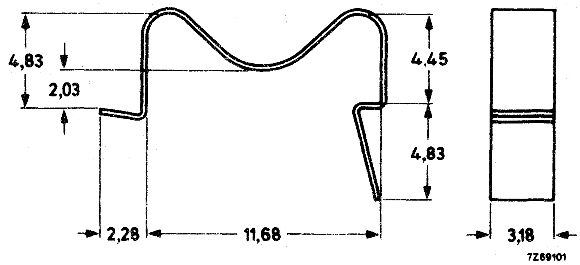
Material: polyester.

Maximum permissible temperature (T_{max}) = 150 °C.

Part no. 56387b, for insulated screw mounting of TO-126 envelopes up to 300 V.

Fig.3 Insulating bush.

ACCESSORIES FOR TO-126 AND SOT82 ENVELOPES



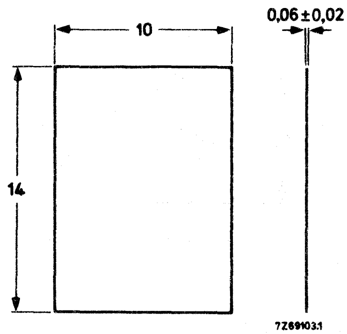
Dimensions in mm.

Material: high carbon spring steel.

Suitable for heatsink of 1.5 to 2 mm.

Part no. 56353, for TO-126 and SOT82 envelopes.

Fig.4 Spring clip.

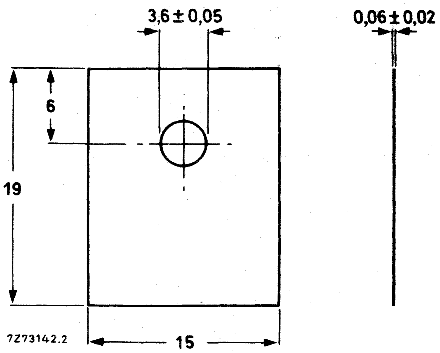


Dimensions in mm.

Part no. 56354, for TO-126 and SOT82 envelopes.

Fig.5 Mica washer.

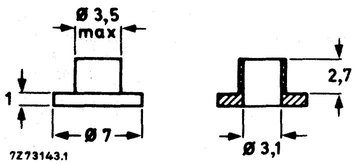
ACCESSORIES FOR TO-220 ENVELOPES



Dimensions in mm.

Part no. 56359b, insulator up to 1000 V.

Fig.6 Mica washer.



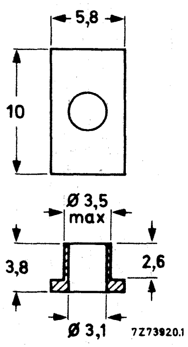
Dimensions in mm.

Material: polyester.

Maximum permissible temperature (T_{max}) = 150 °C.

Part no. 56359c, insulator up to 800 V.

Fig.7 Insulating bush.

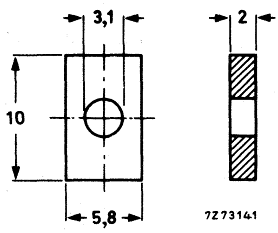


Dimensions in mm.

Maximum permissible temperature (T_{max}) = 150 °C.

Part no. 56359d, insulator up to 1000 V.

Fig.8 Rectangular insulating bush.

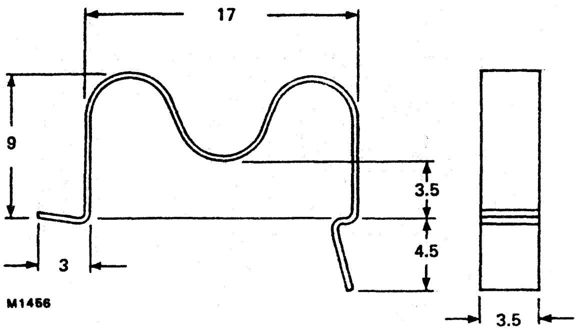


Dimensions in mm.

Material: brass, nickel plated.

Part no. 56360a, for direct and insulated mounting.

Fig.9 Rectangular washer.



Dimensions in mm.

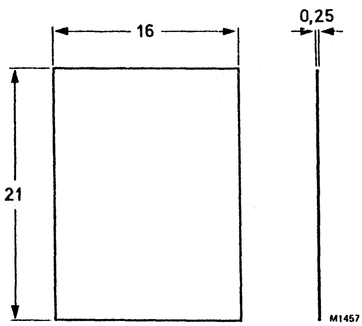
Material: stainless steel; for mounting on heatsink of 1 to 1.5 mm.

Recommended force of clip on device is 20 N (2 kgf).

To be used in conjunction with insulators 56367 and 56369.

Part no. 56364, for insulated mounting.

Fig.10 Spring clip.



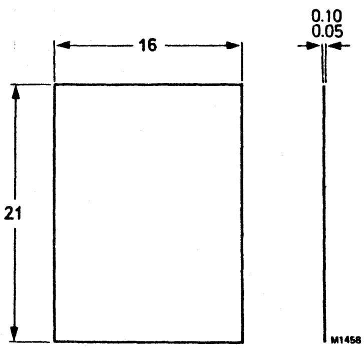
Dimensions in mm.

Material: 96-alumina.

Part no. 56367, for insulated mounting up to 2000 V.

Because alumina is brittle, extreme care must be taken not to crack the alumina when mounting devices, particularly when used without heatsink compound.

Fig.11 Alumina insulator.

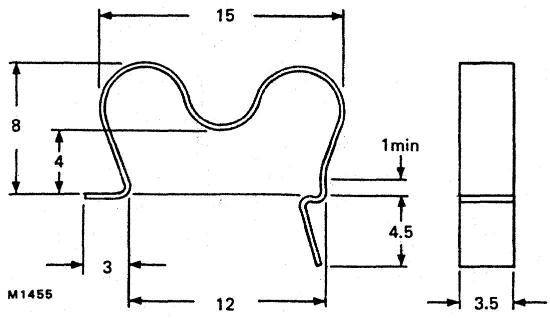


Dimensions in mm.

Part no. 56369, for insulated clip mounting up to 2000 V.

Fig.12 Mica insulator.

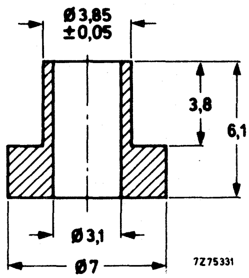
ACCESSORIES FOR TO-220 AND SOT186 ENVELOPES



Dimensions in mm.
Material: stainless steel, for mounting on heatsink of 1 to 2 mm.
Recommended force of clip on device is 20 N (2 kgf).
Part no. 56363, for direct mounting.

Fig.13 Spring clip.

ACCESSORIES FOR SOT93 ENVELOPES



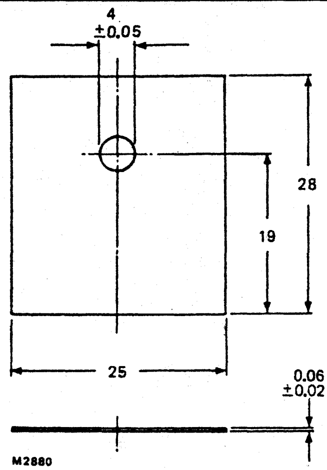
Dimensions in mm.

Material: polyester.

Maximum permissible temperature (T_{max}) = 150 °C.

Part no. 56368b, for insulated screw mounting up to 800 V.

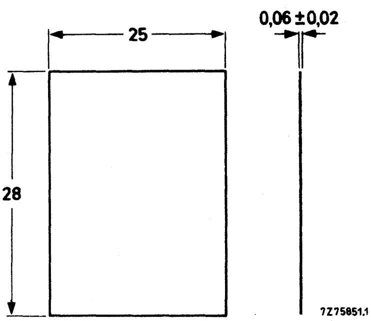
Fig.14 Insulating bush.



Dimensions in mm.

Part no. 56368c, for insulated screw mounting up to 800 V.

Fig.15 Mica insulator.

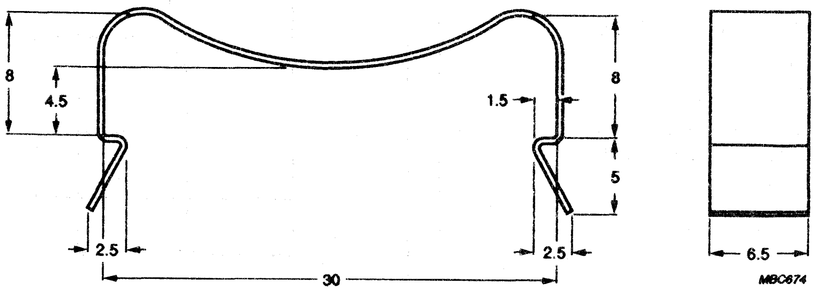


Dimensions in mm.

Part no. 56378, for clip mounting up to 1500 V.

Fig.16 Mica insulator.

ACCESSORIES FOR SOT93 AND SOT199 ENVELOPES



Dimensions in mm.

Material: CrNi steel NLN-939, thickness 0.4 ±0.04.

Part no. 56379, for direct and insulated mounting of SOT93 and SOT199 envelopes.

Fig.17 Spring clip.

DATA HANDBOOK SYSTEM

Data handbook system

DATA HANDBOOK SYSTEM

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Data handbook system

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