DISCRETE SEMICONDUCTORS

# Power Diodes

1997

Data Handbook SC02

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Philips Semiconductors

PHILIPS

## 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.

# PREFACE

## NEW PRODUCTS

Philips Semiconductors are working intensively on bringing new Power Diode products to the market. The products listed below appear for the first time in this data handbook.

25 V SCHOTTKY DIODES

A range of low voltage schottky diodes with a reverse voltage rating of 25 V, with extremely low forward voltage and ultra fast switching. These products are intended for use in switched mode power supplies with 3 V and 3.3 V outputs. They are also ideal for use as or-ing diodes in fault tolerant designs or current sharing configurations. Types: BYV116, PBYR225CT, PBYR1025, PBYR1525CT, PBYR2025CT, PBYR2525CT.

DEFLECTION DIODES

Further extensions to our range of high voltage, fast recovery diodes, designed for use in the horizontal deflection stages of multisync computer monitors with scan rates up to 82 kHz. These devices complement our range of high voltage bipolar deflection transistors and have fast forward recovery time, low forward recovery voltage and reverse voltage ratings up to 1700 V. Types: BY479X-1700, BY559-1500.

ISOLATED 45 V SCHOTTKY AND 200 V EPITAXIAL DIODES

A wide range of 45 V schottky diodes and 200 V ultrafast recovery epitaxial diodes in the SOT186A envelope. This package is an isolated version of TO220AB with 2500 Vrms isolation between leads and case. Types: BYV118X, BYV133X, BYV143X, PBYR745X, PBYR1045X, PBYR1545CTX, PBYR1645X, PBYR2045CTX, PBYR2545CTX, BYQ28X, BYQ28EX, BYW29EX, BYV32EX, BYV42EX,

SURFACE MOUNT POWER DIODES IN SOT404

A wide range of schottky and 200 V epitaxial diodes in a SOT404 envelope suitable for surface mounting. This package is a surface mounting version of TO220AB with the same thermal resistance and current rating. Types: BYV118B, BYV143B, PBYR745B, PBYR1045B, PBYR10100B, PBYR1545CTB, PBYR1645B, PBYR2045CTB, PBYR20100CTB, PBYR2545CTB, BYQ28EB, BYW29EB, BYV32EB, BYV42EB, BYV79EB.

SURFACE MOUNT BREAKOVER DIODES IN SOD106

The BR211 range of breakover diodes in a SOD106 surface mounting envelope. Used for transient overvoltage protection in line based telecommunications equipment. BR211SM series.

## FORTHCOMING PRODUCTS

The products listed below are planned for release within the next 12 months, before the next edition of this data handbook. Contact your Philips Regional or National Sales office for further details.

SURFACE MOUNT POWER DIODES IN SOT428

Available towards the end of 1996, a range of schottky and 200 V epitaxial diodes in a SOT428 envelope suitable for surface mounting. The SOT428 envelope is slightly larger than our present subminiature surface mounting package, SOT223 and may be mounted on the same printed circuit pad layout. However, it has lower thermal resistance and can accommodate larger crystal sizes, thereby allowing higher current ratings to be achieved in a smaller package.

SCHOTTKY AND 200 V EPITAXIAL DIODES IN TO247

Available during the first quarter of 1997, a range of schottky and 200 V epitaxial diodes in a TO247 envelope suitable for high power applications, featuring low thermal resistance and output current ratings up to 60 Amps.

POWER FACTOR CORRECTION DIODES

Available during the first quarter of 1997, a range of ultrafast, 600 V epitaxial diodes specifically designed for power factor correction and other forced commutation applications. These diodes are designed to minimise switching losses both in the diode and in the switching transistor. Other applications include freewheeling diodes in full and half bridge switched mode power supplies, where they complement our new range of 400 V, 500 V and 600 V power mosfets.

## APPLICATIONS

Application information for Power Diodes and other Philips power products is published in Philips Power Semiconductor Applications Handbook. (Order code: 9398-652-85011)

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# SELECTION GUIDE

## Schottky Rectifiers

Schottky rectifiers are used in the output stages of switched mode power supplies, either as high speed rectifiers or as or-ing diodes, where two or more power supply outputs are connected in parallel and share a common load.

Schottky diodes have three advantages over other diode technologies which makes them ideal for modern switched mode power supply designs. These are:-

1. Lowest forward voltage of any type of rectifier.
2. Extremely fast switching with no reverse recovery losses.
3. Rugged, typically 1 Amp reverse surge capability.

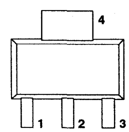
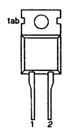
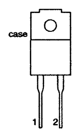
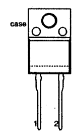
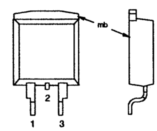
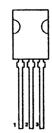
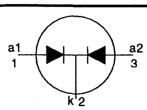
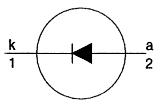
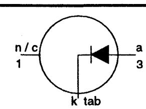
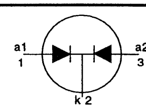
Philips range of schottky diodes are available in three basic voltage grades 25 V, 45 V and 100 V. They are available in a variety of packages including isolated and surface mounting types.

The 35 V/ 40 V/ 45 V range is the optimum choice for power supplies with 5 V outputs. The forward voltage is typically 0.5 V at rated current, at 125˚C giving an efficiency of 90%. The reverse voltage rating is adequate for the range of duty cycles and input voltages found in most designs.

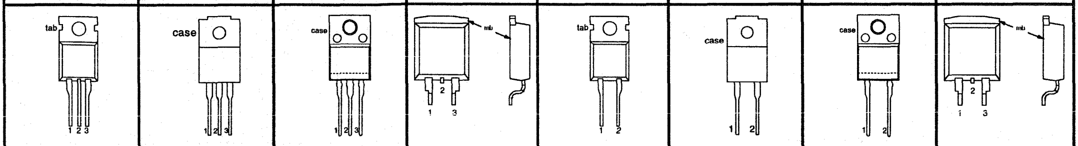
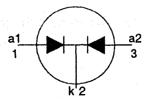
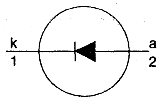
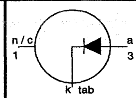
The trend towards lower supply voltages in computers and high speed logic circuits has produced a need for rectifiers with very low forward voltages. The 20 V/ 25 V range of power schottky diodes is intended for use in d.c. To d.c. converters and switched mode power supplies with 3 V or 3.3 V outputs. The typical forward voltage is 0.33 V at rated current at 125˚C.

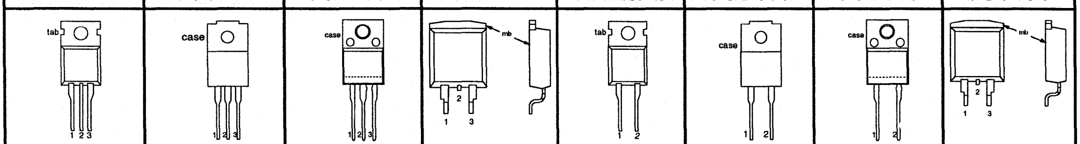
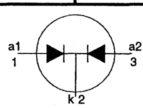
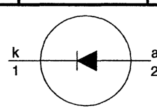
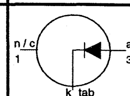
Low voltage 25 V schottky diodes may also be used as or-ing diodes in fault tolerant power supply systems or current sharing configurations, where they provide the optimum combination of low forward losses and good thermal stability.

The 60 V/ 80 V/ 100 V schottky diode range is suitable for power supply output voltages greater than 5 V, for example 12 V and 15 V. They are also suitable for 24 V and 28 V outputs in some designs although Philips range of 200 V epitaxial ultrafast diodes are more commonly used for this range of output voltages. Typical forward voltage is 0.7 V at rated current at 125˚C.

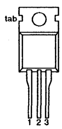
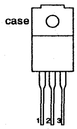
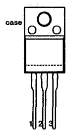
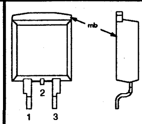
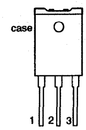
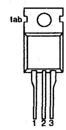
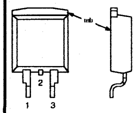
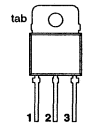
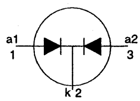
| | $I_{O(AV)}$ Average rectified output current (Amps) | | | | | |
|---|---|---|---|---|---|---|
| | 2 | 7.5 | | | | 10 |
| | SOT223 | TO220AC | SOD100 | SOD113 | SOT404 | SOT82 |
| |  |  |  |  |  |  |
| $V_{RRM}$ (V) |  | |  | |  |  |
| 20 | PBYR220CT | | | | | |
| 25 | PBYR225CT | | | | | |
| 35 | PBYR235CT | PBYR735 | PBYR735F | PBYR735X | PBYR735B | PBYR635CT |
| 40 | PBYR240CT | PBYR740 | PBYR740F | PBYR740X | PBYR740B | PBYR640CT |
| 45 | PBYR245CT | PBYR745 | PBYR745F | PBYR745X | PBYR745B | PBYR645CT |

Schottky Rectifiers (Continued)

| | $I_{O(AV)}$ Average rectified output current (Amps) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 10 | | | | | | | |
| | TO220AB | SOT186 | SOT186A | SOT404 | TO220AC | SOD100 | SOD113 | SOT404 |
| |  | | | | | | | |
| $V_{RRM}$ (V) |  a1 1, a2 3, k 2 | | | |  k 1, a 2 | | |  n/c 1, a 3, k tab |
| 20 | BYV116-20 | | | | PBYR1020 | | | |
| 25 | BYV116-25 | | | | PBYR1025 | | | |
| 35 | BYV118-35 | BYV118F-35 | BYV118X-35 | BYV118B-35 | PBYR1035 | PBYR1035F | PBYR1035X | PBYR1035B |
| 40 | BYV118-40 | BYV118F-40 | BYV118X-40 | BYV118B-40 | PBYR1040 | PBYR1040F | PBYR1040X | PBYR1040B |
| 45 | BYV118-45 | BYV118F-45 | BYV118X-45 | BYV118B-45 | PBYR1045 | PBYR1045F | PBYR1045X | PBYR1045B |
| 60 | | | | | PBYR1060 | | | PBYR1060B |
| 80 | | | | | PBYR1080 | | | PBYR1080B |
| 100 | | | | | PBYR10100 | | | PBYR10100B |

| | $I_{O(AV)}$ Average rectified output current (Amps) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 15 | | | | 16 | | | |
| | TO220AB | SOT186 | SOT186A | SOT404 | TO220AC | SOD100 | SOD113 | SOT404 |
| |  | | | | | | | |
| $V_{RRM}$ (V) |  a1 1, a2 3, k 2 | | | |  k 1, a 2 | | |  n/c 1, a 3, k tab |
| 20 | PBYR1520CT | | | | | | | |
| 25 | PBYR1525CT | | | | | | | |
| 35 | PBYR1535CT | PBYR1535CTF | PBYR1535CTX | PBYR1535CTB | PBYR1635 | PBYR1635F | PBYR1635X | PBYR1635B |
| 40 | PBYR1540CT | PBYR1540CTF | PBYR1540CTX | PBYR1540CTB | PBYR1640 | PBYR1640F | PBYR1640X | PBYR1640B |
| 45 | PBYR1545CT | PBYR1545CTF | PBYR1545CTX | PBYR1545CTB | PBYR1645 | PBYR1645F | PBYR1645X | PBYR1645B |

Schottky Rectifiers (Continued)

| | $I_{O(AV)}$ Average rectified output current (Amps) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 20 | | | | | 30 | | |
| | TO220AB | SOT186 | SOT186A | SOT404 | SOT199 | TO220AB | SOT404 | SOT93 |
| |  |  |  |  |  |  |  |  |
| $V_{RRM}$ (V) |  | | | | | | | |
| 20 | PBYR2020CT | | | | | PBYR2520CT | | |
| 25 | PBYR2025CT | | | | | PBYR2525CT | | |
| 35 | PBYR2035CT<br>BYV133-35 | PBYR2035CTF<br>PBYR2535CTF<br>BYV133F-35<br>BYV143F-35 | PBYR2035CTX<br>PBYR2535CTX<br>BYV133X-35<br>BYV143X-35 | PBYR2035CTB<br>BYV143B-35 | PBYR3035PTF | PBYR2535CT<br>BYV143-35 | PBYR2535CTB | PBYR3035PT |
| 40 | PBYR2040CT<br>BYV133-40 | PBYR2040CTF<br>PBYR2540CTF<br>BYV133F-40<br>BYV143F-40 | PBYR2040CTX<br>PBYR2540CTX<br>BYV133X-40<br>BYV143X-40 | PBYR2040CTB<br>BYV143B-40 | PBYR3040PTF | PBYR2540CT<br>BYV143-40 | PBYR2540CTB | PBYR3040PT |
| 45 | PBYR2045CT<br>BYV133-45 | PBYR2045CTF<br>PBYR2545CTF<br>BYV133F-45<br>BYV143F-45 | PBYR2045CTX<br>PBYR2545CTX<br>BYV133X-45<br>BYV143X-45 | PBYR2045CTB<br>BYV143B-45 | PBYR3045PTF | PBYR2545CT<br>BYV143-45 | PBYR2545CTB | PBYR3045PT |
| 60 | PBYR2060CT | | | PBYR2060CTB | | | | PBYR3060PT |
| 80 | PBYR2080CT | | | PBYR2080CTB | | | | PBYR3080PT |
| 100 | PBYR20100CT | | | PBYR20100CTB | | | | PBYR30100PT |

## Ultrafast Recovery Epitaxial Rectifiers

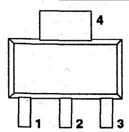
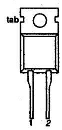
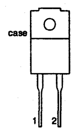
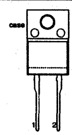
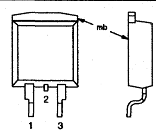
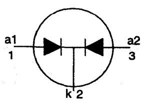
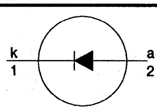
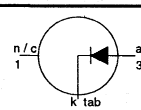
Ultrafast recovery epitaxial rectifiers are used in both the input and output stages of switched mode power supplies, inverters, d.c. to d.c. converters and motor controls.

The 100 V/ 150 V/ 200 V range is used for high frequency rectification in power supplies with higher output voltages, where the reverse voltage requirement precludes the use of schottky diodes. The main features of this range are as follows:-

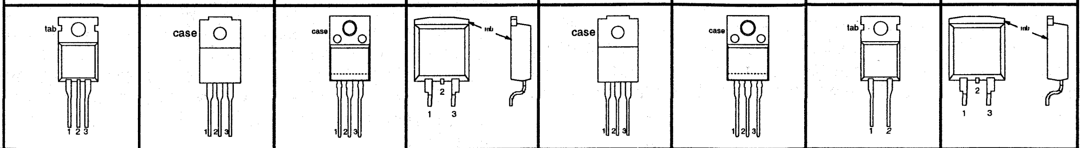
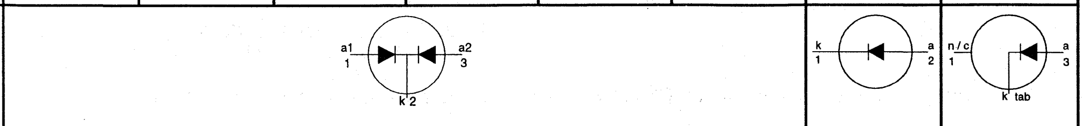
1. Low forward voltage drop, typically 0.8 V at rated current, 150˚C
2. Ultrafast reverse recovery, typically 25 ns.
3. Soft reverse recovery characteristic.
4. Reverse surge and ESD capability for 'E' suffix types.

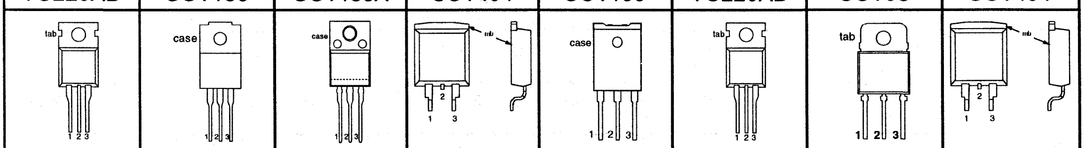
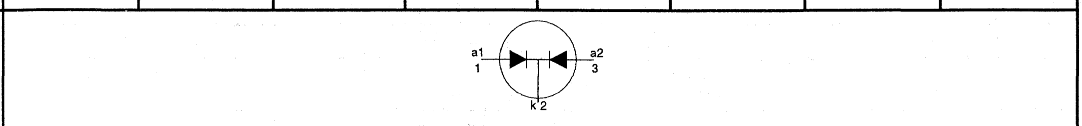
The other two ranges of ultrafast recovery epitaxial rectifier diodes are the 300 V/ 400 V/ 500 V range and the BYR29 and BYR29F types which are available in 500 V/600 V /700 V and 800 V grades. These devices are used as high voltage output rectifiers in television receivers and computer monitors. They are also used as freewheeling diodes in the power switching stage of switched mode power supplies, connected in parallel with the power transistor or MOSFET. The main features are as follows:-

1. Low forward voltage drop, typically 1.1 V at rated current, 150˚C.
2. Ultrafast reverse recovery, 60 ns to 75 ns.
3. Soft reverse recovery characteristic.

| | $I_{O(AV)}$ Average rectified output current (Amps) | | | | |
|---|---|---|---|---|---|
| | 1.5 | 8 - 9 | | | |
| | SOT223 | TO220AC | SOD100 | SOD113 | SOT404 |
| |   |   |   |   |   |
| $V_{RRM}$ (V) |   |   | | |   |
| 100 | BYV40-100<br>BYV40E-100 | BYW29-100<br>BYW29E-100 | BYW29F-100 | BYW29EX-100 | BYW29EB-100 |
| 150 | BYV40-150<br>BYV40E-150 | BYW29-150<br>BYW29E-150 | BYW29F-150 | BYW29EX-150 | BYW29EB-150 |
| 200 | BYV40-200<br>BYV40E-200 | BYW29-200<br>BYW29E-200 | BYW29F-200 | BYW29EX-200 | BYW29EB-200 |
| 300 | | BYV29-300 | BYV29F-300 | | |
| 400 | | BYV29-400 | BYV29F-400 | | |
| 500 | | BYV29-500<br>BYR29-500 | BYV29F-500<br>BYR29F-500 | | |
| 600 | | BYR29-600 | BYR29F-600 | | |
| 700 | | BYR29-700 | BYR29F-700 | | |
| 800 | | BYR29-800 | BYR29F-800 | | |

## Ultrafast Recovery Epitaxial Rectifiers (Continued)

| $V_{RRM}$ (V) | $I_{O(AV)}$ Average rectified output current (Amps) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 10 | | | | 12 | | 14 | |
| | TO220AB | SOT186 | SOT186A | SOT404 | SOT186 | SOT186A | TO220AC | SOT404 |
| |  | | | | | | | |
| |  | | | | | | | |
| 100 | BYQ28-100<br>BYQ28E-100 | BYQ28F-100 | BYQ28X-100<br>BYQ28EX-100 | BYQ28EB-100 | BYV32F-100 | BYV32EX-100 | BYV79-100<br>BYV79E-100 | BYV79EB-100 |
| 150 | BYQ28-150<br>BYQ28E-150 | BYQ28F-150 | BYQ28X-150<br>BYQ28EX-150 | BYQ28EB-150 | BYV32F-150 | BYV32EX-150 | BYV79-150<br>BYV79E-150 | BYV79EB-150 |
| 200 | BYQ28-200<br>BYQ28E-200 | BYQ28F-200 | BYQ28X-200<br>BYQ28EX-200 | BYQ28EB-200 | BYV32F-200 | BYV32EX-200 | BYV79-200<br>BYV79E-200 | BYV79EB-200 |
| 300 | BYT28-300 | | | | | | BYT79-300 | |
| 400 | BYT28-400 | | | | | | BYT79-400 | |
| 500 | BYT28-500 | | | | | | BYT79-500 | |

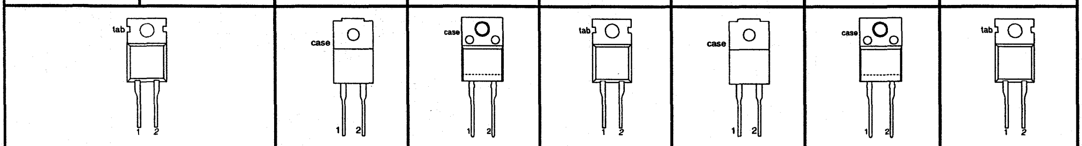
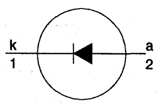
| $V_{RRM}$ (V) | $I_{O(AV)}$ Average rectified output current (Amps) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 20 | | | | | 30 | | |
| | TO220AB | SOT186 | SOT186A | SOT404 | SOT199 | TO220AB | SOT93 | SOT404 |
| |  | | | | | | | |
| |  | | | | | | | |
| 100 | BYV32-100<br>BYV32E-100 | BYV42F-100 | BYV42EX-100 | BYV32EB-100 | BYV72F-100<br>BYV72EF-100 | BYV42-100<br>BYV42E-100 | BYV72-100<br>BYV72E-100 | BYV42EB-100 |
| 150 | BYV32-150<br>BYV32E-150 | BYV42F-150 | BYV42EX-150 | BYV32EB-150 | BYV72F-150<br>BYV72EF-150 | BYV42-150<br>BYV42E-150 | BYV72-150<br>BYV72E-150 | BYV42EB-150 |
| 200 | BYV32-200<br>BYV32E-200 | BYV42F-200 | BYV42EX-200 | BYV32EB-200 | BYV72F-200<br>BYV72EF-200 | BYV42-200<br>BYV42E-200 | BYV72-200<br>BYV72E-200 | BYV42EB-200 |
| 300 | BYV34-300 | | | | BYV74F-300 | BYV44-300 | BYV74-300 | |
| 400 | BYV34-400 | | | | BYV74F-400 | BYV44-400 | BYV74-400 | |
| 500 | BYV34-500 | | | | BYV74F-500 | BYV44-500 | BYV74-500 | |

## Fast Recovery and General Purpose, High Voltage Rectifiers

Fast recovery, high voltage rectifiers are used widely in the power supply and horizontal deflection stage of television receivers and computer monitors. The 1500 V and 1700 V devices are specifically designed for use as damper diodes in the horizontal deflection circuits of high resolution, multisync computer monitors.

These diodes are also suitable for use in a wide variety of other high voltage rectifier applications including inverters, converters, snubbers, scr commutation and mains voltage input circuits. Their main features are as follows:-

1. Reverse voltage ratings up to 1700 V.
2. Low forward recovery voltage and fast forward recovery.
3. Fast reverse recovery (150 ns typ) with soft reverse recovery characteristic.

| | $I_{O(AV)}$ Average rectified output current (Amps) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 7 | 8 | | | 10 | | | 20 |
| | TO220AC | TO220AC | SOD100 | SOD113 | TO220AC | SOD100 | SOD113 | TO220AC |
| |  | | | | | | | |
| $V_{RRM}$ (V) |  | | | | | | | |
| 200 | | BY229-200 | BY229F-200 | BY229X-200 | | | | |
| 300 | BY249-300[1] | | | | | | | |
| 400 | | BY229-400 | BY229F-400 | BY229X-400 | | | | |
| 600 | BY249-600[1] | BY229-600 | BY229F-600 | BY229X-600 | | | | |
| 800 | | BY229-800 | BY229F-800 | BY229X-800 | | | | |
| 1000 | | BY329-1000 | BY329F-1000 | BY329X-1000 | | | | |
| 1200 | | BY329-1200 | BY329F-1200 | BY329X-1200 | | | | |
| 1500 | | | | | BY359-1500<br>BY459-1500 | BY359F-1500<br>BY459F-1500 | BY359X-1500<br>BY459X-1500 | BY559-1500 |
| 1700 | | | | | | | BY479X-1700 | |

**1** General purpose rectifier diode.

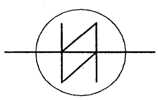
## Breakover Diodes

The Philips BreakOver Diode (BOD) is a two terminal, transient over-voltage suppressor which operates in either an 'off' (non-conducting) or an 'on' (conducting) state. The BOD will remain in the off-state until a transient voltage exceeding the maximum breakover voltage is applied across its terminals. Provided sufficient current is available to switch the device on, it will then switch to the on-state, and conduct with a low on-state voltage. It will remain in the on-state until the transient decays away and the current falls below the holding current.

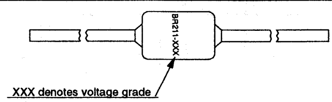
The device is available in either a conventional leaded axial package or an axial surface mounted package.

The main area of application for breakover diodes is over-voltage protection in line based telecommunications equipment (telephones, faxes, modems, internet terminals etc) and also in telephone exchange line cards. Their main features are:-

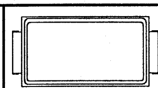
1. 40 Amp surge capability, (10/700μs impulse).
2. Breakover voltages 140 V to 280 V.
3. Low on-state voltage ≤ 2.5 V.
4. Low leakage current in the off-state ≤ 10 μA.
5. High holding current ≥ 150 mA.



*Symbol*




*SOD84 Axial package*



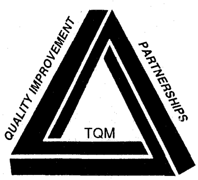
*SOD106 Surface mount package*

| Avalanche voltage $I_D$ = 10mA | Breakover voltage | Peak pulse current 10/700μs pulse | Holding current | Switching current | Type number | |
|---|---|---|---|---|---|---|
| $V_{BR}$ (V) | $V_{BO}$ (V) | $I_{TSM}$ (A) | $I_H$ (mA) | $I_S$ (A) | | |
| MIN | MAX | MAX | MIN | MAX | | |
| 123 | 157 | 40 | 150 | 1 | BR211-140 | BR211SM-140 |
| 140 | 180 | 40 | 150 | 1 | BR211-160 | BR211SM-160 |
| 158 | 202 | 40 | 150 | 1 | BR211-180 | BR211SM-180 |
| 176 | 224 | 40 | 150 | 1 | BR211-200 | BR211SM-200 |
| 193 | 247 | 40 | 150 | 1 | BR211-220 | BR211SM-220 |
| 211 | 269 | 40 | 150 | 1 | BR211-240 | BR211SM-240 |
| 228 | 292 | 40 | 150 | 1 | BR211-260 | BR211SM-260 |
| 246 | 314 | 40 | 150 | 1 | BR211-280 | BR211SM-280 |

# GENERAL

# 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 root 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. Our factories are certified to ISO 9000.

### Partnerships with customers

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

### Partnerships with suppliers

In addition to ISO9000 audits and close monitoring of supplier delivery performance, we operate a Supplier Excellence Award scheme which requires suppliers and their sub-suppliers to use statistical process control, perform gauge studies and use failure mode and effect analysis (FMEA) techniques to identify and correct the root causes of quality and delivery problems.

### 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 optimizations 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 customers inputs and we invite constructive comment 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.

## RATING SYSTEMS

The rating systems described are those recommended by the IEC in its publication number 134.

### Definitions of terms used

ELECTRONIC DEVICE

An electronic tube or valve, transistor or other semiconductor device. This definition excludes inductors, capacitors, resistors and similar components.

CHARACTERISTIC

A characteristic is an inherent and measurable property of a device. Such a property may be electrical, mechanical, thermal, hydraulic, electro-magnetic 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.

BOGEY ELECTRONIC DEVICE

An electronic device whose characteristics have the published nominal values for the type. A bogey electronic device for any particular application can be obtained by considering only those characteristics that are directly related to the application.

RATING

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.

RATING SYSTEM

The set of principles upon which ratings are established and which determine their interpretation. The rating system indicates the division of responsibility between the device manufacturer and the circuit designer, with the object of ensuring that the working conditions do not exceed the ratings.

### Absolute maximum rating system

Absolute maximum ratings are limiting values of operating and environmental conditions applicable to any electronic 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 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 exceeded 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 electronic devices in the equipment.

### Design maximum rating system

Design maximum ratings are limiting values of operating and environmental conditions applicable to a bogey electronic device of a specified type as defined by its published data, and 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 responsibility for the effects of changes in operating conditions due to variations in the characteristics of the electronic device under consideration.

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

### Design centre rating system

Design centre ratings are limiting values of operating and environmental conditions applicable to a bogey electronic device of a specified type as defined by its published data, and should not be exceeded under normal conditions.

These values are chosen by the device manufacturer to provide acceptable serviceability of the device in average applications, taking responsibility for normal changes in operating conditions due to rated supply voltage variation, equipment component variation, equipment control adjustment, load variation, signal variation, environmental conditions, and variations in the characteristics of all electronic devices.

The equipment manufacturer should design so that, initially, no design centre value for the intended service is exceeded with a bogey electronic device in equipment operating at the stated normal supply voltage.

## PRO ELECTRON TYPE NUMBERING SYSTEM

### Basic type number

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

#### FIRST LETTER

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

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

#### SECOND LETTER

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

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

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

#### SERIAL NUMBER/SPECIAL THIRD LETTER

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

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

### Version letter(s)

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

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

### Suffix

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

VOLTAGE REFERENCE AND VOLTAGE REGULATOR DIODES

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

A 1%

B 2%

C 5%

D 10%

E 20%.

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

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

Example: BZY74-C6V3 or -C10.

TRANSIENT VOLTAGE SUPPRESSOR DIODES

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

Example: BZW70-9V1 or –39.

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

Example: BZW10-15B.

CONVENTIONAL AND CONTROLLED AVALANCHE RECTIFIER DIODES AND THYRISTORS

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

Example: BYT-100 or -100R.

RADIATION DETECTORS

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

Example: BPX10-2A.

ARRAY OF RADIATION DETECTORS AND GENERATORS

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

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

HIGH FREQUENCY POWER TRANSISTORS

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

Example: BLU80-24.

## 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.

VOLTAGE RATINGS

- $V_{RSM}$ Non-repetitive peak reverse voltage. The maximum allowable instantaneous reverse voltage including all non-repetitive transients. duration ≤ 10 ms.
- $V_{RRM}$ Repetitive peak reverse voltage. The maximum allowable instantaneous reverse voltage including transients which occur every cycle, duration ≤ 10 ms, duty cycle ≤ 0.01.
- $V_{RWM}$ Crest working reverse voltage. The maximum allowable instantaneous reverse voltage including transients which may be applied every cycle exluding all repetitive and non-repetitive transients.
- $V_R$ Continuous reverse voltage. The maximum allowable constant reverse voltage. Operation at rated $V_R$ may be limited to junction temperatures below $T_{j\,max}$ in order to prevent thermal runaway.

CURRENT RATINGS

- $I_{F(AV)}$ Average forward current. Specified for either square or sinusoidal current waveforms at a maximum mounting base or heatsink temperature. The maximum average current which may be passed through the device without exceeding $T_{j\,max}$.
- $I_{F(RMS)}$ Root mean square current. The rms value of a current waveform is the value which causes the same dissipation as the equivalent 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.

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.

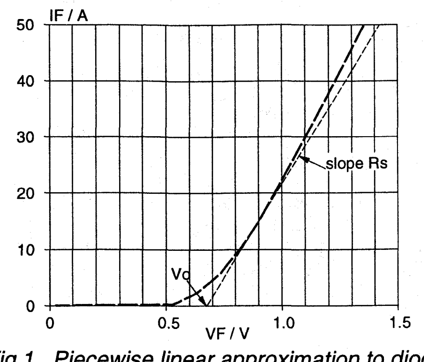



*Fig.1. Piecewise linear approximation to diode forward characteristic.*

**Power diode characteristics**

A characteristic is an inherent and measurable property of a device. Such a property may be 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.

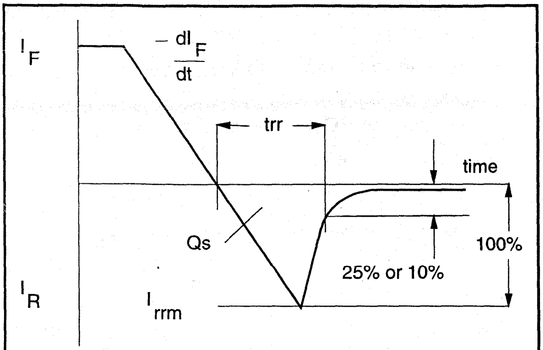



*Fig.2. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$*

*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.

*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.

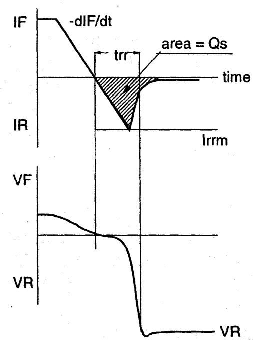



*Fig.3. Waveforms showing the origin of reverse switching losses.*

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.

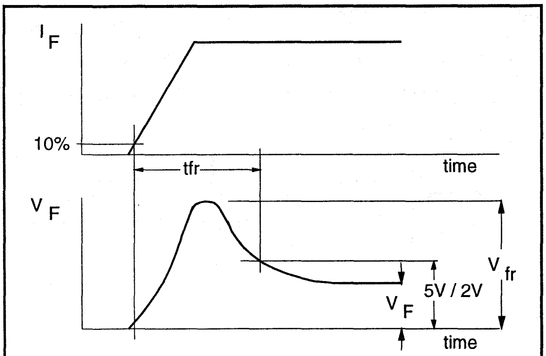



*Fig.4. Definition of $V_{fr}$ and $t_{fr}$*

### 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, and also in a surface mount SOD106 package. BOD's are graded according to breakover voltage.

BREAKOVER DIODE CHARACTERISTICS

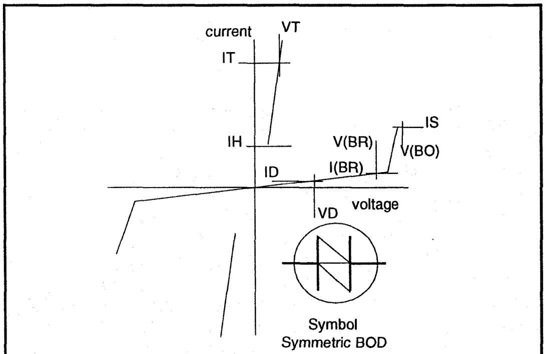



*Fig.5. Breakover diode symbol and characteristics.*

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.

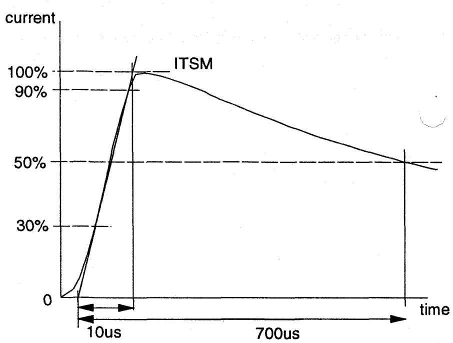



*Fig.6. Definition of $I_{TSM}$ waveform.*

*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.

# DEVICE DATA

in alphanumeric sequence

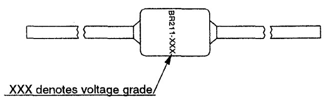
## GENERAL DESCRIPTION

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.

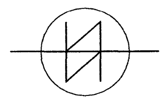
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MIN. | MAX. | UNIT |
|---|---|---|---|---|
| | **BR211-140 to 280** | | | |
| $V_{(BO)}$ | Breakover voltage | 140 | 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 |
|---|---|---|---|---|---|---|
| $R_{th\ j-e}$ | Thermal resistance junction to envelope | | - | 22 | - | K/W |
| $R_{th\ j-a}$ | Thermal resistance junction to ambient | mounted as fig:12 | - | 105 | | K/W |
| $Z_{th\ j-a}$ | Thermal impedance junction to ambient | $t_p$ = 1 ms | - | 2.62 | - | K/W |
| $R_{th\ e-tp}$ | Thermal resistance envelope to tie point | lead length = 5 mm | - | 15 | - | K/W |
| | | lead length = 10 mm | - | 30 | - | K/W |
| $R_{th\ e-a}$ | Thermal resistance envelope to ambient | lead length = 5 mm | - | 440 | - | K/W |
| | | lead length = 10 mm | - | 350 | - | K/W |
| $R_{th\ tp-a}$ | 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 | | | | |
| | | BR211-140 | 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 |
| | | | | | | V |
| | | | | | | 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 |

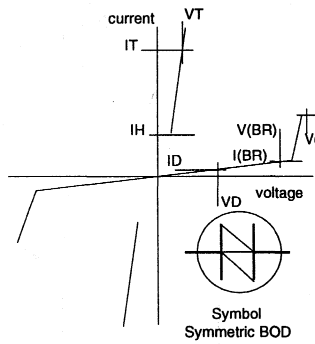



*Fig.1. Definition of breakover diode characteristics.*

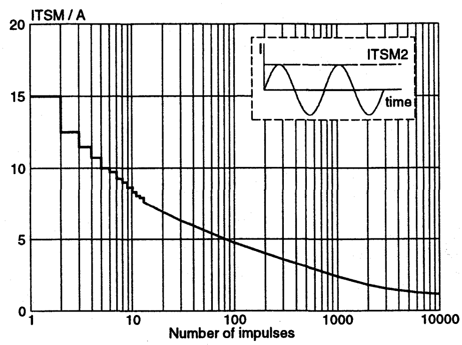



*Fig.3. Maximum permissible non-repetitive on-state current based on sinusoidal currents; f = 50 Hz; device triggered at the start of each pulse; $T_j$ = 70˚C prior to surge.*

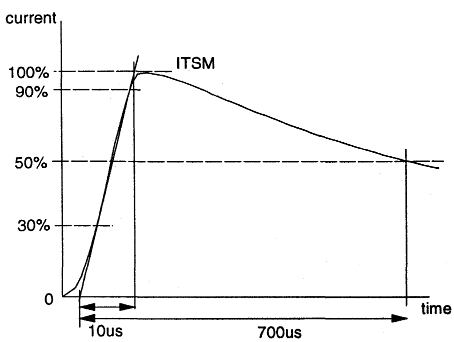



*Fig.2. Test waveform for high voltage impulse ($I_{TSM1}$) according to CCITT vol IX-Rec K17.*

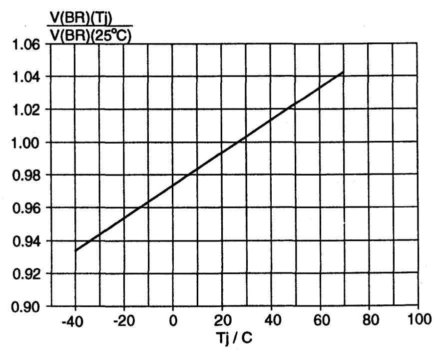



*Fig.4. Normalised avalanche breakdown voltage $V_{(BR)}$ and $V_{(BO)}$ as a function of temperature.*

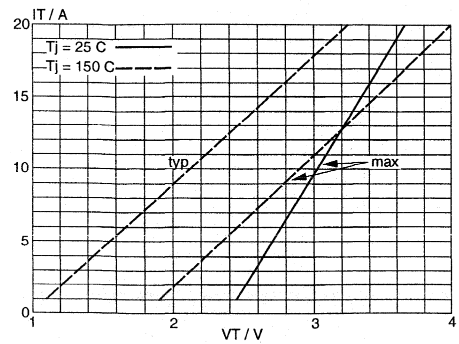



*Fig.5. On-state current as a function of on-state voltage; $t_p$ = 200 µs to avoid excessive dissipation.*

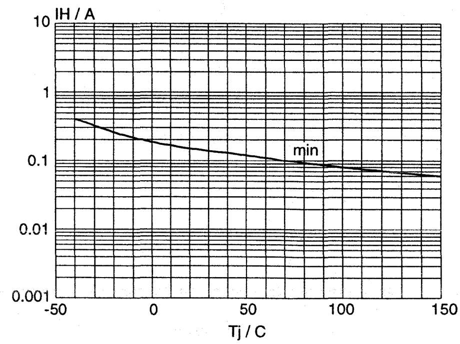



*Fig.8. Minimum holding current as a function of temperature.*

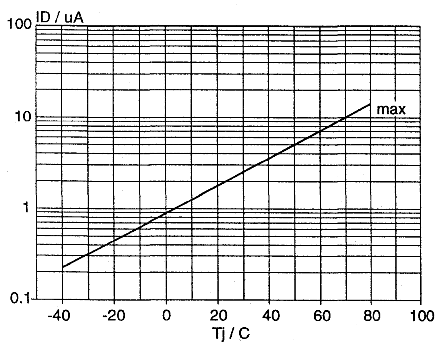



*Fig.6. Maximum off-state current as a function of temperature.*

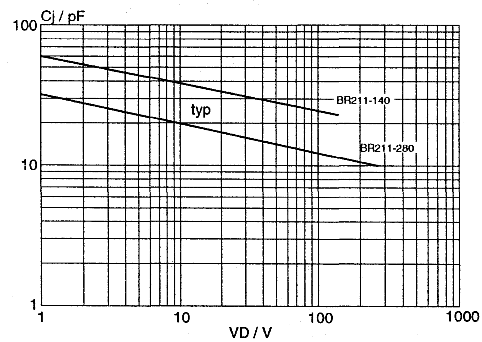



*Fig.9. Typical junction capacitance as a function of off-state voltage, f = 1 MHz; $T_j$ = 25˚C.*

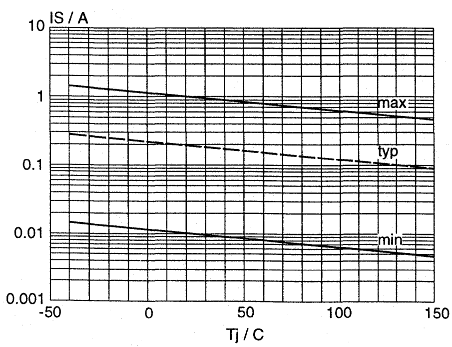



*Fig.7. Switching current as a function of junction temperature.*

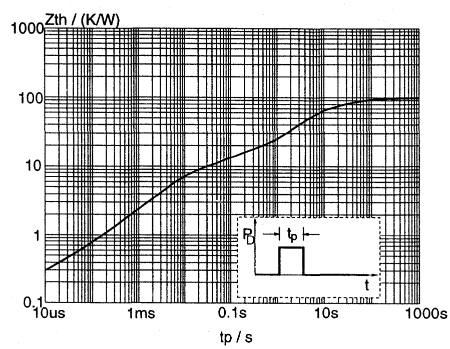



*Fig.10. Transient thermal impedance. $Z_{th\ j\text{-}a} = f(t_p)$.*

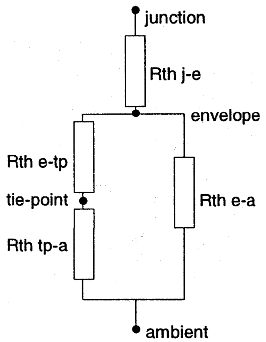



*Fig.11. Components of thermal resistance,*

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

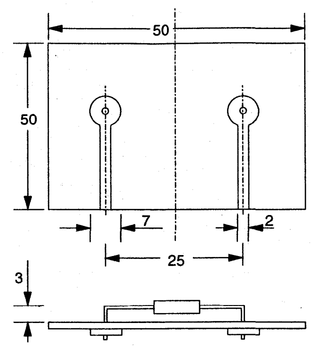



*Fig.12. Mounting on pcb used for $R_{th}$ measurement.*

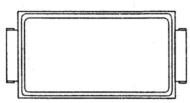
## GENERAL DESCRIPTION

A range of bidirectional, breakover diodes in a two terminal, surface mounting, plastic envelope. These devices feature controlled breakover voltage and high holding current together with high peak current handling capability. Typical application is transient overvoltage protection in telecommunications equipment.

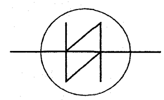
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MIN. | MAX. | UNIT |
|---|---|---|---|---|
| | **BR211SM-140 to BR211SM-280** | | | |
| $V_{(BO)}$ | Breakover voltage | 140 | 280 | V |
| $I_H$ | Holding current | 150 | - | mA |
| $I_{TSM}$ | Non-repetitive peak current | - | 40 | A |

## OUTLINE - SOD106



## 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 | | - 40 | 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 |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}sp}$ | Thermal resistance junction to solder point | | - | - | 12 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | pcb mounted; minimum footprint | - | 100 | - | K/W |
| $Z_{th\ j\text{-}a}$ | Thermal impedance junction to ambient | $t_p$ = 1 ms | - | 2.62 | - | 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 | | | | |
| | | BR211SM-140 | 123 | 140 | 157 | V |
| | | BR211SM-160 | 140 | 160 | 180 | V |
| | | BR211SM-180 | 158 | 180 | 202 | V |
| | | BR211SM-200 | 176 | 200 | 224 | V |
| | | BR211SM-220 | 193 | 220 | 247 | V |
| | | BR211SM-240 | 211 | 240 | 269 | V |
| | | BR211SM-260 | 228 | 260 | 292 | V |
| | | BR211SM-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 |

## 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 |

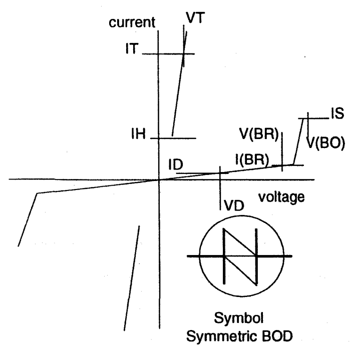



*Fig.1. Definition of breakover diode characteristics.*

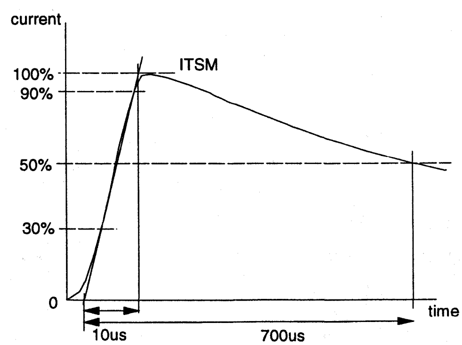



*Fig.2. Test waveform for high voltage impulse ($I_{TSM1}$) according to CCITT vol IX-Rec K17.*

**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. Relative humidity < 65%.

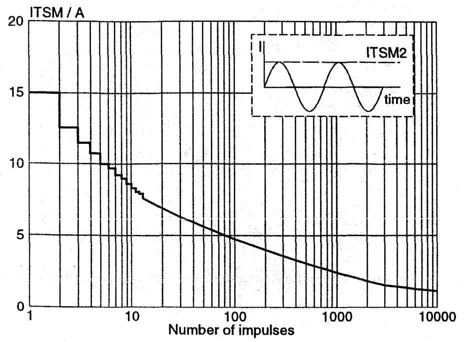



*Fig.3. Maximum permissible non-repetitive on-state current based on sinusoidal currents; f = 50 Hz; device triggered at the start of each pulse; $T_j = 70^\circ C$ prior to surge.*

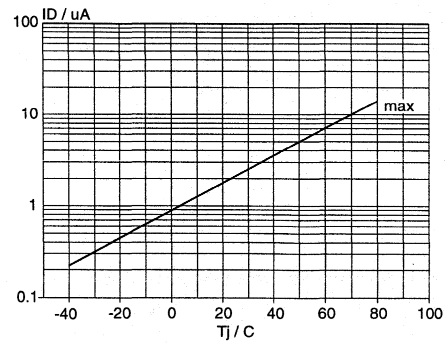



*Fig.6. Maximum off-state current as a function of temperature.*

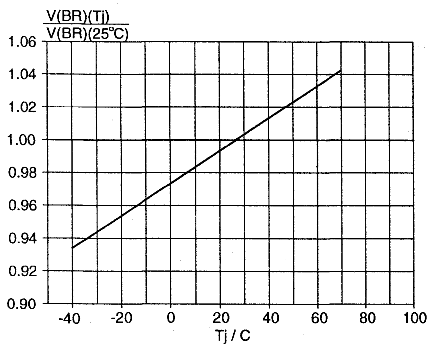



*Fig.4. Normalised avalanche breakdown voltage $V_{(BR)}$ and $V_{(BO)}$ as a function of temperature.*

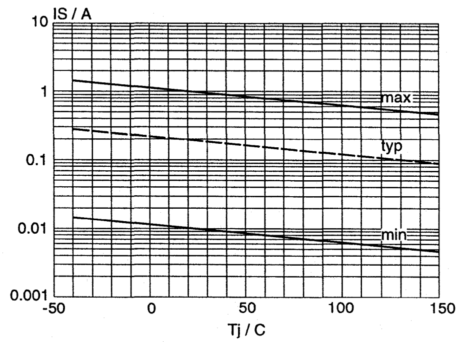



*Fig.7. Switching current as a function of junction temperature.*

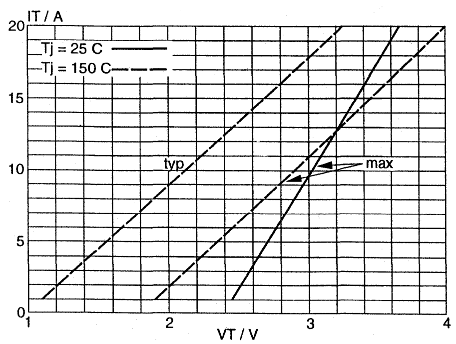



*Fig.5. On-state current as a function of on-state voltage; $t_p$ = 200 µs to avoid excessive dissipation.*

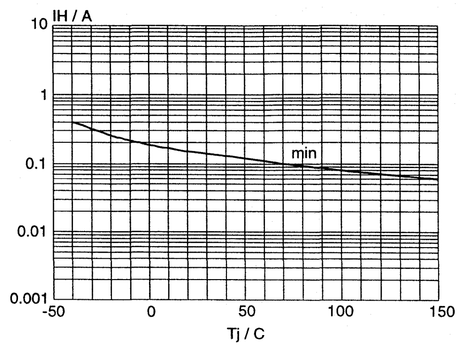



*Fig.8. Minimum holding current as a function of temperature.*

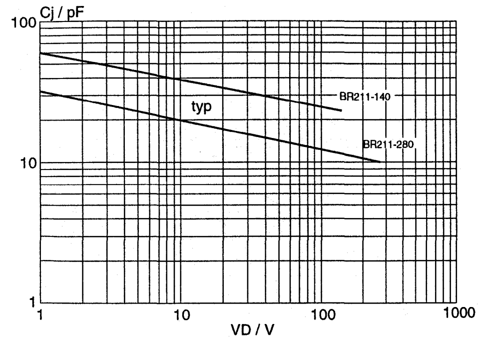



*Fig.9. Typical junction capacitance as a function of off-state voltage, f = 1 MHz; $T_j$ = 25˚C.*

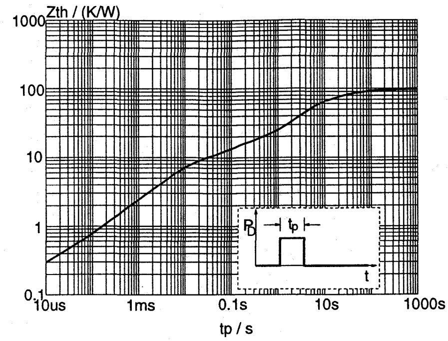



*Fig.10. Transient thermal impedance. $Z_{th\ j\text{-}a} = f(t_p)$.*

# Rectifier diodes fast, soft-recovery

# BY229 series

## 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.

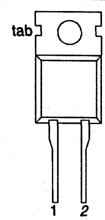
## QUICK REFERENCE DATA

| 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 |

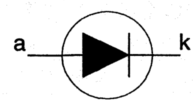
## PINNING - TO220AC

| 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).

<table>
<tr><th>SYMBOL</th><th>PARAMETER</th><th>CONDITIONS</th><th>MIN.</th><th colspan="4">MAX.</th><th>UNIT</th></tr>
<tr><td></td><td></td><td></td><td></td><td>-200</td><td>-400</td><td>-600</td><td>-800</td><td></td></tr>
<tr><td>$V_{RSM}$</td><td>Non-repetitive peak reverse voltage</td><td></td><td>-</td><td>200</td><td>400</td><td>600</td><td>800</td><td>V</td></tr>
<tr><td>$V_{RRM}$</td><td>Repetitive peak reverse voltage</td><td></td><td>-</td><td>200</td><td>400</td><td>600</td><td>800</td><td>V</td></tr>
<tr><td>$V_{RWM}$</td><td>Crest working reverse voltage</td><td></td><td>-</td><td>150</td><td>300</td><td>500</td><td>600</td><td>V</td></tr>
<tr><td>$V_R$</td><td>Continuous reverse voltage</td><td></td><td>-</td><td>150</td><td>300</td><td>500</td><td>600</td><td>V</td></tr>
<tr><td>$I_{F(AV)}$</td><td>Average forward current[1]</td><td>square wave; $\delta = 0.5$; $T_{mb} \leq 122$ °C</td><td>-</td><td colspan="4">8</td><td>A</td></tr>
<tr><td></td><td></td><td>sinusoidal; a = 1.57; $T_{mb} \leq 125$ °C</td><td>-</td><td colspan="4">7</td><td>A</td></tr>
<tr><td>$I_{F(RMS)}$</td><td>RMS forward current</td><td></td><td>-</td><td colspan="4">11</td><td>A</td></tr>
<tr><td>$I_{FRM}$</td><td>Repetitive peak forward current</td><td>t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 122$ °C</td><td>-</td><td colspan="4">16</td><td>A</td></tr>
<tr><td>$I_{FSM}$</td><td>Non-repetitive peak forward current.</td><td>t = 10 ms</td><td>-</td><td colspan="4">60</td><td>A</td></tr>
<tr><td></td><td></td><td>t = 8.3 ms sinusoidal; $T_j = 150$ °C prior to surge; with reapplied $V_{RWM(max)}$</td><td>-</td><td colspan="4">66</td><td>A</td></tr>
<tr><td>$I^2t$</td><td>$I^2t$ for fusing</td><td>t = 10 ms</td><td>-</td><td colspan="4">18</td><td>$A^2s$</td></tr>
<tr><td>$T_{stg}$</td><td>Storage temperature</td><td></td><td>-40</td><td colspan="4">150</td><td>°C</td></tr>
<tr><td>$T_j$</td><td>Operating junction temperature</td><td></td><td>-</td><td colspan="4">150</td><td>°C</td></tr>
</table>

**1** Neglecting switching and reverse current losses.

## THERMAL RESISTANCES

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

## STATIC CHARACTERISTICS

$T_j$ = 25 ˚C unless otherwise stated

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

## DYNAMIC CHARACTERISTICS

$T_j$ = 25 ˚C unless otherwise stated

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

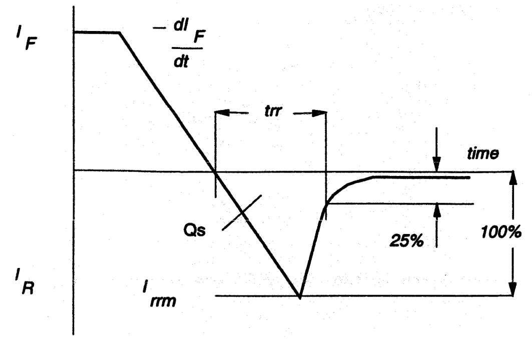



*Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$*

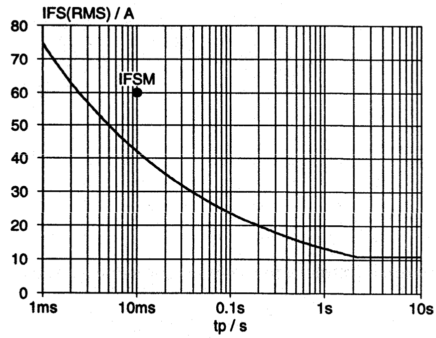



*Fig.4. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j = 150˚C$ prior to surge with reapplied $V_{RWM}$.*

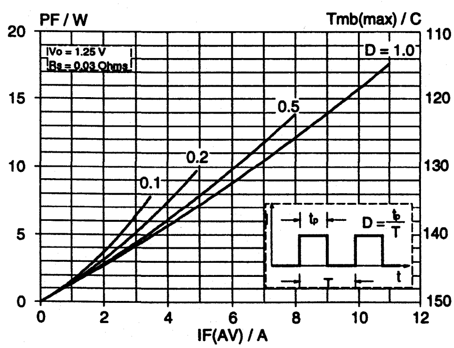



*Fig.2. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; square wave current waveform; parameter D = duty cycle = $t_p/T$.*

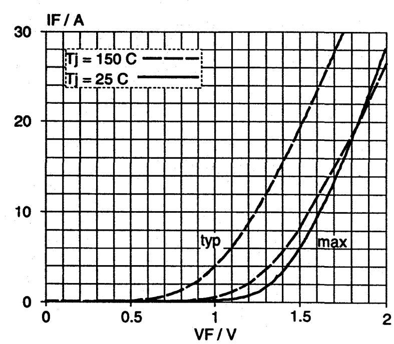



*Fig.5. Typical and maximum forward characteristic; $I_F = f(V_F)$; parameter $T_j$*

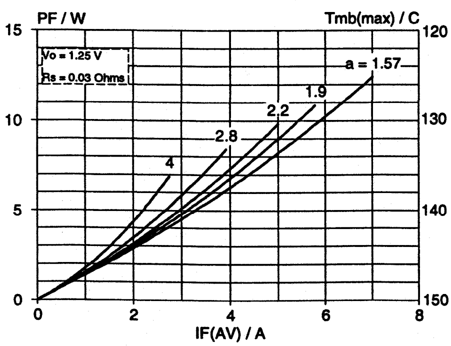



*Fig.3. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; sinusoidal current waveform; parameter a = form factor = $I_{F(RMS)}/I_{F(AV)}$.*

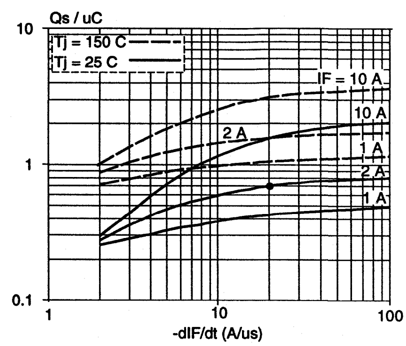



*Fig.6. Maximum $Q_s$ at $T_j = 25˚C$ and $150˚C$*

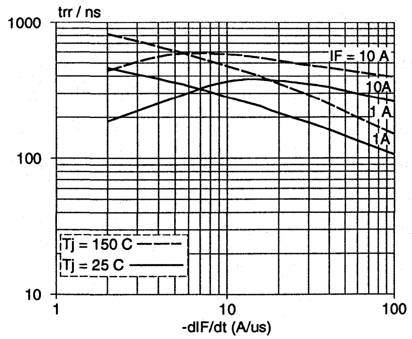



*Fig.7. Maximum $t_{rr}$ measured to 25% of $I_{rrm}$; $T_j$ = 25˚C and 150˚C*

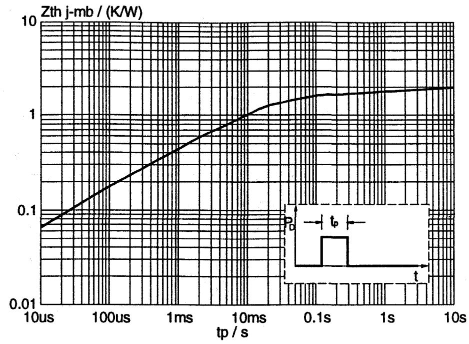



*Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$*

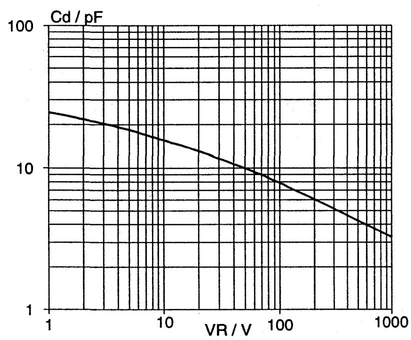



*Fig.8. Typical junction capacitance $C_d$ at f = 1 MHz; $T_j$ = 25˚C*

# Rectifier diodes 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.

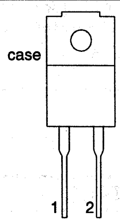
## QUICK REFERENCE DATA

| 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 |

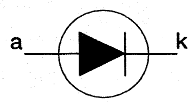
## PINNING - SOD100

| 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 |

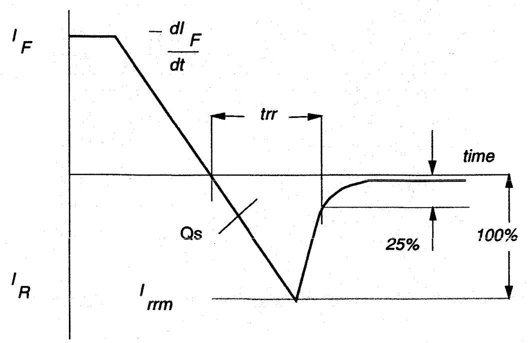



Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$

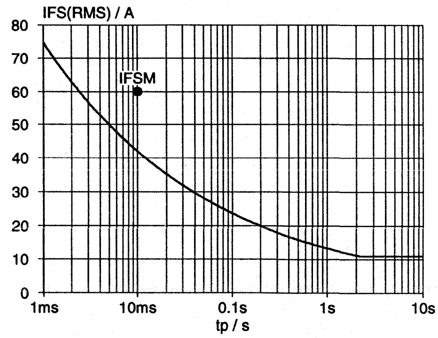



Fig.4. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j = 150^\circ C$ prior to surge with reapplied $V_{RWM}$.

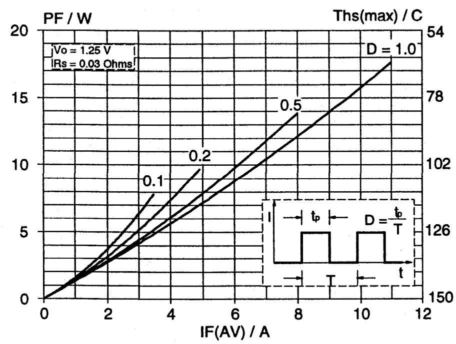



Fig.2. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; square wave current waveform; parameter D = duty cycle = $t_p/T$.

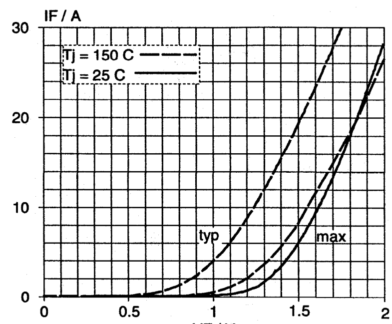



Fig.5. Typical and maximum forward characteristic; $I_F = f(V_F)$; parameter $T_j$

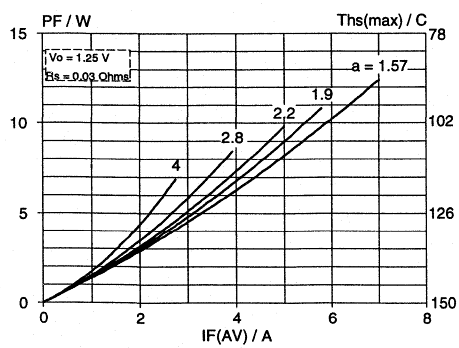



Fig.3. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; sinusoidal current waveform; parameter a = form factor = $I_{F(RMS)}/I_{F(AV)}$.

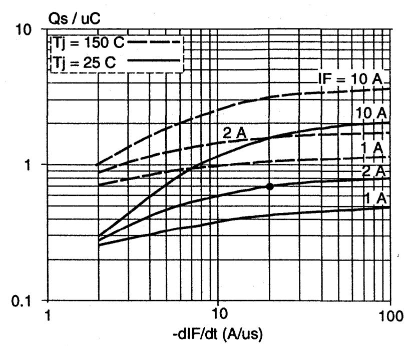



Fig.6. Maximum $Q_s$ at $T_j = 25^\circ C$ and $150^\circ C$

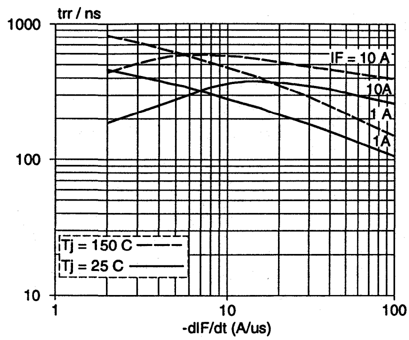



*Fig.7. Maximum $t_{rr}$ measured to 25% of $I_{rrm}$; $T_j$ = 25˚C and 150˚C*

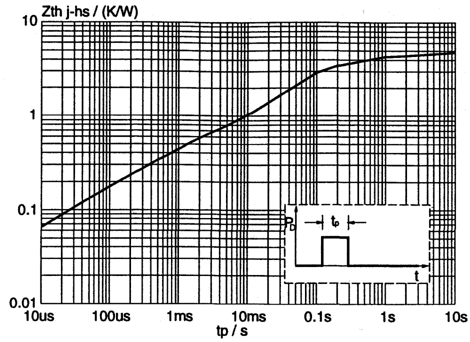



*Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$*

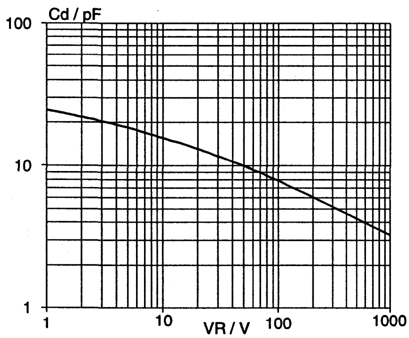



*Fig.8. Typical junction capacitance $C_d$ at f = 1 MHz; $T_j$ = 25˚C*

## 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.

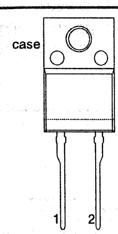
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| | BY229X | -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 | 145 | 145 | 145 | 145 | ns |

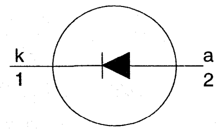
## PINNING - SOD113

| 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 |
|---|---|---|---|---|---|---|---|---|
| | | | | -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 LIMITING VALUE & CHARACTERISTIC

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

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

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j-hs}$ | Thermal resistance junction to heatsink | with heatsink compound | - | - | 4.8 | 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 | $I_F$ = 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 | - | 125 | 145 | 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 |

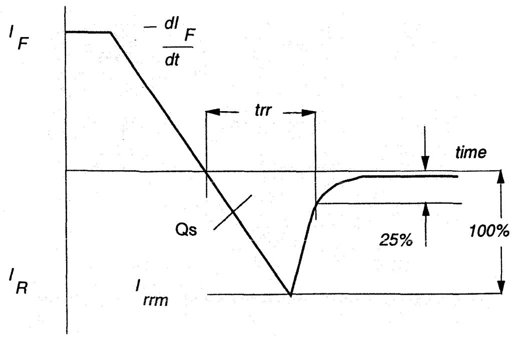



Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$

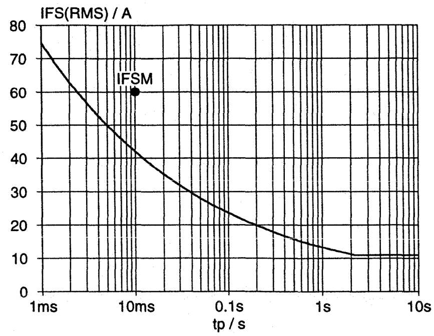



Fig.4. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j = 150°C$ prior to surge with reapplied $V_{RWM}$.

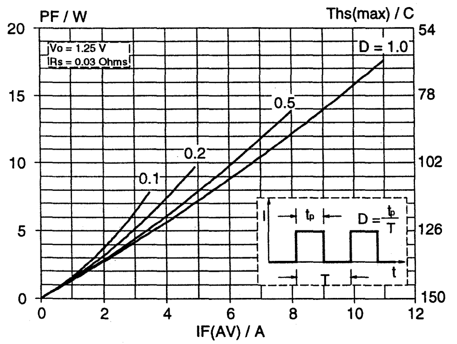



Fig.2. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; square wave current waveform; parameter D = duty cycle = $t_p/T$.

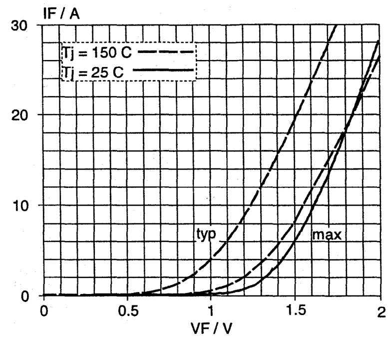



Fig.5. Typical and maximum forward characteristic; $I_F = f(V_F)$; parameter $T_j$

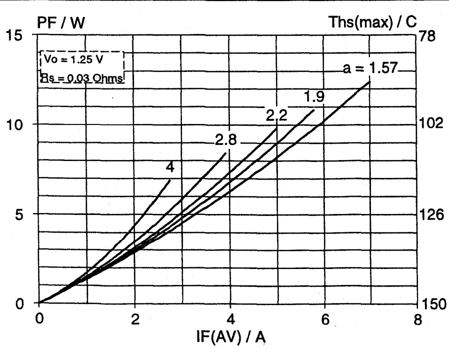



Fig.3. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; sinusoidal current waveform; parameter a = form factor = $I_{F(RMS)}/I_{F(AV)}$.

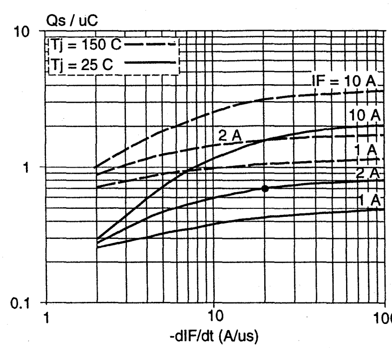



Fig.6. Maximum $Q_s$ at $T_j = 25°C$ and $150°C$

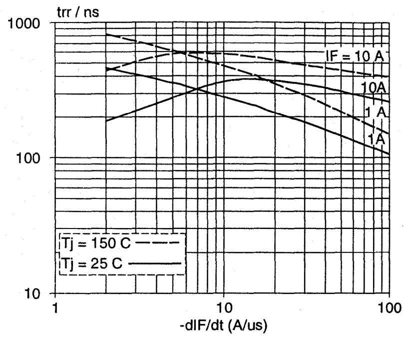



*Fig.7. Maximum $t_{rr}$ measured to 25% of $I_{rrm}$; $T_j = 25˚C$ and 150˚C*

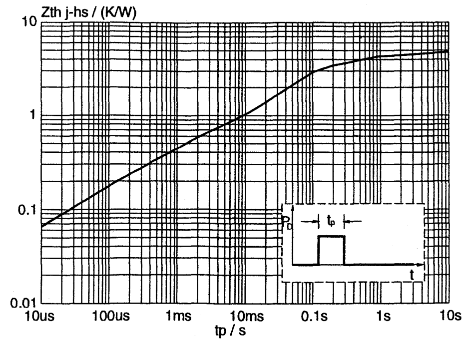



*Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$*

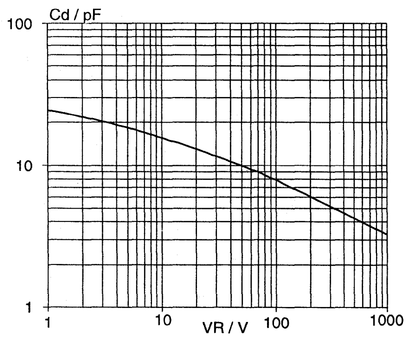



*Fig.8. Typical junction capacitance $C_d$ at f = 1 MHz; $T_j = 25˚C$*

# 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.

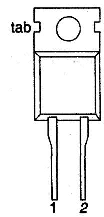
## QUICK REFERENCE DATA

| 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 |

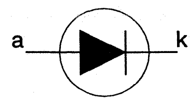
## PINNING - TO220AC

| 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. | | 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 |

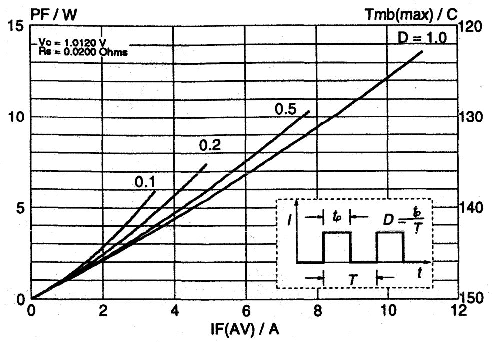



Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

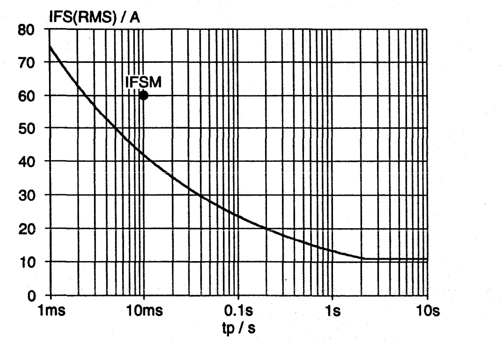



Fig.3. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j = 150^\circ C$ prior to surge with reapplied $V_{RWM}$.

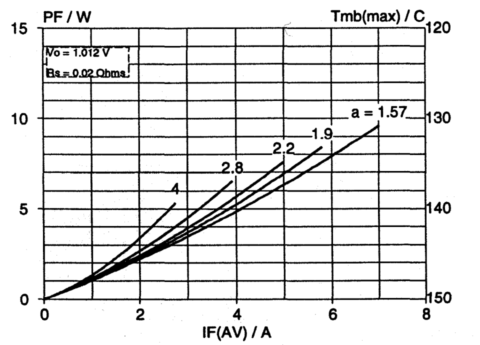



Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

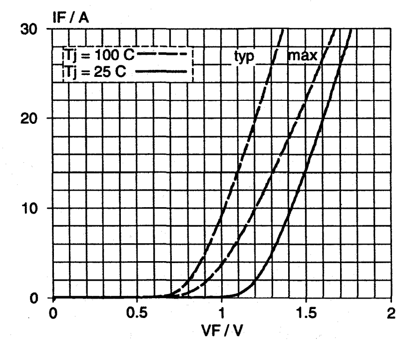



Fig.4. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

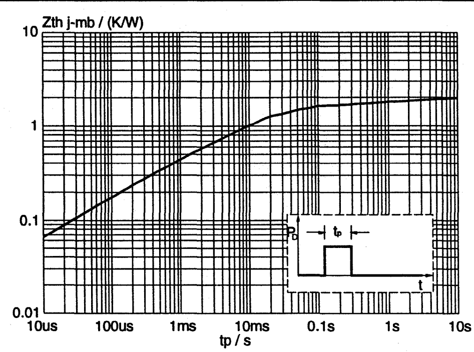



Fig.5. Transient thermal impedance $Z_{th} = f(t_p)$

# Rectifier diodes fast, soft-recovery | BY329 series

## 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.

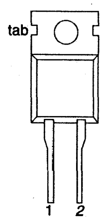
## QUICK REFERENCE DATA

| 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 |

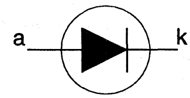
## PINNING - TO220AC

| 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; sinusoidal; $T_j = 150$ ˚C prior to surge; with reapplied $V_{RWM(max)}$ | - | 82 | | | A |
| $I^2t$ | $I^2t$ 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 |

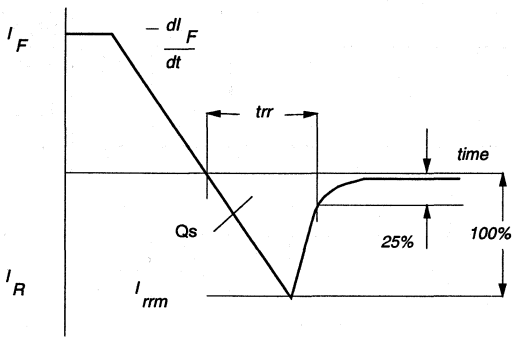



*Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$*

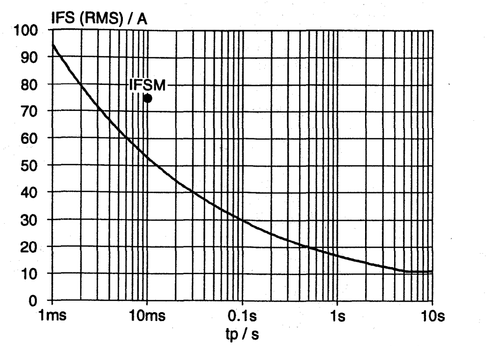



*Fig.4. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j = 150˚C$ prior to surge with reapplied $V_{RWM}$.*

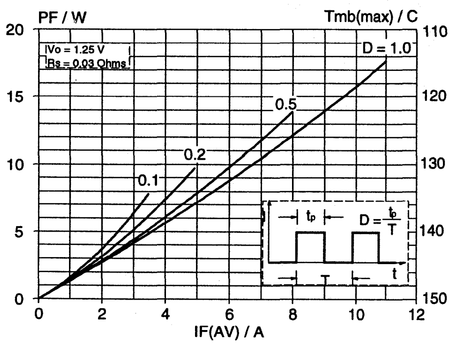



*Fig.2. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; square wave current waveform; parameter D = duty cycle = $t_p/T$.*

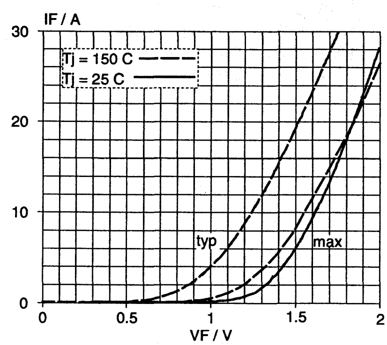



*Fig.5. Typical and maximum forward characteristic; $I_F = f(V_F)$; parameter $T_j$*

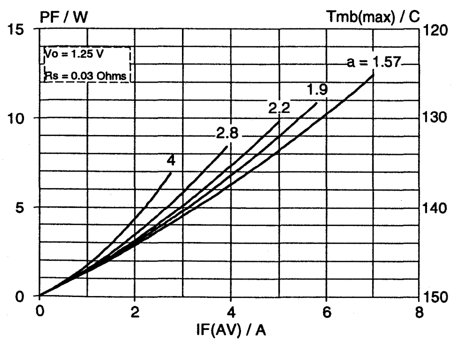



*Fig.3. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; sinusoidal current waveform; parameter a = form factor = $I_{F(RMS)}/I_{F(AV)}$.*

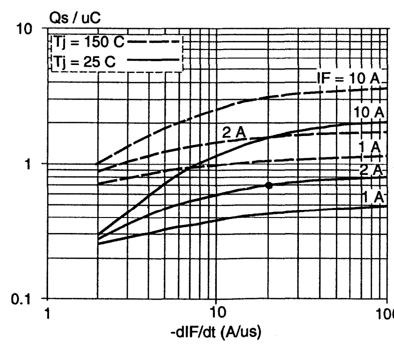



*Fig.6. Maximum $Q_s$ at $T_j = 25˚C$ and $150˚C$*

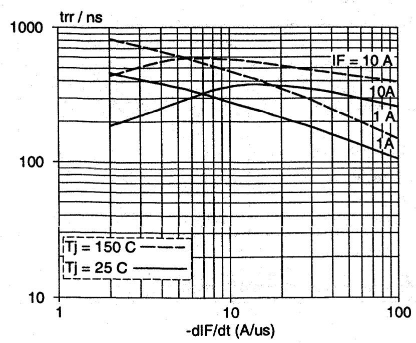



*Fig.7. Maximum $t_{rr}$ measured to 25% of $I_{rrm}$; $T_j = 25˚C$ and $150˚C$*

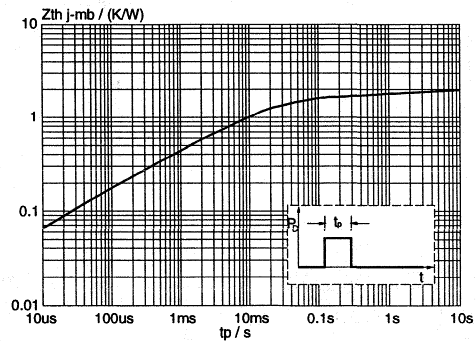



*Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$*

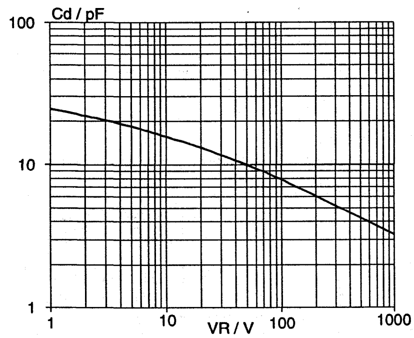



*Fig.8. Typical junction capacitance $C_d$ at f = 1 MHz; $T_j = 25˚C$*

# Rectifier diodes fast, soft-recovery

# BY329F series

## GENERAL DESCRIPTION

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

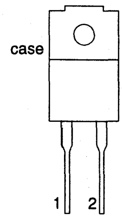
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | BY329F | -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 | 65 | 65 | 65 | A |
| $t_{rr}$ | Reverse recovery time | 145 | 145 | 145 | ns |

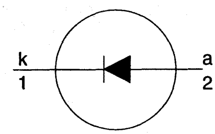
## PINNING - SOD100

| 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 |
|---|---|---|---|---|---|---|---|
| | | | | -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; $\delta = 0.5$; $T_{hs} \leq 83$ ˚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 | - | 65 | | | A |
| | | t = 8.3 ms | - | 71 | | | A |
| | | sinusoidal; $T_j = 150$ ˚C prior to surge; with reapplied $V_{RWM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ for fusing | t = 10 ms | - | 28 | | | $A^2s$ |
| $T_{stg}$ | Storage temperature | | -40 | 150 | | | ˚C |
| $T_j$ | Operating junction temperature | | - | 150 | | | ˚C |

1 Neglecting switching and reverse current losses.

## ISOLATION LIMITING VALUE & CHARACTERISTIC

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

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

## 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 | - | 1.5 | 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 | - | 125 | 145 | 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 |

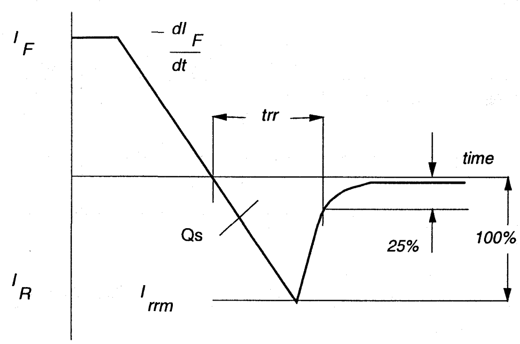



*Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$*

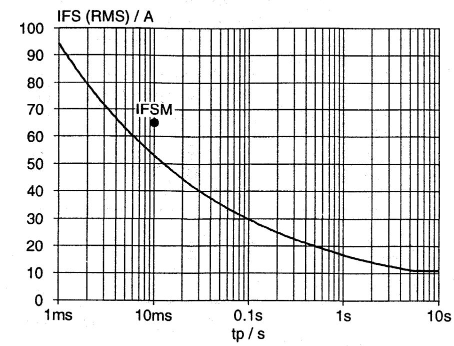



*Fig.4. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j = 150°C$ prior to surge with reapplied $V_{RWM}$.*

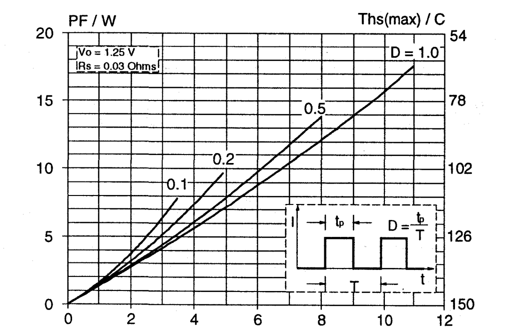



*Fig.2. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; square wave current waveform; parameter D = duty cycle = $t_p/T$.*

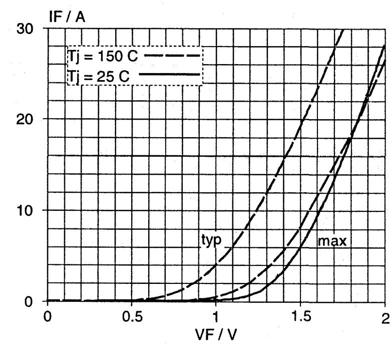



*Fig.5. Typical and maximum forward characteristic; $I_F = f(V_F)$; parameter $T_j$*

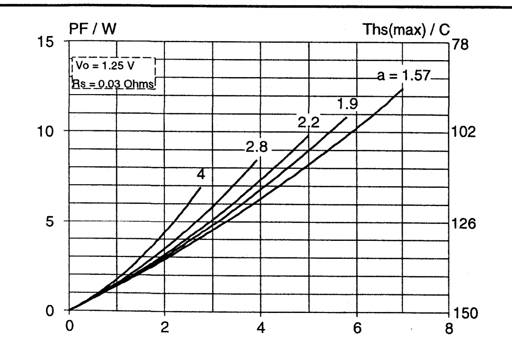



*Fig.3. Maximum forward dissipation, $P_F = f(I_{F(AV)})$; sinusoidal current waveform; parameter a = form factor = $I_{F(RMS)}/I_{F(AV)}$.*

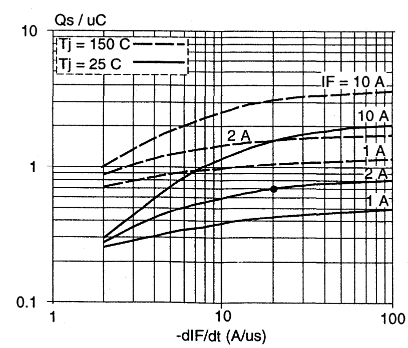



*Fig.6. Maximum $Q_s$ at $T_j$ = 25°C and 150°C*

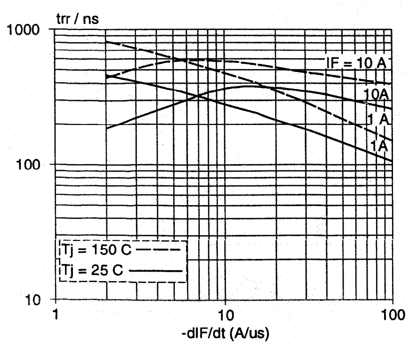



*Fig.7. Maximum $t_{rr}$ measured to 25% of $I_{rrm}$; $T_j$ = 25˚C and 150˚C*

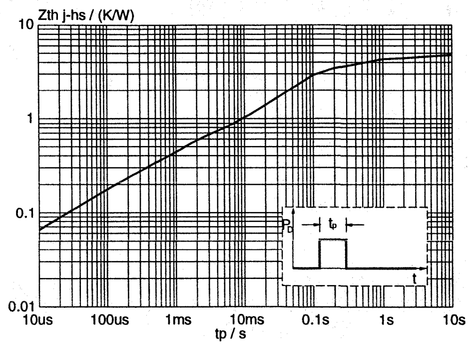



*Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$*

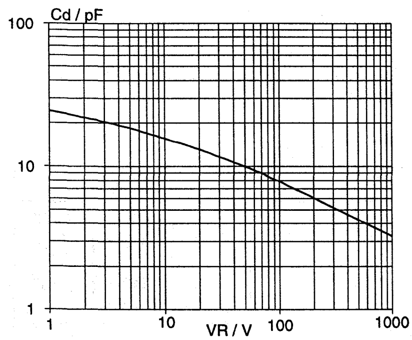



*Fig.8. Typical junction capacitance $C_d$ at f = 1 MHz; $T_j$ = 25˚C*

# Rectifier diodes fast, soft-recovery

# BY329X series

## GENERAL DESCRIPTION

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

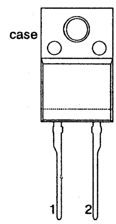
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BY329X** | **-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 | 65 | 65 | 65 | A |
| $t_{rr}$ | Reverse recovery time | 145 | 145 | 145 | ns |

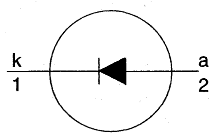
## PINNING - SOD113

| 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 |
|---|---|---|---|---|---|---|---|
| | | | | **-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; $\delta = 0.5$; $T_{hs} \leq 83$ ˚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 | - | 65 | | | A |
| | | t = 8.3 ms | - | 71 | | | A |
| | | sinusoidal; $T_j = 150$ ˚C prior to surge; with reapplied $V_{RWM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ for fusing | t = 10 ms | - | 28 | | | $A^2s$ |
| $T_{stg}$ | Storage temperature | | -40 | 150 | | | ˚C |
| $T_j$ | Operating junction temperature | | - | 150 | | | ˚C |

**1** Neglecting switching and reverse current losses.

## ISOLATION LIMITING VALUE & CHARACTERISTIC

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

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

## THERMAL RESISTANCES

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

## STATIC CHARACTERISTICS

$T_j$ = 25 ˚C unless otherwise stated

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_F$ | Forward voltage | $I_F$ = 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 | - | 125 | 145 | 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 |

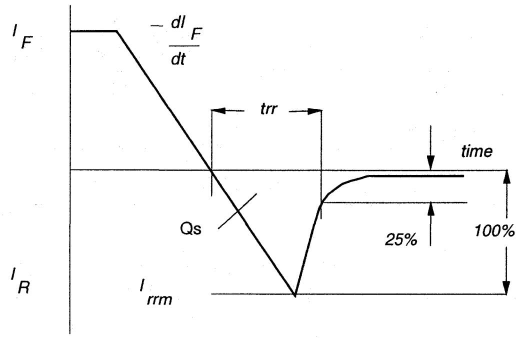



*Fig.1.* Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$

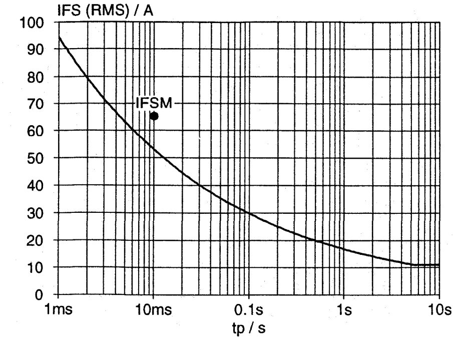



*Fig.4.* Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j$ = 150˚C prior to surge with reapplied $V_{RWM}$.

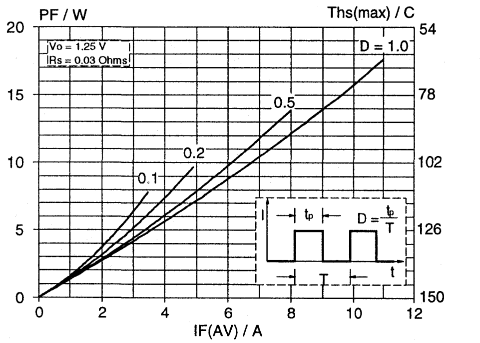



*Fig.2.* Maximum forward dissipation, $P_F = f(I_{F(AV)})$; square wave current waveform; parameter D = duty cycle = $t_p/T$.

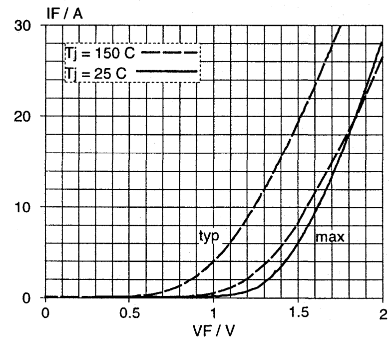



*Fig.5.* Typical and maximum forward characteristic; $I_F = f(V_F)$; parameter $T_j$

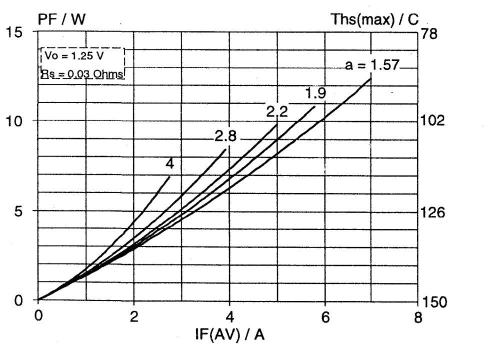



*Fig.3.* Maximum forward dissipation, $P_F = f(I_{F(AV)})$; sinusoidal current waveform; parameter a = form factor = $I_{F(RMS)}/I_{F(AV)}$.

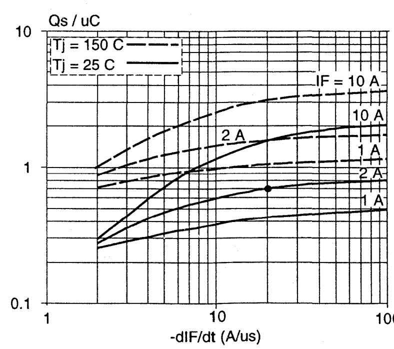



*Fig.6.* Maximum $Q_s$ at $T_j$ = 25˚C and 150˚C

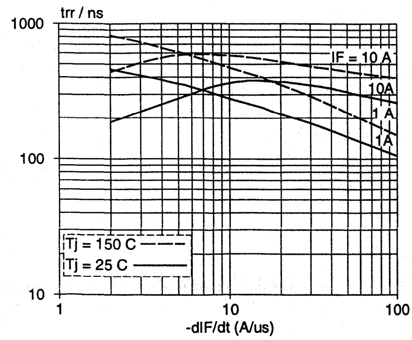



*Fig.7. Maximum $t_{rr}$ measured to 25% of $I_{rrm}$; $T_j = 25˚C$ and 150˚C*

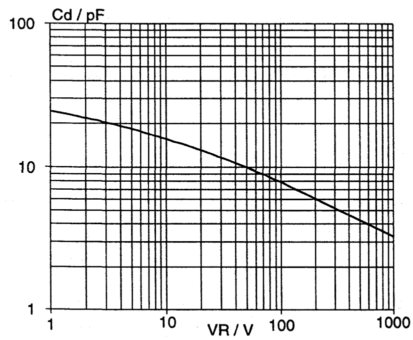



*Fig.8. Typical junction capacitance $C_d$ at f = 1 MHz; $T_j = 25˚C$*

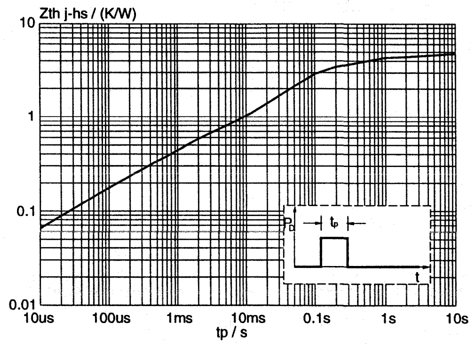



*Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$*

# 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.

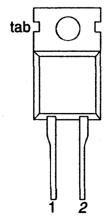
## QUICK REFERENCE DATA

| 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 |

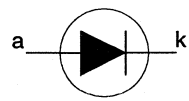
## PINNING - TO220AC

| 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 |

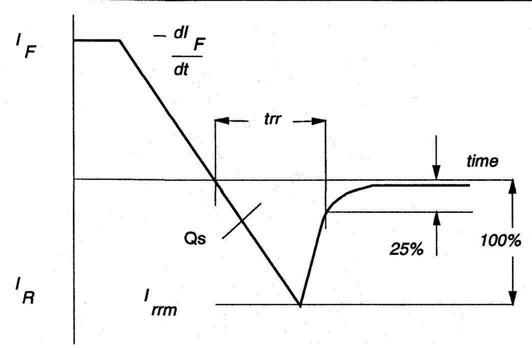



*Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$*

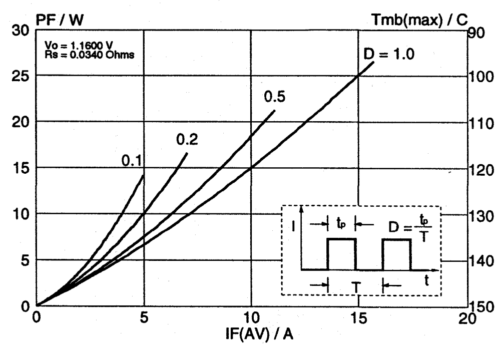



*Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

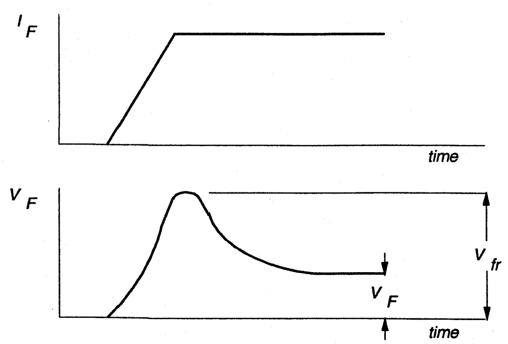



*Fig.2. Definition of $V_{fr}$*

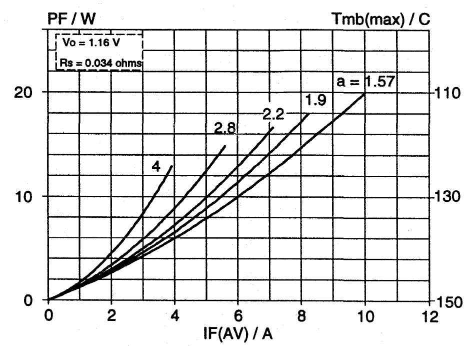



*Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

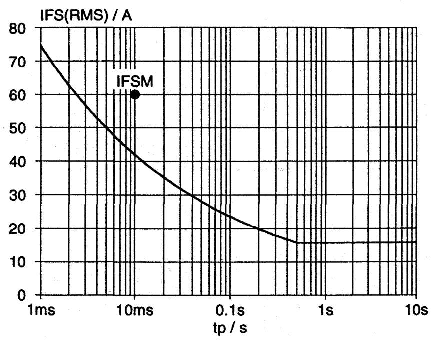



*Fig.5. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j = 150^{\circ}C$ prior to surge with reapplied $V_{RWM}$.*

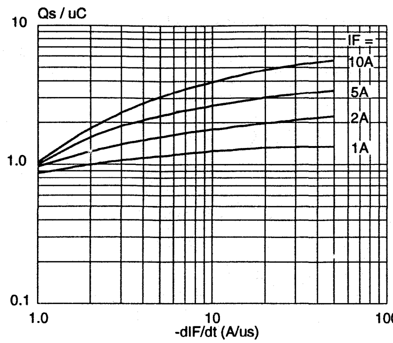



*Fig.8. Maximum reverse recovery charge $Q_s = f(dI_F/dt)$; parameter $T_j$*

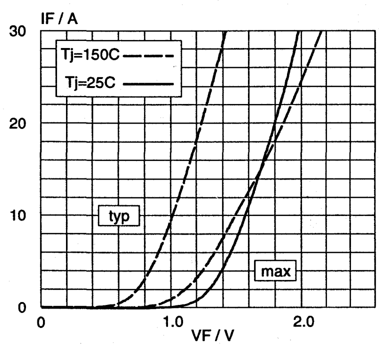



*Fig.6. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

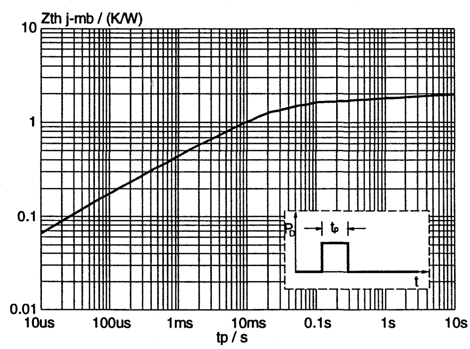



*Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$*

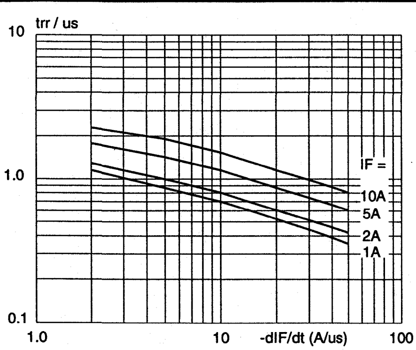



*Fig.7. Maximum reverse recovery time $t_{rr} = f(dI_F/dt)$; parameter $T_j$*

# 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.

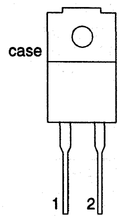
## QUICK REFERENCE DATA

| 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 |

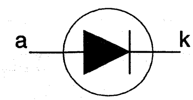
## PINNING - SOD100

| 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 |

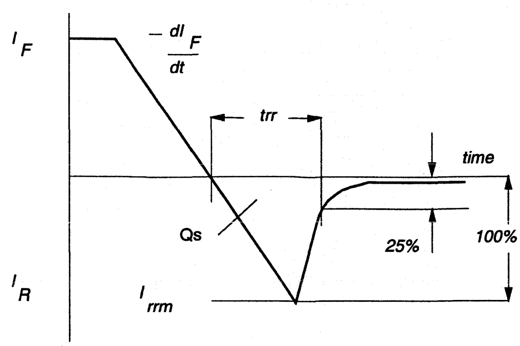



*Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$*

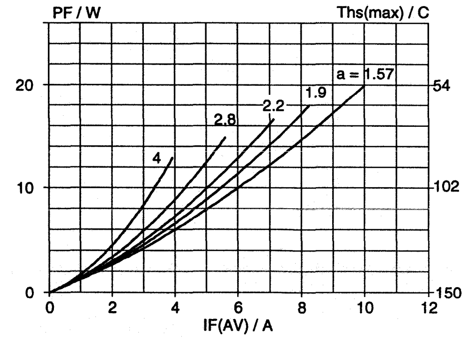



*Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)}$ / $I_{F(AV)}$.*

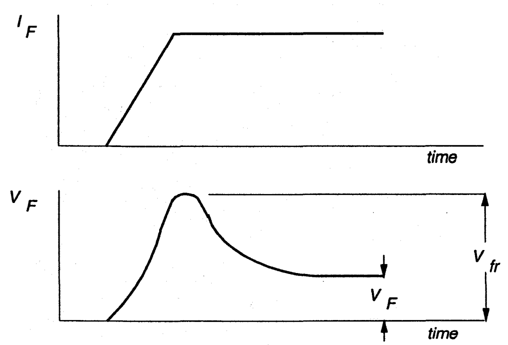



*Fig.2. Definition of $V_{fr}$*

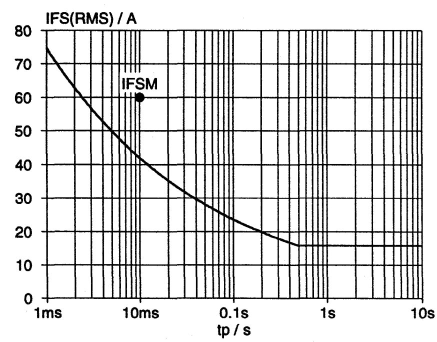



*Fig.5. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j = 150^{\circ}C$ prior to surge with reapplied $V_{RWM}$.*

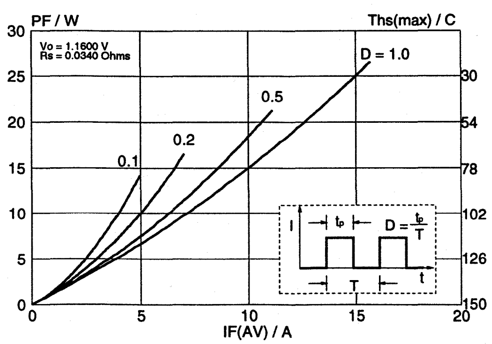



*Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

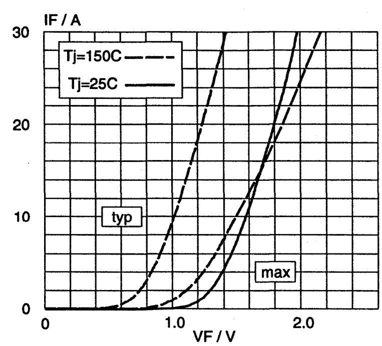



*Fig.6. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

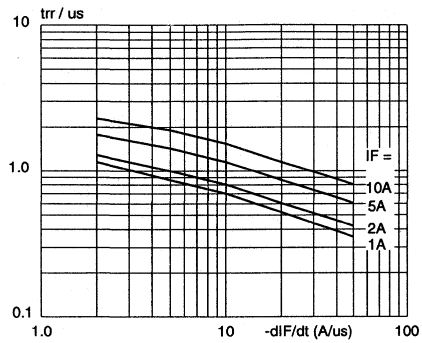



*Fig.7. Maximum reverse recovery time $t_{rr} = f(dI_F/dt)$; parameter $T_j$*

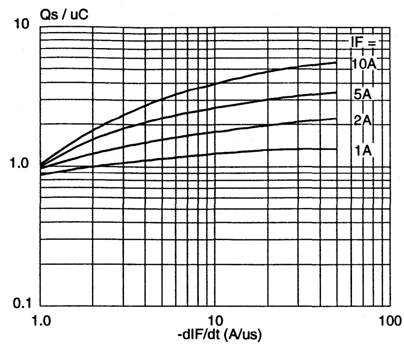



*Fig.8. Maximum reverse recovery charge $Q_s = f(dI_F/dt)$; parameter $T_j$*

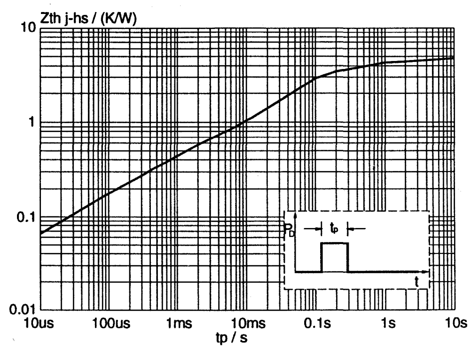



*Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$*

# 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.

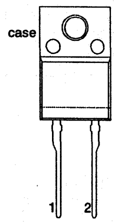
## QUICK REFERENCE DATA

| 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 |

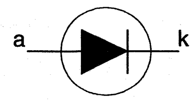
## PINNING - SOD113

| 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 |
|---|---|---|---|---|---|---|
| $R_{th\ j-hs}$ | Thermal resistance junction to heatsink | with heatsink compound | - | - | 4.8 | K/W |
| | | without heatsink compound | - | - | 5.9 | 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 | $I_F$ = 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

# BY359X-1500

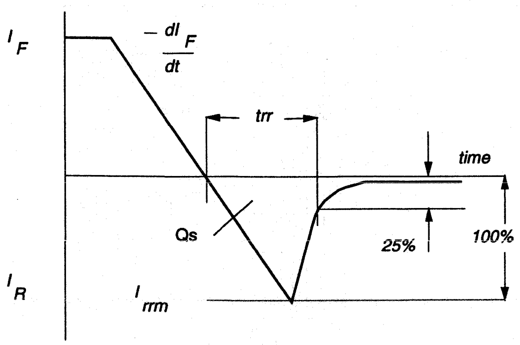



*Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$*

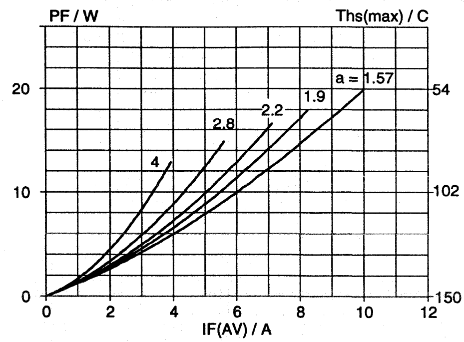



*Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)}$ / $I_{F(AV)}$.*

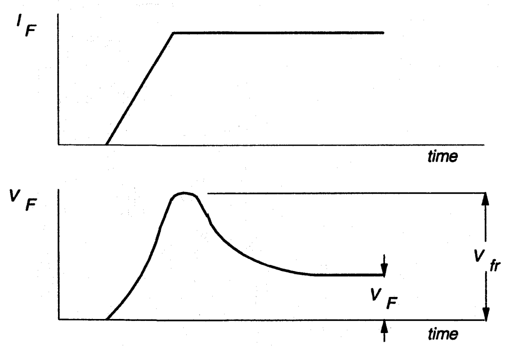



*Fig.2. Definition of $V_{fr}$*

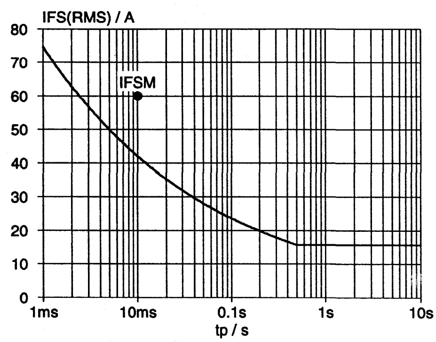



*Fig.5. Maximum non-repetitive rms forward current. $I_F = f(t_p)$; sinusoidal current waveform; $T_j$ = 150˚C prior to surge with reapplied $V_{RWM}$.*

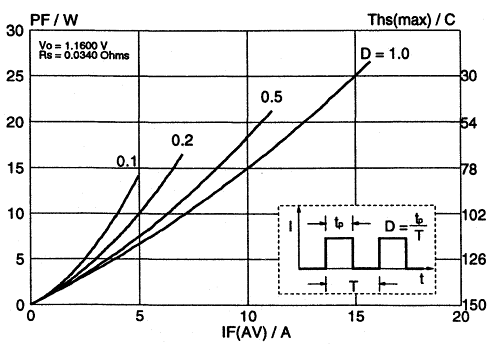



*Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

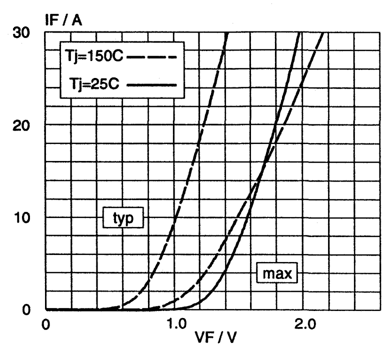



*Fig.6. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

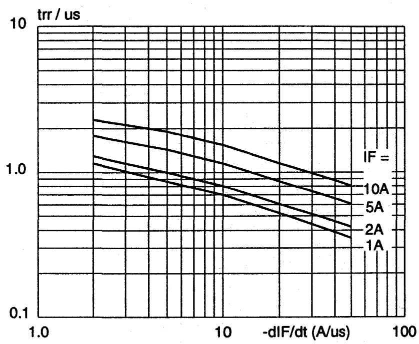



*Fig.7. Maximum reverse recovery time $t_{rr} = f(dI_F/dt)$; parameter $T_j$*

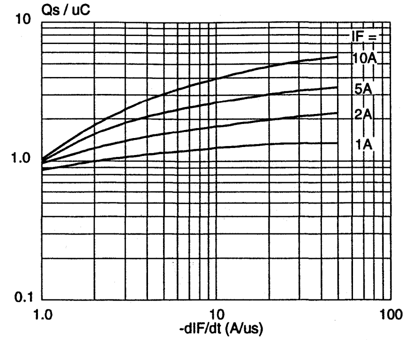



*Fig.8. Maximum reverse recovery charge $Q_s = f(dI_F/dt)$; parameter $T_j$*

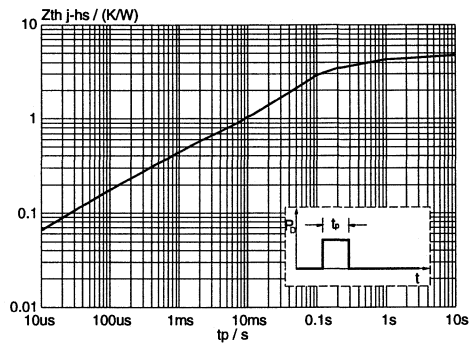



*Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$*

# Rectifier diode fast, high-voltage

# 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 horizontal deflection circuits.

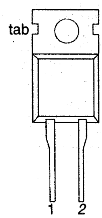
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | UNIT |
|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | 1500 | V |
| $V_F$ | Forward voltage | 1.2 | V |
| $I_{FWM}$ | Working peak forward current | 10 | A |
| $I_{FRM}$ | Repetitive peak forward current | 100 | A |
| $t_{fr}$ | Forward recovery time | 250 | ns |
| $V_{fr}$ | Forward recovery voltage | 14 | V |

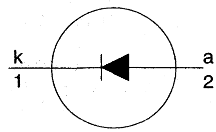
## PINNING - TO220AC

| 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 during flash-over of picture tube | | - | 1500 | V |
| $V_{RRM}$ | Repetitive peak reverse voltage | t = 6 µs; f = 82 kHz | - | 1500 | V |
| $V_{RWM}$ | Crest working reverse voltage | | - | 1300 | V |
| $I_{FWM}$ | Working peak forward current[1] | f = 82 kHz; $T_{mb} \leq 143$ ˚C | - | 10 | A |
| $I_{FRM}$ | Repetitive peak forward current | t = 100 µs | - | 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 $V_{RWM(max)}$ | | | |
| $T_{stg}$ | 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 Including worst case forward recovery losses, see fig:5.

## 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 |
| $Q_s$ | Reverse recovery charge | $I_F$ = 2 A; $-dI_F/dt$ = 20 A/µs; $V_R \geq$ 30 V | - | 2.0 | 3.0 | µC |

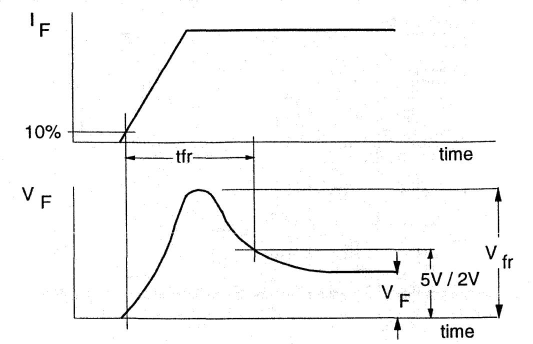



Fig.1. Definition of Vfr and tfr

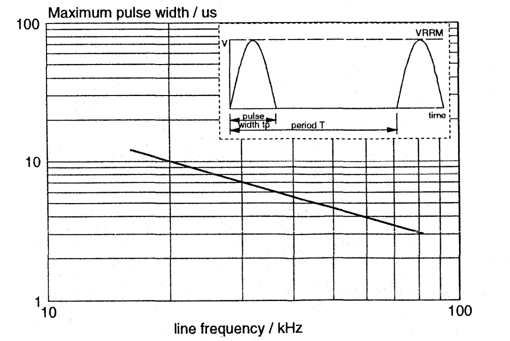



Fig.4. Maximum allowable pulse width $t_p$ versus line frequency; Basic horizontal deflection circuit.

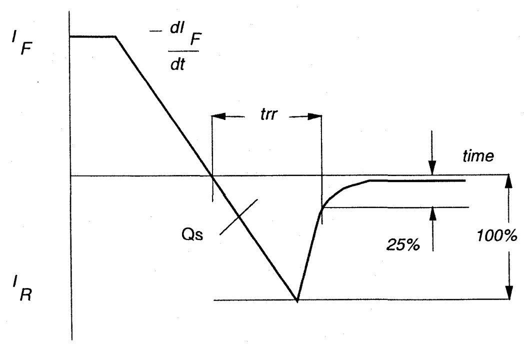



Fig.2. Definition of $t_{rr}$ and $Q_s$

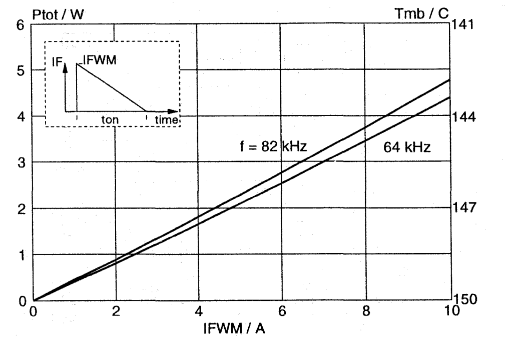



Fig.5. Total dissipation $P_{tot} = f(I_{FWM})$; including forward recovery losses; Basic horizontal deflection circuit.

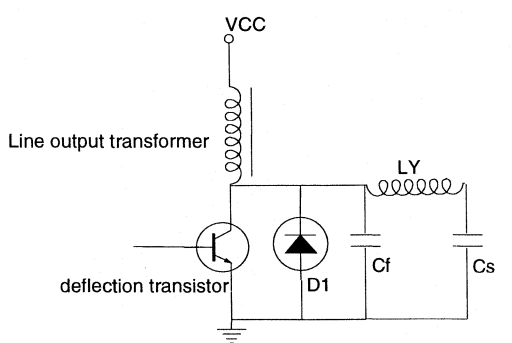



Fig.3. Basic horizontal deflection circuit.

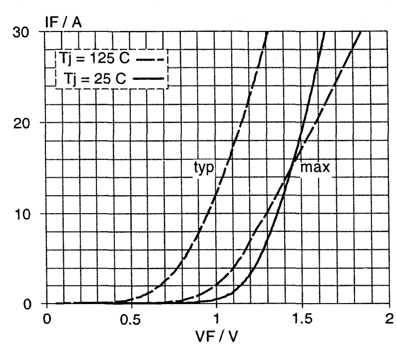



Fig.6. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

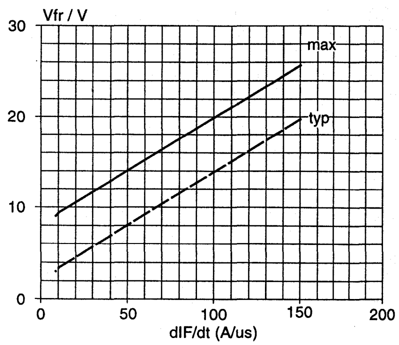



*Fig.7. Typical and maximum $V_{fr} = f(dI_F/dt)$; $I_F = 6.5A$; $T_j = 25^{\circ}C$*

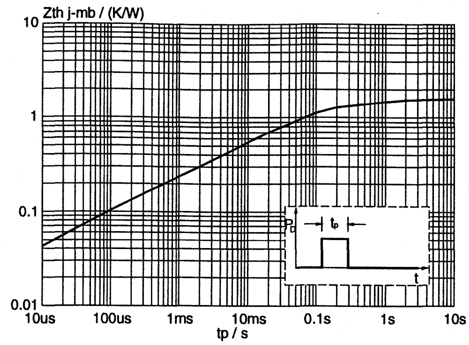



*Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$*

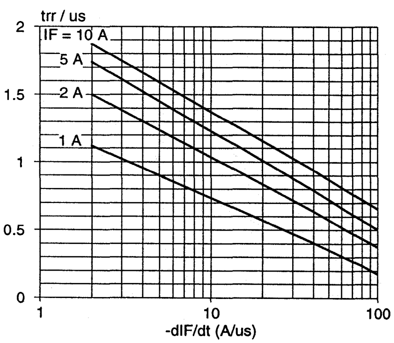



*Fig.8. Maximum reverse recovery time $t_{rr} = f(dI_F/dt)$; parameter $T_j$; $V_R \geq 30V$*

# 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 horizontal deflection circuits.

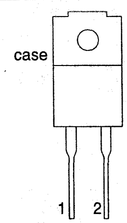
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | UNIT |
|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | 1500 | V |
| $V_F$ | Forward voltage | 1.2 | V |
| $I_{FWM}$ | Working peak forward current | 10 | A |
| $I_{FRM}$ | Repetitive peak forward current | 100 | A |
| $t_{fr}$ | Forward recovery time | 250 | ns |
| $V_{fr}$ | Forward recovery voltage | 14 | V |

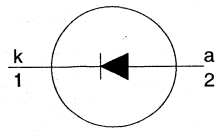
## PINNING - SOD100

| 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 during flash-over of picture tube | | - | 1500 | V |
| $V_{RRM}$ | Repetitive peak reverse voltage | t = 6 µs; f = 82kHz | - | 1500 | V |
| $V_{RWM}$ | Crest working reverse voltage | | - | 1300 | V |
| $I_{FWM}$ | Working peak forward current[1] | f = 82kHz; $T_{hs} \leq 127$ ˚C | - | 10 | A |
| $I_{FRM}$ | Repetitive peak forward current | t = 100 µs | - | 100 | A |
| $I_{FSM}$ | Non-repetitive peak forward current | t = 10 ms | - | 100 | A |
| | | t = 8.3 ms<br>sinusoidal; $T_j$ = 150 ˚C prior to surge; with reapplied $V_{RWM(max)}$ | - | 110 | A |
| $T_{stg}$ | Storage temperature | | -40 | 150 | ˚C |
| $T_j$ | Operating junction temperature | | - | 150 | ˚C |

## ISOLATION LIMITING VALUE & CHARACTERISTIC

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

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

**1** Including worst case forward recovery losses, see fig:5.

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j-hs}$ | Thermal resistance junction to heatsink | with heatsink compound | - | - | 4.8 | K/W |
| | | without heatsink compound | - | - | 5.9 | 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 | $I_F$ = 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 |
| $Q_s$ | Reverse recovery charge | $I_F$ = 2 A; $-dI_F/dt$ = 20 A/µs; $V_R \geq 30$ V | - | 2.0 | 3.0 | µC |

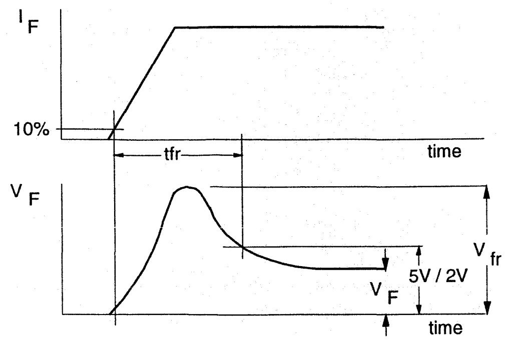



*Fig.1. Definition of Vfr and tfr*

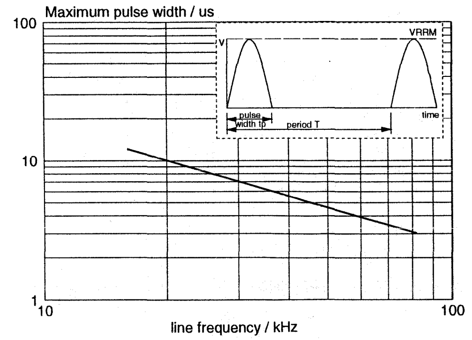



*Fig.4. Maximum allowable pulse width $t_p$ versus line frequency; Basic horizontal deflection circuit.*

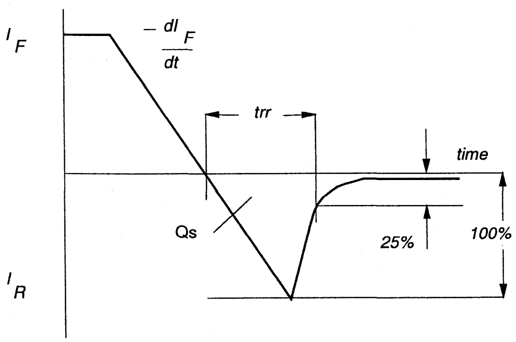



*Fig.2. Definition of $t_{rr}$ and $Q_s$*

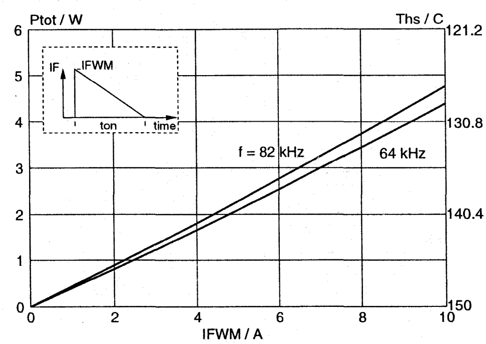



*Fig.5. Total dissipation $P_{tot} = f(I_{FWM})$; including forward recovery losses; Basic horizontal deflection circuit.*

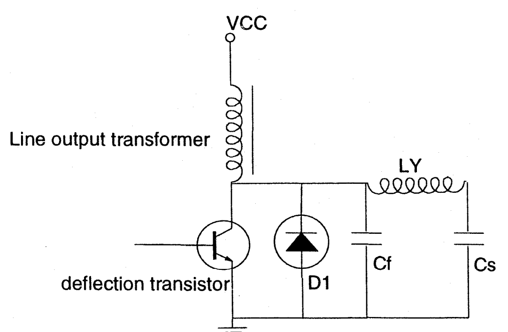



*Fig.3. Basic horizontal deflection circuit.*

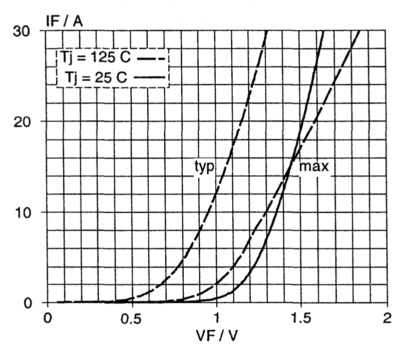



*Fig.6. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

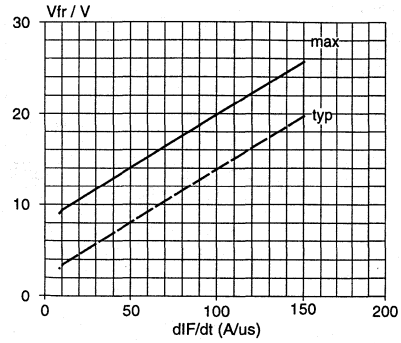



Fig.7. Typical and maximum $V_{fr} = f(dI_F/dt)$; $I_F = 6.5A$; $T_j = 25^{\circ}C$

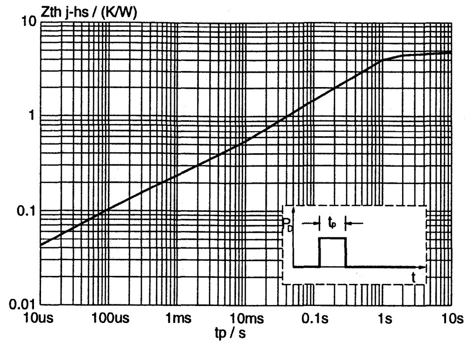



Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$

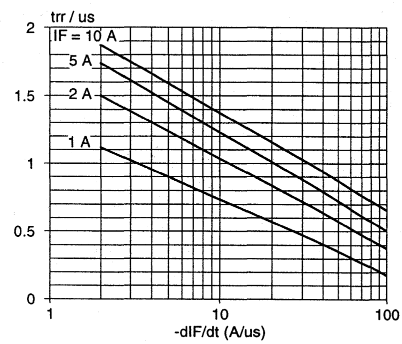



Fig.8. Maximum reverse recovery time $t_{rr} = f(dI_F/dt)$; parameter $T_j$; $V_R \geq 30V$

# Rectifier diode fast, high-voltage

# BY459X-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 horizontal deflection circuits.

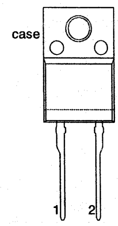
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | UNIT |
|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | 1500 | V |
| $V_F$ | Forward voltage | 1.2 | V |
| $I_{FWM}$ | Working peak forward current | 10 | A |
| $I_{FRM}$ | Repetitive peak forward current | 100 | A |
| $t_{fr}$ | Forward recovery time | 250 | ns |
| $V_{fr}$ | Forward recovery voltage | 14 | V |

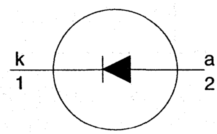
## PINNING - SOD113

| 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 during flash-over of picture tube | | - | 1500 | V |
| $V_{RRM}$ | Repetitive peak reverse voltage | $t = 6\ \mu s$; $f = 82kHz$ | - | 1500 | V |
| $V_{RWM}$ | Crest working reverse voltage | | - | 1300 | V |
| $I_{FWM}$ | Working peak forward current[1] | $f = 82kHz$; $T_{hs} \leq 127\ ˚C$ | - | 10 | A |
| $I_{FRM}$ | Repetitive peak forward current | $t = 100\ \mu s$ | - | 100 | A |
| $I_{FSM}$ | Non-repetitive peak forward current | $t = 10$ ms | - | 100 | A |
| | | $t = 8.3$ ms<br>sinusoidal; $T_j = 150$ ˚C prior to surge; with reapplied $V_{RWM(max)}$ | - | 110 | A |
| $T_{stg}$ | Storage temperature | | -40 | 150 | ˚C |
| $T_j$ | Operating junction temperature | | - | 150 | ˚C |

## ISOLATION LIMITING VALUE & CHARACTERISTIC

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

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

**1** Including worst case forward recovery losses, see fig:5.

## 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 |
| $Q_s$ | Reverse recovery charge | $I_F$ = 2 A; $-dI_F/dt$ = 20 A/µs; $V_R \geq 30$ V | - | 2.0 | 3.0 | µC |

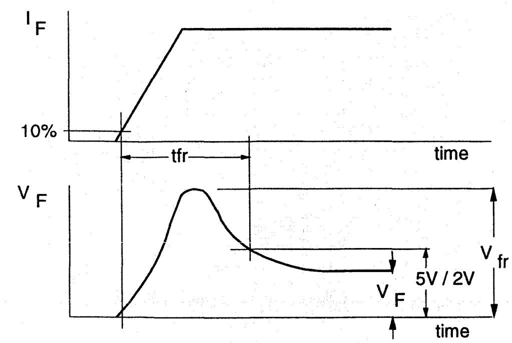



*Fig.1. Definition of Vfr and tfr*

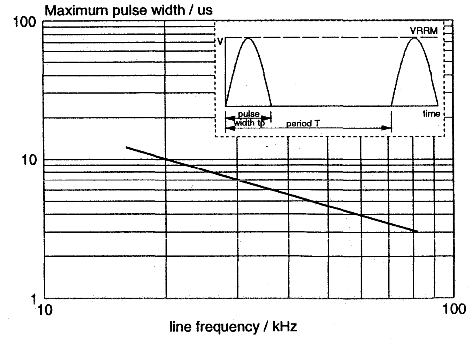



*Fig.4. Maximum allowable pulse width $t_p$ versus line frequency; Basic horizontal deflection circuit.*

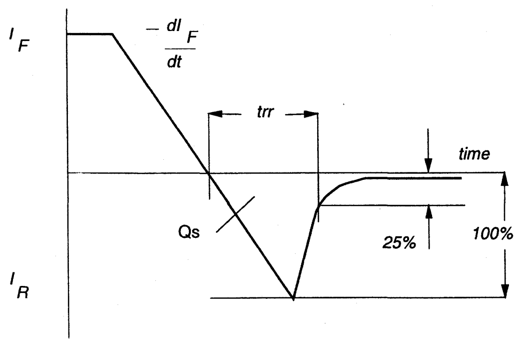



*Fig.2. Definition of $t_{rr}$ and $Q_s$*

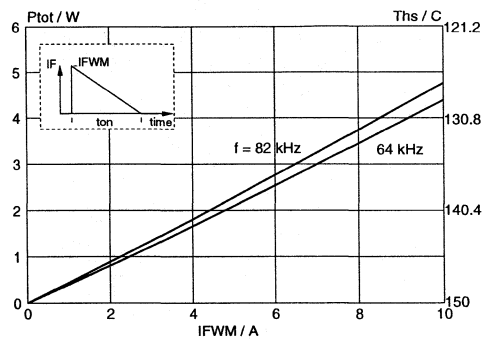



*Fig.5. Total dissipation $P_{tot} = f(I_{FWM})$; including forward recovery losses; Basic horizontal deflection circuit.*

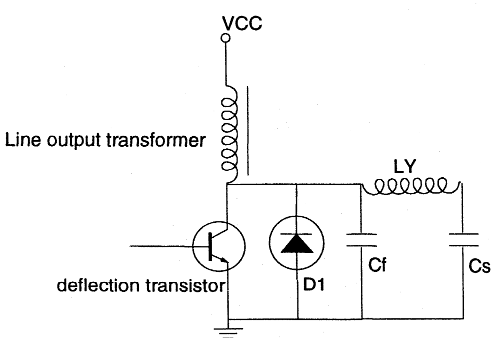



*Fig.3. Basic horizontal deflection circuit.*

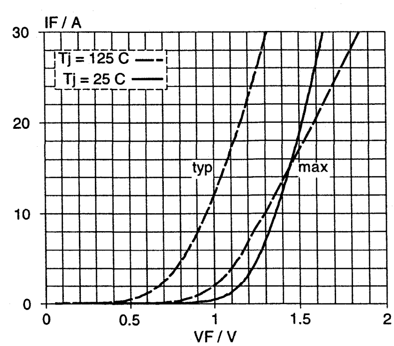



*Fig.6. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

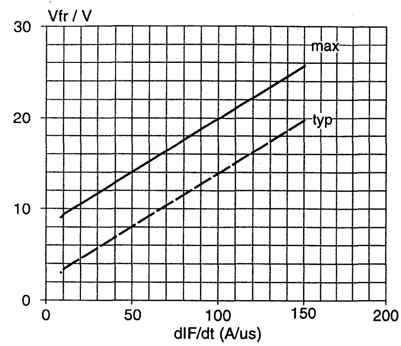



*Fig.7. Typical and maximum $V_{fr} = f(dI_F/dt)$; $I_F = 6.5A$; $T_j = 25^{\circ}C$*

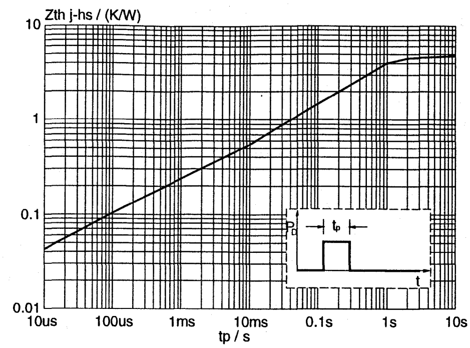



*Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$*

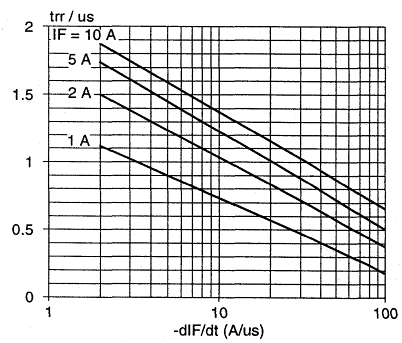



*Fig.8. Maximum reverse recovery time $t_{rr} = f(dI_F/dt)$; parameter $T_j$; $V_R \geq 30V$*

# Rectifier diode fast, high-voltage

# BY479X-1700

## 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 64kHz. The device is designed to withstand transient reverse voltages up to 1700V.

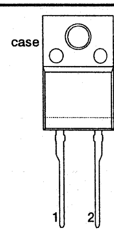
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | UNIT |
|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | 1700 | V |
| $V_F$ | Forward voltage | 1.2 | V |
| $I_{FWM}$ | Working peak forward current | 10 | A |
| $I_{FRM}$ | Repetitive peak forward current | 100 | A |
| $t_{fr}$ | Forward recovery time | 300 | ns |
| $V_{fr}$ | Forward recovery voltage | 19 | V |

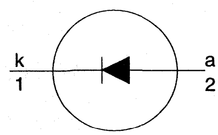
## PINNING - SOD113

| 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 during flash-over of picture tube | | - | 1700 | V |
| $V_{RRM}$ | Repetitive peak reverse voltage | $t = 3.5\ \mu s$; f = 64kHz | - | 1700 | V |
| $V_{RWM}$ | Crest working reverse voltage | | - | 1300 | V |
| $I_{FWM}$ | Working peak forward current[1] | f = 64kHz; $T_{hs} \leq 126\ ^\circ C$ | - | 10 | A |
| $I_{FRM}$ | Repetitive peak forward current | $t = 100\ \mu s$ | - | 100 | A |
| $I_{FSM}$ | Non-repetitive peak forward current | t = 10 ms | - | 100 | A |
| | | t = 8.3 ms | - | 110 | A |
| | | sinusoidal; $T_j = 150\ ^\circ C$ prior to surge; with reapplied $V_{RWM(max)}$ | | | |
| $T_{stg}$ | Storage temperature | | -40 | 150 | ˚C |
| $T_j$ | Operating junction temperature | | - | 150 | ˚C |

## ISOLATION LIMITING VALUE & CHARACTERISTIC

$T_{hs} = 25\ ^\circ C$ unless otherwise specified

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

1 Including worst case forward recovery losses, see fig:5.

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j-hs}$ | Thermal resistance junction to heatsink | with heatsink compound | - | - | 4.8 | K/W |
| | | without heatsink compound | - | - | 5.9 | 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 | $I_F$ = 6.5 A | - | 0.95 | 1.3 | V |
| | | $I_F$ = 6.5 A; $T_j$ = 125 ˚C | - | 0.85 | 1.2 | V |
| $I_R$ | Reverse current | $V_R = V_{RWMmax}$ | - | - | 0.25 | mA |
| | | $V_R = V_{RWMmax}$; $T_j$ = 125 ˚C | - | - | 1.0 | mA |

## DYNAMIC CHARACTERISTICS

$T_j$ = 25 ˚C unless otherwise stated

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{fr}$ | Forward recovery voltage | $I_F$ = 6.5 A; $dI_F/dt$ = 50 A/µs | - | 12 | 19 | V |
| $t_{fr}$ | Forward recovery time | $I_F$ = 6.5 A; $dI_F/dt$ = 50 A/µs; $V_F$ = 5 V | - | 200 | 300 | ns |
| | | $I_F$ = 6.5 A; $dI_F/dt$ = 50 A/µs; $V_F$ = 2 V | - | 400 | - | ns |
| $t_{rr}$ | Reverse recovery time | $I_F$ = 1 A; $-dI_F/dt$ = 50 A/µs; $V_R \geq 30$ V | - | 250 | 350 | ns |
| $Q_s$ | Reverse recovery charge | $I_F$ = 2 A; $-dI_F/dt$ = 20 A/µs; $V_R \geq 30$ V | - | 2.0 | 3.0 | µC |

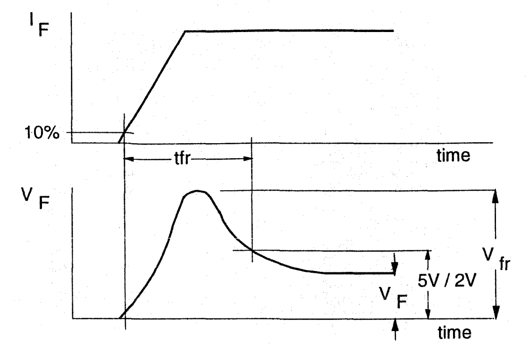



*Fig.1. Definition of Vfr and tfr*

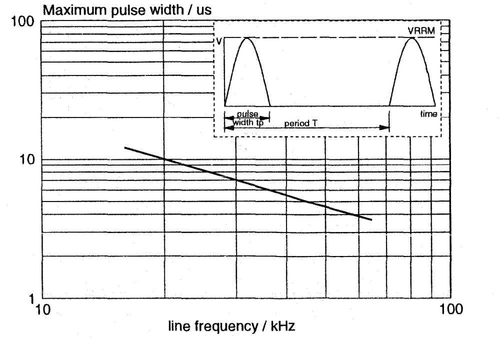



*Fig.4. Maximum allowable pulse width $t_p$ versus line frequency; Basic horizontal deflection circuit.*

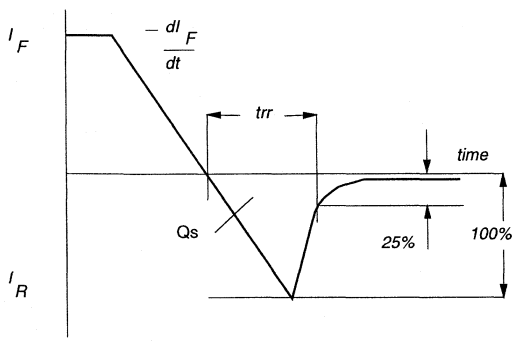



*Fig.2. Definition of $t_{rr}$ and $Q_s$*

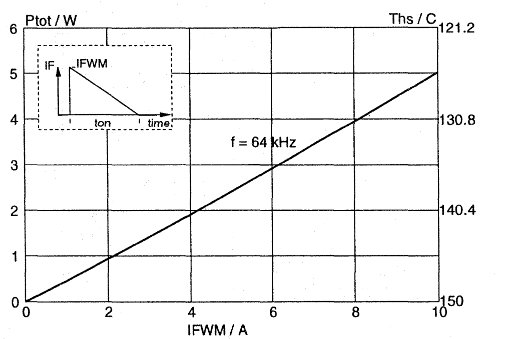



*Fig.5. Total dissipation $P_{tot} = f(I_{FWM})$; including forward recovery losses; Basic horizontal deflection circuit.*

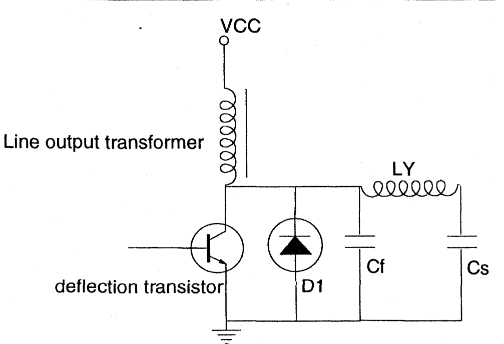



*Fig.3. Basic horizontal deflection circuit.*

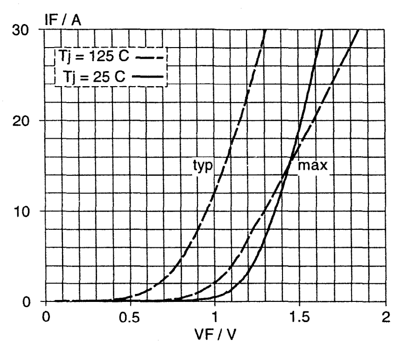



*Fig.6. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

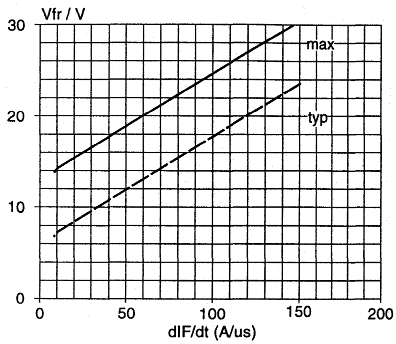



Fig.7. Typical and maximum $V_{fr} = f(dI_F/dt)$; $I_F = 6.5A$; $T_j = 25˚C$

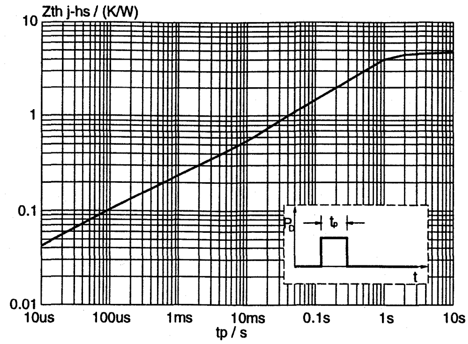



Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$

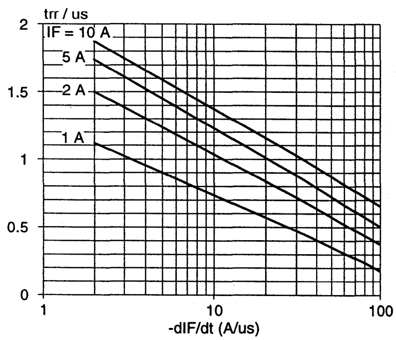



Fig.8. Maximum reverse recovery time $t_{rr} = f(dI_F/dt)$; parameter $T_j$; $V_R \geq 30V$

# Rectifier diode fast, high-voltage

# BY559-1500

## 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 horizontal deflection circuits with scan rates up to 120 kHz.

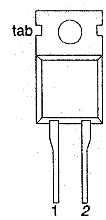
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | UNIT |
|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | 1500 | V |
| $V_F$ | Forward voltage | 0.9 | V |
| $I_{FWM}$ | Working peak forward current | 20 | A |
| $I_{FRM}$ | Repetitive peak forward current | 150 | A |
| $t_{fr}$ | Forward recovery time | 350 | ns |
| $V_{fr}$ | Forward recovery voltage | 11 | V |

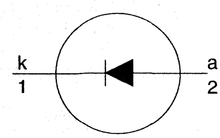
## PINNING - TO220AC

| 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 during flash-over of picture tube | | - | 1500 | V |
| $V_{RRM}$ | Repetitive peak reverse voltage | $t = 6\ \mu s$; $f = 82$ kHz | - | 1500 | V |
| $V_{RWM}$ | Crest working reverse voltage | | - | 1300 | V |
| $I_{FWM}$ | Working peak forward current[1] | $f = 120$ kHz; $T_{mb} \leq 144$ ˚C | - | 20 | A |
| $I_{FRM}$ | Repetitive peak forward current | $t = 100\ \mu s$ | - | 150 | A |
| $I_{FSM}$ | Non repetitive peak forward current | $t = 10$ ms | - | 180 | A |
| | | $t = 8.3$ ms | - | 200 | A |
| | | sinusoidal; $T_j = 150$ ˚C prior to surge; with reapplied $V_{RWM(max)}$ | | | |
| $T_{stg}$ | Storage temperature | | -40 | 150 | ˚C |
| $T_j$ | Operating junction temperature | | - | 150 | ˚C |

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}mb}$ | Thermal resistance junction to mounting base | | - | - | 1.0 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | in free air | - | 60 | - | K/W |

1 Including worst case forward recovery losses, see fig:5.

## STATIC CHARACTERISTICS

$T_j$ = 25 ˚C unless otherwise stated

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_F$ | Forward voltage | $I_F$ = 10 A | - | 1.0 | 1.15 | V |
| | | $I_F$ = 10 A; $T_j$ = 125 ˚C | - | 0.79 | 0.9 | V |
| $I_R$ | Reverse current | $V_R = V_{RWMmax}$ | - | - | 0.5 | mA |
| | | $V_R = V_{RWMmax}$; $T_j$ = 125 ˚C | - | - | 2.0 | mA |

## DYNAMIC CHARACTERISTICS

$T_j$ = 25 ˚C unless otherwise stated

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{fr}$ | Forward recovery voltage | $I_F$ = 10 A; $dI_F/dt$ = 50 A/µs | - | 7 | 11 | V |
| $t_{fr}$ | Forward recovery time | $I_F$ = 10 A; $dI_F/dt$ = 50 A/µs; $V_F$ = 5 V | - | 250 | 350 | ns |
| | | $I_F$ = 10 A; $dI_F/dt$ = 50 A/µs; $V_F$ = 2 V | - | 450 | 600 | ns |
| $t_{rr}$ | Reverse recovery time | $I_F$ = 10 A; $-dI_F/dt$ = 50 A/µs; $V_R \geq$ 30 V | - | 0.75 | 1.0 | µs |
| $Q_s$ | Reverse recovery charge | $I_F$ = 2 A; $-dI_F/dt$ = 20 A/µs; $V_R \geq$ 30 V | - | 4.0 | 6.0 | µC |

# Rectifier diode fast, high-voltage

# BY559-1500

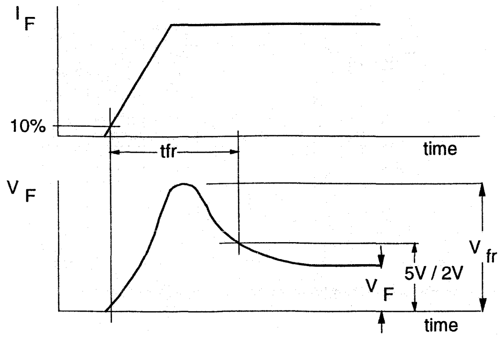



*Fig.1. Definition of Vfr and tfr*

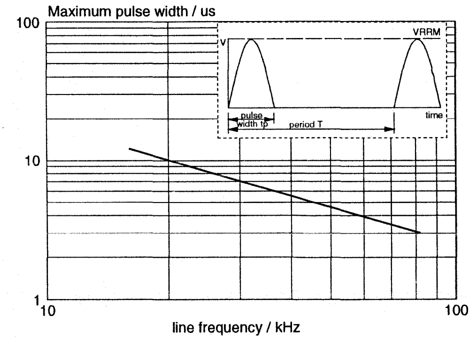



*Fig.4. Maximum allowable pulse width $t_p$ versus line frequency; Basic horizontal deflection circuit.*

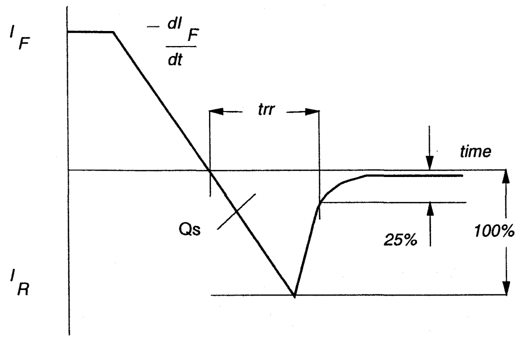



*Fig.2. Definition of $t_{rr}$ and $Q_s$*

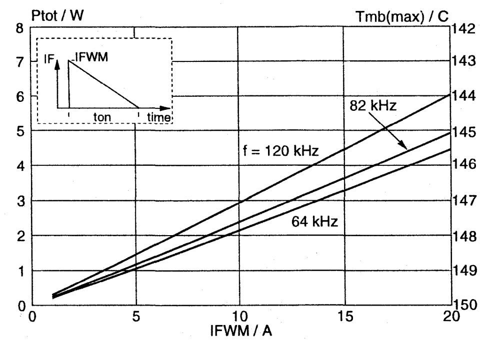



*Fig.5. Total dissipation $P_{tot} = f(I_{FWM})$; including forward recovery losses; Basic horizontal deflection circuit.*

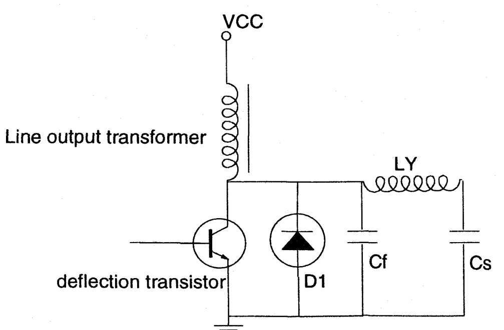



*Fig.3. Basic horizontal deflection circuit.*

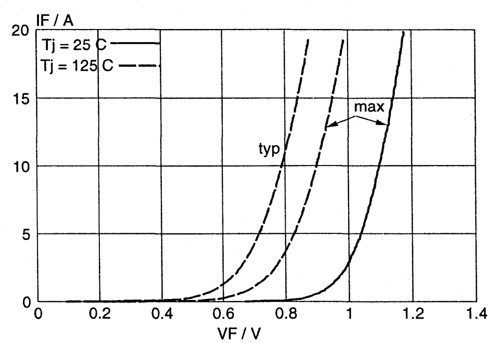



*Fig.6. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

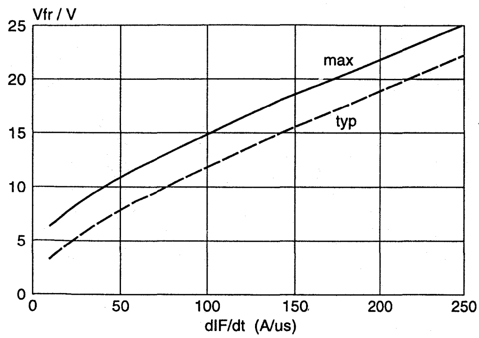



*Fig.7. Typical and maximum $V_{fr} = f(dI_F/dt)$; $I_F = 10$ A; $T_j = 25^\circ C$*

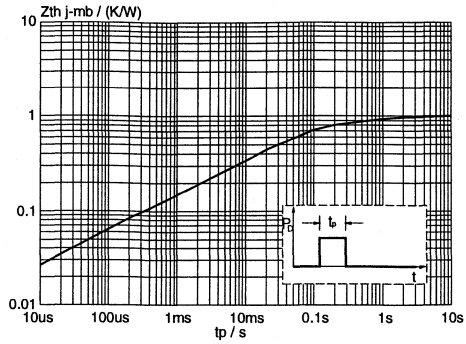



*Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$*

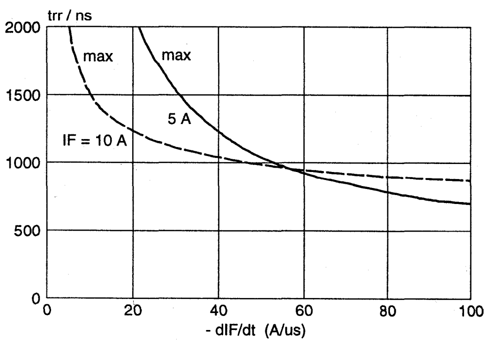



*Fig.8. Maximum reverse recovery time $t_{rr} = f(dI_F/dt)$; parameter $T_j$; $V_R \geq 30V$*

# 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.

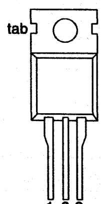
## QUICK REFERENCE DATA

| 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 |

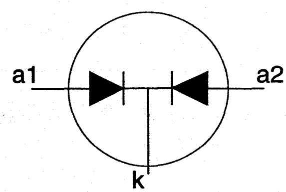
## PINNING - TO220AB

| 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 |

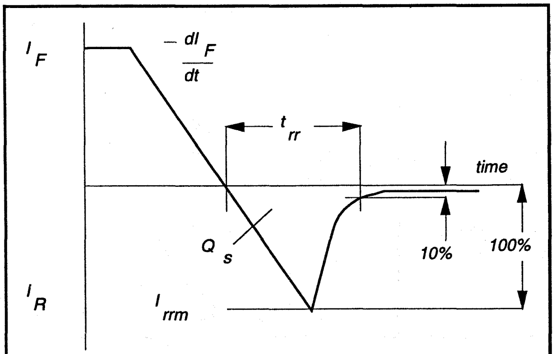



*Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$*

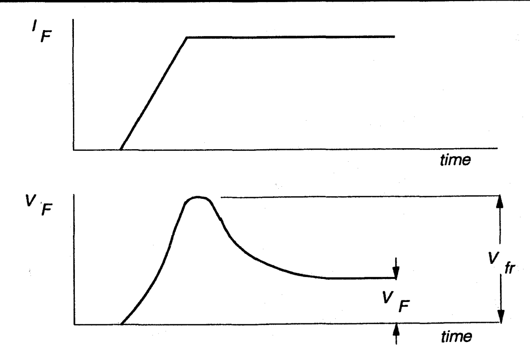



*Fig.2. Definition of $V_{fr}$*

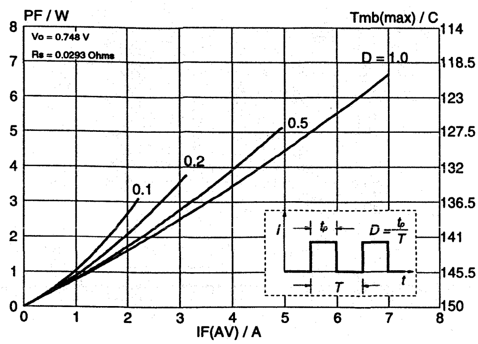



*Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

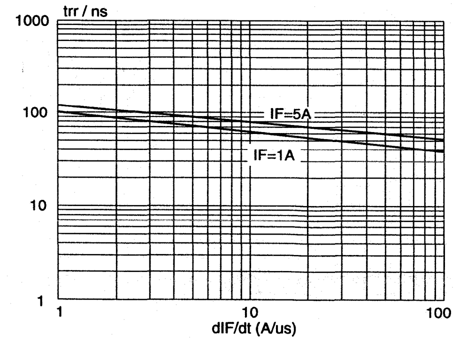



*Fig.6. Maximum $t_{rr}$ at $T_j = 100$ °C; per diode*

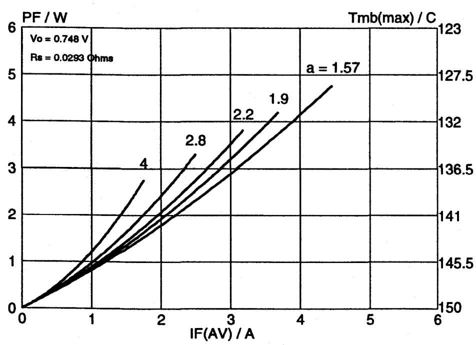



*Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

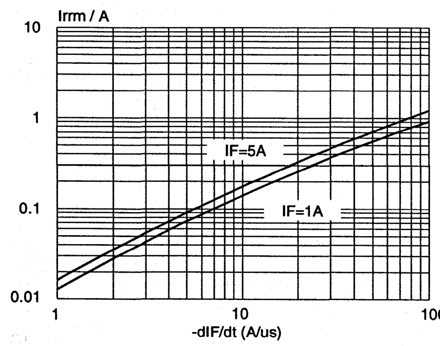



*Fig.7. Maximum $I_{rrm}$ at $T_j = 25$ °C; per diode*

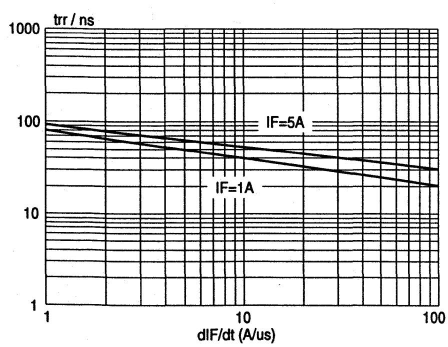



*Fig.5. Maximum $t_{rr}$ at $T_j = 25$ °C; per diode*

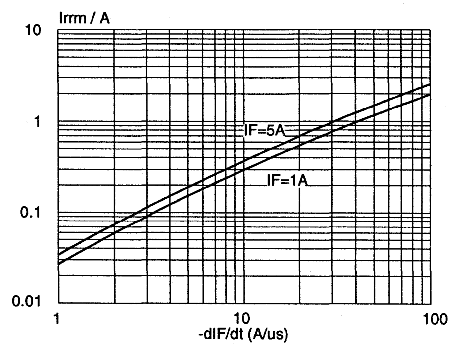



*Fig.8. Maximum $I_{rrm}$ at $T_j = 100$ °C; per diode*

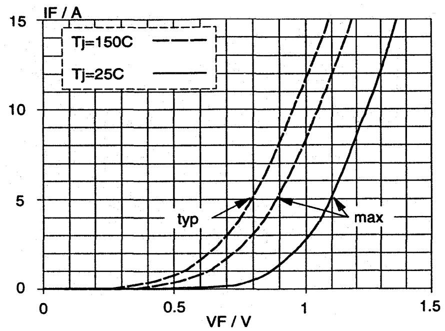



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

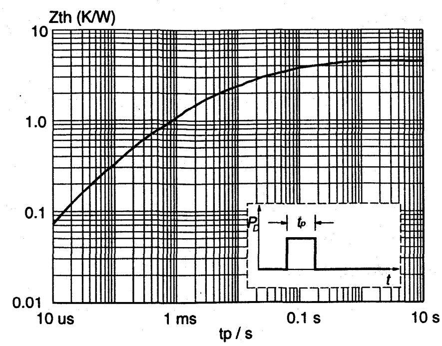



*Fig.11. Transient thermal impedance; per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.*

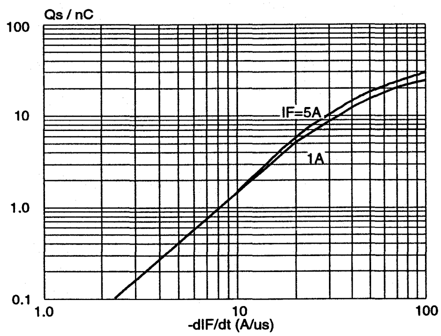



*Fig.10. Maximum $Q_s$ at $T_j$ = 25 ˚C; per diode*

# Rectifier diodes ultrafast, rugged

# BYQ28E series

## GENERAL DESCRIPTION

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

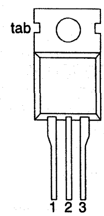
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | 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 |

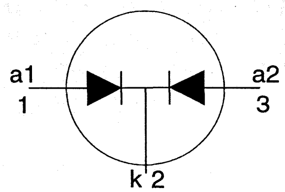
## PINNING - TO220AB

| 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 | - | 55 | | | A |
| | | sinusoidal; with reapplied $V_{RWM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ 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 |

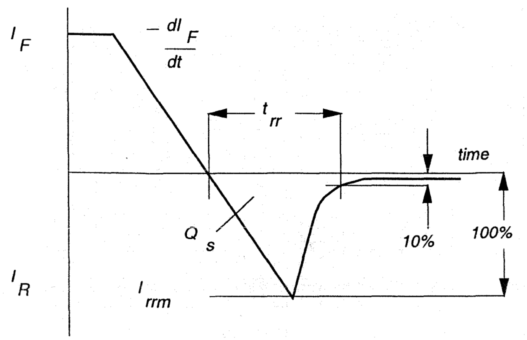



Fig.1. Definition of $t_{rr1}$, $Q_s$ and $I_{rrm}$

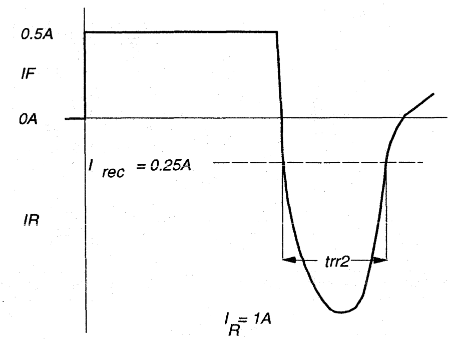



Fig.4. Definition of $t_{rr2}$

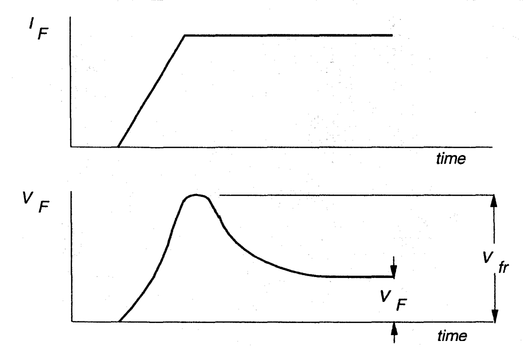



Fig.2. Definition of $V_{fr}$

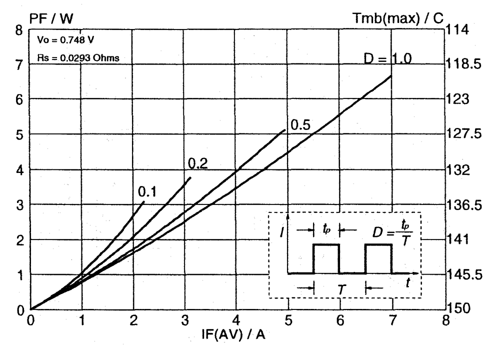



Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

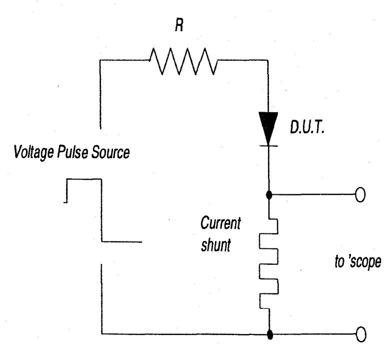



Fig.3. Circuit schematic for $t_{rr2}$

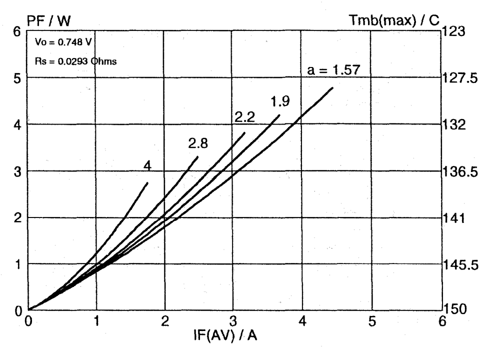



Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

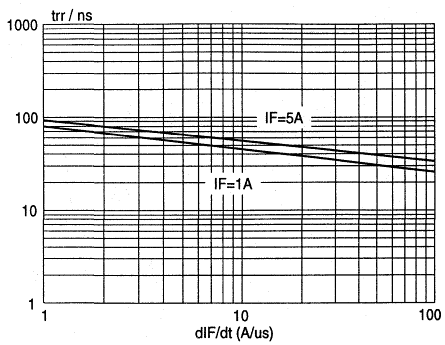



*Fig.7. Maximum $t_{rr}$ at $T_j = 25$ ˚C; per diode*

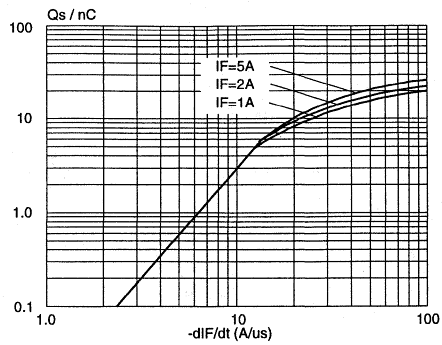



*Fig.10. Maximum $Q_s$ at $T_j = 25$ ˚C; per diode*

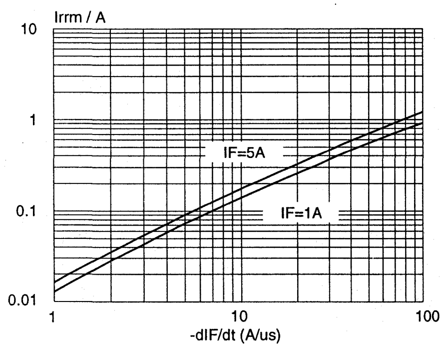



*Fig.8. Maximum $I_{rrm}$ at $T_j = 25$ ˚C; per diode*

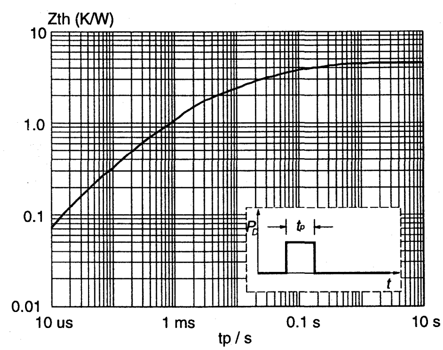



*Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.*

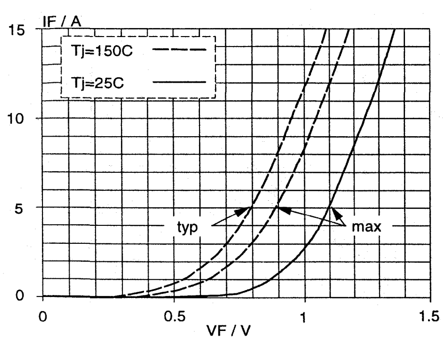



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

# Rectifier diodes ultrafast, rugged | BYQ28EB series

## GENERAL DESCRIPTION

Glass passivated dual epitaxial rectifier diodes in a plastic envelope suitable for surface mounting, featuring low forward voltage drop, ultra-fast recovery times, soft recovery characteristic and guaranteed reverse surge and ESD capability. They are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and switching losses are essential.

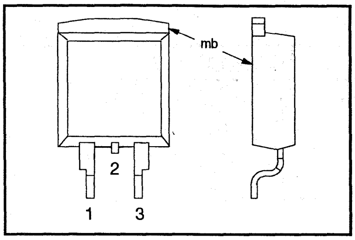
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYQ28EB-** | **100** | **150** | **200** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 100 | 150 | 200 | V |
| $V_F$ | Forward voltage | 0.895 | 0.895 | 0.895 | V |
| $I_{O(AV)}$ | Average 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 |

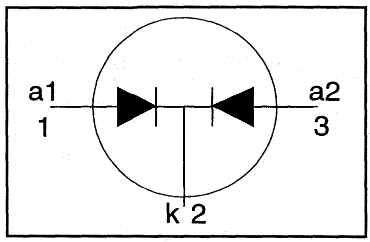
## PINNING - SOT404

| PIN | DESCRIPTION |
|---|---|
| 1 | anode 1 |
| 2 | cathode |
| 3 | anode 2 |
| mb | cathode |

## 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 |
| $I_{O(AV)}$ | Average 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 output current (both diodes conducting) | | - | | 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 $V_{RRM(max)}$ | - | | 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 | minimum footprint, FR4 board | - | 50 | - | 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) | $V_R = V_{RRM}$; $T_j = 100$ ˚C | - | 0.1 | 0.2 | mA |
| | | $V_R = V_{RRM}$ | - | 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 |

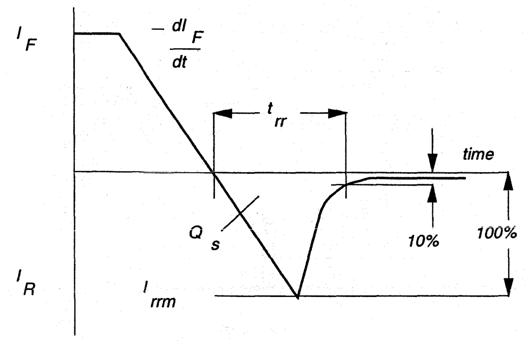



Fig.1. Definition of $t_{rr1}$, $Q_s$ and $I_{rrm}$

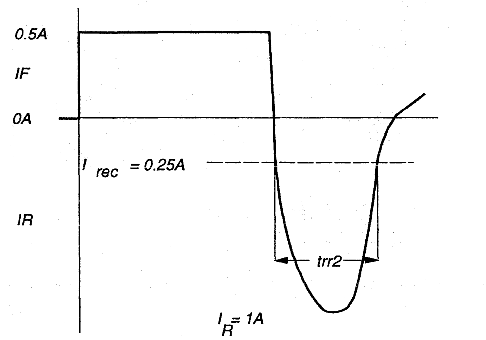



Fig.4. Definition of $t_{rr2}$

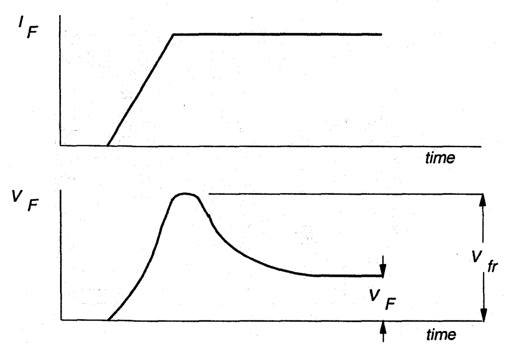



Fig.2. Definition of $V_{fr}$

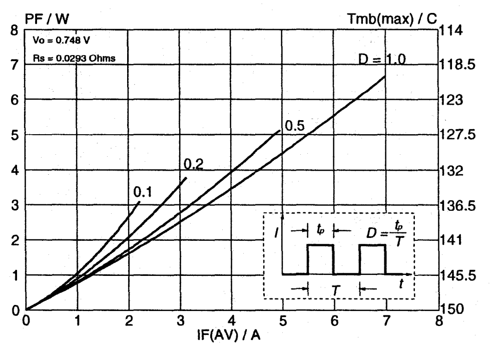



Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

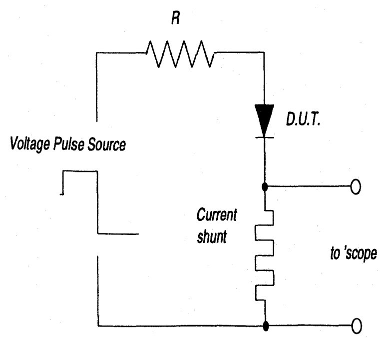



Fig.3. Circuit schematic for $t_{rr2}$

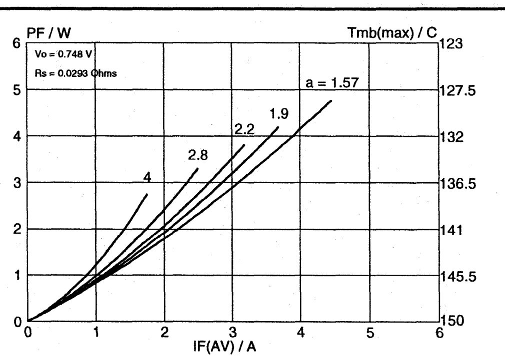



Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

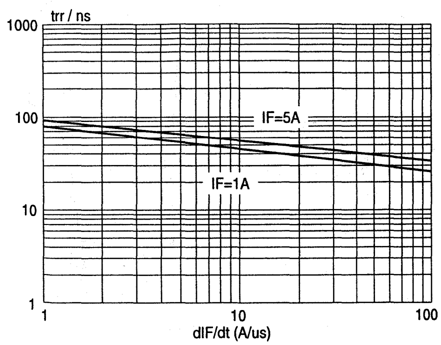



*Fig.7. Maximum $t_{rr}$ at $T_j$ = 25 ˚C; per diode*

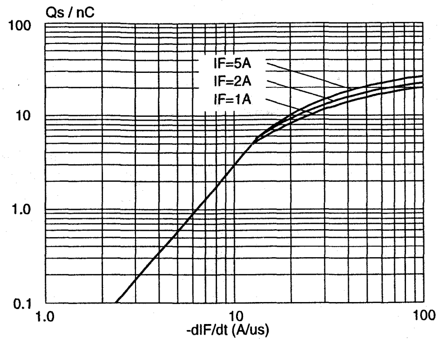



*Fig.10. Maximum $Q_s$ at $T_j$ = 25 ˚C; per diode*

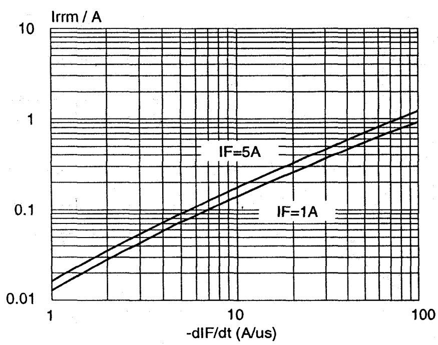



*Fig.8. Maximum $I_{rrm}$ at $T_j$ = 25 ˚C; per diode*

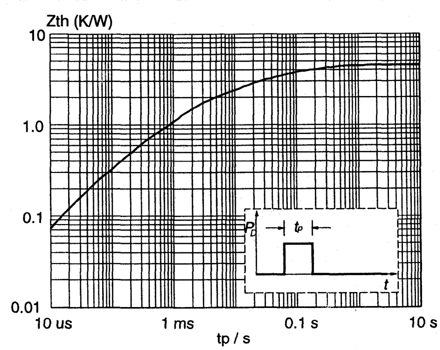



*Fig.11. Transient thermal impedance; per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.*

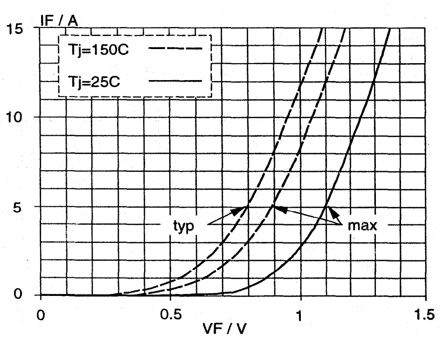



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

# Rectifier diodes ultrafast, rugged

# BYQ28EX series

## GENERAL DESCRIPTION

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

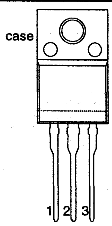
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | BYQ28EX- | 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 |

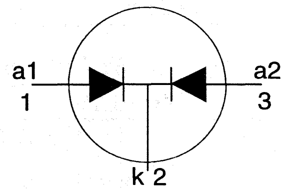
## PINNING - SOT186A

| PIN | DESCRIPTION |
|---|---|
| 1 | anode 1 (a) |
| 2 | cathode (k) |
| 3 | anode 2 (a) |
| 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 |
| $I_{O(AV)}$ | 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 | | | $A^2s$ |
| $I_{RRM}$ | 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 $T_{hs} \leq 148$˚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 |

## ISOLATION LIMITING VALUE & CHARACTERISTIC

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{isol}$ | R.M.S. isolation voltage from all three terminals to external heatsink | f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree | - | | 2500 | V |
| $C_{isol}$ | Capacitance from T2 to external heatsink | f = 1 MHz | - | 10 | - | pF |

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}hs}$ | Thermal resistance junction to heatsink | with heatsink compound | - | - | 5.7 | 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 | 9 | nC |
| $t_{rr1}$ | Reverse recovery time (per diode) | $I_F$ = 1 A; $V_R$ ≥ 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 |

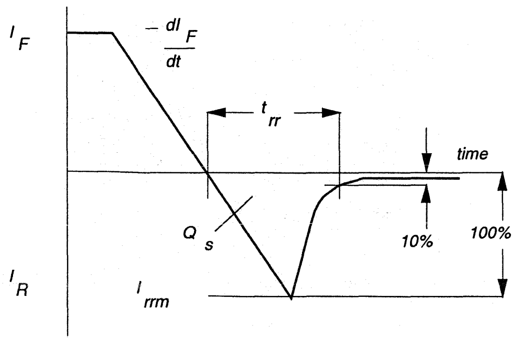



Fig.1. Definition of $t_{rr1}$, $Q_s$ and $I_{rrm}$

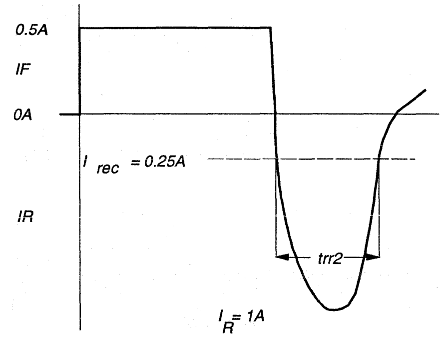



Fig.4. Definition of $t_{rr2}$

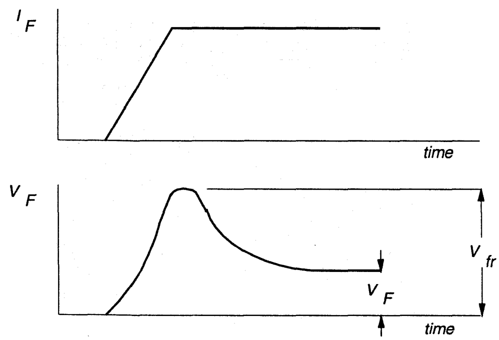



Fig.2. Definition of $V_{fr}$

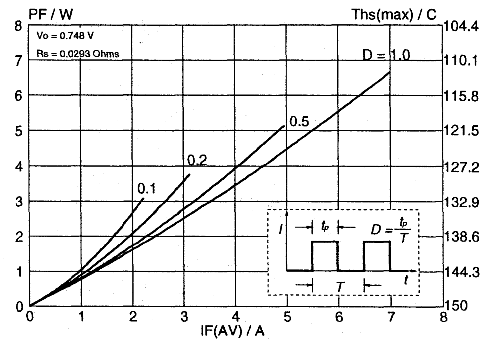



Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

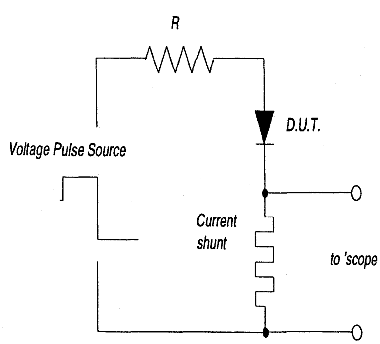



Fig.3. Circuit schematic for $t_{rr2}$

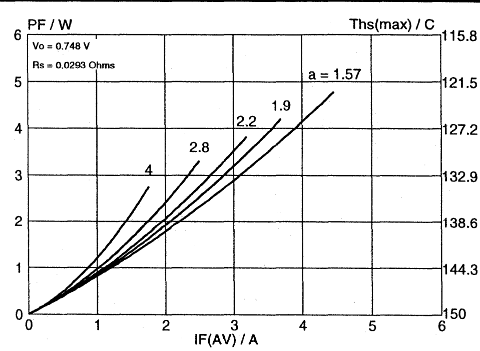



Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

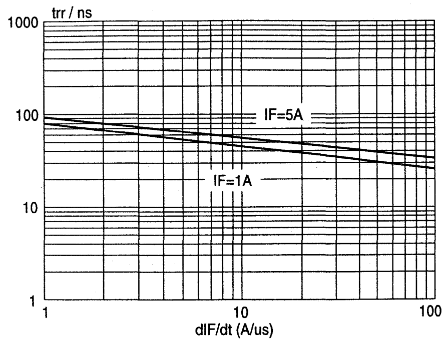



*Fig.7. Maximum $t_{rr}$ at $T_j$ = 25 ˚C; per diode*

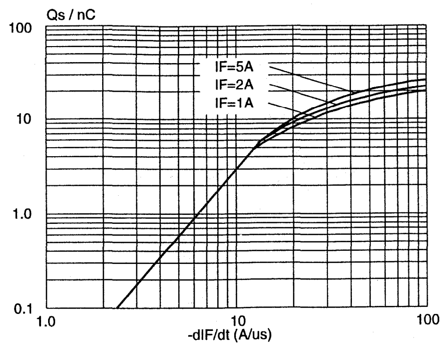



*Fig.10. Maximum $Q_s$ at $T_j$ = 25 ˚C; per diode*

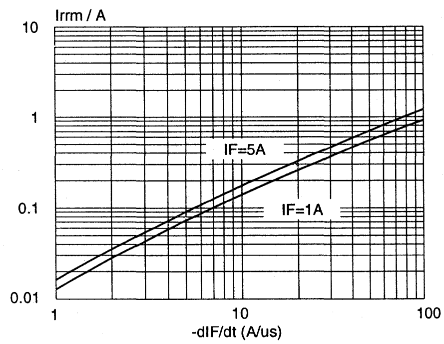



*Fig.8. Maximum $I_{rrm}$ at $T_j$ = 25 ˚C; per diode*

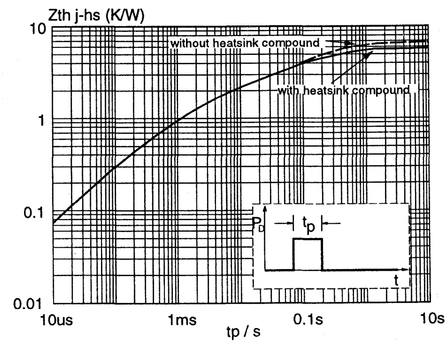



*Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}hs} = f(t_p)$.*

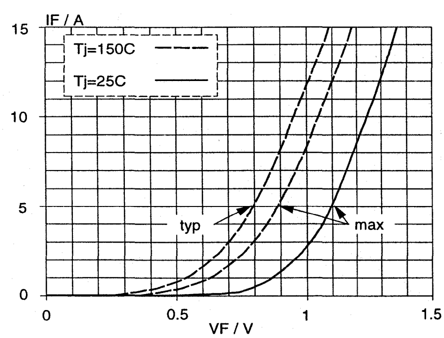



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

# Rectifier diodes ultrafast

# BYQ28F 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.

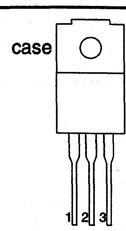
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | 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 |

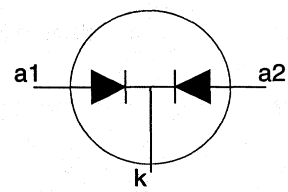
## PINNING - SOT186

| 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<br>without heatsink compound | -<br>- | -<br>- | 5.7<br>6.7 | K/W<br>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<br>$I_F$ = 5 A<br>$I_F$ = 10 A | -<br>-<br>- | 0.80<br>0.95<br>1.10 | 0.895<br>1.10<br>1.25 | V<br>V<br>V |
| $I_R$ | Reverse current (per diode) | $V_R = V_{RWM}$; $T_j$ = 100 ˚C<br>$V_R = V_{RWM}$ | -<br>- | 0.1<br>2 | 0.2<br>10 | mA<br>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; -d$I_F$/dt = 20 A/µs | - | 4 | 5.5 | nC |
| $t_{rr}$ | Reverse recovery time (per diode) | $I_F$ = 1 A; $V_R$ ≥ 30 V; -d$I_F$/dt = 100 A/µs | - | 15 | 20 | ns |
| $I_{rrm}$ | Peak reverse recovery current (per diode) | $I_F$ = 5 A; $V_R$ ≥ 30 V; -d$I_F$/dt = 50 A/µs | - | 0.5 | 0.7 | A |
| $V_{fr}$ | Forward recovery voltage (per diode) | $I_F$ = 1 A; d$I_F$/dt = 10 A/µs | - | 1 | - | V |

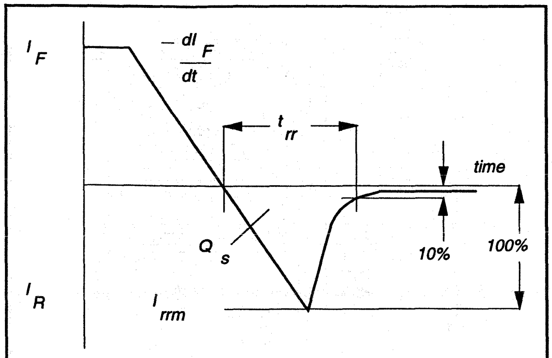



Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$

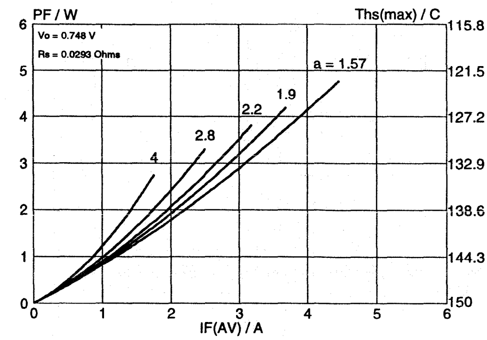



Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

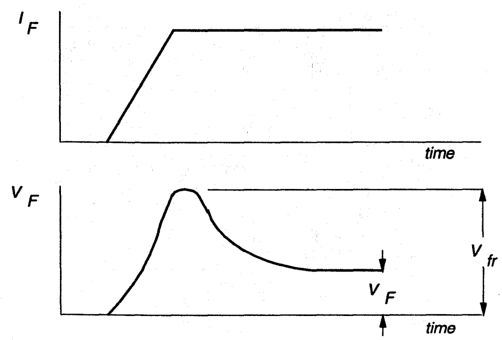



Fig.2. Definition of $V_{fr}$

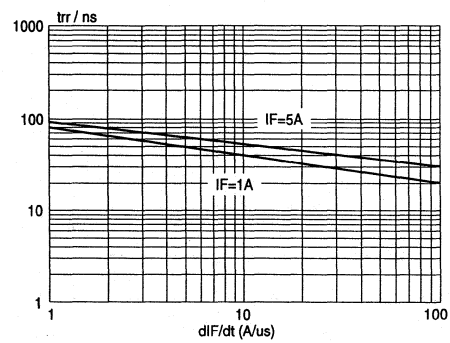



Fig.5. Maximum $t_{rr}$ at $T_j$ = 25 ˚C; per diode

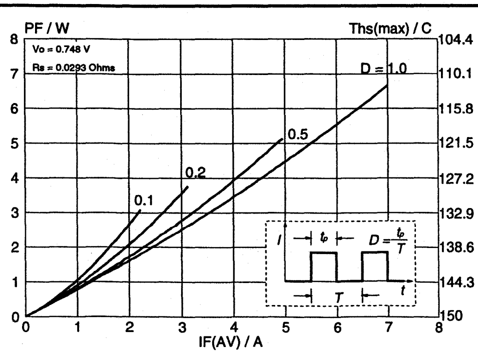



Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

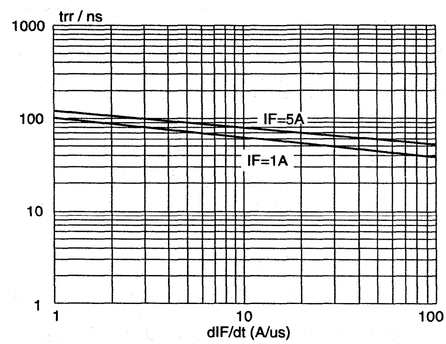



Fig.6. Maximum $t_{rr}$ at $T_j$ = 100 ˚C; per diode

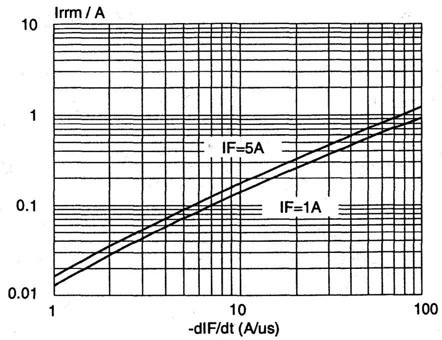



Fig.7. Maximum $I_{rrm}$ at $T_j$ = 25 ˚C; per diode

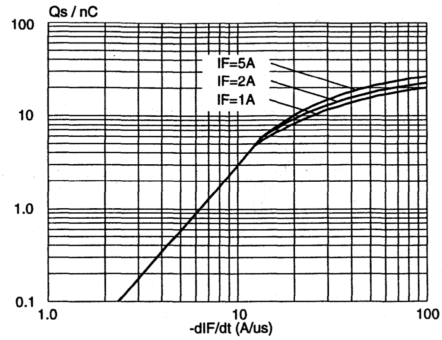



Fig.10. Maximum $Q_s$ at $T_j$ = 25 ˚C; per diode

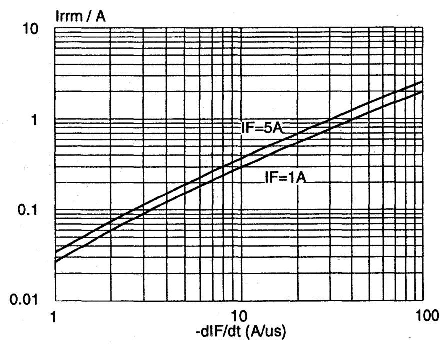



Fig.8. Maximum $I_{rrm}$ at $T_j$ = 100 ˚C; per diode

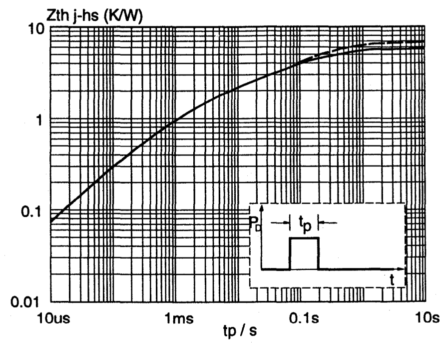



Fig.11. Transient thermal impedance; per diode; $Z_{th\ j-hs} = f(t_p)$.

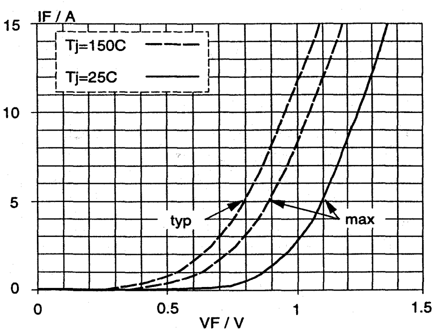



Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

## GENERAL DESCRIPTION

Glass passivated dual epitaxial 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.

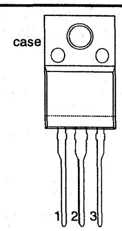
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | BYQ28X- | **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 |

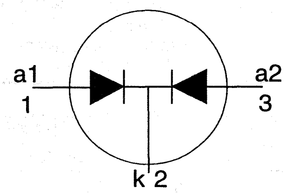
## PINNING - SOT186A

| PIN | DESCRIPTION |
|---|---|
| 1 | anode 1 (a) |
| 2 | cathode (k) |
| 3 | anode 2 (a) |
| 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 |
| $I_{O(AV)}$ | 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 LIMITING VALUE & CHARACTERISTIC

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{isol}$ | R.M.S. isolation voltage from all three terminals to external heatsink | f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree | - | | 2500 | V |
| $C_{isol}$ | Capacitance from T2 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<br>without heatsink compound | -<br>- | -<br>- | 5.7<br>6.7 | K/W<br>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<br>$I_F$ = 5 A<br>$I_F$ = 10 A | -<br>-<br>- | 0.80<br>0.95<br>1.10 | 0.895<br>1.10<br>1.25 | V<br>V<br>V |
| $I_R$ | Reverse current (per diode) | $V_R = V_{RWM}$; $T_j$ = 100 ˚C<br>$V_R = V_{RWM}$ | -<br>- | 0.1<br>2 | 0.2<br>10 | mA<br>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 | 9 | nC |
| $t_{rr1}$ | Reverse recovery time (per diode) | $I_F$ = 1 A; $V_R$ ≥ 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 |

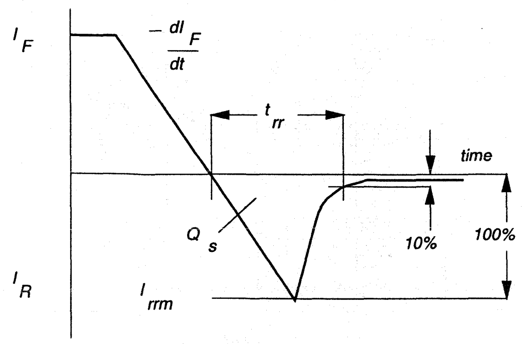



Fig.1. Definition of $t_{rr1}$, $Q_s$ and $I_{rrm}$

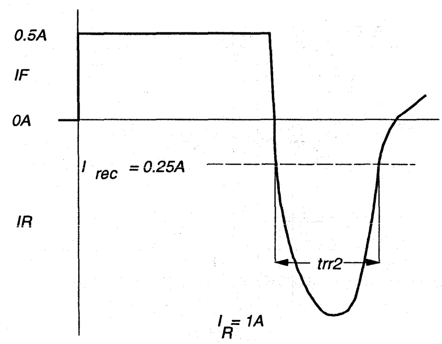



Fig.4. Definition of $t_{rr2}$

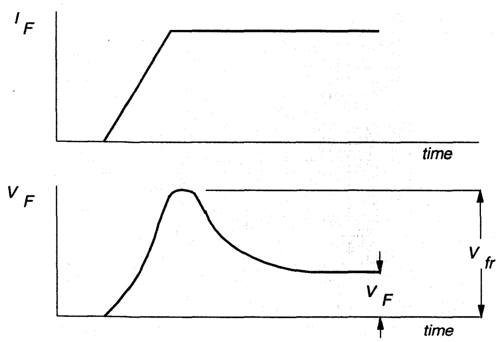



Fig.2. Definition of $V_{fr}$

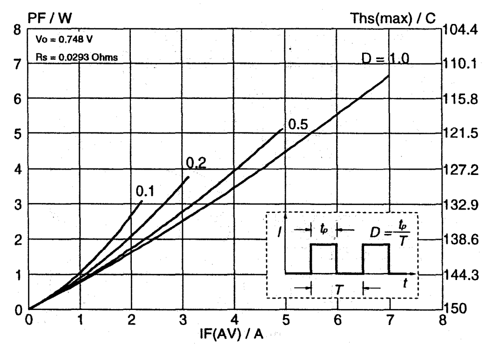



Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

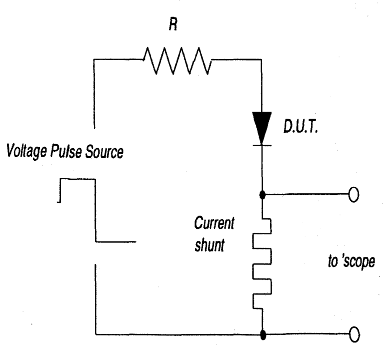



Fig.3. Circuit schematic for $t_{rr2}$

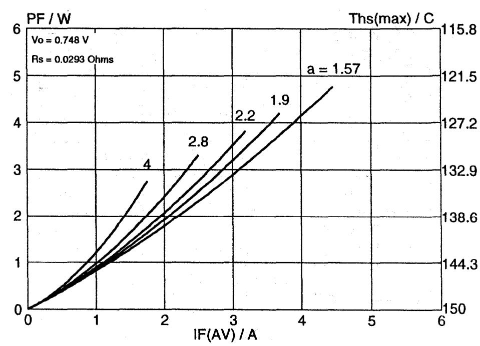



Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

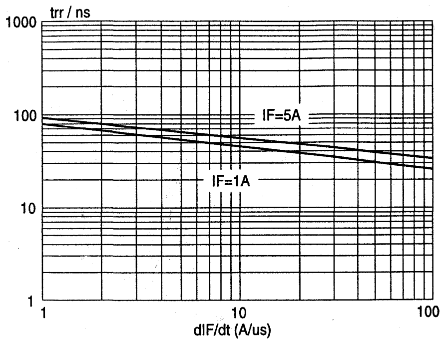



Fig.7. Maximum $t_{rr}$ at $T_j = 25$ °C; per diode

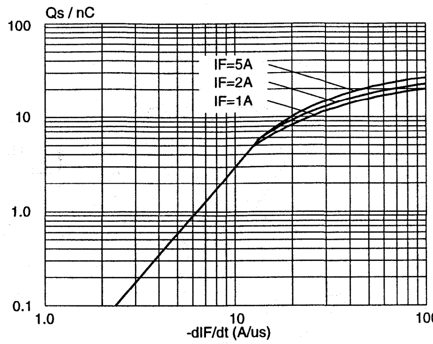



Fig.10. Maximum $Q_s$ at $T_j = 25$ °C; per diode

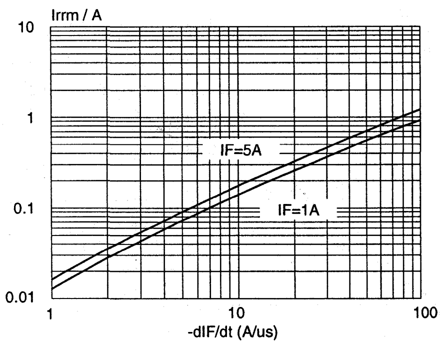



Fig.8. Maximum $I_{rrm}$ at $T_j = 25$ °C; per diode

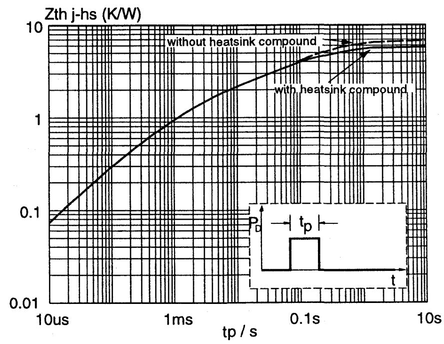



Fig.11. Transient thermal impedance; per diode;
$Z_{th\,j\text{-}hs} = f(t_p)$.

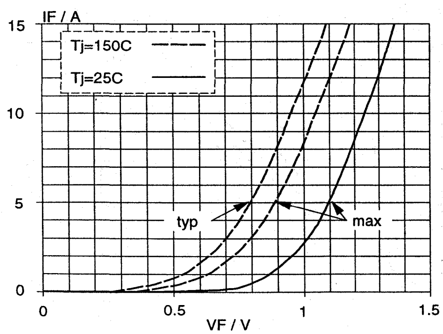



Fig.9. Typical and maximum forward characteristic
$I_F = f(V_F)$; parameter $T_j$

# 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.

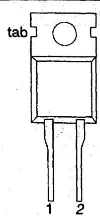
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| | **BYR29-** | **500** | **600** | **700** | **800** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 500 | 600 | 700 | 800 | V |
| $V_F$ | Forward voltage | 1.5 | 1.5 | 1.5 | 1.5 | V |
| $I_{F(AV)}$ | Average forward current | 8 | 8 | 8 | 8 | A |
| $t_{rr}$ | Reverse recovery time | 75 | 75 | 75 | 75 | ns |

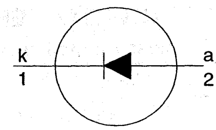
## PINNING - TO220AC

| 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** | **-800** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | | - | 500 | 600 | 700 | 800 | V |
| $V_{RWM}$ | Crest working reverse voltage | | - | 500 | 600 | 700 | 800 | V |
| $V_R$ | Continuous reverse voltage | | - | 500 | 600 | 700 | 800 | V |
| $I_{F(AV)}$ | Average forward current[1] | square wave; $\delta = 0.5$; $T_{mb} \leq 115$ ˚C | - | 8 | | | | A |
| | | sinusoidal; a = 1.57; $T_{mb} \leq 115$ ˚C | - | 7.2 | | | | A |
| $I_{F(RMS)}$ | RMS forward current | | - | 11.3 | | | | A |
| $I_{FRM}$ | Repettive peak forward current | t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 115$ ˚C | - | 16 | | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current | t = 10 ms | - | 60 | | | | A |
| | | t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$ | - | 66 | | | | A |
| $I^2t$ | $I^2t$ 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

$T_j = 25\ ^\circ C$ unless otherwise stated

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_F$ | Forward voltage | $I_F = 8$ A; $T_j = 150^\circ C$ | - | 1.07 | 1.50 | V |
| | | $I_F = 20$ A | - | 1.75 | 1.95 | V |
| $I_R$ | Reverse current | $V_R = V_{RRM}$ | - | 1.0 | 10 | µA |
| | | $V_R = V_{RRM}$; $T_j = 100\ ^\circ C$ | - | 0.1 | 0.2 | mA |

## DYNAMIC CHARACTERISTICS

$T_j = 25\ ^\circ C$ 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; $T_j = 100\ ^\circ C$ | - | - | 6 | A |
| $V_{fr}$ | Forward recovery voltage | $I_F = 10$ A; $dI_F/dt = 10$ A/µs | - | 5.0 | - | V |

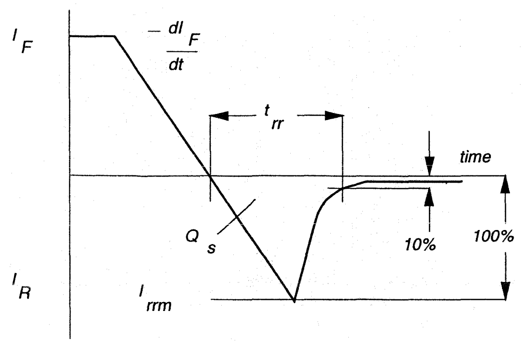



Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$

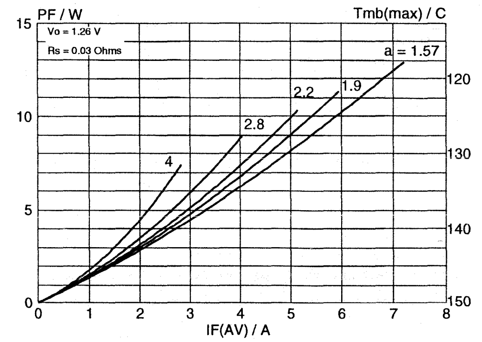



Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

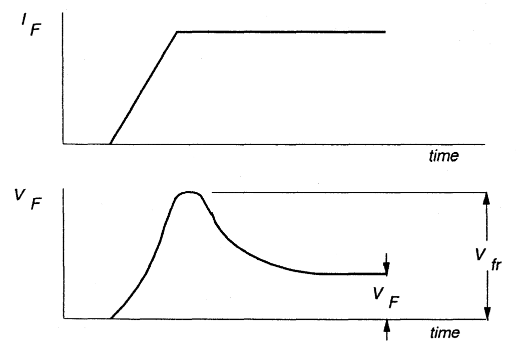



Fig.2. Definition of $V_{fr}$

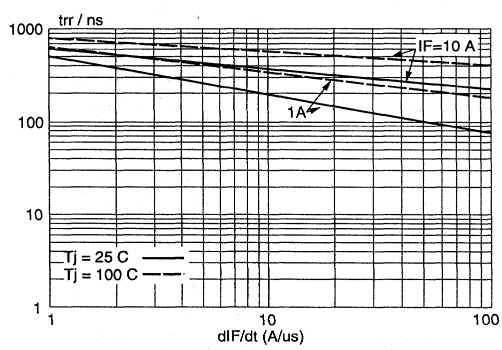



Fig.5. Maximum $t_{rr}$ at $T_j$ = 25˚C and 100˚C.

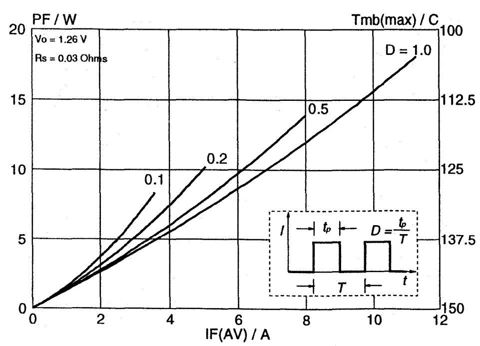



Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

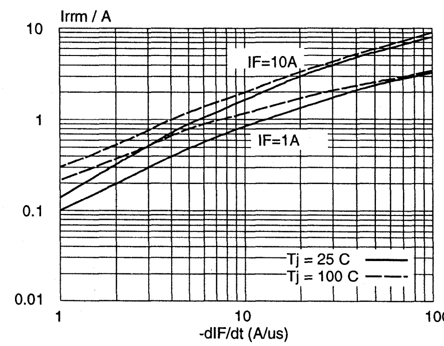



Fig.6. Maximum $I_{rrm}$ at $T_j$ = 25˚C and 100˚C.

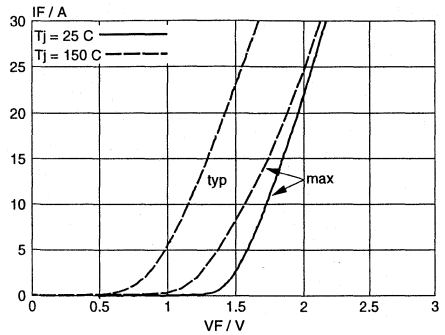



*Fig.7. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

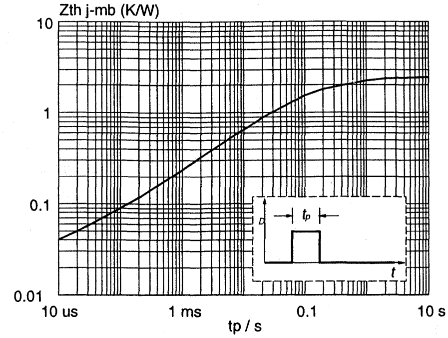



*Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$*

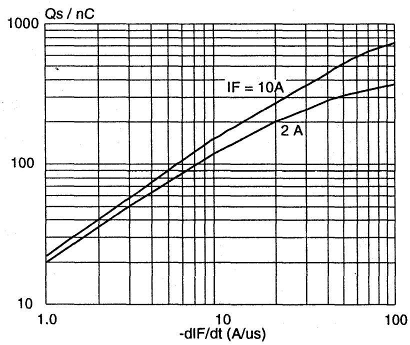



*Fig.8. Maximum $Q_s$ at $T_j = 25^{\circ}C$*

# Rectifier diodes ultrafast

# BYR29F series

## GENERAL DESCRIPTION

Glass passivated, high efficiency, rugged 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.

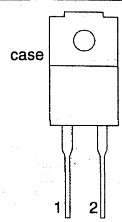
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| | **BYR29F-** | **500** | **600** | **700** | **800** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 500 | 600 | 700 | 800 | V |
| $V_F$ | Forward voltage | 1.5 | 1.5 | 1.5 | 1.5 | V |
| $I_{F(AV)}$ | Average forward current | 8 | 8 | 8 | 8 | A |
| $t_{rr}$ | Reverse recovery time | 75 | 75 | 75 | 75 | ns |

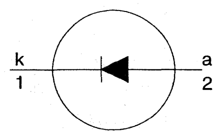
## PINNING - SOD100

| 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** | **-800** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | | - | 500 | 600 | 700 | 800 | V |
| $V_{RWM}$ | Crest working reverse voltage | | - | 500 | 600 | 700 | 800 | V |
| $V_R$ | Continuous reverse voltage | $T_{hs} \leq 136$ ˚C | - | 500 | 600 | 700 | 800 | V |
| $I_{F(AV)}$ | Average forward current[1] | square wave; $\delta = 0.5$; $T_{hs} \leq 73$ ˚C | - | 8 | | | | A |
| | | sinusoidal; a = 1.57; $T_{hs} \leq 79$ ˚C | - | 7.2 | | | | A |
| $I_{F(RMS)}$ | RMS forward current | | - | 11.3 | | | | A |
| $I_{FRM}$ | Repettive peak forward current | t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 73$ ˚C | - | 16 | | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current | t = 10 ms | - | 60 | | | | A |
| | | t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$ | - | 66 | | | | A |
| $I^2t$ | $I^2t$ for fusing | t = 10 ms | - | 18 | | | | $A^2s$ |
| $T_{stg}$ | Storage temperature | | -40 | 150 | | | | ˚C |
| $T_j$ | Operating junction temperature | | - | 150 | | | | ˚C |

**1** Neglecting switching and reverse current losses

## ISOLATION LIMITING VALUE & CHARACTERISTIC

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{isol}$ | 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<br>without heatsink compound | -<br>- | -<br>- | 5.5<br>7.2 | K/W<br>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 | $I_F$ = 8 A; $T_j$ = 150˚C<br>$I_F$ = 20 A | -<br>- | 1.07<br>1.75 | 1.50<br>1.95 | V<br>V |
| $I_R$ | Reverse current | $V_R = V_{RRM}$<br>$V_R = V_{RRM}$; $T_j$ = 100 ˚C | -<br>- | 1.0<br>0.1 | 10<br>0.2 | µA<br>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 |

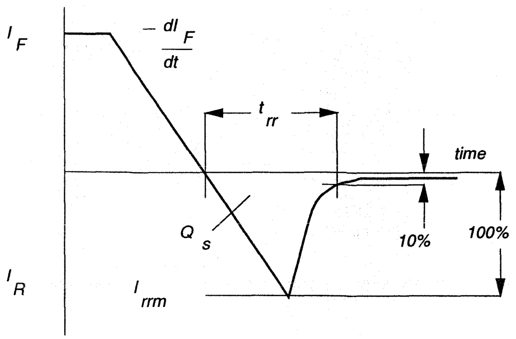



Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$

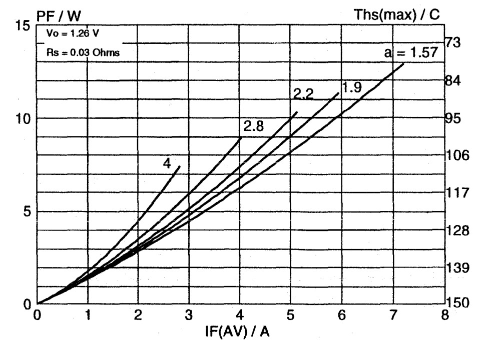



Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

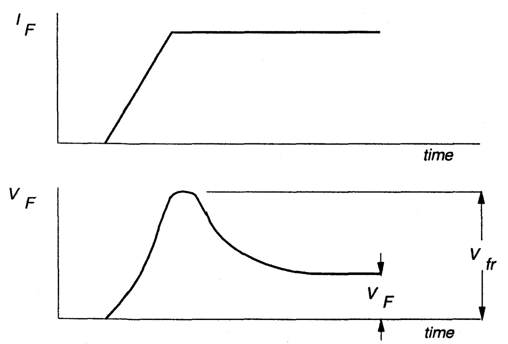



Fig.2. Definition of $V_{fr}$

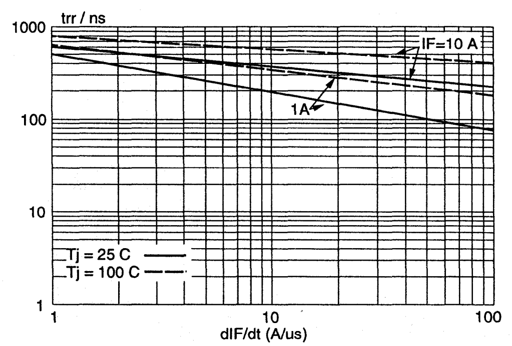



Fig.5. Maximum $t_{rr}$ at $T_j$ = 25˚C and 100˚C.

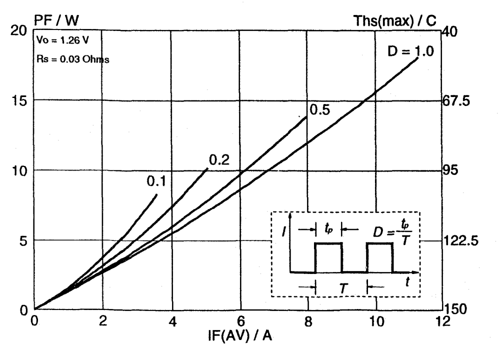



Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

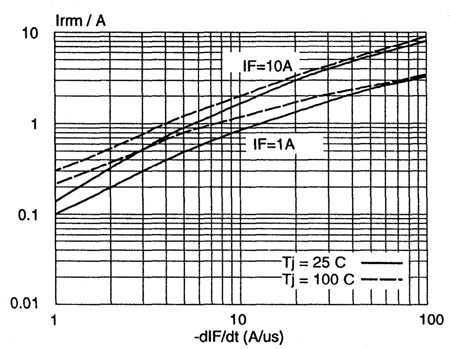



Fig.6. Maximum $I_{rrm}$ at $T_j$ = 25˚C and 100˚C.

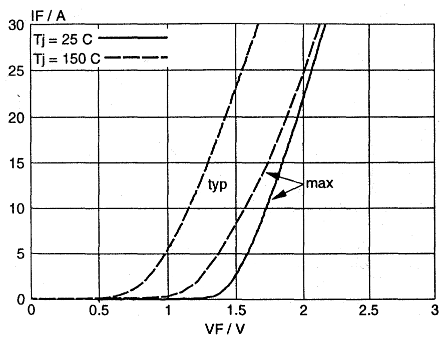



*Fig.7. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

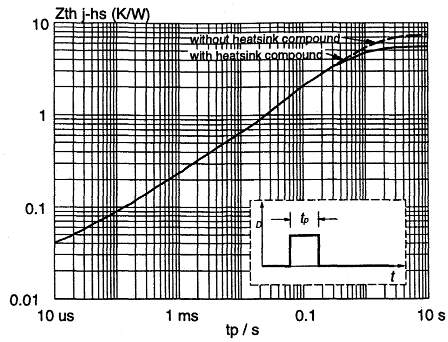



*Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$*

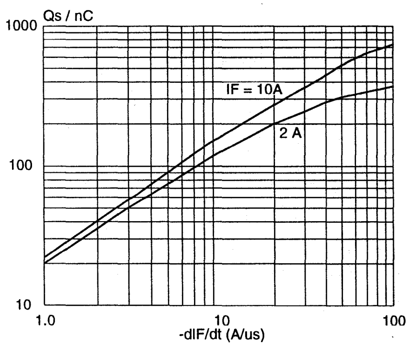



*Fig.8. Maximum $Q_s$ at $T_j = 25˚C$*

# Dual rectifier diodes ultrafast

# BYT28 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.

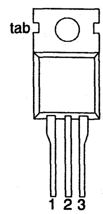
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | 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 |

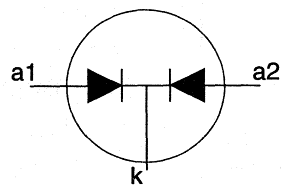
## PINNING - TO220AB

| 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; 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** $T_{mb} \leq 147$˚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 |

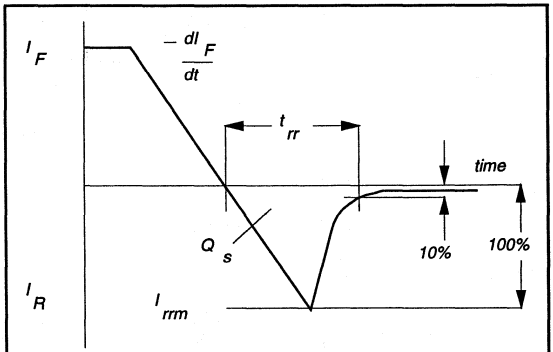



*Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$*

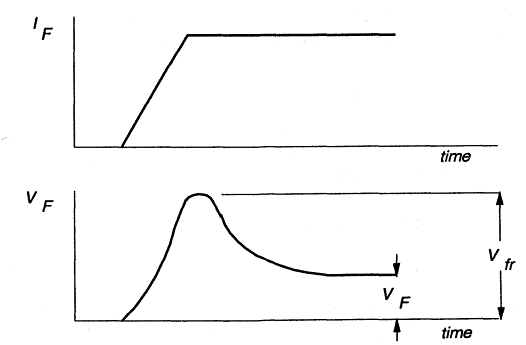



*Fig.2. Definition of $V_{fr}$*

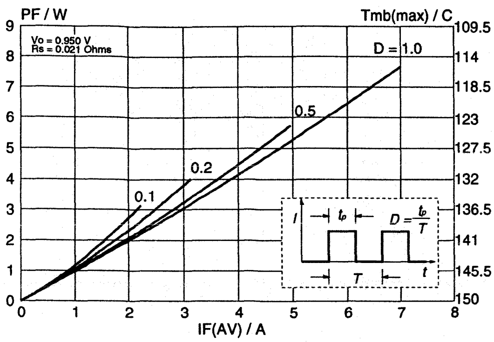



*Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

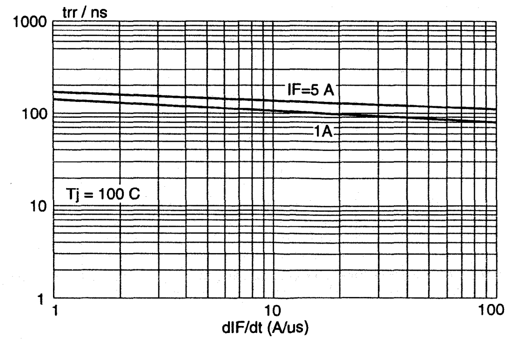



*Fig.6. Maximum $t_{rr}$ at $T_j = 100˚C$; per diode*

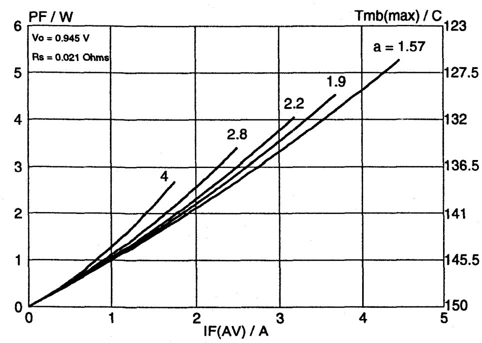



*Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

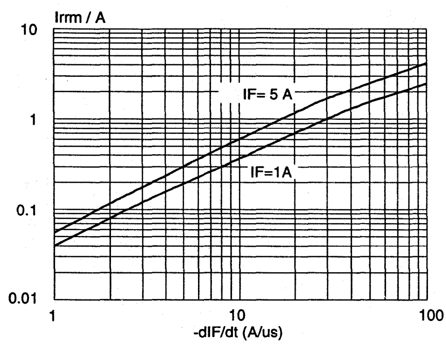



*Fig.7. Maximum $I_{rrm}$ at $T_j = 25˚C$; per diode.*

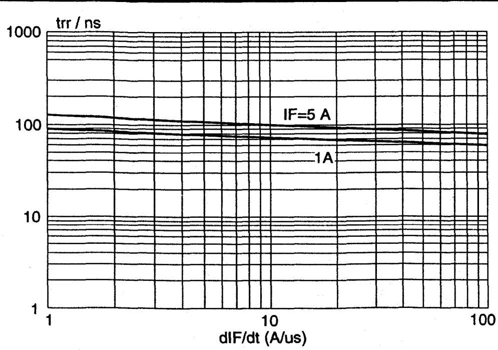



*Fig.5. Maximum $t_{rr}$ at $T_j = 25˚C$; per diode*

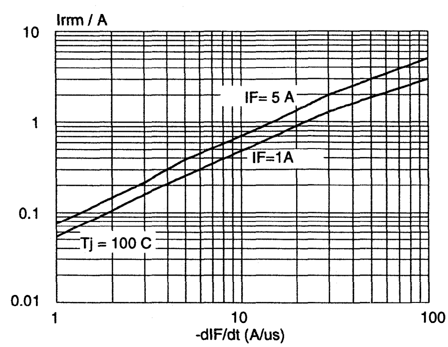



*Fig.8. Maximum $I_{rrm}$ at $T_j = 100˚C$; per diode.*

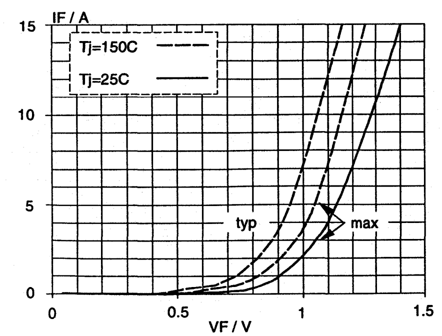



*Fig.9. Typical and maximum forward characteristic* $I_F = f(V_F)$; *parameter* $T_j$

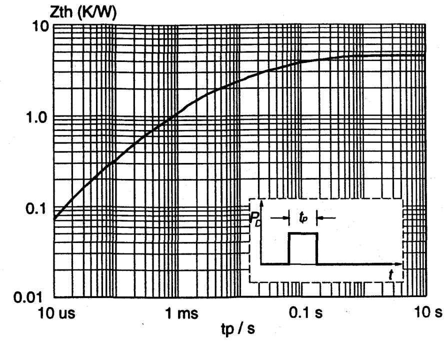



*Fig.11. Transient thermal impedance per diode* $Z_{th} = f(t_p)$

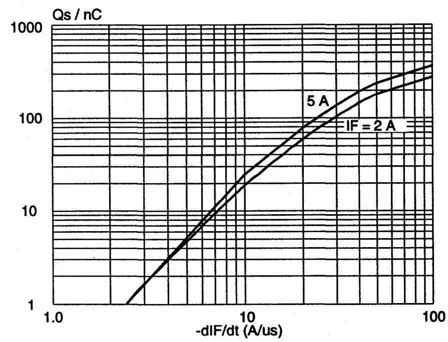



*Fig.10. Maximum* $Q_s$ *at* $T_j = 25^\circ C$; *per diode.*

## 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.

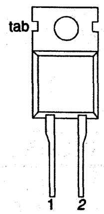
## QUICK REFERENCE DATA

| 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 |

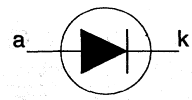
## PINNING - TO220AC

| 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 |

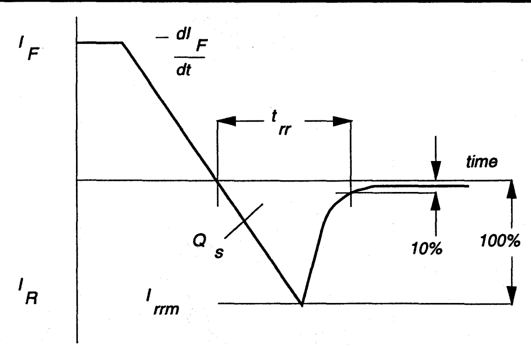



Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$

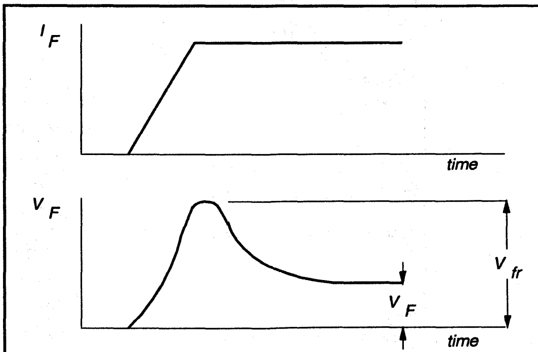



Fig.2. Definition of $V_{fr}$

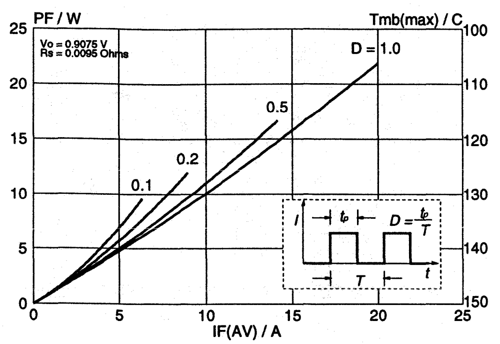



*Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

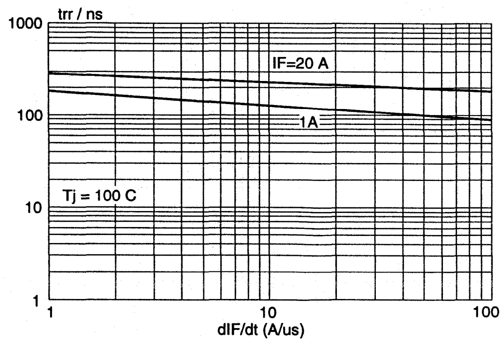



*Fig.6. Maximum $t_{rr}$ at $T_j = 100$˚C*

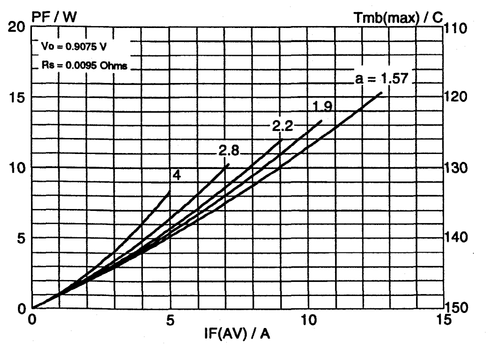



*Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

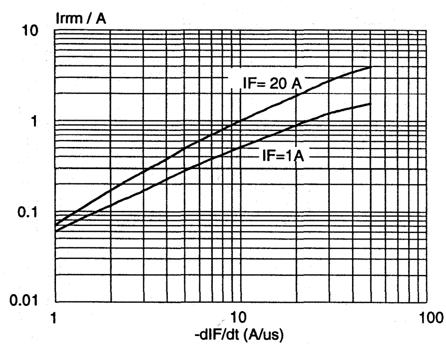



*Fig.7. Maximum $I_{rrm}$ at $T_j = 25$˚C.*

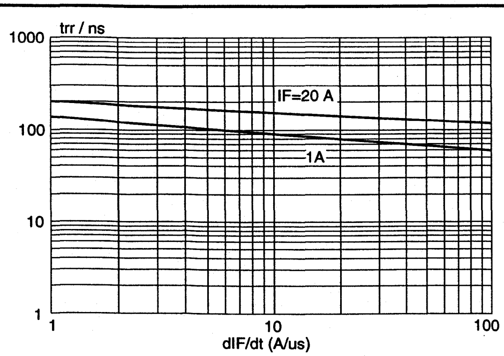



*Fig.5. Maximum $t_{rr}$ at $T_j = 25$˚C*

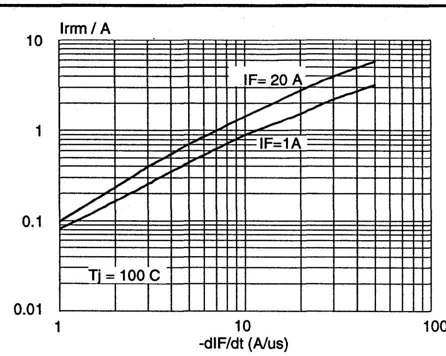



*Fig.8. Maximum $I_{rrm}$ at $T_j = 100$˚C.*

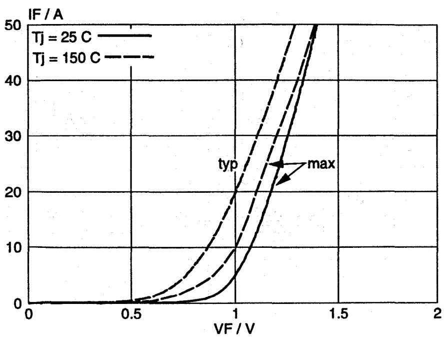



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

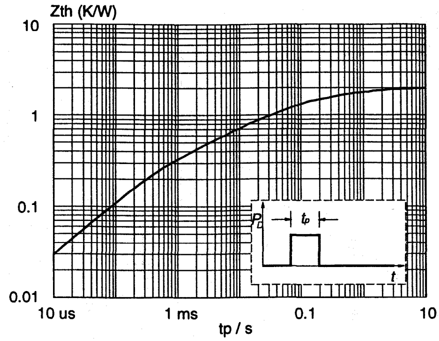



*Fig.11. Transient thermal impedance $Z_{th} = f(t_p)$*

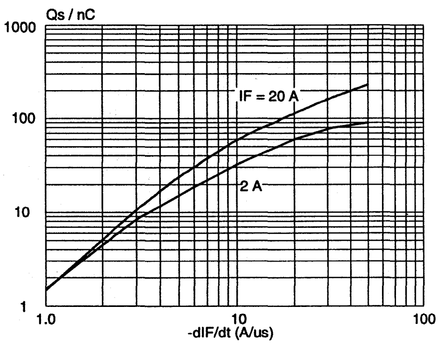



*Fig.10. Maximum $Q_s$ at $T_j = 25˚C$*

# Rectifier diodes ultrafast

# BYV29 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.

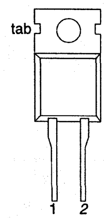
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYV29-** | **300** | **400** | **500** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 300 | 400 | 500 | V |
| $V_F$ | Forward voltage | 1.03 | 1.03 | 1.03 | V |
| $I_{F(AV)}$ | Average forward current | 9 | 9 | 9 | A |
| $t_{rr}$ | Reverse recovery time | 60 | 60 | 60 | ns |

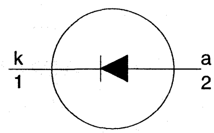
## PINNING - TO220AC

| 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 | | - | 300 | 400 | 500 | V |
| $V_R$ | Continuous reverse voltage | | - | 300 | 400 | 500 | V |
| $I_{F(AV)}$ | Average forward current[1] | square wave; $\delta = 0.5$; $T_{mb} \leq 123$ ˚C | - | 9 | | | A |
| | | sinusoidal; a = 1.57; $T_{mb} \leq 125$ ˚C | - | 8 | | | A |
| $I_{F(RMS)}$ | RMS forward current | | - | 13 | | | A |
| $I_{FRM}$ | Repetitive peak forward current | t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 123$ ˚C | - | 18 | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current. | t = 10 ms | - | 100 | | | A |
| | | t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$ | - | 110 | | | A |
| $I^2t$ | $I^2t$ for fusing | t = 10 ms | - | 50 | | | $A^2s$ |
| $T_{stg}$ | Storage temperature | | -40 | 150 | | | ˚C |
| $T_j$ | Operating junction temperature | | - | 150 | | | ˚C |

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 | - | 0.90 | 1.03 | V |
| | | $I_F$ = 8 A | - | 1.05 | 1.25 | V |
| | | $I_F$ = 20 A | - | 1.20 | 1.40 | V |
| $I_R$ | Reverse current | $V_R = V_{RRM}$ | - | 2.0 | 50 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 100 ˚C | - | 0.1 | 0.35 | mA |

## 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 | - | 40 | 60 | nC |
| $t_{rr}$ | Reverse recovery time | $I_F$ = 1 A to $V_R \geq$ 30 V; $dI_F/dt$ = 100 A/µs | - | 50 | 60 | ns |
| $I_{rrm}$ | Peak reverse recovery current | $I_F$ = 10 A to $V_R \geq$ 30 V; $dI_F/dt$ = 50 A/µs; $T_j$ = 100˚C | - | 4.0 | 5.5 | A |
| $V_{fr}$ | Forward recovery voltage | $I_F$ = 10 A; $dI_F/dt$ = 10 A/µs | - | 2.5 | - | V |

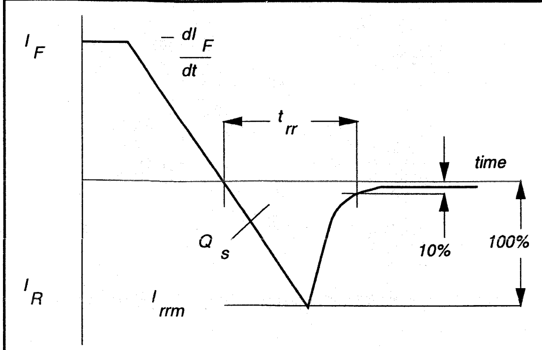



Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$

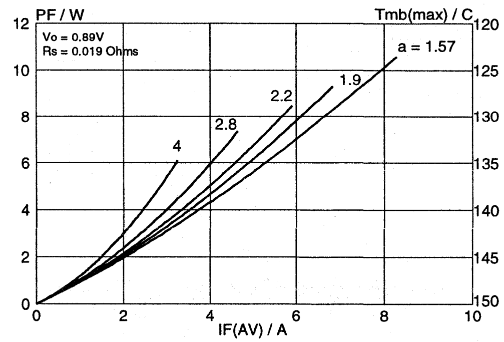



Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)}$ / $I_{F(AV)}$.

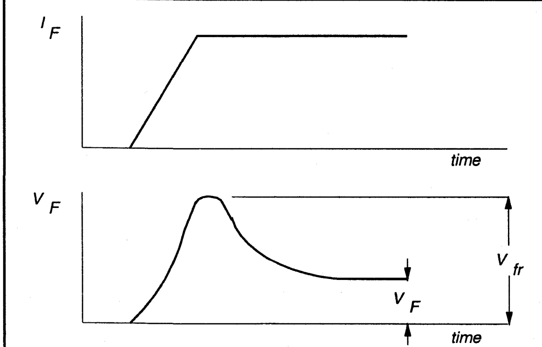



Fig.2. Definition of $V_{fr}$

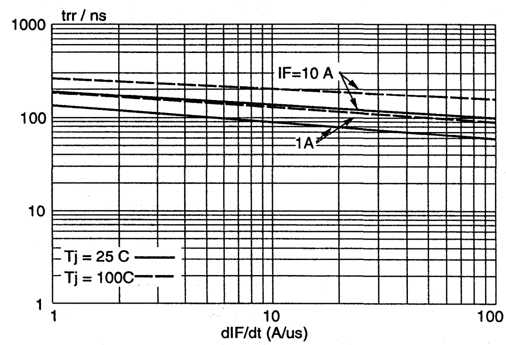



Fig.5. Maximum $t_{rr}$ at $T_j$ = 25˚C and 100˚C

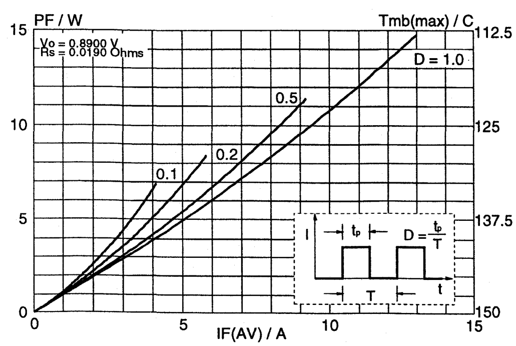



Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

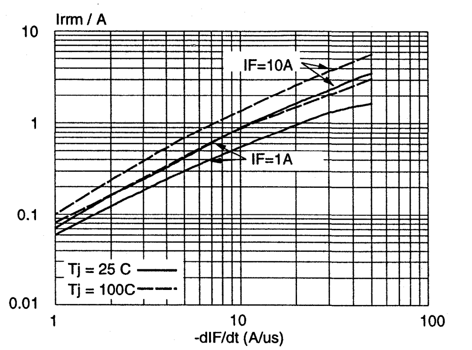



Fig.6. Maximum $I_{rrm}$ at $T_j$ = 25˚C and 100˚C.

# Rectifier diodes ultrafast

# BYV29 series

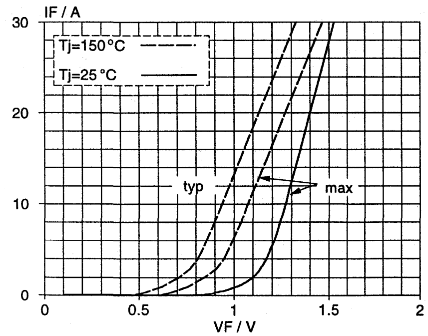



*Fig.7. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

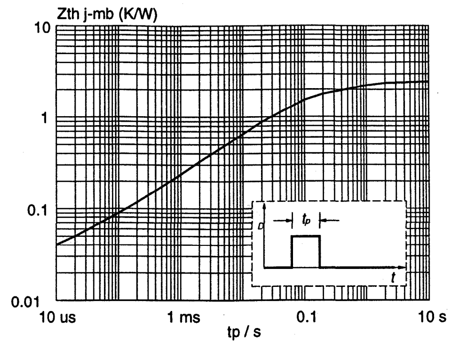



*Fig.9. Transient thermal impedance $Z_{th\ j\text{-}mb} = f(t_p)$*

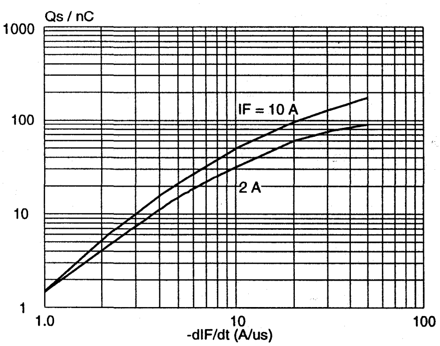



*Fig.8. Maximum $Q_s$ at $T_j = 25^{\circ}C$*

## 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.

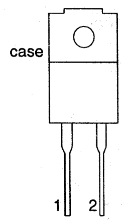
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | BYV29F- | **300** | **400** | **500** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 300 | 400 | 500 | V |
| $V_F$ | Forward voltage | 1.03 | 1.03 | 1.03 | V |
| $I_{F(AV)}$ | Average forward current | 9 | 9 | 9 | A |
| $t_{rr}$ | Reverse recovery time | 60 | 60 | 60 | ns |

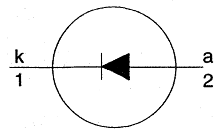
## PINNING - SOD100

| 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 | | - | 300 | 400 | 500 | V |
| $V_R$ | Continuous reverse voltage | $T_{hs} \leq 138$˚C | - | 300 | 400 | 500 | V |
| $I_{F(AV)}$ | Average forward current[1] | square wave; $\delta = 0.5$; $T_{hs} \leq 90$ ˚C | - | 9 | | | A |
| | | sinusoidal; a = 1.57; $T_{hs} \leq 95$ ˚C | - | 8 | | | A |
| $I_{F(RMS)}$ | RMS forward current | | - | 13 | | | A |
| $I_{FRM}$ | Repetitive peak forward current | t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 90$ ˚C | - | 18 | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current | t = 10 ms | - | 100 | | | A |
| | | t = 8.3 ms | - | 110 | | | A |
| | | sinusoidal; with reapplied $V_{RRM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ for fusing | t = 10 ms | - | 50 | | | $A^2s$ |
| $T_{stg}$ | Storage temperature | | -40 | 150 | | | ˚C |
| $T_j$ | Operating junction temperature | | - | 150 | | | ˚C |

**1** Neglecting switching and reverse current losses

## ISOLATION LIMITING VALUE & CHARACTERISTIC

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{isol}$ | 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 |
| | | 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 | $I_F$ = 8 A; $T_j$ = 150˚C | - | 0.90 | 1.03 | V |
| | | $I_F$ = 8 A | - | 1.05 | 1.25 | V |
| | | $I_F$ = 20 A | - | 1.20 | 1.40 | V |
| $I_R$ | Reverse current | $V_R = V_{RRM}$ | - | 2.0 | 50 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 100 ˚C | - | 0.1 | 0.35 | mA |

## 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 | - | 40 | 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 |

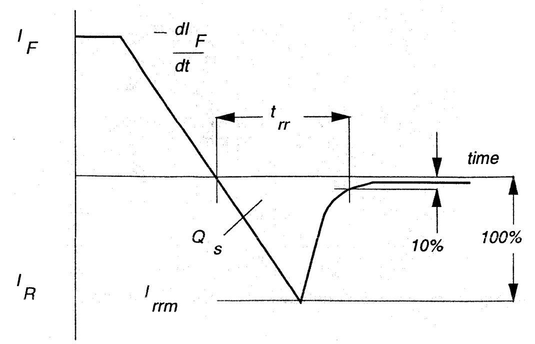



Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$

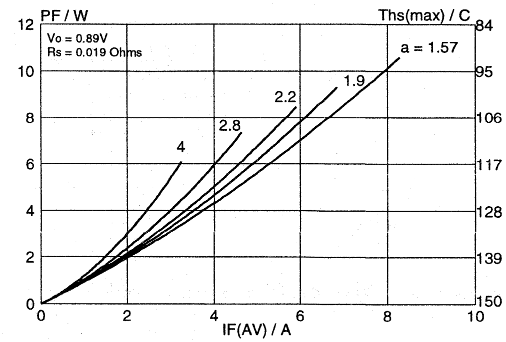



Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)}$ / $I_{F(AV)}$.

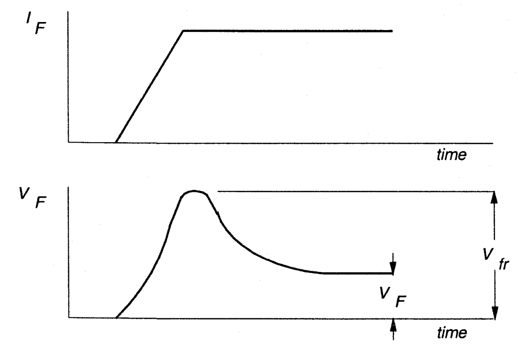



Fig.2. Definition of $V_{fr}$

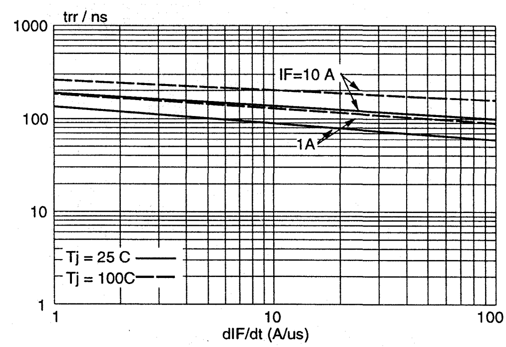



Fig.5. Maximum $t_{rr}$ at $T_j$ = 25˚C and 100˚C

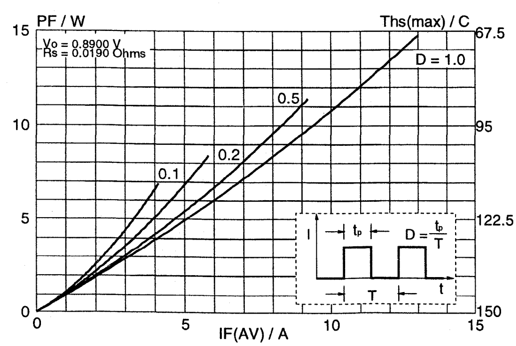



Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

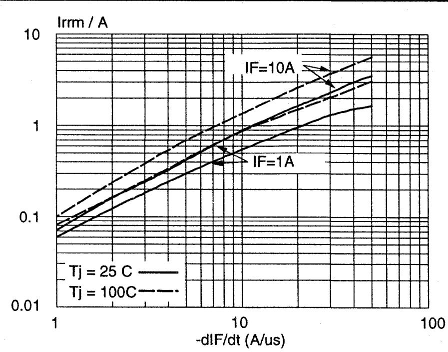



Fig.6. Maximum $I_{rrm}$ at $T_j$ = 25˚C and 100˚C.

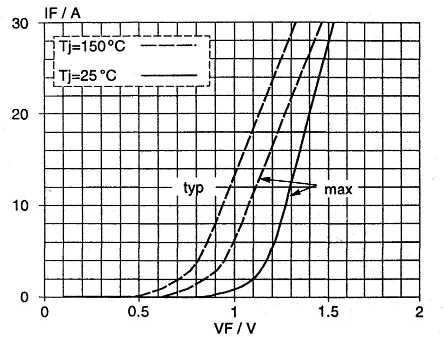



Fig.7. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

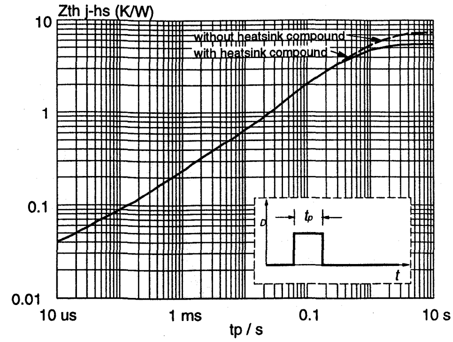



Fig.9. Transient thermal impedance $Z_{th\,j\text{-}hs} = f(t_p)$

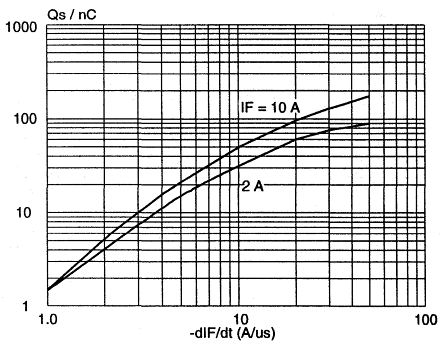



Fig.8. Maximum $Q_s$ at $T_j = 25^{\circ}C$

# 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.

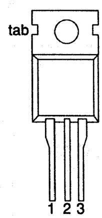
## QUICK REFERENCE DATA

| 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 |

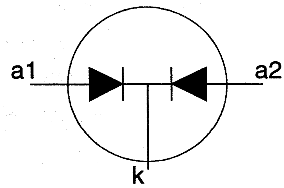
## PINNING - TO220AB

| 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; -d$I_F$/dt = 20 A/µs | - | 8 | 12.5 | nC |
| $t_{rr}$ | Reverse recovery time (per diode) | $I_F$ = 1 A; $V_R \geq$ 30 V; -d$I_F$/dt = 100 A/µs | - | 20 | 25 | ns |
| $I_{rrm}$ | Peak reverse recovery current (per diode) | $I_F$ = 1 A; $V_R \geq$ 30 V; -d$I_F$/dt = 50 A/µs; $T_j$ = 100 ˚C | - | 1.5 | 2 | A |
| $V_{fr}$ | Forward recovery voltage (per diode) | $I_F$ = 1 A; d$I_F$/dt = 10 A/µs | - | 1 | - | V |

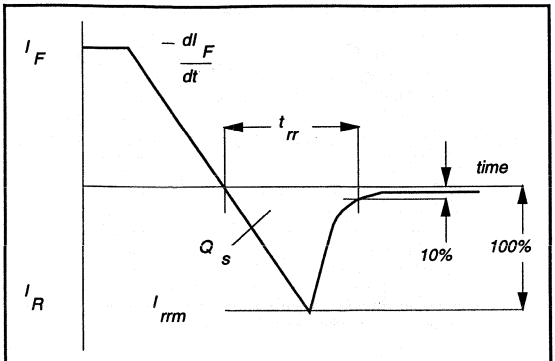



*Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$*

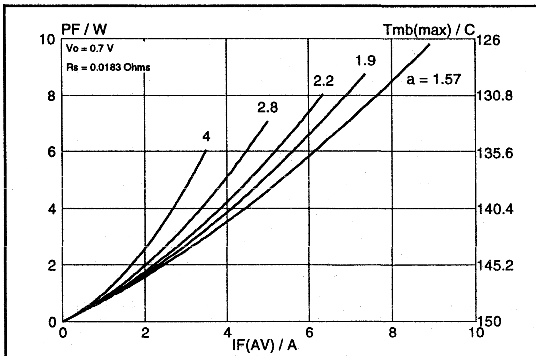



*Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)}$ / $I_{F(AV)}$.*

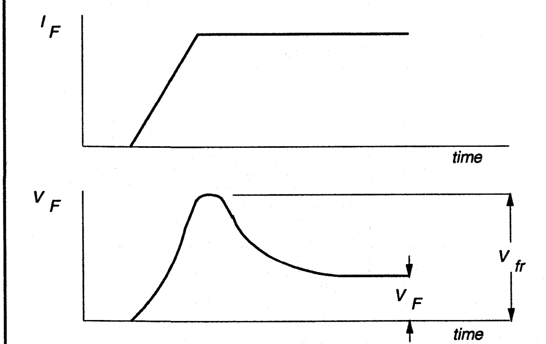



*Fig.2. Definition of $V_{fr}$*

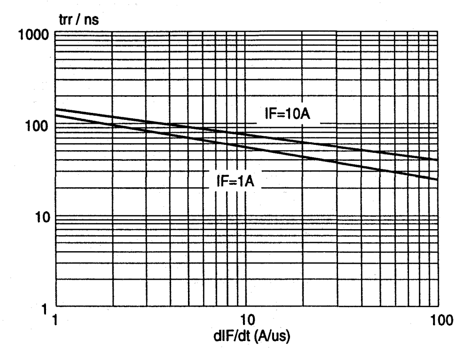



*Fig.5. Maximum $t_{rr}$ at $T_j$ = 25 ˚C; per diode*

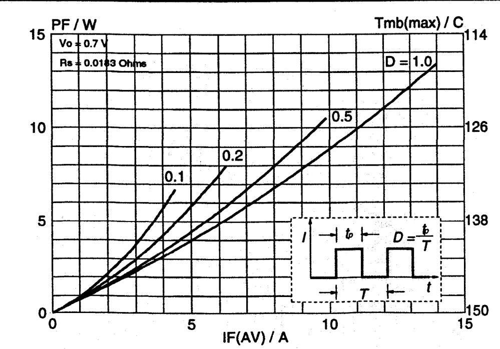



*Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

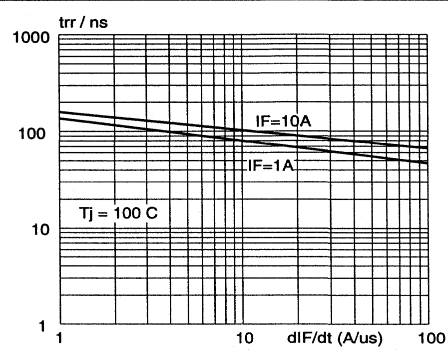



*Fig.6. Maximum $t_{rr}$ at $T_j$ = 100 ˚C; per diode*

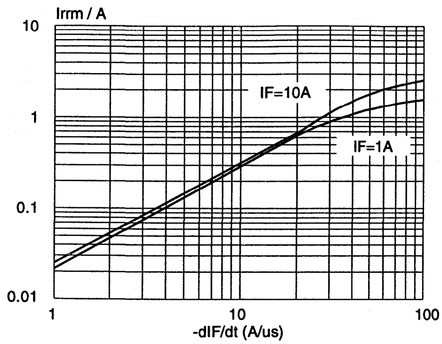



*Fig.7. Maximum $I_{rrm}$ at $T_j$ = 25 ˚C; per diode*

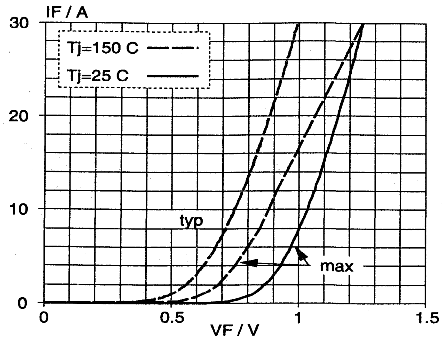



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

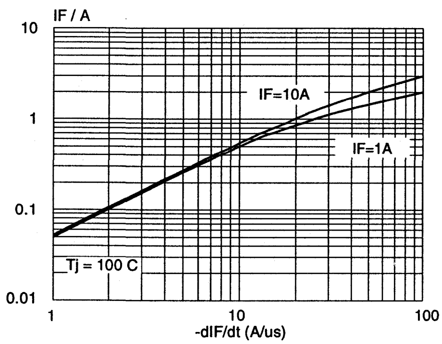



*Fig.8. Maximum $I_{rrm}$ at $T_j$ = 100 ˚C; per diode*

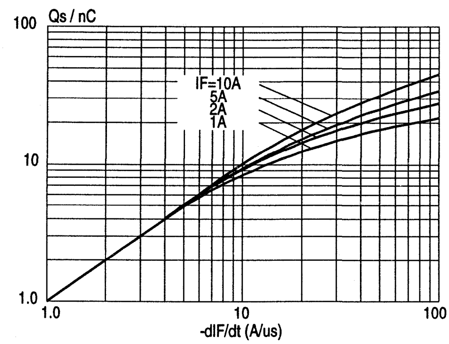



*Fig.10. Maximum $Q_s$ at $T_j$ = 25 ˚C; per diode*

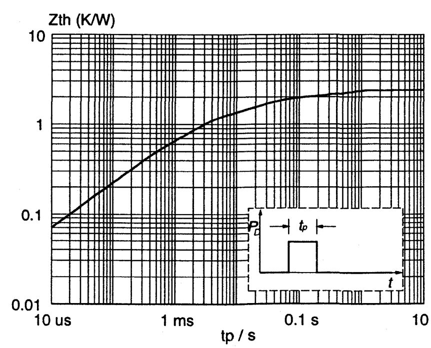



*Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.*

# 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.

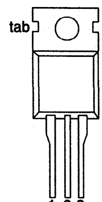
## QUICK REFERENCE DATA

| 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 |

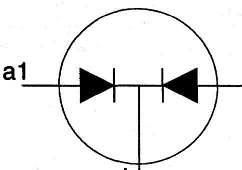
## PINNING - TO220AB

| 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 |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}mb}$ | 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; $V_R$ ≥ 30 V; $-dI_F/dt$ = 20 A/µs | - | 8 | 12.5 | nC |
| $t_{rr1}$ | Reverse recovery time (per diode) | $I_F$ = 1 A; $V_R$ ≥ 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 |

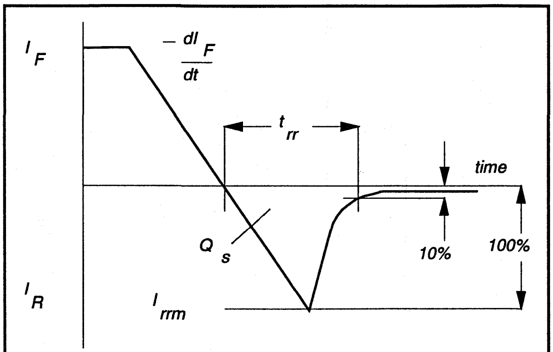



*Fig.1. Definition of $t_{rr1}$, $Q_s$ and $I_{rrm}$*

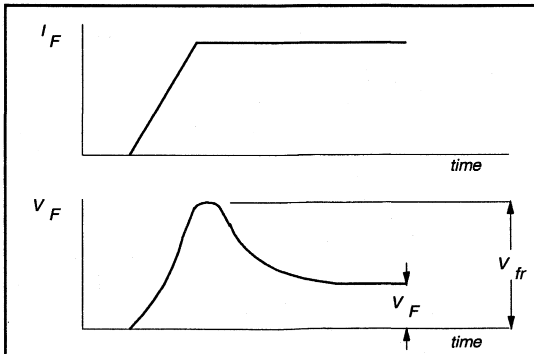



*Fig.2. Definition of $V_{fr}$*

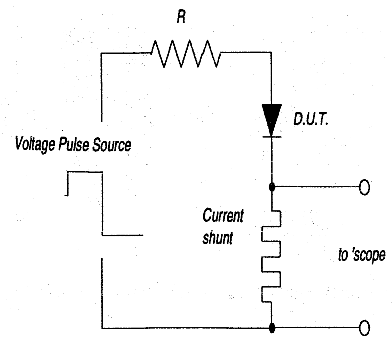



*Fig.3. Circuit schematic for $t_{rr2}$*

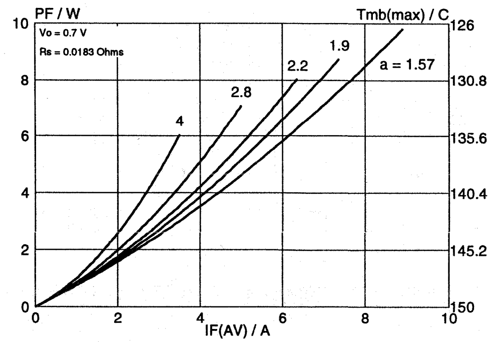



*Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

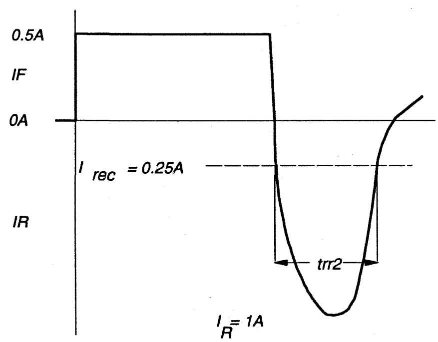



*Fig.4. Definition of $t_{rr2}$*

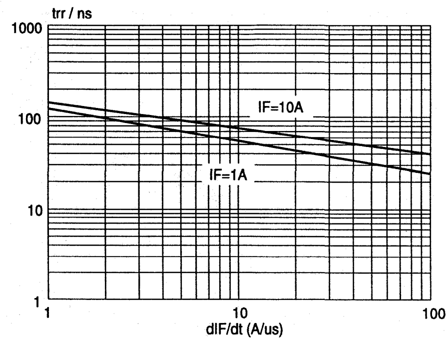



*Fig.7. Maximum $t_{rr}$ at $T_j$ = 25 ˚C; per diode*

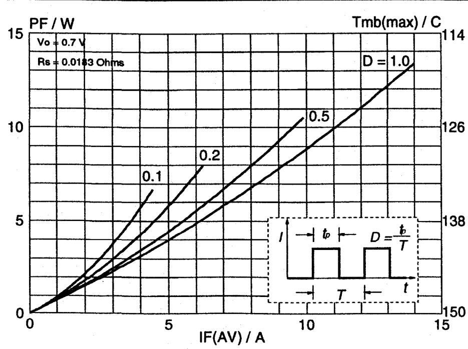



*Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

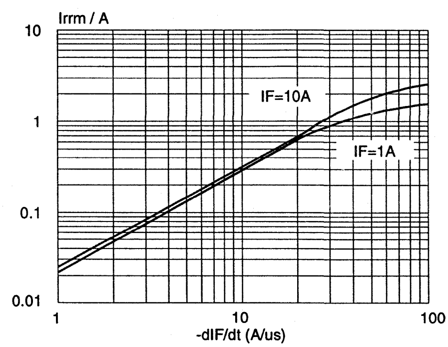



*Fig.8. Maximum $I_{rrm}$ at $T_j$ = 25 ˚C; per diode*

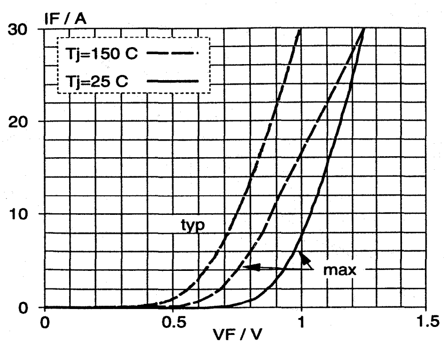



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

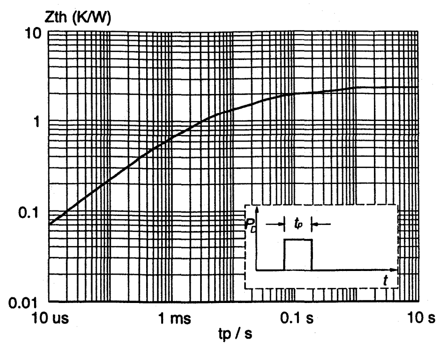



*Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.*

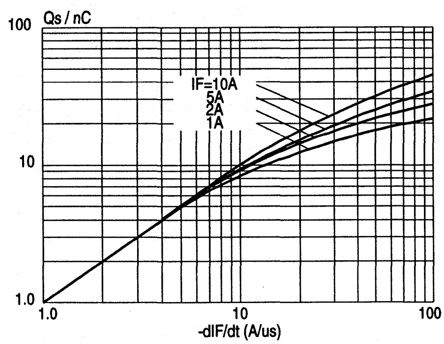



*Fig.10. Maximum $Q_s$ at $T_j = 25$ ˚C; per diode*

# Rectifier diodes ultrafast, rugged

# BYV32EB series

## GENERAL DESCRIPTION

Glass passivated dual epitaxial rectifier diodes in a plastic envelope suitable for surface mounting, featuring low forward voltage drop, ultra-fast recovery times, soft recovery characteristic and guaranteed reverse surge and ESD capability. They are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and switching losses are essential.

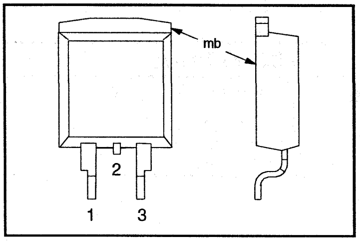
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYV32EB-** | **100** | **150** | **200** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 100 | 150 | 200 | V |
| $V_F$ | Forward voltage | 0.85 | 0.85 | 0.85 | V |
| $I_{O(AV)}$ | Average 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 |

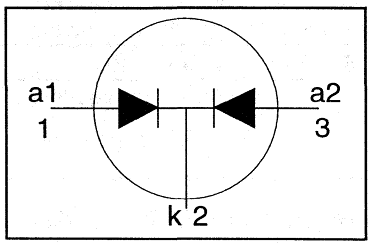
## PINNING - SOT404

| PIN | DESCRIPTION |
|---|---|
| 1 | anode 1 |
| 2 | cathode |
| 3 | anode 2 |
| mb | cathode |

## 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 |
| $I_{O(AV)}$ | Average 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 output current (both diodes conducting) | | - | 28 | | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | $t = 25$ µs; $\delta = 0.5$; $T_{hs} \leq 115$ ˚C | - | 20 | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current per diode | t = 10 ms | - | 125 | | | A |
| | | t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$ | - | 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 |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}mb}$ | 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 | minimum footprint, FR4 board | - | 50 | - | 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) | $V_R = V_{RRM}$; $T_j$ = 100 ˚C | - | 0.2 | 0.6 | mA |
| | | $V_R = V_{RRM}$ | - | 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 |

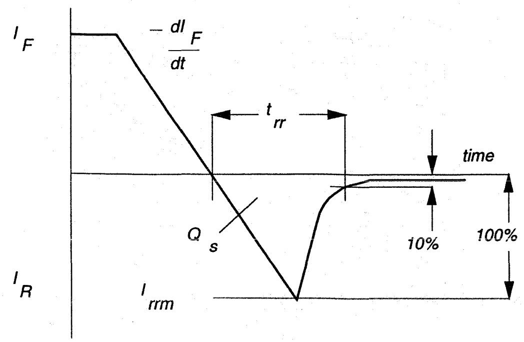



Fig.1. Definition of $t_{rr1}$, $Q_s$ and $I_{rrm}$

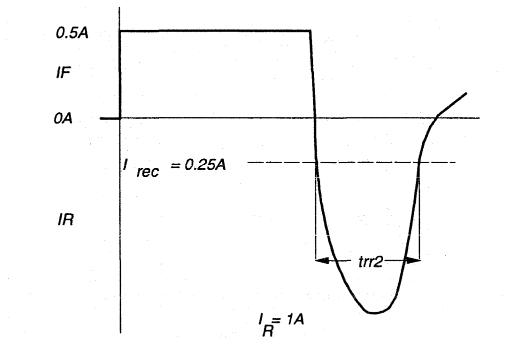



Fig.4. Definition of $t_{rr2}$

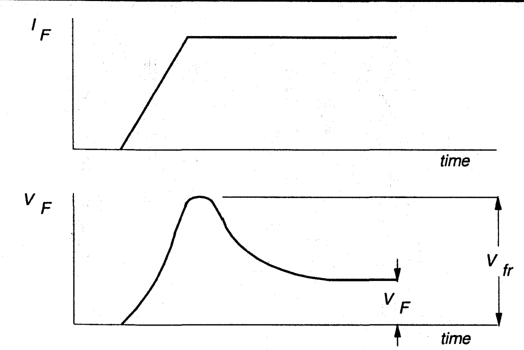



Fig.2. Definition of $V_{fr}$

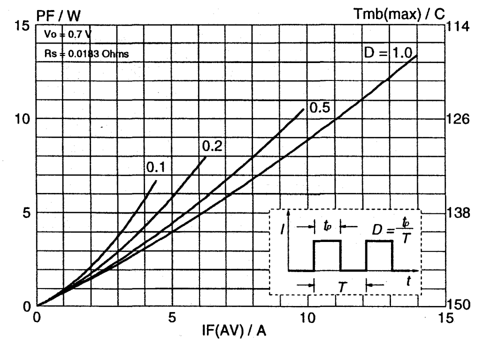



Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

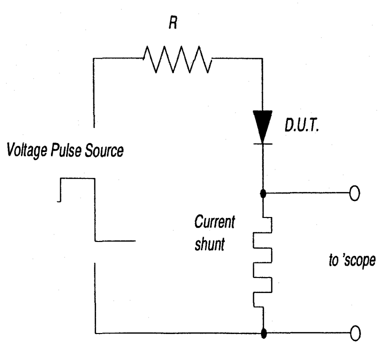



Fig.3. Circuit schematic for $t_{rr2}$

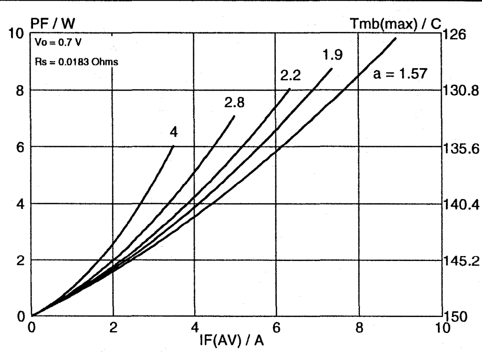



Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

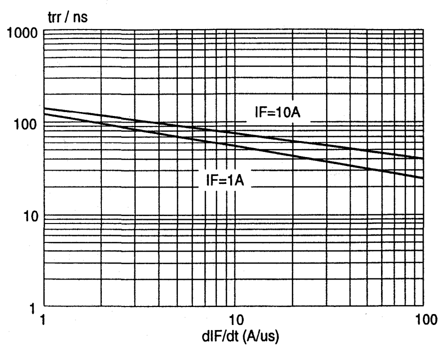



*Fig.7. Maximum $t_{rr}$ at $T_j$ = 25 ˚C; per diode*

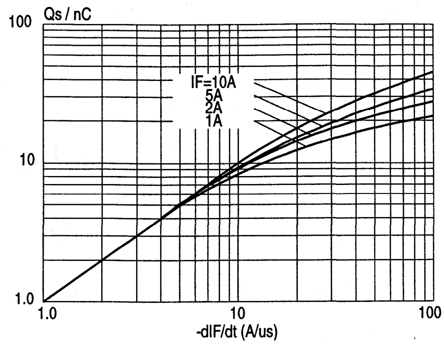



*Fig.10. Maximum $Q_s$ at $T_j$ = 25 ˚C; per diode*

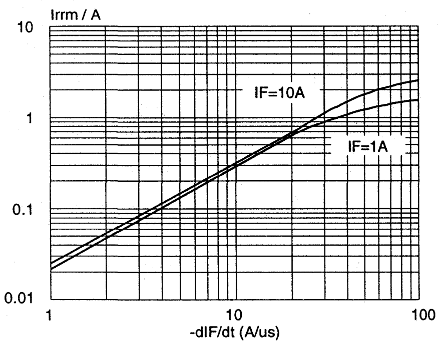



*Fig.8. Maximum $I_{rrm}$ at $T_j$ = 25 ˚C; per diode*

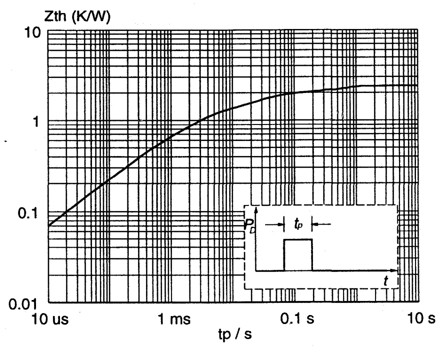



*Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.*

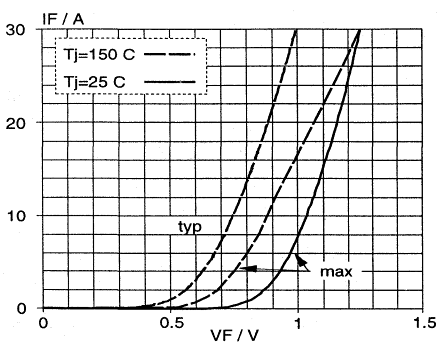



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

## GENERAL DESCRIPTION

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

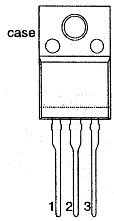
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYV32EX-** | **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 |
| $I_{RRM}$ | Repetitive peak reverse current per diode | 0.2 | 0.2 | 0.2 | A |

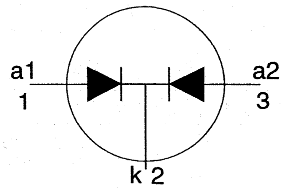
## PINNING - SOT186A

| PIN | DESCRIPTION |
|---|---|
| 1 | anode 1 (a) |
| 2 | cathode (k) |
| 3 | anode 2 (a) |
| 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 | | - | 100 | 150 | 200 | V |
| $I_{O(AV)}$ | Output current (both diodes conducting)[1] | 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 | | | $A^2s$ |
| $I_{RRM}$ | Repetitive peak reverse current per diode | $t_p = 2$ µs; $\delta = 0.001$ | - | 0.2 | | | A |
| $I_{RSM}$ | Non-repetitive peak reverse current per diode | $t_p = 100$ µs | - | 0.2 | | | A |
| $T_{stg}$ | Storage temperature | | -40 | 150 | | | ˚C |
| $T_j$ | Operating junction temperature | | - | 150 | | | ˚C |

**1** Neglecting switching and reverse current losses

## ESD LIMITING VALUE

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| $V_C$ | Electrostatic discharge capacitor voltage | Human body model; C = 250 pF; R = 1.5 kΩ | - | 8 | kV |

## ISOLATION LIMITING VALUE & CHARACTERISTIC

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{isol}$ | R.M.S. isolation voltage from all three terminals to external heatsink | f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree | - | | 2500 | V |
| $C_{isol}$ | Capacitance from T2 to external heatsink | f = 1 MHz | - | 10 | - | pF |

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}hs}$ | Thermal resistance junction to heatsink (per diode) | with heatsink compound | - | - | 5.0 | K/W |
| | | without heatsink compound | - | - | 7.0 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | in free air | - | 55 | - | K/W |

## 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; -d$I_F$/dt = 20 A/µs | - | 8 | 12.5 | nC |
| $t_{rr1}$ | Reverse recovery time (per diode) | $I_F$ = 1 A; $V_R$ ≥ 30 V; -d$I_F$/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; d$I_F$/dt = 10 A/µs | - | 1 | - | V |

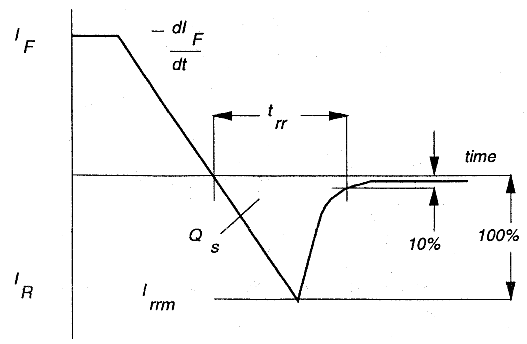



Fig.1. Definition of $t_{rr1}$, $Q_s$ and $I_{rrm}$

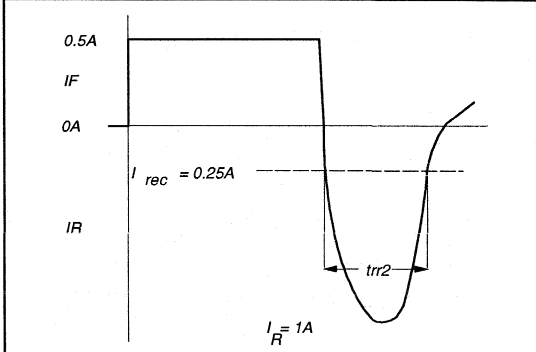



Fig.4. Definition of $t_{rr2}$

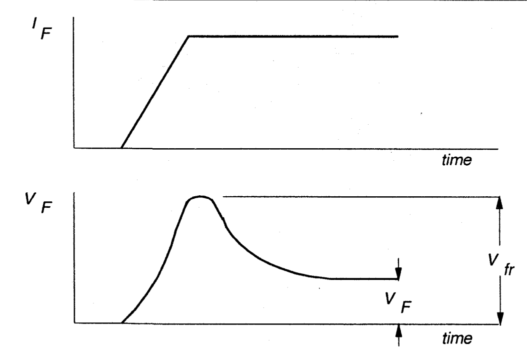



Fig.2. Definition of $V_{fr}$

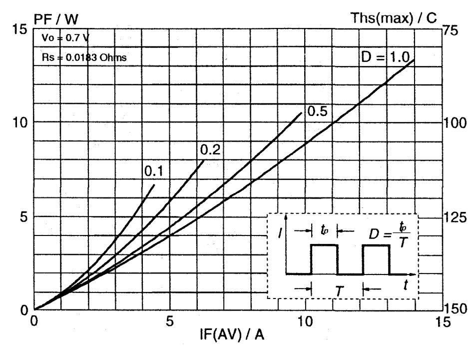



Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

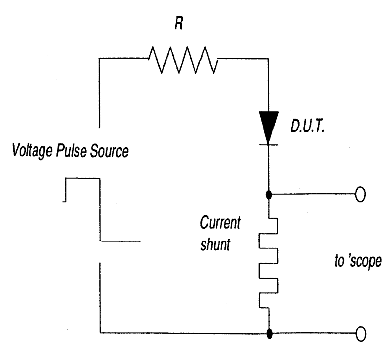



Fig.3. Circuit schematic for $t_{rr2}$

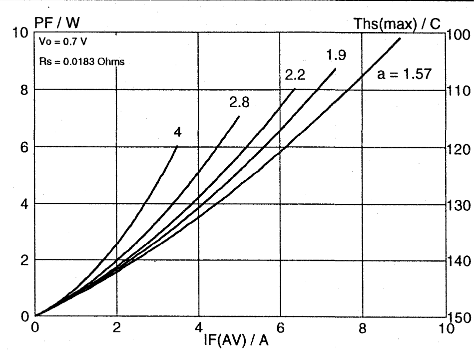



Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

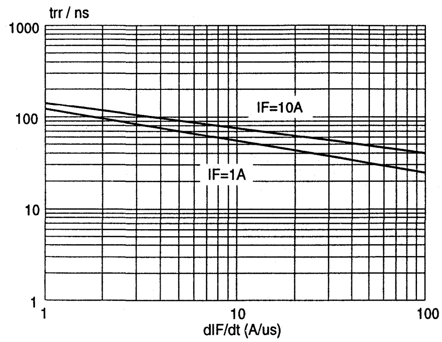



Fig.7. Maximum $t_{rr}$ at $T_j$ = 25 ˚C; per diode

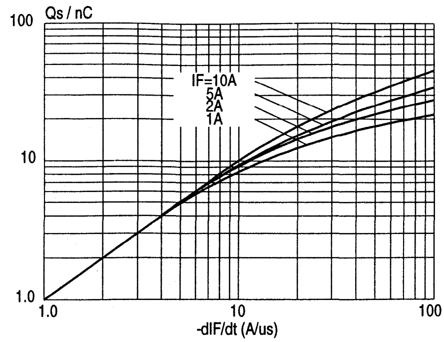



Fig.10. Maximum $Q_s$ at $T_j$ = 25 ˚C; per diode

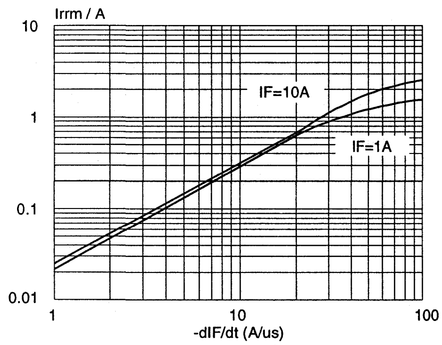



Fig.8. Maximum $I_{rrm}$ at $T_j$ = 25 ˚C; per diode

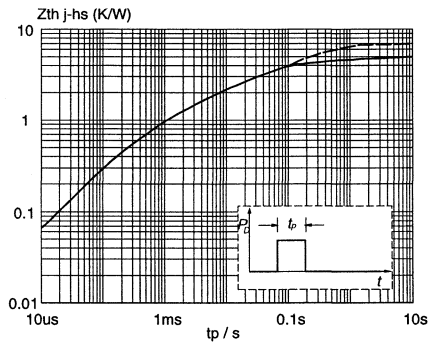



Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}hs} = f(t_p)$.

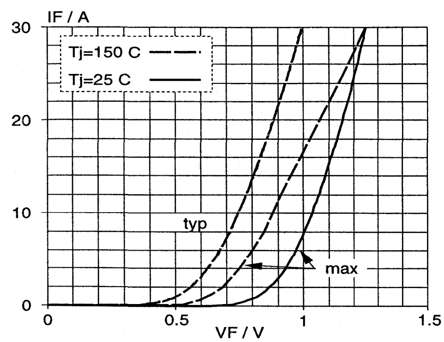



Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

# Rectifier diodes ultrafast

# 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.

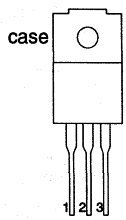
## QUICK REFERENCE DATA

| 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 |

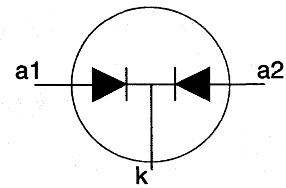
## PINNING - SOT186

| 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 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** $T_{hs} \leq 130$˚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 |

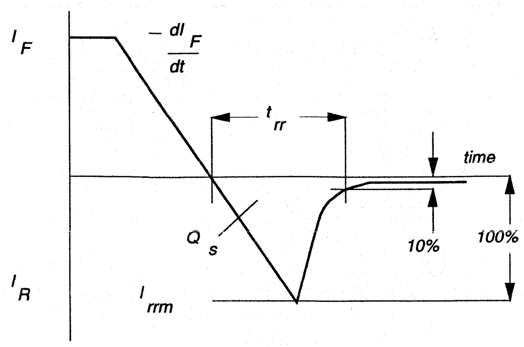



Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$

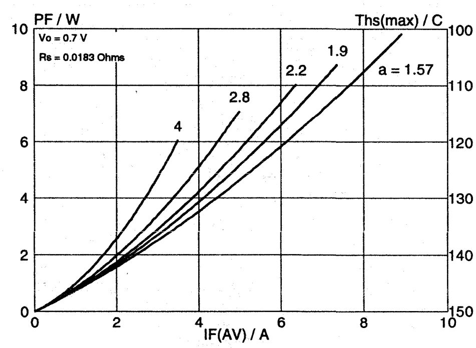



Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)}$ / $I_{F(AV)}$.

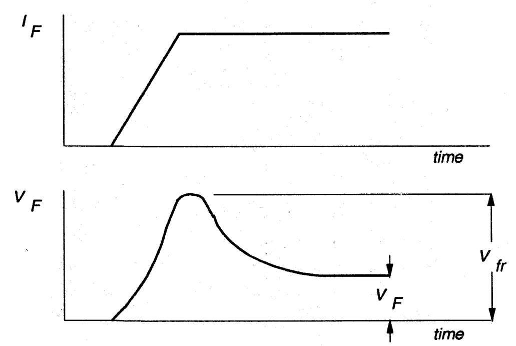



Fig.2. Definition of $V_{fr}$

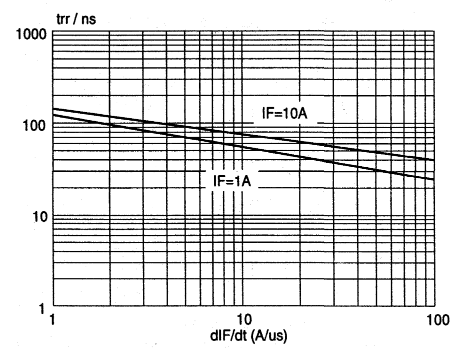



Fig.5. Maximum $t_{rr}$ at $T_j$ = 25 ˚C; per diode

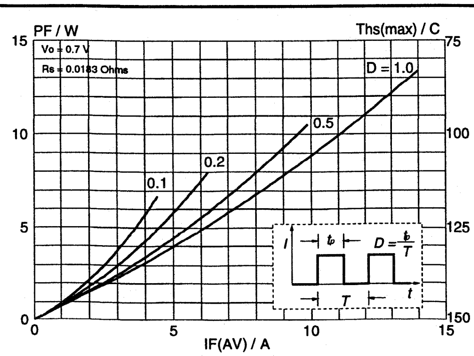



Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

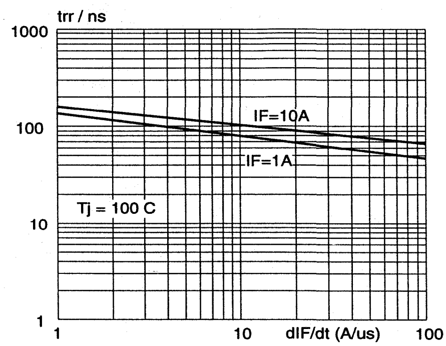



Fig.6. Maximum $t_{rr}$ at $T_j$ = 100 ˚C; per diode

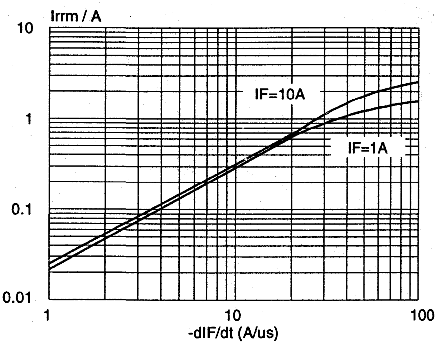



*Fig.7. Maximum $I_{rrm}$ at $T_j = 25$ ˚C; per diode*

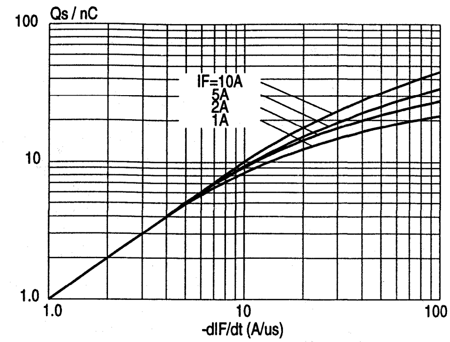



*Fig.10. Maximum $Q_s$ at $T_j = 25$ ˚C; per diode*

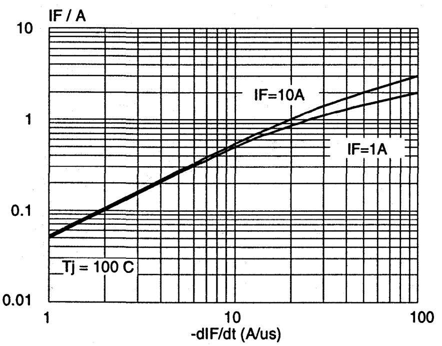



*Fig.8. Maximum $I_{rrm}$ at $T_j = 100$ ˚C; per diode*

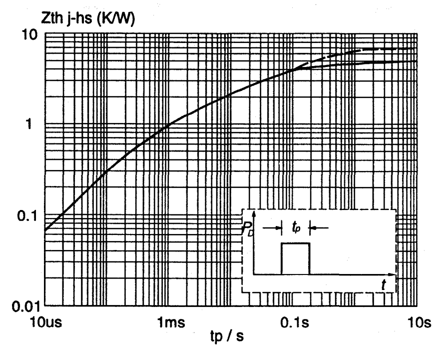



*Fig.11. Transient thermal impedance; per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.*

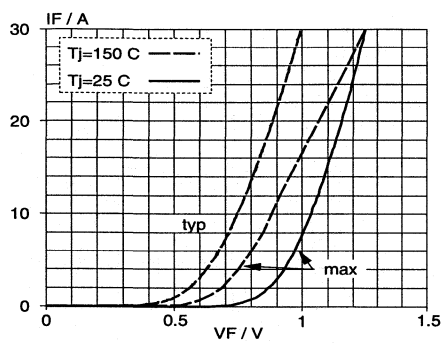



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

# Dual rectifier diodes ultrafast

# BYV34 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.

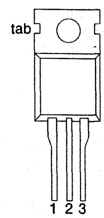
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | BYV34- | 300 | 400 | 500 | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 300 | 400 | 500 | V |
| $V_F$ | Forward voltage | 1.05 | 1.05 | 1.05 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | 20 | 20 | 20 | A |
| $t_{rr}$ | Reverse recovery time | 60 | 60 | 60 | ns |

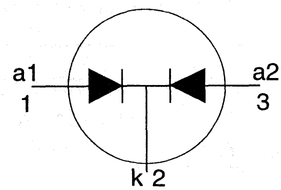
## PINNING - TO220AB

| 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 | | - | 300 | 400 | 500 | V |
| $V_R$ | Continuous reverse voltage | $T_{mb} \leq 138^{\circ}C$ | - | 300 | 400 | 500 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting)[1] | square wave; $\delta = 0.5$; $T_{mb} \leq 115\ ^{\circ}C$ | - | 20 | | | A |
| | | sinusoidal; a = 1.57; $T_{mb} \leq 116\ ^{\circ}C$ | - | 18 | | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | 28 | | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | $t = 25\ \mu s$; $\delta = 0.5$; $T_{mb} \leq 115\ ^{\circ}C$ | - | 20 | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current per diode. | t = 10 ms | - | 120 | | | A |
| | | t = 8.3 ms; sinusoidal; with reapplied $V_{RRM(max)}$ | - | 132 | | | A |
| $I^2t$ | $I^2t$ for fusing | t = 10 ms | - | 72 | | | $A^2s$ |
| $T_{stg}$ | Storage temperature | | -40 | 150 | | | $^{\circ}C$ |
| $T_j$ | Operating junction temperature | | - | 150 | | | $^{\circ}C$ |

**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 | 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) | $I_F$ = 10 A; $T_j$ = 150˚C | - | 0.87 | 1.05 | V |
| | | $I_F$ = 20 A | - | 1.10 | 1.35 | V |
| $I_R$ | Reverse current (per diode) | $V_R = V_{RRM}$ | - | 10 | 50 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 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 (per diode) | $I_F$ = 2 A to $V_R \geq$ 30 V; $dI_F/dt$ = 20 A/µs | - | 50 | 60 | nC |
| $t_{rr}$ | Reverse recovery time (per diode) | $I_F$ = 1 A to $V_R \geq$ 30 V; $dI_F/dt$ = 100 A/µs | - | 50 | 60 | ns |
| $I_{rrm}$ | Peak reverse recovery current (per diode) | $I_F$ = 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 (per diode) | $I_F$ = 10 A; $dI_F/dt$ = 10 A/µs | - | 2.5 | - | V |

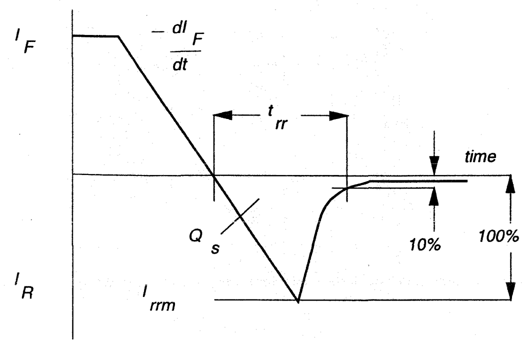



*Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$*

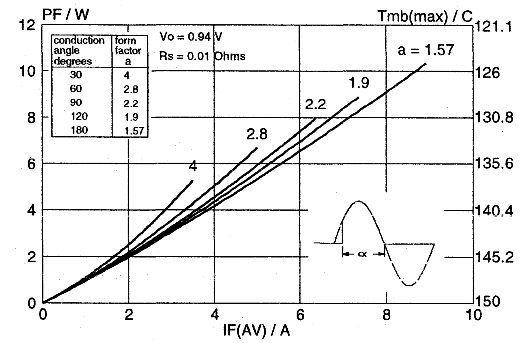



*Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)}$ / $I_{F(AV)}$.*

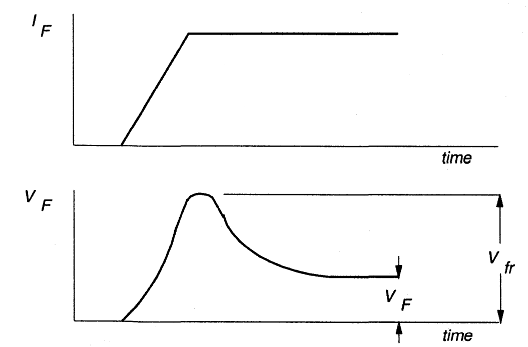



*Fig.2. Definition of $V_{fr}$*

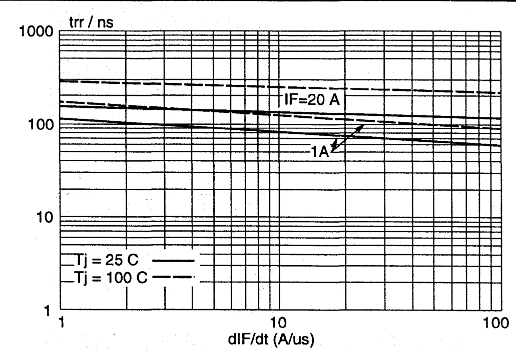



*Fig.5. Maximum $t_{rr}$ at $T_j$ = 25˚C and 100˚C; per diode*

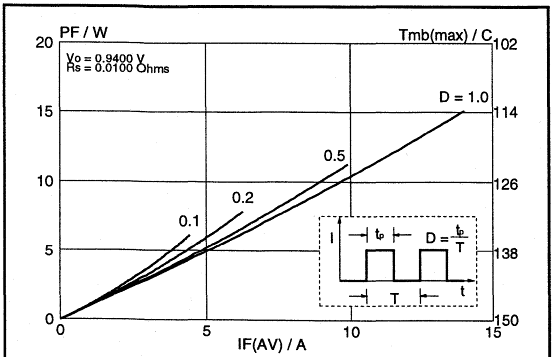



*Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

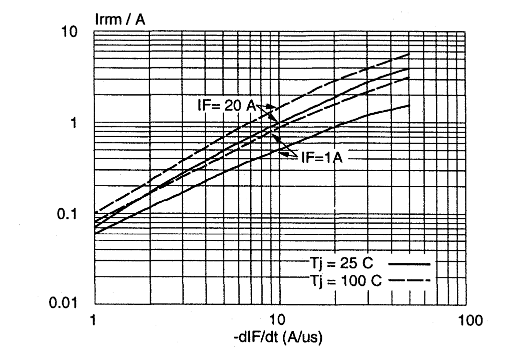



*Fig.6. Maximum $I_{rrm}$ at $T_j$ = 25˚C and 100˚C; per diode.*

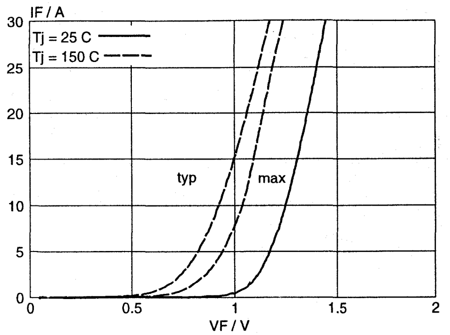



*Fig.7. Typical and maximum forward characteristic*

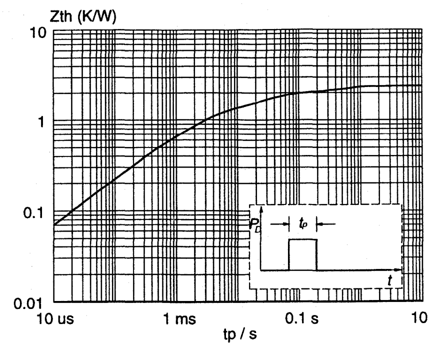



*Fig.9. Transient thermal impedance per diode* $Z_{th\ j\text{-}mb} = f(t_p)$

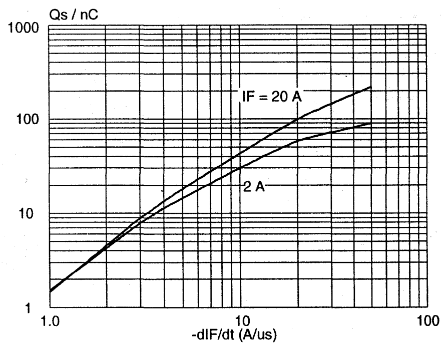



*Fig.8. Maximum $Q_s$ at $T_j = 25^{\circ}C$; per diode.*

# 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.

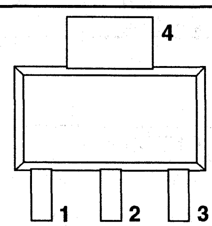
## QUICK REFERENCE DATA

| 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 |

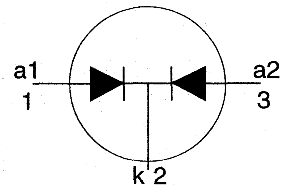
## PINNING - SOT223

| 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; $\delta = 0.5$; $T_{sp} \leq 132^{\circ}C$ | - | 1.5 | | | A |
| | | sinusoidal; a = 1.57; $T_{sp} \leq 134^{\circ}C$ | - | 1.35 | | | A |
| $I_{O(RMS)}$ | RMS forward current | | - | 2.1 | | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | t = 25 µs; $\delta = 0.5$; $T_{sp} \leq 132\ ^{\circ}C$ | - | 1.5 | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current per diode | $t_p$ = 10 ms | - | 6 | | | A |
| | | $t_p$ = 8.3 ms sinusoidal; $T_j = 150^{\circ}C$ prior to surge; with reapplied $V_{RWM(max)}$ | - | 6.6 | | | A |
| $I^2t$ | $I^2t$ for fusing | t = 10 ms | - | 0.18 | | | $A^2s$ |
| $T_{stg}$ | Storage temperature | | -65 | 150 | | | ˚C |
| $T_j$ | Operating junction temperature | | - | 150 | | | ˚C |

**1** $T_{sp} \leq 120^{\circ}C$ for thermal stability.

**2** Neglecting switching and reverse current losses

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}sp}$ | Thermal resistance junction to solder point | one or both diodes conducting | - | - | 15 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | pcb mounted; minimum footprint | - | 156 | - | K/W |
| | | pcb mounted; pad area as in fig:9 | - | 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) | $I_F$ = 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 (per diode) | $V_R = V_{RWM}$; $T_j$ = 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 (per diode) | $I_F$ = 2 A; $V_R \geq 30$ V; $-dI_F/dt$ = 20 A/µs | - | - | 11 | nC |
| $t_{rr}$ | Reverse recovery time (per diode) | $I_F$ = 1 A; $V_R \geq 30$ V; $-dI_F/dt$ = 100 A/µs | - | - | 25 | ns |
| $V_{fr}$ | Forward recovery voltage (per diode) | $I_F$ = 2 A; $dI_F/dt$ = 20 A/µs | - | 3 | - | V |

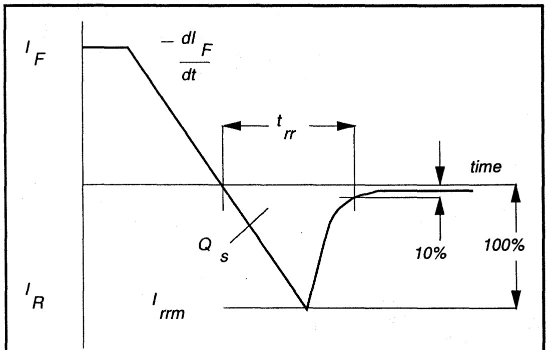



Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$

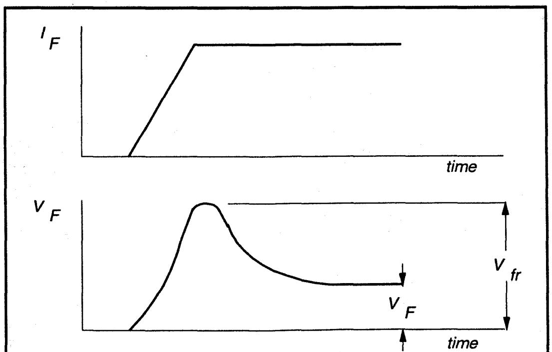



Fig.2. Definition of $V_{fr}$

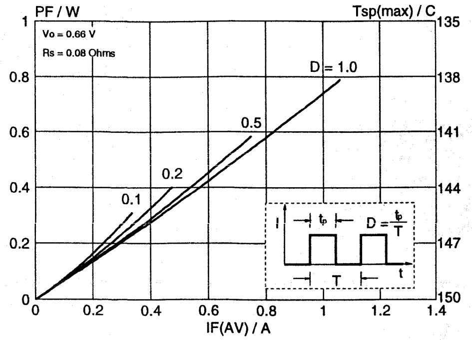



Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

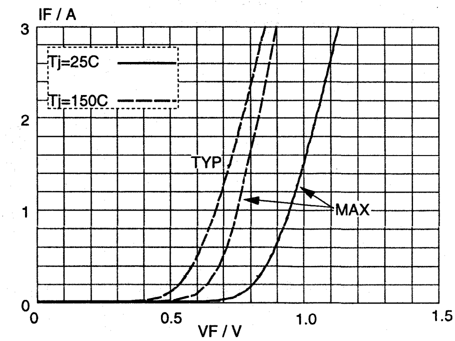



Fig.6. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

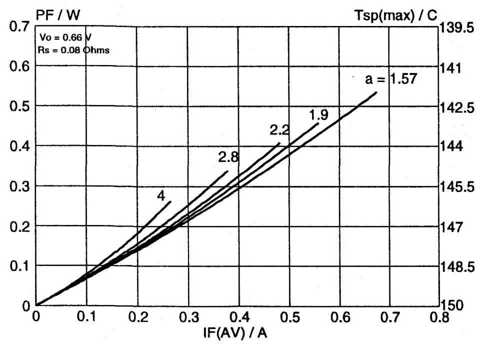



Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

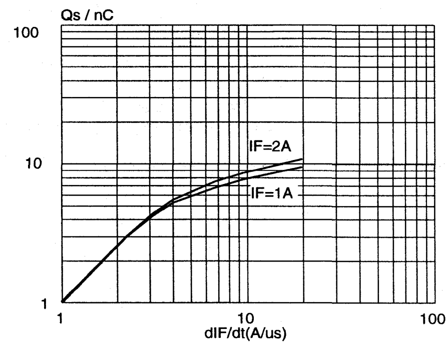



Fig.7. Maximum $Q_s$ at $T_j$ = 25 ˚C; per diode

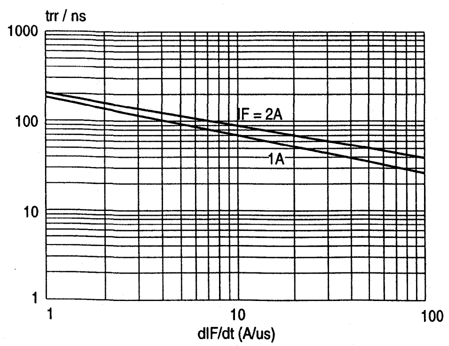



Fig.5. Maximum $t_{rr}$ at $T_j$ = 25 ˚C; per diode

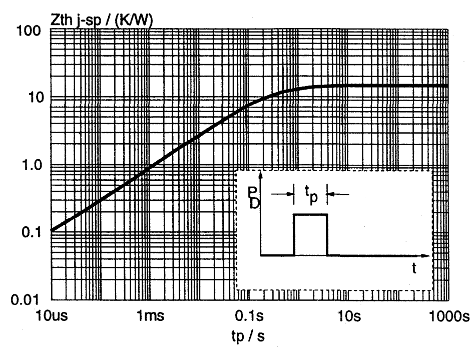



Fig.8. Transient thermal impedance; per diode; $Z_{th\ j\text{-}sp} = f(t_p)$.

## PRINTED CIRCUIT BOARD

*Dimensions in mm.*

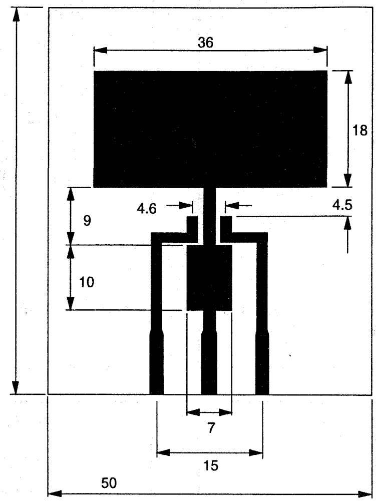



*Fig.9. PCB for thermal resistance and power rating for SOT223.*
*PCB: FR4 epoxy glass (1.6 mm thick), copper laminate (35 μm thick).*

# Rectifier diodes ultrafast, rugged

# BYV40E series

## GENERAL DESCRIPTION

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

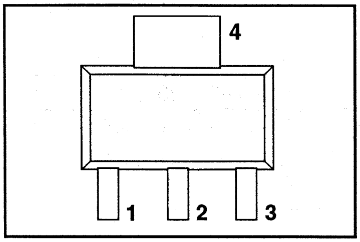
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYV40E-** | **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 |
| $I_{RRM}$ | Repetitive peak reverse current per diode | 0.1 | 0.1 | 0.1 | A |

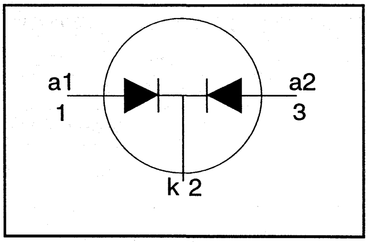
## PINNING - SOT223

| 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 |
|---|---|---|---|---|---|---|---|
| | | | | -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; $\delta = 0.5$; $T_{sp} \leq 132$˚C | - | | 1.5 | | A |
| | | sinusoidal; a = 1.57; $T_{sp} \leq 134$˚C | - | | 1.35 | | A |
| $I_{O(RMS)}$ | RMS forward current | | - | | 2.1 | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | t = 25 µs; $\delta = 0.5$; $T_{sp} \leq 132$ ˚C | - | | 1.5 | | A |
| $I_{FSM}$ | Non-repetitive peak forward current per diode | $t_p$ = 10 ms | - | | 6 | | A |
| | | $t_p$ = 8.3 ms sinusoidal; $T_j$ = 150˚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 µs; $\delta = 0.001$ | - | | 0.1 | | A |
| $I_{RSM}$ | Non-repetitive peak reverse current per diode | $t_p$ = 100 µs | - | | 0.1 | | A |
| $T_{stg}$ | Storage temperature | | -65 | | 150 | | ˚C |
| $T_j$ | Operating junction temperature | | - | | 150 | | ˚C |

**1** $T_{sp} \leq 120$˚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 |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}sp}$ | Thermal resistance junction to solder point | one or both diodes conducting | - | - | 15 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | pcb mounted; minimum footprint | - | 156 | - | K/W |
| | | pcb mounted; pad area as in fig:11 | - | 70 | - | K/W |

## STATIC CHARACTERISTICS

$T_j$ = 25 ˚C unless otherwise stated

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_F$ | Forward voltage (per diode) | $I_F$ = 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 (per diode) | $V_R = V_{RWM}$; $T_j$ = 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 (per diode) | $I_F$ = 2 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 20 A/µs | - | - | 11 | nC |
| $t_{rr1}$ | Reverse recovery time (per diode) | $I_F$ = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 100 A/µs | - | - | 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) | $I_F$ = 2 A; $dI_F/dt$ = 20 A/µs | - | 3 | - | V |

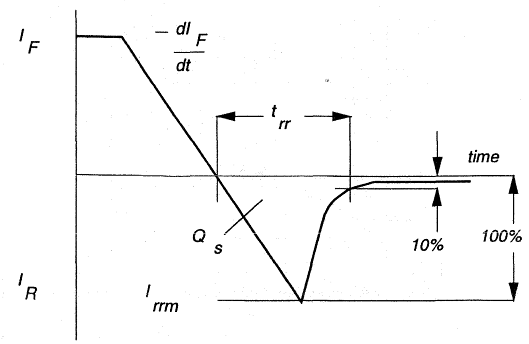



Fig.1. Definition of $t_{rr1}$, $Q_s$ and $I_{rrm}$

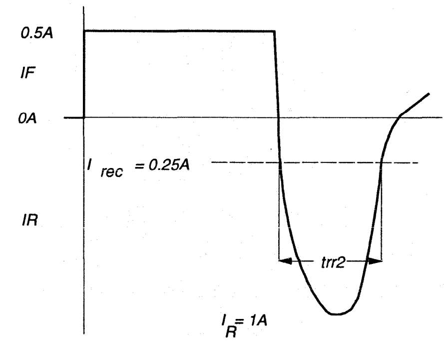



Fig.4. Definition of $t_{rr2}$

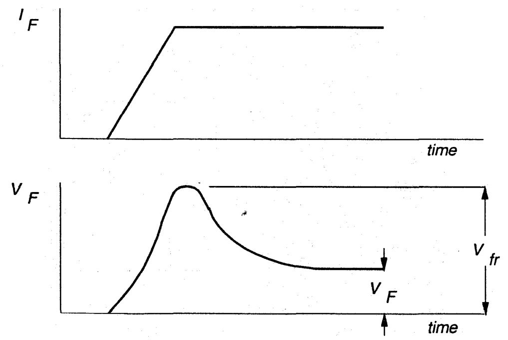



Fig.2. Definition of $V_{fr}$

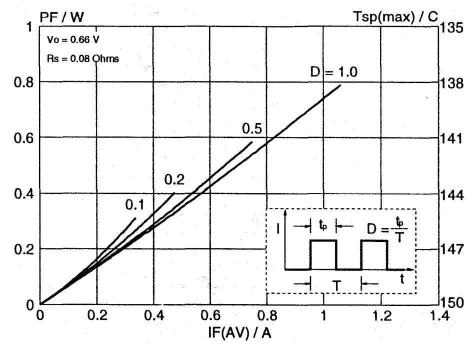



Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

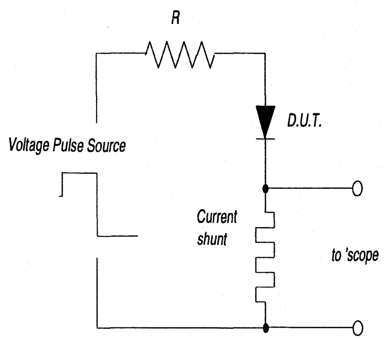



Fig.3. Circuit schematic for $t_{rr2}$

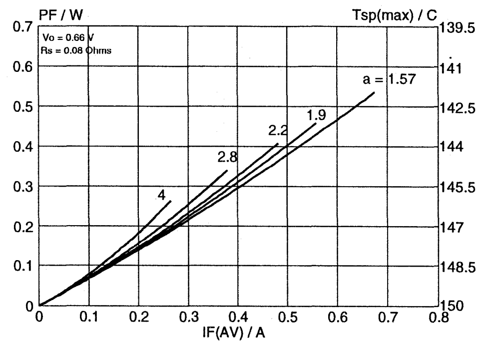



Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

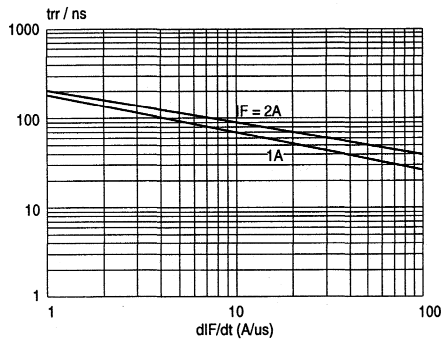



*Fig.7. Maximum $t_{rr}$ at $T_j$ = 25 ˚C; per diode*

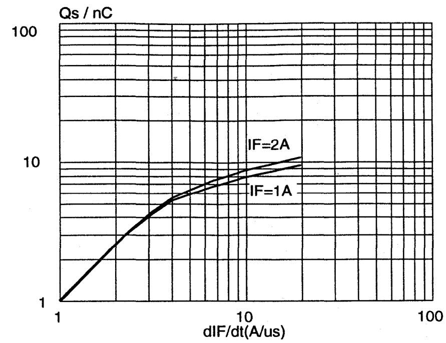



*Fig.9. Maximum $Q_s$ at $T_j$ = 25 ˚C; per diode*

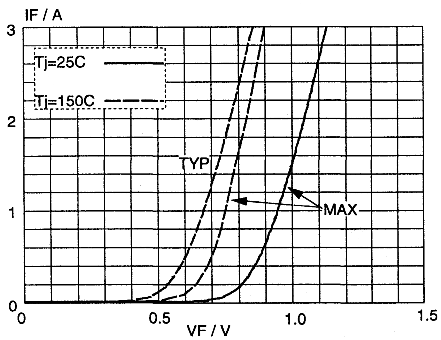



*Fig.8. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

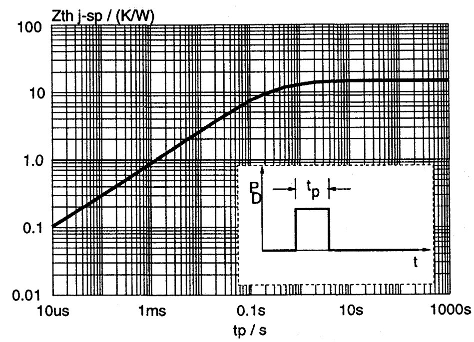



*Fig.10. Transient thermal impedance; per diode; $Z_{th\,j\text{-}sp} = f(t_p)$.*

## PRINTED CIRCUIT BOARD

*Dimensions in mm.*

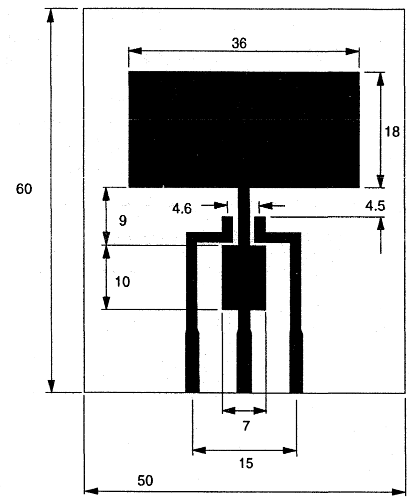



*Fig.11. PCB for thermal resistance and power rating for SOT223.*
*PCB: FR4 epoxy glass (1.6 mm thick), copper laminate (35 µm thick).*

## 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.

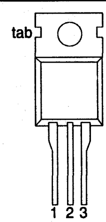
## QUICK REFERENCE DATA

| 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 |

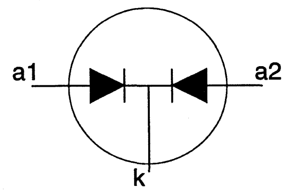
## PINNING - TO220AB

| 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 sinusoidal; with reapplied $V_{RWM(max)}$ | - | 160 | | | A |
| $I^2t$ | $I^2t$ 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 |

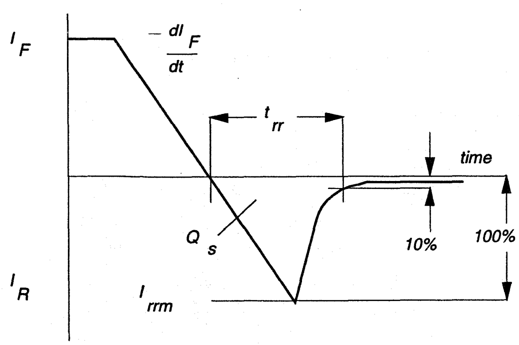



*Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$*

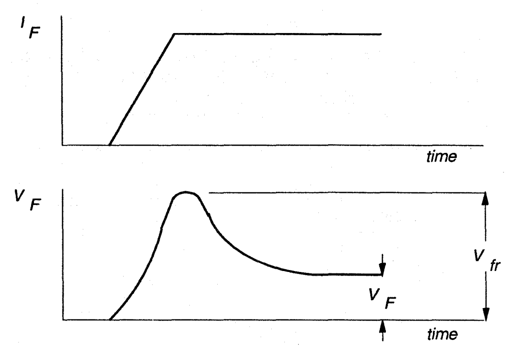



*Fig.2. Definition of $V_{fr}$*

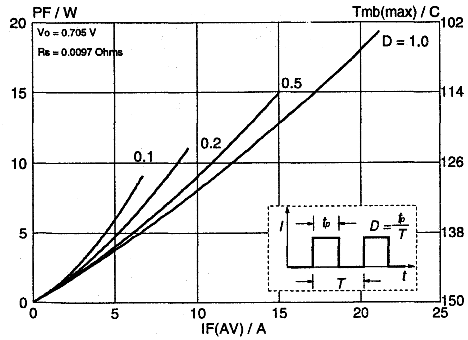



Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

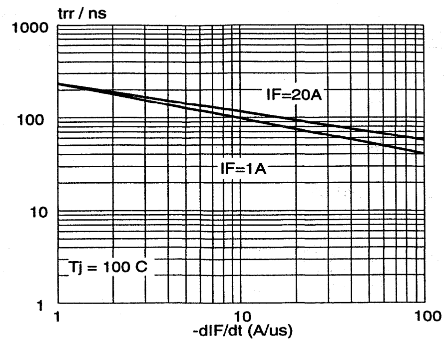



Fig.6. Maximum $t_{rr}$ at $T_j = 100$ °C; per diode

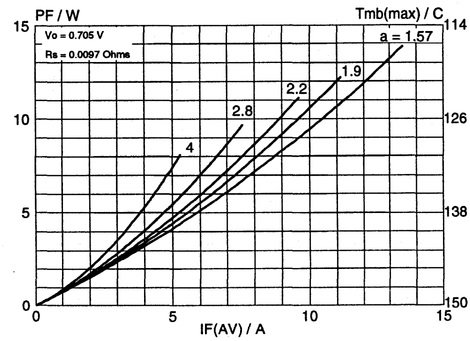



Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

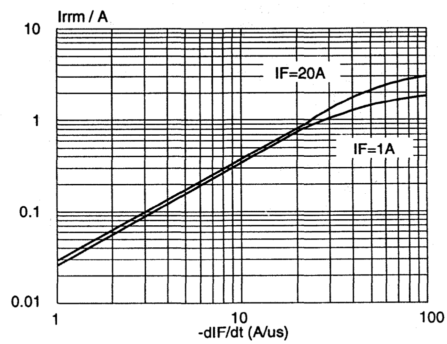



Fig.7. Maximum $I_{rrm}$ at $T_j = 25$ °C; per diode

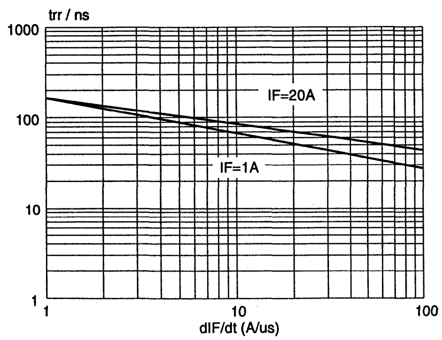



Fig.5. Maximum $t_{rr}$ at $T_j = 25$ °C; per diode

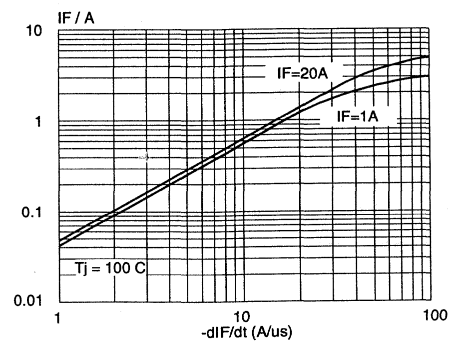



Fig.8. Maximum $I_{rrm}$ at $T_j = 100$ °C; per diode

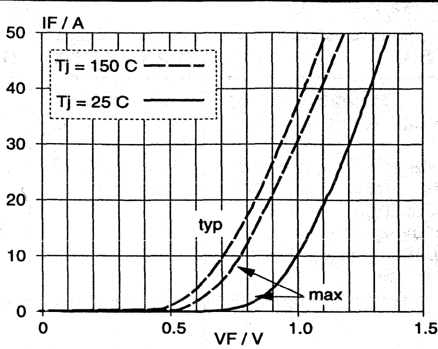



Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

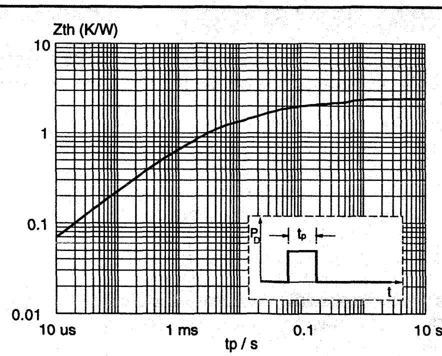



Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.

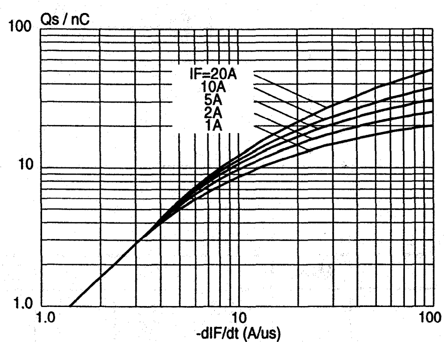



Fig.10. Maximum $Q_s$ at $T_j = 25$ ˚C; per diode

# 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.

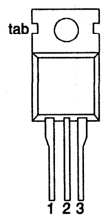
## QUICK REFERENCE DATA

| 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 |

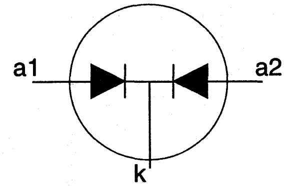
## PINNING - TO220AB

| 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 | $t = 25$ 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 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 | - | 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 |

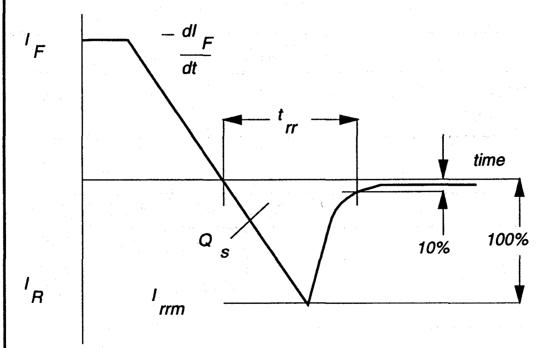



Fig.1. Definition of $t_{rr1}$, $Q_s$ and $I_{rrm}$

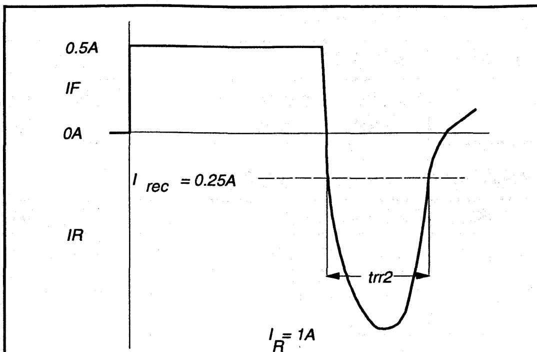



Fig.4. Definition of $t_{rr2}$

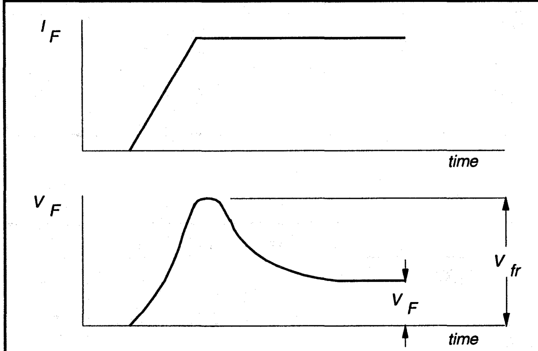



Fig.2. Definition of $V_{fr}$

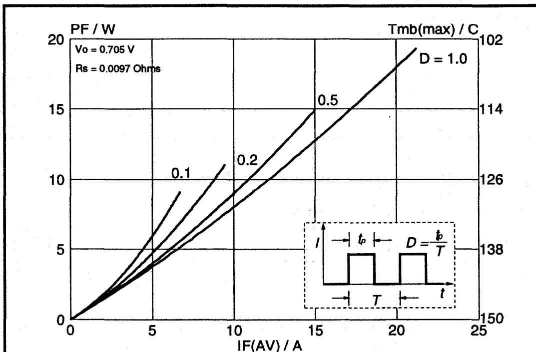



Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

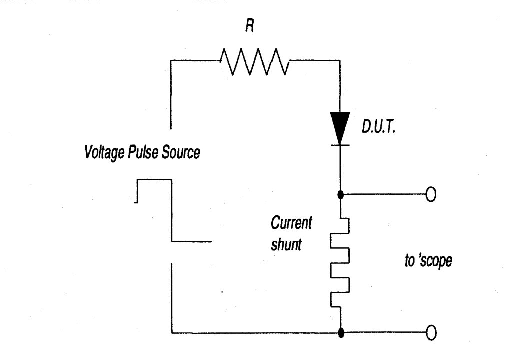



Fig.3. Circuit schematic for $t_{rr2}$

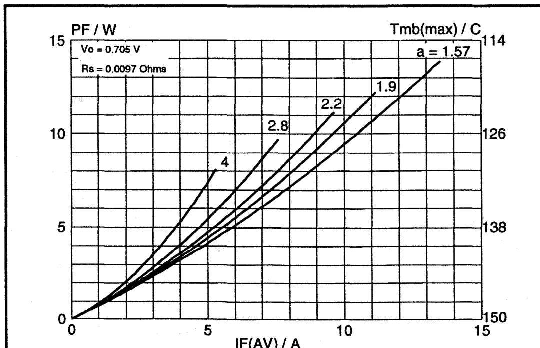



Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

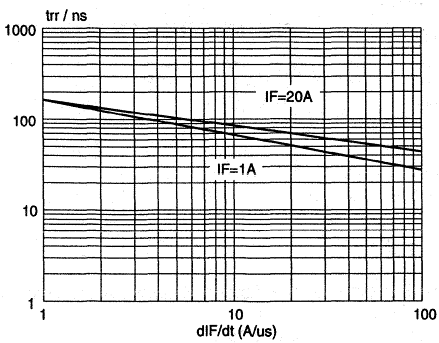



*Fig.7. Maximum $t_{rr}$ at $T_j$ = 25 ˚C; per diode*

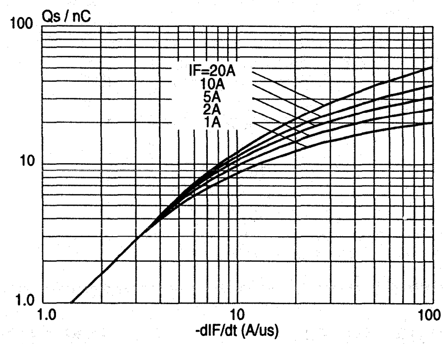



*Fig.10. Maximum $Q_s$ at $T_j$ = 25 ˚C; per diode*

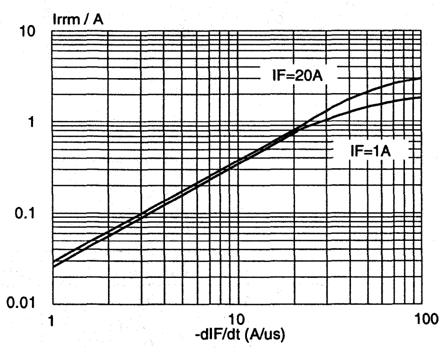



*Fig.8. Maximum $I_{rrm}$ at $T_j$ = 25 ˚C; per diode*

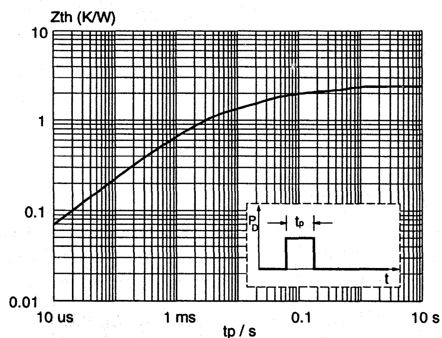



*Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.*

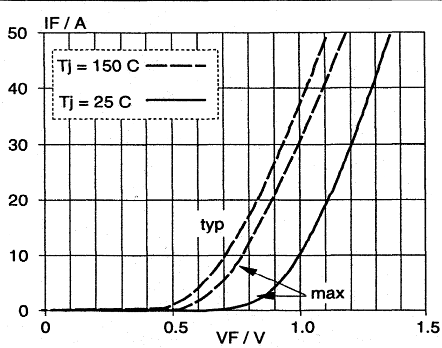



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

# Rectifier diodes ultrafast, rugged

# BYV42EB series

## GENERAL DESCRIPTION

Glass passivated dual epitaxial rectifier diodes in a plastic envelope suitable for surface mounting, featuring low forward voltage drop, ultra-fast recovery times, soft recovery characteristic and guaranteed reverse surge and ESD capability. They are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and switching losses are essential.

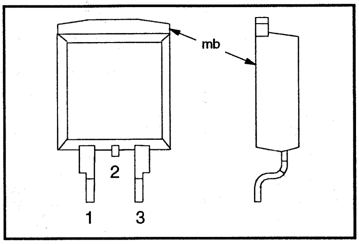
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYV42EB-** | **100** | **150** | **200** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 100 | 150 | 200 | V |
| $V_F$ | Forward voltage | 0.85 | 0.85 | 0.85 | V |
| $I_{O(AV)}$ | Average 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 |

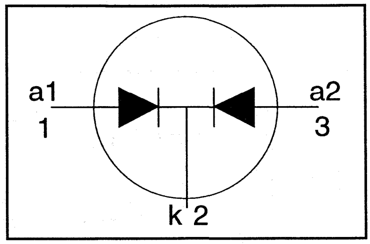
## PINNING - SOT404

| PIN | DESCRIPTION |
|---|---|
| 1 | anode 1 |
| 2 | cathode |
| 3 | anode 2 |
| mb | cathode |

## 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 | $T_{mb} \leq 144$ °C | - | 100 | 150 | 200 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting)[1] | 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 output current (both diodes conducting) | | - | 43 | | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | $t = 25$ µs; $\delta = 0.5$; $T_{hs} \leq 108$ °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 $V_{RRM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ 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** 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 | - | - | 2.4 | K/W |
| | | both diodes conducting | - | - | 1.4 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | minimum footprint, FR4 board | - | 50 | - | 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) | $V_R = V_{RRM}$; $T_j$ = 100 ˚C | - | 0.5 | 1 | mA |
| | | $V_R = V_{RRM}$ | - | 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 |

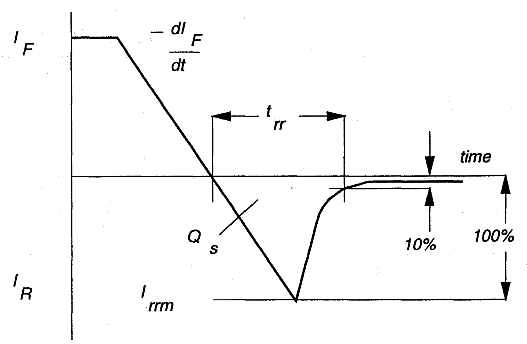



Fig.1. Definition of $t_{rr1}$, $Q_s$ and $I_{rrm}$

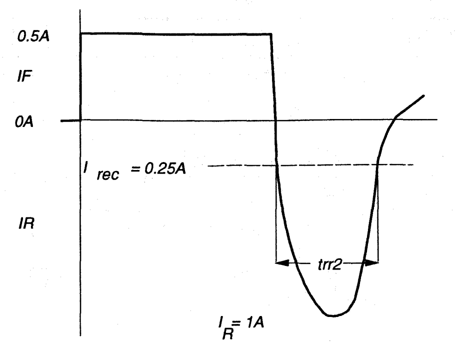



Fig.4. Definition of $t_{rr2}$

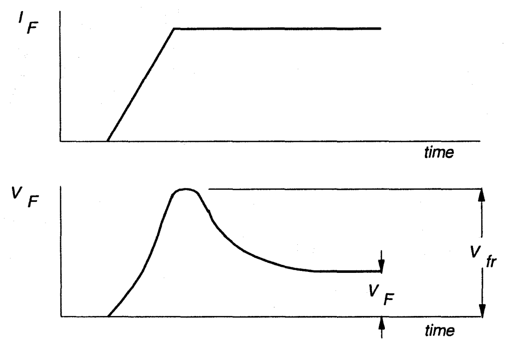



Fig.2. Definition of $V_{fr}$

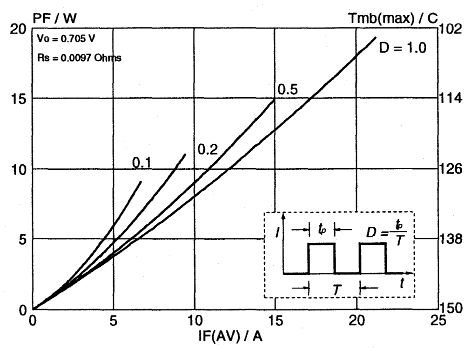



Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

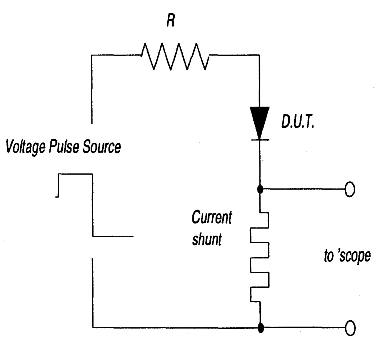



Fig.3. Circuit schematic for $t_{rr2}$

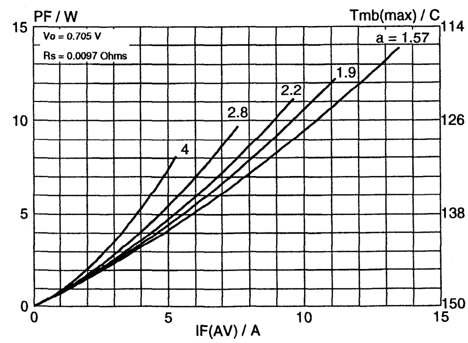



Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

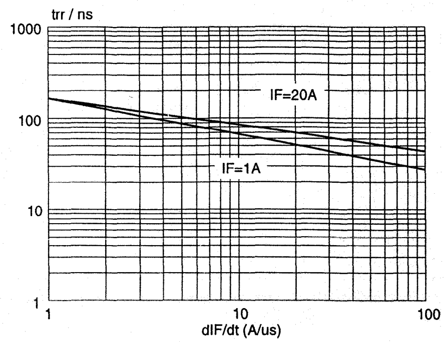



*Fig.7. Maximum $t_{rr}$ at $T_j$ = 25 ˚C; per diode*

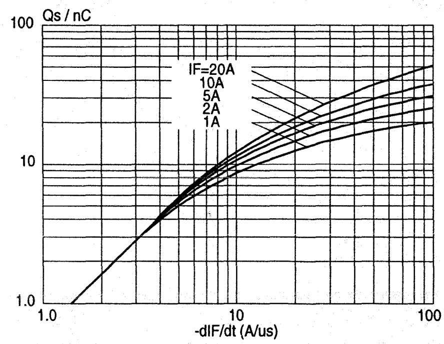



*Fig.10. Maximum $Q_s$ at $T_j$ = 25 ˚C; per diode*

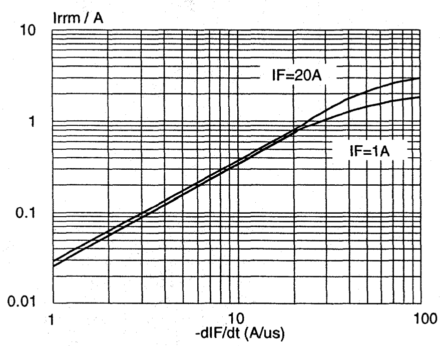



*Fig.8. Maximum $I_{rrm}$ at $T_j$ = 25 ˚C; per diode*

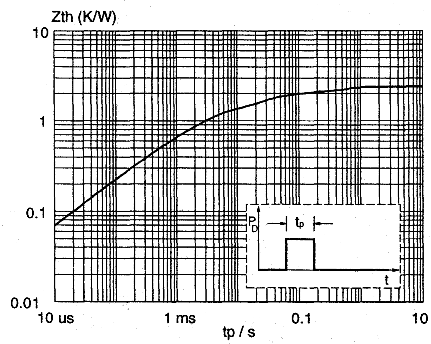



*Fig.11. Transient thermal impedance; per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.*

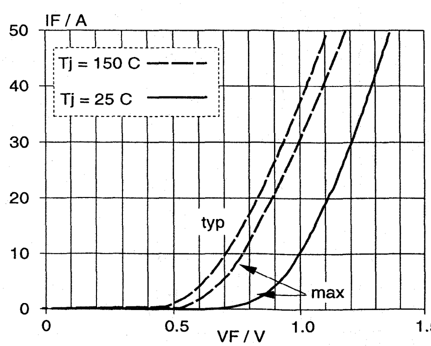



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

# Rectifier diodes ultrafast, rugged

# BYV42EX series

## GENERAL DESCRIPTION

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

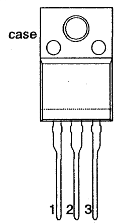
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYV42EX-** | **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 |
| $I_{RRM}$ | Repetitive peak reverse current per diode | 0.2 | 0.2 | 0.2 | A |

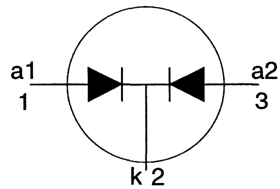
## PINNING - SOT186A

| PIN | DESCRIPTION |
|---|---|
| 1 | anode 1 (a) |
| 2 | cathode (k) |
| 3 | anode 2 (a) |
| 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 |
| $I_{O(AV)}$ | 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 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** $T_{hs} \leq 125$˚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 |

## ISOLATION LIMITING VALUE & CHARACTERISTIC

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{isol}$ | R.M.S. isolation voltage from all three terminals to external heatsink | f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree | - | | 2500 | V |
| $C_{isol}$ | Capacitance from T2 to external heatsink | f = 1 MHz | - | 10 | - | pF |

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}hs}$ | Thermal resistance junction to heatsink | both diodes conducting | | | | |
| | | with heatsink compound | - | - | 4.0 | K/W |
| | | without heatsink compound | - | - | 8.0 | K/W |
| | | per diode | | | | |
| | | with heatsink compound | - | - | 5.0 | K/W |
| | | without heatsink compound | - | - | 9.0 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | in free air | - | 55 | - | K/W |

## 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; $V_R$ ≥ 30 V; $-dI_F/dt$ = 20 A/µs | - | 6 | 15 | nC |
| $t_{rr1}$ | Reverse recovery time (per diode) | $I_F$ = 1 A; $V_R$ ≥ 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 |

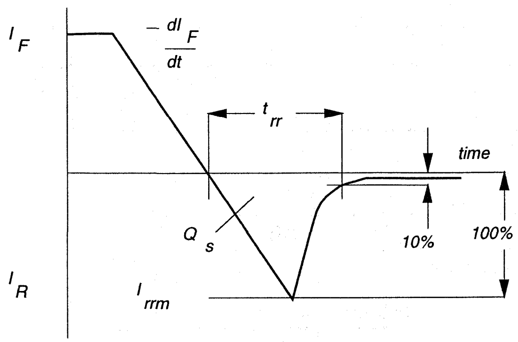



Fig.1. Definition of $t_{rr1}$, $Q_s$ and $I_{rrm}$

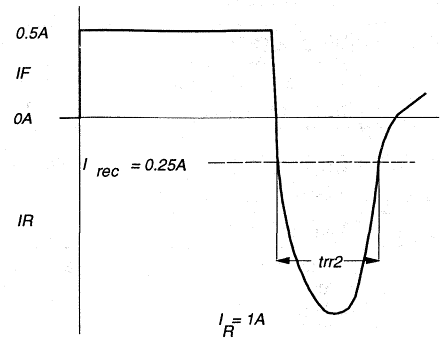



Fig.4. Definition of $t_{rr2}$

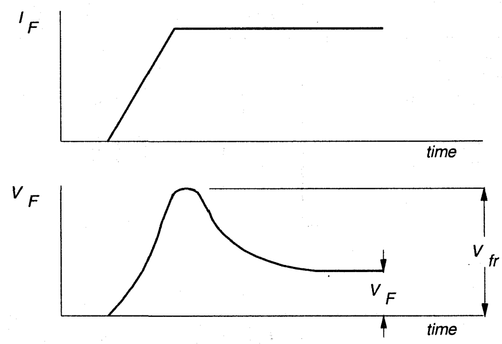



Fig.2. Definition of $V_{fr}$

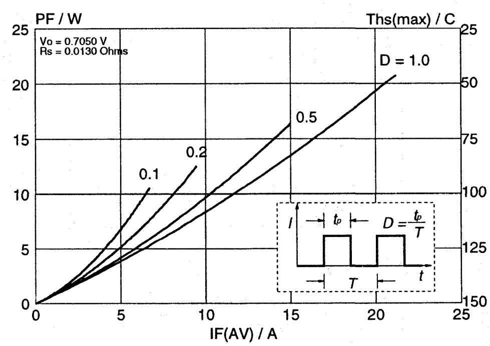



Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

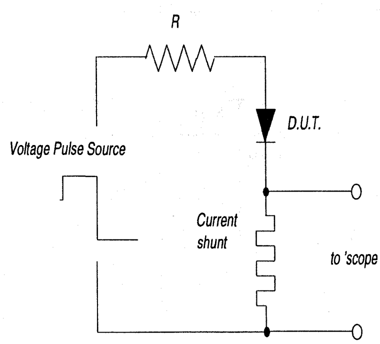



Fig.3. Circuit schematic for $t_{rr2}$

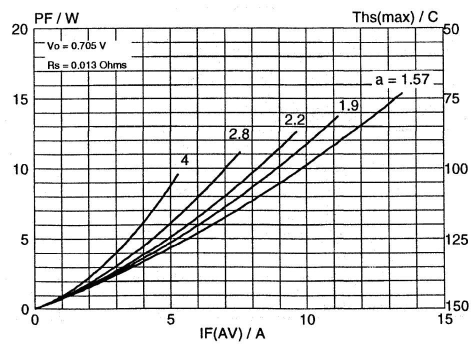



Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

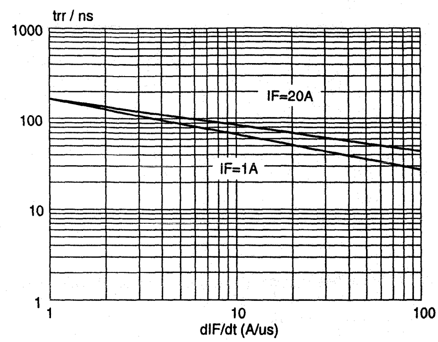



*Fig.7. Maximum $t_{rr}$ at $T_j$ = 25 ˚C; per diode*

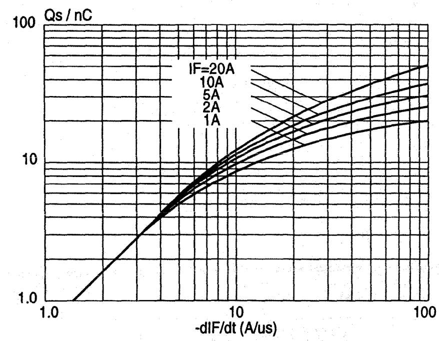



*Fig.10. Maximum $Q_s$ at $T_j$ = 25 ˚C; per diode*

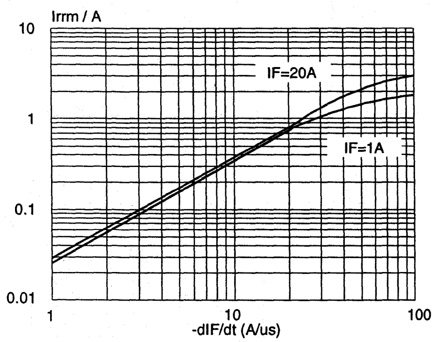



*Fig.8. Maximum $I_{rrm}$ at $T_j$ = 25 ˚C; per diode*

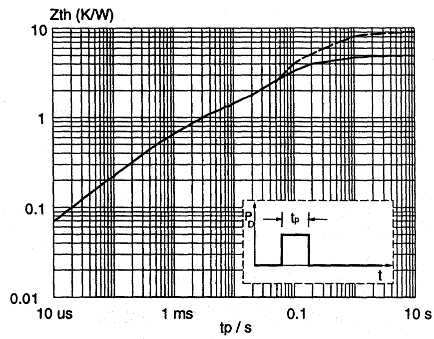



*Fig.11. Transient thermal impedance; per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.*

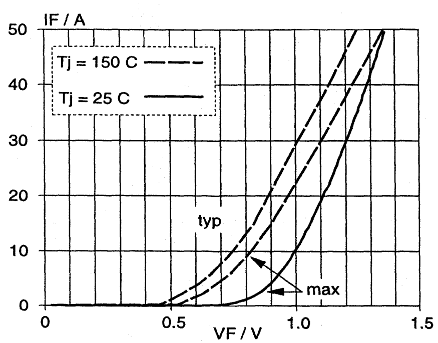



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

## 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.

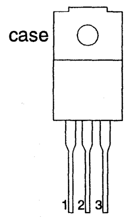
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYV42F-** | **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 |

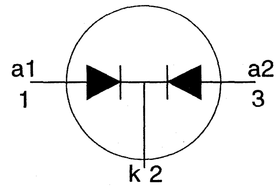
## PINNING - SOT186

| 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; $\delta = 0.5$; $T_{hs} \leq 78$ ˚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 sinusoidal; with reapplied $V_{RWM(max)}$ | - | | 160 | | A |
| $I^2t$ | $I^2t$ 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 LIMITING VALUE & CHARACTERISTIC

$T_{hs}$ = 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 | both diodes conducting | | | | |
| | | with heatsink compound | - | - | 4.0 | K/W |
| | | without heatsink compound | - | - | 8.0 | K/W |
| | | per diode | | | | |
| | | with heatsink compound | - | - | 5.0 | K/W |
| | | without heatsink compound | - | - | 9.0 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | in free air | - | 55 | - | K/W |

## 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; $V_R$ ≥ 30 V; $-dI_F/dt$ = 20 A/µs | - | 6 | 15 | nC |
| $t_{rr}$ | Reverse recovery time (per diode) | $I_F$ = 1 A; $V_R$ ≥ 30 V; $-dI_F/dt$ = 100 A/µs | - | 20 | 28 | ns |
| $I_{rrm}$ | Peak reverse recovery current (per diode) | $I_F$ = 10 A; $V_R$ ≥ 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 |

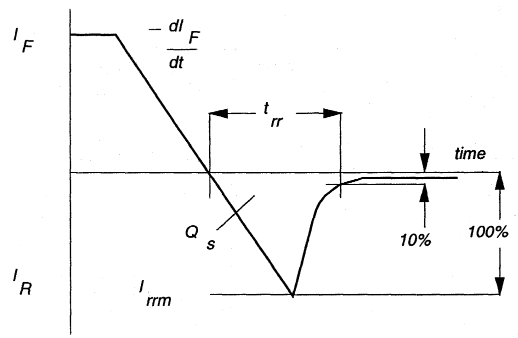


*Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$*

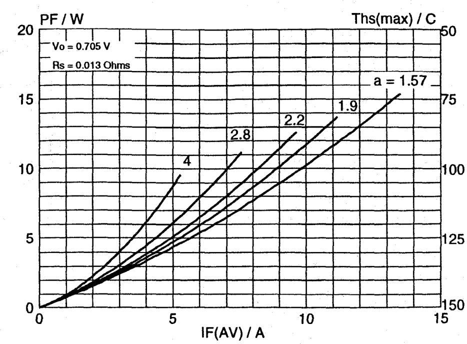


*Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)}$ / $I_{F(AV)}$.*

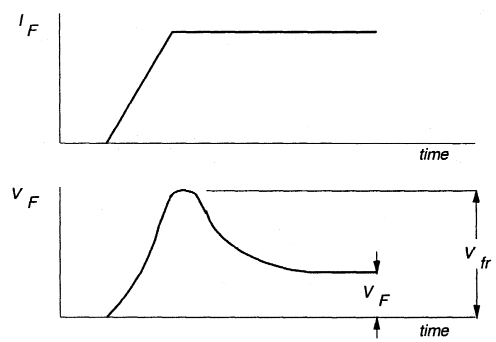


*Fig.2. Definition of $V_{fr}$*

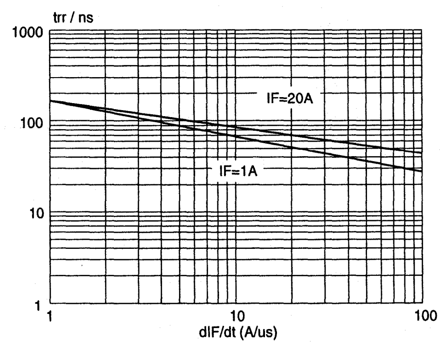


*Fig.5. Maximum $t_{rr}$ at $T_j$ = 25 ˚C; per diode*

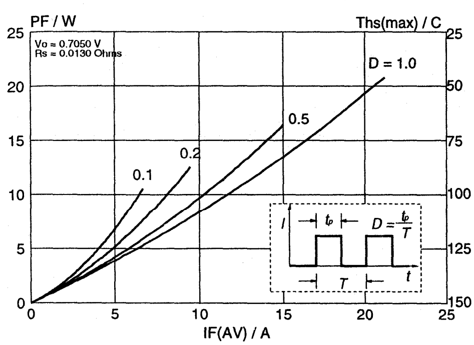


*Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

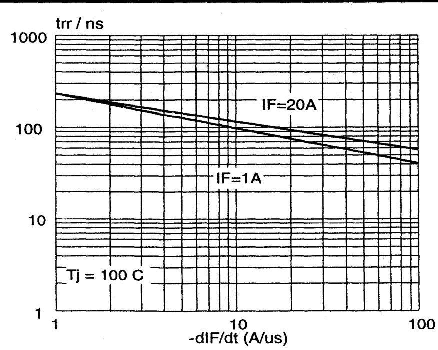


*Fig.6. Maximum $t_{rr}$ at $T_j$ = 100 ˚C; per diode*

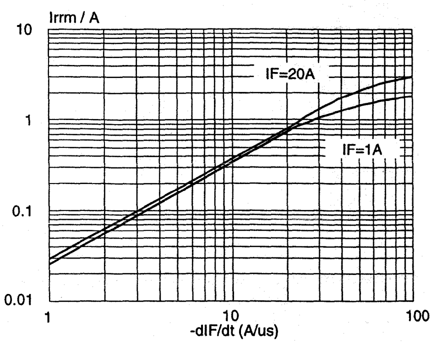



*Fig.7. Maximum $I_{rrm}$ at $T_j$ = 25 ˚C; per diode*

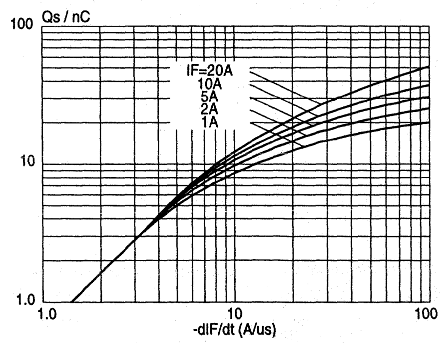



*Fig.10. Maximum $Q_s$ at $T_j$ = 25 ˚C; per diode*

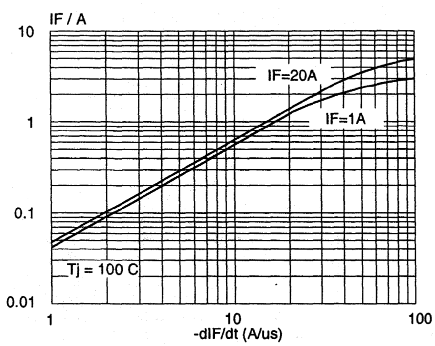



*Fig.8. Maximum $I_{rrm}$ at $T_j$ = 100 ˚C; per diode*

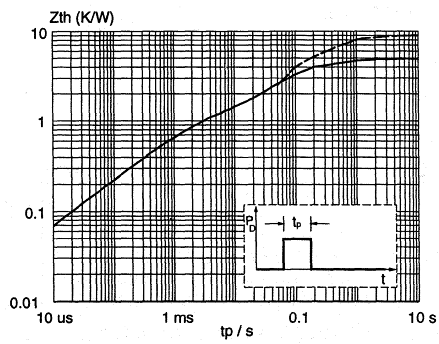



*Fig.11. Transient thermal impedance; per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.*

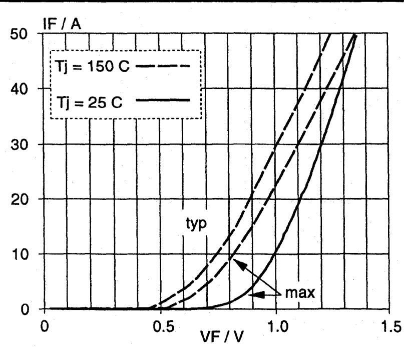



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

# Dual rectifier diodes ultrafast

# BYV44 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.

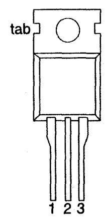
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYV44-** | **300** | **400** | **500** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 300 | 400 | 500 | V |
| $V_F$ | Forward voltage | 1.12 | 1.12 | 1.12 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | 30 | 30 | 30 | A |
| $t_{rr}$ | Reverse recovery time | 60 | 60 | 60 | ns |

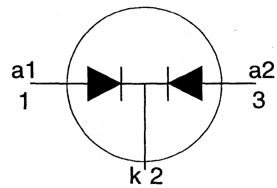
## PINNING - TO220AB

| 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 | | - | 300 | 400 | 500 | V |
| $V_R$ | Continuous reverse voltage | $T_{mb} \leq 136$˚C | - | 300 | 400 | 500 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting)[1] | square wave; $\delta = 0.5$; $T_{mb} \leq 94$ ˚C | - | 30 | | | A |
| | | sinusoidal; a = 1.57; $T_{mb} \leq 98$ ˚C | - | 27 | | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | 43 | | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 94$ ˚C | - | 30 | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current per diode. | t = 10 ms | - | 150 | | | A |
| | | t = 8.3 ms | - | 160 | | | A |
| | | sinusoidal; with reapplied $V_{RRM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ for fusing | t = 10 ms | - | 112 | | | $A^2s$ |
| $T_{stg}$ | Storage temperature | | -40 | 150 | | | ˚C |
| $T_j$ | Operating junction temperature | | - | 150 | | | ˚C |

**1** 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 (per diode) | $I_F$ = 15 A; $T_j$ = 150˚C | - | 0.95 | 1.12 | V |
| | | $I_F$ = 15 A | - | 1.08 | 1.25 | V |
| | | $I_F$ = 30 A | - | 1.15 | 1.36 | V |
| $I_R$ | Reverse current (per diode) | $V_R = V_{RRM}$ | - | 10 | 50 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 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 (per diode) | $I_F$ = 2 A to $V_R \geq$ 30 V; $dI_F/dt$ = 20 A/µs | - | 40 | 60 | nC |
| $t_{rr}$ | Reverse recovery time (per diode) | $I_F$ = 1 A to $V_R \geq$ 30 V; $dI_F/dt$ = 100 A/µs | - | 50 | 60 | ns |
| $I_{rrm}$ | Peak reverse recovery current (per diode) | $I_F$ = 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 (per diode) | $I_F$ = 10 A; $dI_F/dt$ = 10 A/µs | - | 2.5 | - | V |

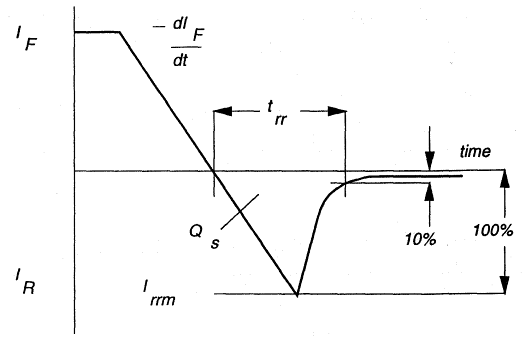



*Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$*

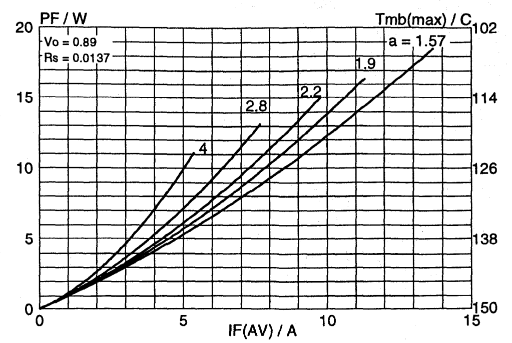



*Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

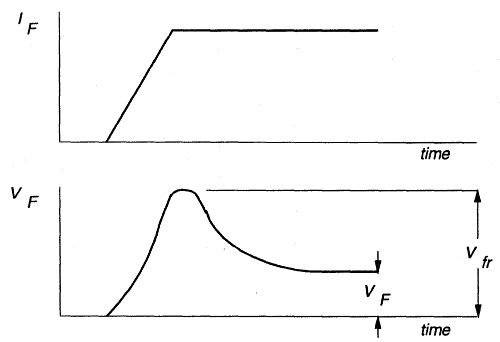



*Fig.2. Definition of $V_{fr}$*

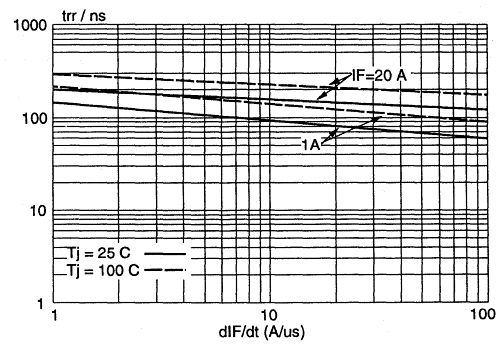



*Fig.5. Maximum $t_{rr}$ at $T_j$ = 25˚C and 100˚C; per diode*

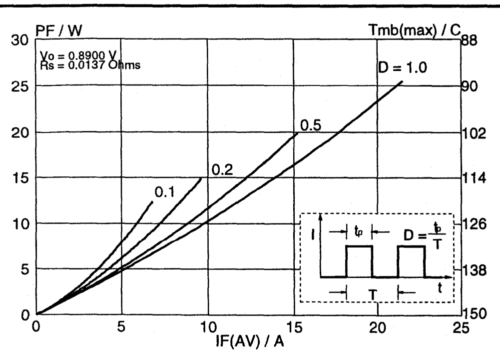



*Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

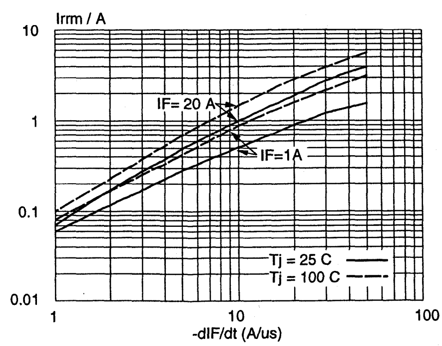



*Fig.6. Maximum $I_{rrm}$ at $T_j$ = 25˚C and 100˚C; per diode*

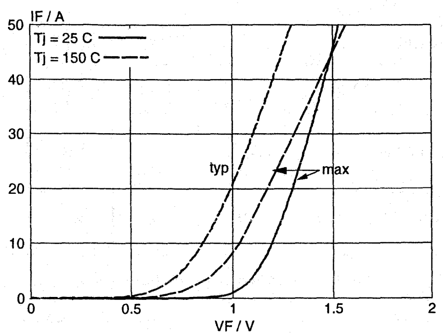



*Fig.7. Typical and maximum forward characteristic* $I_F = f(V_F)$*; parameter* $T_j$

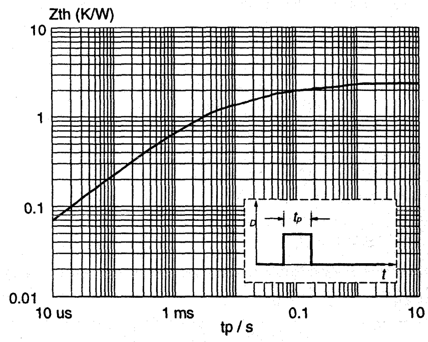



*Fig.9. Transient thermal impedance per diode* $Z_{th\,j\text{-}mb} = f(t_p)$

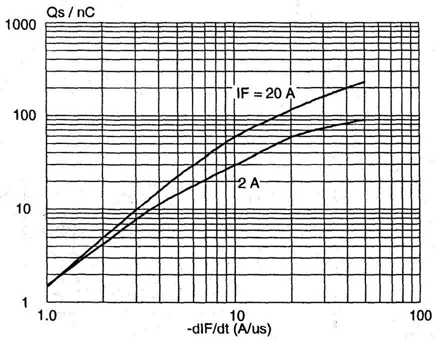



*Fig.8. Maximum* $Q_s$ *at* $T_j = 25^{\circ}C$*; per diode*

## 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.

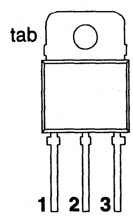
## QUICK REFERENCE DATA

| 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 |

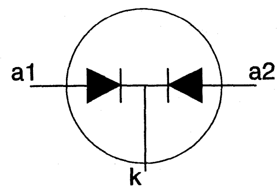
## PINNING - SOT93

| 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 sinusoidal; with reapplied $V_{RWM(max)}$ | - | 160 | | | A |
| $I^2t$ | $I^2t$ 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 |

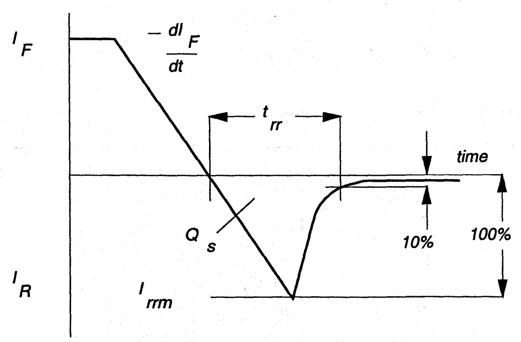



*Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$*

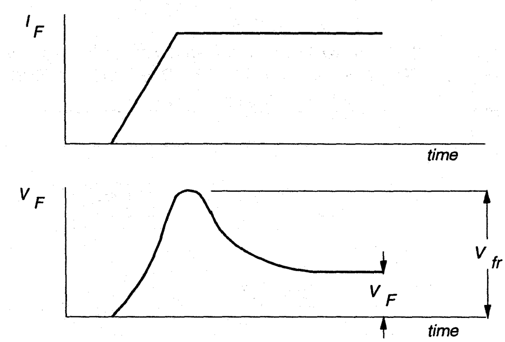



*Fig.2. Definition of $V_{fr}$*

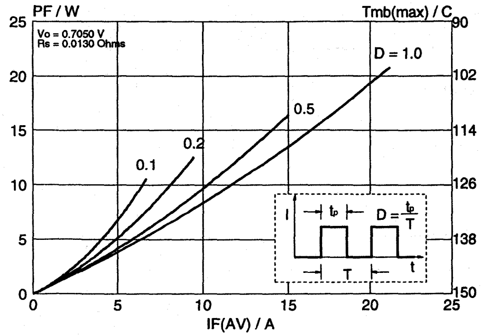



*Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

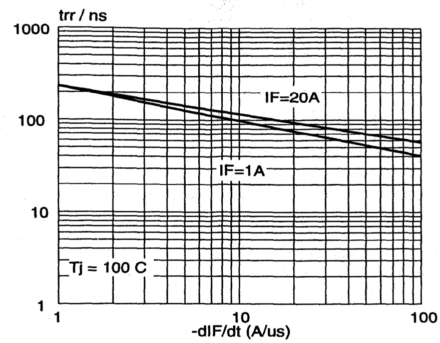



*Fig.6. Maximum $t_{rr}$ at $T_j$ = 100 ˚C; per diode*

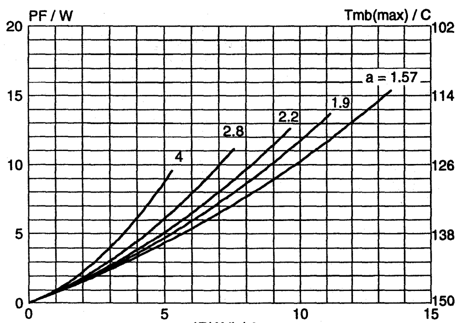



*Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

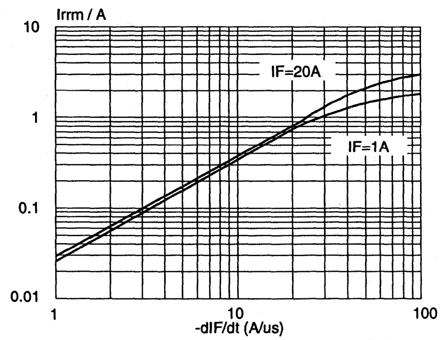



*Fig.7. Maximum $I_{rrm}$ at $T_j$ = 25 ˚C; per diode*

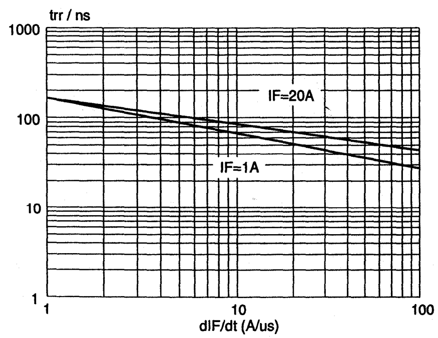



*Fig.5. Maximum $t_{rr}$ at $T_j$ = 25 ˚C; per diode*

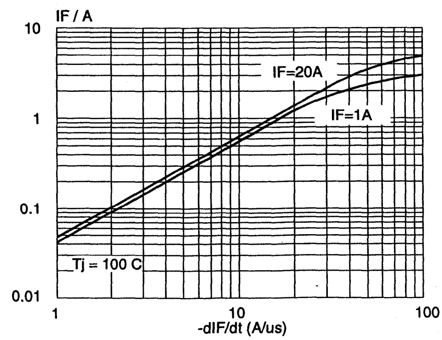



*Fig.8. Maximum $I_{rrm}$ at $T_j$ = 100 ˚C; per diode*

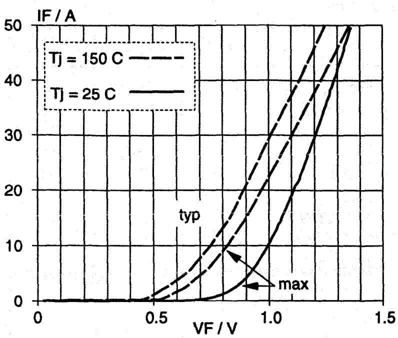



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

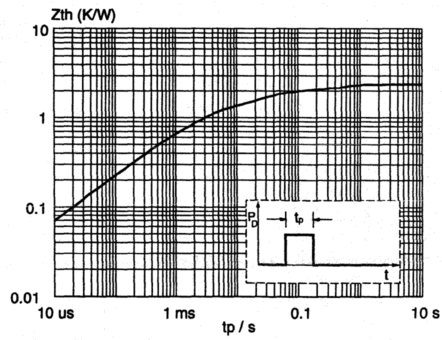



*Fig.11. Transient thermal impedance; per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.*

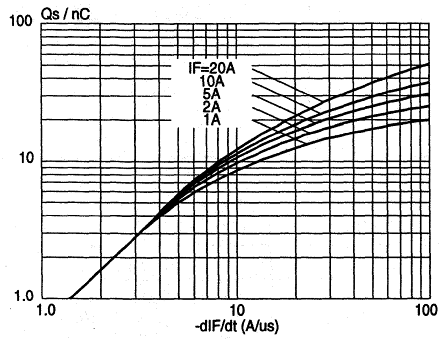



*Fig.10. Maximum $Q_s$ at $T_j = 25$ °C; per diode*

# 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.

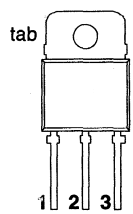
## QUICK REFERENCE DATA

| 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 |

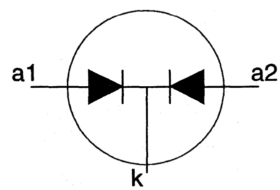
## PINNING - SOT93

| 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 | - | 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 | $t_p = 2$ 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 |

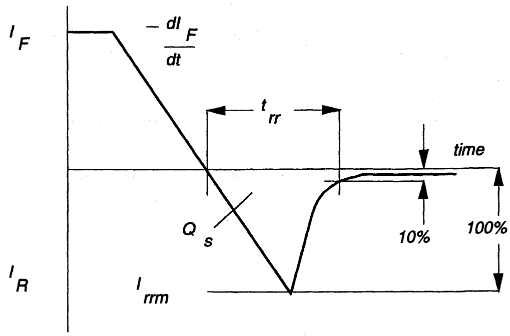



Fig.1. Definition of $t_{rr1}$, $Q_s$ and $I_{rrm}$

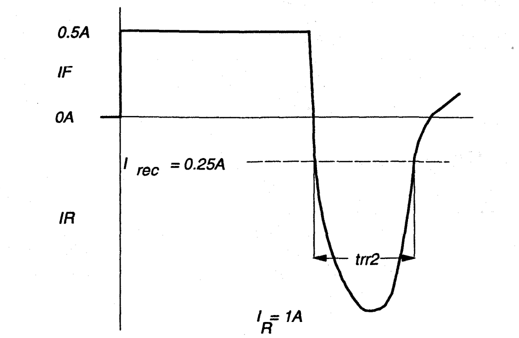



Fig.4. Definition of $t_{rr2}$

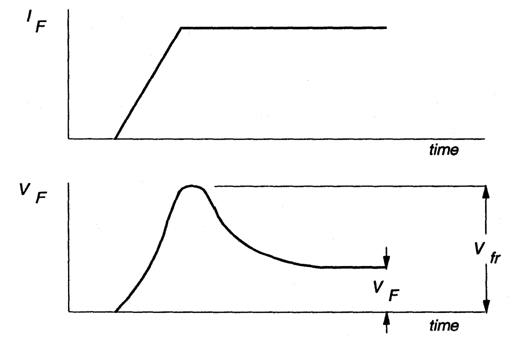



Fig.2. Definition of $V_{fr}$

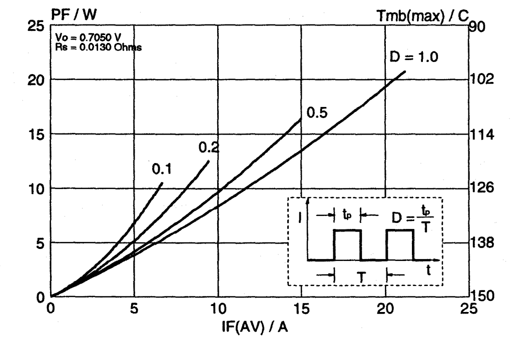



Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

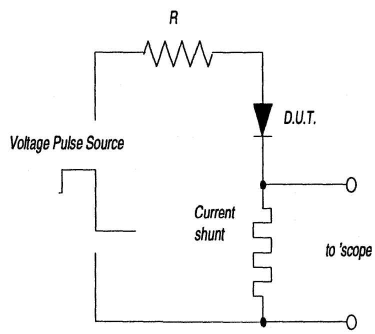



Fig.3. Circuit schematic for $t_{rr2}$

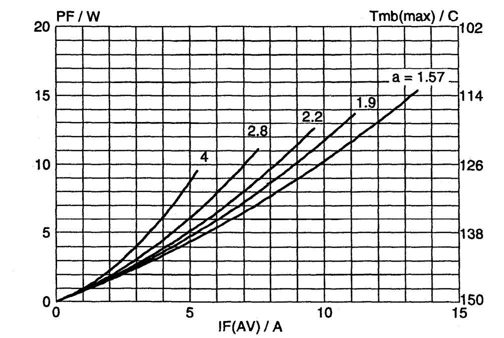



Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

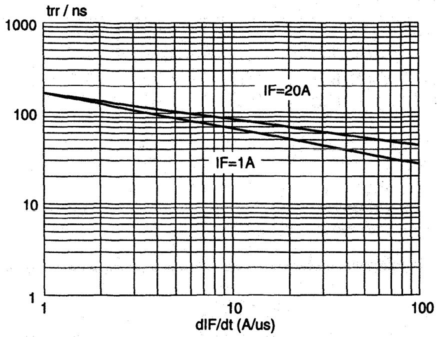



*Fig.7. Maximum $t_{rr}$ at $T_j$ = 25 ˚C; per diode*

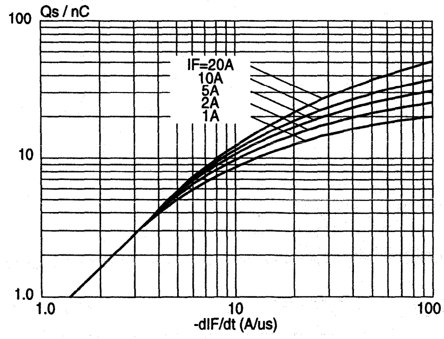



*Fig.10. Maximum $Q_s$ at $T_j$ = 25 ˚C; per diode*

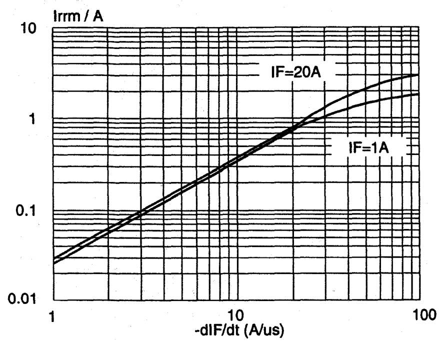



*Fig.8. Maximum $I_{rrm}$ at $T_j$ = 25 ˚C; per diode*

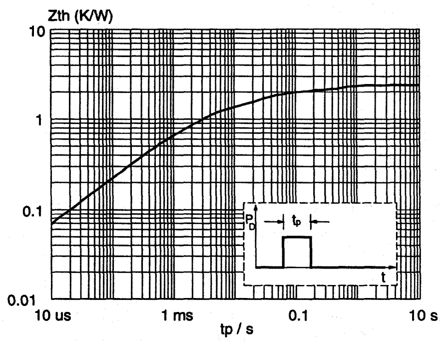



*Fig.11. Transient thermal impedance; per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.*

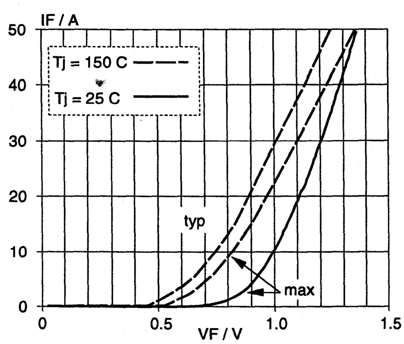



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

# Rectifier diodes ultrafast, rugged

# BYV72EF series

## GENERAL DESCRIPTION

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

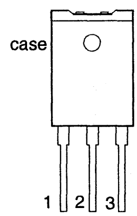
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYV72EF-** | **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 |
| $I_{RRM}$ | Repetitive peak reverse current per diode | 0.2 | 0.2 | 0.2 | A |

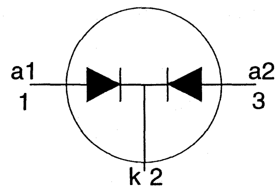
## PINNING - SOT199

| 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 |
|---|---|---|---|---|---|---|---|
| | | | | **-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 | | $A^2s$ |
| $I_{RRM}$ | 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** $T_{hs} \leq 125$˚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 |

## ISOLATION LIMITING VALUE & CHARACTERISTIC

$T_{hs}$ = 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; $V_R$ ≥ 30 V; -d$I_F$/dt = 20 A/µs | - | 6 | 15 | nC |
| $t_{rr1}$ | Reverse recovery time (per diode) | $I_F$ = 1 A; $V_R$ ≥ 30 V; -d$I_F$/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; d$I_F$/dt = 10 A/µs | - | 1 | - | V |

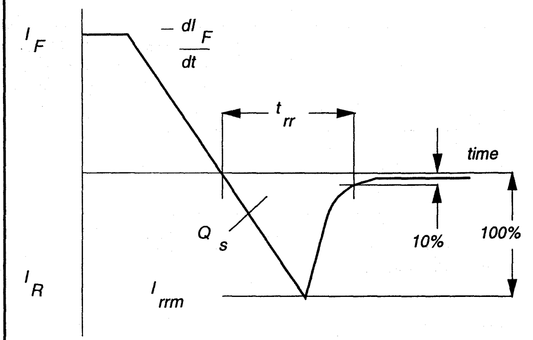



Fig.1. Definition of $t_{rr1}$, $Q_s$ and $I_{rrm}$

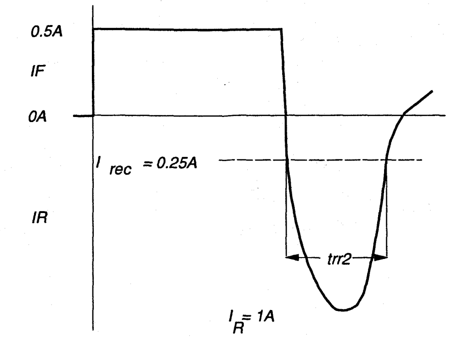



Fig.4. Definition of $t_{rr2}$

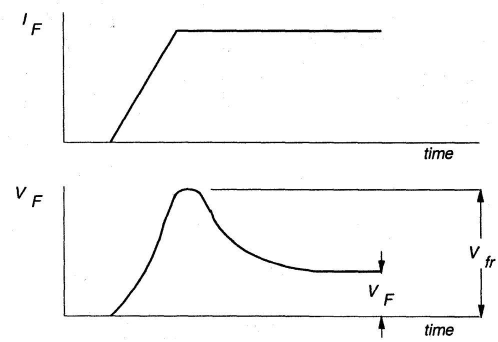



Fig.2. Definition of $V_{fr}$

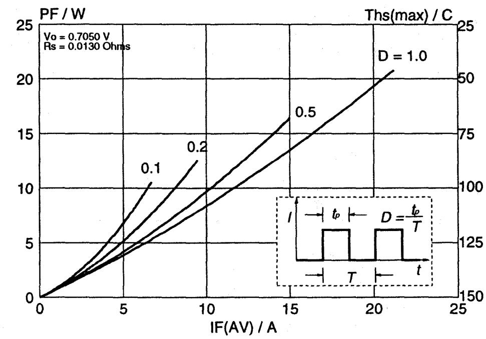



Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

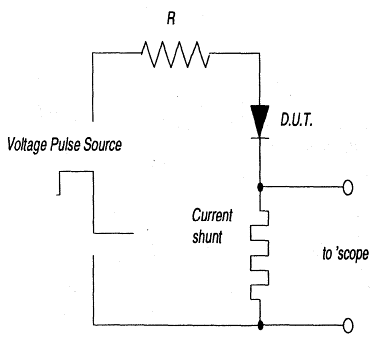



Fig.3. Circuit schematic for $t_{rr2}$

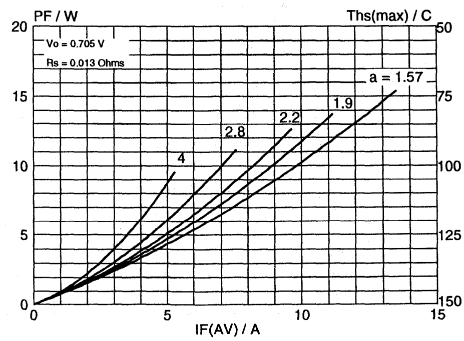



Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

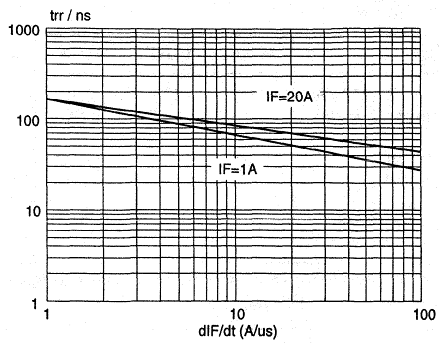



*Fig.7. Maximum $t_{rr}$ at $T_j = 25$ ˚C; per diode*

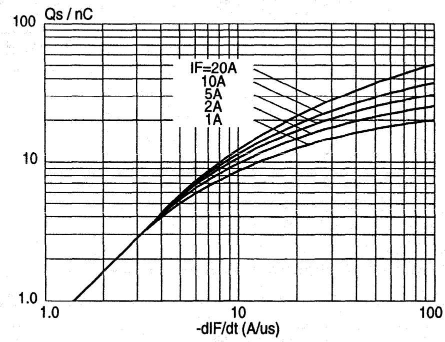



*Fig.10. Maximum $Q_s$ at $T_j = 25$ ˚C; per diode*

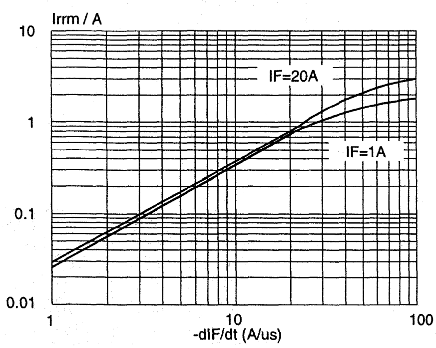



*Fig.8. Maximum $I_{rrm}$ at $T_j = 25$ ˚C; per diode*

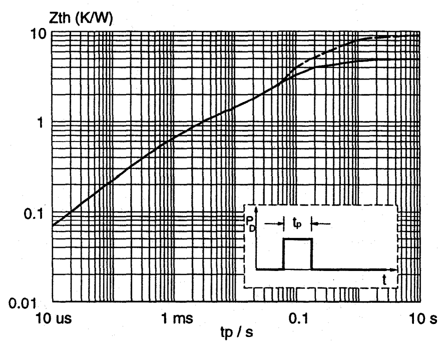



*Fig.11. Transient thermal impedance; per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.*

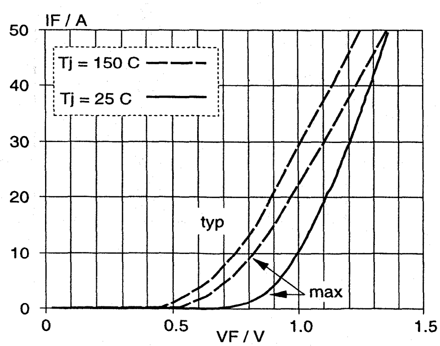



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

# Rectifier diodes ultrafast

# BYV72F 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.

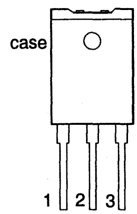
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **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 |

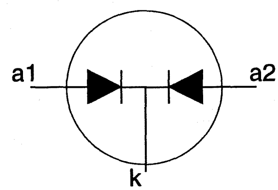
## PINNING - SOT199

| 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 sinusoidal; with reapplied $V_{RWM(max)}$ | - | 160 | | | A |
| $I^2t$ | $I^2t$ 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; $V_R$ ≥ 30 V; $-dI_F/dt$ = 20 A/µs | - | 6 | 15 | nC |
| $t_{rr}$ | Reverse recovery time (per diode) | $I_F$ = 1 A; $V_R$ ≥ 30 V; $-dI_F/dt$ = 100 A/µs | - | 20 | 28 | ns |
| $I_{rrm}$ | Peak reverse recovery current (per diode) | $I_F$ = 10 A; $V_R$ ≥ 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 |

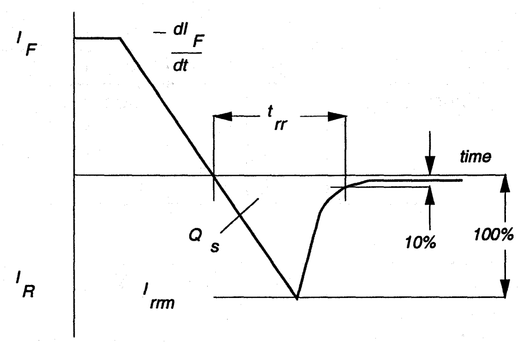



Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$

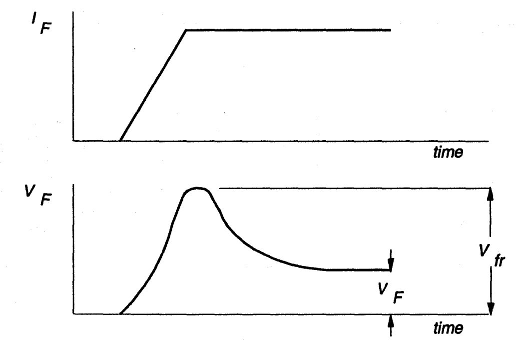



Fig.2. Definition of $V_{fr}$

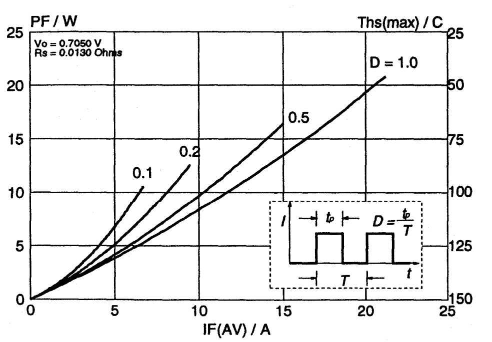



Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

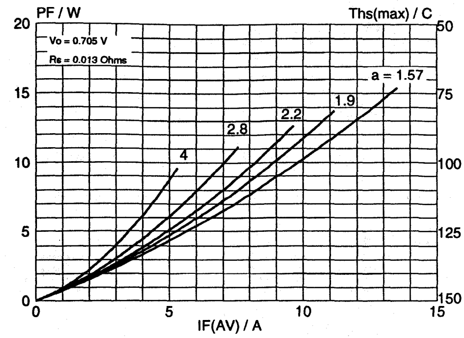



Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

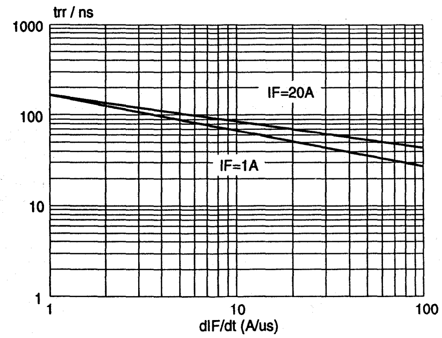



Fig.5. Maximum $t_{rr}$ at $T_j = 25$ ˚C; per diode

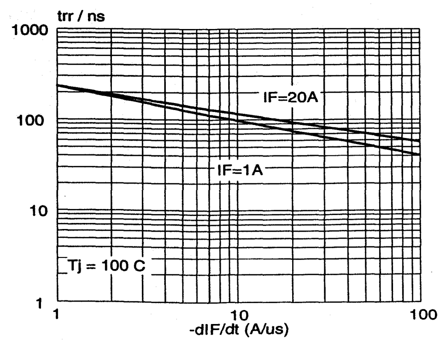



Fig.6. Maximum $t_{rr}$ at $T_j = 100$ ˚C; per diode

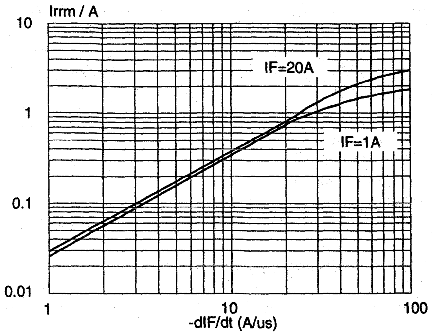



*Fig.7. Maximum $I_{rrm}$ at $T_j = 25$ ˚C; per diode*

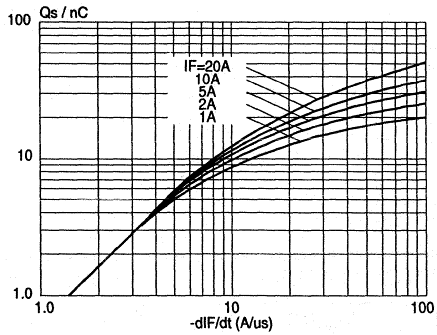



*Fig.10. Maximum $Q_s$ at $T_j = 25$ ˚C; per diode*

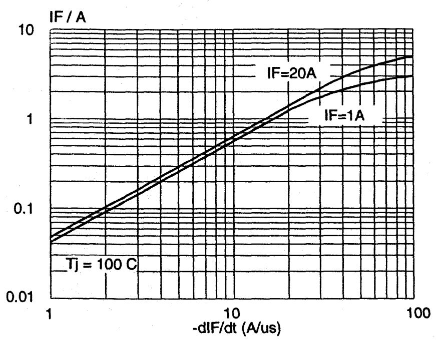



*Fig.8. Maximum $I_{rrm}$ at $T_j = 100$ ˚C; per diode*

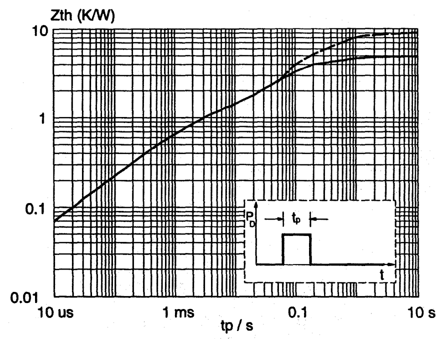



*Fig.11. Transient thermal impedance; per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.*

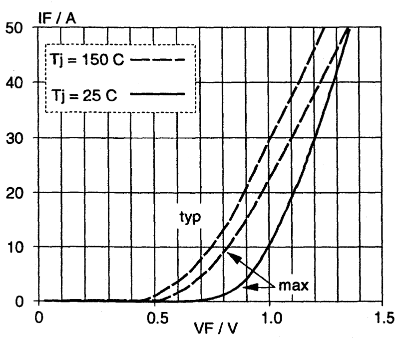



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

# 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.

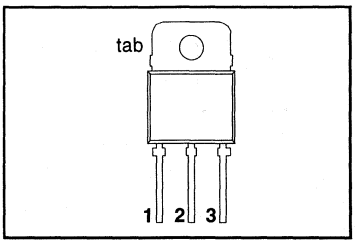
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYV74-** | **300** | **400** | **500** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 300 | 400 | 500 | V |
| $V_F$ | Forward voltage | 1.12 | 1.12 | 1.12 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | 30 | 30 | 30 | A |
| $t_{rr}$ | Reverse recovery time | 60 | 60 | 60 | ns |

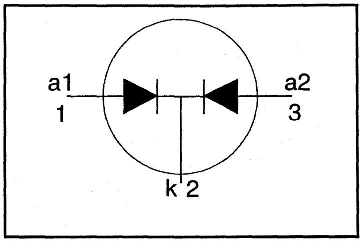
## PINNING - SOT93

| 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 | | - | 300 | 400 | 500 | V |
| $V_R$ | Continuous reverse voltage | $T_{mb} \leq 136$˚C | - | 300 | 400 | 500 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting)[1] | square wave; $\delta = 0.5$; $T_{mb} \leq 94$ ˚C | - | 30 | | | A |
| | | sinusoidal; a = 1.57; $T_{mb} \leq 98$ ˚C | - | 27 | | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | 43 | | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 94$ ˚C | - | 30 | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current per diode. | t = 10 ms | - | 150 | | | A |
| | | t = 8.3 ms | - | 160 | | | A |
| | | sinusoidal; with reapplied $V_{RRM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ for fusing | t = 10 ms | - | 112 | | | $A^2s$ |
| $T_{stg}$ | Storage temperature | | -40 | 150 | | | ˚C |
| $T_j$ | Operating junction temperature | | - | 150 | | | ˚C |

**1** 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. | - | 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 | - | 0.95 | 1.12 | V |
| | | $I_F$ = 15 A | - | 1.08 | 1.25 | V |
| | | $I_F$ = 30 A | - | 1.15 | 1.36 | V |
| $I_R$ | Reverse current (per diode) | $V_R = V_{RRM}$ | - | 10 | 50 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 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 (per diode) | $I_F$ = 2 A to $V_R \geq$ 30 V; $dI_F/dt$ = 20 A/µs | - | 40 | 60 | nC |
| $t_{rr}$ | Reverse recovery time (per diode) | $I_F$ = 1 A to $V_R \geq$ 30 V; $dI_F/dt$ = 100 A/µs | - | 50 | 60 | ns |
| $I_{rrm}$ | Peak reverse recovery current (per diode) | $I_F$ = 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 (per diode) | $I_F$ = 10 A; $dI_F/dt$ = 10 A/µs | - | 2.5 | - | V |

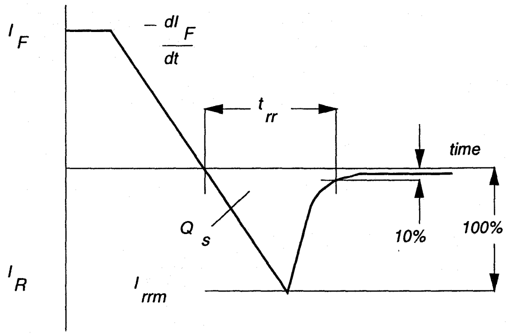



Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$

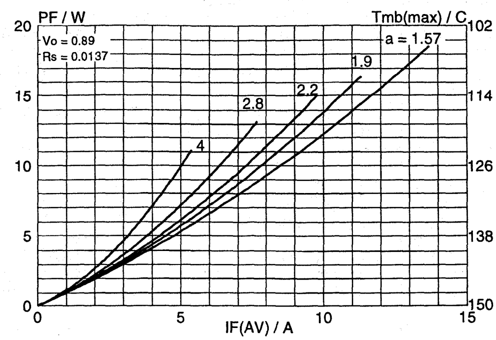



Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

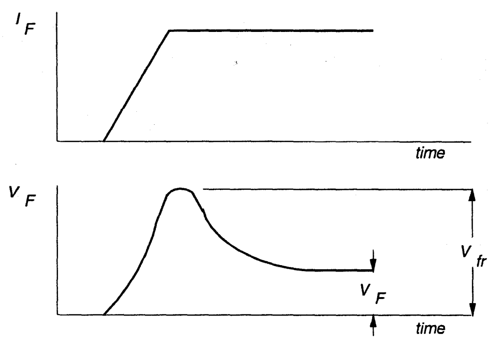



Fig.2. Definition of $V_{fr}$

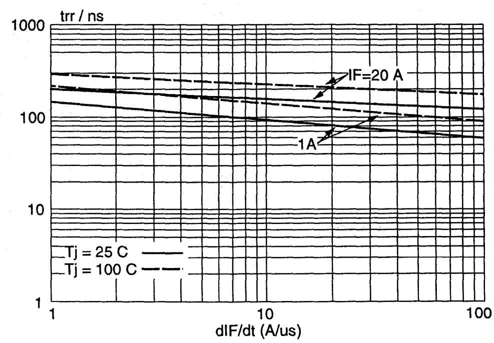



Fig.5. Maximum $t_{rr}$ at $T_j$ = 25˚C and 100˚C; per diode

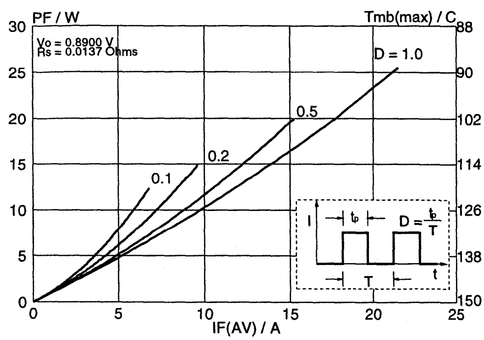



Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

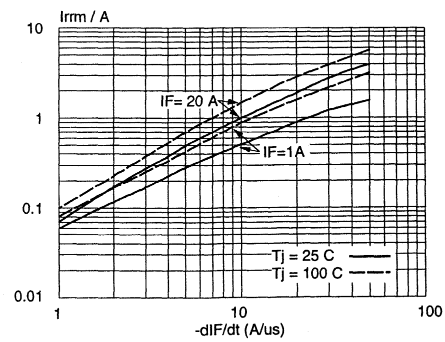



Fig.6. Maximum $I_{rrm}$ at $T_j$ = 25˚C and 100˚C; per diode

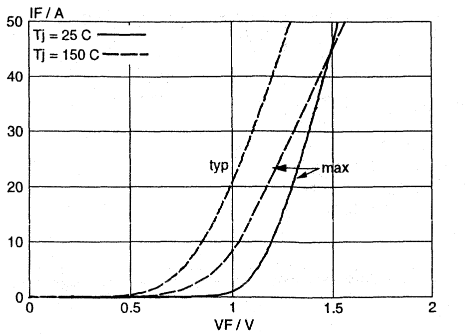



*Fig.7. Typical and maximum forward characteristic* $I_F = f(V_F)$*; parameter* $T_j$

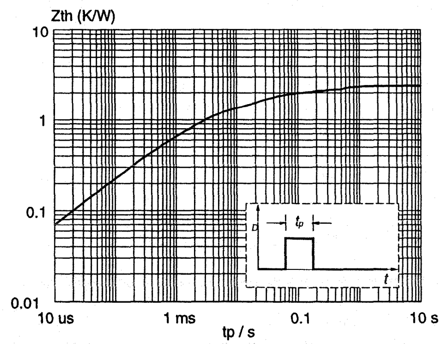



*Fig.9. Transient thermal impedance per diode* $Z_{th\,j\text{-}mb} = f(t_p)$

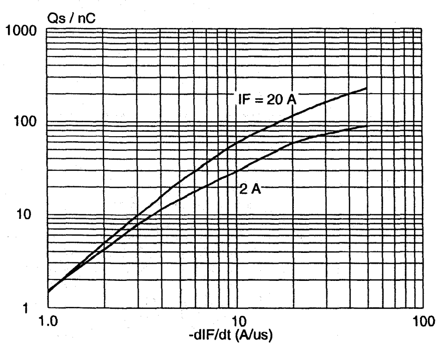



*Fig.8. Maximum* $Q_s$ *at* $T_j = 25^{\circ}C$*; per diode*

# Dual rectifier diodes ultrafast

# BYV74F 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.

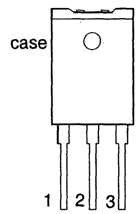
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYV74F-** | **300** | **400** | **500** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 300 | 400 | 500 | V |
| $V_F$ | Forward voltage | 1.12 | 1.12 | 1.12 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | 20 | 20 | 20 | A |
| $t_{rr}$ | Reverse recovery time | 60 | 60 | 60 | ns |

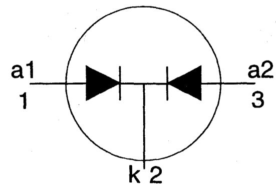
## PINNING - SOT199

| 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. | | | UNIT |
|---|---|---|---|---|---|---|---|
| | | | | **-300** | **-400** | **-500** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | | - | 300 | 400 | 500 | V |
| $V_{RWM}$ | Crest working reverse voltage | | - | 300 | 400 | 500 | V |
| $V_R$ | Continuous reverse voltage | $T_{mb} \leq 117$˚C | - | 300 | 400 | 500 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting)[1] | square wave; $\delta = 0.5$; $T_{hs} \leq 54$ ˚C | - | 20 | | | A |
| | | sinusoidal; a = 1.57; $T_{hs} \leq 54$ ˚C | - | 20 | | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | 20 | | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 54$ ˚C | - | 30 | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current per diode. | t = 10 ms | - | 150 | | | A |
| | | t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$ | - | 160 | | | A |
| $I^2t$ | $I^2t$ for fusing | t = 10 ms | - | 112 | | | $A^2s$ |
| $T_{stg}$ | Storage temperature | | -40 | 150 | | | ˚C |
| $T_j$ | Operating junction temperature | | - | 150 | | | ˚C |

**1** Neglecting switching and reverse current losses.

## ISOLATION LIMITING VALUE & CHARACTERISTIC

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{isol}$ | 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 | - | 0.95 | 1.12 | V |
| | | $I_F$ = 15 A | - | 1.08 | 1.25 | V |
| | | $I_F$ = 30 A | - | 1.15 | 1.36 | V |
| $I_R$ | Reverse current (per diode) | $V_R = V_{RRM}$ | - | 10 | 50 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 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 (per diode) | $I_F$ = 2 A to $V_R$ ≥ 30 V; $dI_F/dt$ = 20 A/µs | - | 40 | 60 | nC |
| $t_{rr}$ | Reverse recovery time (per diode) | $I_F$ = 1 A to $V_R$ ≥ 30 V; $dI_F/dt$ = 100 A/µs | - | 50 | 60 | ns |
| $I_{rrm}$ | Peak reverse recovery current (per diode) | $I_F$ = 10 A to $V_R$ ≥ 30 V; $dI_F/dt$ = 50 A/µs; $T_j$ = 100˚C | - | 4.2 | 5.2 | A |
| $V_{fr}$ | Forward recovery voltage (per diode) | $I_F$ = 10 A; $dI_F/dt$ = 10 A/µs | - | 2.5 | - | V |

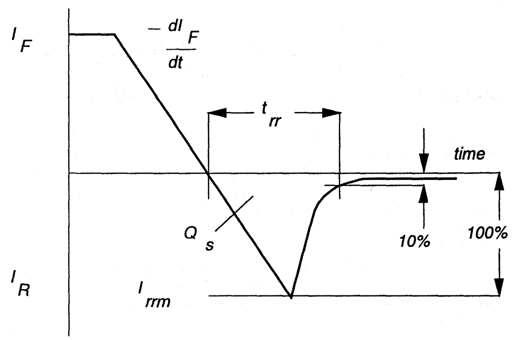



Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$

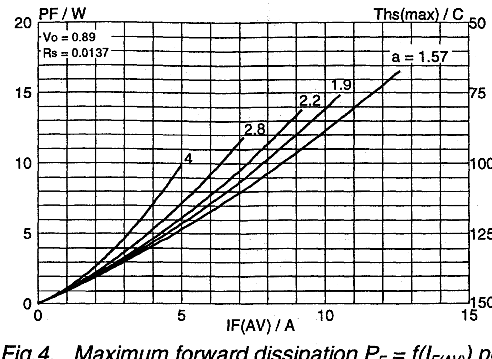



Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)}$ / $I_{F(AV)}$.

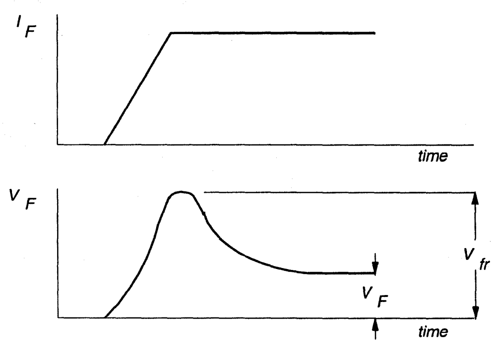



Fig.2. Definition of $V_{fr}$

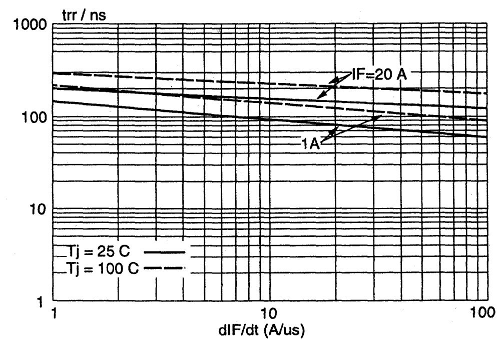



Fig.5. Maximum $t_{rr}$ at $T_j$ = 25˚C and 100˚C; per diode

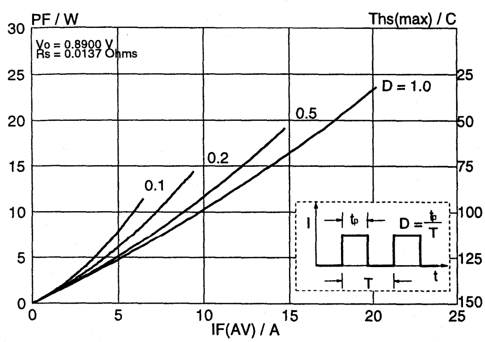



Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

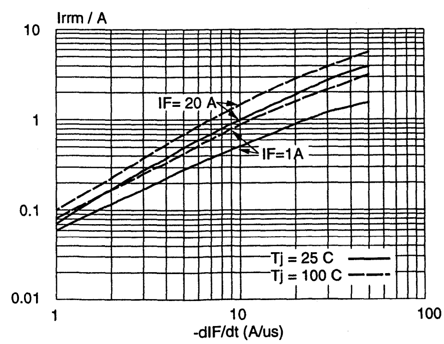



Fig.6. Maximum $I_{rrm}$ at $T_j$ = 25˚C and 100˚C; per diode.

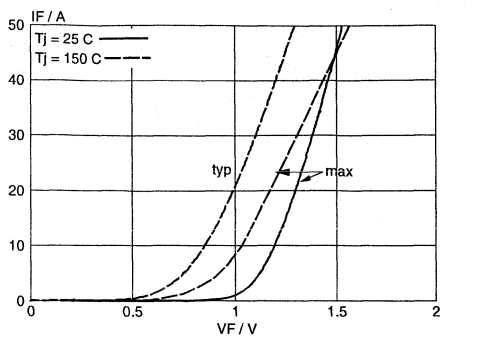



*Fig.7. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

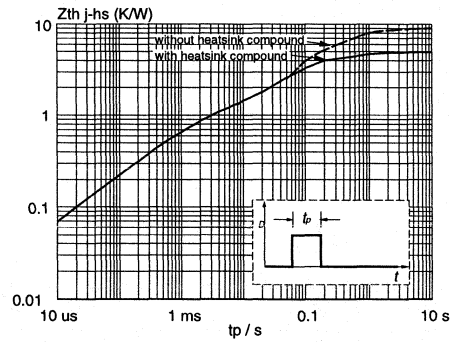



*Fig.9. Transient thermal impedance per diode $Z_{th\,j\text{-}hs} = f(t_p)$*

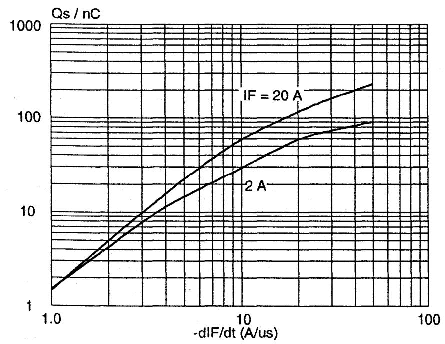



*Fig.8. Maximum $Q_s$ at $T_j = 25^{\circ}C$; per diode*

# Rectifier diodes ultrafast

# BYV79 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.

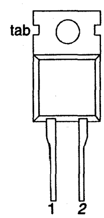
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **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 |

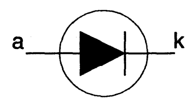
## PINNING - TO220AC

| 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 |

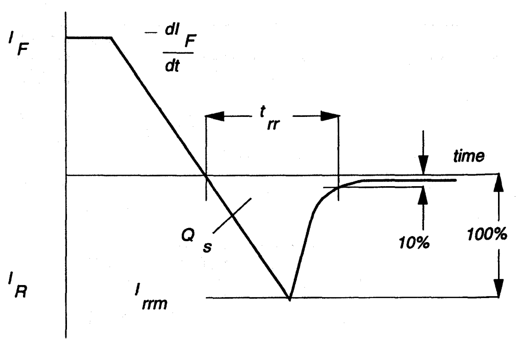



Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$

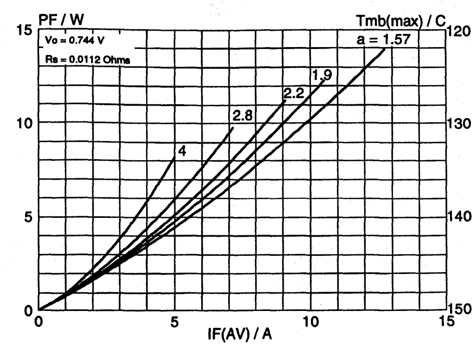



Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

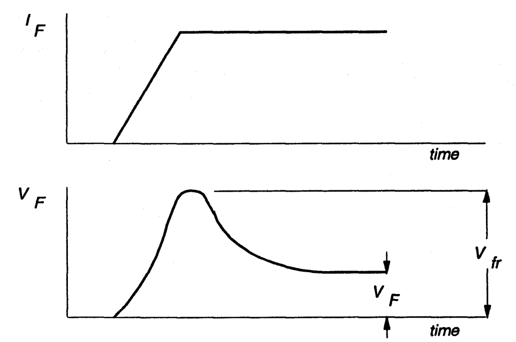



Fig.2. Definition of $V_{fr}$

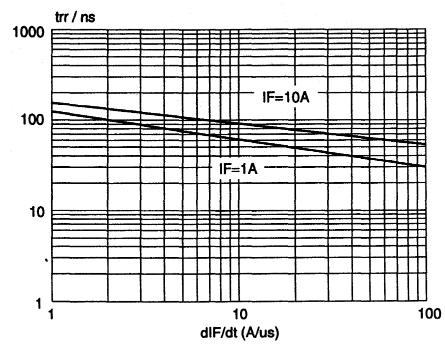



Fig.5. Maximum $t_{rr}$ at $T_j$ = 25 ˚C.

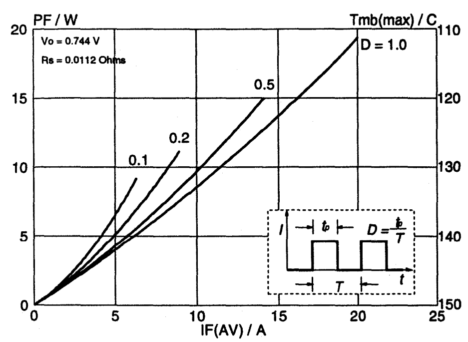



Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

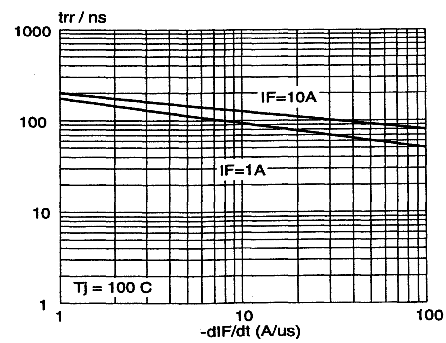



Fig.6. Maximum $t_{rr}$ at $T_j$ = 100 ˚C.

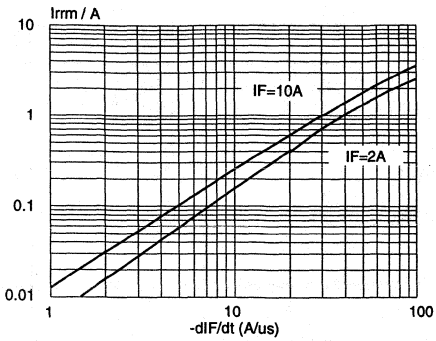



*Fig.7. Maximum $I_{rrm}$ at $T_j$ = 25 ˚C.*

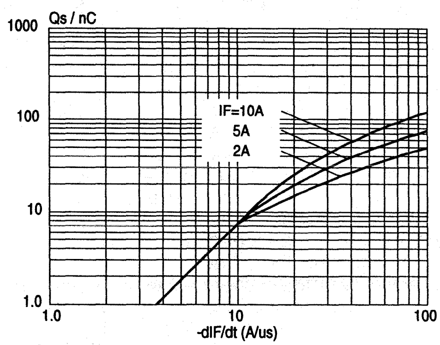



*Fig.10. Maximum $Q_s$ at $T_j$ = 25 ˚C.*

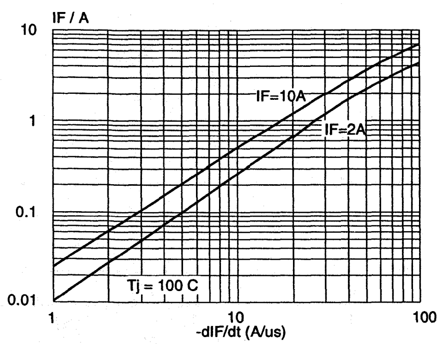



*Fig.8. Maximum $I_{rrm}$ at $T_j$ = 100 ˚C.*

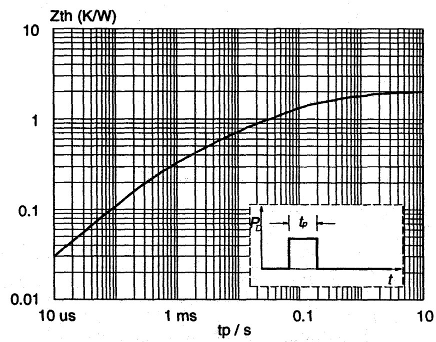



*Fig.11. Transient thermal impedance; $Z_{th\ j\text{-}mb} = f(t_p)$.*

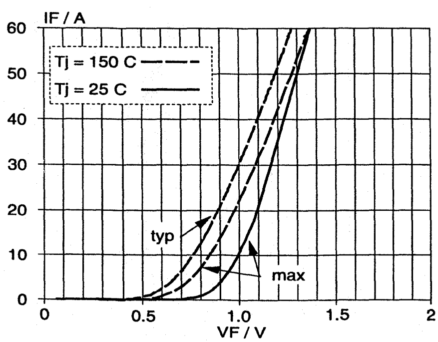



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

# 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.

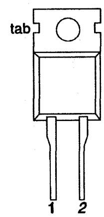
## QUICK REFERENCE DATA

| 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 |

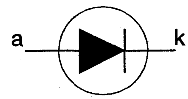
## PINNING - TO220AC

| 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; -d$I_F$/dt = 20 A/µs | - | 6 | 15 | nC |
| $t_{rr1}$ | Reverse recovery time | $I_F$ = 1 A; $V_R \geq$ 30 V; -d$I_F$/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; d$I_F$/dt = 10 A/µs | - | 1 | - | V |

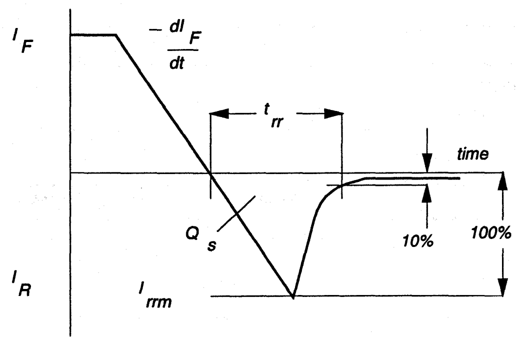



Fig.1. Definition of $t_{rr1}$, $Q_s$ and $I_{rrm}$

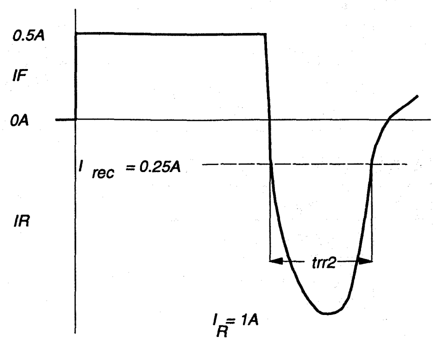



Fig.4. Definition of $t_{rr2}$

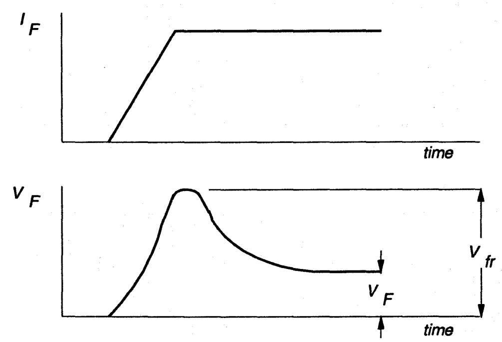



Fig.2. Definition of $V_{fr}$

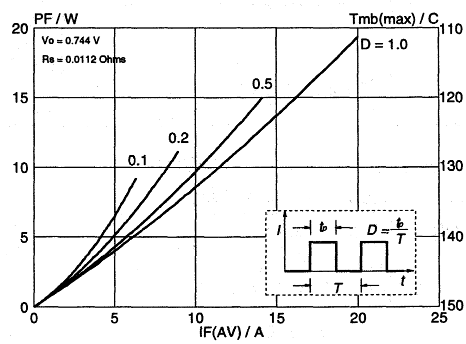



Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

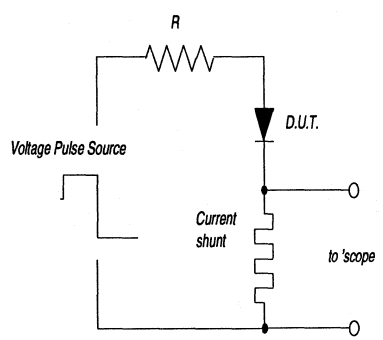



Fig.3. Circuit schematic for $t_{rr2}$

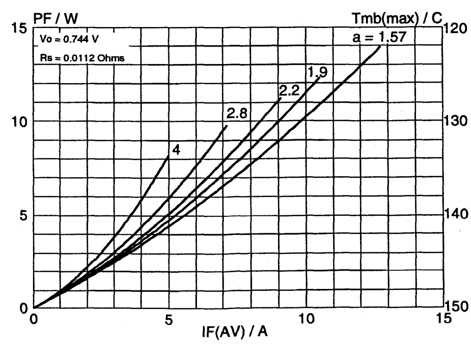



Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

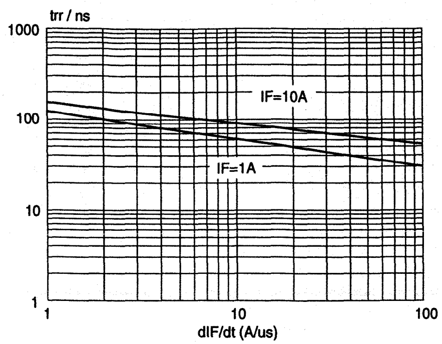



*Fig.7. Maximum $t_{rr}$ at $T_j = 25$ ˚C.*

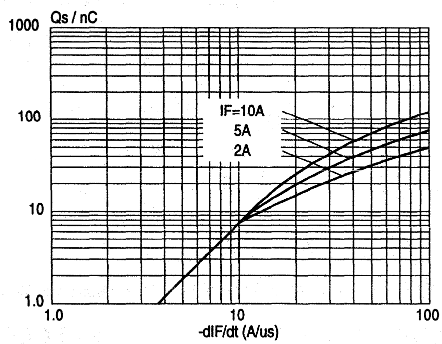



*Fig.10. Maximum $Q_s$ at $T_j = 25$ ˚C.*

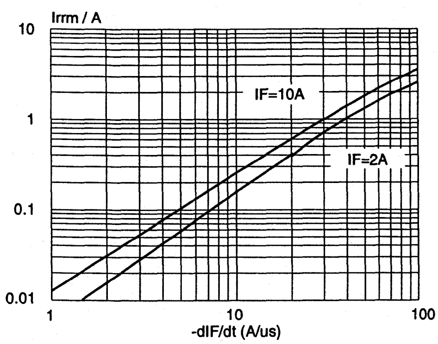



*Fig.8. Maximum $I_{rrm}$ at $T_j = 25$ ˚C.*

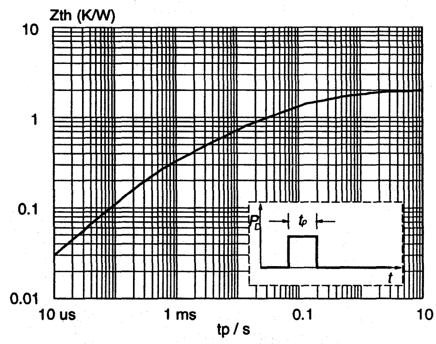



*Fig.11. Transient thermal impedance; $Z_{th\ j\text{-}mb} = f(t_p)$.*

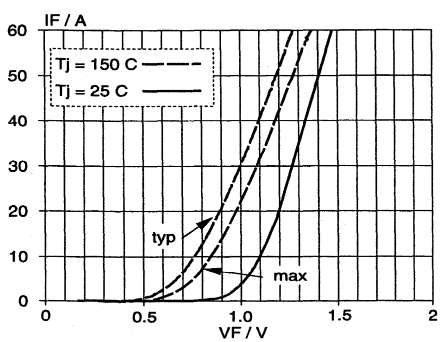



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

## GENERAL DESCRIPTION

Glass passivated epitaxial rectifier diodes in a plastic envelope suitable for surface mounting, featuring low forward voltage drop, ultra-fast recovery times, soft recovery characteristic and guaranteed reverse surge and ESD capability. They are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and switching losses are essential.

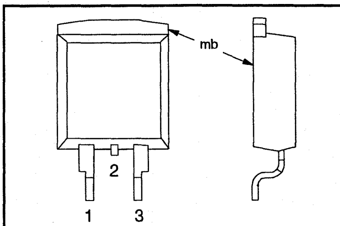
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYV79EB-** | **100** | **150** | **200** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 100 | 150 | 200 | V |
| $V_F$ | Forward voltage | 0.9 | 0.9 | 0.9 | V |
| $I_{F(AV)}$ | Average 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 |

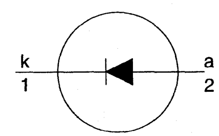
## PINNING - SOT404

| PIN | DESCRIPTION |
|---|---|
| 1 | no connection |
| 2 | cathode |
| 3 | anode |
| mb | cathode |

## 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 | $T_{mb} \leq 145^{\circ}C$ | - | 100 | 150 | 200 | V |
| $I_{F(AV)}$ | Average forward current[1] | square wave $\delta = 0.5$; $T_{mb} \leq 120\ ^{\circ}C$ | - | 14 | | | A |
| | | sinusoidal a = 1.57; $T_{mb} \leq 122\ ^{\circ}C$ | - | 12.7 | | | A |
| $I_{F(RMS)}$ | RMS forward current | | - | 20 | | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 120\ ^{\circ}C$ | - | 28 | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current | t = 10 ms | - | 150 | | | A |
| | | t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$ | - | 160 | | | A |
| $I^2t$ | $I^2t$ 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 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 | | - | - | 2 | K/W |
| $R_{th\ j-a}$ | Thermal resistance junction to ambient | minimum footprint, FR4 board | - | 50 | - | 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 | $V_R = V_{RRM}$; $T_j$ = 100 ˚C | - | 0.5 | 1.3 | mA |
| | | $V_R = V_{RRM}$ | - | 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 |

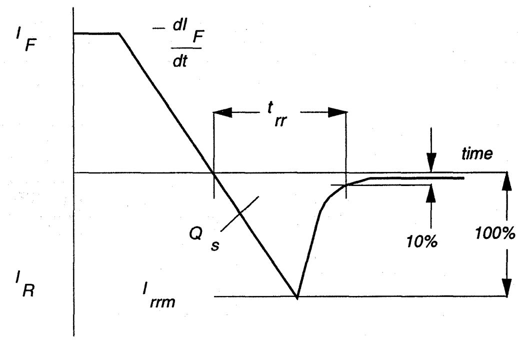



Fig.1. Definition of $t_{rr1}$, $Q_s$ and $I_{rrm}$

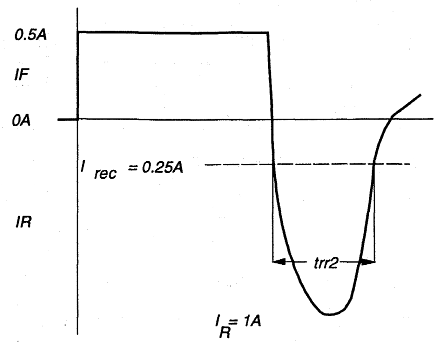



Fig.4. Definition of $t_{rr2}$

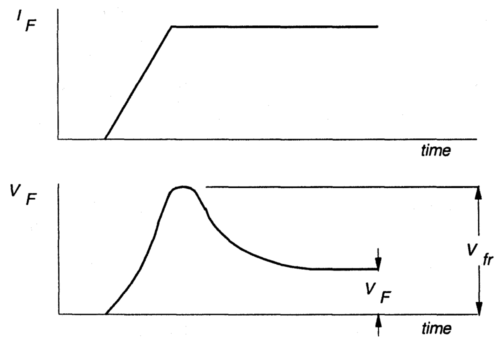



Fig.2. Definition of $V_{fr}$

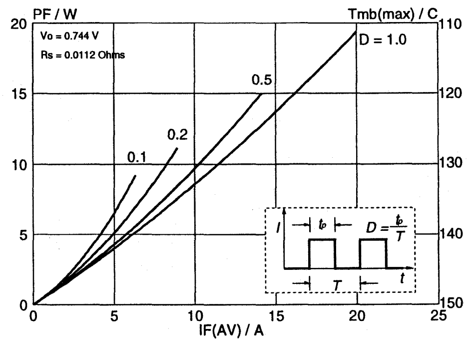



Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

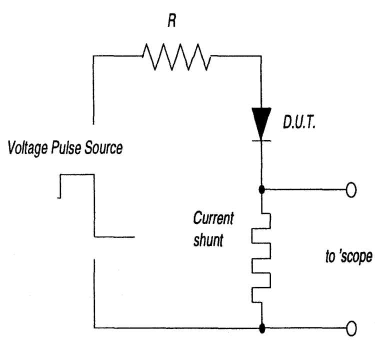



Fig.3. Circuit schematic for $t_{rr2}$

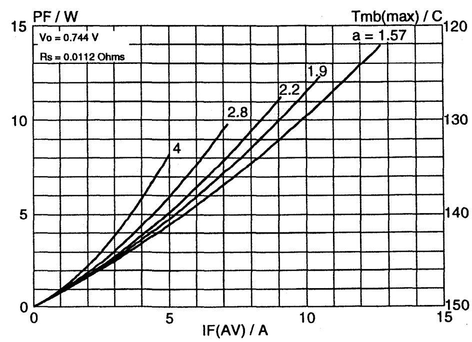



Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

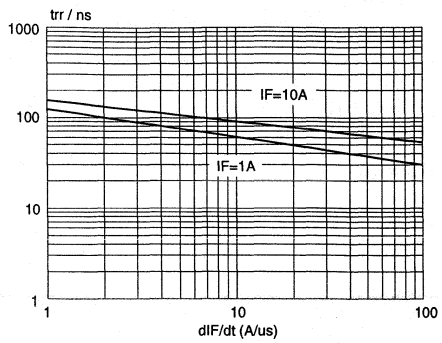



*Fig.7. Maximum $t_{rr}$ at $T_j$ = 25 ˚C.*

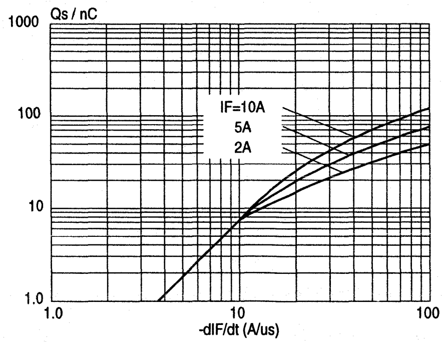



*Fig.10. Maximum $Q_s$ at $T_j$ = 25 ˚C.*

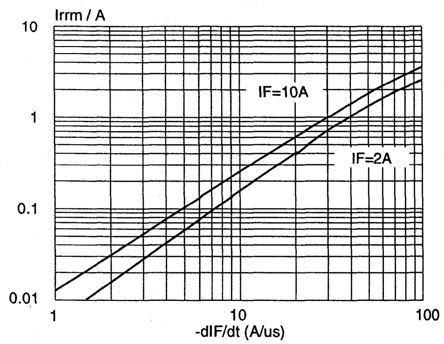



*Fig.8. Maximum $I_{rrm}$ at $T_j$ = 25 ˚C.*

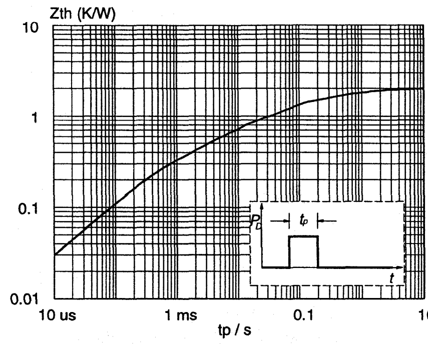



*Fig.11. Transient thermal impedance; $Z_{th\ j\text{-}mb} = f(t_p)$.*

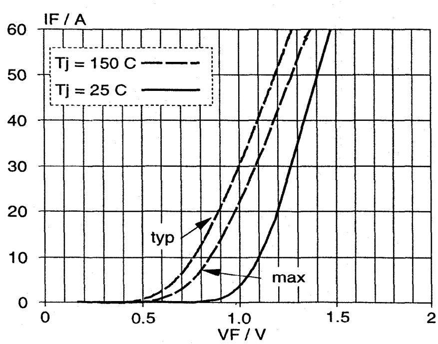



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

# Rectifier diodes schottky barrier

# BYV116 series

## GENERAL DESCRIPTION

Dual nickel silicide schottky barrier 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 with 3 V - 3.3 V outputs, or as or-ing diodes in fault tolerant power supply systems.

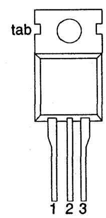
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | UNIT |
|---|---|---|---|---|
| | BYV116- | **20** | **25** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 20 | 25 | V |
| $V_F$ | Forward voltage | 0.54 | 0.54 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | 10 | 10 | A |

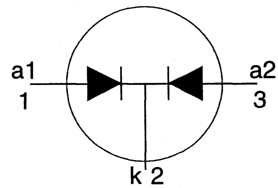
## PINNING - TO220AB

| 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 |
|---|---|---|---|---|---|---|
| | | | | -20 | -25 | |
| $V_{RRM}$ | Repetitive peak reverse voltage | | - | 20 | 25 | V |
| $V_{RWM}$ | Crest working reverse voltage | | - | 20 | 25 | V |
| $V_R$ | Continuous reverse voltage | $T_{mb} \leq 117$ ˚C | - | 20 | 25 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_{mb} \leq 135$ ˚C | - | 10 | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | 14 | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 135$ ˚C | - | 10 | | A |
| $I_{FSM}$ | Non-repetitive peak forward current, per diode | t = 10 ms | - | 25 | | A |
| | | t = 8.3 ms | - | 27 | | A |
| | | sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$ | | | | |
| $I^2t$ | $I^2t$ for fusing | t = 10 ms | - | 3.1 | | $A^2s$ |
| $I_{RRM}$ | 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 | - | - | 6.0 | K/W |
| | | both diodes | - | - | 5.0 | 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; $T_j$ = 125˚C | - | 0.49 | 0.54 | V |
| | | $I_F$ = 10 A; $T_j$ = 125˚C | - | 0.66 | 0.73 | V |
| | | $I_F$ = 5 A | - | 0.58 | 0.64 | V |
| $I_R$ | Reverse current (per diode) | $V_R = V_{RRM}$ | - | 0.5 | 3.0 | mA |
| | | $V_R = V_{RRM}$; $T_j$ = 100 ˚C | - | 5 | 10 | mA |
| $C_d$ | Junction capacitance (per diode) | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 150 | - | pF |

## GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky rectifier diodes in a plastic envelope featuring low forward voltage drop, absence of stored charge. and 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.

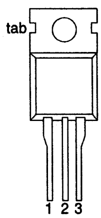
## QUICK REFERENCE DATA

| 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 |

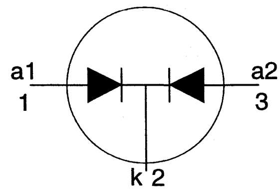
## PINNING - TO220AB

| 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 | $T_{mb} \leq 133$˚C | - | 35 | 40 | 45 | V |
| $I_{O(AV)}$ | Output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_{mb} \leq 128$˚C | - | 10 | | | A |
| | | sinusoidal; a = 1.57; $T_{mb} \leq 130$˚C | - | 9 | | | A |
| $I_{O(RMS)}$ | RMS forward current | | - | 14 | | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode. | t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 128$˚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 | - | - | 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 | - | 0.50 | 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 |

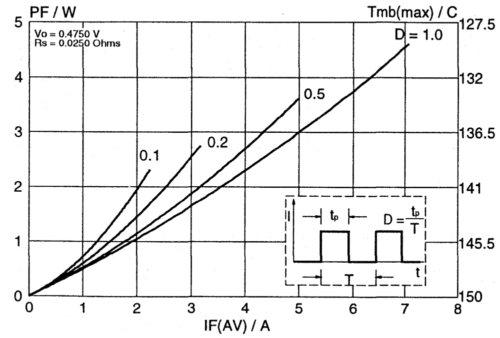



Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

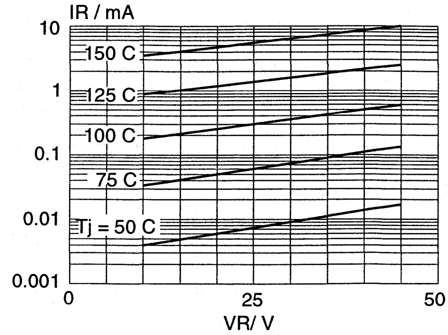



Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$

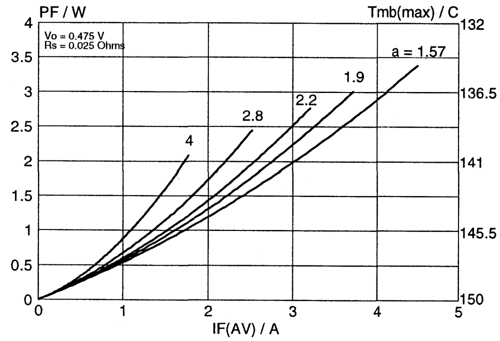



Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

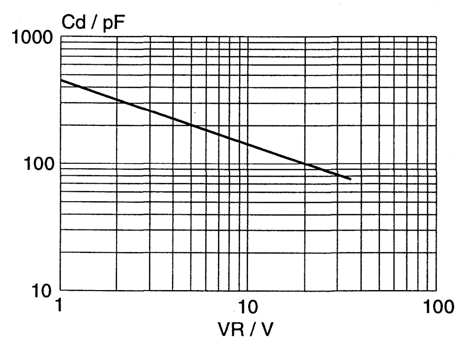



Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.

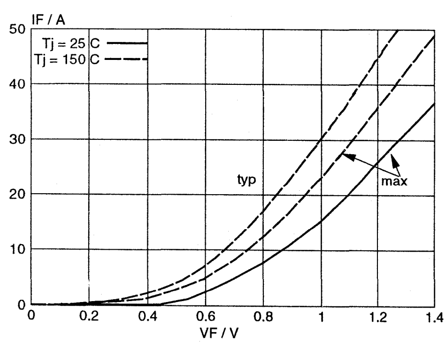



Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

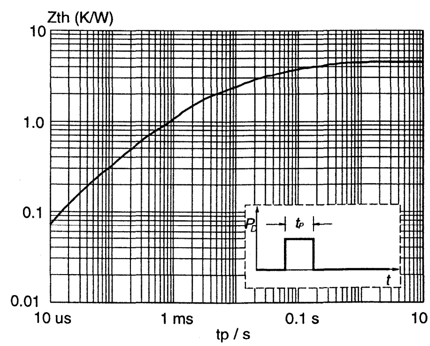



Fig.6. Transient thermal impedance; per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

# Rectifier diodes schottky barrier

# BYV118B series

## GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky rectifier diodes in a plastic envelope suitable for surface mounting, featuring low forward voltage drop, absence of stored charge. and 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.

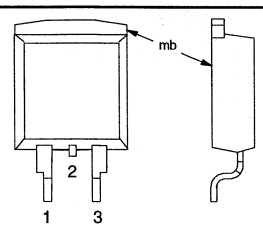
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYV118B-** | **35** | **40** | **45** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 35 | 40 | 45 | V |
| $V_F$ | Forward voltage | 0.6 | 0.6 | 0.6 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | 10 | 10 | 10 | A |

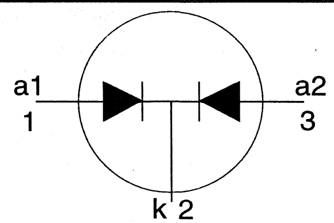
## PINNING - SOT404

| PIN | DESCRIPTION |
|---|---|
| 1 | anode 1 |
| 2 | cathode |
| 3 | anode 2 |
| mb | cathode |

## 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 | $T_{mb} \leq 133$˚C | - | 35 | 40 | 45 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_{mb} \leq 128$˚C | - | 10 | | | A |
| | | sinusoidal; a = 1.57; $T_{mb} \leq 130$˚C | - | 9 | | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | 14 | | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode. | t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 128$˚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 $V_{RRM(max)}$ | - | 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 |

## 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 | minimum footprint, FR4 board | - | 50 | - | 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) | $V_R = V_{RRM}$ | - | 50 | 100 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 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 |

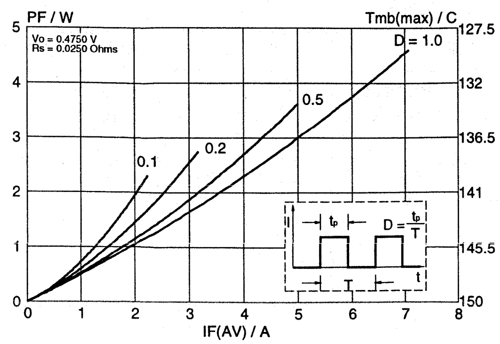



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

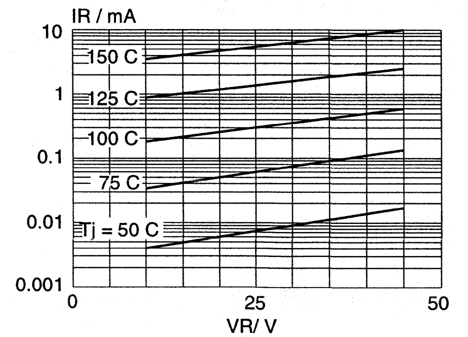



*Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

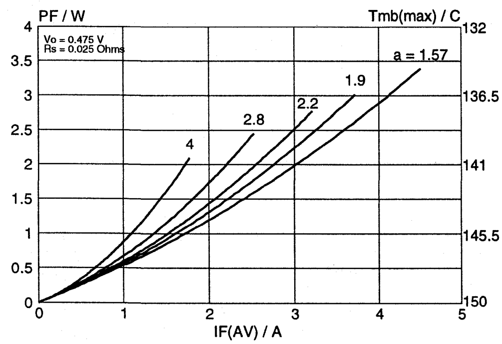



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

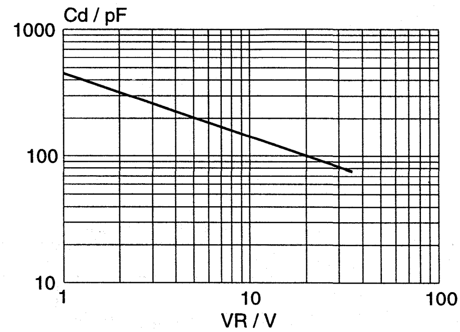



*Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

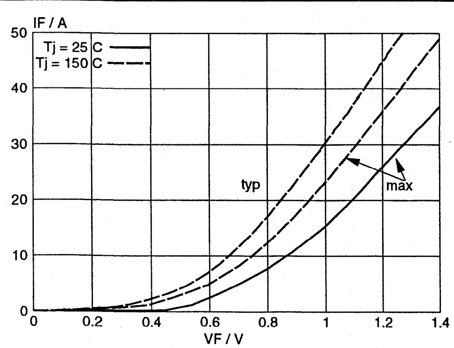



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

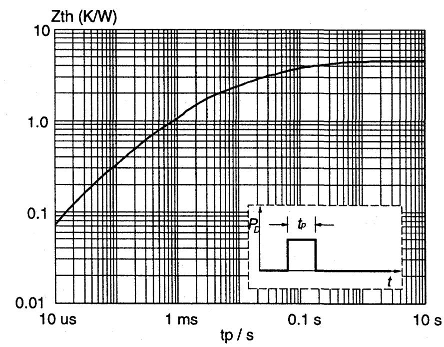



*Fig.6. Transient thermal impedance; per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.*

# 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.

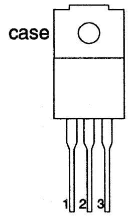
## QUICK REFERENCE DATA

| 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 |

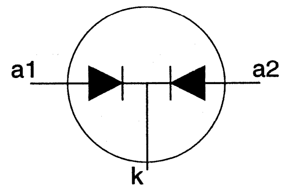
## PINNING - SOT186

| 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. -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 | $T_{hs} \leq 123$ ˚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 |

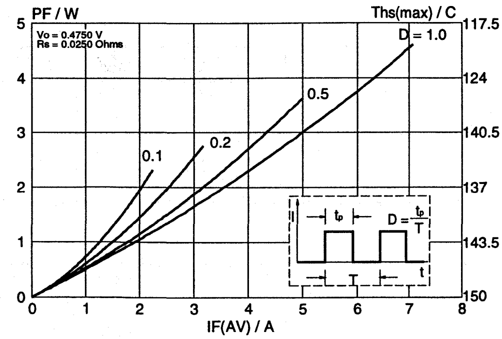



Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

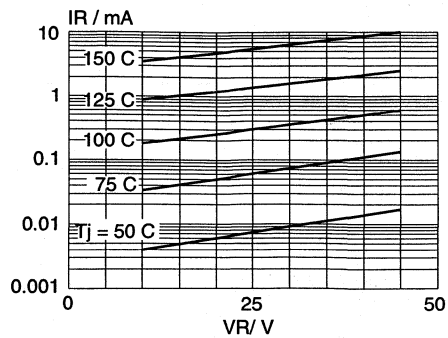



Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$

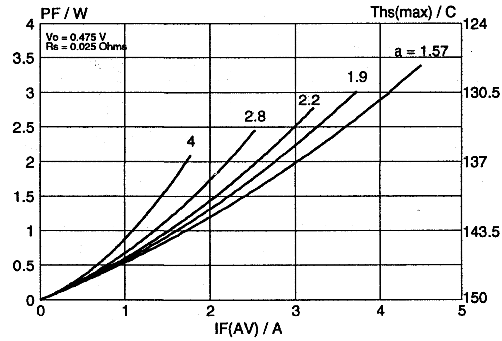



Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

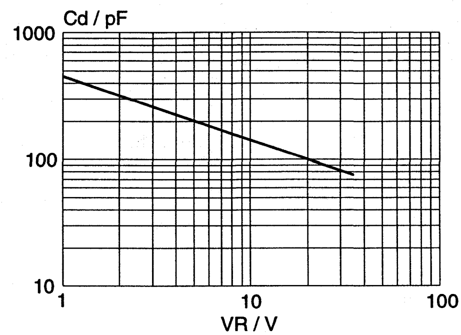



Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.

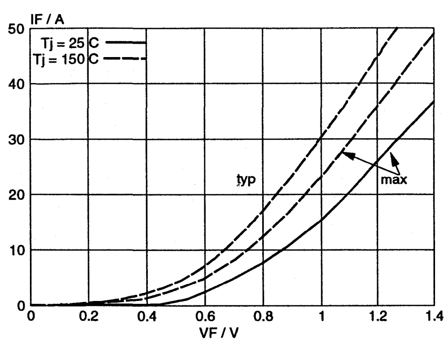



Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

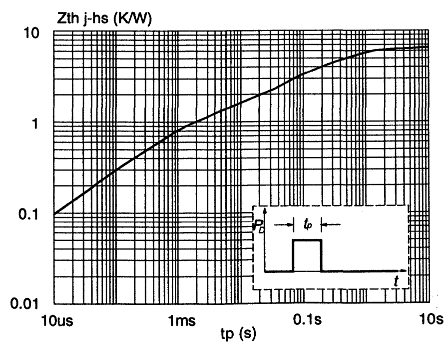



Fig.6. Transient thermal impedance; per diode; $Z_{th\ j\text{-}hs} = f(t_p)$.

# Rectifier diodes schottky barrier

# BYV118X series

## GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky rectifier diodes in a full pack plastic envelope featuring low forward voltage drop, absence of stored charge. and 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.

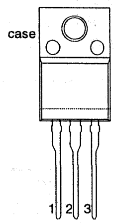
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYV118X-** | **35** | **40** | **45** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 35 | 40 | 45 | V |
| $V_F$ | Forward voltage | 0.6 | 0.6 | 0.6 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | 10 | 10 | 10 | A |

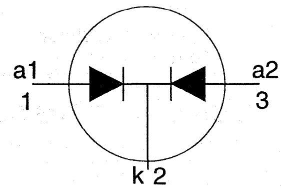
## PINNING - SOT186A

| PIN | DESCRIPTION |
|---|---|
| 1 | anode 1 (a) |
| 2 | cathode (k) |
| 3 | anode 2 (a) |
| 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 | $T_{hs} \leq 123$ ˚C | - | 35 | 40 | 45 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_{hs} \leq 110$ ˚C | - | | 10 | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | | 14 | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode. | $t = 25$ µs; $\delta = 0.5$; $T_{mb} \leq 110$˚C | - | | 10 | | A |
| $I_{FSM}$ | Non-repetitive peak forward current, per diode | t = 10 ms | - | | 100 | | A |
| | | t = 8.3 ms<br>sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$ | - | | 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 LIMITING VALUE & CHARACTERISTIC

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{isol}$ | R.M.S. isolation voltage from all three terminals to external heatsink | f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree | - | | 2500 | V |
| $C_{isol}$ | Capacitance from T2 to external heatsink | f = 1 MHz | - | 10 | - | pF |

## THERMAL RESISTANCES

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

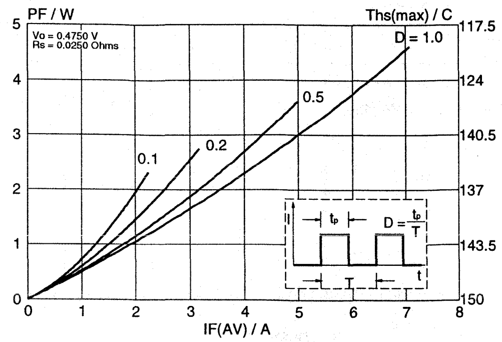



*Fig.1.* *Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

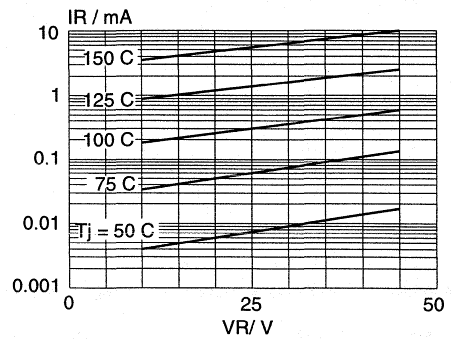



*Fig.4.* *Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

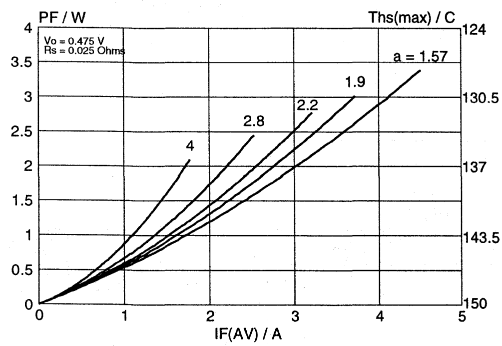



*Fig.2.* *Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

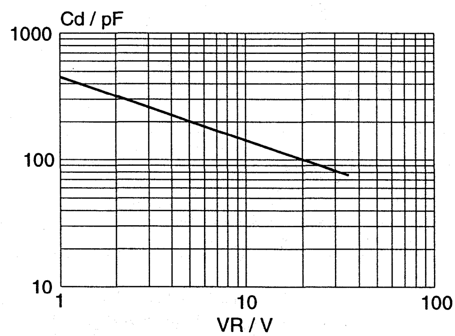



*Fig.5.* *Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

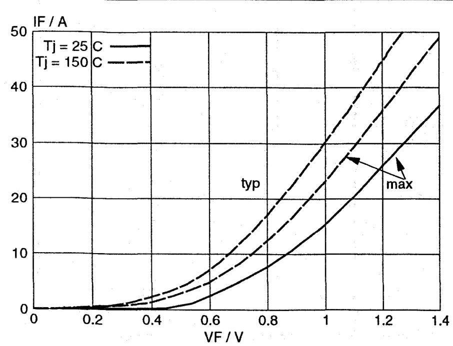



*Fig.3.* *Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

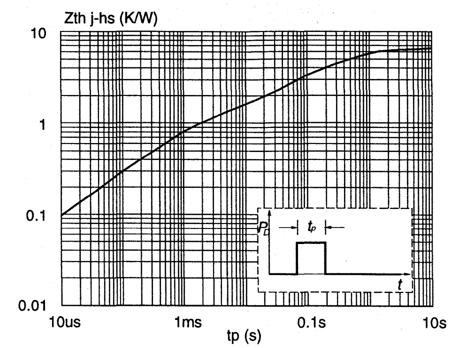



*Fig.6.* *Transient thermal impedance; per diode; $Z_{th\ j\text{-}hs} = f(t_p)$.*

## 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.

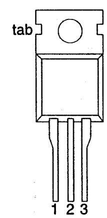
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **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 |

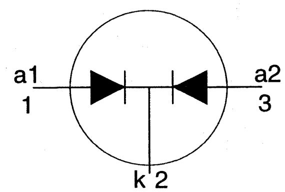
## PINNING - TO220AB

| 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 | - | 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 |

**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 |

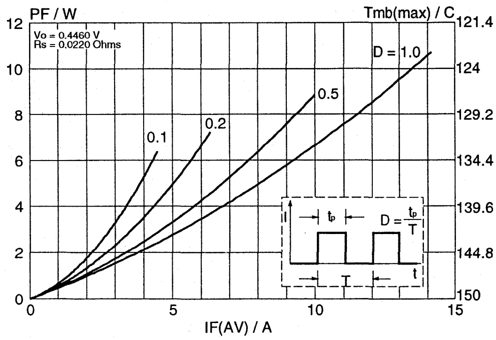



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

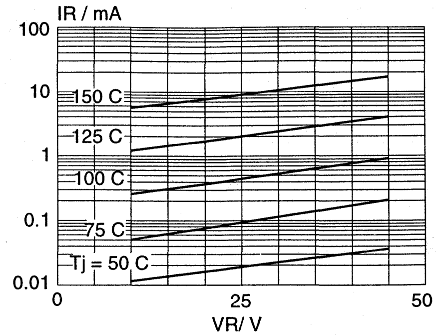



*Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

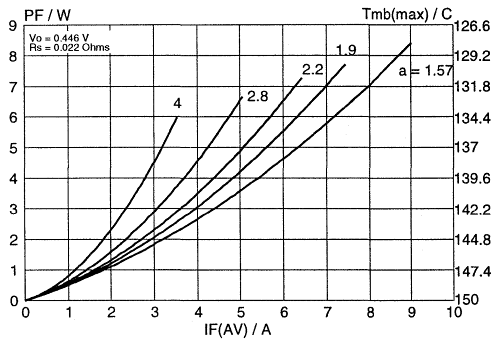



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

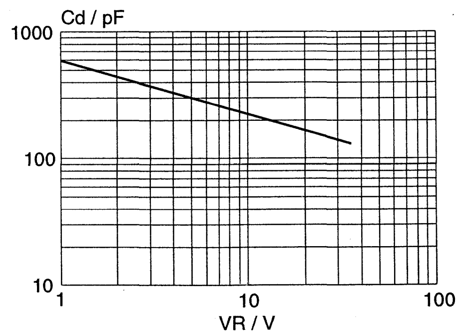



*Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

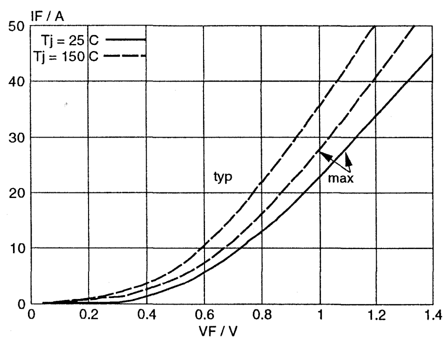



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

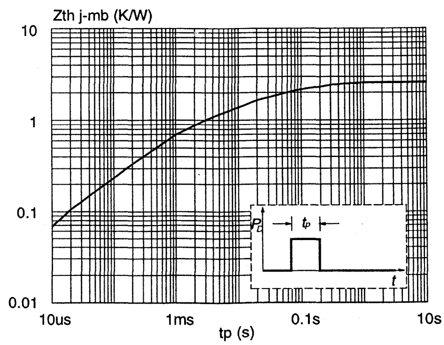



*Fig.6. Transient thermal impedance; per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.*

# Rectifier diodes schottky barrier

# BYV133F series

## GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky rectifier diodes in a full pack plastic envelope featuring low forward voltage drop, absence of stored charge. and 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.

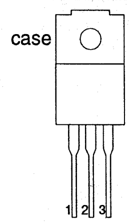
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYV133F-** | **35** | **40** | **45** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 35 | 40 | 45 | V |
| $V_F$ | Forward voltage | 0.60 | 0.60 | 0.60 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | 20 | 20 | 20 | A |

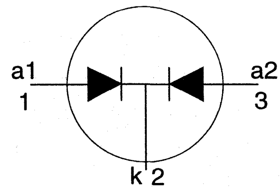
## PINNING - SOT186

| 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 | $T_{hs} \leq 112$ ˚C | - | 35 | 40 | 45 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_{hs} \leq 61$ ˚C | - | | 20 | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | | 20 | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | $t = 25\ \mu s$; $\delta = 0.5$; $T_{hs} \leq 61$ ˚C | - | | 20 | | A |
| $I_{FSM}$ | Non-repetitive peak forward current, per diode | t = 10 ms | - | | 100 | | A |
| | | t = 8.3 ms | - | | 110 | | A |
| | | sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ for fusing | t = 10 ms | - | | 50 | | $A^2s$ |
| $I_{RRM}$ | 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 | | -65 | | 175 | | ˚C |
| $T_j$ | Operating junction temperature | | - | | 150 | | ˚C |

## ISOLATION LIMITING VALUE & CHARACTERISTIC

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{isol}$ | Repetitive peak voltage from 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 | K/W |
| | | both diodes (with heatsink compound) | - | - | 5 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | in free air. | - | 55 | - | K/W |

## 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) | $V_R = V_{RRM}$ | - | 50 | 100 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 125 ˚C | - | 4 | 15 | mA |
| $C_d$ | Junction capacitance (per diode) | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 300 | - | pF |

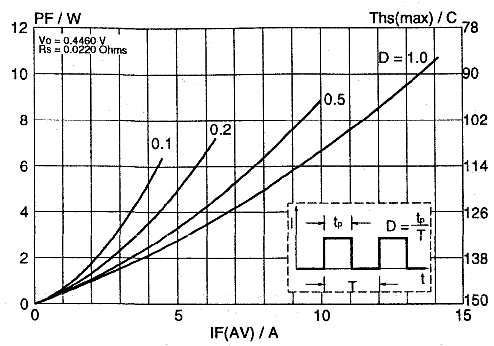



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

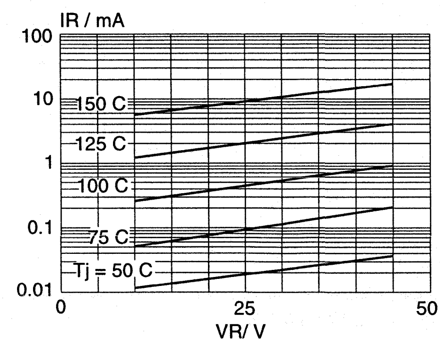



*Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

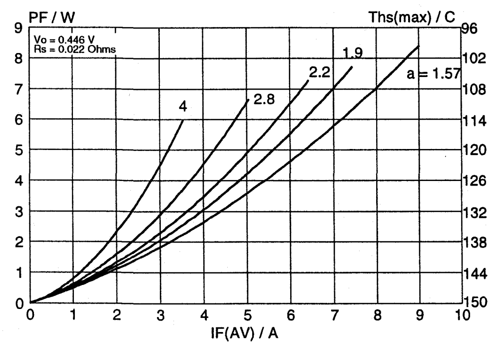



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

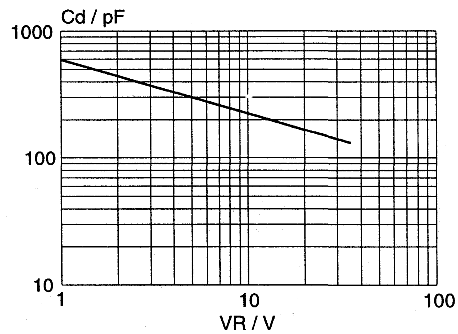



*Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

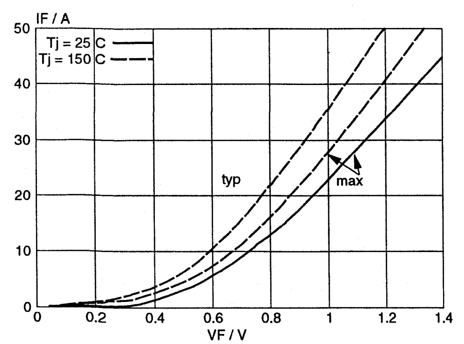



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

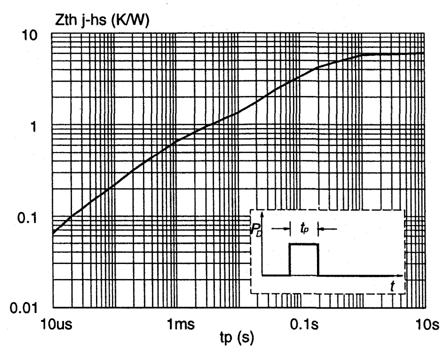



*Fig.6. Transient thermal impedance; per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.*

# Rectifier diodes schottky barrier

# BYV133X series

## GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky rectifier diodes in a full pack plastic envelope featuring low forward voltage drop, absence of stored charge. and 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.

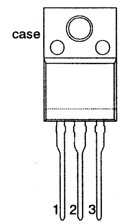
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYV133X-** | **35** | **40** | **45** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 35 | 40 | 45 | V |
| $V_F$ | Forward voltage | 0.60 | 0.60 | 0.60 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | 20 | 20 | 20 | A |

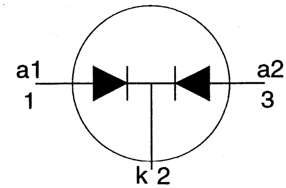
## PINNING - SOT186A

| PIN | DESCRIPTION |
|---|---|
| 1 | anode 1 (a) |
| 2 | cathode (k) |
| 3 | anode 2 (a) |
| 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 | $T_{hs} \leq 112$ ˚C | - | 35 | 40 | 45 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_{hs} \leq 61$ ˚C | - | 20 | | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | 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 $V_{RRM(max)}$ | - | 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 LIMITING VALUE & CHARACTERISTIC

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{isol}$ | R.M.S. isolation voltage from all three terminals to external heatsink | f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree | - | | 2500 | V |
| $C_{isol}$ | Capacitance from T2 to external heatsink | f = 1 MHz | - | 10 | - | pF |

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}hs}$ | Thermal resistance junction to heatsink | per diode | - | - | 6 | K/W |
| | | both diodes (with heatsink compound) | - | - | 5 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | in free air. | - | 55 | - | K/W |

## 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) | $V_R = V_{RRM}$ | - | 50 | 100 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 125 ˚C | - | 4 | 15 | mA |
| $C_d$ | Junction capacitance (per diode) | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 300 | - | pF |

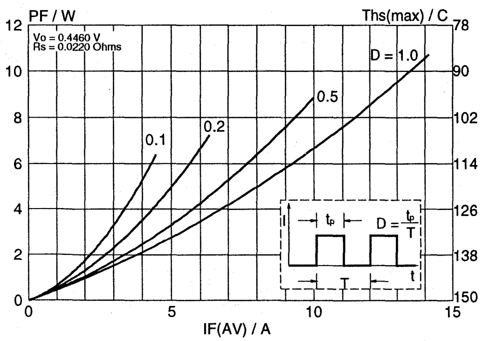



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

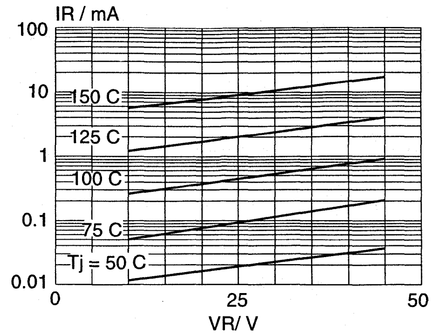



*Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

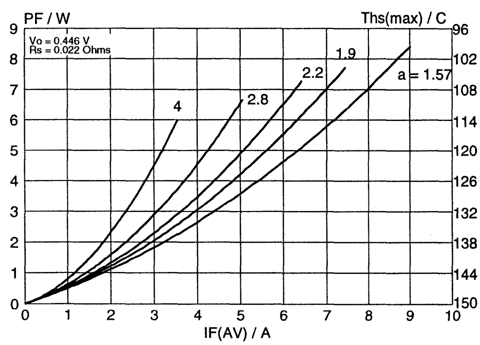



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

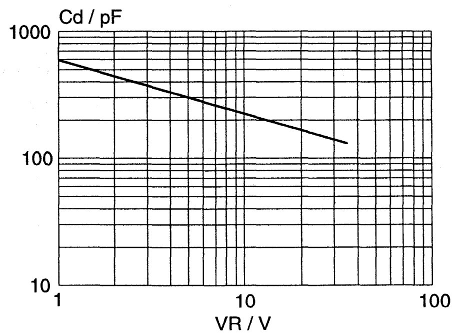



*Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

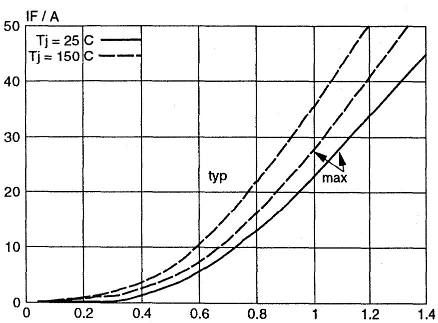



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

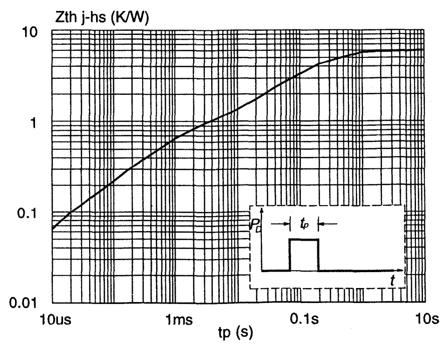



*Fig.6. Transient thermal impedance; per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.*

## 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.

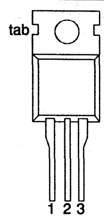
## QUICK REFERENCE DATA

| 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 |

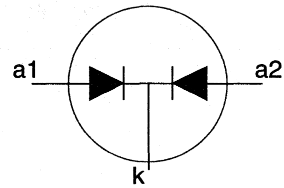
## PINNING - TO220AB

| 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. | | | 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 | $T_{mb} \leq 135$˚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 |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}mb}$ | Thermal resistance junction to mounting base | per diode | - | - | 2.3 | K/W |
| | | both diodes | - | - | 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 | - | 0.55 | 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 |

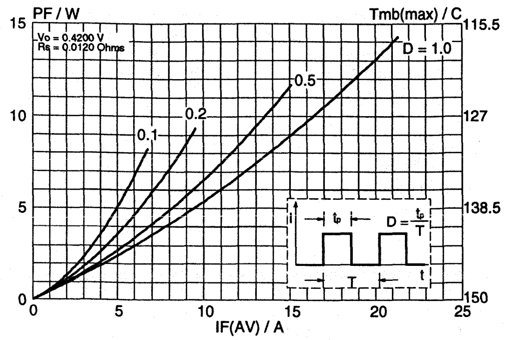



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

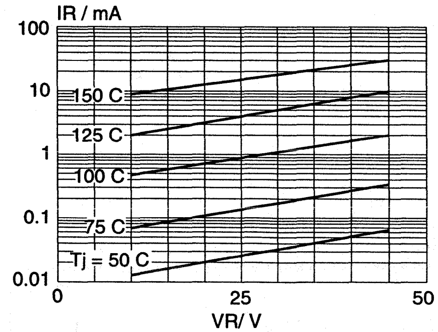



*Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

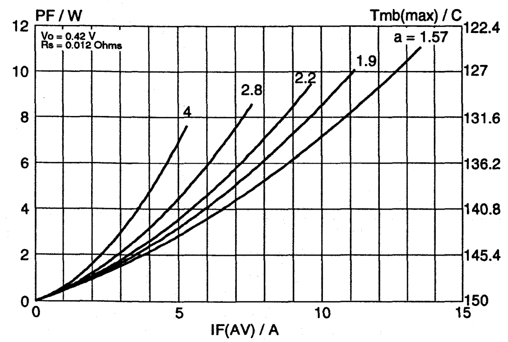



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

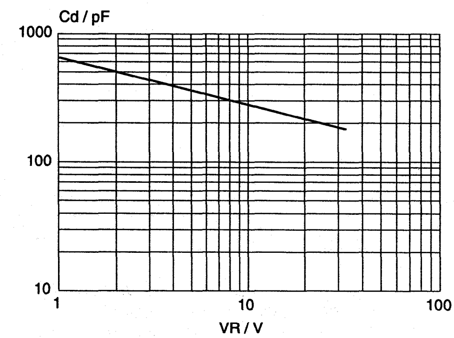



*Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

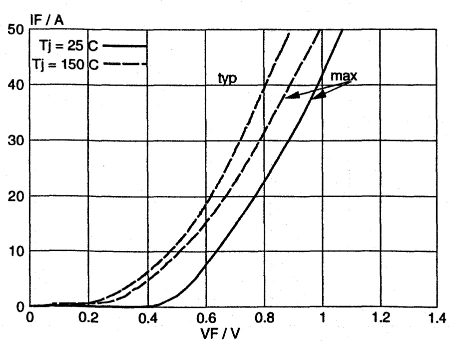



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

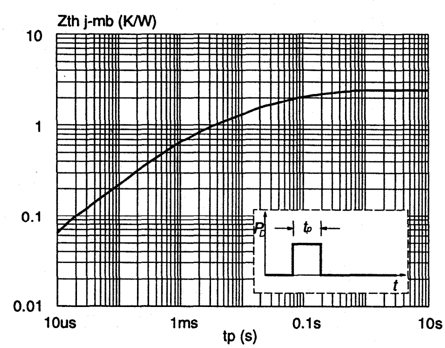



*Fig.6. Transient thermal impedance; per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.*

# Rectifier diodes schottky barrier
# BYV143B series

## GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky rectifier diodes in a plastic envelope suitable for surface mounting, featuring low forward voltage drop, absence of stored charge. and 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.

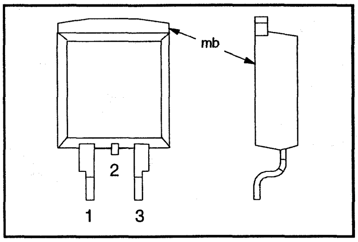
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYV143B-** | **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 |

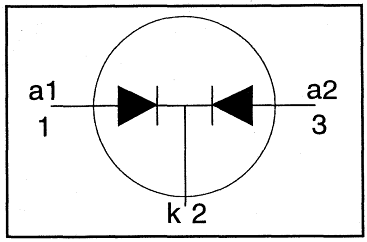
## PINNING - SOT404

| PIN | DESCRIPTION |
|---|---|
| 1 | anode 1 |
| 2 | cathode |
| 3 | anode 2 |
| mb | cathode |

## 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 | $T_{mb} \leq 135^{\circ}C$ | - | 35 | 40 | 45 | V |
| $I_{O(AV)}$ | Output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_{mb} \leq 117\ ^{\circ}C$ | - | 30 | | | A |
| | | sinusoidal; a = 1.57; $T_{mb} \leq 119\ ^{\circ}C$ | - | 27 | | | A |
| $I_{F(RMS)}$ | RMS forward current | | - | 43 | | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 117\ ^{\circ}C$ | - | 30 | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current, both diodes conducting. | t = 10 ms | - | 200 | | | A |
| | | t = 8.3 ms | - | 220 | | | A |
| | | sinusoidal $T_j = 125\ ^{\circ}C$ prior to surge; with reapplied $V_{RRM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ 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 |

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}mb}$ | Thermal resistance junction to mounting base | per diode | - | - | 2.3 | K/W |
| | | both diodes | - | - | 1.4 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | minimum footprint, FR4 board | - | 50 | - | 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) | $V_R = V_{RRM}$ | - | 10 | 200 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 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 |

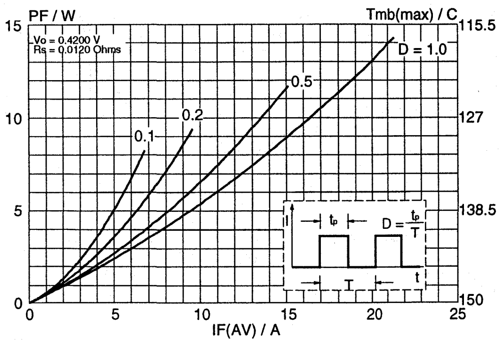



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

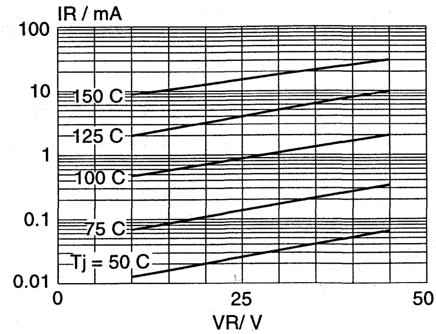



*Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

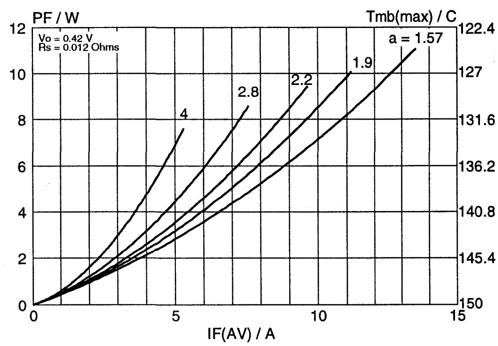



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

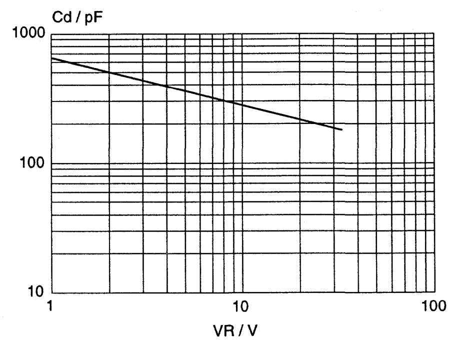



*Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

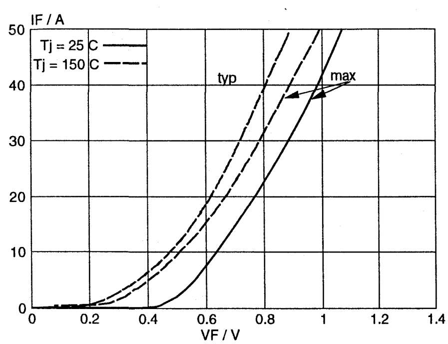



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

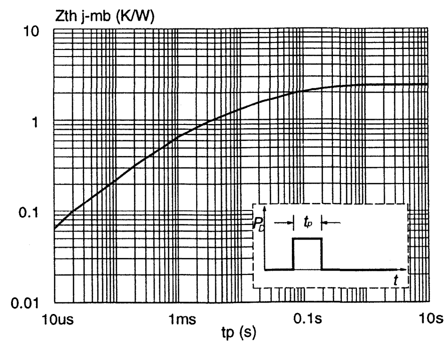



*Fig.6. Transient thermal impedance; per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.*

# Rectifier diodes schottky barrier

# BYV143F series

## GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky rectifier diodes in a full pack plastic envelope, featuring low forward voltage drop, absence of stored charge. and 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.

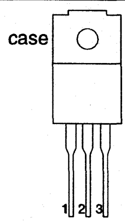
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYV143F-** | **35** | **40** | **45** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 35 | 40 | 45 | V |
| $V_F$ | Forward voltage | 0.62 | 0.62 | 0.62 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | 20 | 20 | 20 | A |

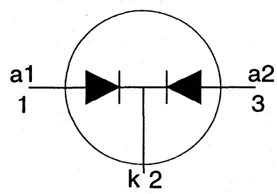
## PINNING - SOT186

| 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 | $T_{hs} \leq 112$ ˚C | - | 35 | 40 | 45 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_{hs} \leq 87$ ˚C | - | 20 | | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | 20 | | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | $t = 25$ µs; $\delta = 0.5$; $T_{hs} \leq 87$ ˚C | - | 30 | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current, per diode | t = 10 ms | - | 100 | | | A |
| | | t = 8.3 ms | - | 110 | | | A |
| | | sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ 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 LIMITING VALUE & CHARACTERISTIC

$T_{hs}$ = 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<br>both diodes<br>(with heatsink compound) | -<br>- | -<br>- | 5.7<br>4.8 | K/W<br>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<br>$I_F$ = 20 A | -<br>- | 0.55<br>0.76 | 0.62<br>0.80 | V<br>V |
| $I_R$ | Reverse current (per diode) | $V_R = V_{RRM}$<br>$V_R = V_{RRM}$; $T_j$ = 125 ˚C | -<br>- | 10<br>10 | 200<br>30 | µA<br>mA |
| $C_d$ | Junction capacitance (per diode) | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 500 | - | pF |

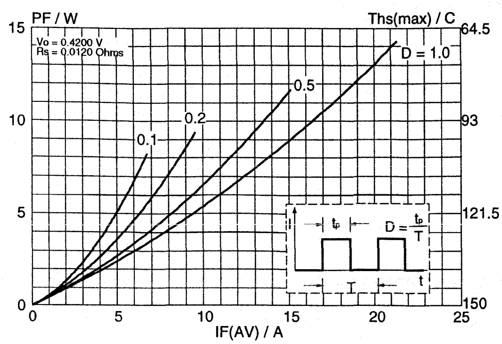



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

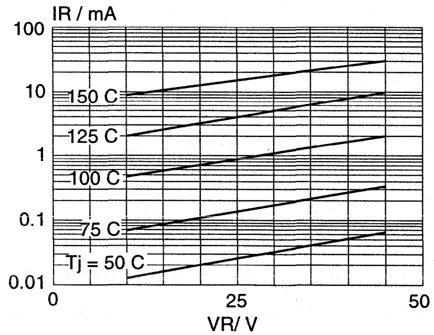



*Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

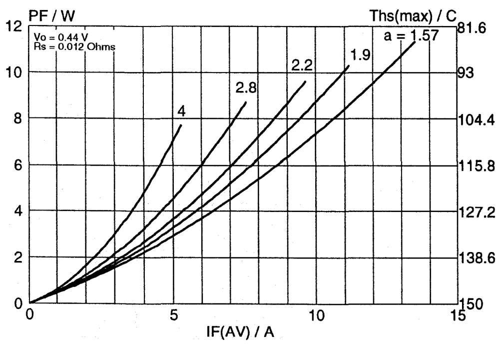



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

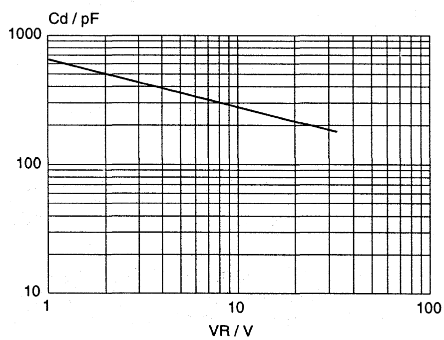



*Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

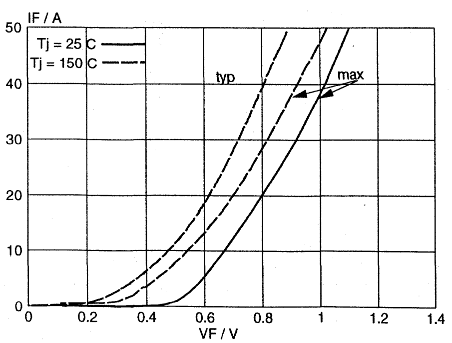



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

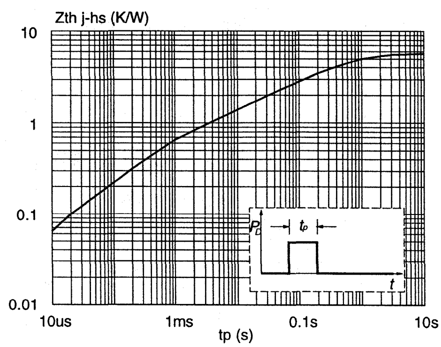



*Fig.6. Transient thermal impedance; per diode; $Z_{th\ j\text{-}hs} = f(t_p)$.*

# Rectifier diodes schottky barrier

# BYV143X series

## GENERAL DESCRIPTION

Dual, low leakage, platinum barrier, schottky rectifier diodes in a full pack plastic envelope, featuring low forward voltage drop, absence of stored charge. and 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.

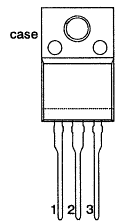
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYV143X-** | **35** | **40** | **45** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 35 | 40 | 45 | V |
| $V_F$ | Forward voltage | 0.62 | 0.62 | 0.62 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | 20 | 20 | 20 | A |

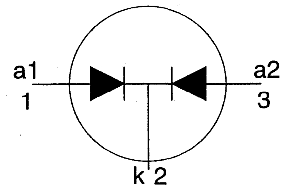
## PINNING - SOT186A

| PIN | DESCRIPTION |
|---|---|
| 1 | anode 1 (a) |
| 2 | cathode (k) |
| 3 | anode 2 (a) |
| 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 | $T_{hs} \leq 112$ ˚C | - | 35 | 40 | 45 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_{hs} \leq 87$ ˚C | - | 20 | | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | 20 | | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | $t = 25$ µs; $\delta = 0.5$; $T_{hs} \leq 87$ ˚C | - | 30 | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current, per diode | t = 10 ms | - | 100 | | | A |
| | | t = 8.3 ms | - | 110 | | | A |
| | | sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ 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 LIMITING VALUE & CHARACTERISTIC

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{isol}$ | R.M.S. isolation voltage from all three terminals to external heatsink | f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree | - | | 2500 | V |
| $C_{isol}$ | Capacitance from T2 to external heatsink | f = 1 MHz | - | 10 | - | pF |

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}hs}$ | Thermal resistance junction to heatsink | per diode | - | - | 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) | $V_R = V_{RRM}$ | - | 10 | 200 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 125 ˚C | - | 10 | 30 | mA |
| $C_d$ | Junction capacitance (per diode) | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 500 | - | pF |

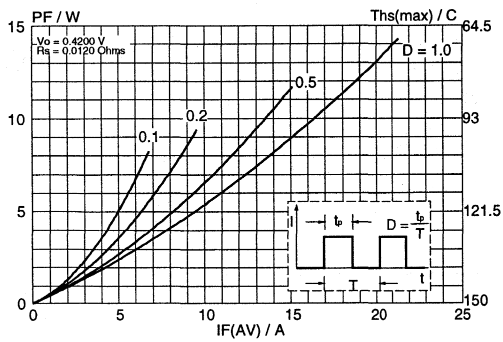



*Fig.1.* *Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

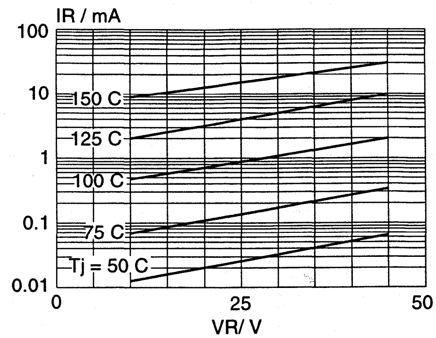



*Fig.4.* *Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

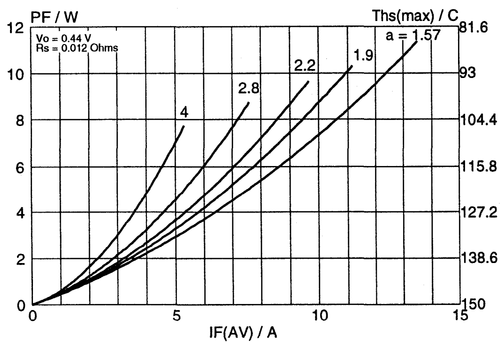



*Fig.2.* *Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

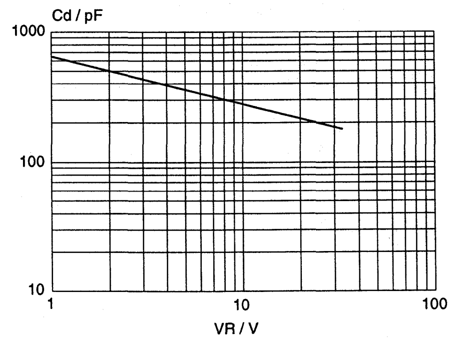



*Fig.5.* *Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

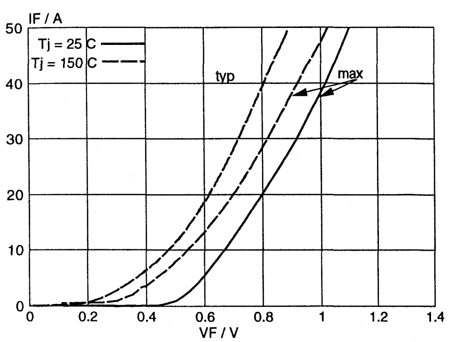



*Fig.3.* *Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

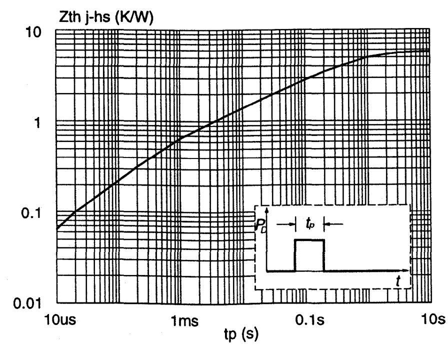



*Fig.6.* *Transient thermal impedance; per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.*

# 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.

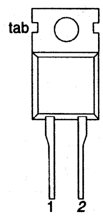
## QUICK REFERENCE DATA

| 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 |

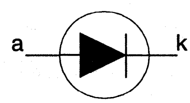
## PINNING - TO220AC

| 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 | - | 88 | | | A |
| | | sinusoidal; with reapplied $V_{RWM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ 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 |

# Rectifier diodes ultrafast

# BYW29 series

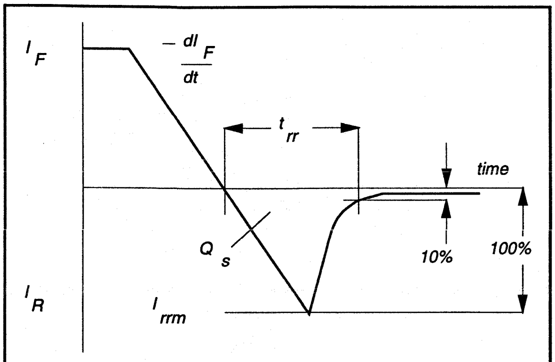



Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$

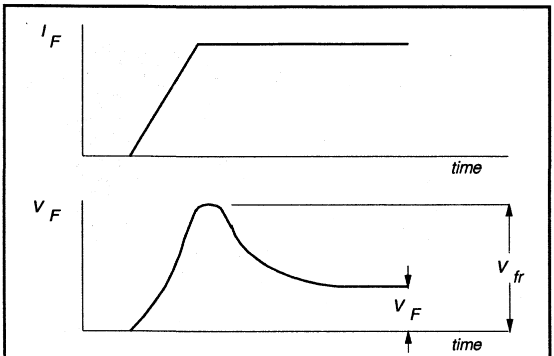



Fig.2. Definition of $V_{fr}$

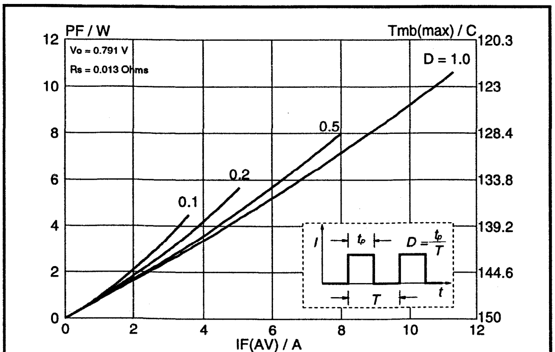



Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

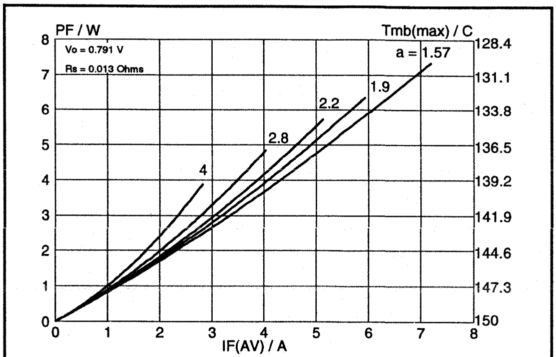



Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

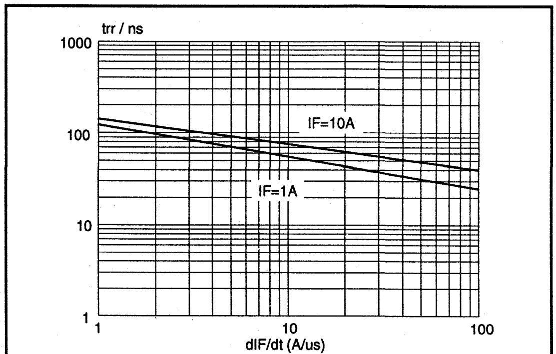



Fig.5. Maximum $t_{rr}$ at $T_j$ = 25 ˚C.

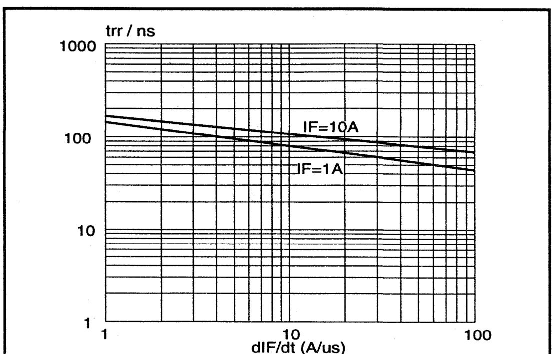



Fig.6. Maximum $t_{rr}$ at $T_j$ = 100 ˚C.

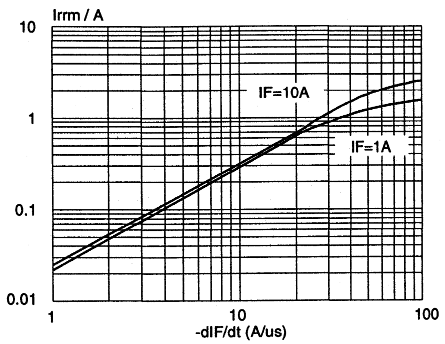



Fig.7. Maximum $I_{rrm}$ at $T_j = 25$ ˚C.

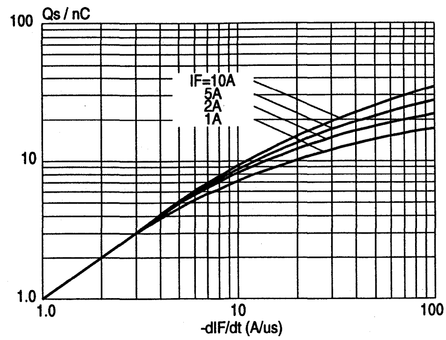



Fig.10. Maximum $Q_s$ at $T_j = 25$ ˚C.

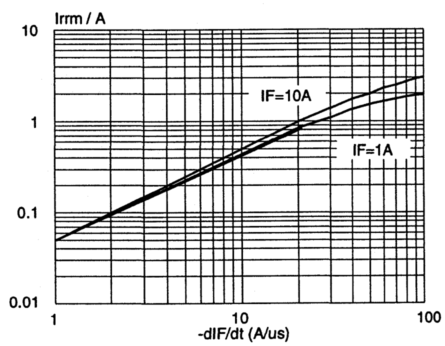



Fig.8. Maximum $I_{rrm}$ at $T_j = 100$ ˚C.

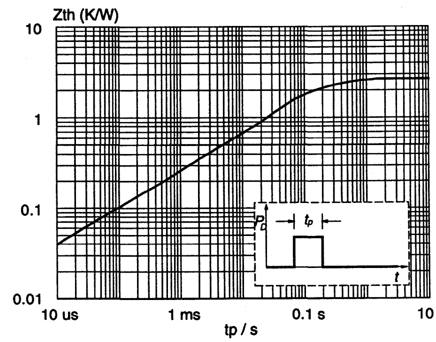



Fig.11. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

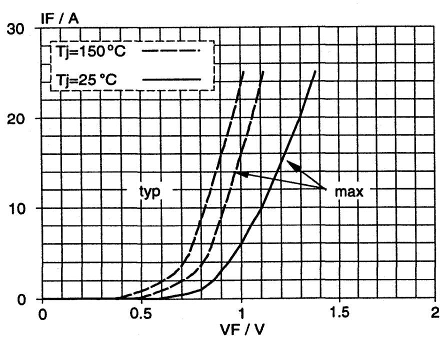



Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

# 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.

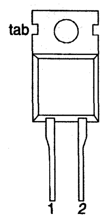
## QUICK REFERENCE DATA

| 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 |

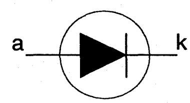
## PINNING - TO220AC

| 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 |

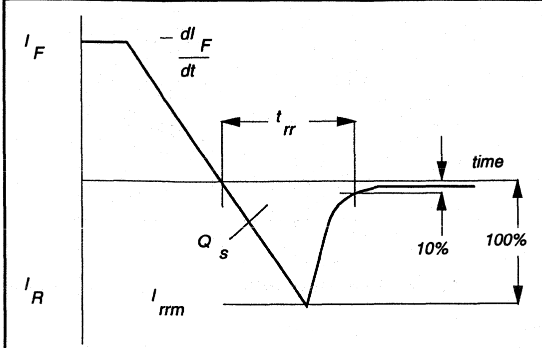



Fig.1. Definition of $t_{rr1}$, $Q_s$ and $I_{rrm}$

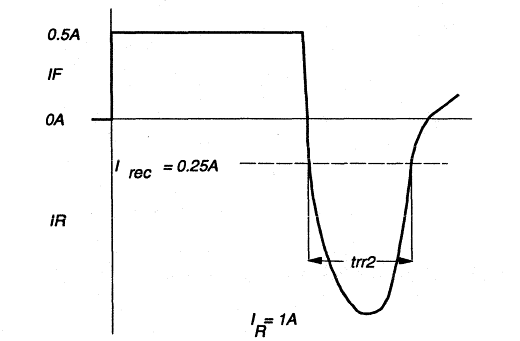



Fig.4. Definition of $t_{rr2}$

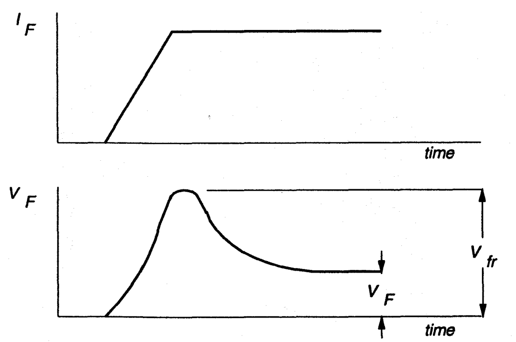



Fig.2. Definition of $V_{fr}$

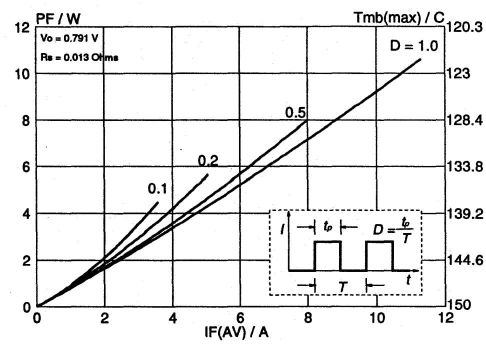



Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

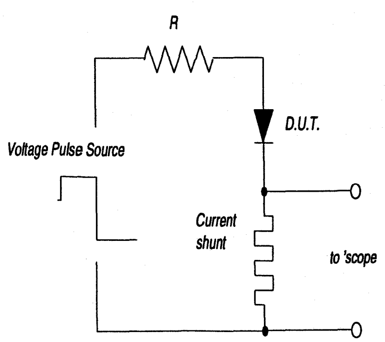



Fig.3. Circuit schematic for $t_{rr2}$

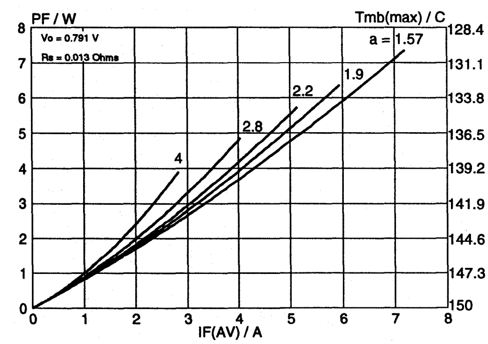



Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

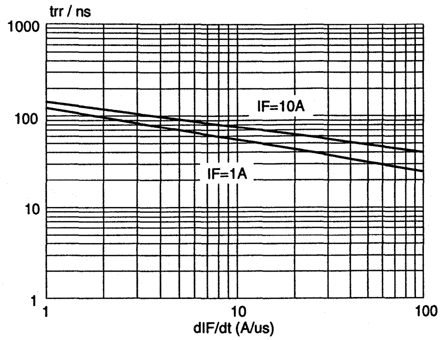



*Fig.7. Maximum $t_{rr}$ at $T_j$ = 25 ˚C.*

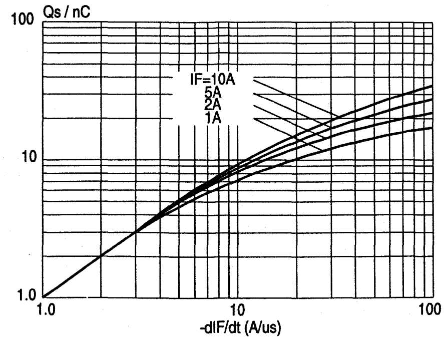



*Fig.10. Maximum $Q_s$ at $T_j$ = 25 ˚C.*

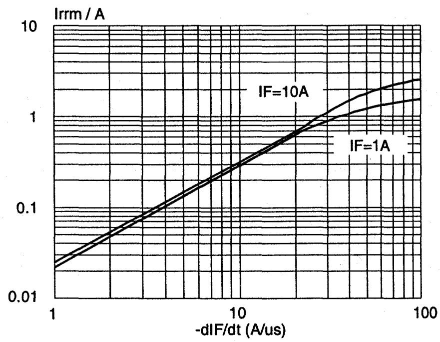



*Fig.8. Maximum $I_{rrm}$ at $T_j$ = 25 ˚C.*

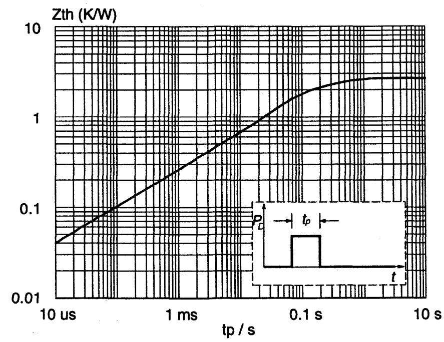



*Fig.11. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.*

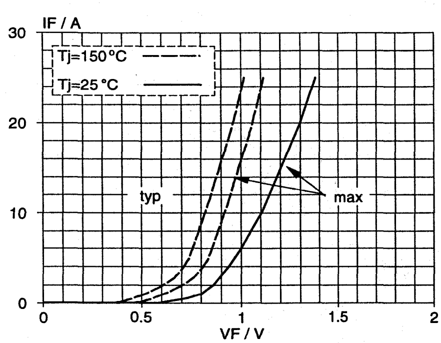



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

# Rectifier diodes ultrafast, rugged

# BYW29EB series

## GENERAL DESCRIPTION

Glass passivated epitaxial rectifier diodes in a plastic envelope suitable for surface mounting, featuring low forward voltage drop, ultra-fast recovery times, soft recovery characteristic and guaranteed reverse surge and ESD capability. They are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and switching losses are essential.

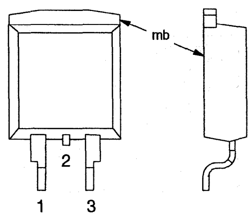
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYW29EB-** | **100** | **150** | **200** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 100 | 150 | 200 | V |
| $V_F$ | Forward voltage | 0.895 | 0.895 | 0.895 | V |
| $I_{F(AV)}$ | Average 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 |

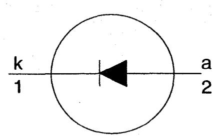
## PINNING - SOT404

| PIN | DESCRIPTION |
|---|---|
| 1 | no connection |
| 2 | cathode |
| 3 | anode |
| mb | cathode |

## 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 | | A |
| $I_{F(RMS)}$ | RMS forward current | | - | | 11 | | 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 $V_{RRM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ 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 | minimum footprint, FR4 board | - | 50 | - | 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 | $V_R = V_{RRM}$; $T_j$ = 100 ˚C | - | 0.2 | 0.6 | mA |
| | | $V_R = V_{RRM}$ | - | 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 |

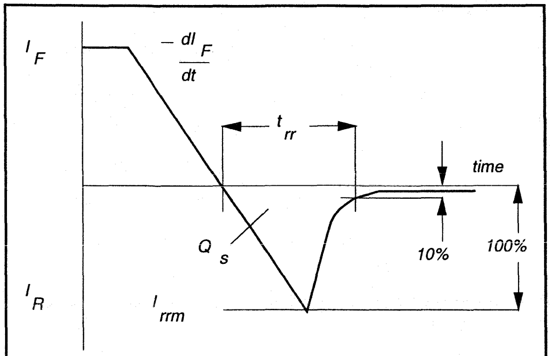



Fig.1. Definition of $t_{rr1}$, $Q_s$ and $I_{rrm}$

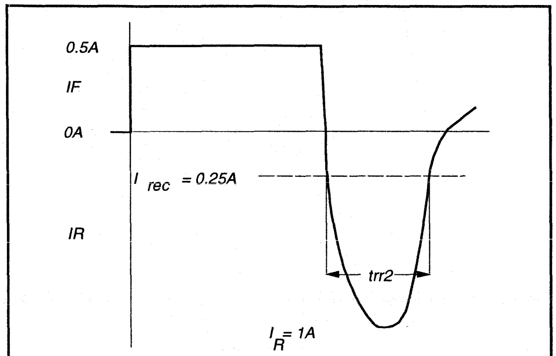



Fig.4. Definition of $t_{rr2}$

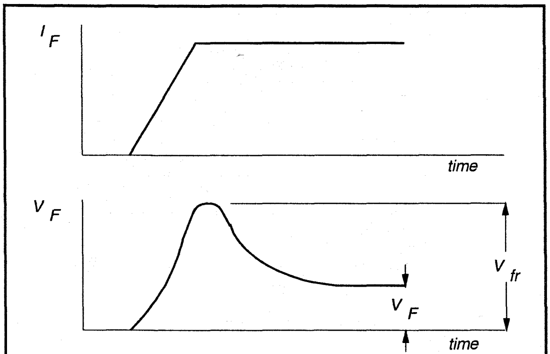



Fig.2. Definition of $V_{fr}$

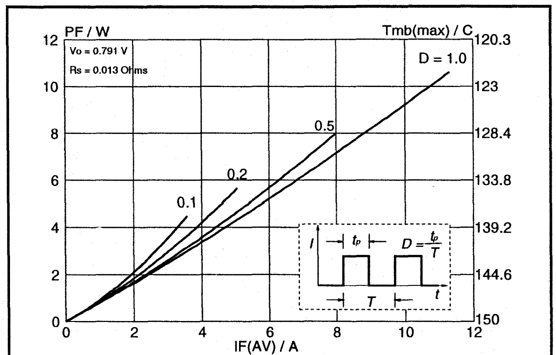



Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

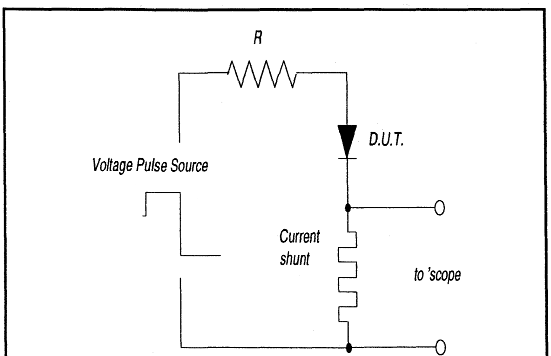



Fig.3. Circuit schematic for $t_{rr2}$

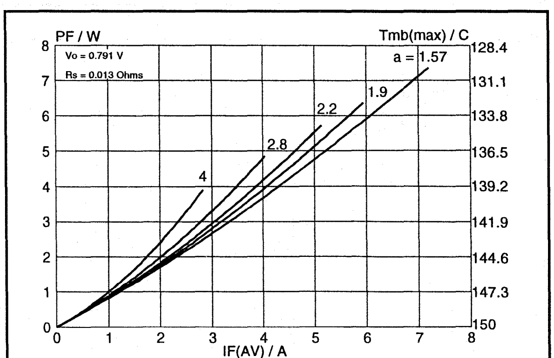



Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

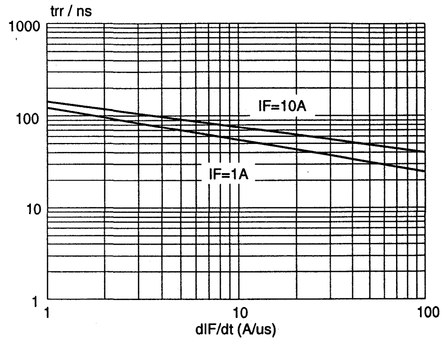



*Fig.7. Maximum $t_{rr}$ at $T_j$ = 25 ˚C.*

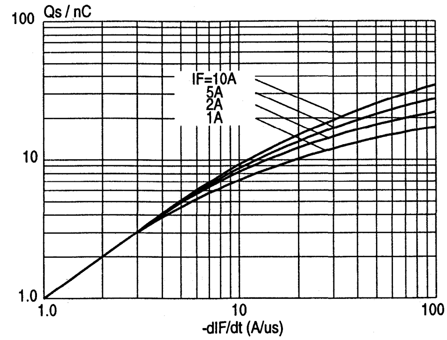



*Fig.10. Maximum $Q_s$ at $T_j$ = 25 ˚C.*

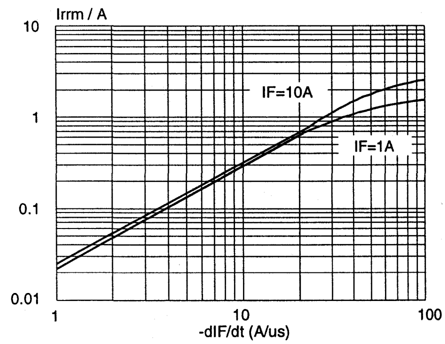



*Fig.8. Maximum $I_{rrm}$ at $T_j$ = 25 ˚C.*

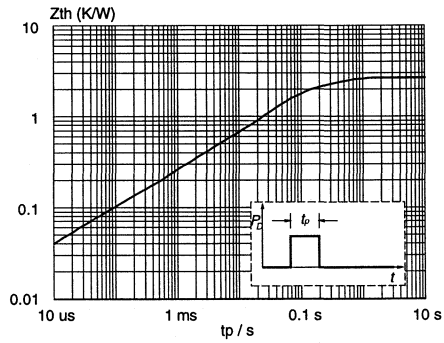



*Fig.11. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.*

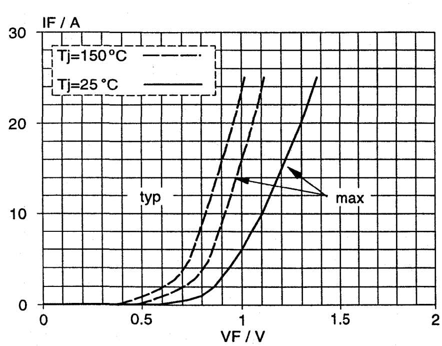



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

## GENERAL DESCRIPTION

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

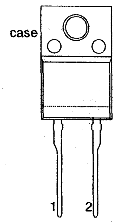
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **BYW29EX-** | **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 |

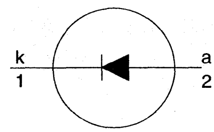
## PINNING - SOD113

| 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 |
|---|---|---|---|---|---|---|---|
| | | | | **-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; $\delta = 0.5$; $T_{hs} \leq 106$ ˚C | - | 8 | | | A |
| | | sinusoidal; a = 1.57; $T_{hs} \leq 109$ ˚C | - | 7.3 | | | A |
| $I_{F(RMS)}$ | RMS forward current | | - | 11.3 | | | A |
| $I_{FRM}$ | Repetitive peak forward current | t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 106$ ˚C | - | 16 | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current | t = 10 ms | - | 80 | | | A |
| | | t = 8.3 ms | - | 88 | | | A |
| | | sinusoidal; with reapplied $V_{RWM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ for fusing | t = 10 ms | - | 32 | | | $A^2s$ |
| $I_{RRM}$ | Repetitive peak reverse current | $t_p = 2$ µs; $\delta = 0.001$ | - | 0.2 | | | A |
| $I_{RSM}$ | Non-repetitive peak reverse current | $t_p = 100$ µs | - | 0.2 | | | A |
| $T_{stg}$ | Storage temperature | | -40 | 150 | | | ˚C |
| $T_j$ | Operating junction temperature | | - | 150 | | | ˚C |

**1** Neglecting switching and reverse current losses

## ESD LIMITING VALUE

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| $V_C$ | Electrostatic discharge capacitor voltage | Human body model; C = 250 pF; R = 1.5 kΩ | - | 8 | kV |

## ISOLATION LIMITING VALUE & CHARACTERISTIC

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

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

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}hs}$ | Thermal resistance junction to heatsink | with heatsink compound | - | - | 5.5 | K/W |
| | | without heatsink compound | - | - | 7.2 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | in free air | - | 55 | - | K/W |

## 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; $V_R$ ≥ 30 V; $-dI_F/dt$ = 20 A/µs | - | 4 | 11 | nC |
| $t_{rr1}$ | Reverse recovery time | $I_F$ = 1 A; $V_R$ ≥ 30 V; $-dI_F/dt$ = 100 A/µs | - | 20 | 25 | ns |
| $t_{rr2}$ | Reverse recovery time | $I_F$ = 0.5 A to $I_R$ = 1 A; $I_{rec}$ = 0.25 A | - | 15 | 20 | ns |
| $V_{fr}$ | Forward recovery voltage | $I_F$ = 1 A; $dI_F/dt$ = 10 A/µs | - | 1 | - | V |

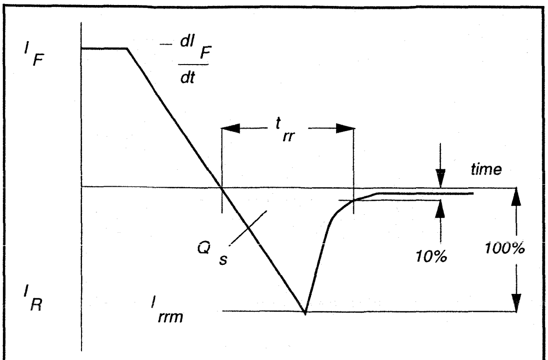



Fig.1. Definition of $t_{rr1}$, $Q_s$ and $I_{rrm}$

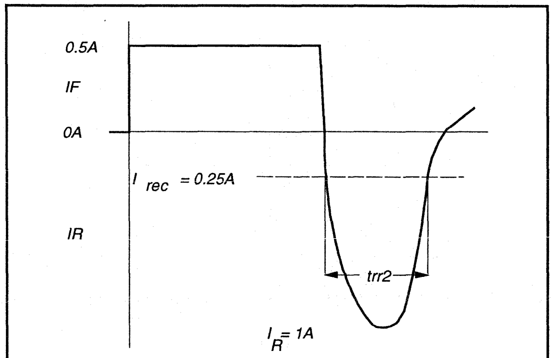



Fig.4. Definition of $t_{rr2}$

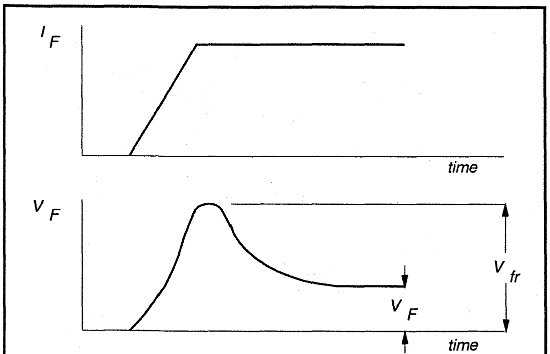



Fig.2. Definition of $V_{fr}$

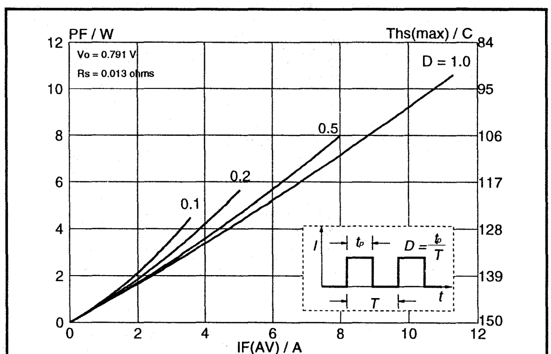



Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

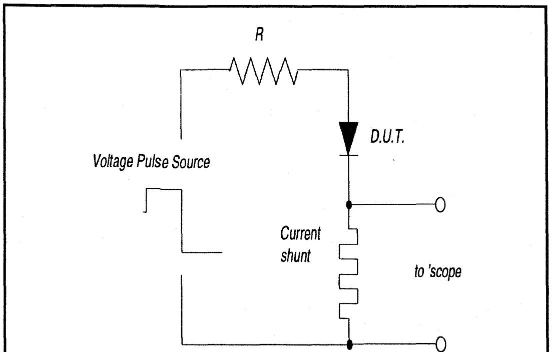



Fig.3. Circuit schematic for $t_{rr2}$

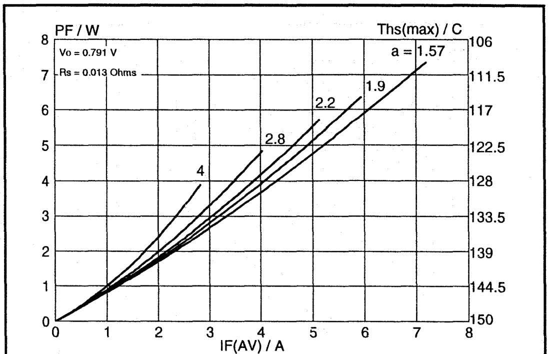



Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

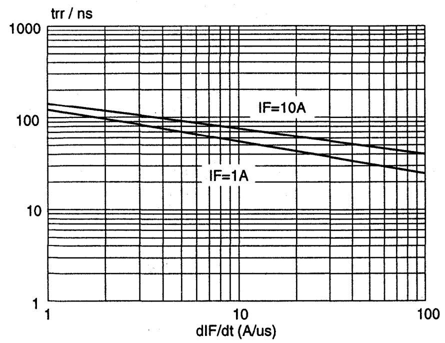



*Fig.7. Maximum $t_{rr}$ at $T_j$ = 25 ˚C.*

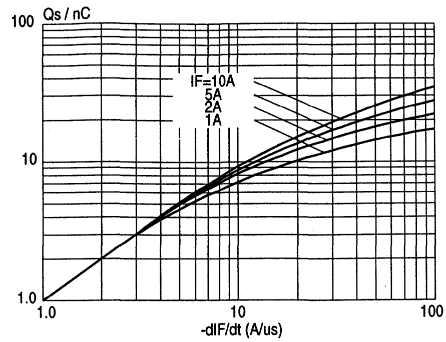



*Fig.10. Maximum $Q_s$ at $T_j$ = 25 ˚C.*

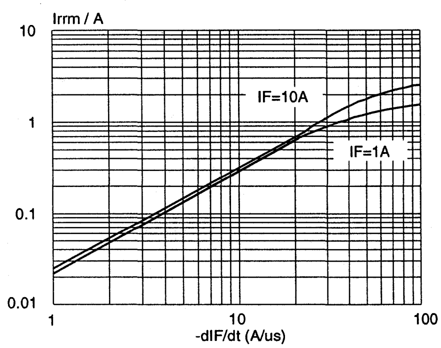



*Fig.8. Maximum $I_{rrm}$ at $T_j$ = 25 ˚C.*

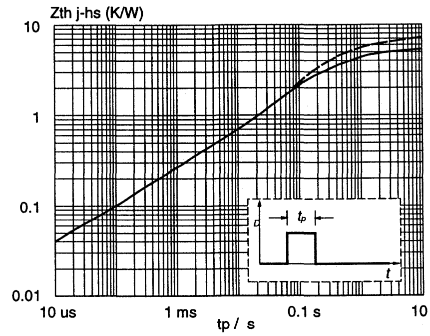



*Fig.11. Transient thermal impedance; $Z_{th\,j\text{-}hs} = f(t_p)$.*

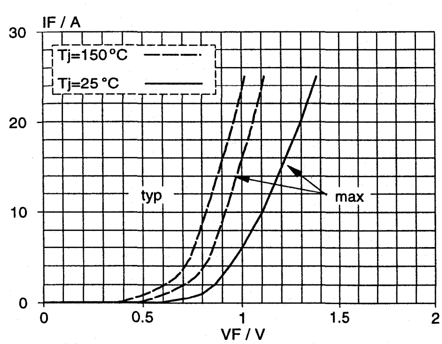



*Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

# Rectifier diodes ultrafast

# BYW29F 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.

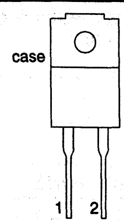
## QUICK REFERENCE DATA

| 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 |

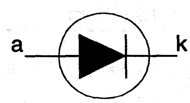
## PINNING - SOD100

| 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 |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}hs}$ | Thermal resistance junction to mounting base | with heatsink compound | - | - | 5.5 | K/W |
| | | without heatsink compound | - | - | 7.2 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | in free air | - | 55 | - | K/W |

## 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 |

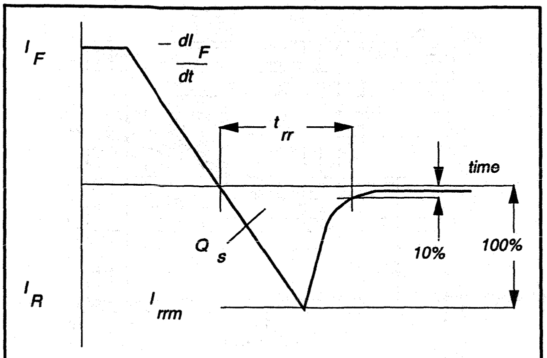



Fig.1. Definition of $t_{rr}$, $Q_s$ and $I_{rrm}$

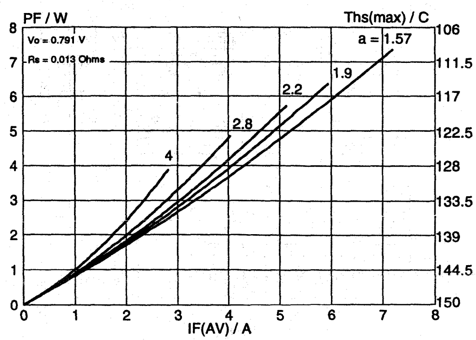



Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)}$ / $I_{F(AV)}$.

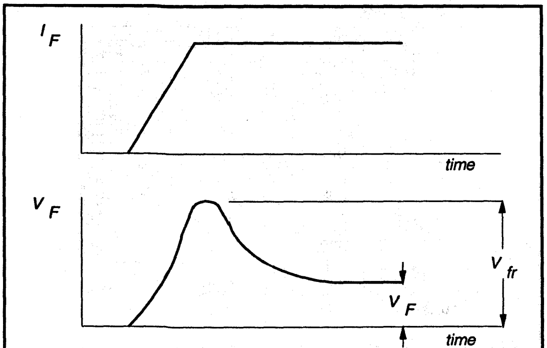



Fig.2. Definition of $V_{fr}$

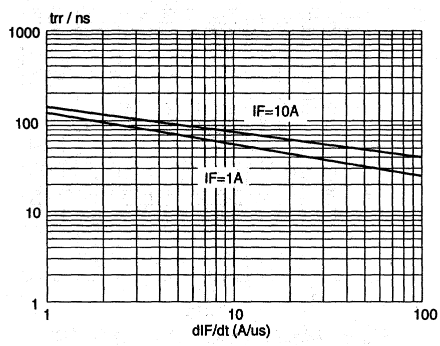



Fig.5. Maximum $t_{rr}$ at $T_j$ = 25 °C.

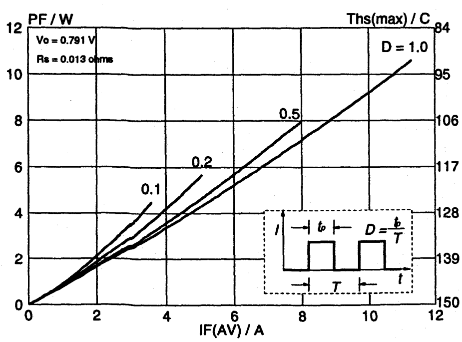



Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

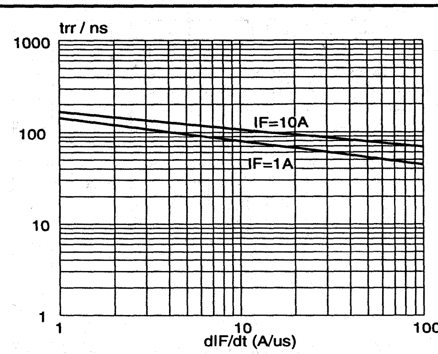



Fig.6. Maximum $t_{rr}$ at $T_j$ = 100 °C.

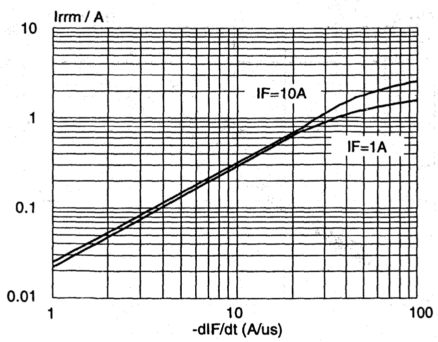



Fig.7. Maximum $I_{rrm}$ at $T_j$ = 25 ˚C.

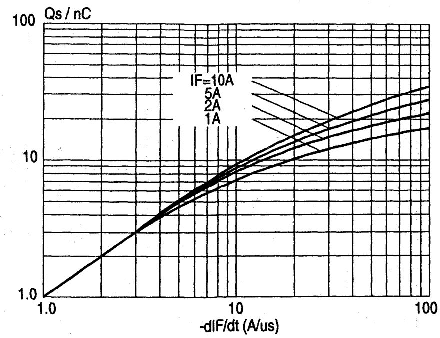



Fig.10. Maximum $Q_s$ at $T_j$ = 25 ˚C.

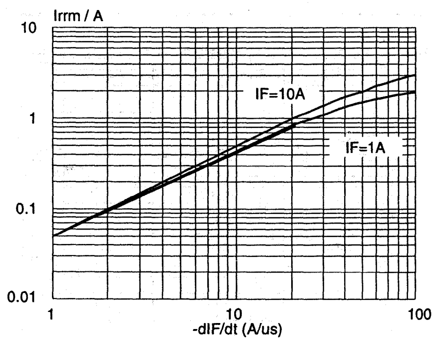



Fig.8. Maximum $I_{rrm}$ at $T_j$ = 100 ˚C.

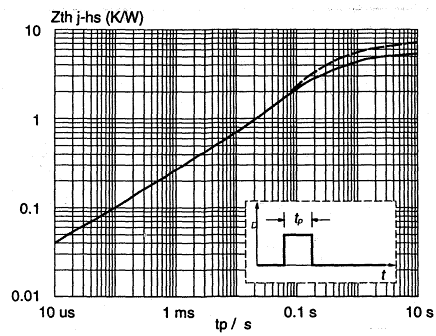



Fig.11. Transient thermal impedance; $Z_{th\,j\text{-}hs} = f(t_p)$.

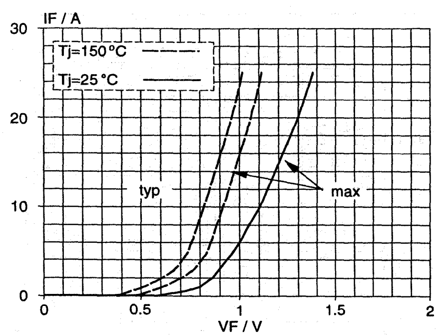



Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

# Rectifier diodes schottky barrier

# PBYR225CT series

## GENERAL DESCRIPTION

Dual nickel silicide schottky barrier 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 with 3 V - 3.3 V outputs, or as or-ing diodes in fault tolerant power supply systems.

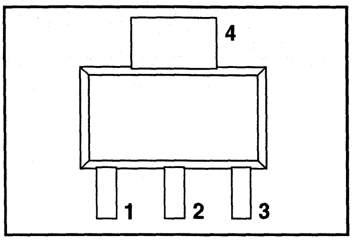
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | UNIT |
|---|---|---|---|---|
| | PBYR2- | 20CT | 25CT | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 20 | 25 | V |
| $V_F$ | Forward voltage | 0.33 | 0.33 | V |
| $I_{O(AV)}$ | Output current (both diodes conducting) | 2 | 2 | A |

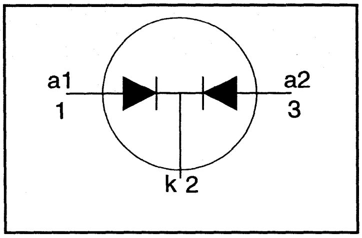
## PINNING - SOT223

| 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 |
|---|---|---|---|---|---|---|
| | | | | -20 | -25 | |
| $V_{RRM}$ | Repetitive peak reverse voltage | | - | 20 | 25 | V |
| $V_{RWM}$ | Crest working reverse voltage | | - | 20 | 25 | V |
| $V_R$ | Continuous reverse voltage | $T_b \leq 97$ ˚C | - | 20 | 25 | V |
| $I_{O(AV)}$ | Output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_b \leq 138$ ˚C | - | 2 | | A |
| $I_{O(RMS)}$ | RMS forward current | | - | 2.8 | | A |
| $I_{FRM}$ | Repetitive forward peak current per diode | t = 25µs; $\delta = 0.5$; $T_b \leq 138$ ˚C | - | 2 | | A |
| $I_{FSM}$ | Non-repetitive peak forward current per diode. | t = 10 ms | - | 6 | | A |
| | | t = 8.3 ms | - | 6.6 | | A |
| | | sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$ | | | | |
| $I^2t$ | $I^2t$ for fusing | t = 10 ms | - | 0.18 | | $A^2s$ |
| $I_{RRM}$ | 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 |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}sp}$ | Thermal resistance junction to solder point | one or both diodes conducting | - | - | 15 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | pcb mounted; minimum footprint | - | 156 | - | K/W |
| | | pcb mounted; pad area as in fig:1 | - | 70 | - | K/W |

## 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; $T_j$ = 125˚C | - | 0.28 | 0.33 | V |
| | | $I_F$ = 2 A | - | 0.42 | 0.51 | V |
| $I_R$ | Reverse current (per diode) | $V_R = V_{RWM}$ | - | 0.5 | 3 | mA |
| | | $V_R = V_{RWM}$; $T_j$ = 100 ˚C | - | 5 | 10 | mA |
| $C_d$ | Junction capacitance (per diode) | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 150 | - | pF |

## PRINTED CIRCUIT BOARD

*Dimensions in mm.*

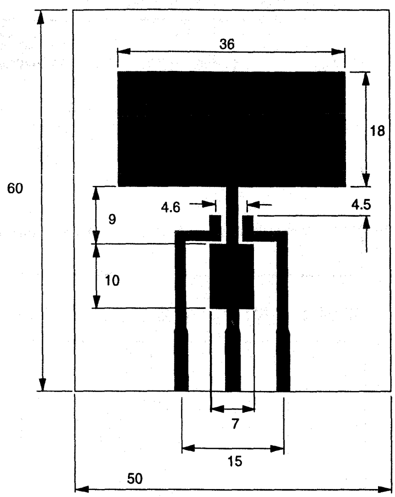



*Fig.1. PCB for thermal resistance and power rating for SOT223.*
*PCB: FR4 epoxy glass (1.6 mm thick), copper laminate (35 $\mu$m thick).*

# 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.

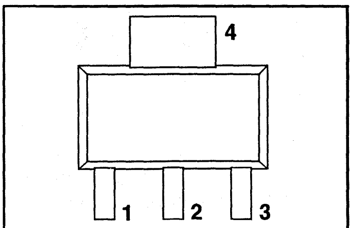
## QUICK REFERENCE DATA

| 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 |

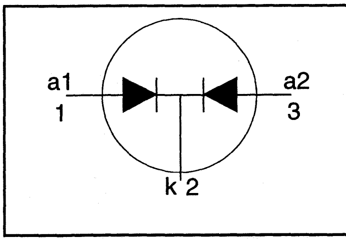
## PINNING - SOT223

| 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 | $T_{sp} \leq 99$ ˚C | - | 35 | 40 | 45 | V |
| $I_{O(AV)}$ | Output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_{sp} \leq 133$ ˚C | - | 2 | | | A |
| $I_{O(RMS)}$ | RMS forward current | | - | 2.8 | | | A |
| $I_{FRM}$ | Repetitive forward peak current per diode | t = 25µs; $\delta = 0.5$; $T_{sp} \leq 133$ ˚C | - | 2 | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current per diode. | t = 10 ms | - | 6 | | | A |
| | | t = 8.3 ms | - | 6.6 | | | A |
| | | sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ for fusing | t = 10 ms | - | 0.18 | | | $A^2s$ |
| $I_{RRM}$ | 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 |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}sp}$ | Thermal resistance junction to solder point | one or both diodes conducting | - | - | 15 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | pcb mounted; minimum footprint | - | 156 | - | K/W |
| | | pcb mounted; pad area as in fig:7 | - | 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 |

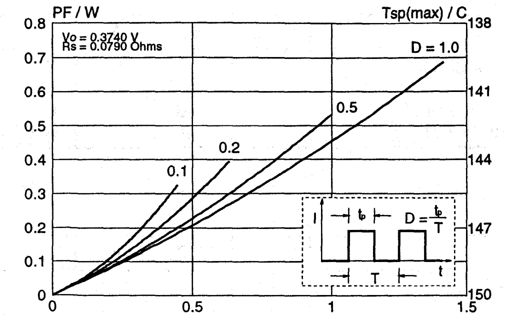



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

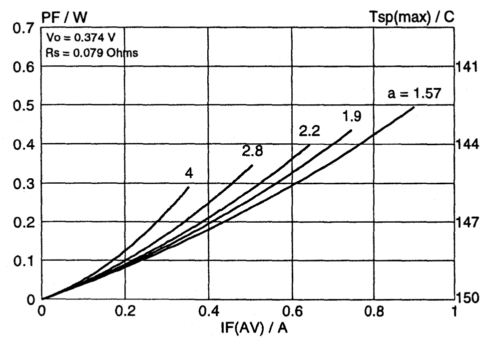



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

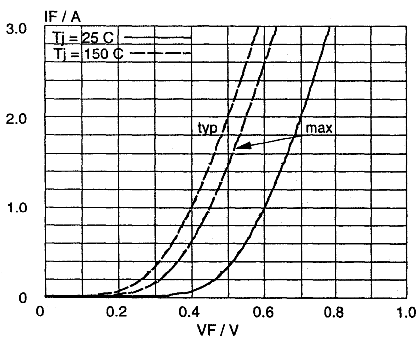



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

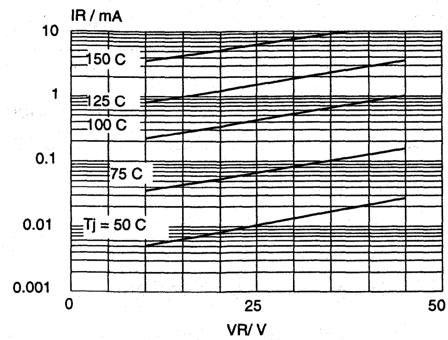



*Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

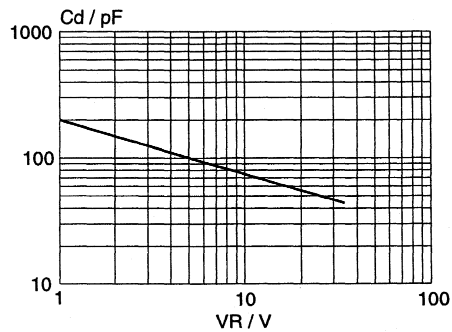



*Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

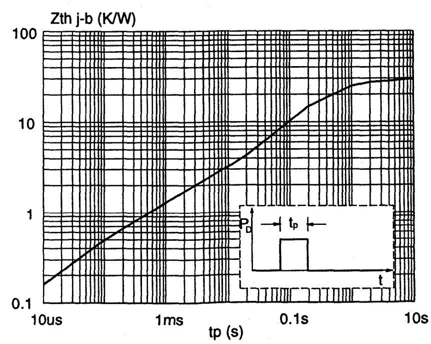



*Fig.6. Transient thermal impedance; per diode; $Z_{th\ j\text{-}b} = f(t_p)$.*

## PRINTED CIRCUIT BOARD

*Dimensions in mm.*

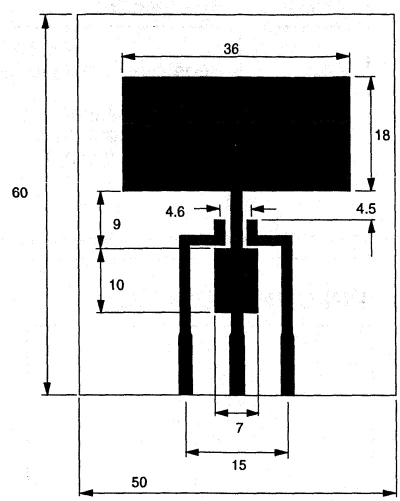



*Fig.7. PCB for thermal resistance and power rating for SOT223.*
*PCB: FR4 epoxy glass (1.6 mm thick), copper laminate (35 µm thick).*

# 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.

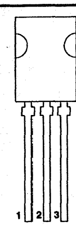
## QUICK REFERENCE DATA

| 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 |

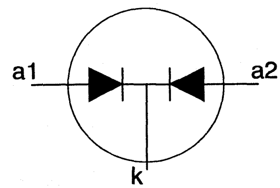
## PINNING - SOT82

| 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 sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$ | - | 88 | | | A |
| $I^2t$ | $I^2t$ 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 |

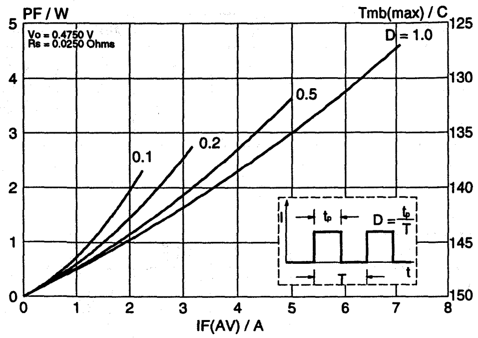



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

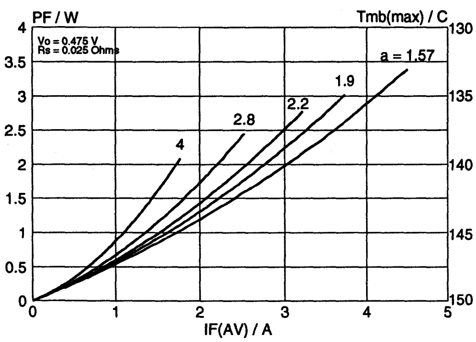



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

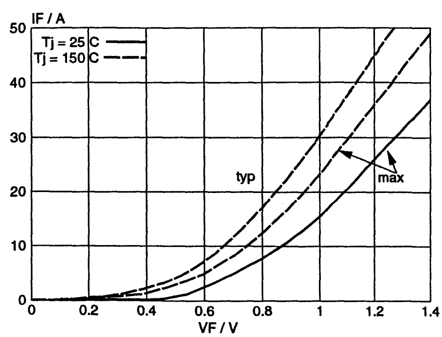



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

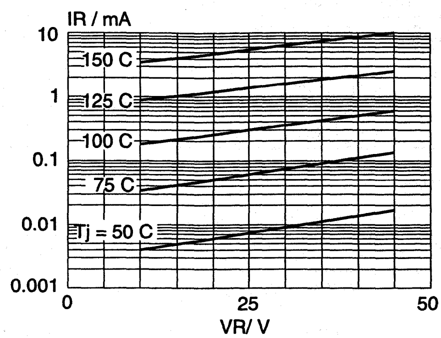



*Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

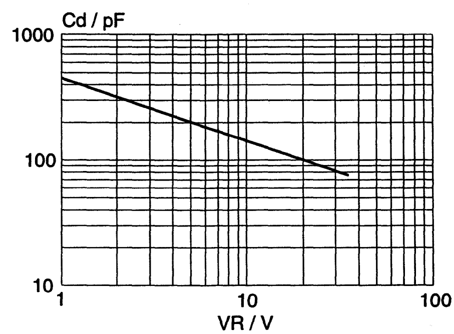



*Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

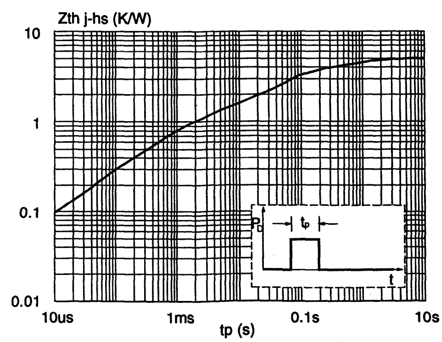



*Fig.6. Transient thermal impedance; per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.*

# 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.

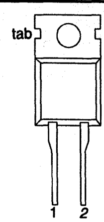
## QUICK REFERENCE DATA

| 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 |

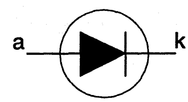
## PINNING - TO220AC

| 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 |

# Rectifier diodes schottky barrier

# PBYR745 series

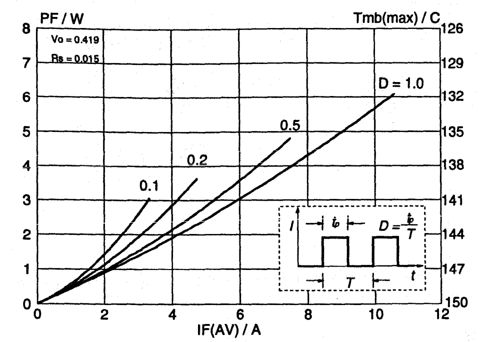



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

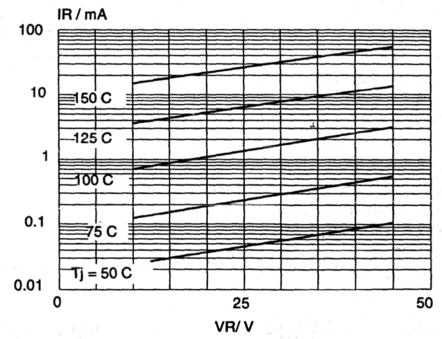



*Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter $T_j$*

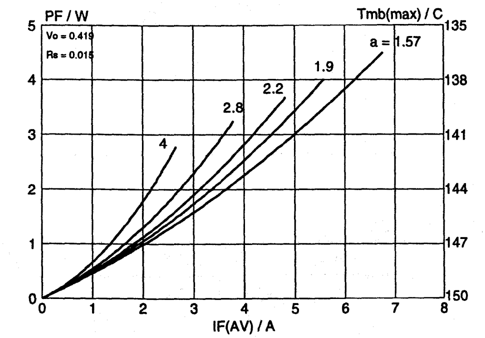



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

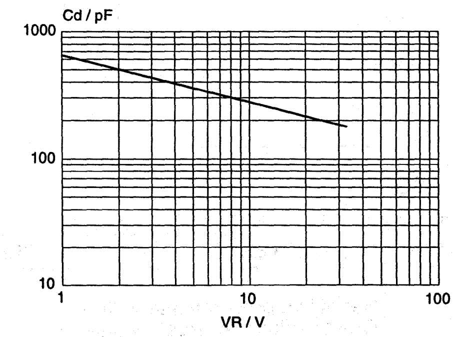



*Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

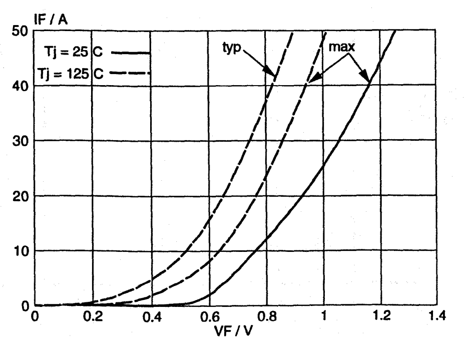



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

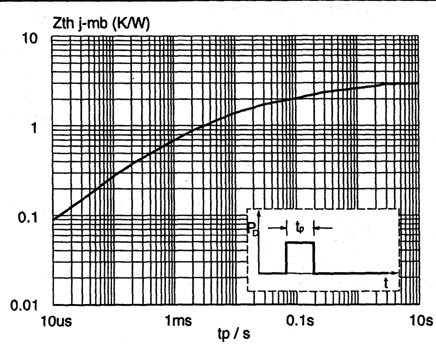



*Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.*

# Rectifier diodes schottky barrier

# PBYR745B series

## GENERAL DESCRIPTION

Low leakage, platinum barrier, schottky rectifier diodes in a plastic envelope suitable for surface mounting, featuring low forward voltage drop, absence of stored charge. and 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.

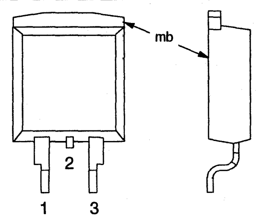
## QUICK REFERENCE DATA

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

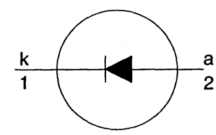
## PINNING - SOT404

| PIN | DESCRIPTION |
|---|---|
| 1 | no connection |
| 2 | cathode |
| 3 | anode |
| mb | cathode |

## 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 | | - | 11 | | | 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 $V_{RRM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ 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 | minimum footprint, FR4 board | - | 50 | - | 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 | $V_R = V_{RRM}$ | - | 50 | 100 | µA |
| | | $V_R = V_{RRM}$; $T_j = 125$ ˚C | - | 12 | 22 | mA |
| $C_d$ | Junction capacitance | f = 1MHz; $V_R = 5$V; $T_j = 25$ ˚C to 125 ˚C | - | 350 | - | pF |

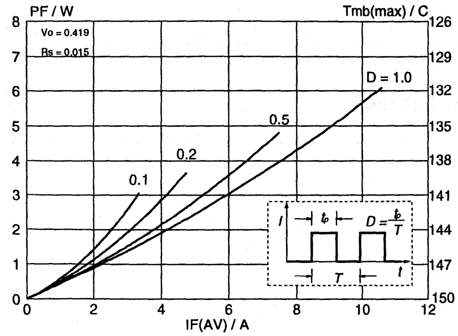



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

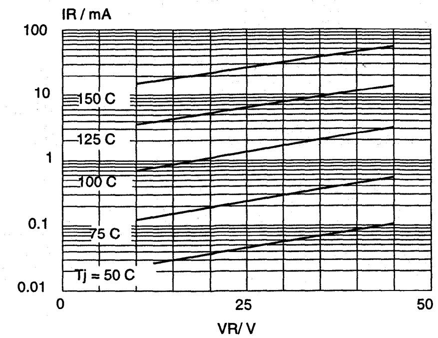



*Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter $T_j$*

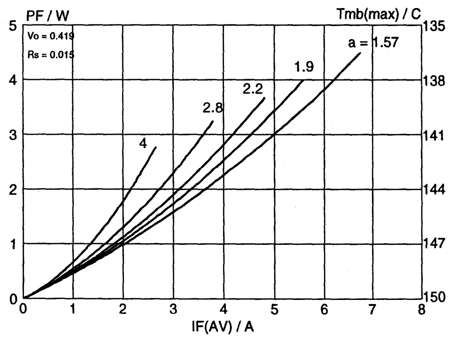



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

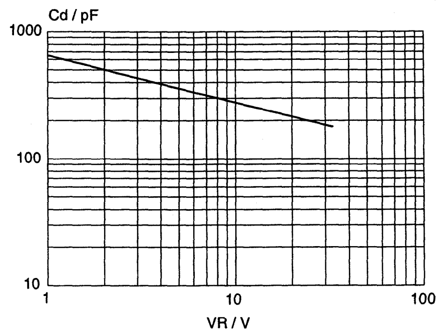



*Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

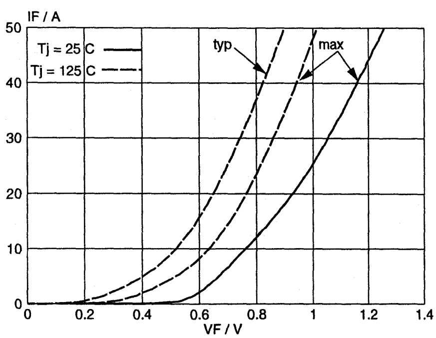



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

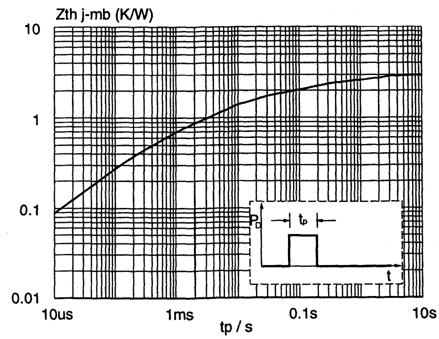



*Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.*

# 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.

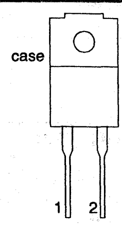
## QUICK REFERENCE DATA

| 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 |

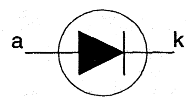
## PINNING - SOD100

| 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 | $t = 25$ µs; $\delta = 0.5$; $T_{hs} \leq 123$ ˚C | - | 15 | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current | t = 10 ms | - | 100 | | | A |
| | | t = 8.3 ms | - | 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 | $I_F$ = 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 |

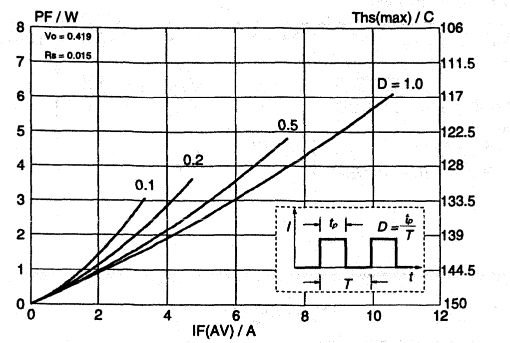



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

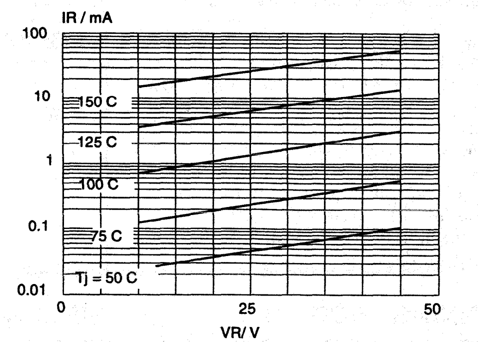



*Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter $T_j$*

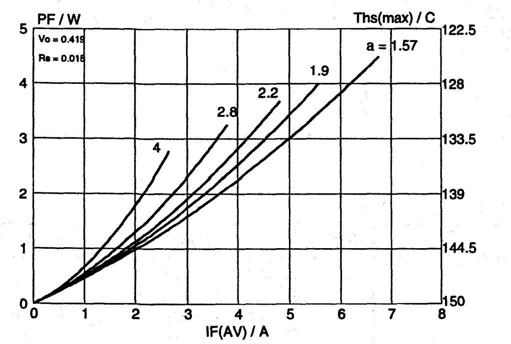



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

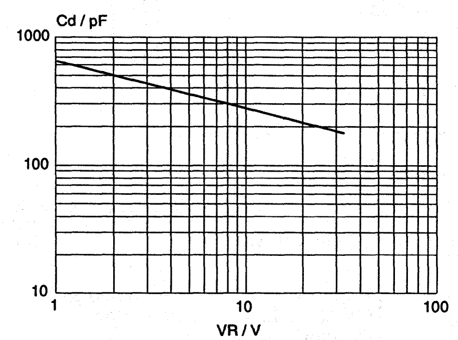



*Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

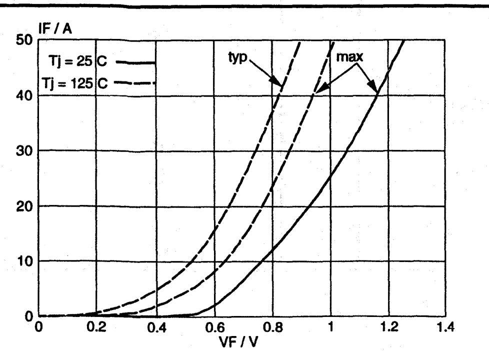



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

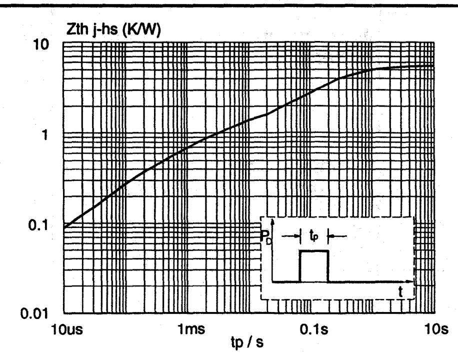



*Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}hs} = f(t_p)$.*

# Rectifier diodes schottky barrier

# PBYR745X series

## GENERAL DESCRIPTION

Low leakage, platinum barrier, schottky rectifier diodes in a full pack plastic envelope featuring low forward voltage drop, absence of stored charge. and 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.

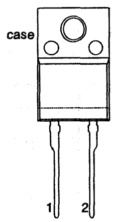
## QUICK REFERENCE DATA

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

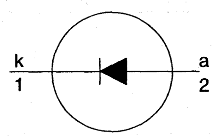
## PINNING - SOD113

| PIN | DESCRIPTION |
|---|---|
| 1 | cathode |
| 2 | anode |
| case | isolated |

## PIN CONFIGURATION




## SYMBOL




## LIMITING VALUES

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | | | UNIT |
|---|---|---|---|---|---|---|---|
| | | | | -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 output current | | - | 10.6 | | | A |
| $I_{FRM}$ | Repetitive peak forward current | $t = 25$ µs; $\delta = 0.5$; $T_{hs} \leq 123$ ˚C | - | 15 | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current | $t = 10$ ms | - | 100 | | | A |
| | | $t = 8.3$ ms | - | 110 | | | A |
| | | sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ 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 LIMITING VALUE & CHARACTERISTIC

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{isol}$ | R.M.S. isolation voltage from all three terminals to external heatsink | f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree | - | | 2500 | V |
| $C_{isol}$ | Capacitance from T2 to external heatsink | f = 1 MHz | - | 10 | - | pF |

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j-hs}$ | Thermal resistance junction to heatsink | with heatsink compound | - | - | 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 | 0.59 | 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 | $V_R = V_{RRM}$ | - | 50 | 100 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 125 ˚C | - | 13 | 22 | mA |
| $C_d$ | Junction capacitance | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 350 | - | pF |

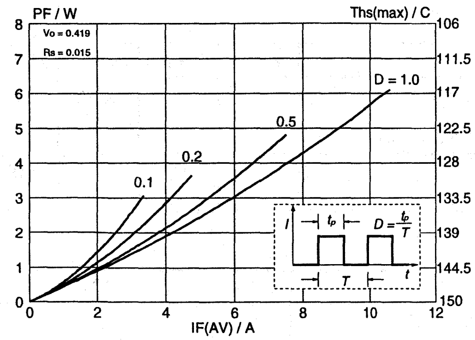



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

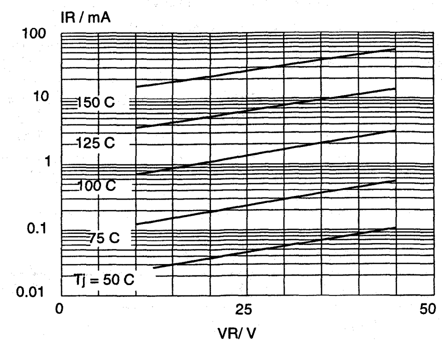



*Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter $T_j$*

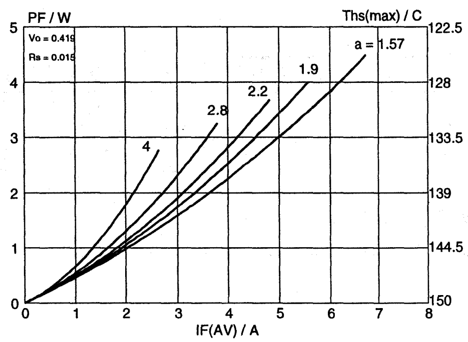



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

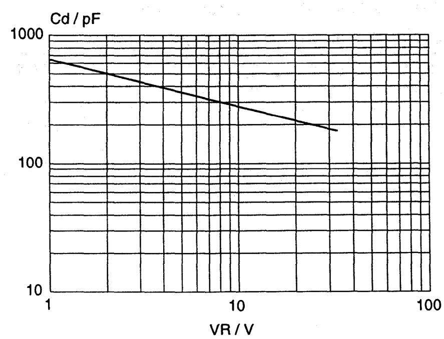



*Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

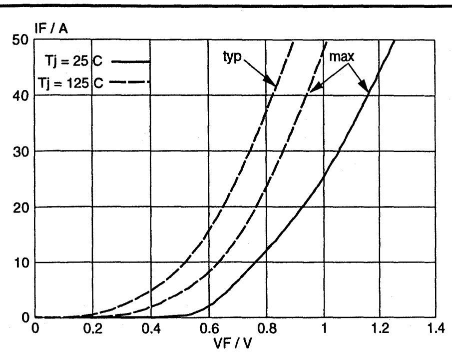



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

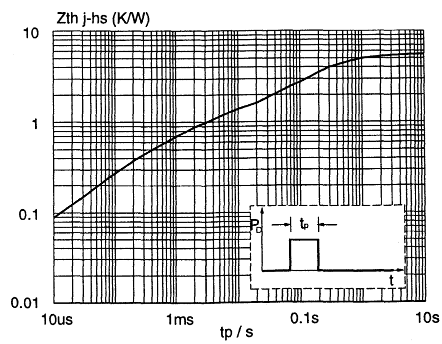



*Fig.6. Transient thermal impedance; $Z_{th\ j\text{-}hs} = f(t_p)$.*

# Rectifier diodes schottky barrier

# PBYR1025 series

## GENERAL DESCRIPTION

Nickel silicide schottky barrier 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 with 3 V - 3.3 V outputs, or as or-ing diodes in fault tolerant power supply systems.

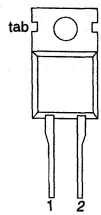
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | UNIT |
|---|---|---|---|---|
| | PBYR10- | **20** | **25** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 20 | 25 | V |
| $V_F$ | Forward voltage | 0.41 | 0.41 | V |
| $I_{F(AV)}$ | Average forward current | 10 | 10 | A |

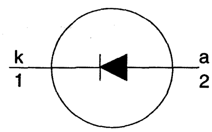
## PINNING - TO220AC

| 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 |
|---|---|---|---|---|---|---|
| | | | | -20 | -25 | |
| $V_{RRM}$ | Repetitive peak reverse voltage | | - | 20 | 25 | V |
| $V_{RWM}$ | Crest working reverse voltage | | - | 20 | 25 | V |
| $V_R$ | Continuous reverse voltage | $T_{mb} \leq 120$ ˚C | - | 20 | 25 | V |
| $I_{F(AV)}$ | Average forward current | square wave; $\delta = 0.5$; $T_{mb} \leq 140$ ˚C | - | 10 | | A |
| $I_{F(RMS)}$ | RMS forward current | | - | 14 | | A |
| $I_{FRM}$ | Repetitive peak forward current | $t = 25$ µs; $\delta = 0.5$; $T_{mb} \leq 140$ ˚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 $V_{RRM(max)}$ | | | | |
| $I^2t$ | $I^2t$ 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 | - | 0.33 | 0.41 | V |
| | | $I_F$ = 20 A; $T_j$ = 125˚C | - | 0.43 | 0.50 | V |
| | | $I_F$ = 20 A | - | 0.51 | 0.60 | V |
| $I_R$ | Reverse current | $V_R = V_{RRM}$ | - | 1.0 | 5.0 | mA |
| | | $V_R = V_{RRM}$; $T_j$ = 100 ˚C | - | 22 | 40 | mA |
| $C_d$ | Junction capacitance | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 700 | - | pF |

# Rectifier diodes schottky barrier

# PBYR1025 series

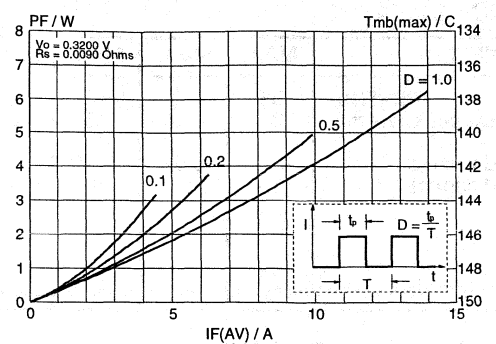



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

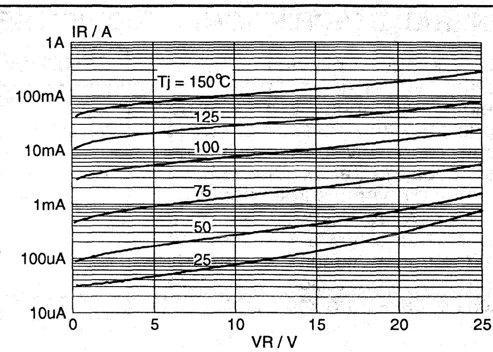



*Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter $T_j$*

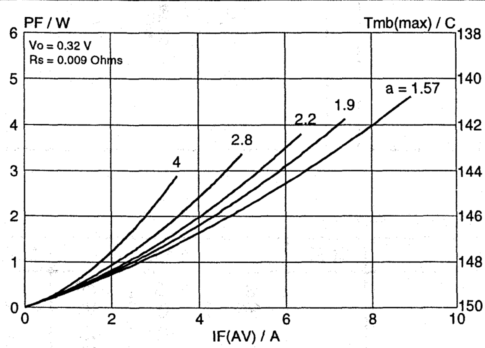



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

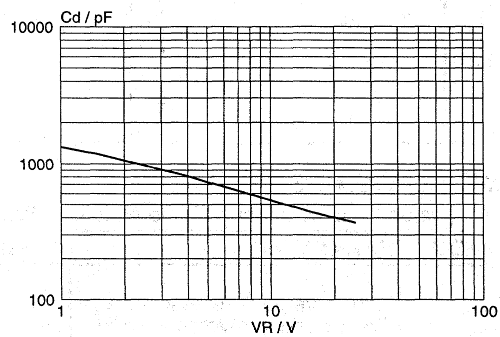



*Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

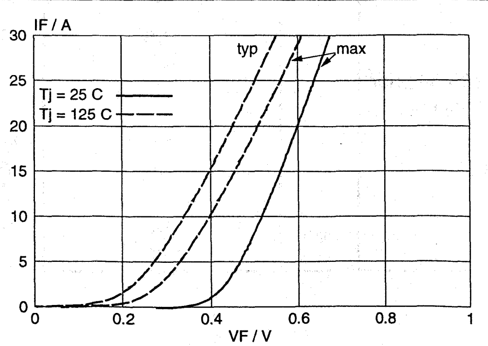



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

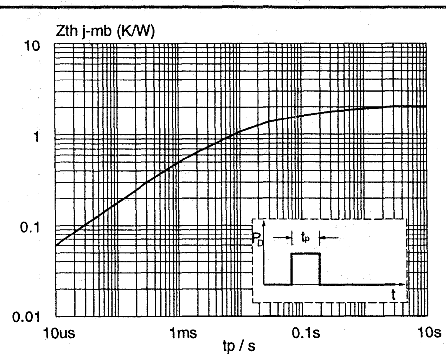



*Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.*

# Rectifier diodes schottky barrier | PBYR1045 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.

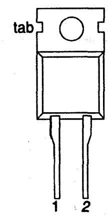
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **PBYR10-** | **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 |

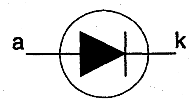
## PINNING - TO220AC

| 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 | $t = 25$ µs; $\delta = 0.5$; $T_{mb} \leq 136$ ˚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 | $t_p = 2$ 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 | - | 0.50 | 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 |

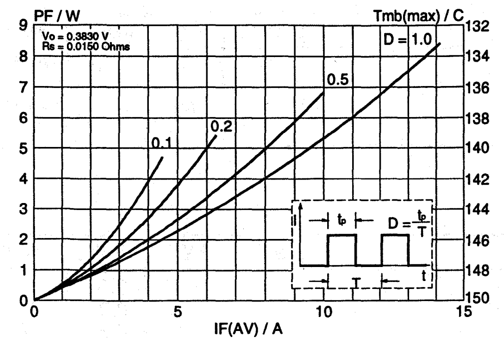



Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

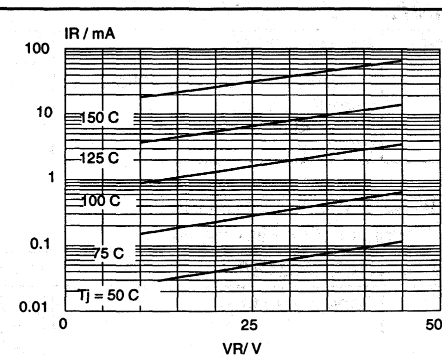



Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter $T_j$

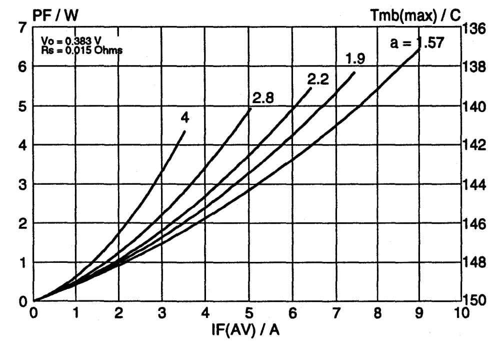



Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

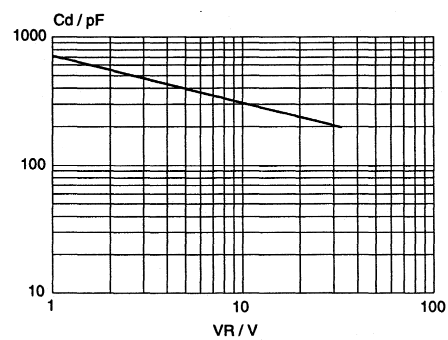



Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.

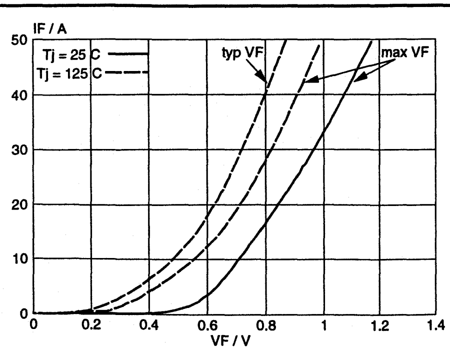



Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

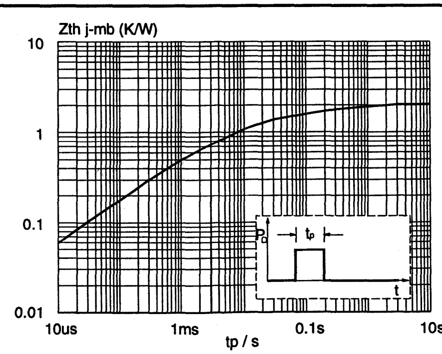



Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

## GENERAL DESCRIPTION

Low leakage, platinum barrier, schottky rectifier diodes in a plastic envelope suitable for surface mounting, featuring low forward voltage drop, absence of stored charge. and 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.

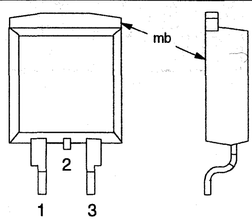
## QUICK REFERENCE DATA

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

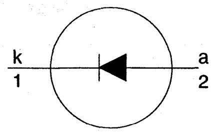
## PINNING - SOT404

| PIN | DESCRIPTION |
|---|---|
| 1 | no connection |
| 2 | cathode |
| 3 | anode |
| mb | cathode |

## 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 | $t = 25$ µs; $\delta = 0.5$; $T_{mb} \leq 136$ ˚C | - | 20 | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current | $t = 10$ ms | - | 135 | | | A |
| | | $t = 8.3$ ms<br>sinusoidal; $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$ | - | 150 | | | A |
| $I^2t$ | $I^2t$ 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 | minimum footprint, FR4 board | - | 50 | - | 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 | $V_R = V_{RRM}$ | - | 50 | 100 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 125 ˚C | - | 13 | 26 | mA |
| $C_d$ | Junction capacitance | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 400 | - | pF |

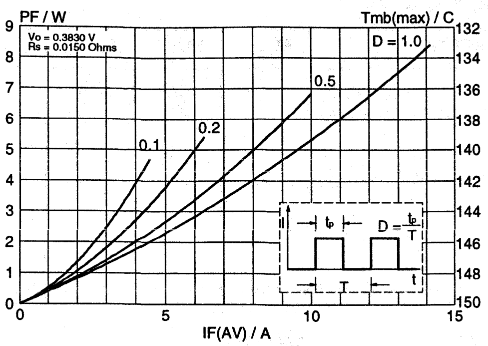



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

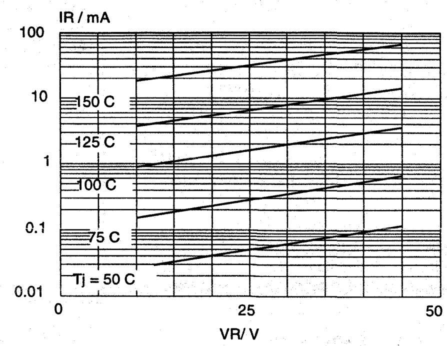



*Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter $T_j$*

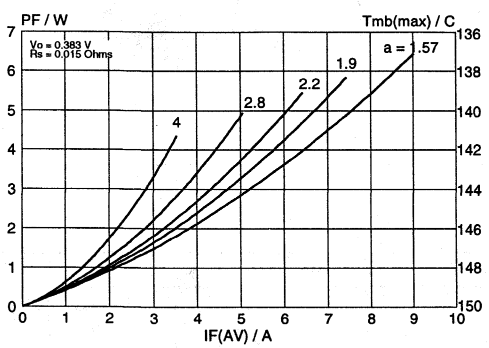



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

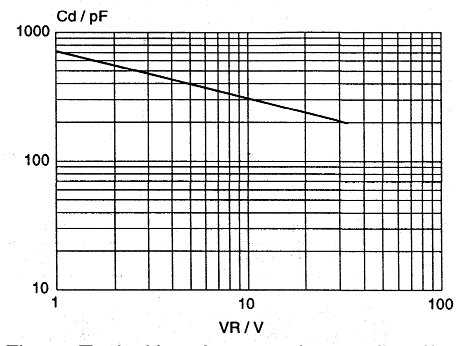



*Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

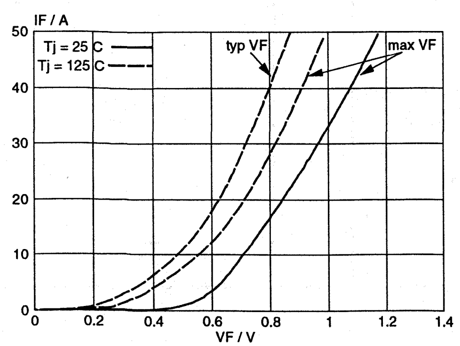



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

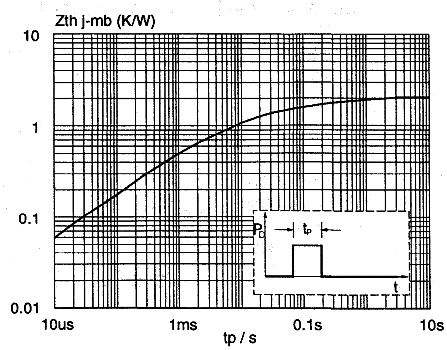



*Fig.6. Transient thermal impedance; $Z_{th\ j\text{-}mb} = f(t_p)$.*

# Rectifier diodes schottky barrier

# PBYR1045F 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.

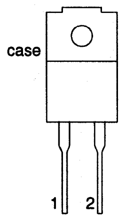
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **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 |

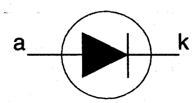
## PINNING - SOD100

| 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 |

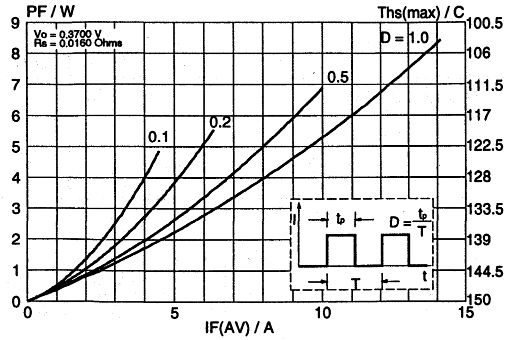



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

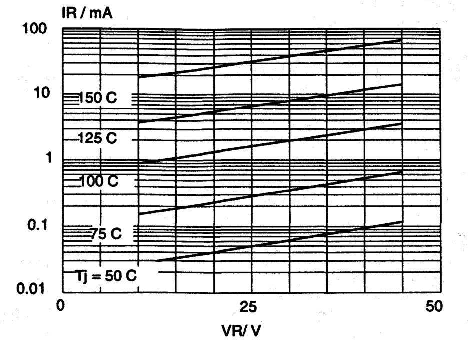



*Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter $T_j$*

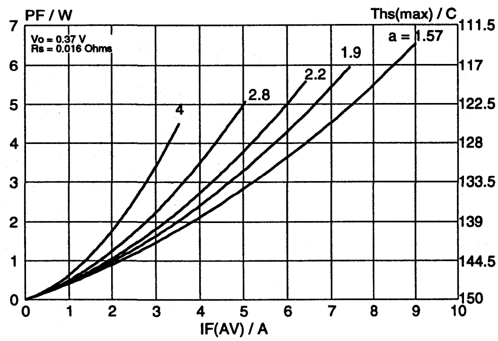



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

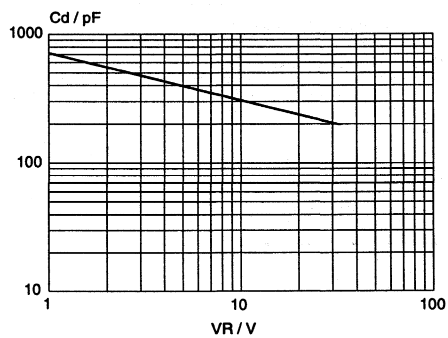



*Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

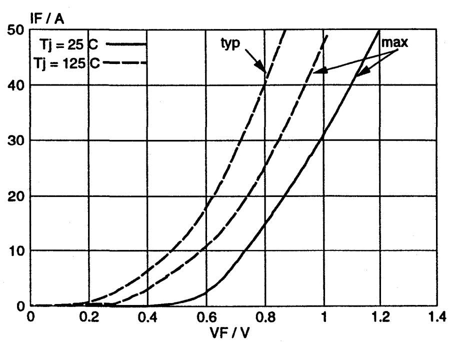



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

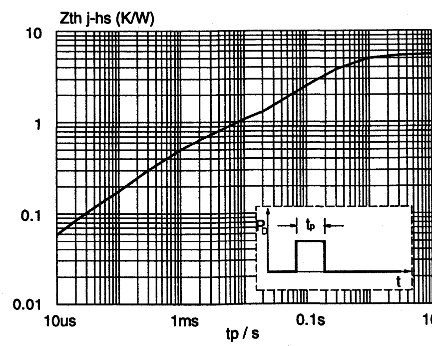



*Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}hs} = f(t_p)$.*

# Rectifier diodes schottky barrier

# PBYR1045X series

## GENERAL DESCRIPTION

Low leakage, platinum barrier, schottky rectifier diodes in a full pack plastic envelope, featuring low forward voltage drop, absence of stored charge. and 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.

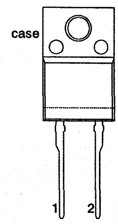
## QUICK REFERENCE DATA

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

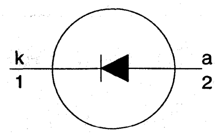
## PINNING - SOD113

| PIN | DESCRIPTION |
|---|---|
| 1 | cathode |
| 2 | anode |
| case | isolated |

## PIN CONFIGURATION




## SYMBOL




## LIMITING VALUES

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | | | UNIT |
|---|---|---|---|---|---|---|---|
| | | | | -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 output 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 $V_{RRM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ 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 LIMITING VALUE & CHARACTERISTIC

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{isol}$ | R.M.S. isolation voltage from all three terminals to external heatsink | f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree | - | | 2500 | V |
| $C_{isol}$ | Capacitance from T2 to external heatsink | f = 1 MHz | - | 10 | - | pF |

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}hs}$ | Thermal resistance junction to heatsink | with heatsink compound | - | - | 5.5 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | in free air. | - | 55 | - | K/W |

## 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 | $V_R = V_{RRM}$ | - | 50 | 100 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 125 ˚C | - | 13 | 26 | mA |
| $C_d$ | Junction capacitance | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 400 | - | pF |

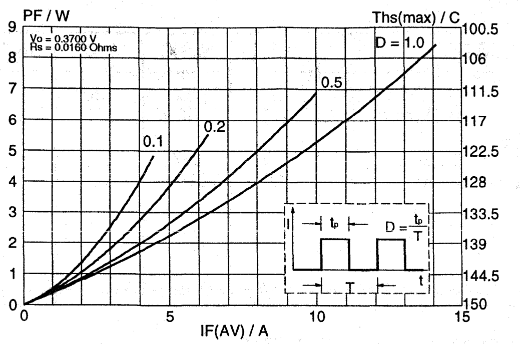



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

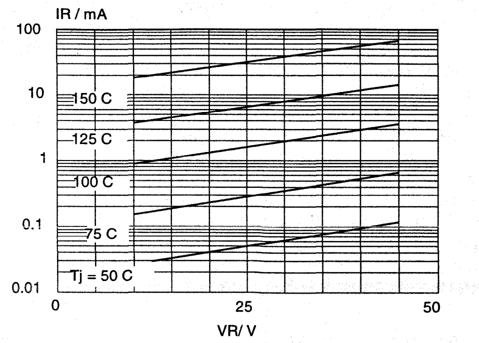



*Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter $T_j$*

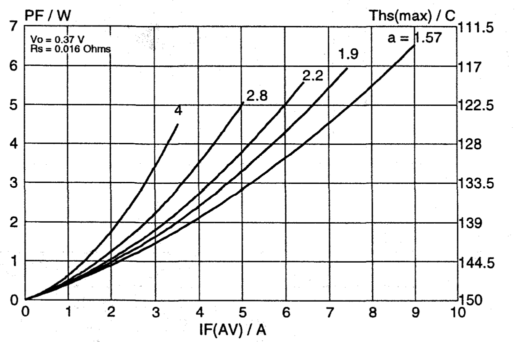



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

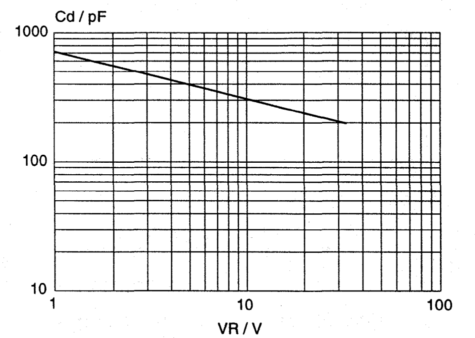



*Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

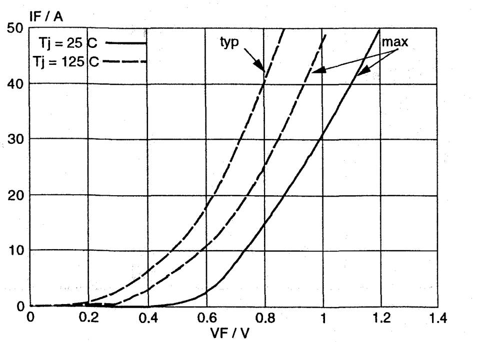



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

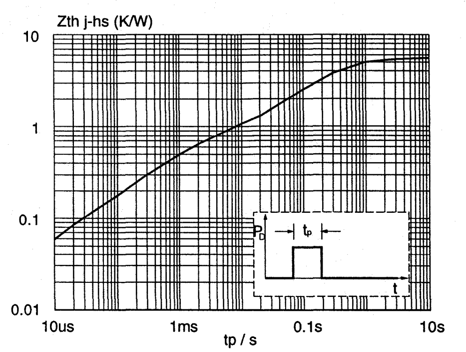



*Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}hs} = f(t_p)$.*

## 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.

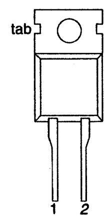
## QUICK REFERENCE DATA

| 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 |

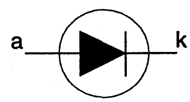
## PINNING - TO220AC

| 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 |

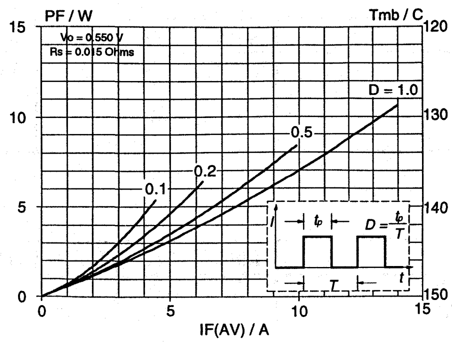



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

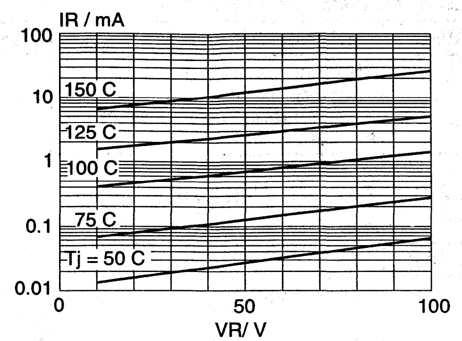



*Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter $T_j$*

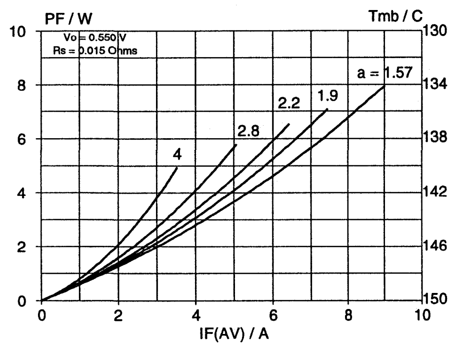



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

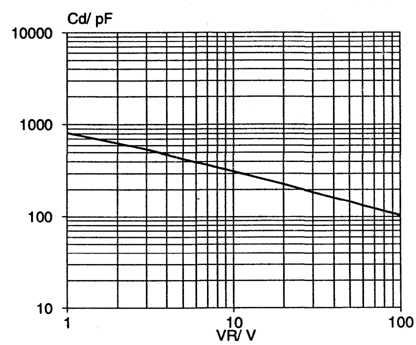



*Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

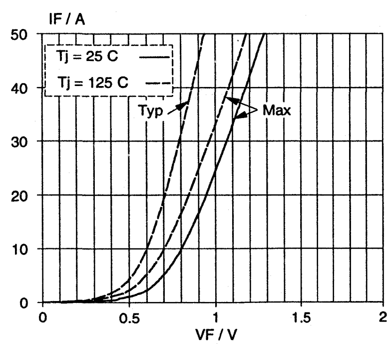



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

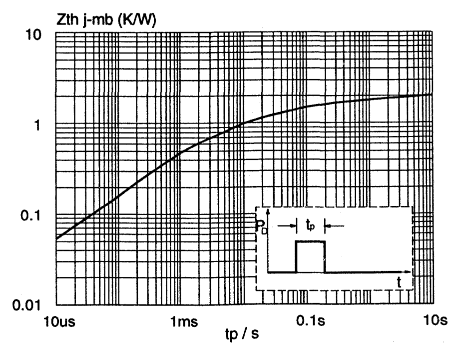



*Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.*

# Rectifier diodes schottky barrier

# PBYR10100B series

## GENERAL DESCRIPTION

Low leakage, platinum barrier, schottky rectifier diodes in a plastic envelope suitable for surface mounting, featuring low forward voltage drop, absence of stored charge. and 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.

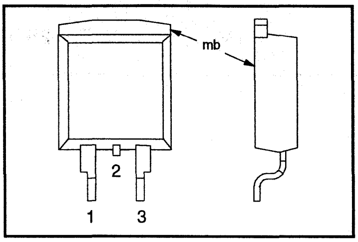
## QUICK REFERENCE DATA

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

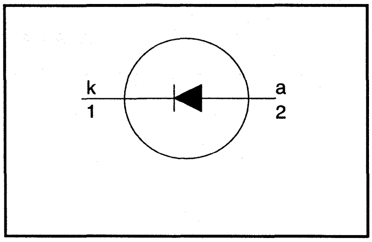
## PINNING - SOT404

| PIN | DESCRIPTION |
|---|---|
| 1 | no connection |
| 2 | cathode |
| 3 | anode |
| mb | cathode |

## 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 |
| $I_{F(RMS)}$ | RMS forward current | | - | 14 | | | 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 $V_{RRM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ 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 | pcb mounted, minimum footprint | - | 50 | - | 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 | $V_R$ = $V_{RRM}$; $T_j$ = 25 ˚C | - | 5.0 | 150 | µA |
| | | $V_R$ = $V_{RRM}$; $T_j$ = 125 ˚C | - | 5.0 | 15 | mA |
| $C_d$ | Junction capacitance | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 420 | - | pF |

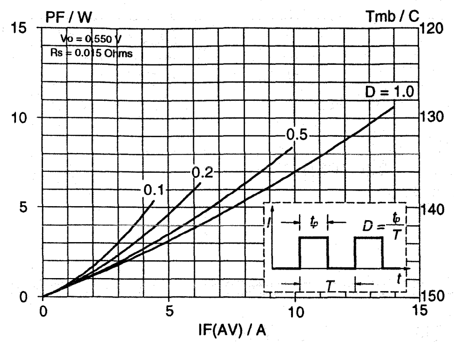



Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

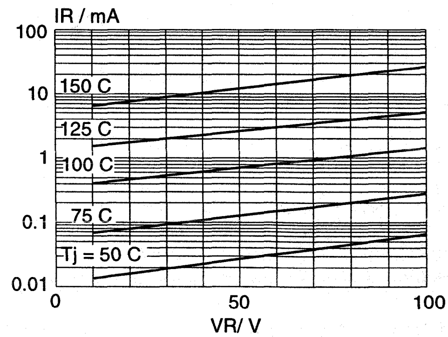



Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter $T_j$

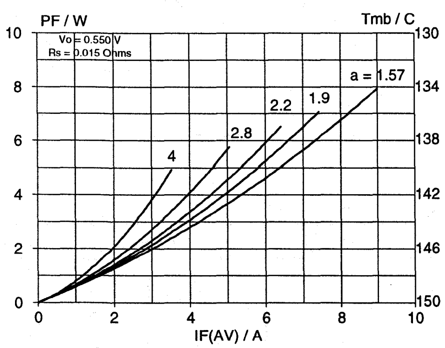



Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

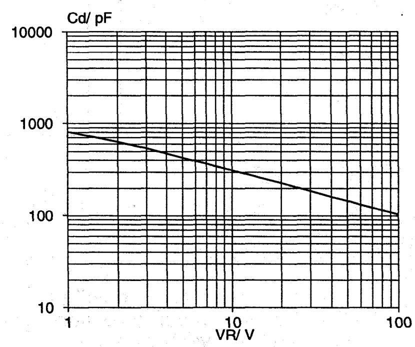



Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.

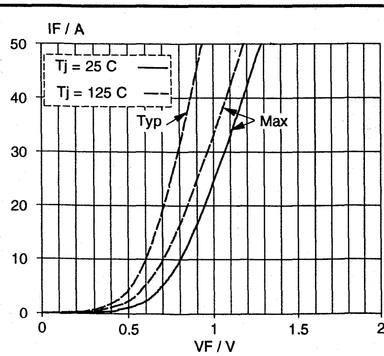



Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

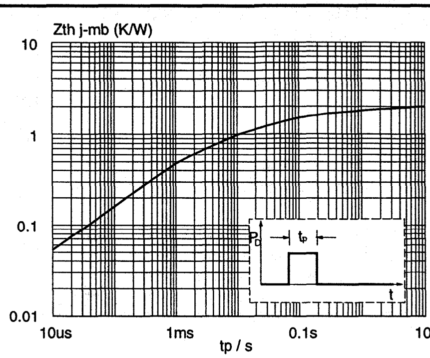



Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.

## GENERAL DESCRIPTION

Dual nickel silicide schottky barrier 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 with 3 V - 3.3 V outputs, or as or-ing diodes in fault tolerant power supply systems.

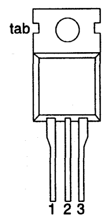
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | UNIT |
|---|---|---|---|---|
| | PBYR15- | 20CT | 25CT | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 20 | 25 | V |
| $V_F$ | Forward voltage | 0.41 | 0.41 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | 15 | 15 | A |

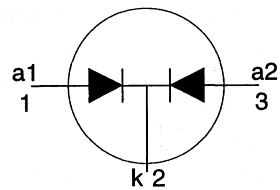
## PINNING - TO220AB

| 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 |
|---|---|---|---|---|---|---|
| | | | | -20 | -25 | |
| $V_{RRM}$ | Repetitive peak reverse voltage | | - | 20 | 25 | V |
| $V_{RWM}$ | Crest working reverse voltage | | - | 20 | 25 | V |
| $V_R$ | Continuous reverse voltage | $T_{mb} \leq 120$ ˚C | - | 20 | 25 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_{mb} \leq 135$ ˚C | - | 15 | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | 21 | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 135$ ˚C | - | 15 | | 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 $V_{RRM(max)}$ | | | | |
| $I^2t$ | $I^2t$ 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 | - | - | 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 | - | 0.32 | 0.41 | V |
| | | $I_F$ = 15 A; $T_j$ = 125˚C | - | 0.42 | 0.50 | V |
| | | $I_F$ = 15 A | - | 0.49 | 0.60 | V |
| $I_R$ | Reverse current (per diode) | $V_R = V_{RRM}$ | - | 1.0 | 5.0 | mA |
| | | $V_R = V_{RRM}$; $T_j$ = 100 ˚C | - | 20 | 30 | mA |
| $C_d$ | Junction capacitance (per diode) | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 600 | - | pF |

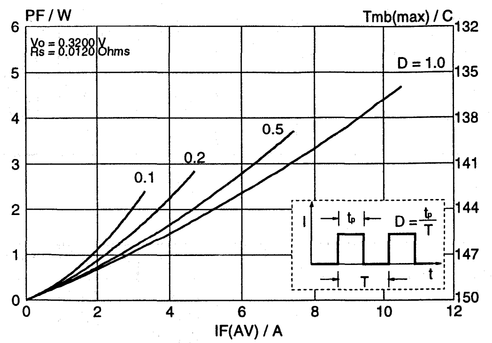



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

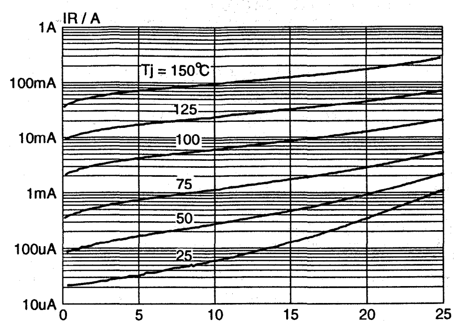



*Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

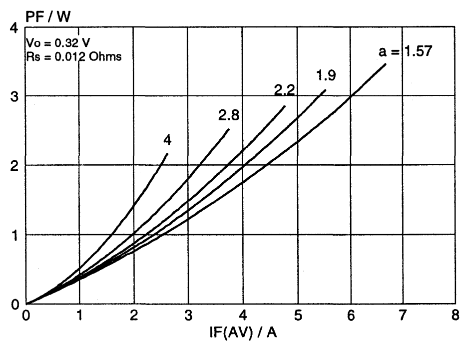



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

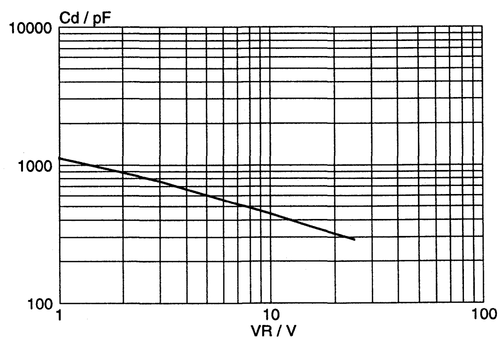



*Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

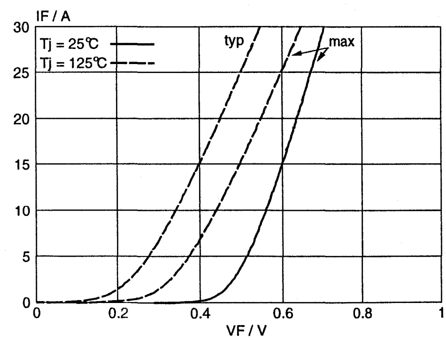



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

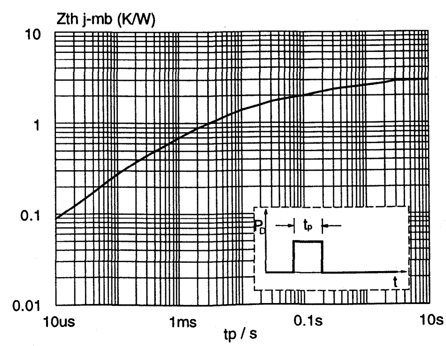



*Fig.6. Transient thermal impedance per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.*

# Rectifier diodes schottky barrier

# 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.

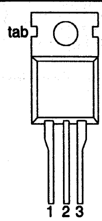
## QUICK REFERENCE DATA

| 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 |

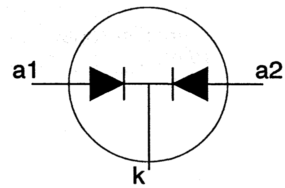
## PINNING - TO220AB

| 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).

<table>
<tr><th>SYMBOL</th><th>PARAMETER</th><th>CONDITIONS</th><th>MIN.</th><th colspan="3">MAX.</th><th>UNIT</th></tr>
<tr><td></td><td></td><td></td><td></td><td>-35</td><td>-40</td><td>-45</td><td></td></tr>
<tr><td>$V_{RRM}$</td><td>Repetitive peak reverse voltage</td><td></td><td>-</td><td>35</td><td>40</td><td>45</td><td>V</td></tr>
<tr><td>$V_{RWM}$</td><td>Crest working reverse voltage</td><td></td><td>-</td><td>35</td><td>40</td><td>45</td><td>V</td></tr>
<tr><td>$V_R$</td><td>Continuous reverse voltage</td><td>$T_{mb} \leq 134$ ˚C</td><td>-</td><td>35</td><td>40</td><td>45</td><td>V</td></tr>
<tr><td>$I_{O(AV)}$</td><td>Output current (both diodes conducting)</td><td>square wave; $\delta = 0.5$; $T_{mb} \leq 131$ ˚C</td><td>-</td><td colspan="3">15</td><td>A</td></tr>
<tr><td>$I_{O(RMS)}$</td><td>RMS forward current</td><td></td><td>-</td><td colspan="3">21</td><td>A</td></tr>
<tr><td>$I_{FRM}$</td><td>Repetitive peak forward current per diode</td><td>t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 131$ ˚C</td><td>-</td><td colspan="3">15</td><td>A</td></tr>
<tr><td>$I_{FSM}$</td><td>Non-repetitive peak forward current per diode</td><td>t = 10 ms</td><td>-</td><td colspan="3">135</td><td>A</td></tr>
<tr><td></td><td></td><td>t = 8.3 ms<br>sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RWM(max)}$</td><td>-</td><td colspan="3">150</td><td>A</td></tr>
<tr><td>$I^2t$</td><td>$I^2t$ for fusing</td><td>t = 10 ms</td><td>-</td><td colspan="3">91</td><td>$A^2s$</td></tr>
<tr><td>$I_{RRM}$</td><td>Repetitive peak reverse current per diode.</td><td>$t_p = 2$ µs; $\delta = 0.001$</td><td>-</td><td colspan="3">1</td><td>A</td></tr>
<tr><td>$I_{RSM}$</td><td>Non-repetitive peak reverse current per diode.</td><td>$t_p = 100$ µs</td><td>-</td><td colspan="3">1</td><td>A</td></tr>
<tr><td>$T_{stg}$</td><td>Storage temperature</td><td></td><td>-65</td><td colspan="3">175</td><td>˚C</td></tr>
<tr><td>$T_j$</td><td>Operating junction temperature</td><td></td><td>-</td><td colspan="3">150</td><td>˚C</td></tr>
</table>

## 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 |

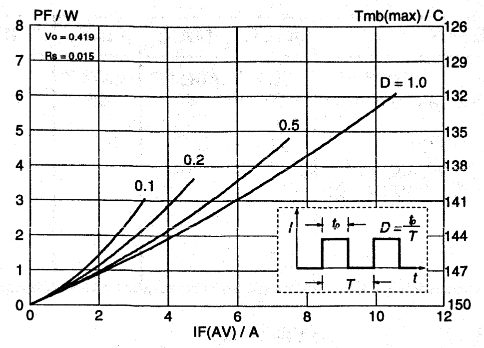



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

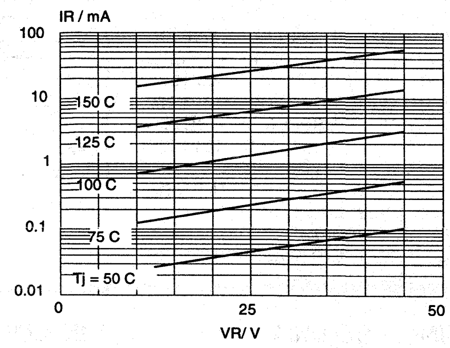



*Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

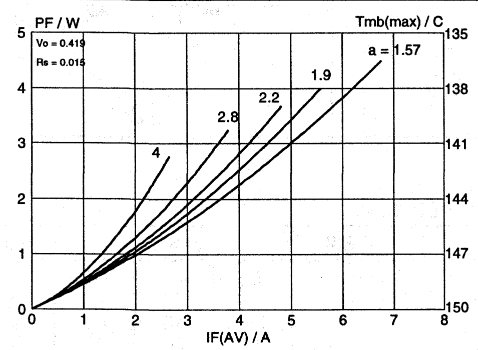



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

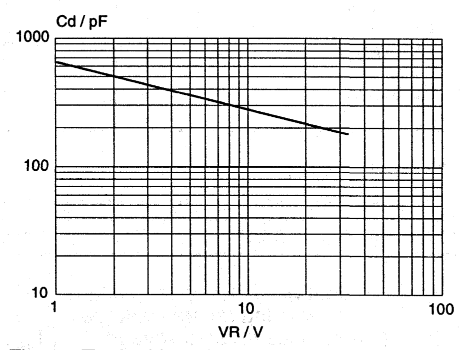



*Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

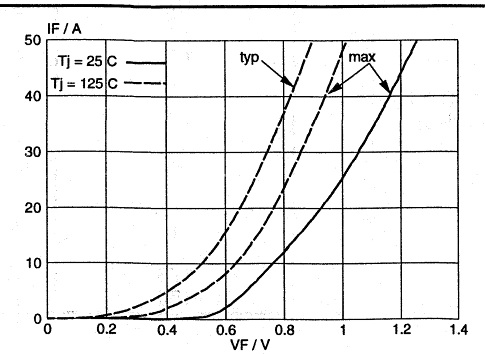



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

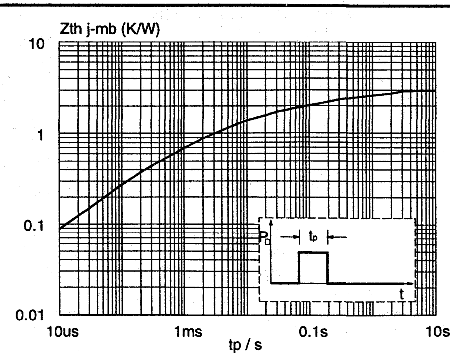



*Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.*

# Rectifier diodes schottky barrier

# PBYR1545CTB series

## GENERAL DESCRIPTION

Dual low leakage, platinum barrier, schottky rectifier diodes in a plastic envelope suitable for surface mounting, featuring low forward voltage drop, absence of stored charge. and 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.

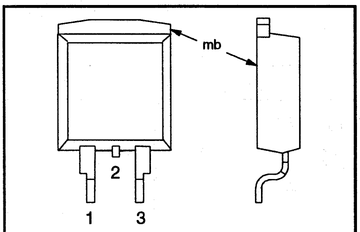
## QUICK REFERENCE DATA

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

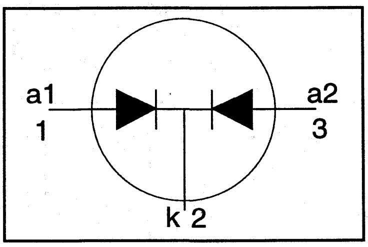
## PINNING - SOT404

| PIN | DESCRIPTION |
|---|---|
| 1 | anode 1 |
| 2 | cathode |
| 3 | anode 2 |
| mb | cathode |

## 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 |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_{mb} \leq 131$ ˚C | - | 15 | | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | 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 | - | 150 | | | A |
| | | sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ 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 | - | - | 3.0 | K/W |
| | | both diodes | - | - | 2.0 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | minimum footprint, FR4 board | - | 50 | - | 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) | $V_R = V_{RRM}$ | - | 50 | 100 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 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 |

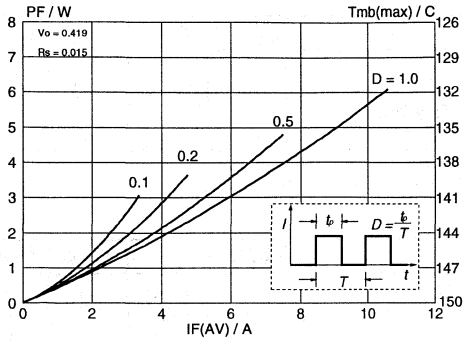



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

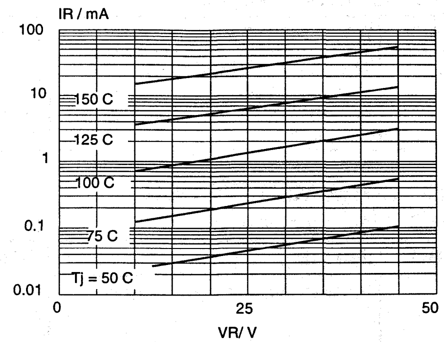



*Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

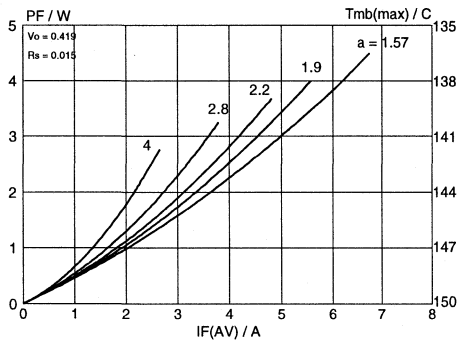



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

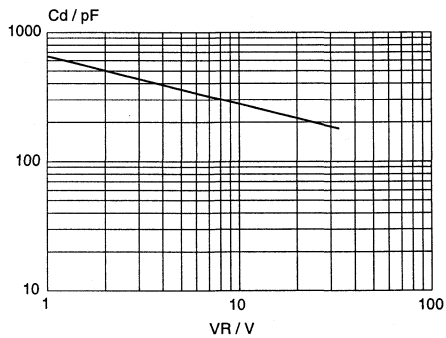



*Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

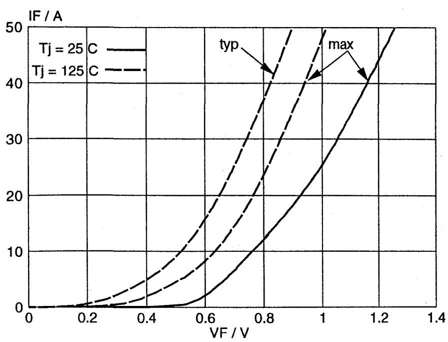



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

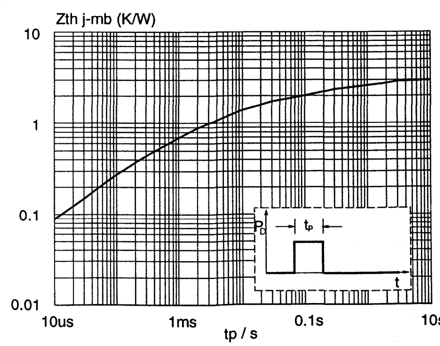



*Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.*

# Rectifier diodes schottky barrier

# PBYR1545CTF series

## GENERAL DESCRIPTION

Dual low leakage, platinum barrier, schottky rectifier diodes in a full pack plastic envelope, featuring low forward voltage drop, absence of stored charge. and 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.

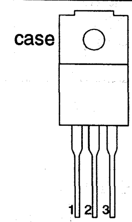
## QUICK REFERENCE DATA

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

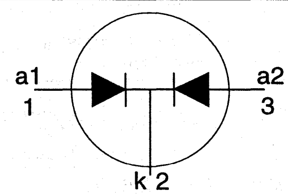
## PINNING - SOT186

| 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 |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_{hs} \leq 100$ ˚C | - | 15 | | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | 20 | | | 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 $V_{RRM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ 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 LIMITING VALUE & CHARACTERISTIC

$T_{hs}$ = 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<br>both diodes<br>(with heatsink compound) | -<br>- | -<br>- | 6.1<br>5.2 | K/W<br>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<br>$I_F$ = 15 A; $T_j$ = 125˚C<br>$I_F$ = 15 A | -<br>-<br>- | 0.50<br>0.62<br>0.74 | 0.57<br>0.72<br>0.84 | V<br>V<br>V |
| $I_R$ | Reverse current (per diode) | $V_R = V_{RRM}$<br>$V_R = V_{RRM}$; $T_j$ = 125 ˚C | -<br>- | 50<br>12 | 100<br>22 | µA<br>mA |
| $C_d$ | Junction capacitance (per diode) | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 350 | - | pF |

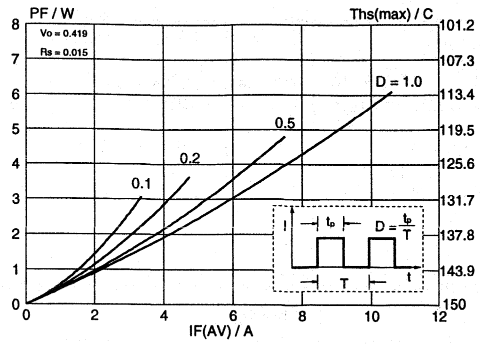



*Fig.1.* Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

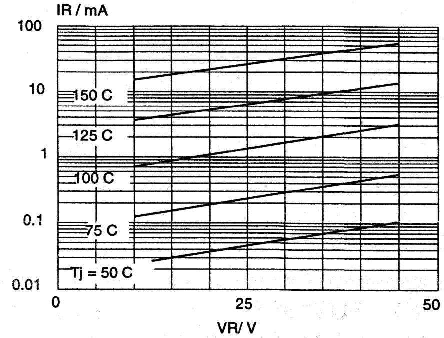



*Fig.4.* Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$

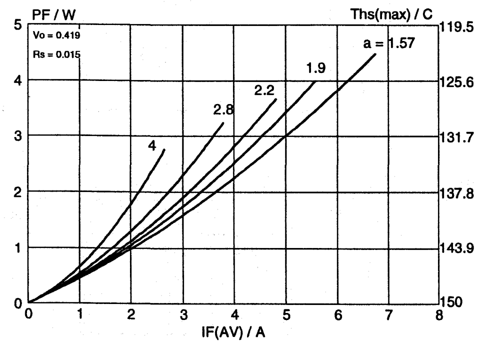



*Fig.2.* Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

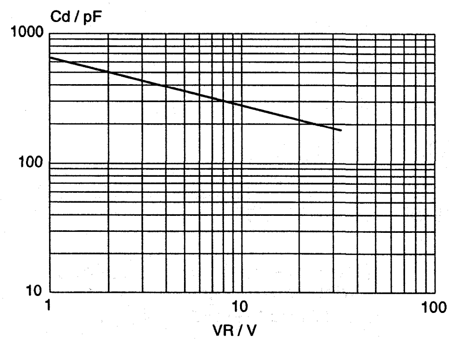



*Fig.5.* Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.

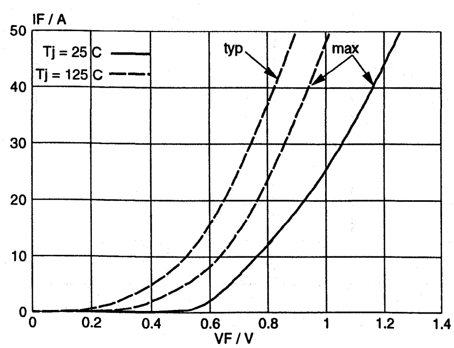



*Fig.3.* Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

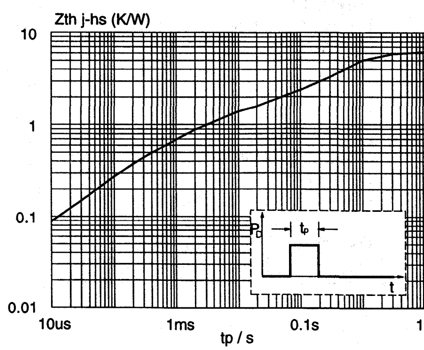



*Fig.6.* Transient thermal impedance per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.

## GENERAL DESCRIPTION

Dual low leakage, platinum barrier, schottky rectifier diodes in a full pack plastic envelope, featuring low forward voltage drop, absence of stored charge. and 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.

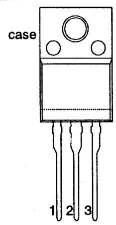
## QUICK REFERENCE DATA

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

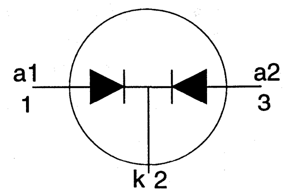
## PINNING - SOT186A

| PIN | DESCRIPTION |
|---|---|
| 1 | anode 1 (a) |
| 2 | cathode (k) |
| 3 | anode 2 (a) |
| 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 | $T_{hs} \leq 117$ ˚C | - | 35 | 40 | 45 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_{hs} \leq 100$ ˚C | - | 15 | | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | 20 | | | 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 $V_{RRM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ 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 LIMITING VALUE & CHARACTERISTIC

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{isol}$ | R.M.S. isolation voltage from all three terminals to external heatsink | f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree | - | | 2500 | V |
| $C_{isol}$ | Capacitance from T2 to external heatsink | f = 1 MHz | - | 10 | - | pF |

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}hs}$ | Thermal resistance junction to heatsink | per diode | - | - | 6.1 | K/W |
| | | both diodes (with heatsink compound) | - | - | 5.2 | 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 (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) | $V_R = V_{RRM}$ | - | 50 | 100 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 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 |

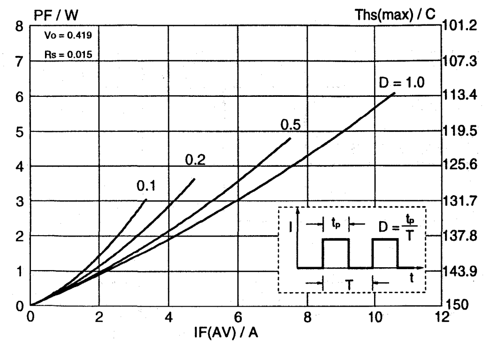



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

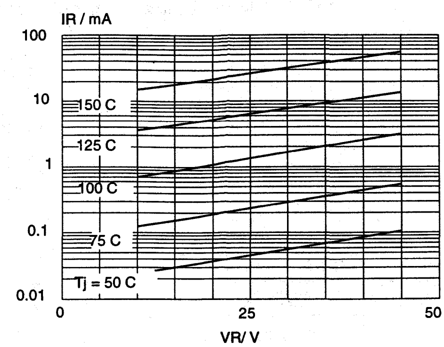



*Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

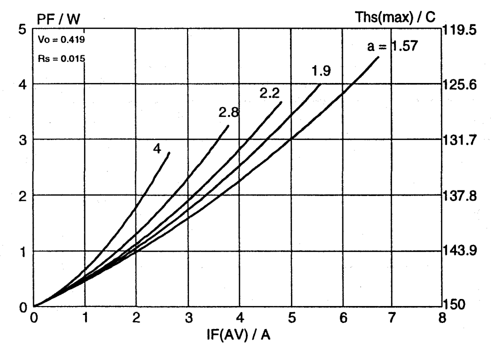



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

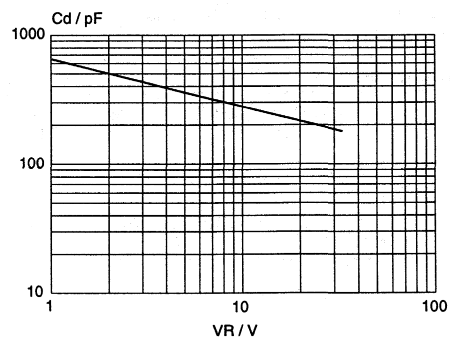



*Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

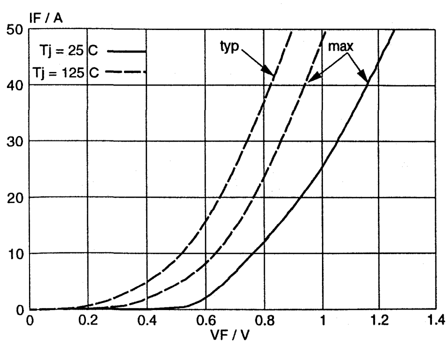



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

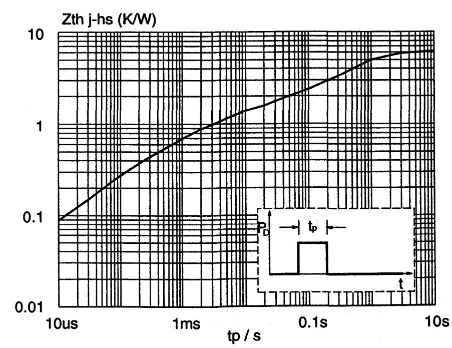



*Fig.6. Transient thermal impedance per diode; $Z_{th\ j\text{-}hs} = f(t_p)$.*

# 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.

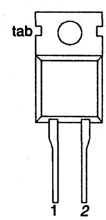
## QUICK REFERENCE DATA

| 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 |

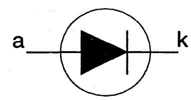
## PINNING - TO220AC

| 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. -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 | $T_{mb} \leq 141$ ˚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 | $t = 25\ \mu s$; $\delta = 0.5$; $T_{mb} \leq 134$ ˚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 | $t_p = 2\ \mu s$; $\delta = 0.001$ | - | 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 |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}mb}$ | 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 |

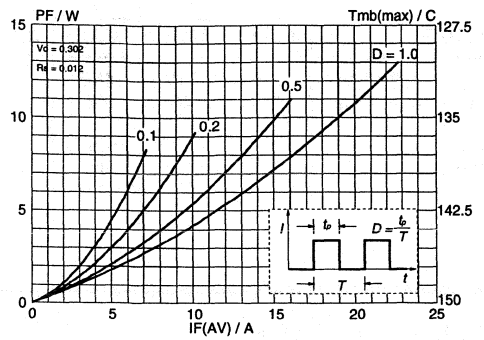



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

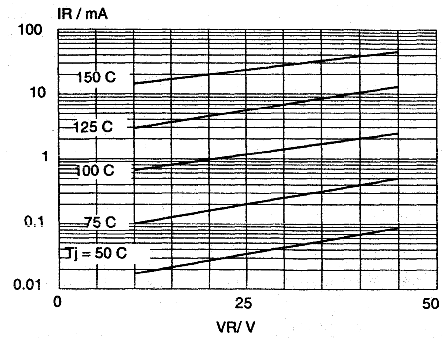



*Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter $T_j$*

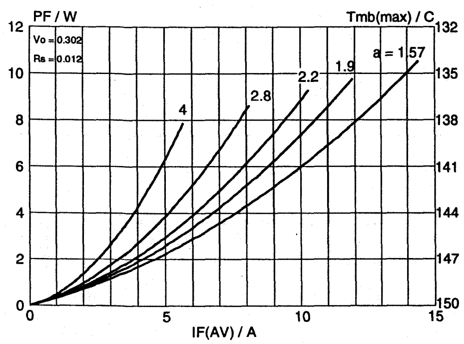



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

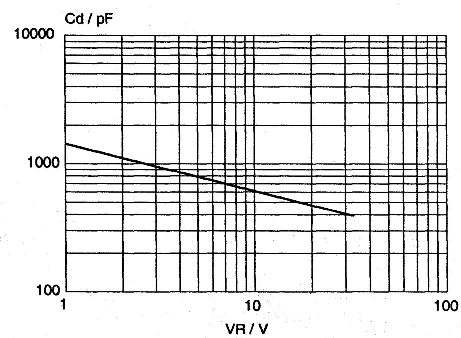



*Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

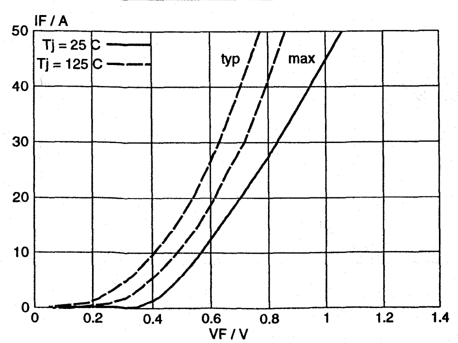



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

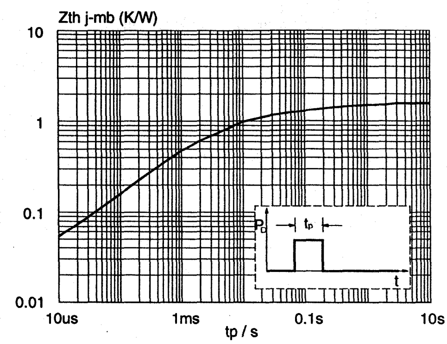



*Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}mb} = f(t_p)$.*

## GENERAL DESCRIPTION

Low leakage, platinum barrier, schottky rectifier diodes in a plastic envelope suitable for surface mounting, featuring low forward voltage drop, absence of stored charge. and 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.

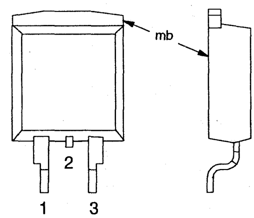
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | PBYR16- | 35B | 40B | 45B | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 35 | 40 | 45 | V |
| $V_F$ | Forward voltage | 0.57 | 0.57 | 0.57 | V |
| $I_{F(AV)}$ | Average forward current | 16 | 16 | 16 | A |

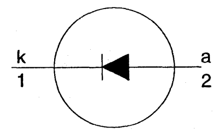
## PINNING - SOT404

| PIN | DESCRIPTION |
|---|---|
| 1 | no connection |
| 2 | cathode |
| 3 | anode |
| mb | cathode |

## 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 | | - | 23 | | | 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 $V_{RRM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ 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 | minimum footprint, FR4 board | - | 50 | - | 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 | $V_R = V_{RRM}$ | - | 100 | 200 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 125 ˚C | - | 12 | 40 | mA |
| $C_d$ | Junction capacitance | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 800 | - | pF |

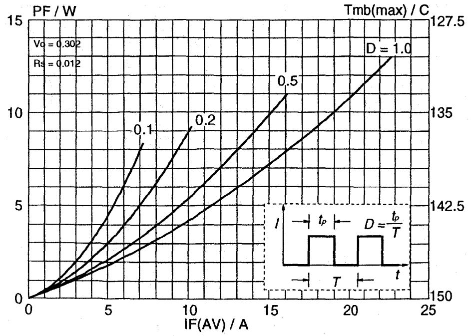



Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

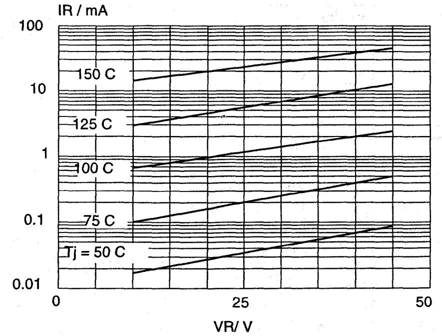



Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter $T_j$

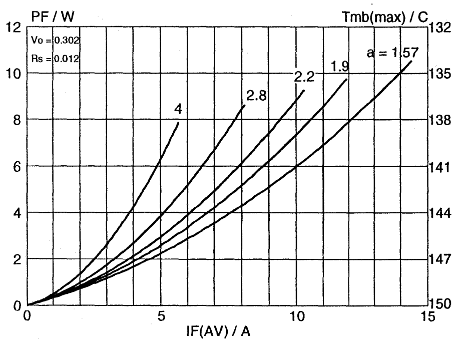



Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

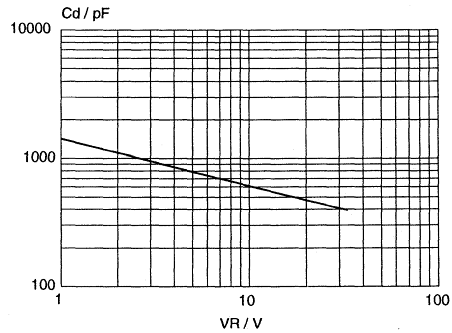



Fig.5. Typical junction capacitance; $C_d = f(V_R)$; $f$ = 1 MHz; $T_j$ = 25˚C to 125 ˚C.

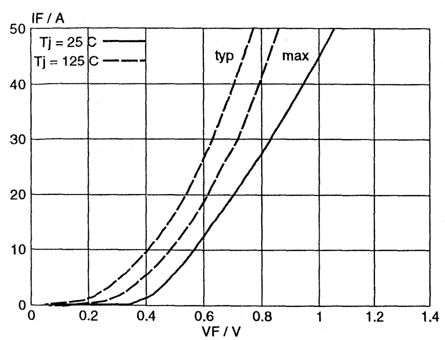



Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

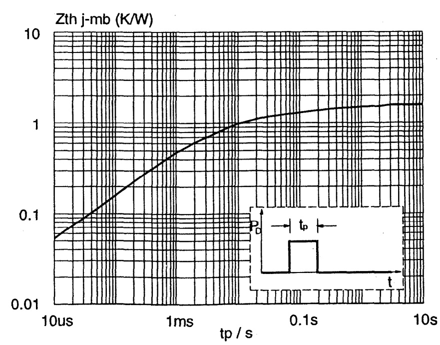



Fig.6. Transient thermal impedance; $Z_{th\ j\text{-}mb} = f(t_p)$.

# 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, absence of stored charge. and 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.

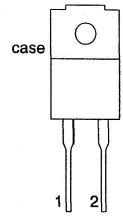
## QUICK REFERENCE DATA

| 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 |
| $I_{F(AV)}$ | Average forward current | 20 | 20 | 20 | A |

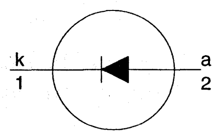
## PINNING - SOD100

| 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; $\delta = 0.5$; $T_{hs} \leq 110$ ˚C | - | 14 | | | A |
| $I_{F(RMS)}$ | RMS output current | | - | 20 | | | A |
| $I_{FRM}$ | Repetitive peak forward current | t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 110$ ˚C | - | 28 | | | 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 $V_{RRM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ 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 LIMITING VALUE & CHARACTERISTIC

$T_{hs}$ = 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 | - | - | 4.2 | 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 | $I_F$ = 16 A; $T_j$ = 125˚C | - | 0.53 | 0.60 | V |
| | | $I_F$ = 16 A | - | 0.63 | 0.68 | V |
| $I_R$ | Reverse current | $V_R = V_{RRM}$ | - | 100 | 200 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 125 ˚C | - | 12 | 40 | mA |
| $C_d$ | Junction capacitance | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 800 | - | pF |

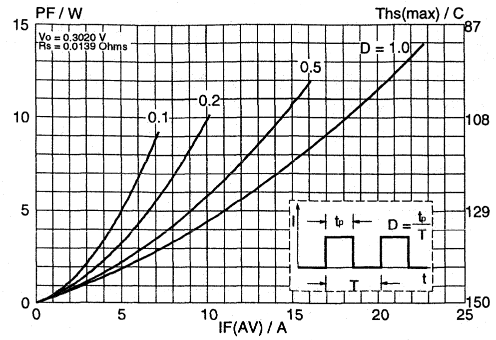



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

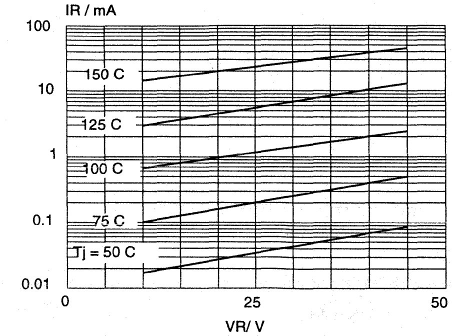



*Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter $T_j$*

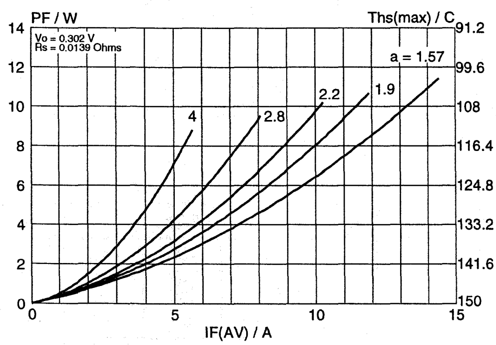



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

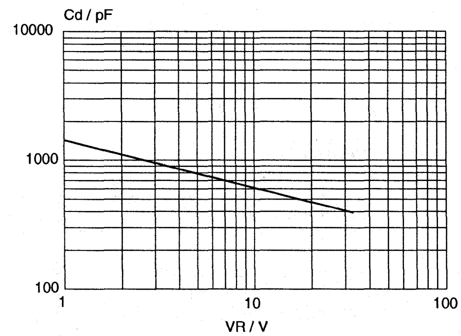



*Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

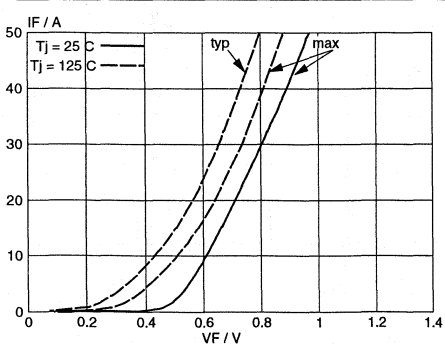



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

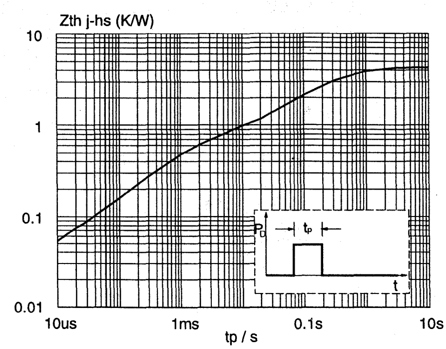



*Fig.6. Transient thermal impedance; $Z_{th\ j\text{-}hs} = f(t_p)$.*

# Rectifier diodes schottky barrier

# PBYR1645X series

## GENERAL DESCRIPTION

Low leakage, platinum barrier, schottky rectifier diodes in a full pack plastic envelope, featuring low forward voltage drop, absence of stored charge. and 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.

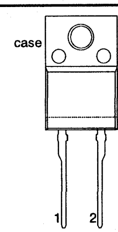
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | PBYR16- | 35X | 40X | 45X | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 35 | 40 | 45 | V |
| $V_F$ | Forward voltage | 0.6 | 0.6 | 0.6 | V |
| $I_{F(AV)}$ | Average forward current | 20 | 20 | 20 | A |

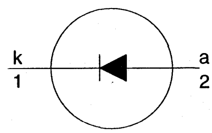
## PINNING - SOD113

| PIN | DESCRIPTION |
|---|---|
| 1 | cathode |
| 2 | anode |
| case | isolated |

## PIN CONFIGURATION




## SYMBOL




## LIMITING VALUES

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | | | UNIT |
|---|---|---|---|---|---|---|---|
| | | | | -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; $\delta = 0.5$; $T_{hs} \leq 110$ ˚C | - | 14 | | | A |
| $I_{F(RMS)}$ | RMS output current | | - | 20 | | | A |
| $I_{FRM}$ | Repetitive peak forward current | t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 110$ ˚C | - | 28 | | | 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 $V_{RRM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ 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 LIMITING VALUE & CHARACTERISTIC

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{isol}$ | R.M.S. isolation voltage from all three terminals to external heatsink | f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree | - | | 2500 | V |
| $C_{isol}$ | Capacitance from T2 to external heatsink | f = 1 MHz | - | 10 | - | pF |

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j-hs}$ | Thermal resistance junction to heatsink | with heatsink compound | - | - | 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 | $V_R = V_{RRM}$ | - | 100 | 200 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 125 ˚C | - | 12 | 40 | mA |
| $C_d$ | Junction capacitance | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 800 | - | pF |

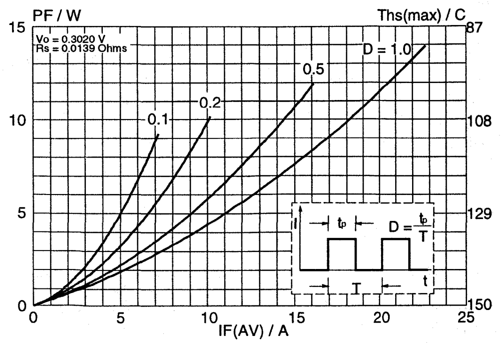



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

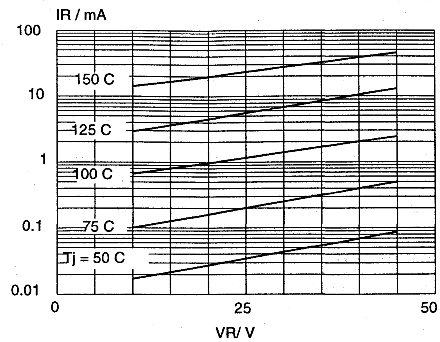



*Fig.4. Typical reverse leakage current; $I_R = f(V_R)$; parameter $T_j$*

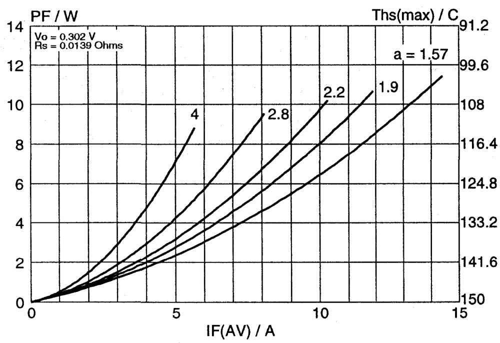



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

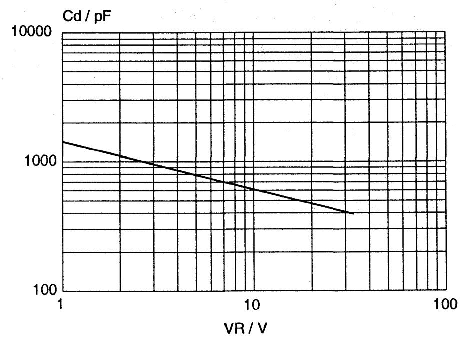



*Fig.5. Typical junction capacitance; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

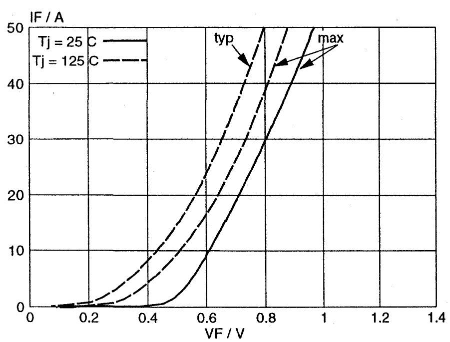



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

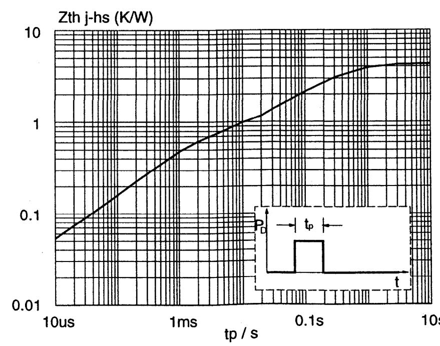



*Fig.6. Transient thermal impedance; $Z_{th\,j\text{-}hs} = f(t_p)$.*

# Rectifier diodes schottky barrier

# PBYR2025CT series

## GENERAL DESCRIPTION

Dual nickel silicide schottky barrier 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 with 3 V - 3.3 V outputs, or as or-ing diodes in fault tolerant power supply systems.

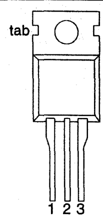
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | UNIT |
|---|---|---|---|---|
| | PBYR20- | 20CT | 25CT | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 20 | 25 | V |
| $V_F$ | Forward voltage | 0.41 | 0.41 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | 20 | 20 | A |

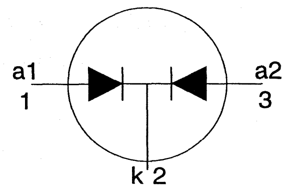
## PINNING - TO220AB

| 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 |
|---|---|---|---|---|---|---|
| | | | | -20 | -25 | |
| $V_{RRM}$ | Repetitive peak reverse voltage | | - | 20 | 25 | V |
| $V_{RWM}$ | Crest working reverse voltage | | - | 20 | 25 | V |
| $V_R$ | Continuous reverse voltage | $T_{mb} \leq 120$ ˚C | - | 20 | 25 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_{mb} \leq 135$ ˚C | - | 20 | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | 28 | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 135$ ˚C | - | 20 | | A |
| $I_{FSM}$ | Non-repetitive peak forward current, per diode | t = 10 ms | - | 135 | | A |
| | | t = 8.3 ms<br>sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$ | - | 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 | - | - | 2.0 | K/W |
| | | both diodes | - | - | 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 (per diode) | $I_F$ = 10 A; $T_j$ = 125˚C | - | 0.33 | 0.41 | V |
| | | $I_F$ = 20 A; $T_j$ = 125˚C | - | 0.43 | 0.50 | V |
| | | $I_F$ = 20 A | - | 0.51 | 0.60 | V |
| $I_R$ | Reverse current (per diode) | $V_R = V_{RRM}$ | - | 1.0 | 5.0 | mA |
| | | $V_R = V_{RRM}$; $T_j$ = 100 ˚C | - | 22 | 40 | mA |
| $C_d$ | Junction capacitance (per diode) | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 700 | - | pF |

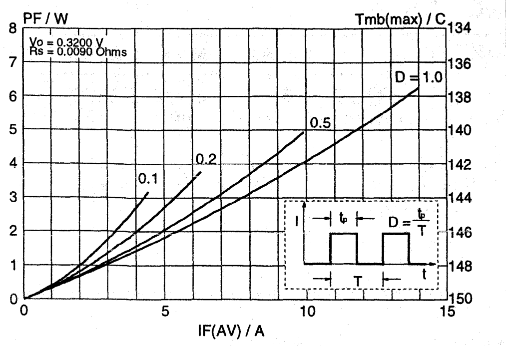



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

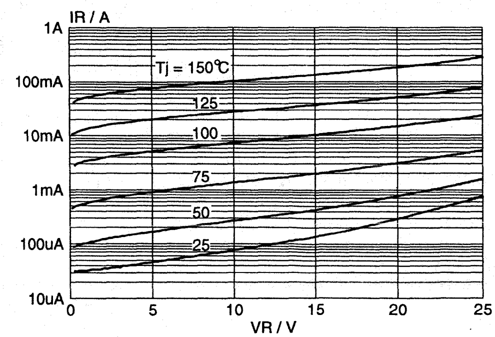



*Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

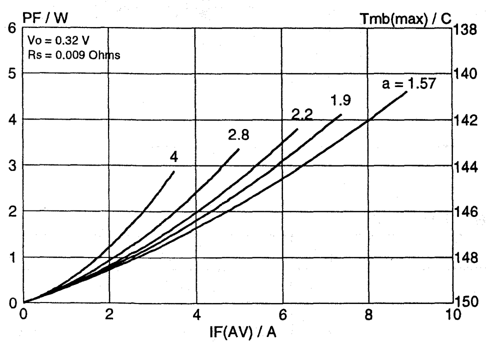



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

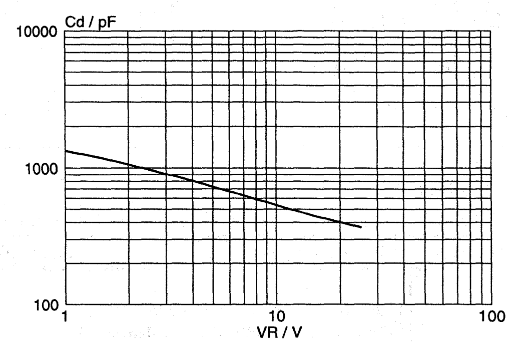



*Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

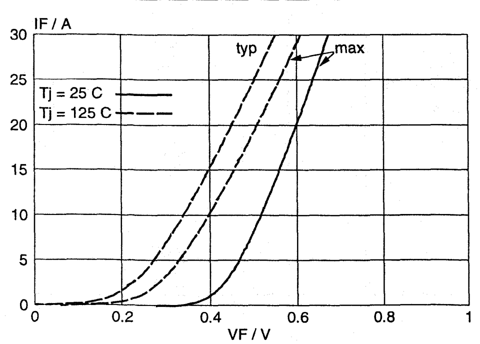



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

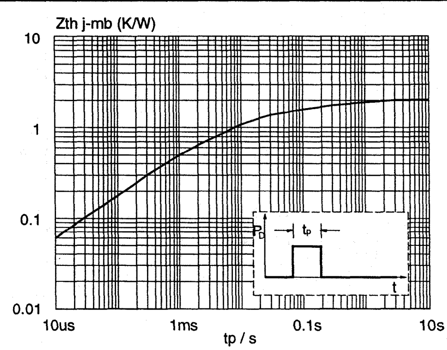



*Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.*

# Rectifier diodes schottky barrier

# 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.

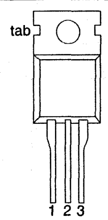
## QUICK REFERENCE DATA

| 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 |

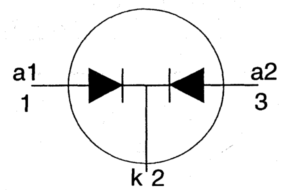
## PINNING - TO220AB

| 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; $\delta = 0.5$; $T_{mb} \leq 129$ ˚C | - | 20 | | | A |
| $I_{O(RMS)}$ | RMS forward current | | - | 28 | | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 129$ ˚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 |
|---|---|---|---|---|---|---|
| $R_{th\ j-mb}$ | Thermal resistance junction to mounting base | per diode | - | - | 2.0 | K/W |
| | | both diodes | - | - | 1.5 | 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) | $I_F = 10$ A; $T_j = 125$˚C | - | 0.50 | 0.57 | V |
| | | $I_F = 20$ A; $T_j = 125$˚C | - | 0.65 | 0.72 | V |
| | | $I_F = 20$ A | - | 0.78 | 0.84 | |
| $I_R$ | Reverse current (per diode) | $V_R = V_{RWM}$ | - | 50 | 100 | µA |
| | | $V_R = V_{RWM}$; $T_j = 125$ ˚C | - | 13 | 26 | mA |
| $C_d$ | Junction capacitance (per diode) | f = 1MHz; $V_R = 5$V; $T_j = 25$ ˚C to 125 ˚C | - | 400 | - | pF |

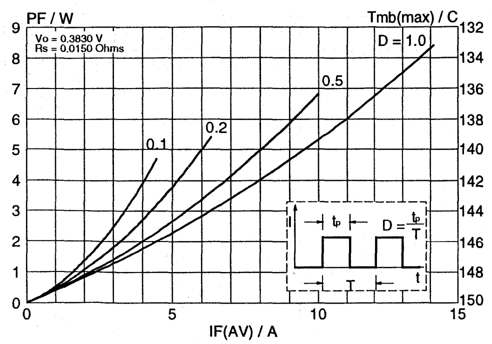



Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

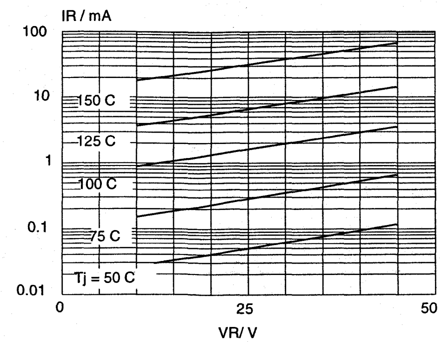



Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$

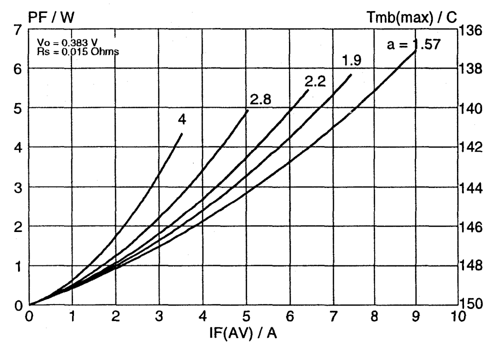



Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

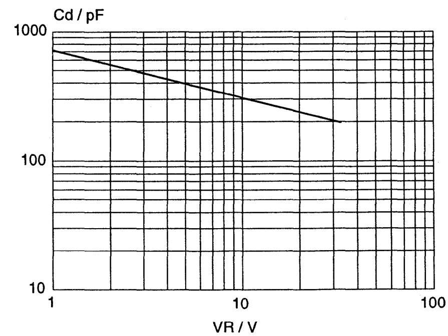



Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.

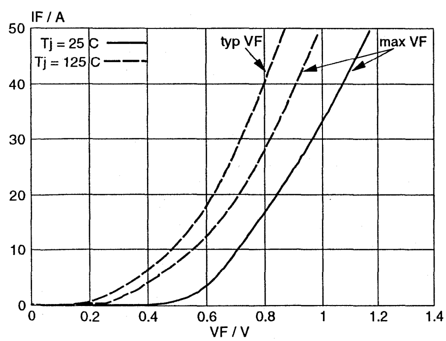



Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

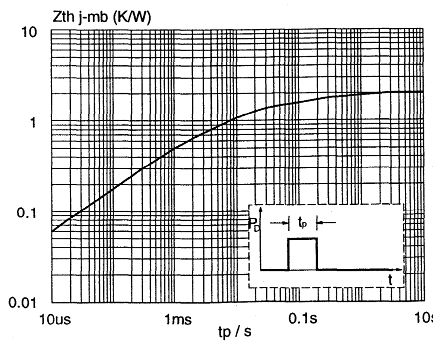



Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

# Rectifier diodes schottky barrier

# PBYR2045CTB series

## GENERAL DESCRIPTION

Dual low leakage, platinum barrier, schottky rectifier diodes in a plastic envelope suitable for surface mounting, featuring low forward voltage drop, absence of stored charge. and 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.

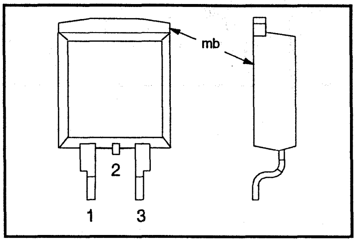
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | PBYR20- | 35CTB | 40CTB | 45CTB | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 35 | 40 | 45 | V |
| $V_F$ | Forward voltage | 0.57 | 0.57 | 0.57 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | 20 | 20 | 20 | A |

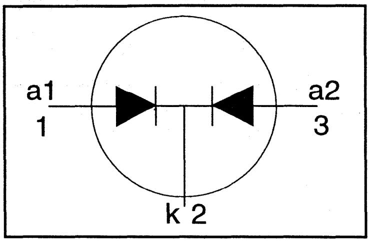
## PINNING - SOT404

| PIN | DESCRIPTION |
|---|---|
| 1 | anode 1 |
| 2 | cathode |
| 3 | anode 2 |
| mb | cathode |

## 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 |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_{mb} \leq 129$ ˚C | - | 20 | | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | 28 | | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | $t = 25$ µs; $\delta = 0.5$; $T_{mb} \leq 129$ ˚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 $V_{RRM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ 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 | - | - | 1.5 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | minimum footprint, FR4 board | - | 50 | - | 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 | - | 0.50 | 0.57 | V |
| | | $I_F$ = 20 A; $T_j$ = 125˚C | - | 0.65 | 0.72 | V |
| | | $I_F$ = 20 A | - | 0.78 | 0.84 | |
| $I_R$ | Reverse current (per diode) | $V_R = V_{RRM}$ | - | 50 | 100 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 125 ˚C | - | 13 | 26 | mA |
| $C_d$ | Junction capacitance (per diode) | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 400 | - | pF |

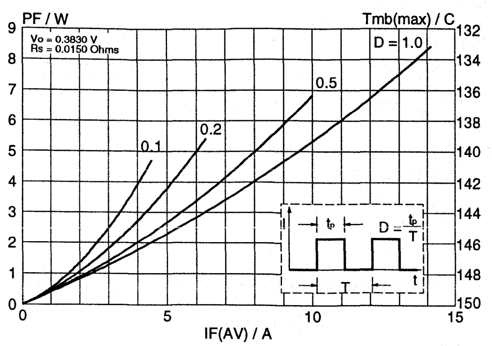



Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

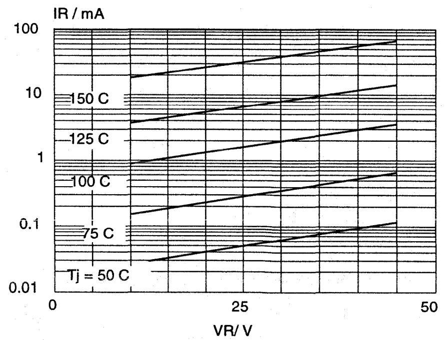



Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$

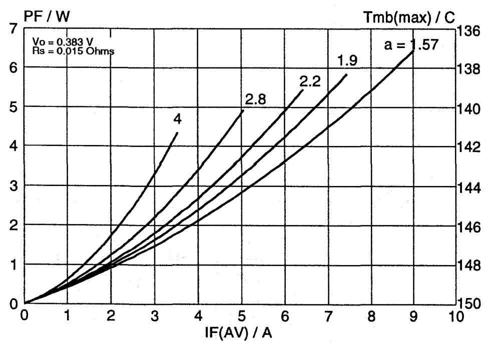



Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

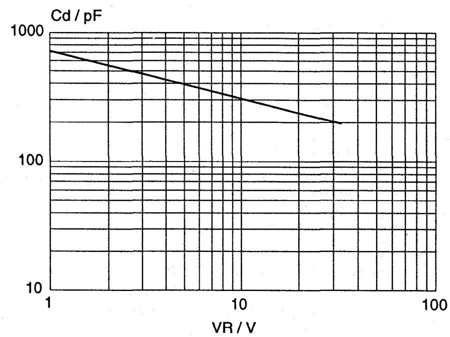



Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.

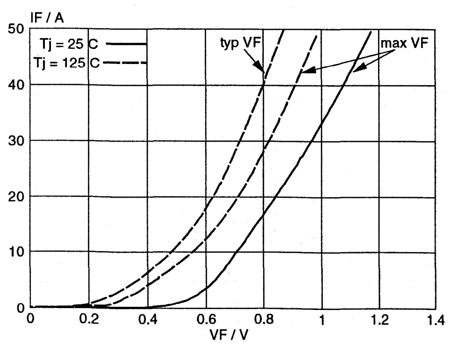



Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

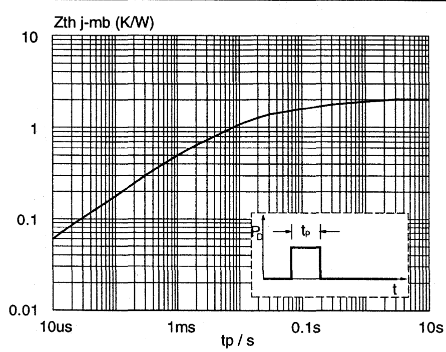



Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

## GENERAL DESCRIPTION

Dual low leakage, platinum barrier, schottky rectifier diodes in a full pack plastic envelope, featuring low forward voltage drop, absence of stored charge. and 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.

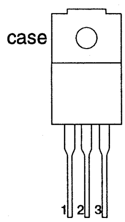
## QUICK REFERENCE DATA

| 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 |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | 20 | 20 | 20 | A |

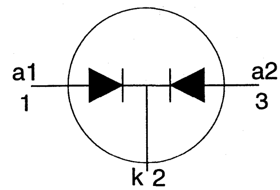
## PINNING - SOT186

| 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 |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_{hs} \leq 81$ ˚C | - | 20 | | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | 20 | | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | $t = 25\ \mu s$; $\delta = 0.5$; $T_{hs} \leq 81$ ˚C | - | 20 | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current, per diode | t = 10 ms | - | 100 | | | A |
| | | t = 8.3 ms<br>sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$ | - | 110 | | | A |
| $I^2t$ | $I^2t$ for fusing | t = 10 ms | - | 50 | | | $A^2s$ |
| $I_{RRM}$ | Repetitive peak reverse current per diode. | $t_p = 2\ \mu s$; $\delta = 0.001$ | - | 1 | | | A |
| $I_{RSM}$ | Non-repetitive peak reverse current per diode. | $t_p = 100\ \mu s$ | - | 1 | | | A |
| $T_{stg}$ | Storage temperature | | -65 | 175 | | | ˚C |
| $T_j$ | Operating junction temperature | | - | 150 | | | ˚C |

## ISOLATION LIMITING VALUE & CHARACTERISTIC

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{isol}$ | Repetitive peak voltage from 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 | - | - | 5.9 | K/W |
| | | both diodes (with heatsink compound) | - | - | 5.0 | 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) | $I_F$ = 10 A; $T_j$ = 125˚C | - | 0.51 | 0.57 | V |
| | | $I_F$ = 20 A; $T_j$ = 125˚C | - | 0.67 | 0.72 | V |
| | | $I_F$ = 20 A | - | 0.79 | 0.84 | V |
| $I_R$ | Reverse current (per diode) | $V_R = V_{RRM}$ | - | 50 | 100 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 125 ˚C | - | 13 | 26 | mA |
| $C_d$ | Junction capacitance (per diode) | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 400 | - | pF |

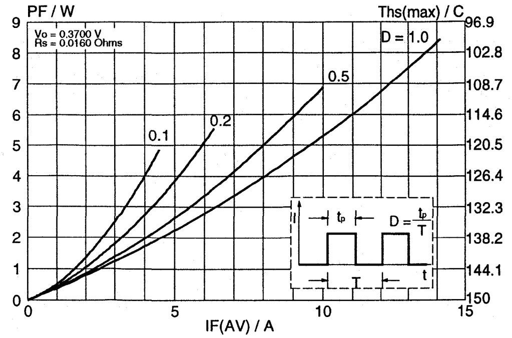



Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

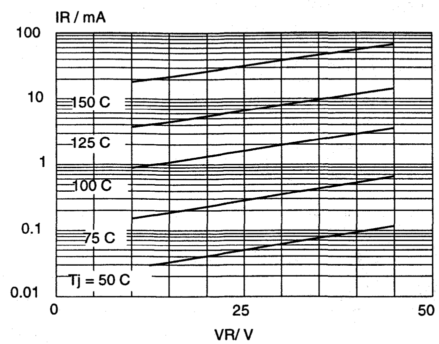



Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$

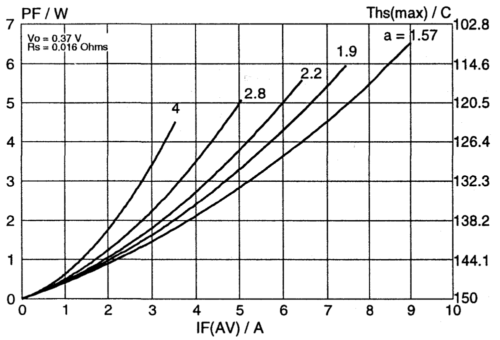



Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

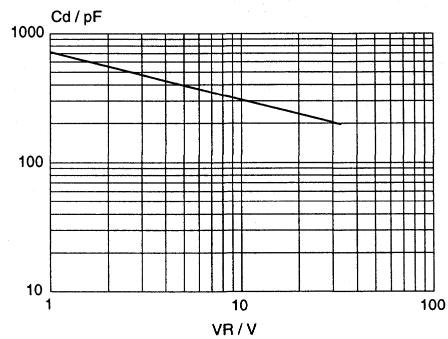



Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.

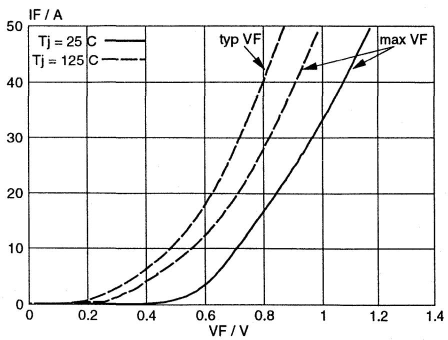



Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

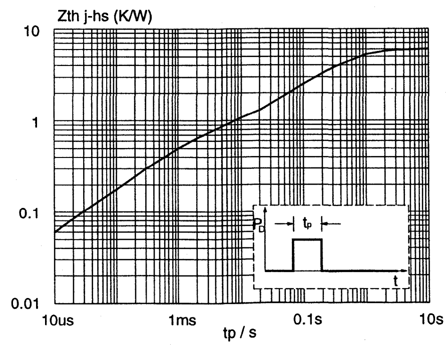



Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.

# Rectifier diodes schottky barrier

# PBYR2045CTX series

## GENERAL DESCRIPTION

Dual low leakage, platinum barrier, schottky rectifier diodes in a full pack plastic envelope, featuring low forward voltage drop, absence of stored charge. and 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.

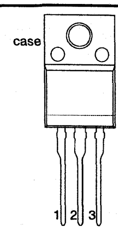
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | PBYR20- | 35CTX | 40CTX | 45CTX | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 35 | 40 | 45 | V |
| $V_F$ | Forward voltage | 0.57 | 0.57 | 0.57 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | 20 | 20 | 20 | A |

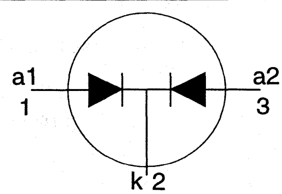
## PINNING - SOT186A

| PIN | DESCRIPTION |
|---|---|
| 1 | anode 1 (a) |
| 2 | cathode (k) |
| 3 | anode 2 (a) |
| 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 | $T_{hs} \leq 114$ ˚C | - | 35 | 40 | 45 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_{hs} \leq 81$ ˚C | - | 20 | | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | 20 | | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | $t = 25$ µs; $\delta = 0.5$; $T_{hs} \leq 81$ ˚C | - | 20 | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current, per diode | t = 10 ms | - | 100 | | | A |
| | | t = 8.3 ms<br>sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$ | - | 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 LIMITING VALUE & CHARACTERISTIC

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{isol}$ | R.M.S. isolation voltage from all three terminals to external heatsink | f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree | - | | 2500 | V |
| $C_{isol}$ | Capacitance from T2 to external heatsink | f = 1 MHz | - | 10 | - | pF |

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j-hs}$ | Thermal resistance junction to heatsink | per diode | - | - | 5.9 | K/W |
| | | both diodes (with heatsink compound) | - | - | 5.0 | 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 (per diode) | $I_F$ = 10 A; $T_j$ = 125˚C | - | 0.51 | 0.57 | V |
| | | $I_F$ = 20 A; $T_j$ = 125˚C | - | 0.67 | 0.72 | V |
| | | $I_F$ = 20 A | - | 0.79 | 0.84 | V |
| $I_R$ | Reverse current (per diode) | $V_R = V_{RRM}$ | - | 50 | 100 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 125 ˚C | - | 13 | 26 | mA |
| $C_d$ | Junction capacitance (per diode) | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 400 | - | pF |

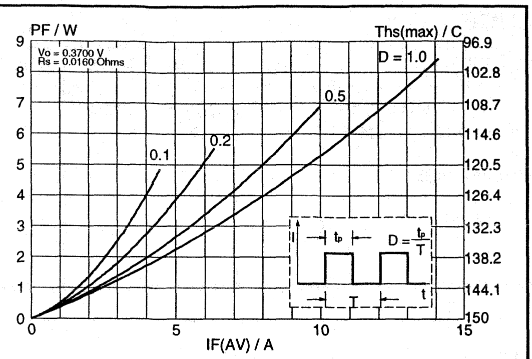



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

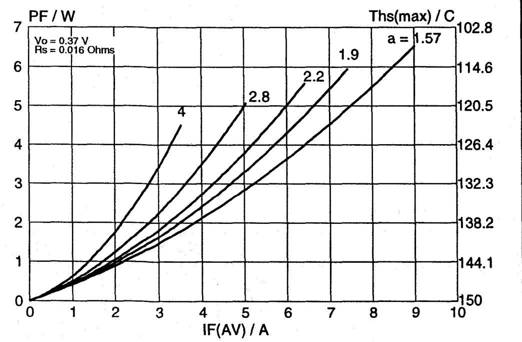



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

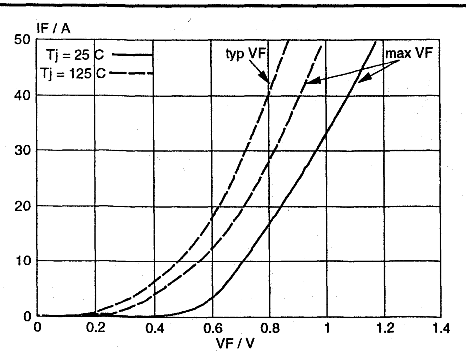



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

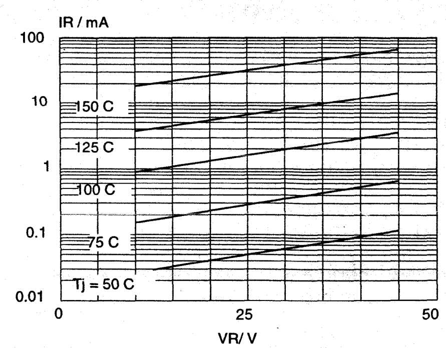



*Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

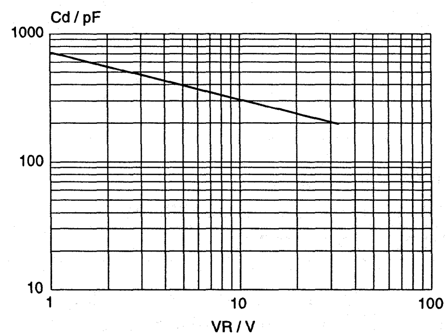



*Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25°C to 125 °C.*

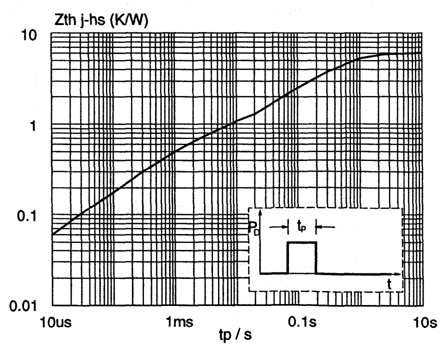



*Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.*

# 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.

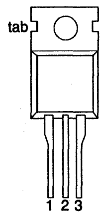
## QUICK REFERENCE DATA

| 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 |

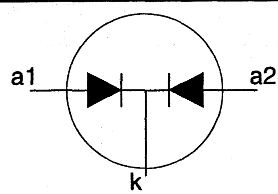
## PINNING - TO220AB

| 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 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 | - | - | 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 |

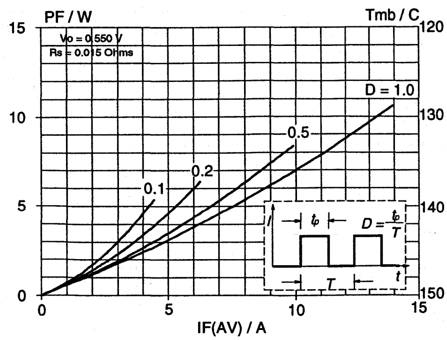



*Fig.1.* Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

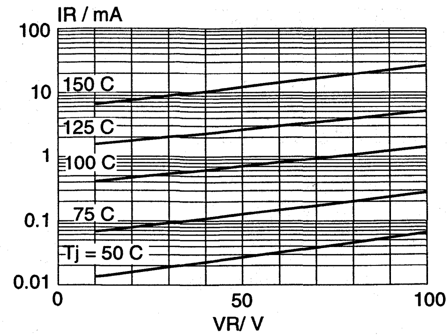



*Fig.4.* Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$

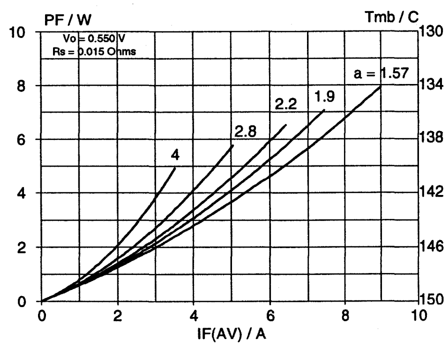



*Fig.2.* Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

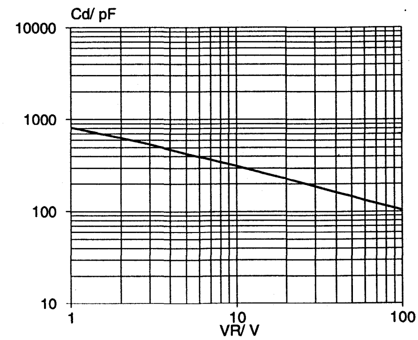



*Fig.5.* Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.

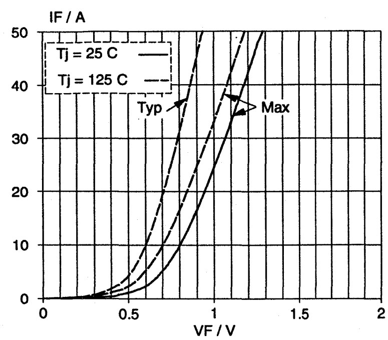



*Fig.3.* Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

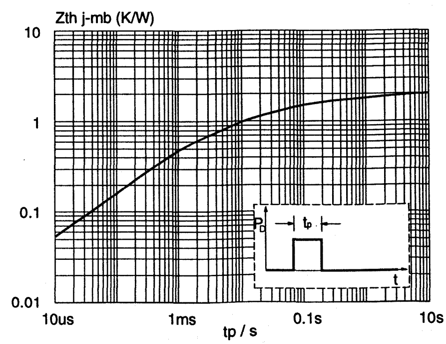



*Fig.6.* Transient thermal impedance per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.

## GENERAL DESCRIPTION

Dual low leakage, platinum barrier, schottky rectifier diodes in a plastic envelope suitable for surface mounting, featuring low forward voltage drop, absence of stored charge. and 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.

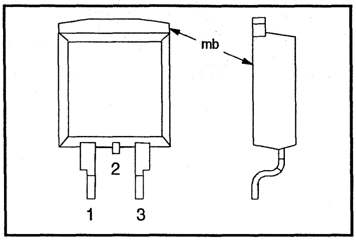
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | **PBYR20-** | **60CTB** | **80CTB** | **100CTB** | |
| $V_{RRM}$ | 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 |

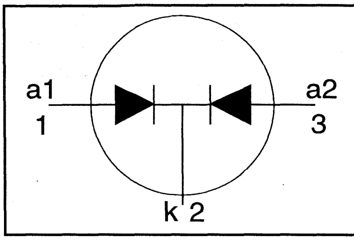
## PINNING - SOT404

| PIN | DESCRIPTION |
|---|---|
| 1 | anode 1 |
| 2 | cathode |
| 3 | anode 2 |
| mb | cathode |

## 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<br>sinusoidal $T_j = 125$ ˚C prior to surge; with reapplied $V_{RRM(max)}$ | - | 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 | - | - | 2.0 | K/W |
| | | both diodes | - | - | 1.0 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | pcb mounted, minimum footprint | - | 50 | - | 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) | $V_R = V_{RRM}$; $T_j$ = 25 ˚C | - | 5.0 | 150 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 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 |

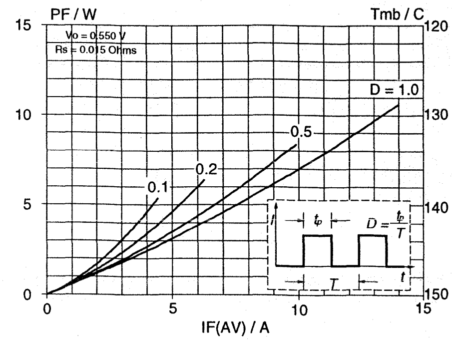



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

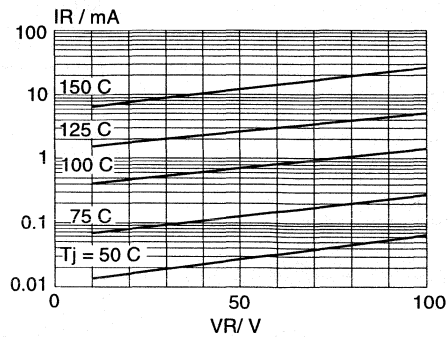



*Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

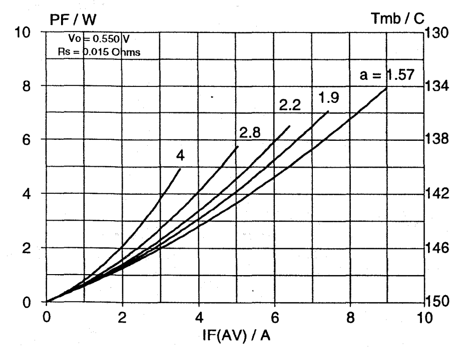



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

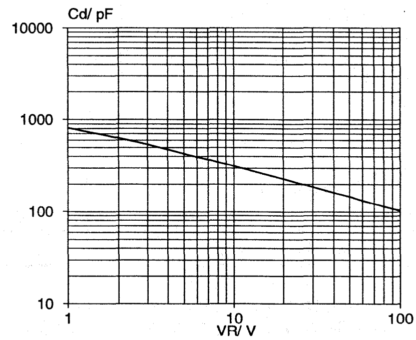



*Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

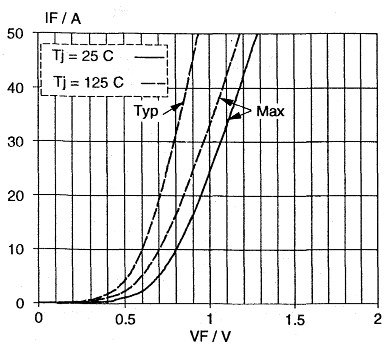



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

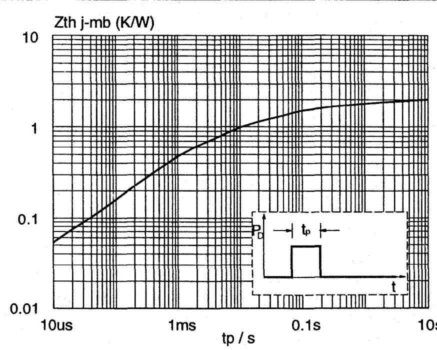



*Fig.6. Transient thermal impedance per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.*

# Rectifier diodes schottky barrier

# PBYR2525CT series

## GENERAL DESCRIPTION

Dual nickel silicide schottky barrier 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 with 3 V - 3.3 V outputs, or as or-ing diodes in fault tolerant power supply systems.

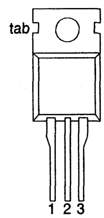
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | UNIT |
|---|---|---|---|---|
| | **PBYR25-** | **20CT** | **25CT** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 20 | 25 | V |
| $V_F$ | Forward voltage | 0.41 | 0.41 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | 30 | 30 | A |

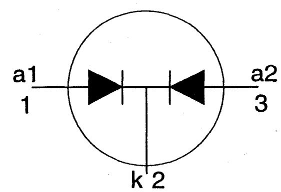
## PINNING - TO220AB

| 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 |
|---|---|---|---|---|---|---|
| | | | | **-20** | **-25** | |
| $V_{RRM}$ | Repetitive peak reverse voltage | | - | 20 | 25 | V |
| $V_{RWM}$ | Crest working reverse voltage | | - | 20 | 25 | V |
| $V_R$ | Continuous reverse voltage | $T_{mb} \leq 109$ ˚C | - | 20 | 25 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_{mb} \leq 135$ ˚C | - | 30 | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | 43 | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 135$ ˚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 $V_{RRM(max)}$ | | | | |
| $I^2t$ | $I^2t$ for fusing | t = 10 ms | - | 162 | | $A^2s$ |
| $I_{RRM}$ | Repetitive peak reverse current per diode | $t_p = 2$ µs; $\delta = 0.001$ | - | 2 | | A |
| $I_{RSM}$ | Non-repetitive peak reverse current per diode | $t_p = 100$ µs | - | 2 | | A |
| $T_{stg}$ | Storage temperature | | -65 | 175 | | ˚C |
| $T_j$ | Operating junction temperature | | - | 150 | | ˚C |

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}mb}$ | Thermal resistance junction to mounting base | per diode | - | - | 1.5 | 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) | $I_F$ = 15 A; $T_j$ = 125˚C | - | 0.33 | 0.41 | V |
| | | $I_F$ = 30 A; $T_j$ = 125˚C | - | 0.43 | 0.50 | V |
| | | $I_F$ = 30 A | - | 0.51 | 0.60 | V |
| $I_R$ | Reverse current (per diode) | $V_R = V_{RRM}$ | - | 2.0 | 10 | mA |
| | | $V_R = V_{RRM}$; $T_j$ = 100 ˚C | - | 30 | 80 | mA |
| $C_d$ | Junction capacitance (per diode) | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 900 | - | pF |

# 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.

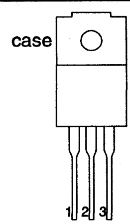
## QUICK REFERENCE DATA

| 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 |

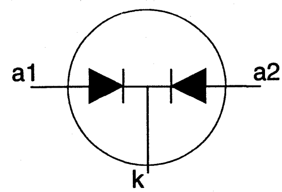
## PINNING - SOT186

| 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. -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 | $T_{hs} \leq 114$ ˚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<br>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<br>both diodes<br>(with heatsink compound) | -<br>- | -<br>- | 5.9<br>5.0 | K/W<br>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<br>$I_F$ = 20 A; $T_j$ = 125˚C<br>$I_F$ = 20 A | -<br>-<br> | 0.51<br>0.67<br>0.79 | 0.57<br>0.72<br>0.84 | V<br>V<br> |
| $I_R$ | Reverse current (per diode) | $V_R = V_{RWM}$<br>$V_R = V_{RWM}$; $T_j$ = 125 ˚C | -<br>- | 50<br>13 | 100<br>26 | µA<br>mA |
| $C_d$ | Junction capacitance (per diode) | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 400 | - | pF |

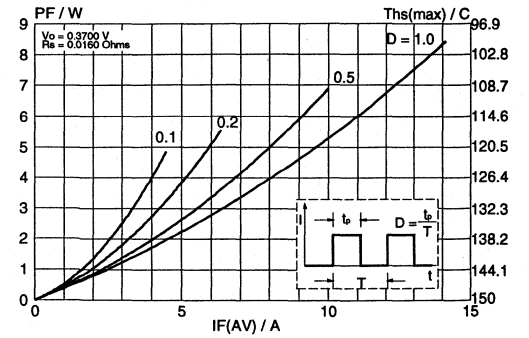



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

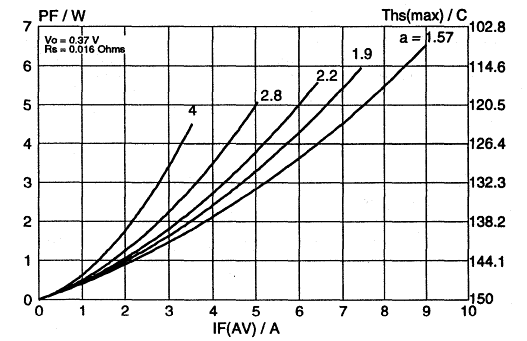



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

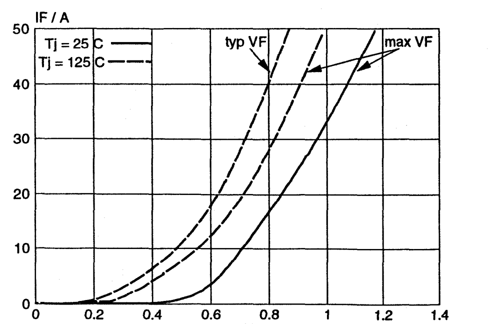



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

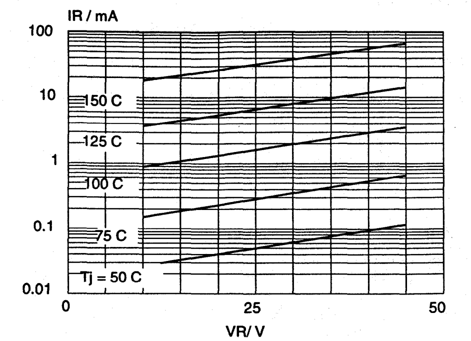



*Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

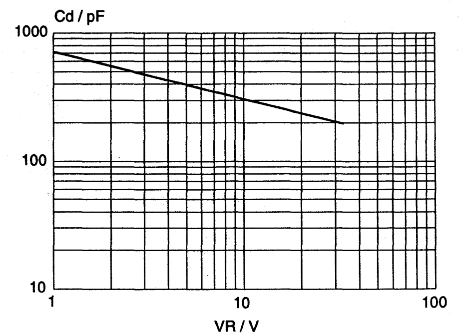



*Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

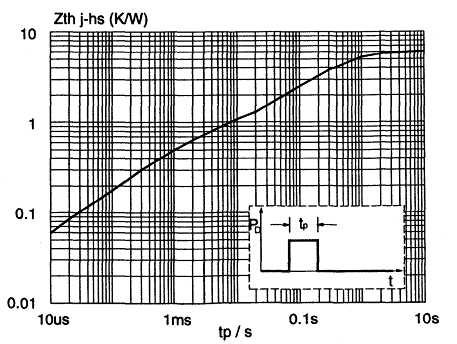



*Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.*

# Rectifier diodes schottky barrier

# PBYR2545CTB series

## GENERAL DESCRIPTION

Dual low leakage, platinum barrier, schottky rectifier diodes in a plastic envelope suitable for surface mounting, featuring low forward voltage drop, absence of stored charge. and 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.

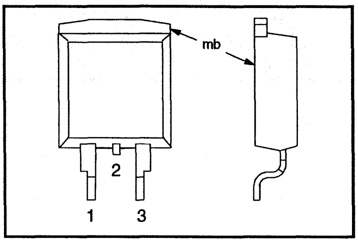
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | PBYR25- | 35CTB | 40CTB | 45CTB | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 35 | 40 | 45 | V |
| $V_F$ | Forward voltage | 0.62 | 0.62 | 0.62 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | 30 | 30 | 30 | A |

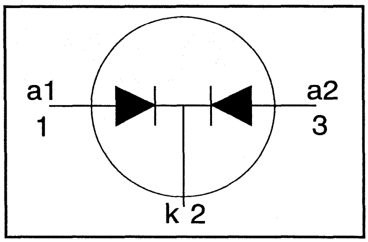
## PINNING - SOT404

| PIN | DESCRIPTION |
|---|---|
| 1 | anode 1 |
| 2 | cathode |
| 3 | anode 2 |
| mb | cathode |

## 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 | | - | 60 | 80 | 100 | V |
| $V_R$ | Continuous reverse voltage | $T_{mb} \leq 136$ ˚C | - | 35 | 40 | 45 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_{mb} \leq 130$ ˚C | - | 30 | | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | 43 | | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | $t = 25\ \mu s$; $\delta = 0.5$; $T_{mb} \leq 130$ ˚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 $V_{RRM(max)}$ | | | | | |
| $I^2t$ | $I^2t$ for fusing | t = 10 ms | - | 91 | | | $A^2s$ |
| $I_{RRM}$ | 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 | | -65 | 175 | | | ˚C |
| $T_j$ | Operating junction temperature | | - | 150 | | | ˚C |

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}mb}$ | Thermal resistance junction to mounting base | per diode | - | - | 1.5 | K/W |
| | | both diodes | - | - | 1.0 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | minumum footprint, FR4 board | - | 50 | - | 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) | $V_R = V_{RRM}$ | - | 100 | 200 | µA |
| | | $V_R = V_{RRM}$; $T_j$ = 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 |

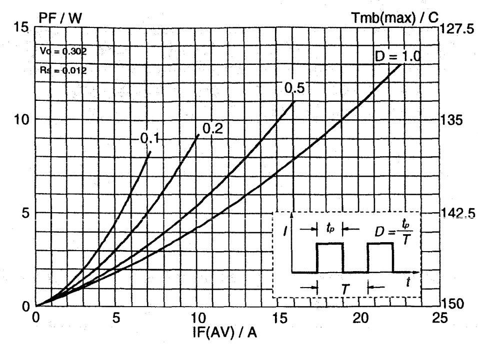



Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

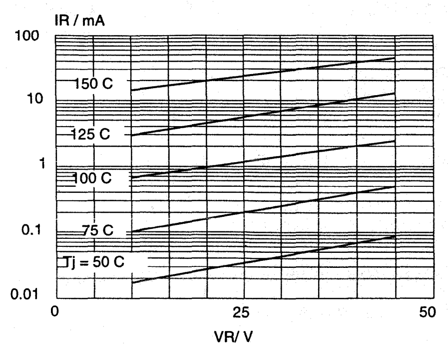



Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$

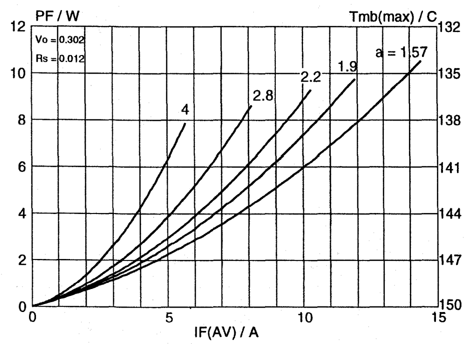



Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

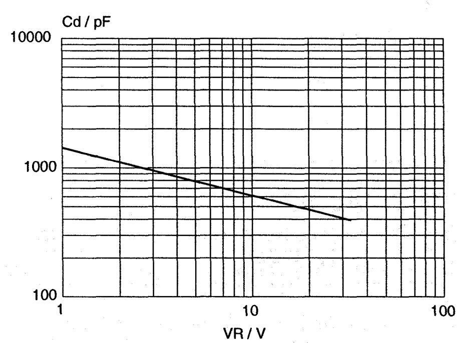



Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.

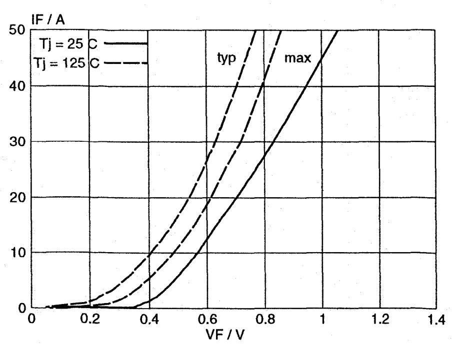



Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

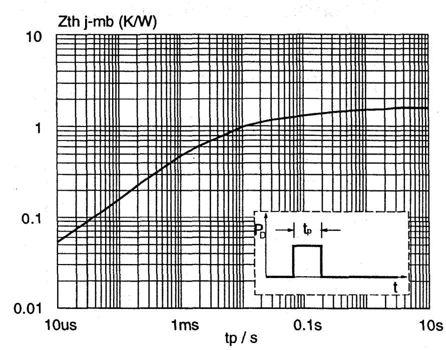



Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.

# 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.

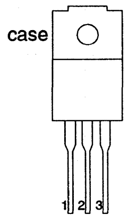
## QUICK REFERENCE DATA

| 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 |

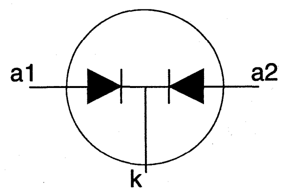
## PINNING - SOT186

| 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 |

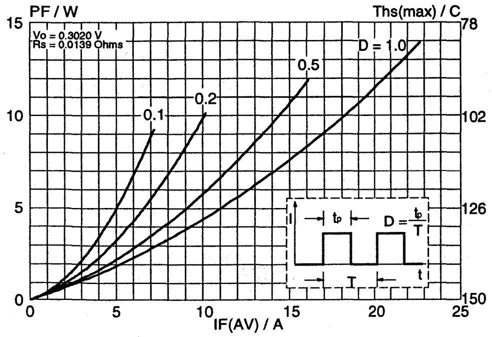



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

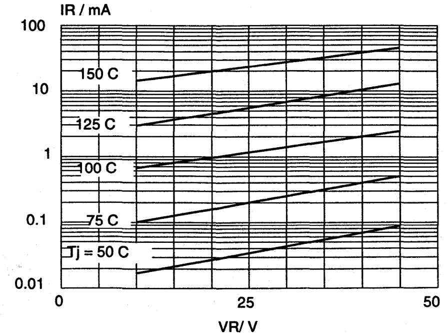



*Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

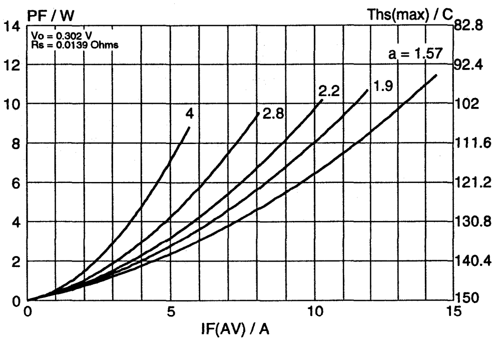



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

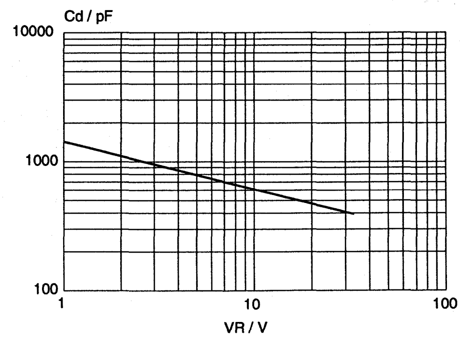



*Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

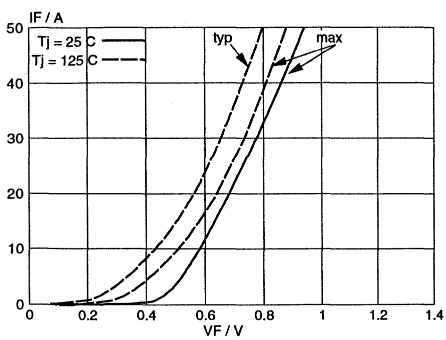



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

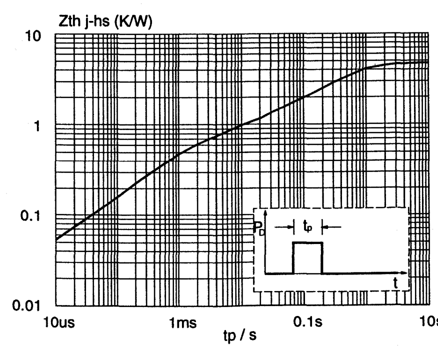



*Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.*

## GENERAL DESCRIPTION

Dual low leakage, platinum barrier, schottky rectifier diodes in a full pack plastic envelope, featuring low forward voltage drop, absence of stored charge. and 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.

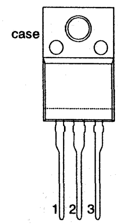
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | PBYR25- | 35CTX | 40CTX | 45CTX | |
| $V_{RRM}$ | Repetitive peak reverse voltage | 35 | 40 | 45 | V |
| $V_F$ | Forward voltage | 0.65 | 0.65 | 0.65 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | 20 | 20 | 20 | A |

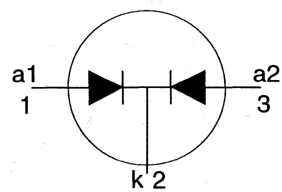
## PINNING - SOT186A

| PIN | DESCRIPTION |
|---|---|
| 1 | anode 1 (a) |
| 2 | cathode (k) |
| 3 | anode 2 (a) |
| case | isolated |

## 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 | | - | 60 | 80 | 100 | V |
| $V_R$ | Continuous reverse voltage | $T_{hs} \leq 111$ ˚C | - | 35 | 40 | 45 | V |
| $I_{O(AV)}$ | Average output current (both diodes conducting) | square wave; $\delta = 0.5$; $T_{hs} \leq 103$ ˚C | - | 20 | | | A |
| $I_{O(RMS)}$ | RMS output current (both diodes conducting) | | - | 20 | | | A |
| $I_{FRM}$ | Repetitive peak forward current per diode | $t = 25$ µs; $\delta = 0.5$; $T_{hs} \leq 103$ ˚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 $V_{RRM(max)}$ | - | 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 LIMITING VALUE & CHARACTERISTIC

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{isol}$ | R.M.S. isolation voltage from all three terminals to external heatsink | f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree | - | | 2500 | V |
| $C_{isol}$ | Capacitance from T2 to external heatsink | f = 1 MHz | - | 10 | - | pF |

## THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $R_{th\ j\text{-}hs}$ | Thermal resistance junction to heatsink | per diode<br>both diodes<br>(with heatsink compound) | -<br>- | -<br>- | 4.8<br>4.0 | K/W<br>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<br>$I_F$ = 20 A | -<br>- | 0.58<br>0.63 | 0.65<br>0.68 | V<br>V |
| $I_R$ | Reverse current (per diode) | $V_R = V_{RRM}$<br>$V_R = V_{RRM}$; $T_j$ = 125 ˚C | -<br>- | 100<br>12 | 200<br>40 | µA<br>mA |
| $C_d$ | Junction capacitance (per diode) | f = 1MHz; $V_R$ = 5V; $T_j$ = 25 ˚C to 125 ˚C | - | 800 | - | pF |

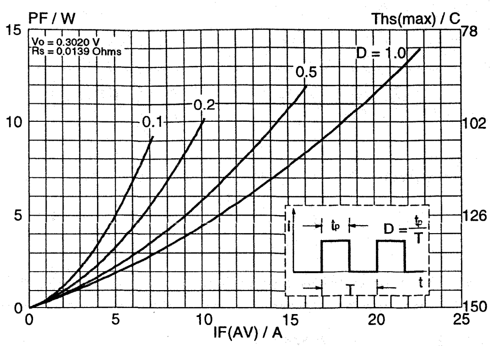



Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

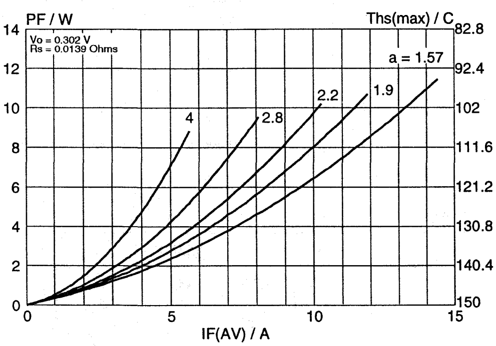



Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

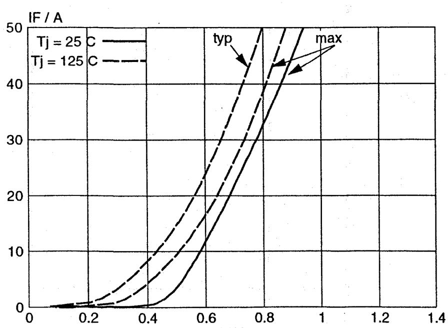



Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

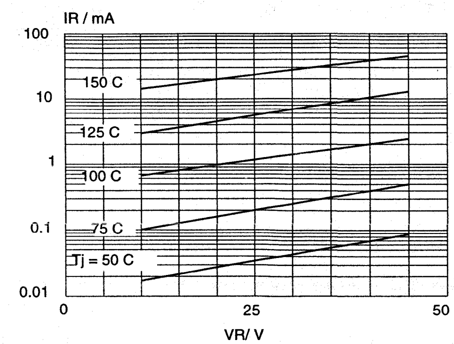



Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$

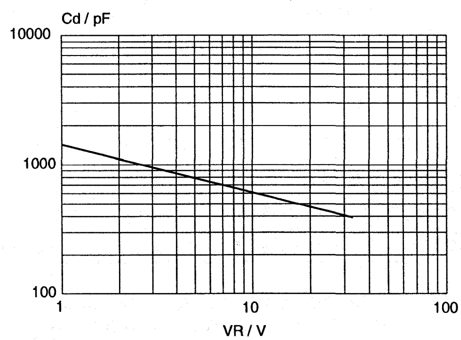



Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.

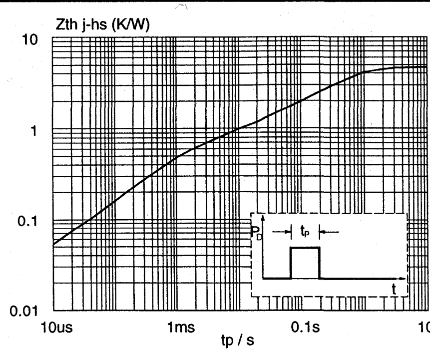



Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.

# 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.

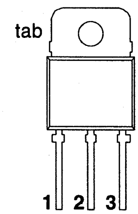
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | PBYR30- | **35PT** | **40PT** | **45PT** | |
| $V_{RRM}$ | 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 |

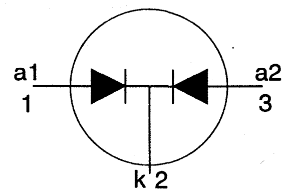
## PINNING - SOT93

| 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 | $t = 25\ \mu s$; $\delta = 0.5$; $T_{mb} \leq 130$ ˚C | - | 30 | | | A |
| $I_{FSM}$ | Non-repetitive peak forward current per diode | t = 10 ms | - | 180 | | | A |
| | | t = 8.3 ms | - | 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. | $t_p = 2\ \mu s$; $\delta = 0.001$ | - | 2 | | | A |
| $I_{RSM}$ | Non-repetitive peak reverse current per diode. | $t_p = 100\ \mu s$ | - | 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 |

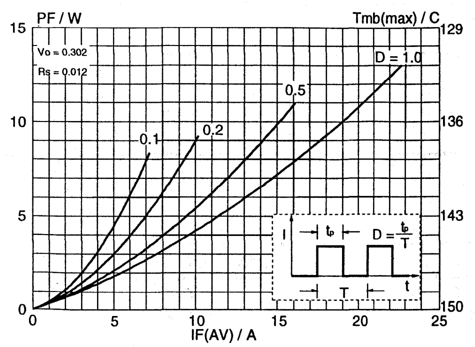



Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

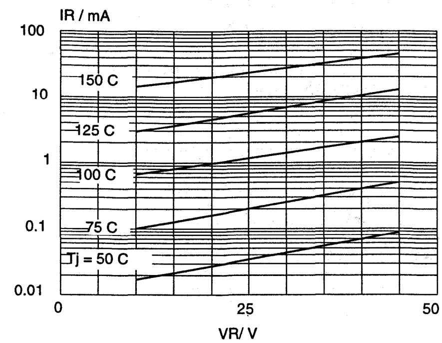



Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$

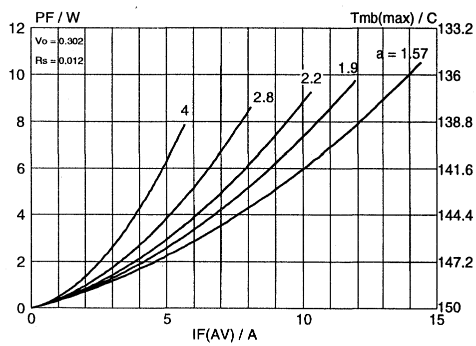



Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

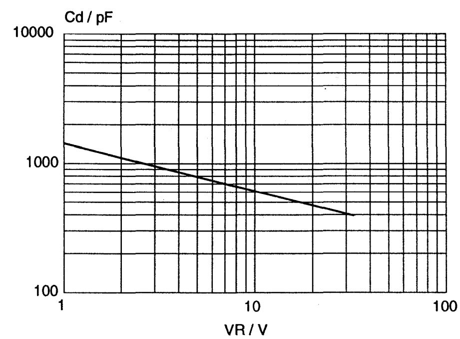



Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.

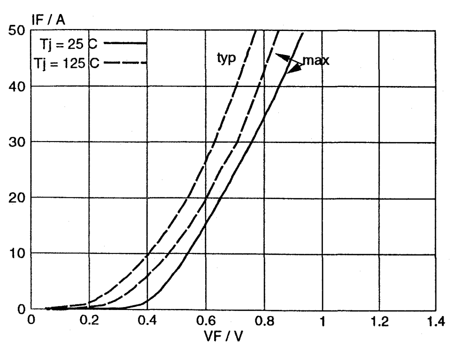



Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$

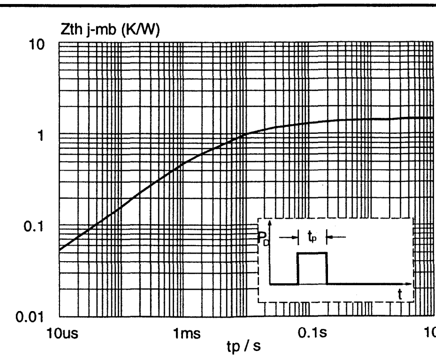



Fig.6. Transient thermal impedance per diode; $Z_{th\ j\text{-}mb} = f(t_p)$.

# 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.

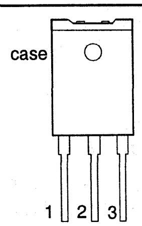
## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|---|---|---|---|---|---|
| | PBYR30- | 35PTF | 40PTF | 45PTF | |
| $V_{RRM}$ | 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 |

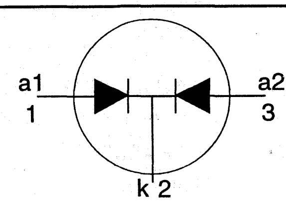
## PINNING - SOT199

| 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 | - | 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; $\delta = 0.001$ | - | 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 LIMITING VALUE & CHARACTERISTIC

$T_{hs}$ = 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 |

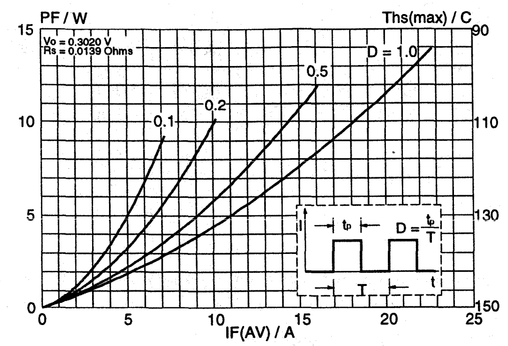



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

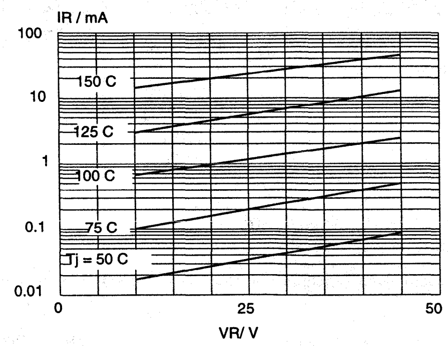



*Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

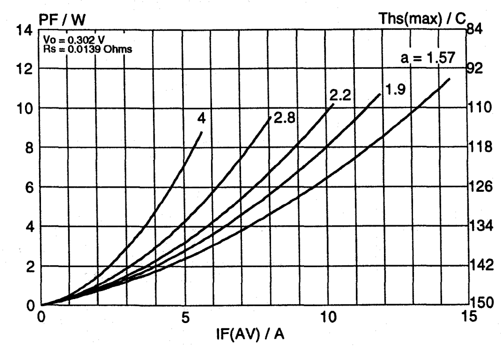



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

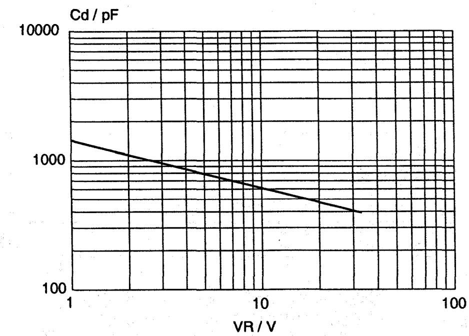



*Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

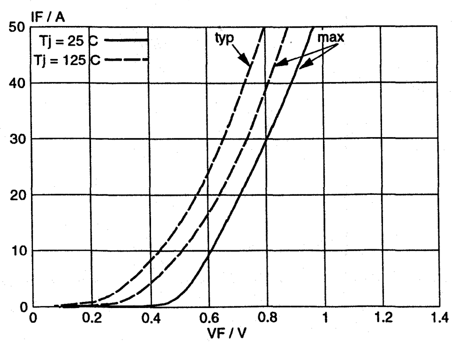



*Fig.3. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter $T_j$*

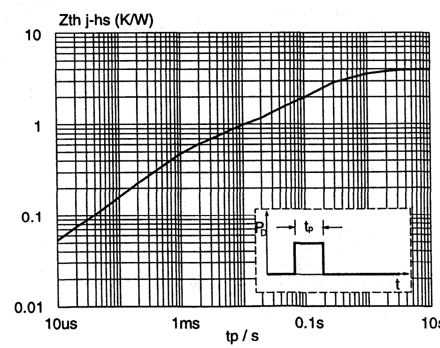



*Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}hs} = f(t_p)$.*

# 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.

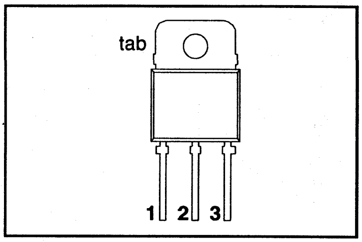
## QUICK REFERENCE DATA

| 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 |

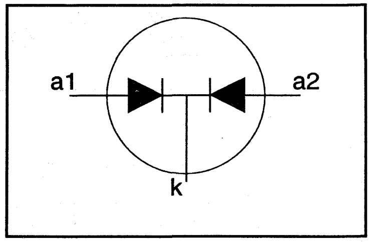
## PINNING - SOT93

| 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 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; $\delta = 0.001$ | - | 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 |
|---|---|---|---|---|---|---|
| $R_{th\ j-mb}$ | Thermal resistance junction to mounting base | per diode | - | - | 1.4 | K/W |
| | | both diodes | - | - | 1.0 | K/W |
| $R_{th\ j-a}$ | 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 |

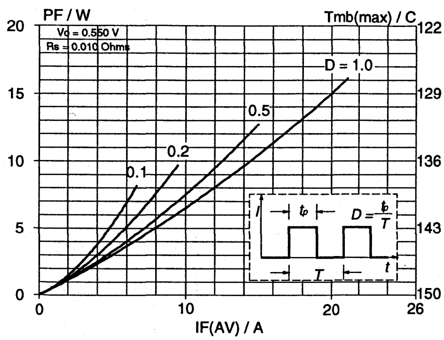



*Fig.1. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.*

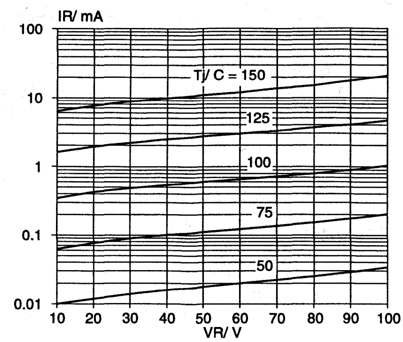



*Fig.4. Typical reverse leakage current per diode; $I_R = f(V_R)$; parameter $T_j$*

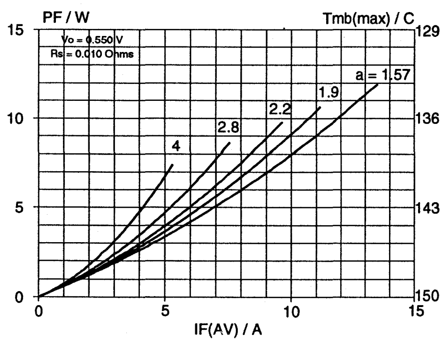



*Fig.2. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.*

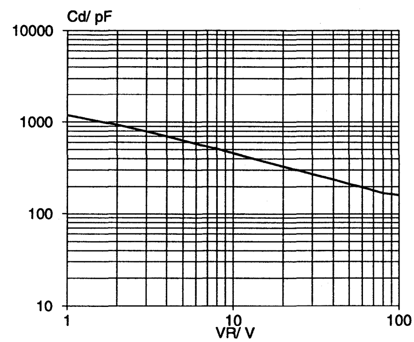



*Fig.5. Typical junction capacitance per diode; $C_d = f(V_R)$; f = 1 MHz; $T_j$ = 25˚C to 125 ˚C.*

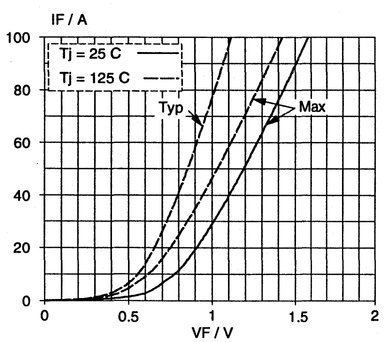



*Fig.3. Typical and maximum forward characteristic per diode; $I_F = f(V_F)$; parameter $T_j$*

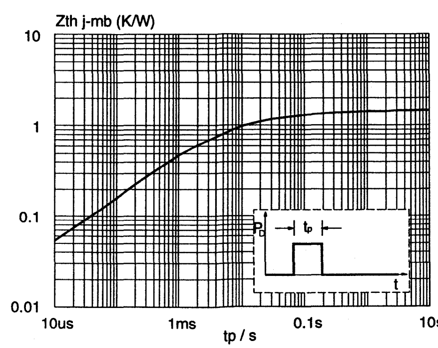



*Fig.6. Transient thermal impedance per diode; $Z_{th\,j\text{-}mb} = f(t_p)$.*

# PACKAGE OUTLINES

## MECHANICAL DATA

*Dimensions in mm*

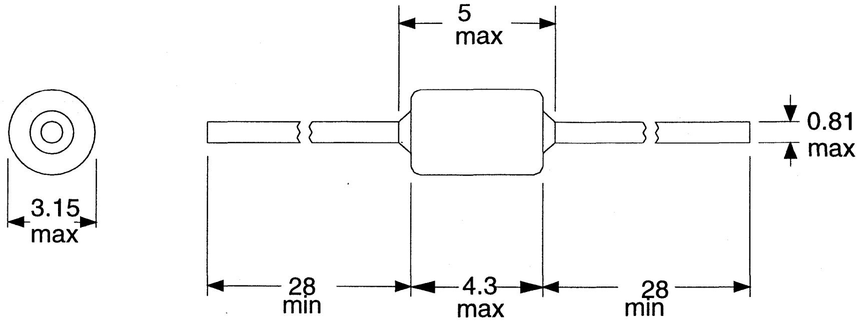



*Fig.13. SOD84.*

## MECHANICAL DATA

*Dimensions in mm*

*Net Mass: 2 g*

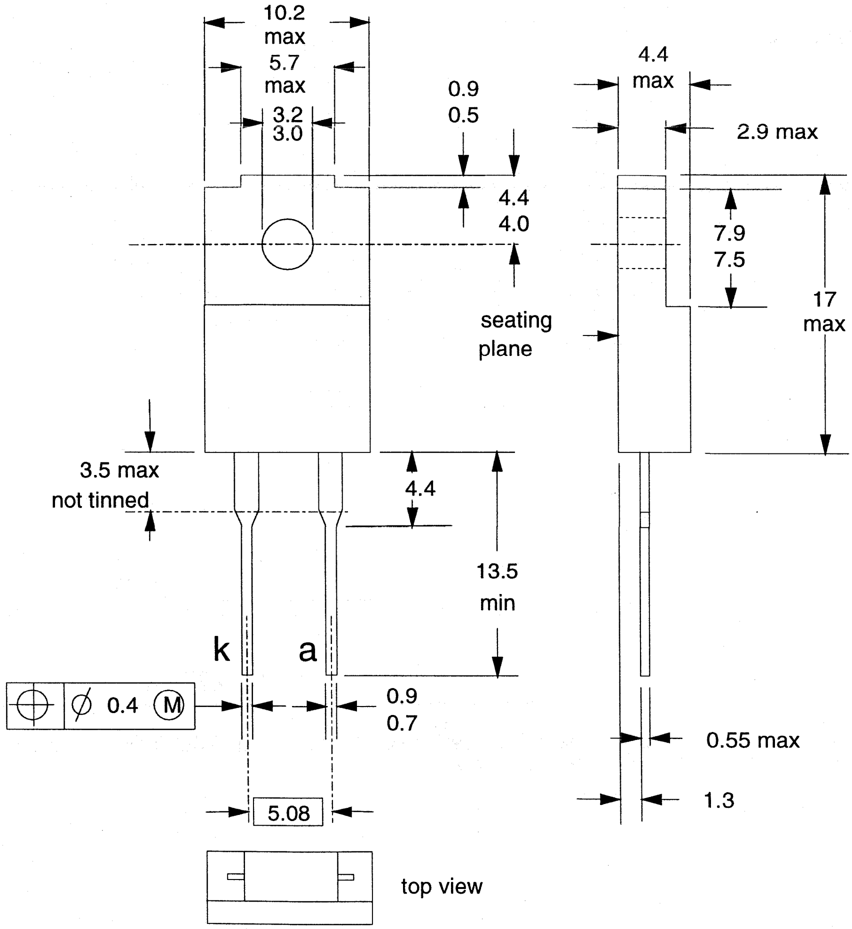



*Fig.10. SOD100; The seating plane is electrically isolated from all terminals.*

**Notes**
1. Refer to mounting instructions for F-pack envelopes.
2. Epoxy meets UL94 V0 at 1/8".

## MECHANICAL DATA

*Dimensions in mm*

*Net Mass: 0.2 g*

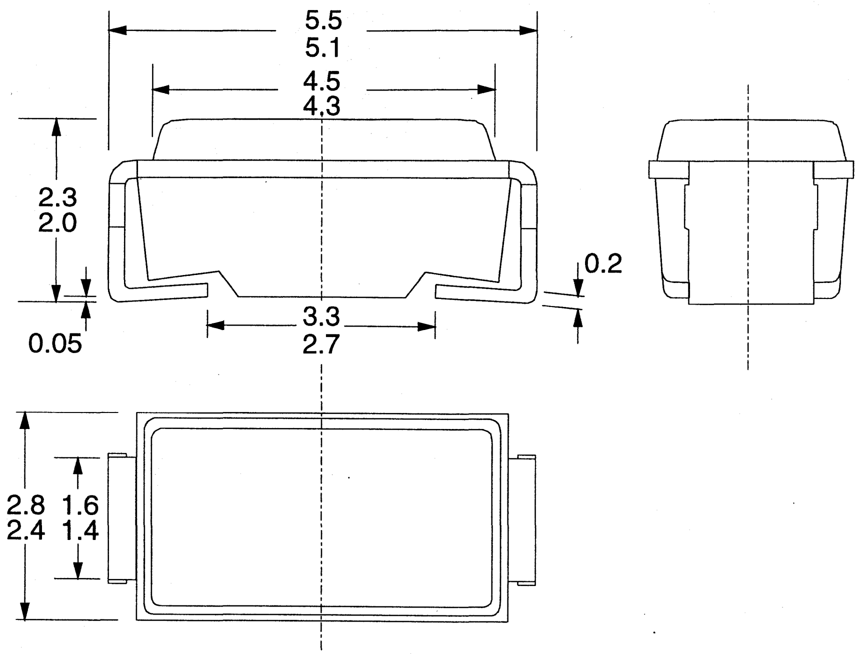



*Fig.11. SOD106.*

**Notes**

1. For mounting and soldering instructions refer to publication SC18 "SMD Footprint Design and Soldering Guidelines". Order code:9397 750 00505.

## MECHANICAL DATA

*Dimensions in mm*

*Net Mass: 2 g*

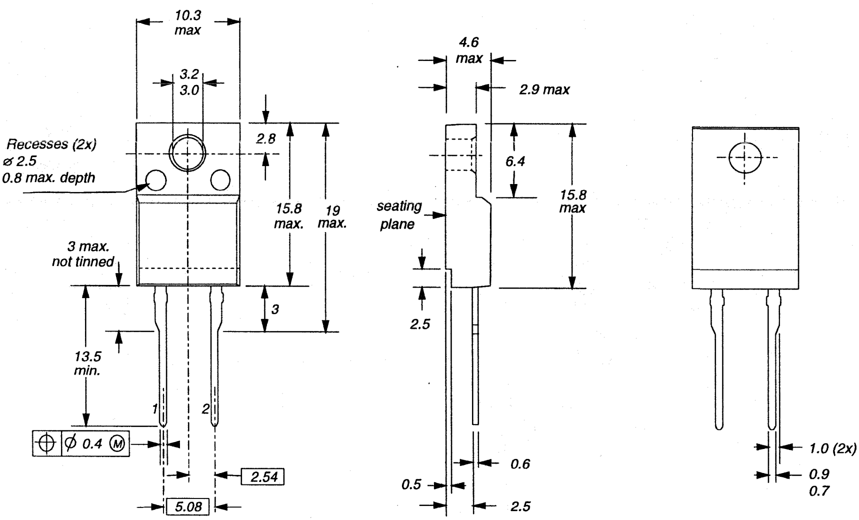


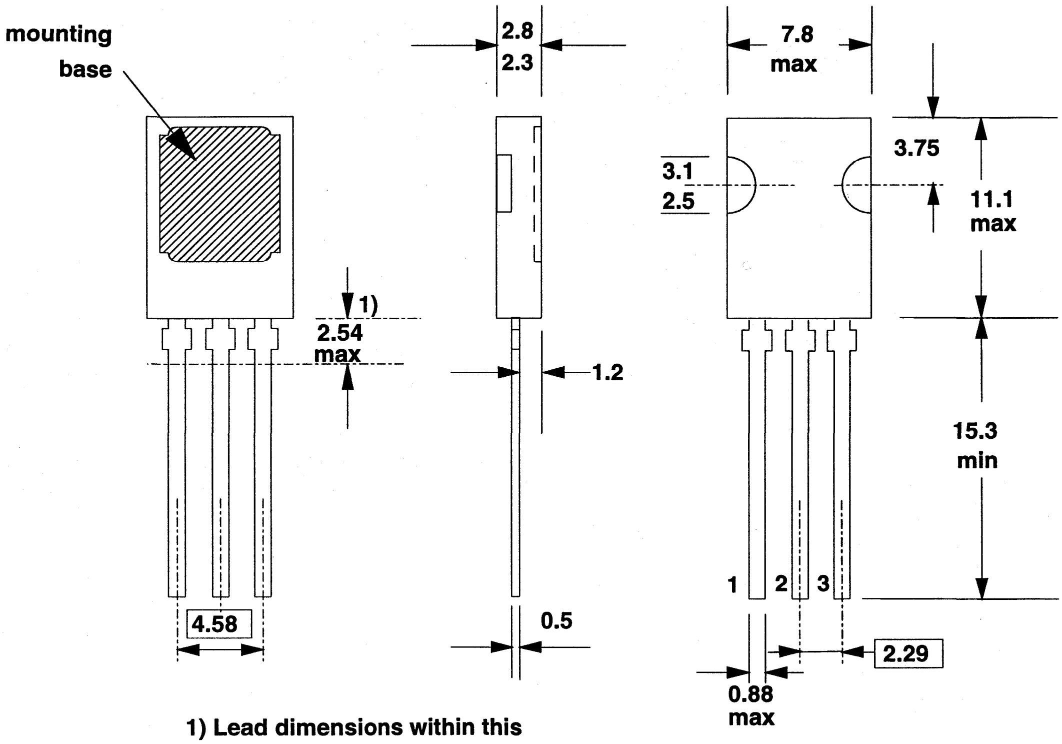

*Fig.7. SOD113; The seating plane is electrically isolated from all terminals.*

**Notes**
1. Refer to mounting instructions for F-pack envelopes.
2. Epoxy meets UL94 V0 at 1/8".

## MECHANICAL DATA

*Dimensions in mm*

*Net Mass: 0.8 g*




**1) Lead dimensions within this zone uncontrolled.**

*Fig.7. SOT82; pin 2 connected to mounting base.*

**Notes**
1. Accessories supplied on request: refer to mounting instructions for SOT82 envelopes.

## MECHANICAL DATA

*Dimensions in mm*

*Net Mass: 5 g*

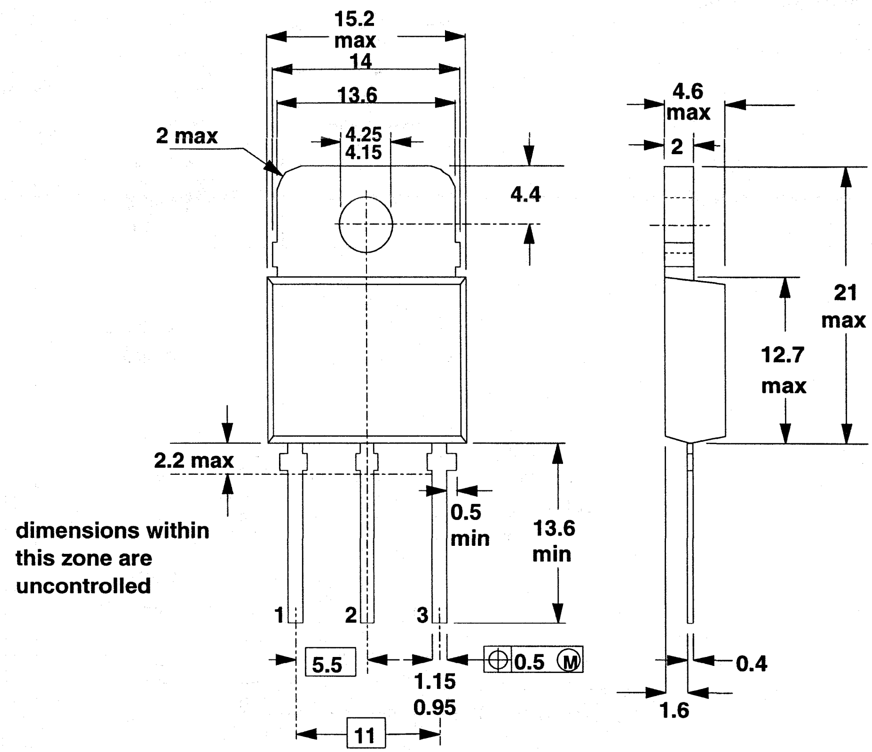



*Fig.7. SOT93; pin 2 connected to mounting base.*

**Notes**
1. Refer to mounting instructions for SOT93 envelope.
2. Epoxy meets UL94 V0 at 1/8".

## MECHANICAL DATA

*Dimensions in mm*

*Net Mass: 2 g*

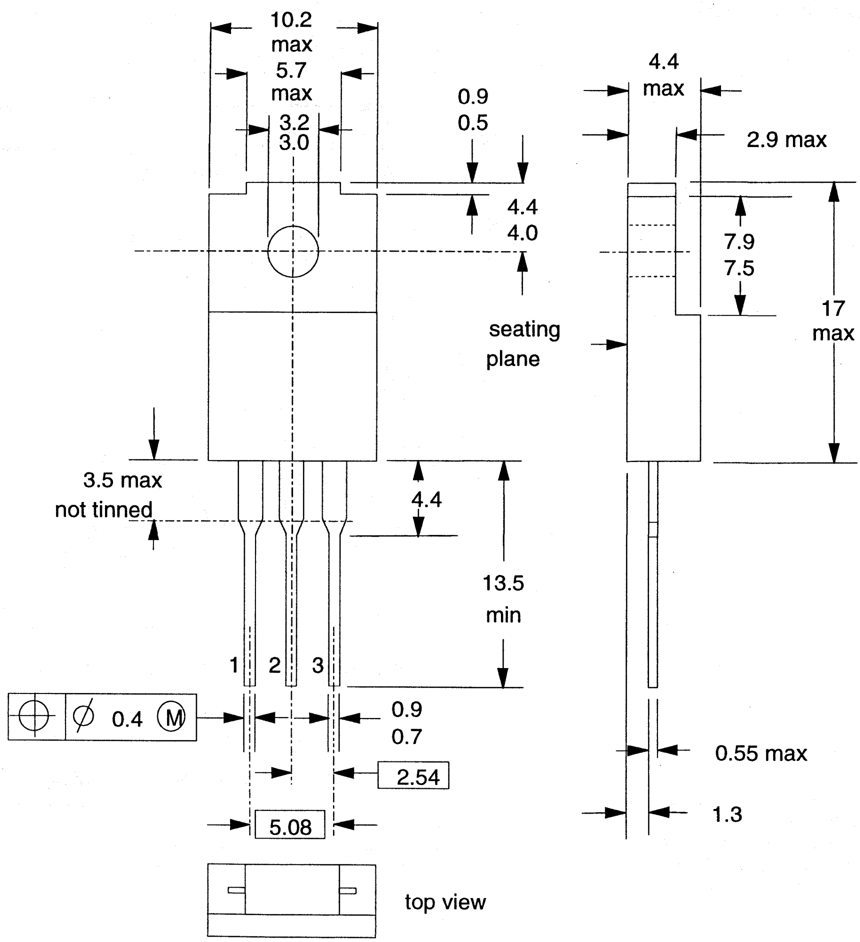



*Fig.12. SOT186; The seating plane is electrically isolated from all terminals.*

**Notes**

1. Refer to mounting instructions for F-pack envelopes.
2. Epoxy meets UL94 V0 at 1/8".

## MECHANICAL DATA

*Dimensions in mm*

*Net Mass: 2 g*

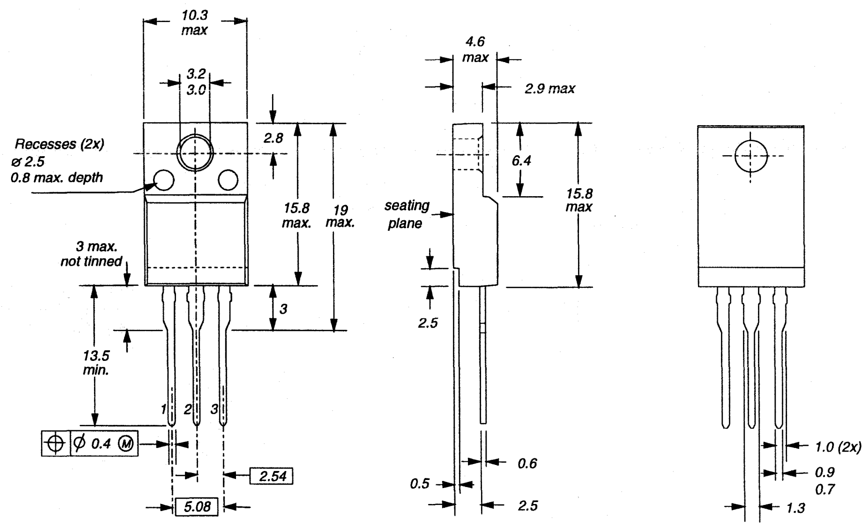



*Fig.7. SOT186A; The seating plane is electrically isolated from all terminals.*

**Notes**
1. Refer to mounting instructions for F-pack envelopes.
2. Epoxy meets UL94 V0 at 1/8".

## MECHANICAL DATA

*Dimensions in mm*

*Net Mass: 5.5 g*

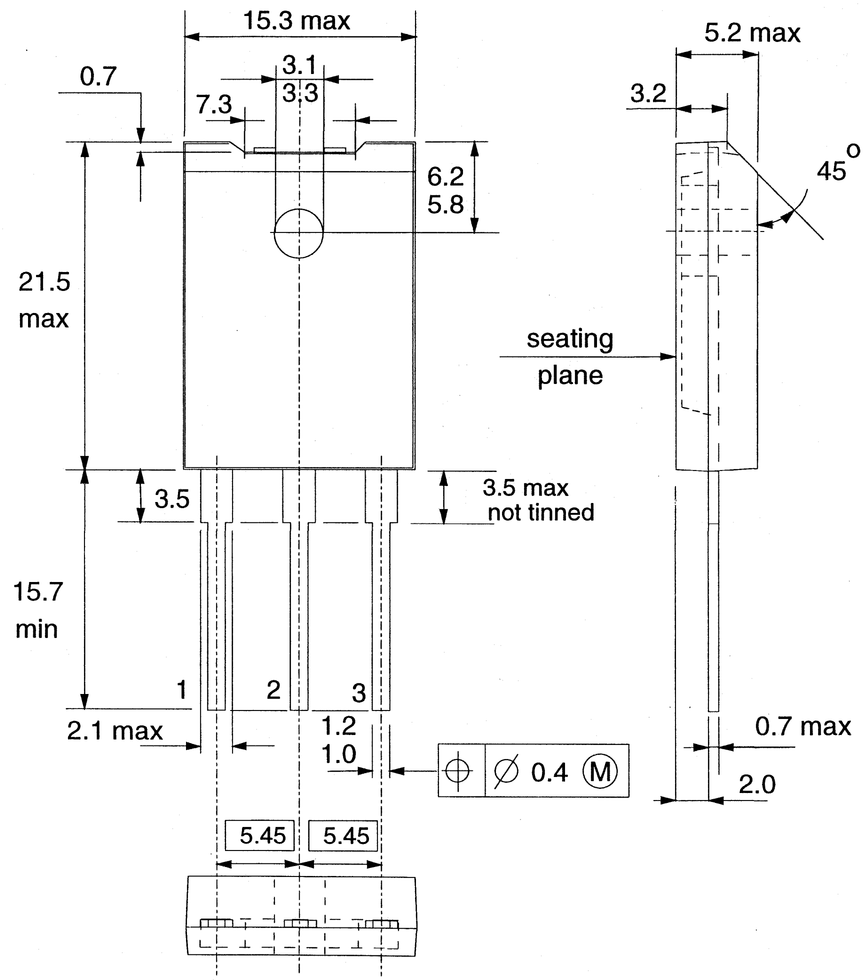



*Fig.10. SOT199; The seating plane is electrically isolated from all terminals.*

**Notes**

1. Refer to mounting instructions for F-pack envelopes.
2. Epoxy meets UL94 V0 at 1/8".

## MECHANICAL DATA

*Dimensions in mm*

*Net Mass: 0.11 g*

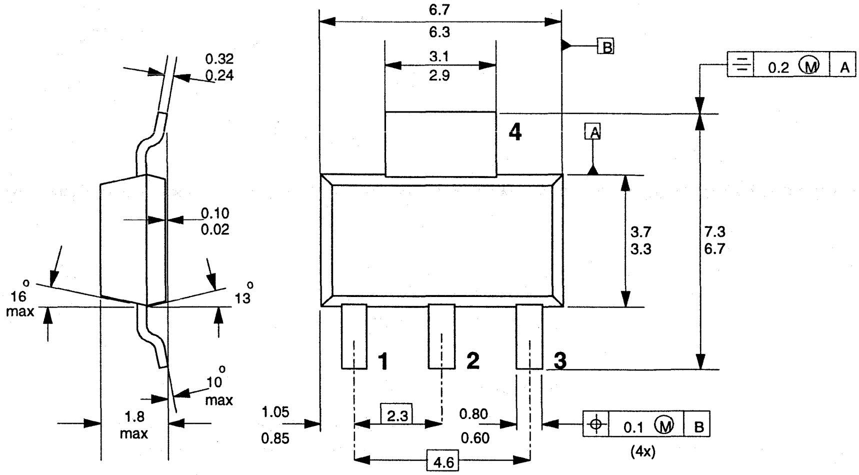



*Fig.8. SOT223 surface mounting package.*

**Notes**

1. For further information, refer to Philips publication SC18 " SMD Footprint Design and Soldering Guidelines". Order code: 9397 750 00505.
2. Epoxy meets UL94 V0 at 1/8".

## MECHANICAL DATA

*Dimensions in mm*

*Net Mass: 1.4 g*

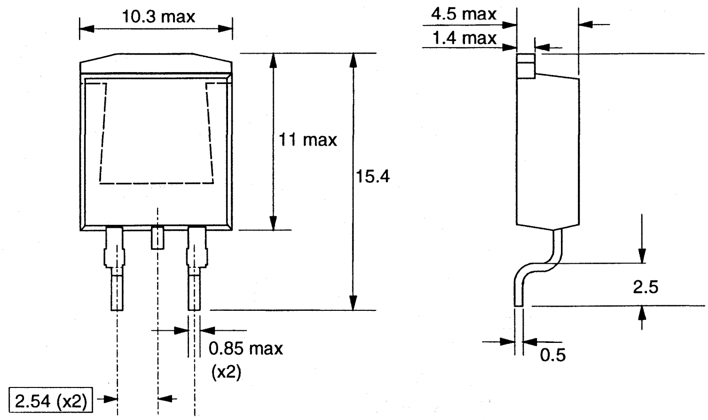



*Fig.7. SOT404 : centre pin connected to mounting base.*

**Notes**

1. Epoxy meets UL94 V0 at 1/8".

## MECHANICAL DATA

*Dimensions in mm*

*Net Mass: 2 g*

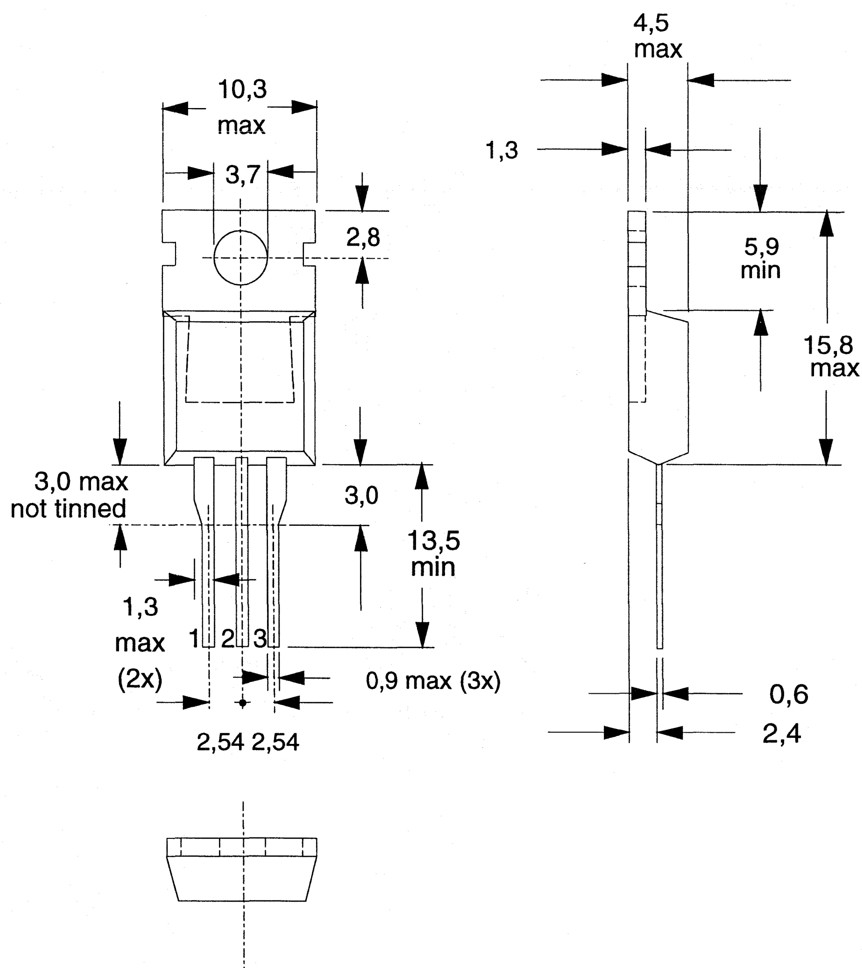



*Fig.7. TO220AB; pin 2 connected to mounting base.*

**Notes**
1. Refer to mounting instructions for TO220 envelopes.
2. Epoxy meets UL94 V0 at 1/8".

## MECHANICAL DATA

*Dimensions in mm*

*Net Mass: 2 g*

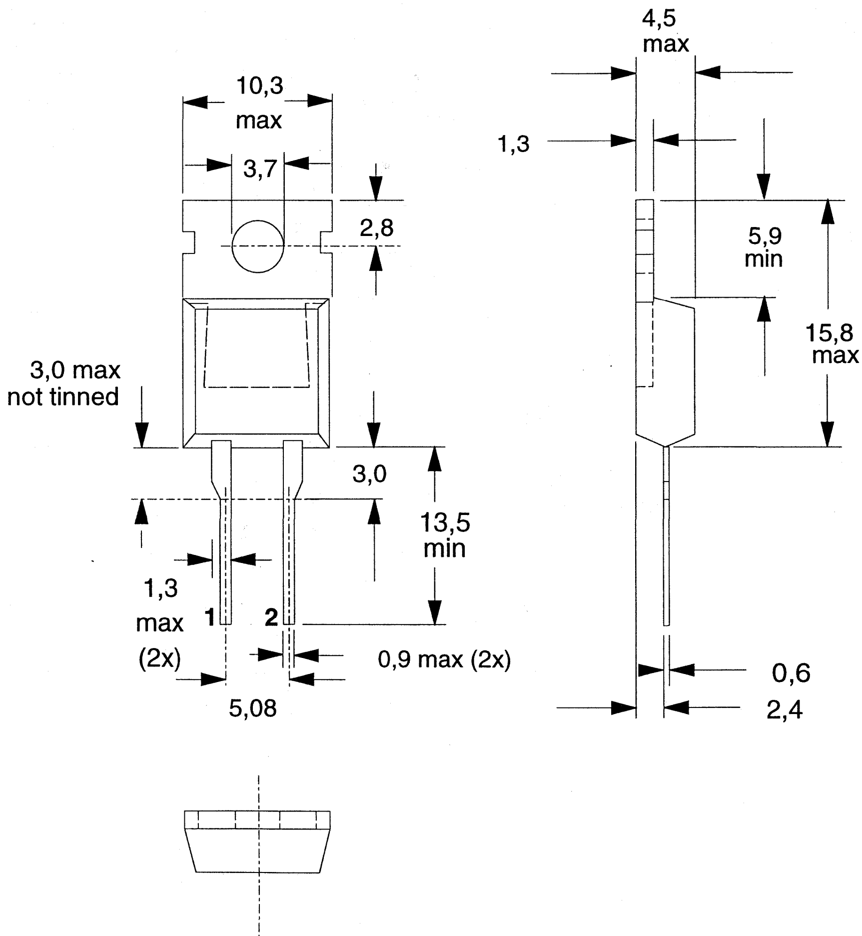


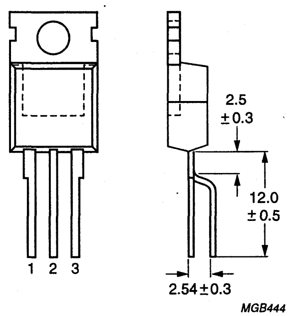

*Fig.10. TO220AC; pin 1 connected to mounting base.*

**Notes**
1. Refer to mounting instructions for TO220 envelopes.
2. Epoxy meets UL94 V0 at 1/8".

# LEADFORM OPTIONS

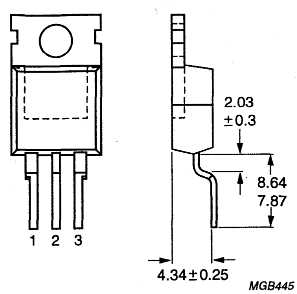
## LEADFORM OPTIONS

- These options require a special part number before ordering.
- Contact your local Philips Semiconductors representative for pricing, minimum order quantities and part number.



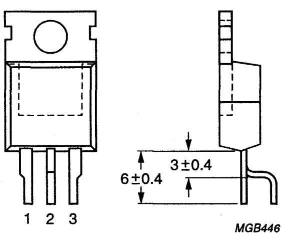

SOT78 (TO-220)

Fig.1 Leadform 78-02.



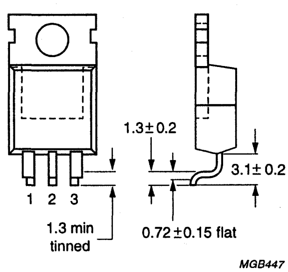

SOT78 (TO-220)

Fig.2 Leadform 78-05W.



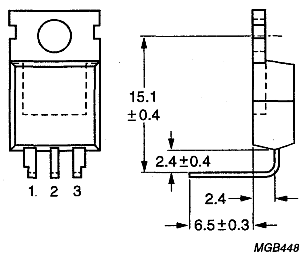

SOT78 (TO-220)

Fig.3 Leadform 78-13.



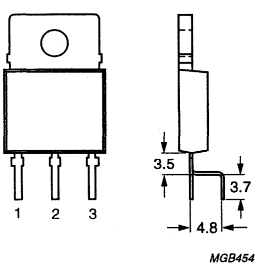

SOT78 (TO-220)

Fig.4 Leadform 78-14.



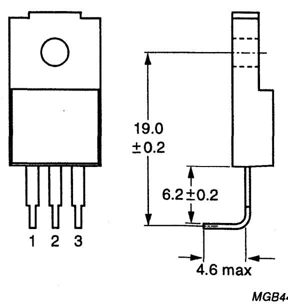

SOT78 (TO-220)

Fig.5 Leadform 78-15.



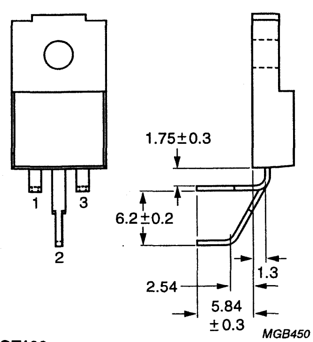

SOT93

Fig.6 Leadform 93-01.



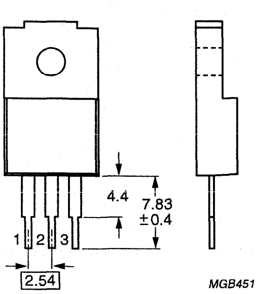

SOT186

Fig.7 Leadform 186-01A.



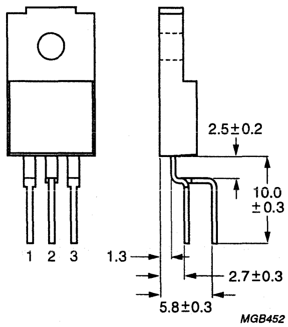

SOT186

Fig.8 Leadform 186-01B.



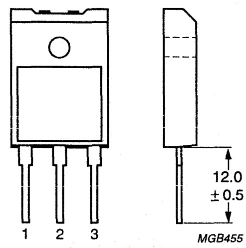

SOT186

Fig.9 Leadform 186-02.



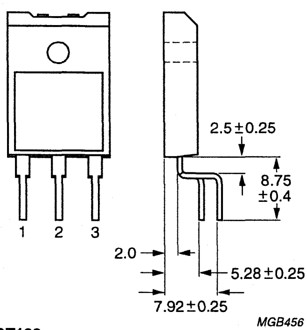

SOT186

Fig.10 Leadform 186A-02.



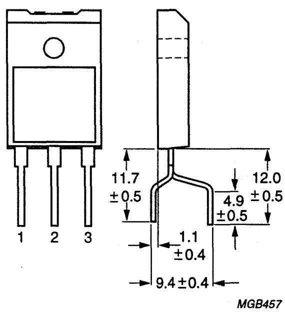

SOT199

Fig.11 Leadform 199-01.



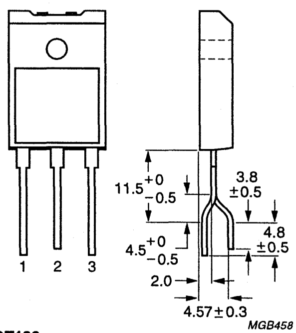

SOT199

Fig.12 Leadform 199-02.



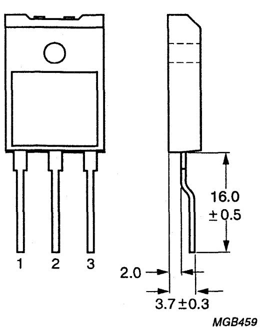

SOT199

Fig.13 Leadform 199-04.



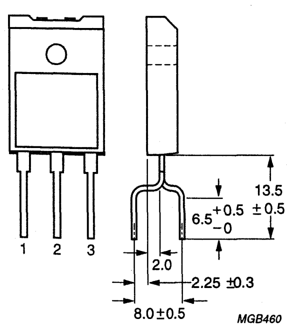

SOT199

Fig.14 Leadform 199-05.



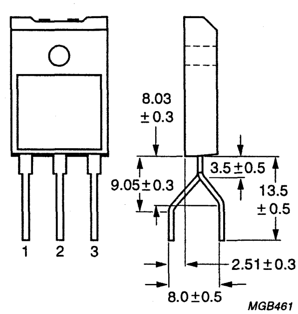

SOT199

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 a metal washer is inserted between the screw head and the device.

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 storage temperature rating $T_{stg} \leq 150$ °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 paste (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 ≤ 165°C for ≤ 10 s max is recommended.

## Lead bending

Lead forming by Philips is available as an option on all products supplied in these outlines.

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.

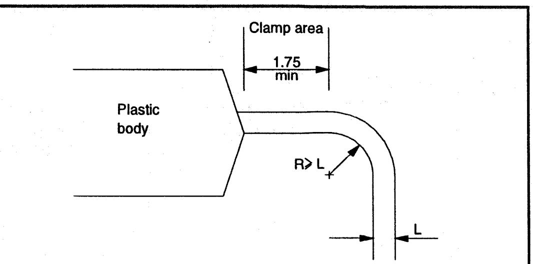



Fig 1. Minimum lead bend radius.

## 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.

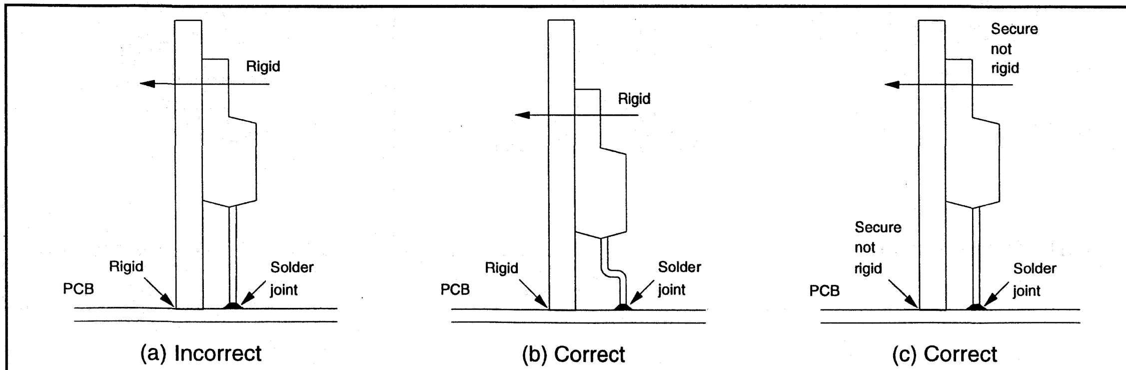



Fig 2. Printed circuit board and heatsink mounting.

## INSTRUCTIONS FOR CLIP MOUNTING

**Direct mounting with spring clip**

1. Apply heatsink compound to the mounting base, then place the device on the heatsink.
2. Push the short end of the clip into the narrow slot in the heatsink with the clip at an angle of 10° to 30° to the vertical. See 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.

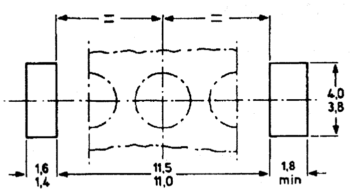



Fig 3. Heatsink requirements.

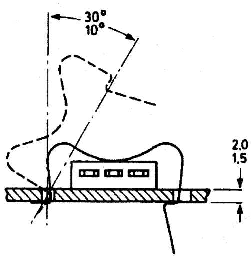



Fig 4. Mounting.

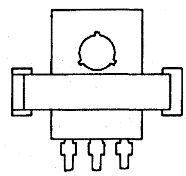


Fig 5. Position of device (top view).

**Insulated mounting with clip and insulator**

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.

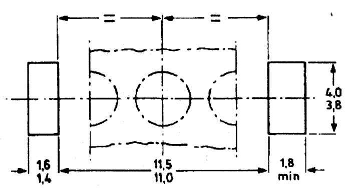



Fig 6. Heatsink requirements.

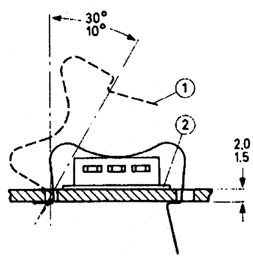



Fig 7. Mounting.
(1) spring clip
(2) insulator

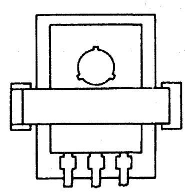


Fig 8. Position of device (top view).

## INSTRUCTIONS FOR SCREW MOUNTING (TO126 ONLY)

### Direct mounting with screw and spacing washer

THROUGH HEATSINK WITH NUT

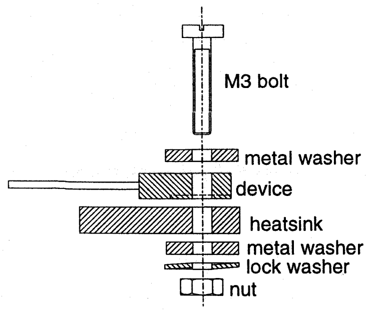



Fig 9. Assembly

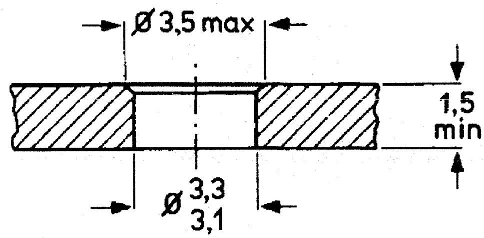



Fig 10. Heatsink requirements.

INTO TAPPED HEATSINK

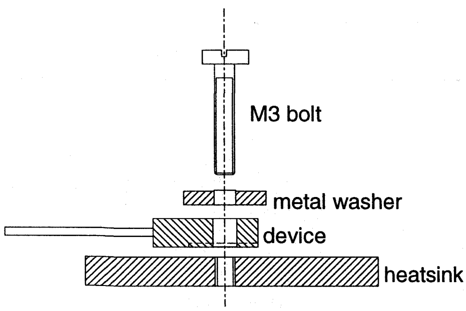



Fig 11. Assembly.

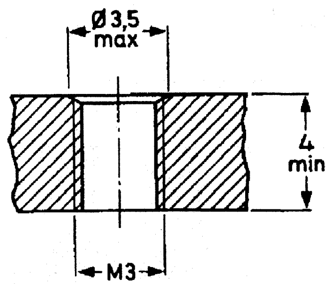



Fig 12. Heatsink requirements.

### Insulated mounting with screw and spacing washer

Not recommended where mounting tab is at mains voltage.

THROUGH HEATSINK WITH NUT

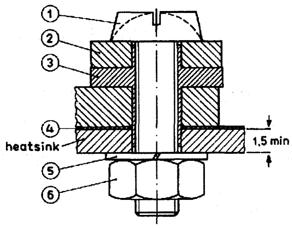



Fig 13. Insulated screw mounting with rectangular washer.

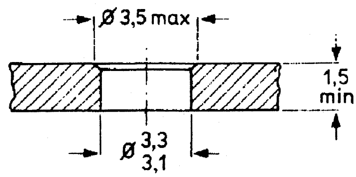



Fig 14. Heatsink requirements.

(1) M2.5 screw
(2) metal washer
(3) insulating bush
(4) insulating washer
(5) lock washer
(6) M2.5 nut

INTO TAPPED HEATSINK

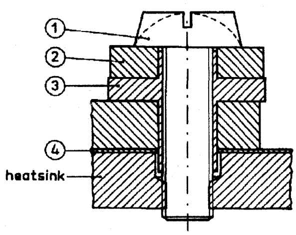



Fig 15. Insulated screw mounting with rectangular washer into tapped heatsink.

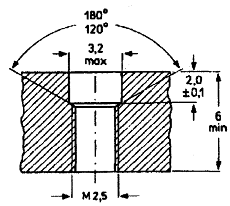



Fig 16. Heatsink requirements.

(1) M2.5 screw
(2) metal washer
(3) insulating bush
(4) insulating washer

## 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. When screw mounting, the rectangular washer should not exert any force on the plastic part of the body.

### 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 a metal 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 (SOT186 and SOT186A) 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 ($R_{th\ mb\text{-}h}$) 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 TO220 envelopes with various heatsink mounting methods

Typical figures, for exact figures see data for each device type.

| $R_{th\ mb\text{-}h}$ Thermal resistance from mounting base to heatsink | K/W | |
|---|---|---|
| **Mounting method** | **clip** | **screw** |
| direct with heatsink compound | 0.3 | 0.5 |
| direct without heatsink compound | 1.4 | 1.4 |
| with heatsink compound and 0.1 mm maximum mica insulator | 2.2 | - |
| with heatsink compound and 0.25 mm maximum alumina insulator | 0.8 | - |
| with heatsink compound and 0.05 mm mica insulator | | |
| insulated up to 500 V | - | 1.4 |
| insulated up to 800 V / 1000 V | - | 1.6 |
| without heatsink compound and 0.05 mm mica insulator | | |
| insulated up to 500 V | - | 3.0 |
| insulated up to 800 V / 1000 V | - | 4.5 |

Additional insulators are generally not required when mounting the full-pack (SOT186 and SOT186A) envelopes.

### Soldering

Recommendations for devices with a maximum storage 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.

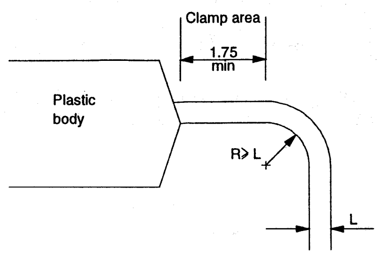



Fig 1. Minimum lead bend radius.

### 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.

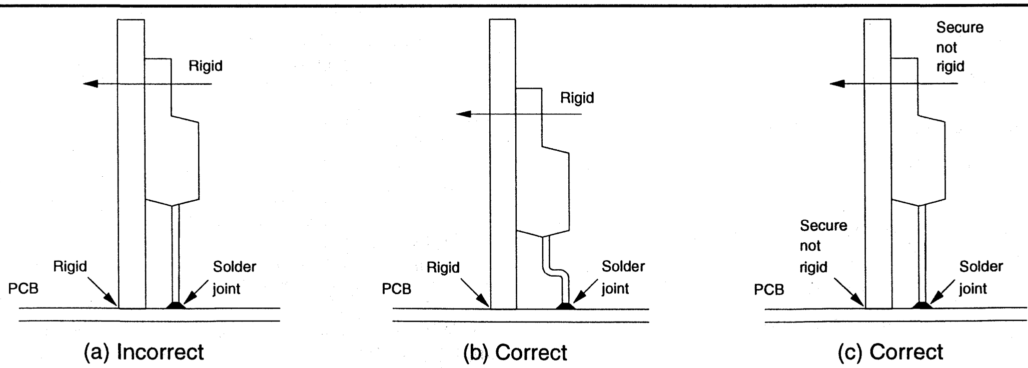



Fig 2. Printed circuit board and heatsink mounting.

# INSTRUCTIONS FOR CLIP MOUNTING

## Direct mounting with spring clip

1. Apply heatsink compound to the mounting base, then place the device on the heatsink.
2. Push the short end of the clip into the narrow slot in the heatsink with the clip at an angle of 10° to 30° to the vertical. See 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.

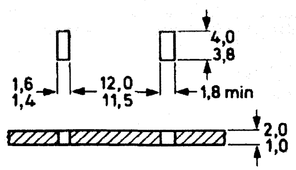



Fig 3. Heatsink requirements.

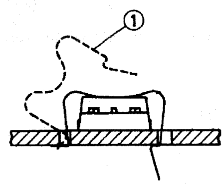



Fig 4. Mounting.
(1) spring clip.

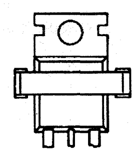


Fig 5. Position of device (top view).

## Insulated mounting with spring clip

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.

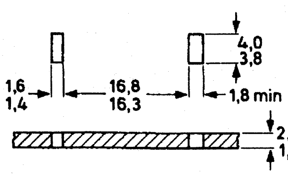



Fig 6. Heatsink requirements.

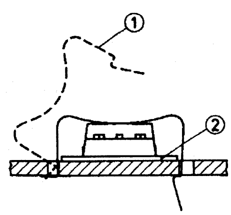



Fig 7. Mounting.
(1) spring clip.
(2) insulator.

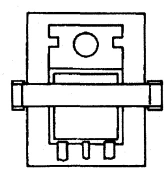


Fig 8. Position of device (top view).

## INSTRUCTIONS FOR SCREW MOUNTING

### Direct mounting with screw and spacing washer

THROUGH HEATSINK WITH NUT

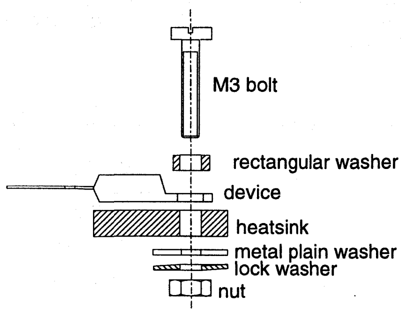



Fig 9. Assembly

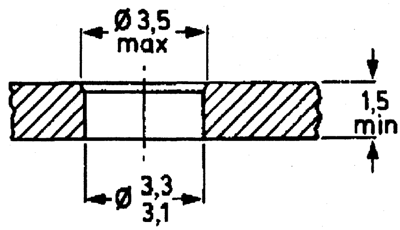



Fig 10. Heatsink requirements

INTO TAPPED HEATSINK

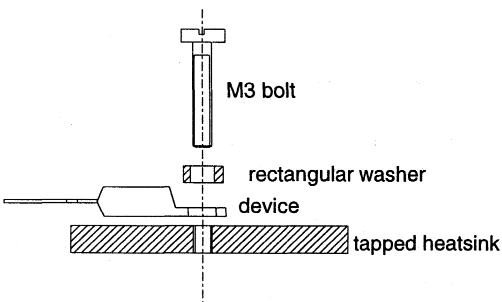



Fig 11. Assembly

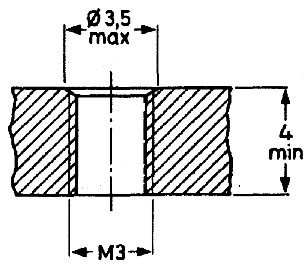



Fig 12. Heatsink requirements.

**Insulated mounting with screw and spacing washer**

Not recommended where mounting tab is at mains voltage. Not applicable for SOT186 or SOT186A.

THROUGH HEATSINK WITH NUT

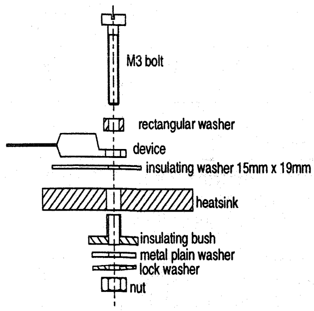



Fig 13. Insulated screw mounting with rectangular washer

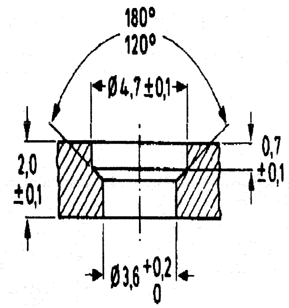



Fig 14. Heatsink requirements for 500 V insulation

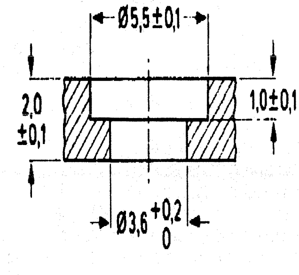



Fig 15. Heatsink requirements for 800V insulation

INTO TAPPED HEATSINK

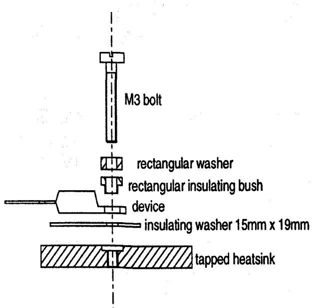



Fig 16. Insulated screw mounting with rectangular washer into tapped heatsink.

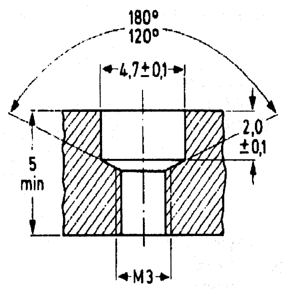



Fig 17. Heatsink requirements for 500 V insulation

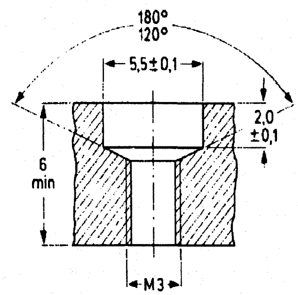



Fig 18. Heatsink requirements for 1000V insulation

## GENERAL DATA AND INSTRUCTIONS

### Scope

The technology of placing, soldering and reworking surface mounted components is covered extensively by other Philips publications listed in the references section. These mounting instructions refer specifically to power semiconductors in the SOT404 envelope.

### The SOT404 Envelope

Surface mounting envelopes for power semiconductors differ from other surface mounting envelopes in that heat generated in the chip has to be conducted efficiently to a heatsink. Surface mount packages such as SOT223 dissipate heat via their leads, which due to their small cross sectional area and long length results in a high thermal resistance.

The SOT404 package removes this limitation. It is the same size and shape as the conventional, leaded TO220 but there is no mounting tab, the leads have been preformed and the mounting surfaces have been lead-tin plated to ensure good solderability. Inside the package, the chip is mounted on a large copper header which conducts the heat from the chip directly to the printed circuit board.

The SOT404 package has the same thermal resistance as TO220 and hence can handle the same power. It has the added advantages of automated surface mounting assembly and higher packing density than through hole components.

### Thermal Management

In order to get the best performance from devices in SOT404, the printed circuit substrate material and the copper traces must conduct heat away efficiently from the mounting base to a heatsink.

The table below gives thermal data for the SOT404 envelope mounted on various printed circuit board substrate materials. The figures are representative of a single-sided printed circuit board measuring 60 mm x 40 mm, with the surface mounted power components and copper traces on the top side. The board is fastened to a heatsink with machine screws and a layer of heatsink compound or a thermally conducting pad is placed between the printed circuit board and the heatsink to improve thermal contact.

The figures are typical only. The thermal resistance of individual designs will depend upon the overall size of the printed circuit board, the packing density of the power devices, and the width of the copper traces.

The thermal resistance between junction and mounting base is quoted in the data sheet for each device type. This value needs to be added to the figures in the table to give the total thermal resistance between junction and heatsink.

**Thermal resistance between mounting base and heatsink.**

| Mounting method | $R_{th\ mb\text{-}hs}$ Typical K/W |
|---|---|
| FR4 glass-epoxy board, 1.6 mm thick, land size as in fig:1. | 50 |
| FR4 glass-epoxy board, 1.6 mm thick, 2.5 cm square mounting land. | 40 |
| FR4 glass-epoxy board, 1.6 mm thick, land size as in fig:1, with pattern of 18 x 0.5 mm dia plated through holes filled with solder. | 8 |
| FR4 glass-epoxy board, 0.8 mm thick, land size as in fig:1, with pattern of 18 x 0.5 mm dia plated through holes filled with solder. | 4 |
| Alumina substrate, 0.8 mm thick, land size as in fig:1. | 2 |
| Aluminium clad substrate, 1.6 mm thick, land size as in fig:1. | 1 |

### PCB Design

Fig:1 shows the recommended land design for SOT404. Increasing the dimensions of the mounting land will improve the thermal conduction between the mounting base and the heatsink.

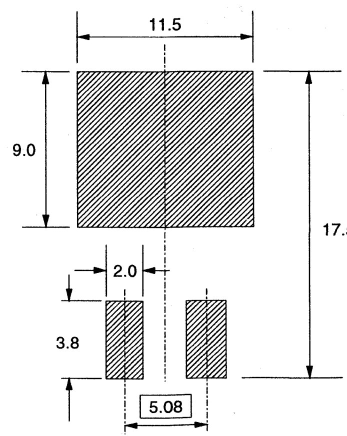



*Fig. 1. SOT404: soldering pattern for surface mounting, (Dimensions in mm)*

### Soldering process

In order to ensure proper solder flow between the device mounting base and the board land, the amount of solder paste on the mounting base land must be controlled. An excess of solder will cause the device top edge to rise up and float on a meniscus of solder. Conversely too little solder will mean an imperfect joint with voids, and the voids will be hidden from visual inspection. Both faults will increase the thermal resistance.

The preferred method of applying solder paste is screen printing or stencil printing. The preferred soldering method is reflow soldering.

SMD footprint design and soldering guidelines are covered in Philips publication SC18. See references section below.

### References

1. SMD Footprint design and Soldering Guidelines. Philips Publication: SC18. Order code: 9397 750 00505
2. SMD Technology, Working with SMDs Order code: 9398 346 60011.
3. SMD Technology, Substrate Design Guidelines. Order code: 9398 346 70011.
4. SMD Technology, Computer-aided Design for SMD Boards. Order code: 9398 346 80011.
5. SMD Technology, Thermal Considerations. Order code: 9398 346 90011.
6. SMD Technology, Substrate Selection. Order code: 9398 347 00011.
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12. SMD Technology, Soldering Techniques. Order code: 9398 347 60011.
13. SMD Technology, Soldered Joint Criteria. Order code: 9398 347 70011.
14. SMD Technology, Test and Repair. Order code: 9398 347 80011.

## 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. When screw mounting, the washer should not exert any force the pastic part of the body.

### 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.

SCREW MOUNTING

It is recommended that a metal washer is inserted between the screw head and the mounting tab.

Do not use self tapping screws.

Mounting torques for screw mounting:

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.

This method is not recommended for full pack envelopes (SOT199) 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 ($R_{th\ mb\text{-}h}$) 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 SOT93 envelope with various heatsink mounting methods

Typical figures, for exact figures see data for each device type.

| $R_{th\ mb\text{-}h}$ | **Thermal resistance from mounting base to heatsink** | **K/W** | |
|---|---|---|---|
| **Mounting method** | | **clip** | **screw** |
| direct with heatsink compound | | 0.3 | 0.3 |
| 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 |

Additional insulators are generally not required when mounting the full-pack, SOT199 envelope.

### 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.

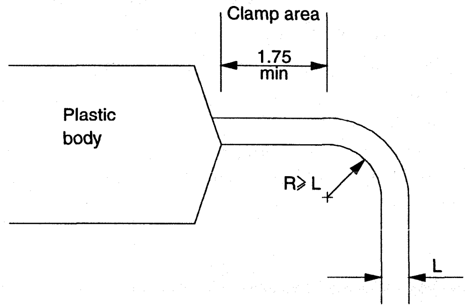
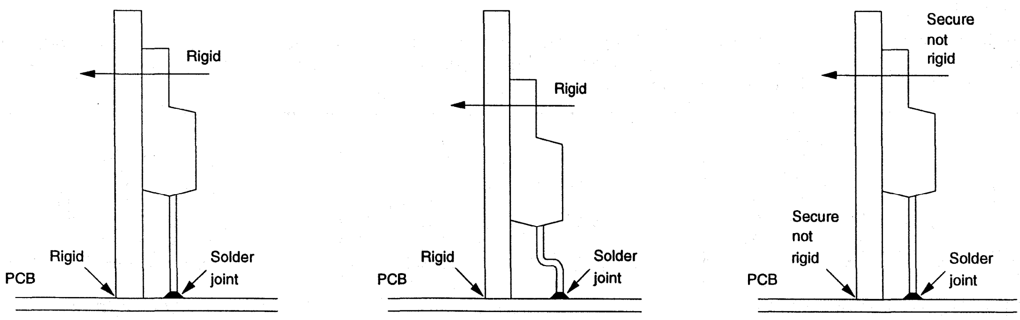



Fig 1. Minimum lead bend radius.

## 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 spring clip

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.

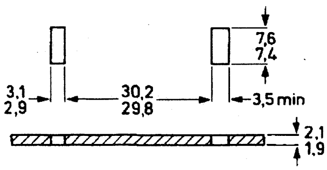


Fig 3. Heatsink requirements

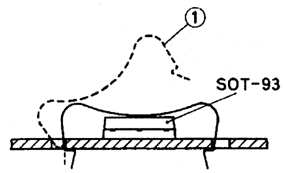


Fig 4. Mounting
(1) spring clip

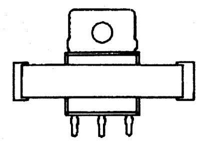


Fig 5. Position of the device.

### Insulated mounting with spring clip

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.

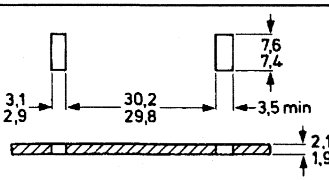


Fig 6. Heatsink requirements

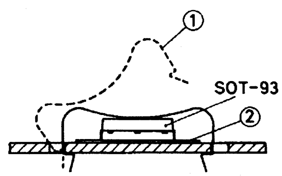


Fig 7. Mounting
(1) spring clip
(2) insulator

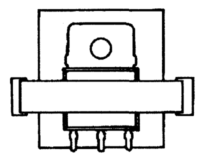


Fig 8. Position of the device.

## INSTRUCTIONS FOR SCREW MOUNTING

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 vibration is expected the use of a lock washer or of a curved spring washer is recommended with a plain washer between the spring washer and the heatsink.

### Direct mounting

THROUGH HEATSINK WITH NUT

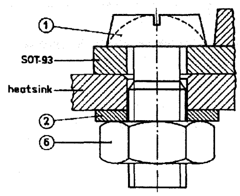



Fig 9. Assembly

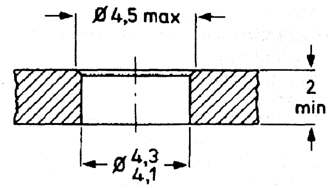



Fig 10. Heatsink requirements

(1) M4 screw
(2) plain washer
(6) M4 nut.

### Insulated mounting

THROUGH HEATSINK WITH NUT UP TO 800 V

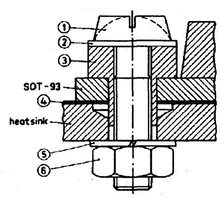



Fig 11. Assembly

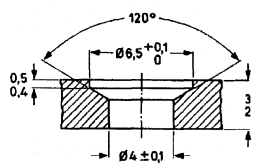



Fig 12. Heatsink requirements up to 800V.

(1) M3 screw
(2) plain washer
(3) insulating bush
(4) mica insulator
(5) lock washer
(6) M3 nut

INTO TAPPED HEATSINK UP TO 800 V

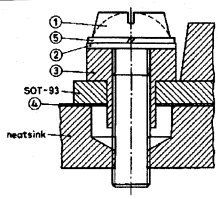



Fig 13. Assembly

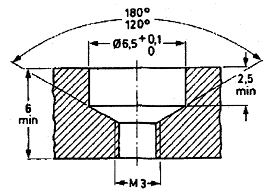



Fig 14. Heatsink requirements up to 800V

(1) M3 screw
(2) plain washer
(3) insulating bush
(4) mica insulator
(5) lock washer

WITH INSERT NUT; UP TO 500V

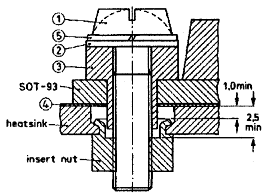



Fig 15. Assembly and heatsink requirements for 500V insulation. See also figures 9 and 10.

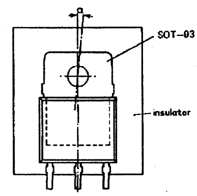



Fig 16. Mica insulator. The axial deviation ($\alpha$) between package and mica should not exceed 5°

(1) M3 screw
(2) plain washer
(3) insulating bush
(4) mica insulator
(5) lock washer

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# Data handbook system

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