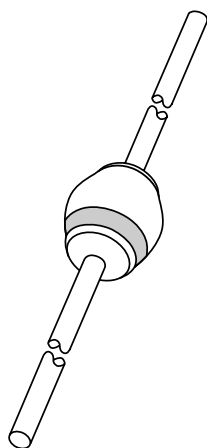


# DATA SHEET



## **BYW97 series** Fast soft-recovery controlled avalanche rectifiers

Product specification  
Supersedes data of 1996 Jun 07

1996 Sep 18

## Fast soft-recovery controlled avalanche rectifiers

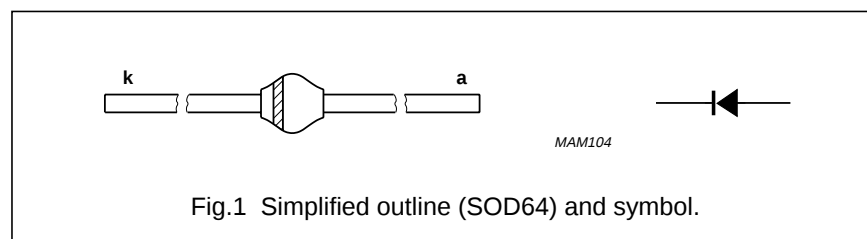
## BYW97 series

### FEATURES

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

### DESCRIPTION

Rugged glass package, using a high temperature alloyed construction. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.



### LIMITING VALUES

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

| SYMBOL      | PARAMETER                                           | CONDITIONS                                                                                                               | MIN. | MAX. | UNIT |
|-------------|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|------|------|------|
| $V_{RRM}$   | repetitive peak reverse voltage<br>BYW97F<br>BYW97G |                                                                                                                          | –    | 1200 | V    |
|             |                                                     |                                                                                                                          | –    | 1400 | V    |
| $V_R$       | continuous reverse voltage<br>BYW97F<br>BYW97G      |                                                                                                                          | –    | 1200 | V    |
|             |                                                     |                                                                                                                          | –    | 1400 | V    |
| $I_{F(AV)}$ | average forward current                             | $T_{tp} = 50\text{ °C}$ ; lead length = 10 mm<br>see Fig.2;<br>averaged over any 20 ms period;<br>see also Fig.6         | –    | 3.3  | A    |
| $I_{F(AV)}$ | average forward current                             | $T_{amb} = 55\text{ °C}$ ; PCB mounting (see<br>Fig.11); see Fig.3;<br>averaged over any 20 ms period;<br>see also Fig.6 | –    | 1.3  | A    |
| $I_{FRM}$   | repetitive peak forward current                     | $T_{tp} = 50\text{ °C}$ ; see Fig.4                                                                                      | –    | 33   | A    |
|             |                                                     | $T_{amb} = 55\text{ °C}$ ; see Fig.5                                                                                     | –    | 13   | A    |
| $I_{FSM}$   | non-repetitive peak forward current                 | $t = 10\text{ ms}$ half sine wave;<br>$T_j = T_{j\max}$ prior to surge;<br>$V_R = V_{RRM\max}$                           | –    | 60   | A    |
| $E_{RSM}$   | non-repetitive peak reverse avalanche energy        | $L = 120\text{ mH}$ ; $T_j = T_{j\max}$ prior to<br>surge; inductive load switched off                                   | –    | 10   | mJ   |
| $T_{stg}$   | storage temperature                                 |                                                                                                                          | –65  | +175 | °C   |
| $T_j$       | junction temperature                                | see Fig.7                                                                                                                | –65  | +175 | °C   |

# Fast soft-recovery controlled avalanche rectifiers

## BYW97 series

### ELECTRICAL CHARACTERISTICS

$T_j = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

| SYMBOL                         | PARAMETER                                                  | CONDITIONS                                                                                                                 | MIN.         | TYP.   | MAX.   | UNIT                   |
|--------------------------------|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|--------------|--------|--------|------------------------|
| $V_F$                          | forward voltage                                            | $I_F = 5\text{ A}$ ; $T_j = T_{j\text{ max}}$ ; see Fig.8                                                                  | –            | –      | 1.25   | V                      |
|                                |                                                            | $I_F = 5\text{ A}$ ; see Fig.8                                                                                             | –            | –      | 1.45   | V                      |
| $V_{(BR)R}$                    | reverse avalanche<br>breakdown voltage<br>BYW97F<br>BYW97G | $I_R = 0.1\text{ mA}$                                                                                                      |              |        |        |                        |
|                                |                                                            |                                                                                                                            | 1300<br>1500 | –<br>– | –<br>– | V<br>V                 |
| $I_R$                          | reverse current                                            | $V_R = V_{RRM\text{ max}}$ ;<br>see Fig.9                                                                                  | –            | –      | 1      | $\mu\text{A}$          |
|                                |                                                            | $V_R = V_{RRM\text{ max}}$ ; $T_j = 165\text{ }^{\circ}\text{C}$ ;<br>see Fig.9                                            | –            | –      | 150    | $\mu\text{A}$          |
| $t_{rr}$                       | reverse recovery time                                      | when switched from $I_F = 0.5\text{ A}$<br>to $I_R = 1\text{ A}$ ; measured at<br>$I_R = 0.25\text{ A}$ ; see Fig.12       | –            | –      | 500    | ns                     |
| $C_d$                          | diode capacitance                                          | $f = 1\text{ MHz}$ ; $V_R = 0\text{ V}$ ; see Fig.10                                                                       | –            | 65     | –      | pF                     |
| $\left \frac{dI_R}{dt}\right $ | maximum slope of<br>reverse recovery current               | when switched from $I_F = 1\text{ A}$ to<br>$V_R \geq 30\text{ V}$ and $dI_F/dt = -1\text{ A}/\mu\text{s}$ ;<br>see Fig.13 | –            | –      | 5      | $\text{A}/\mu\text{s}$ |

### THERMAL CHARACTERISTICS

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

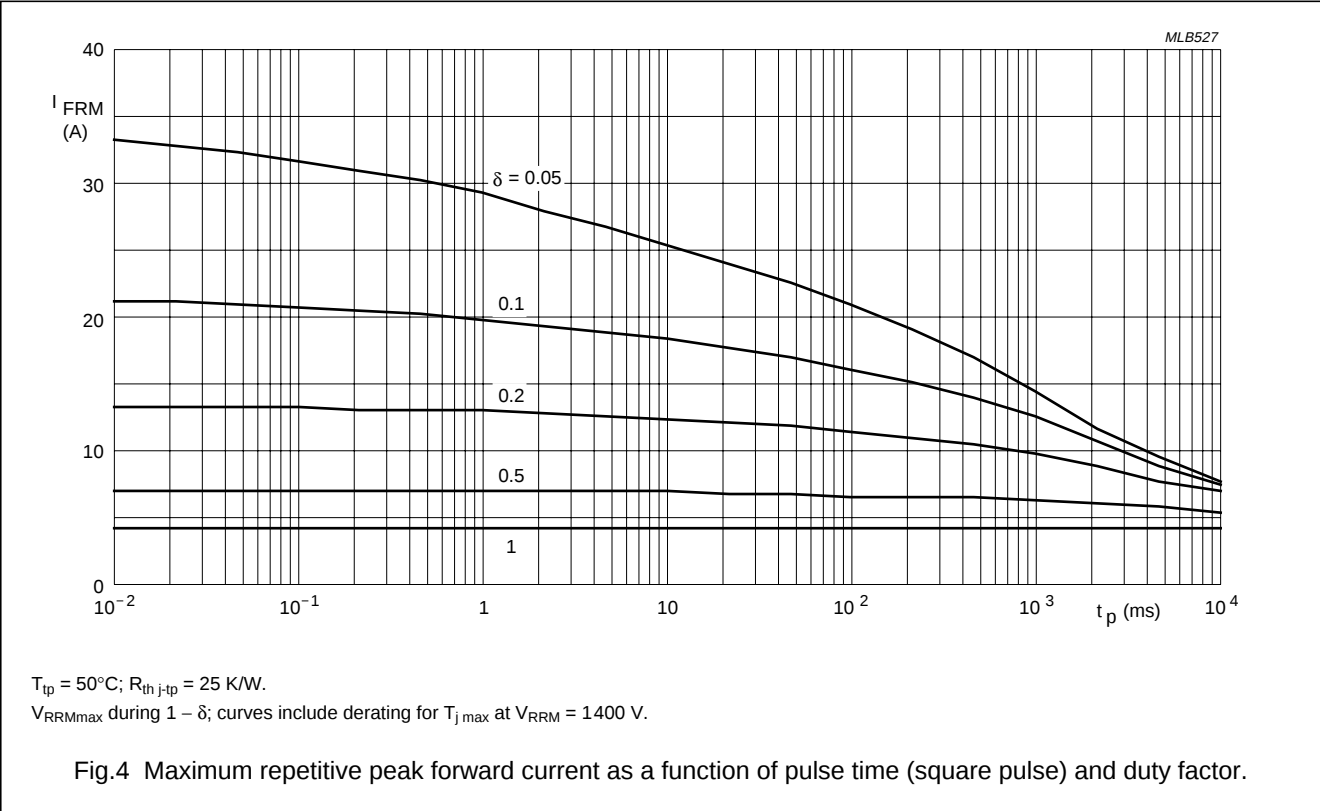
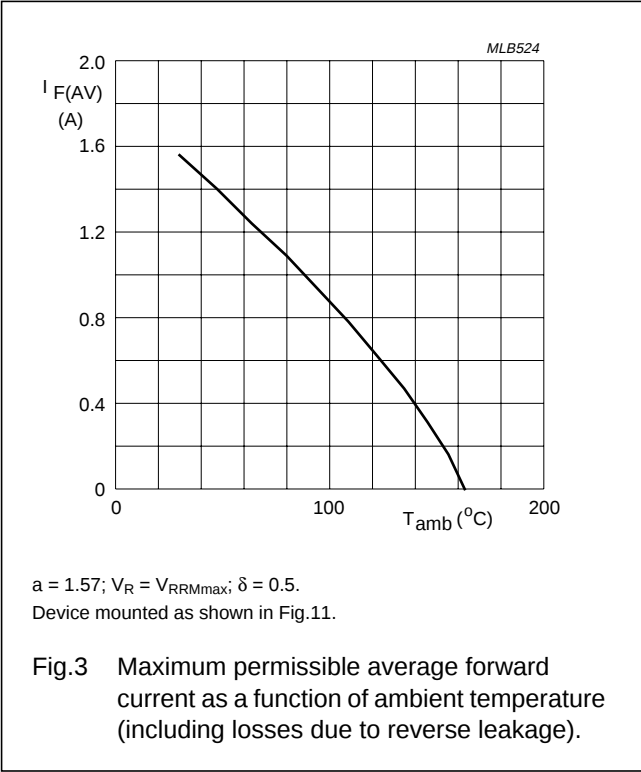
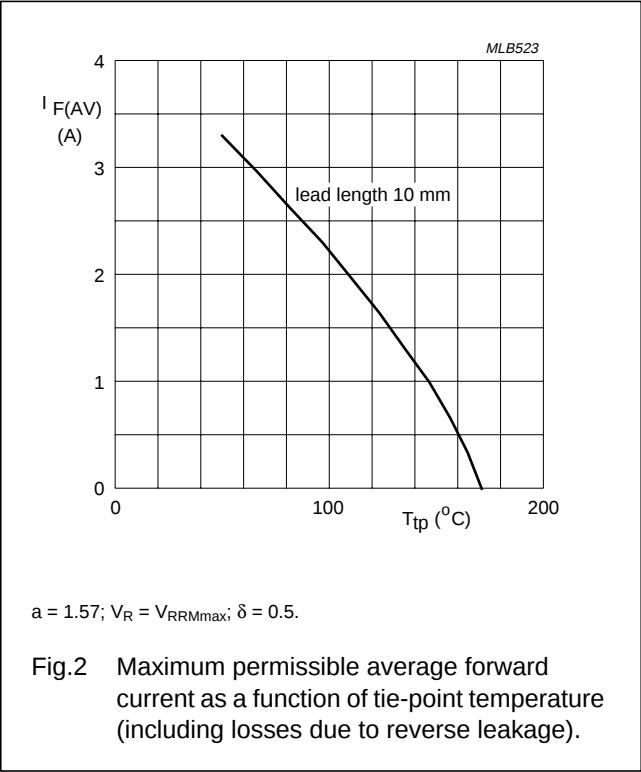
#### Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer  $\geq 40\text{ }\mu\text{m}$ , see Fig.11.  
For more information please refer to the "General Part of associated Handbook".

Fast soft-recovery  
controlled avalanche rectifiers

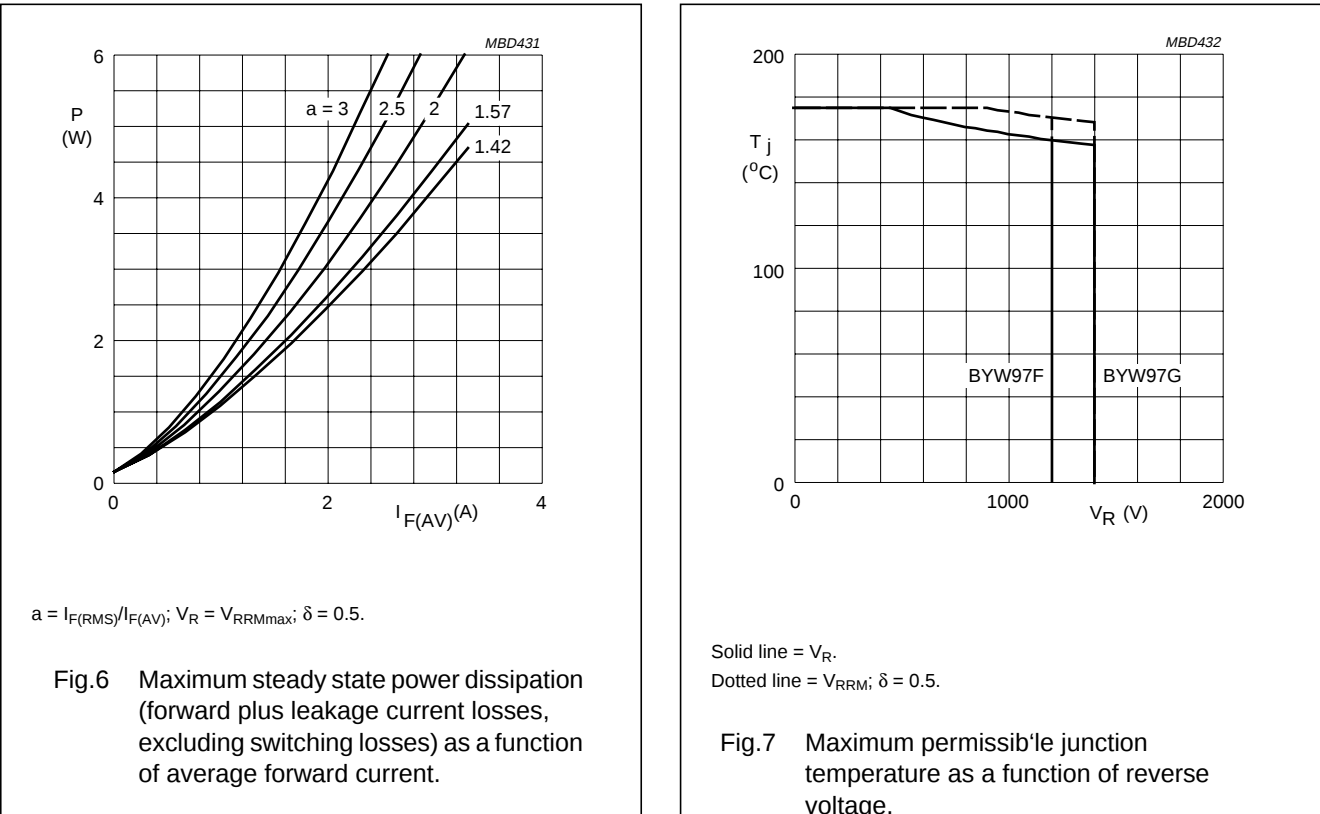
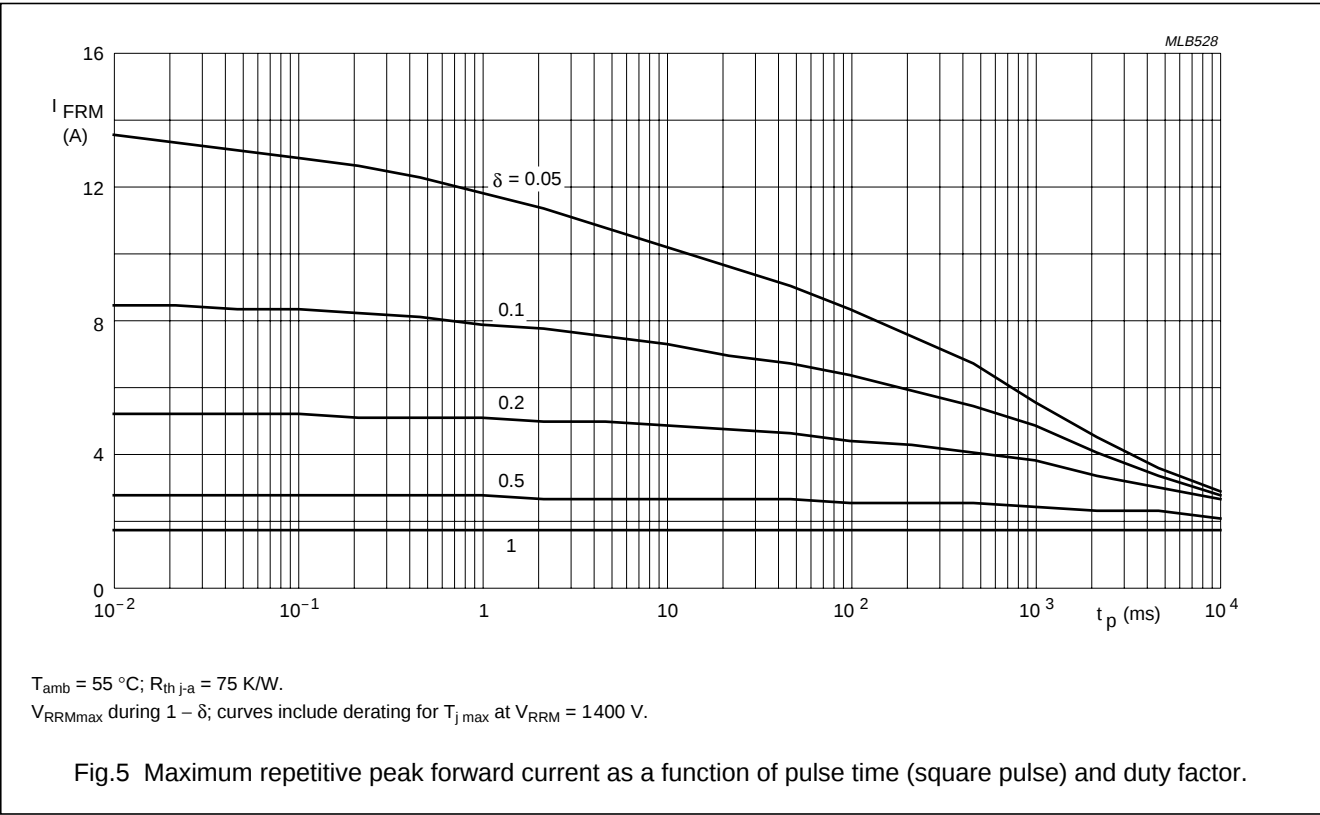
BYW97 series

GRAPHICAL DATA



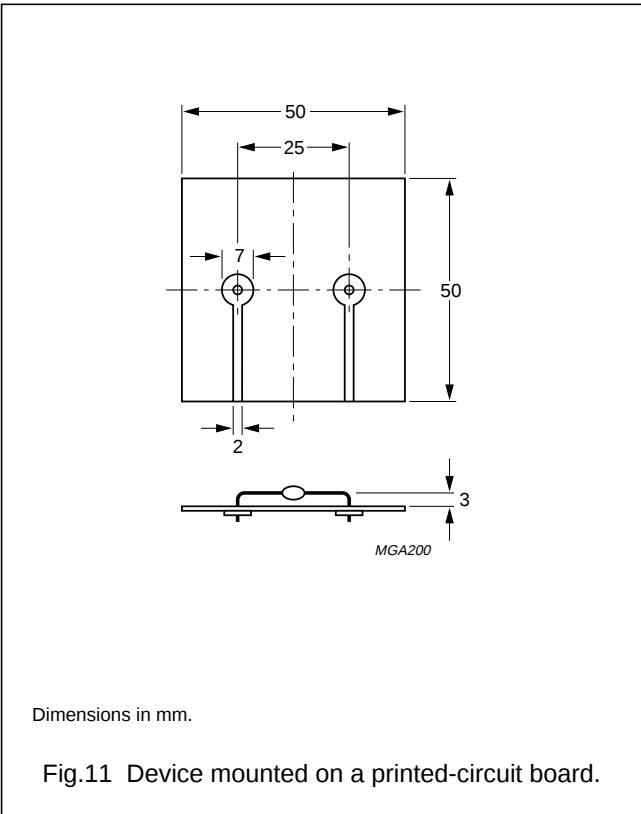
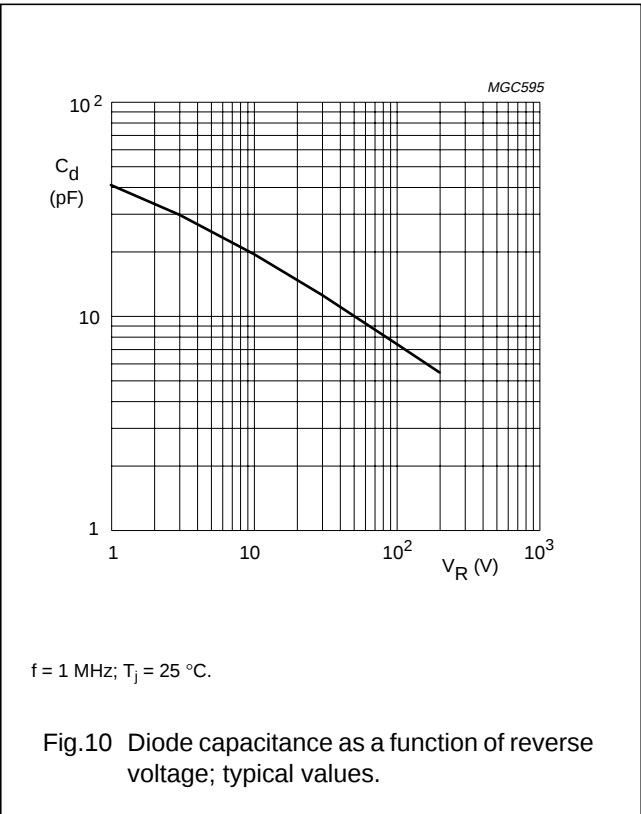
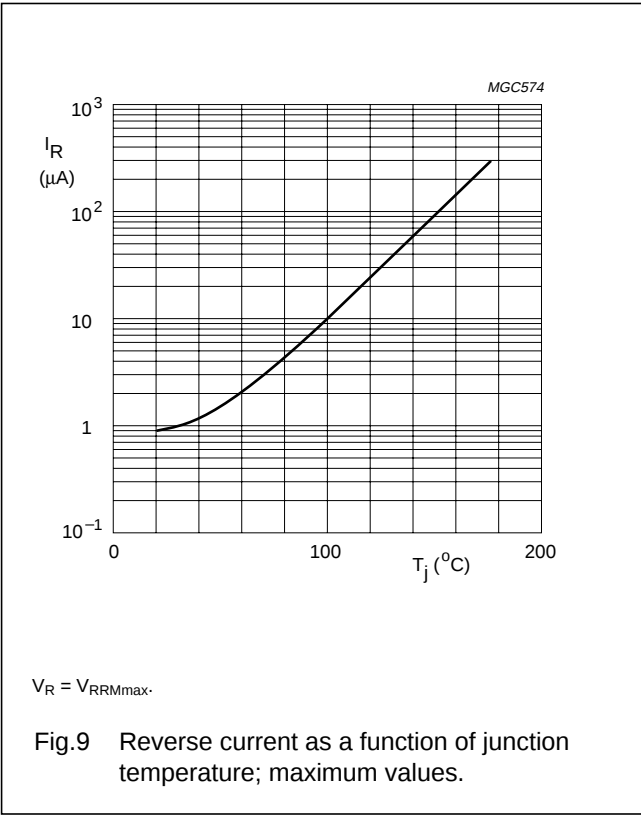
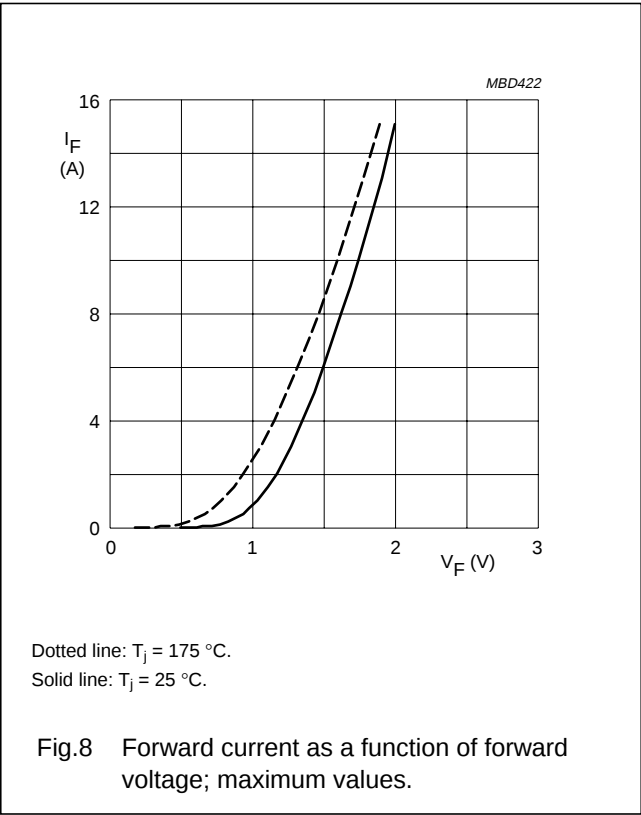
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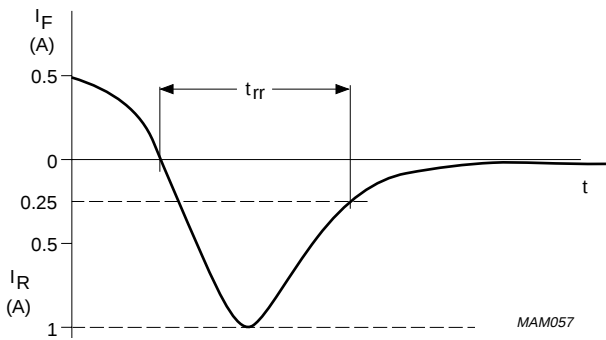
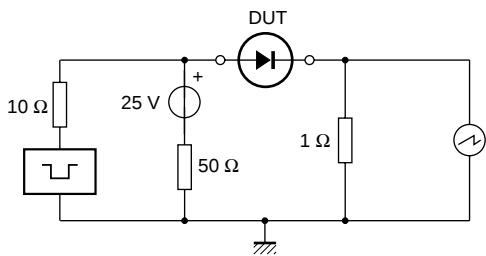
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Input impedance oscilloscope: 1 M $\Omega$ , 22 pF;  $t_r \leq 7$  ns.  
Source impedance: 50  $\Omega$ ;  $t_r \leq 15$  ns.

Fig.12 Test circuit and reverse recovery time waveform and definition.

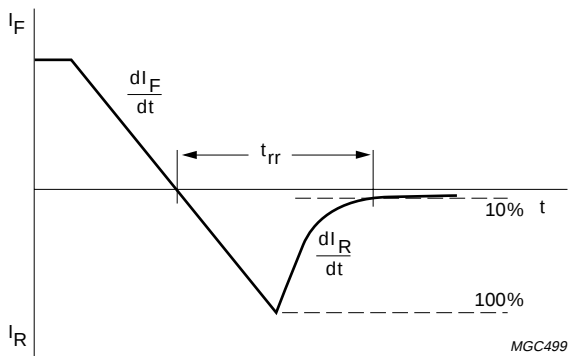
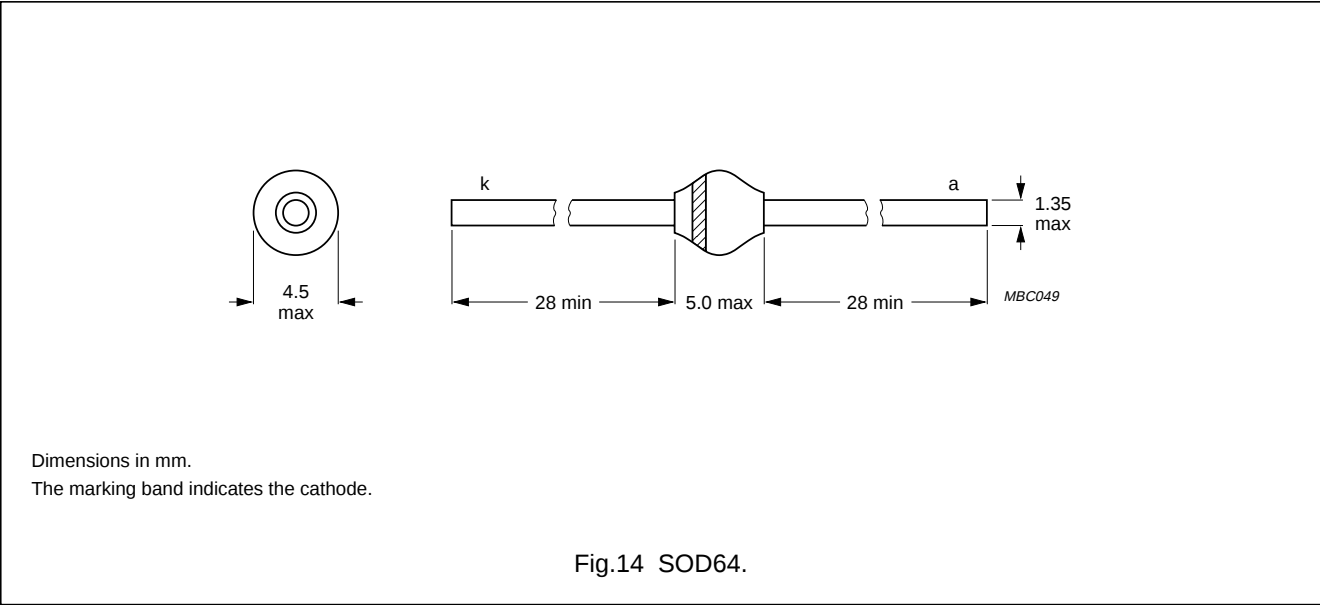


Fig.13 Reverse recovery definitions.

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controlled avalanche rectifiers

BYW97 series

PACKAGE OUTLINE



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.                                                                                                                                                                                                                                                                                                                                                       |                                                                                       |

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