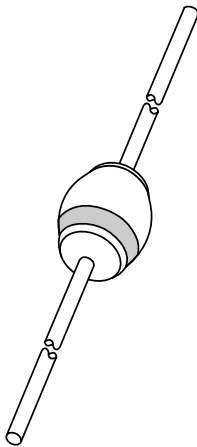


# DATA SHEET



## **BYV96 series** Fast soft-recovery controlled avalanche rectifiers

Product specification  
Supersedes data of April 1982

1996 Jun 07

## Fast soft-recovery controlled avalanche rectifiers

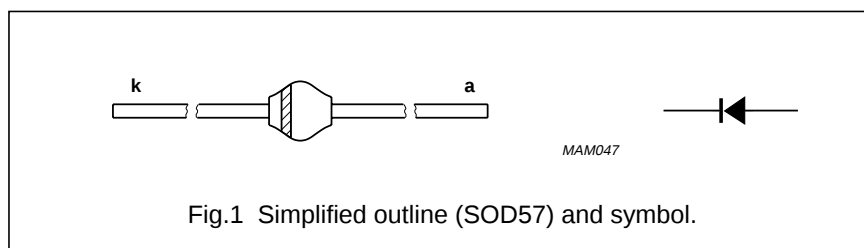
## BYV96 series

### FEATURES

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

### DESCRIPTION

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



### 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>BYV96D<br>BYV96E |                                                                                                                       | –    | 800  | V    |
|             |                                                     |                                                                                                                       | –    | 1000 | V    |
| $V_R$       | continuous reverse voltage<br>BYV96D<br>BYV96E      |                                                                                                                       | –    | 800  | V    |
|             |                                                     |                                                                                                                       | –    | 1000 | V    |
| $I_{F(AV)}$ | average forward current                             | $T_{tp} = 55\text{ °C}$ ; lead length = 10 mm<br>see Fig 2;<br>averaged over any 20 ms period;<br>see also Fig 6      | –    | 1.5  | A    |
|             |                                                     | $T_{amb} = 55\text{ °C}$ ; PCB mounting (see Fig.11); see Fig 3;<br>averaged over any 20 ms period;<br>see also Fig 6 | –    | 0.8  | A    |
| $I_{FRM}$   | repetitive peak forward current                     | $T_{tp} = 55\text{ °C}$ ; see Fig 4                                                                                   | –    | 17   | A    |
|             |                                                     | $T_{amb} = 55\text{ °C}$ ; see Fig 5                                                                                  | –    | 9    | 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>$V_R = V_{RRM\max}$                        | –    | 35   | A    |
| $E_{RSM}$   | non-repetitive peak reverse avalanche energy        | $L = 120\text{ mH}$ ; $T_j = T_{j\max}$ prior to surge; inductive load switched off                                   | –    | 10   | mJ   |
| $T_{stg}$   | storage temperature                                 |                                                                                                                       | –65  | +175 | °C   |
| $T_j$       | junction temperature                                | see Fig 7                                                                                                             | –65  | +175 | °C   |

# Fast soft-recovery controlled avalanche rectifiers

## BYV96 series

### ELECTRICAL CHARACTERISTICS

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

| SYMBOL                         | PARAMETER                                                  | CONDITIONS                                                                                                                 | MIN.        | TYP.   | MAX.   | UNIT                   |
|--------------------------------|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------|--------|--------|------------------------|
| $V_F$                          | forward voltage                                            | $I_F = 3\text{ A}$ ; $T_j = T_{j\text{ max}}$ ; see Fig 8                                                                  | –           | –      | 1.35   | V                      |
|                                |                                                            | $I_F = 3\text{ A}$ ; see Fig 8                                                                                             | –           | –      | 1.60   | V                      |
| $V_{(BR)R}$                    | reverse avalanche<br>breakdown voltage<br>BYV96D<br>BYV96E | $I_R = 0.1\text{ mA}$                                                                                                      |             |        |        |                        |
|                                |                                                            |                                                                                                                            | 900<br>1100 | –<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       | –           | –      | 300    | ns                     |
| $C_d$                          | diode capacitance                                          | $f = 1\text{ MHz}$ ; $V_R = 0\text{ V}$ ; see Fig 10                                                                       | –           | 40     | –      | 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 | –           | –      | 6      | $\text{A}/\mu\text{s}$ |

### THERMAL CHARACTERISTICS

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

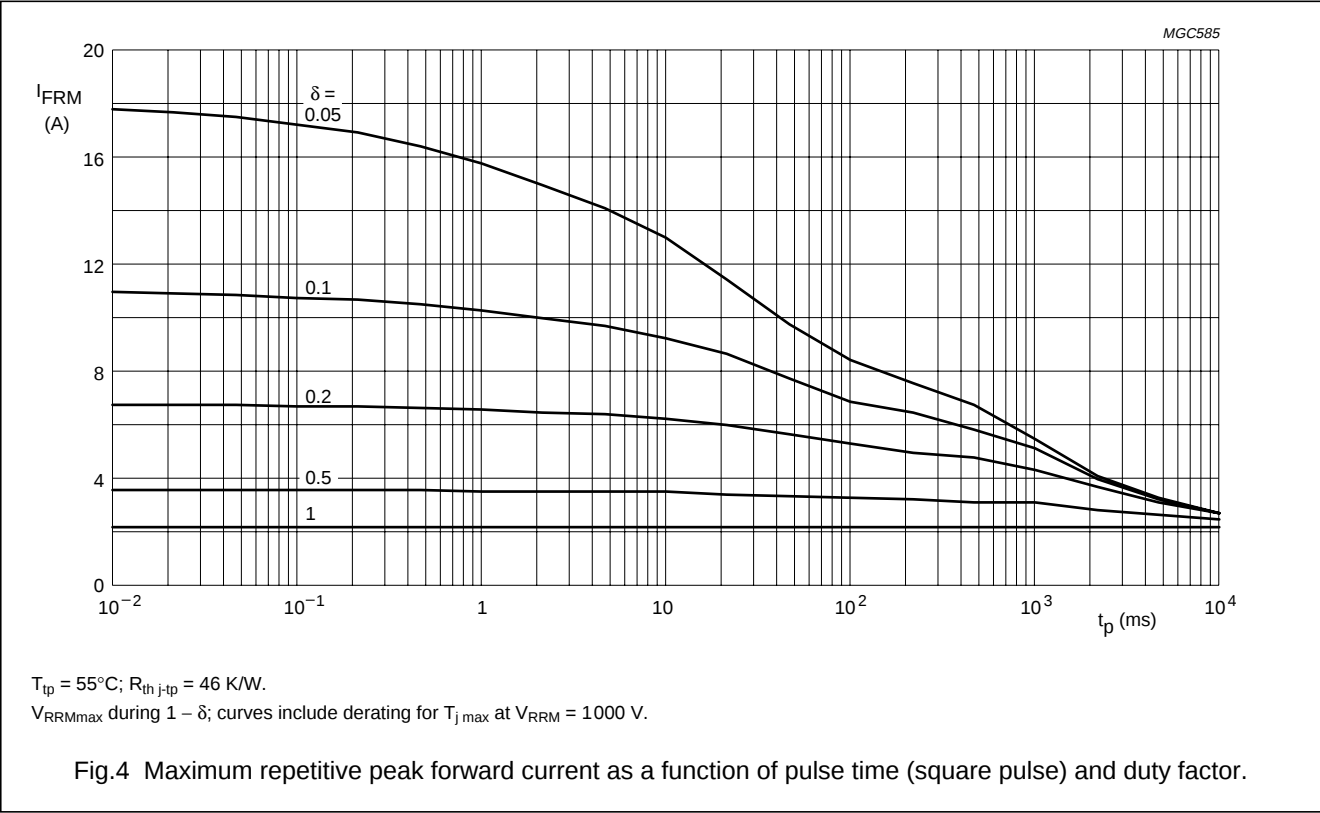
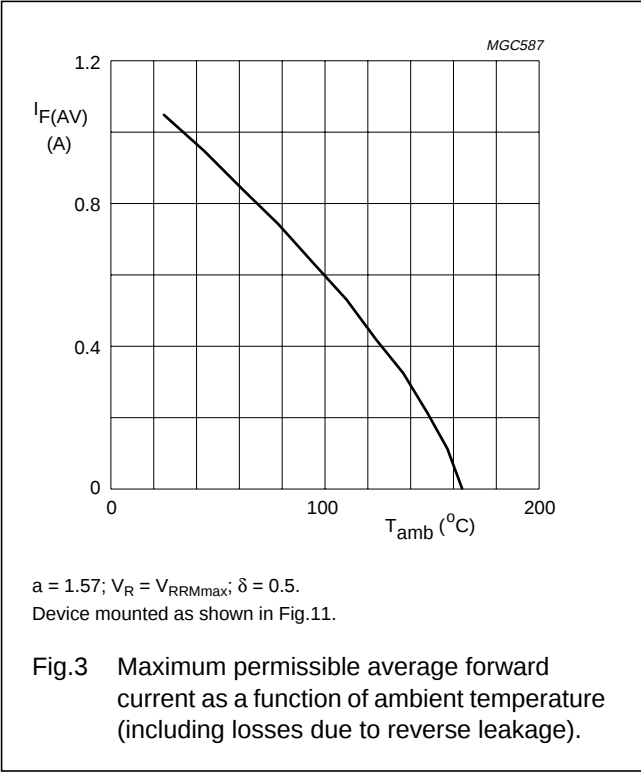
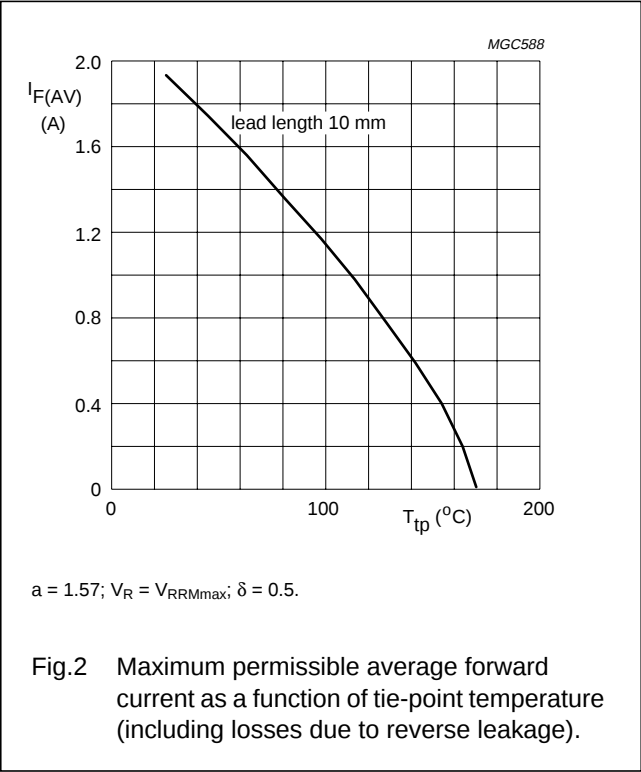
#### Note

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

Fast soft-recovery  
controlled avalanche rectifiers

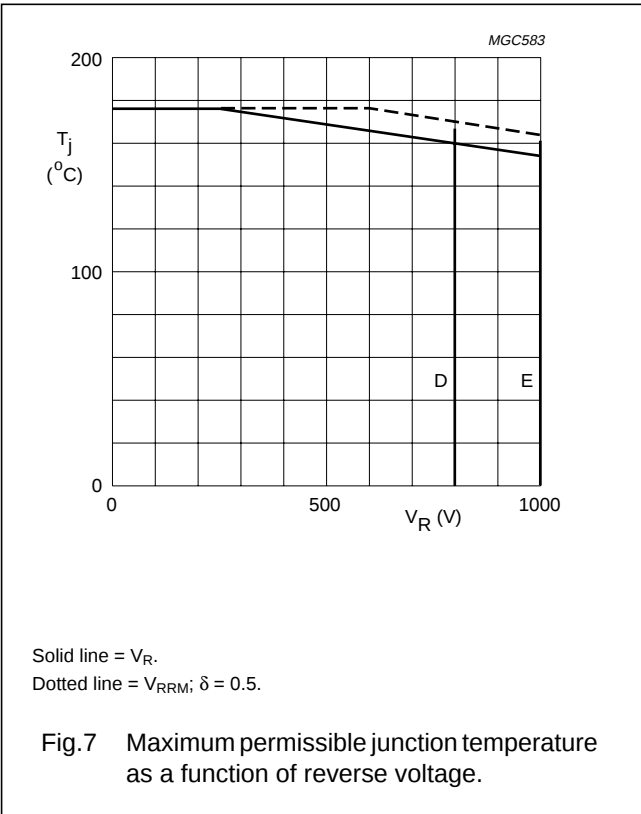
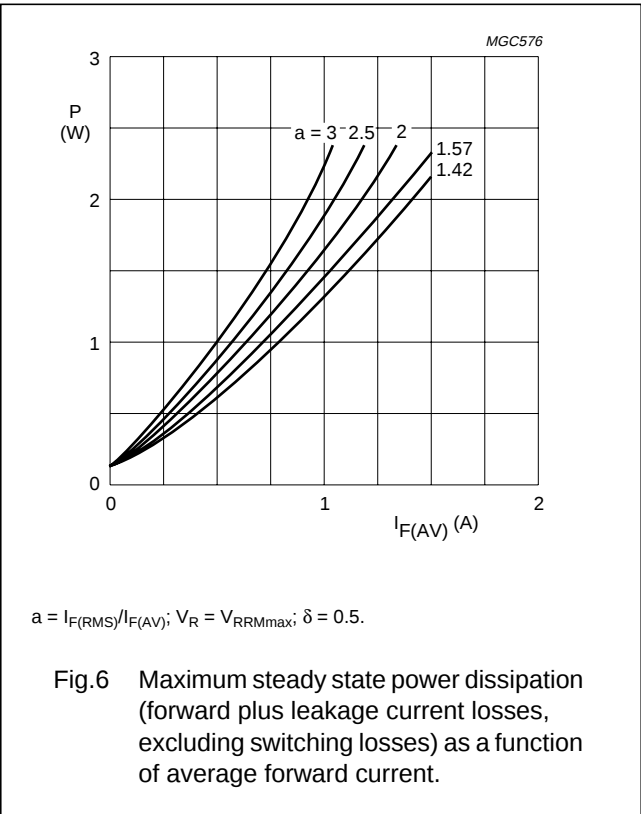
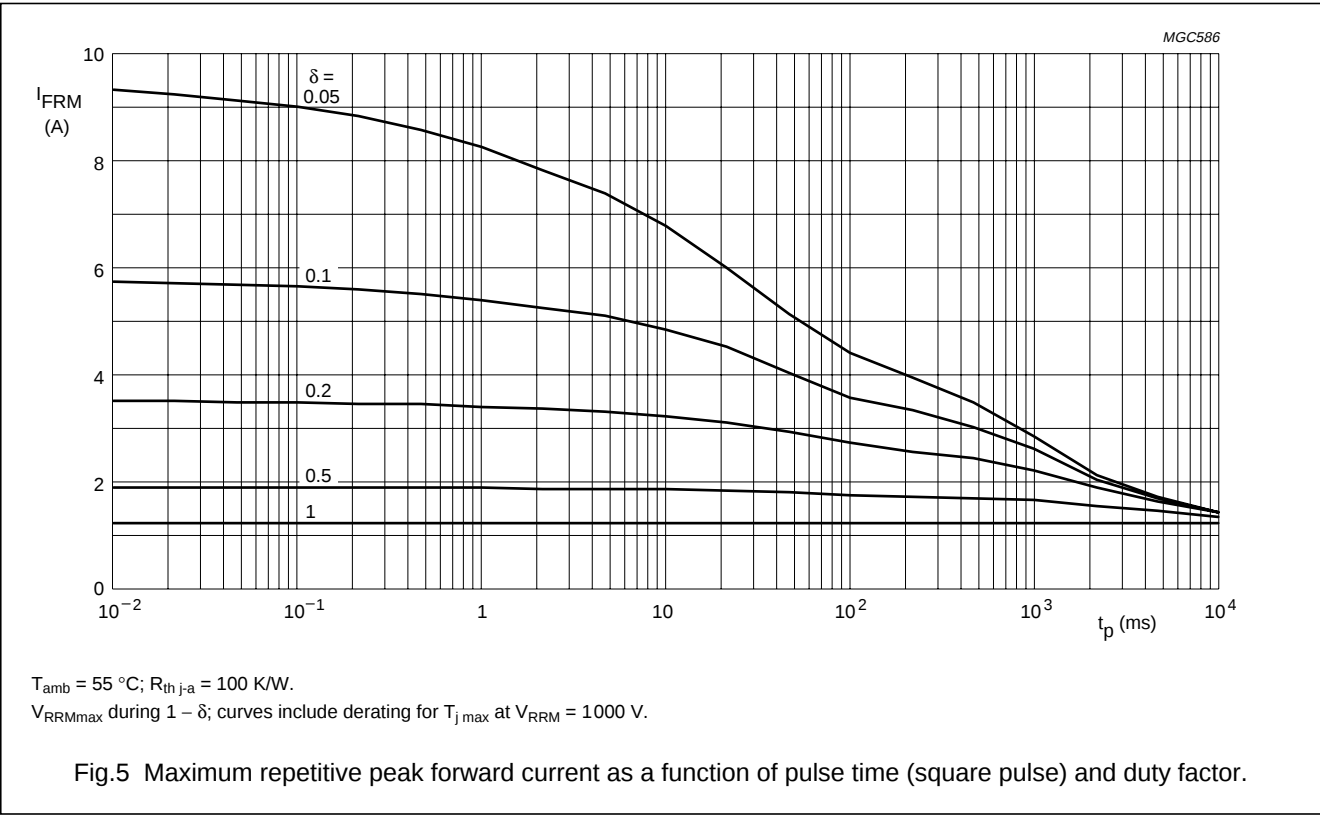
BYV96 series

GRAPHICAL DATA



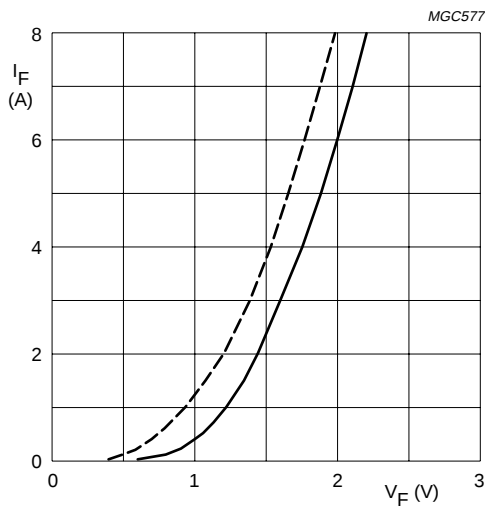
Fast soft-recovery  
controlled avalanche rectifiers

BYV96 series



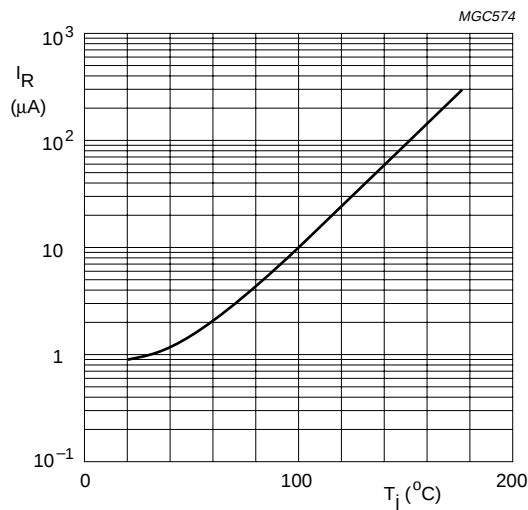
Fast soft-recovery  
controlled avalanche rectifiers

BYV96 series



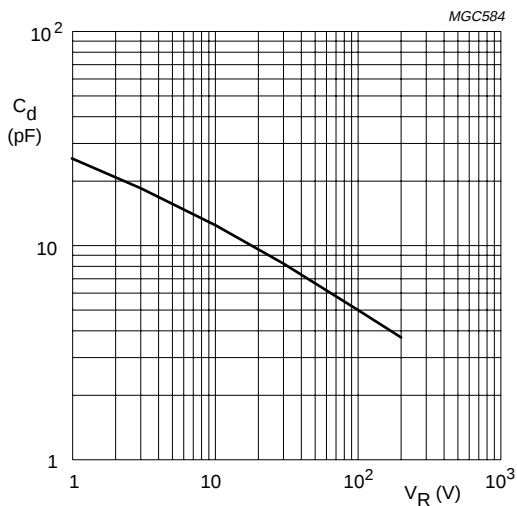
Dotted line:  $T_J = 175\text{ }^{\circ}\text{C}$ .  
Solid line:  $T_J = 25\text{ }^{\circ}\text{C}$ .

Fig.8 Forward current as a function of forward voltage; maximum values.



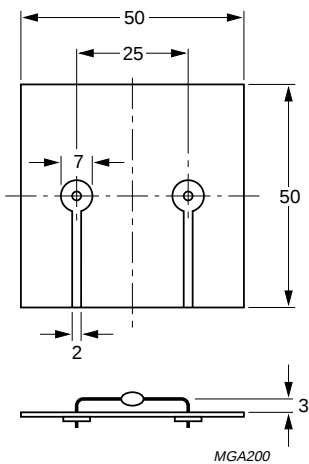
$V_R = V_{RRMmax}$ .

Fig.9 Reverse current as a function of junction temperature; maximum values.



$f = 1\text{ MHz}$ ;  $T_J = 25\text{ }^{\circ}\text{C}$ .

Fig.10 Diode capacitance as a function of reverse voltage; typical values.

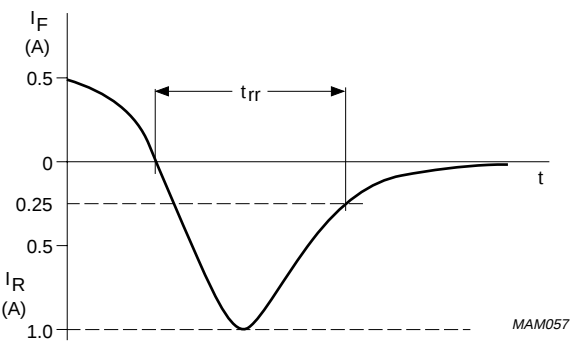
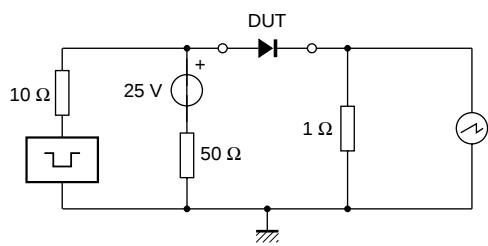


Dimensions in mm.

Fig.11 Device mounted on a printed-circuit board.

Fast soft-recovery  
controlled avalanche rectifiers

BYV96 series



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

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

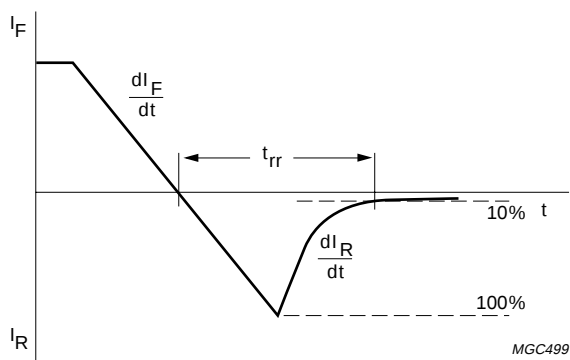
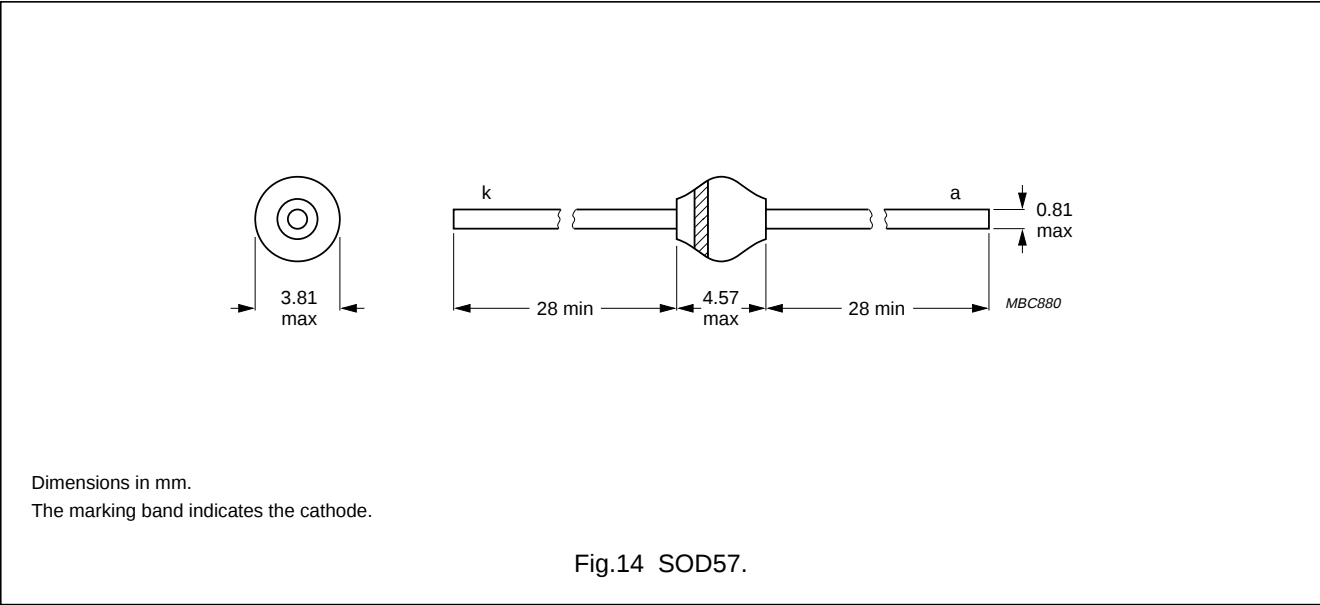


Fig.13 Reverse recovery definitions.

Fast soft-recovery  
controlled avalanche rectifiers

BYV96 series

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.                                                                                                                                                                                                                                                                                                                                                       |                                                                                       |

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.