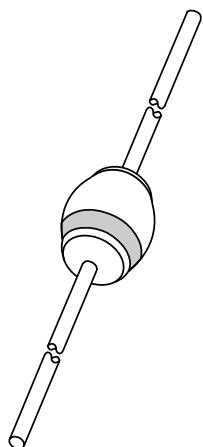


DATA SHEET



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.

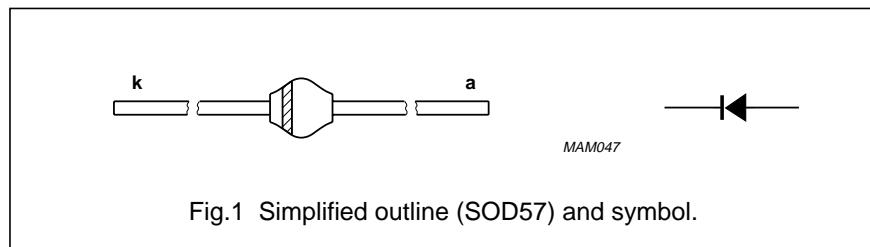


Fig.1 Simplified outline (SOD57) and symbol.

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage BYV96D BYV96E		–	800 1000	V V
V_R	continuous reverse voltage BYV96D BYV96E		–	800 1000	V V
$I_{F(AV)}$	average forward current	$T_{tp} = 55^\circ\text{C}$; lead length = 10 mm see Fig 2; averaged over any 20 ms period; see also Fig 6	–	1.5	A
		$T_{amb} = 55^\circ\text{C}$; PCB mounting (see Fig.11); see Fig 3; averaged over any 20 ms period; see also Fig 6	–	0.8	A
I_{FRM}	repetitive peak forward current	$T_{tp} = 55^\circ\text{C}$; see Fig 4	–	17	A
		$T_{amb} = 55^\circ\text{C}$; see Fig 5	–	9	A
I_{FSM}	non-repetitive peak forward current	$t = 10\text{ ms}$ half sine wave; $T_j = T_{j\ max}$ prior to surge; $V_R = V_{RRM\ max}$	–	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

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	$I_F = 3 \text{ A}; T_j = T_{j\max}; \text{ see Fig 8}$	–	–	1.35	V
		$I_F = 3 \text{ A}; \text{ see Fig 8}$	–	–	1.60	V
$V_{(BR)R}$	reverse avalanche breakdown voltage BYV96D BYV96E	$I_R = 0.1 \text{ mA}$	900 1100	– –	– –	V V
I_R	reverse current	$V_R = V_{RRM\max}; \text{ see Fig 9}$	–	–	1	μA
		$V_R = V_{RRM\max}; T_j = 165^\circ\text{C}; \text{ see Fig 9}$	–	–	150	μA
t_{rr}	reverse recovery time	when switched from $I_F = 0.5 \text{ A}$ to $I_R = 1 \text{ A}$; measured at $I_R = 0.25 \text{ A}$; see Fig 12	–	–	300	ns
C_d	diode capacitance	$f = 1 \text{ MHz}; V_R = 0 \text{ V}; \text{ see Fig 10}$	–	40	–	pF
$\left \frac{dI_R}{dt} \right $	maximum slope of reverse recovery current	when switched from $I_F = 1 \text{ A}$ to $V_R \geq 30 \text{ V}$ and $dI_F/dt = -1 \text{ A}/\mu\text{s}$; see Fig.13	–	–	6	$\text{A}/\mu\text{s}$

THERMAL CHARACTERISTICS

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

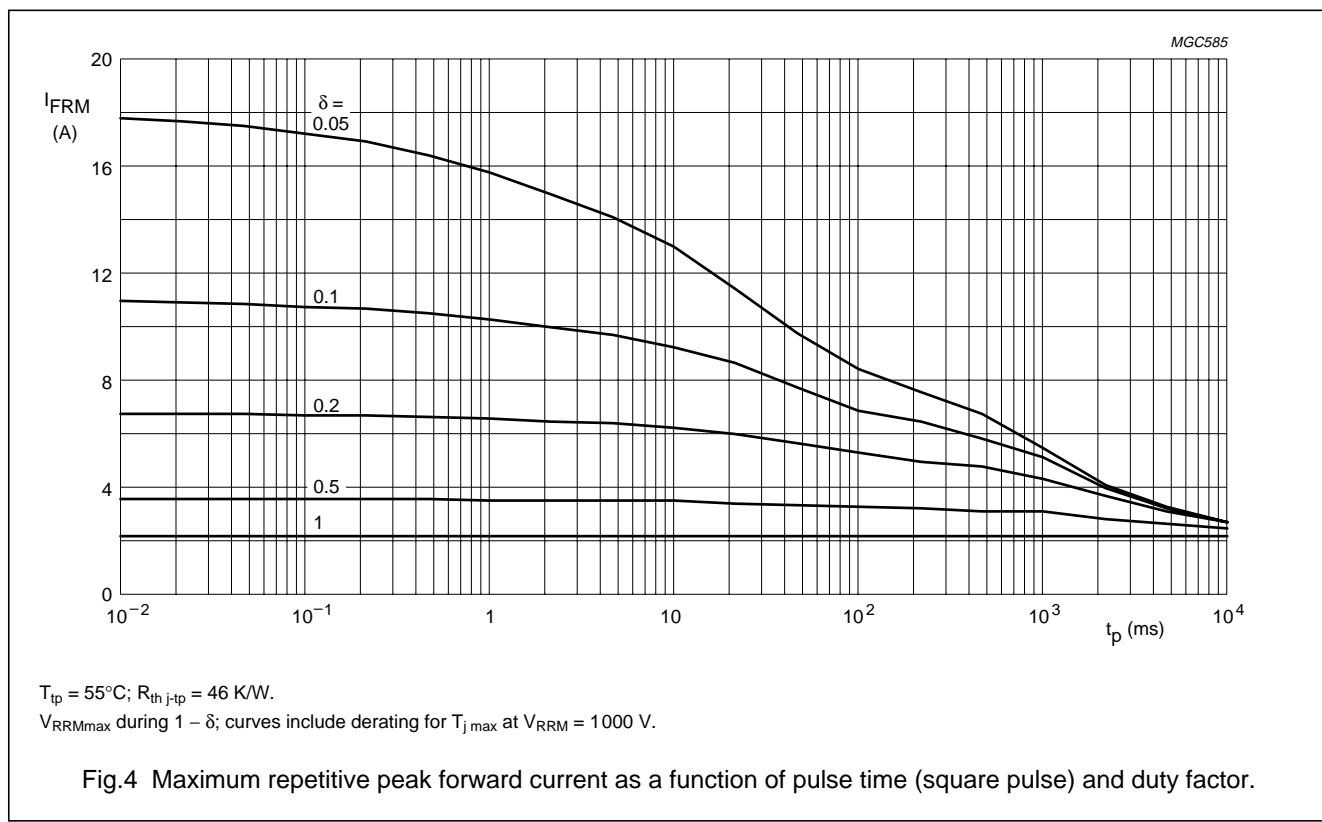
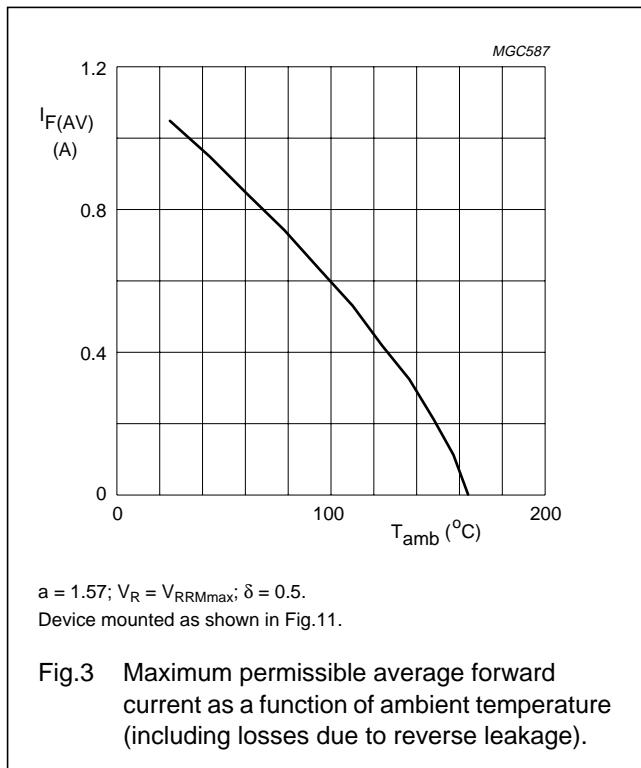
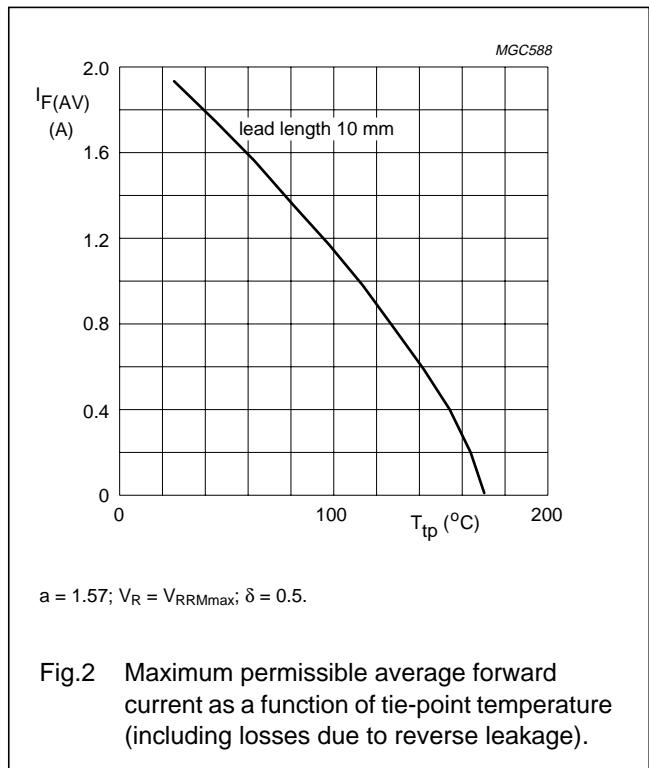
Note

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

Fast soft-recovery controlled avalanche rectifiers

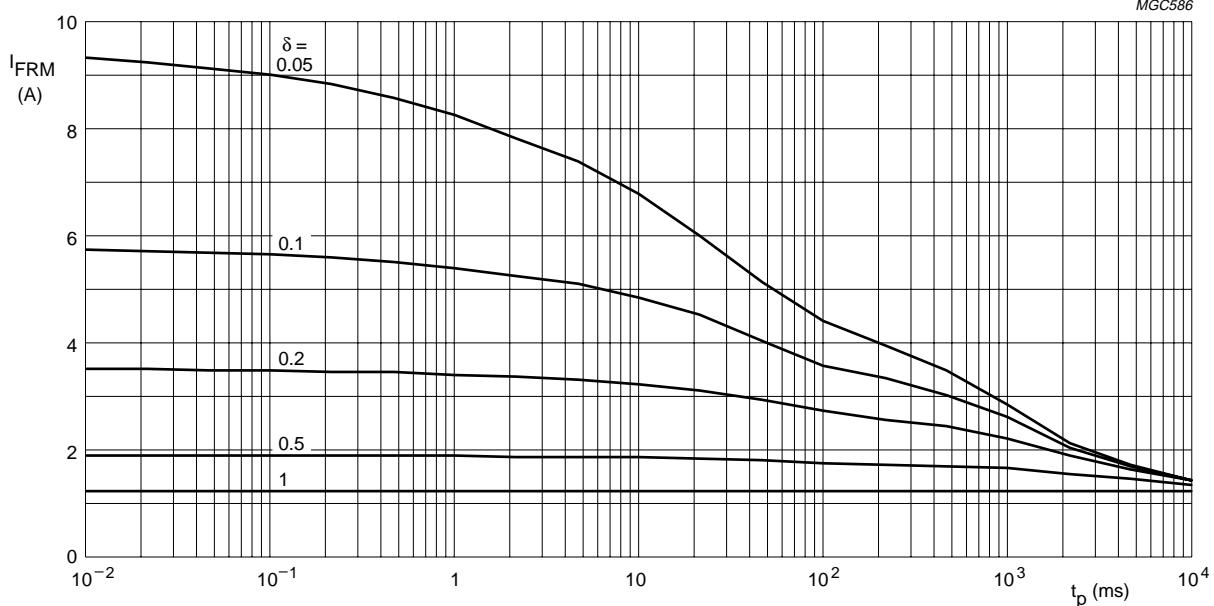
BYV96 series

GRAPHICAL DATA



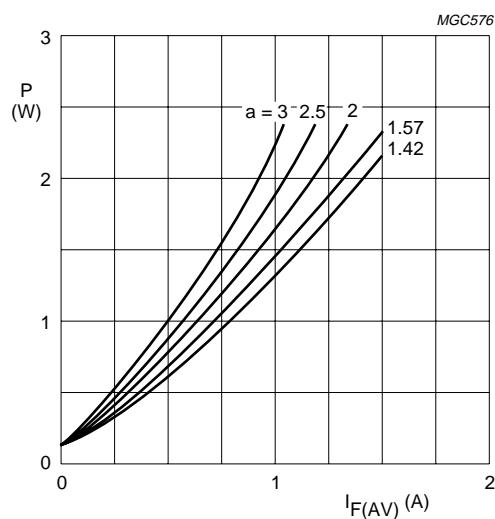
Fast soft-recovery controlled avalanche rectifiers

BYV96 series



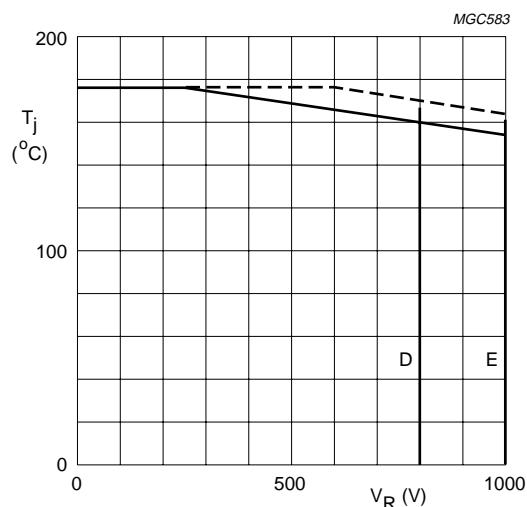
$T_{amb} = 55^{\circ}\text{C}$; $R_{th\ j-a} = 100 \text{ K/W}$.
 V_{RRMmax} during $1 - \delta$; curves include derating for $T_{j\ max}$ at $V_{RRM} = 1000 \text{ V}$.

Fig.5 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



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

Fig.6 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.

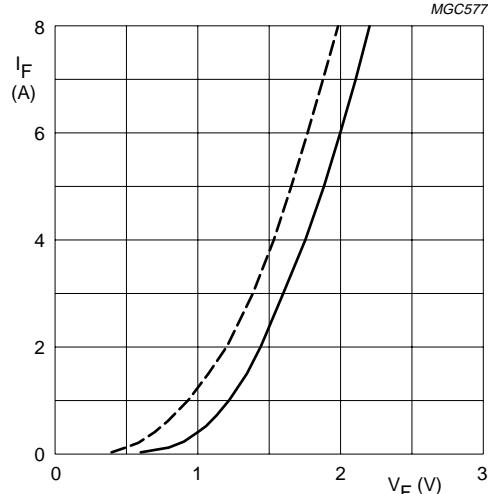


Solid line = V_R .
Dotted line = V_{RRM} ; $\delta = 0.5$.

Fig.7 Maximum permissible junction temperature as a function of reverse voltage.

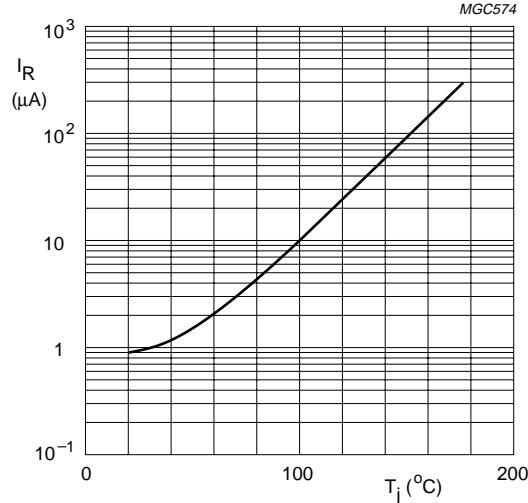
Fast soft-recovery controlled avalanche rectifiers

BYV96 series



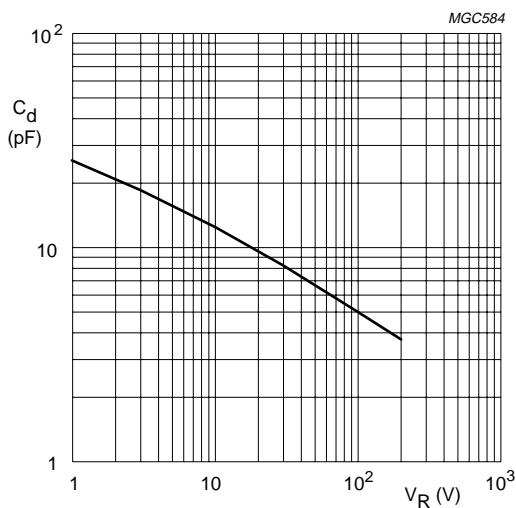
Dotted line: $T_j = 175$ °C.
Solid line: $T_j = 25$ °C.

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



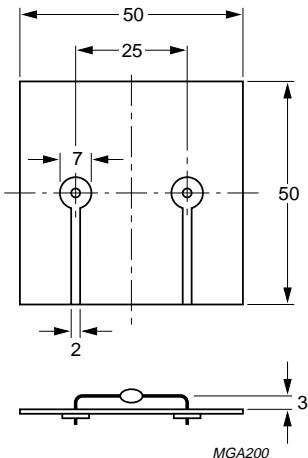
$V_R = V_{RRMmax}$.

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



$f = 1$ MHz; $T_j = 25$ °C.

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

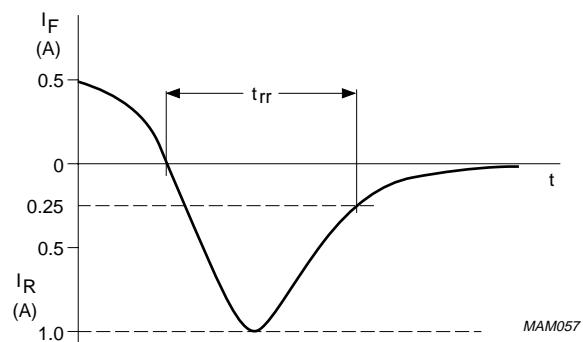
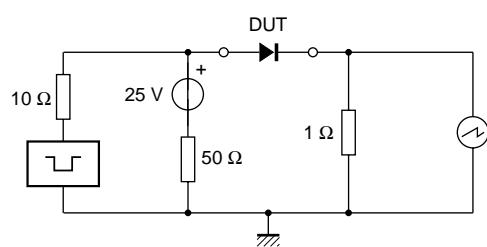


Dimensions in mm.

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

Fast soft-recovery controlled avalanche rectifiers

BYV96 series



Input impedance oscilloscope: $1 \text{ M}\Omega$, 22 pF ; $t_r \leq 7 \text{ ns}$.

Source impedance: 50Ω ; $t_r \leq 15 \text{ ns}$.

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

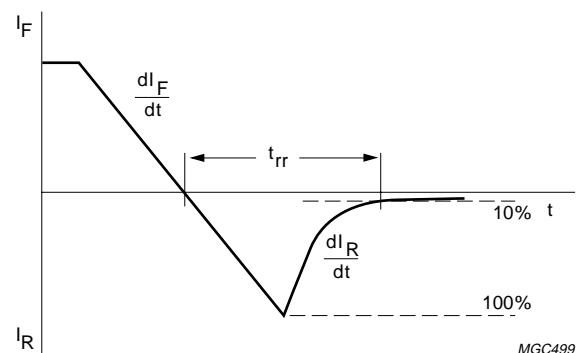
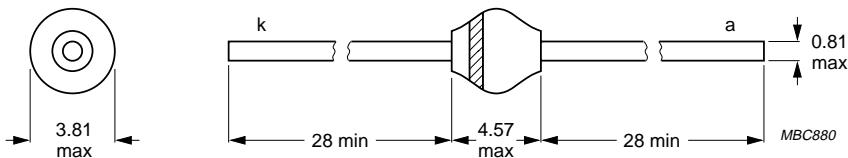


Fig.13 Reverse recovery definitions.

Fast soft-recovery controlled avalanche rectifiers

BYV96 series

PACKAGE OUTLINE



Dimensions in mm.

The marking band indicates the cathode.

Fig.14 SOD57.

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.