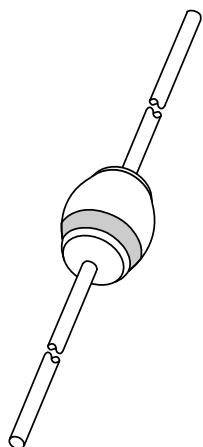


# DATA SHEET



## **BYV98** Fast soft-recovery rectifier

Product specification  
Supersedes data of May 1993

1996 Jun 07

**Fast soft-recovery rectifier****BYV98****FEATURES**

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Available in ammo-pack.

**DESCRIPTION**

Rugged glass SOD57 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.

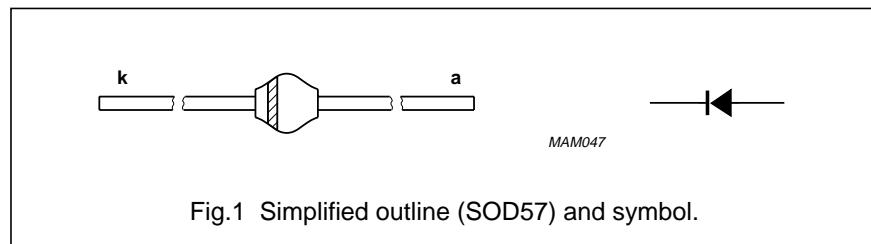


Fig.1 Simplified outline (SOD57) and symbol.

**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{RSM}$	non-repetitive peak reverse voltage		–	2100	V
$V_{RRM}$	repetitive peak reverse voltage		–	2000	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	–	1.00	A
$I_{F(AV)}$	average forward current	$T_{amb} = 60^\circ\text{C}$ ; PCB mounting (see Fig.11); see Fig. 3; averaged over any 20 ms period; see also Fig. 6	–	0.43	A
$I_{FRM}$	repetitive peak forward current	$T_{tp} = 55^\circ\text{C}$ ; see Fig. 4	–	9.0	A
		$T_{amb} = 60^\circ\text{C}$ ; see Fig. 5	–	4.5	A
$I_{FSM}$	non-repetitive peak forward current	$t = 10\text{ ms half sine wave}$ ; $T_j = T_{j\max}$ prior to surge; $V_R = V_{RRM\max}$	–	15	A
$T_{stg}$	storage temperature		-65	+175	$^\circ\text{C}$
$T_j$	junction temperature	see Fig.7	-65	+175	$^\circ\text{C}$

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_F$	forward voltage	$I_F = 2 \text{ A}; T_j = T_{j\max};$ see Fig. 8	–	–	2.2	V
		$I_F = 2 \text{ A};$ see Fig. 8	–	–	2.4	V
$I_R$	reverse current	$V_R = V_{RRM\max};$ see Fig. 9	–	–	5	$\mu\text{A}$
		$V_R = V_{RRM\max}; T_j = 125^\circ\text{C};$ see Fig. 9	–	–	50	$\mu\text{A}$
$t_{rr}$	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	$f = 1 \text{ MHz}; V_R = 0 \text{ V};$ see Fig 10	–	30	–	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	–	–	5	$\text{A}/\mu\text{s}$

**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

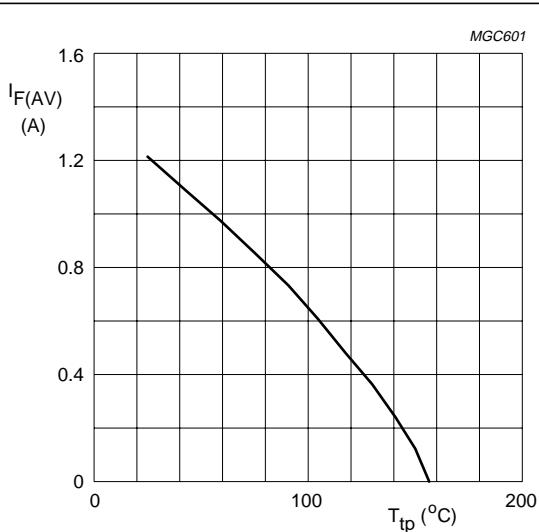
**Note**

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 rectifier

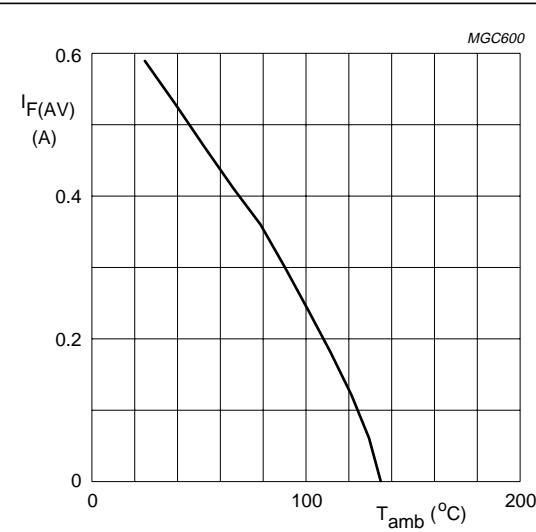
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## GRAPHICAL DATA

 $a = 1.42; V_R = V_{RRMmax}; \delta = 0.5.$ 

Switched mode application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).

 $a = 1.42; V_R = V_{RRMmax}; \delta = 0.5.$ 

Device mounted as shown in Fig.11.

Switched mode application.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).

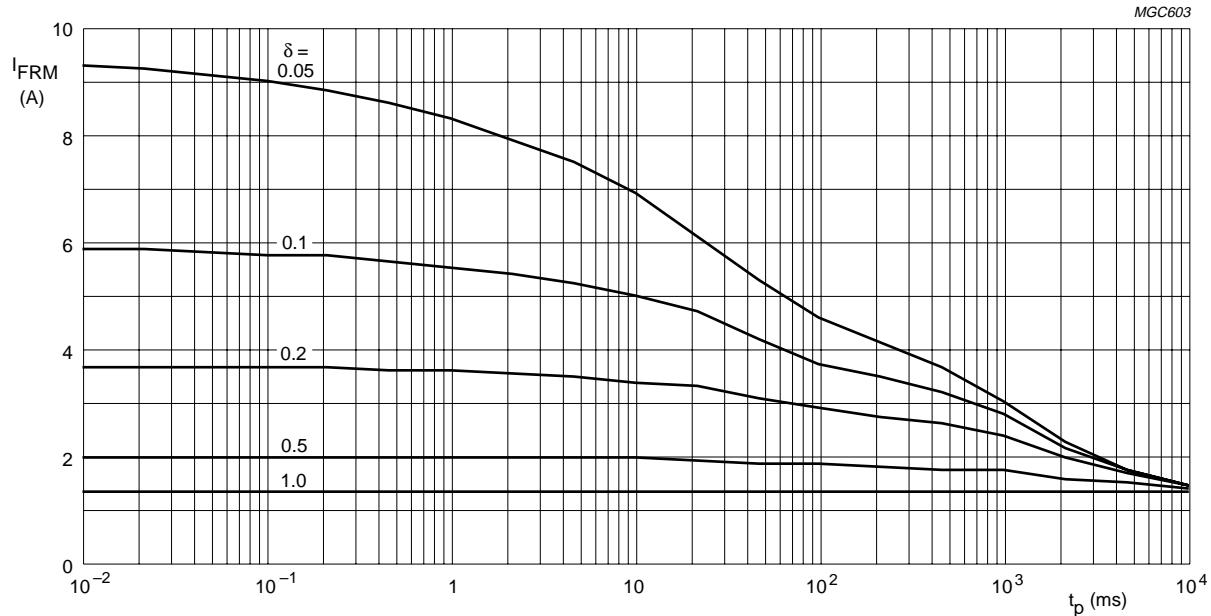
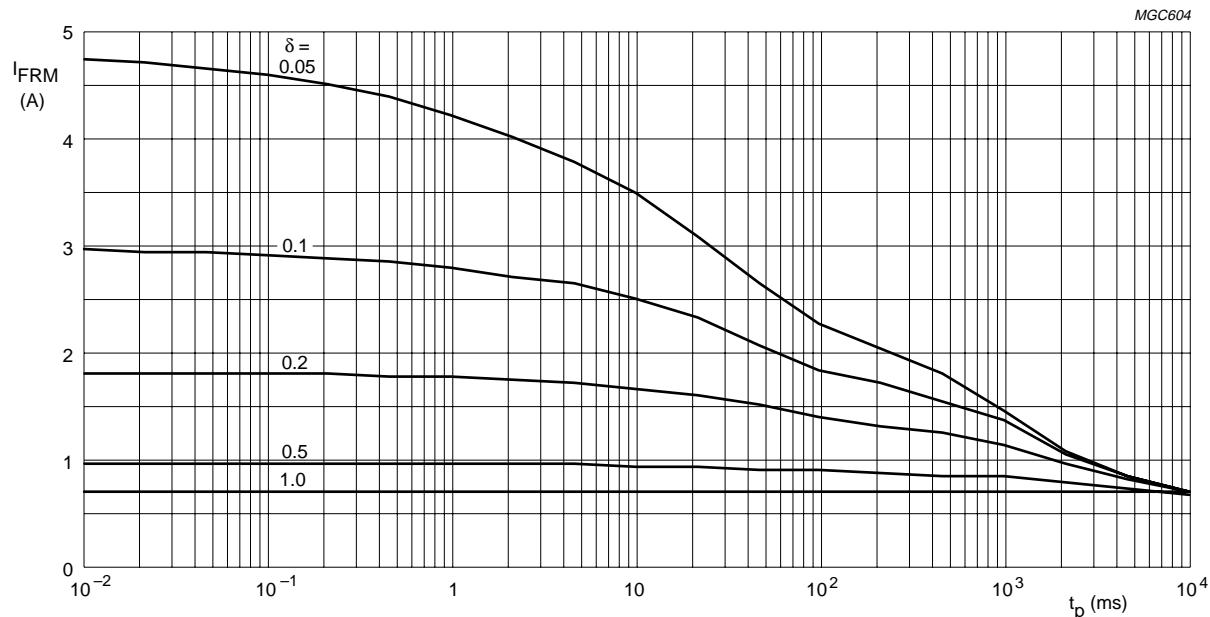
 $T_{tp} = 55^\circ\text{C}; R_{th,j-tp} = 46 \text{ K/W}.$  $V_{RRMmax}$  during  $1 - \delta$ ; curves include derating for  $T_{j\max}$  at  $V_{RRM} = 2000 \text{ V}$ .

Fig.4 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

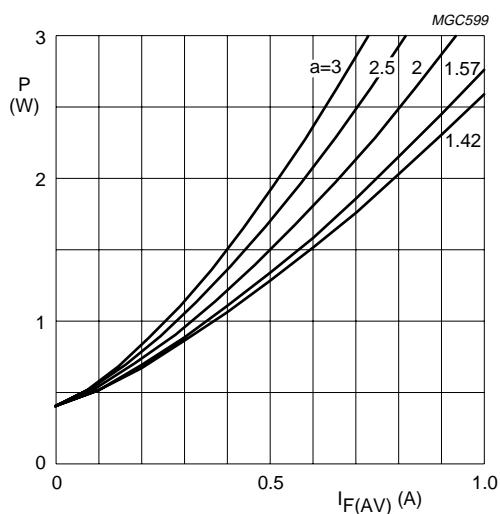
## Fast soft-recovery rectifier

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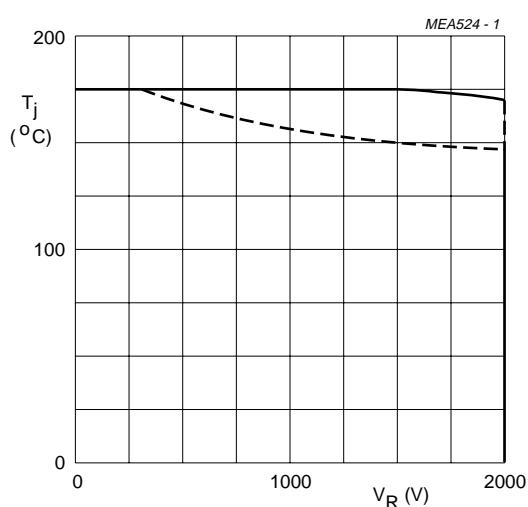
$T_{\text{amb}} = 60^\circ\text{C}$ ;  $R_{\text{th}\ j-a} = 100 \text{ K/W}$ .  
 $V_{\text{RRMmax}}$  during  $1 - \delta$ ; curves include derating for  $T_{\text{j max}}$  at  $V_{\text{RRM}} = 2000 \text{ V}$ .

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



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

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

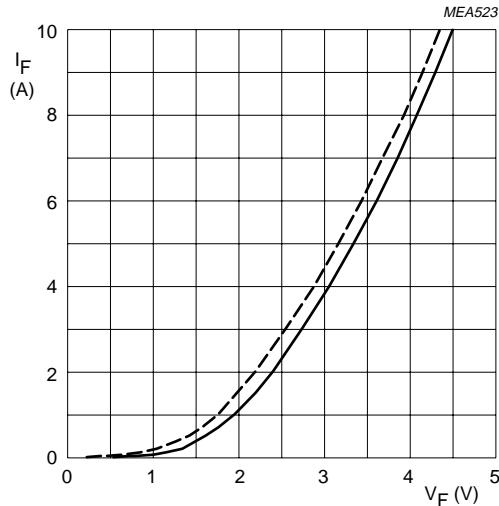


Solid line =  $V_{\text{RRM}}$ ;  $\delta = 0.1$ .  
Dotted line =  $V_{\text{RRM}}$ ;  $\delta = 0.5$ .

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

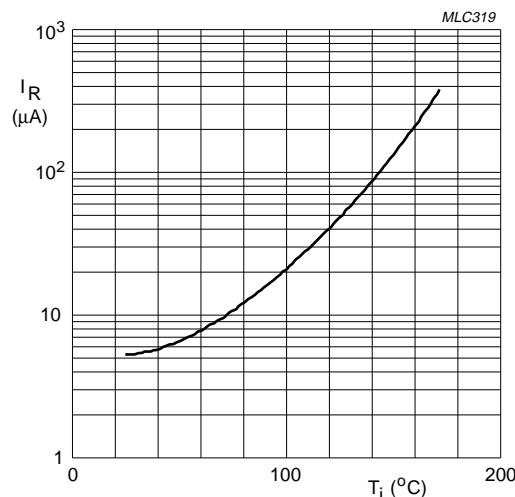
## Fast soft-recovery rectifier

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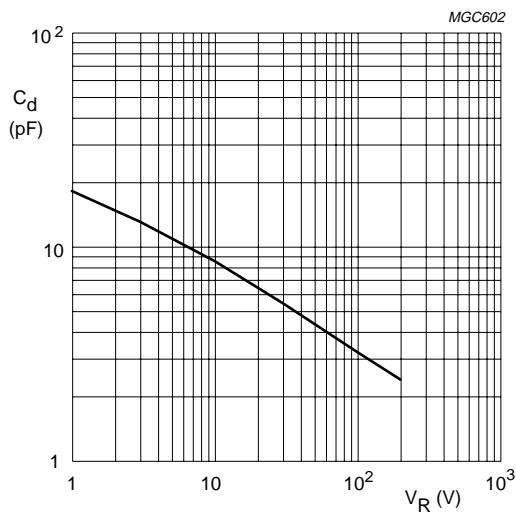
Dotted line:  $T_j = 175^\circ\text{C}$ .  
Solid line:  $T_j = 25^\circ\text{C}$ .

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



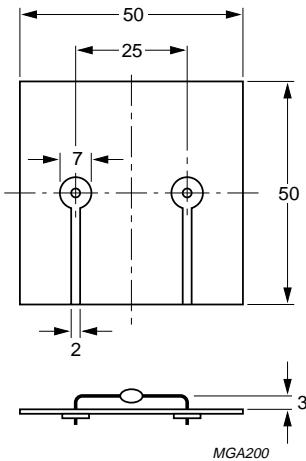
$V_R = V_{RRMmax}$ .

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



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

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

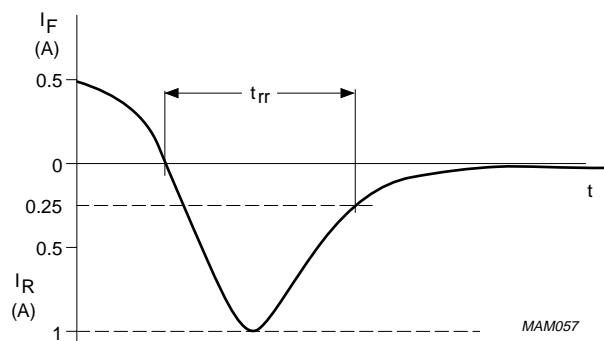
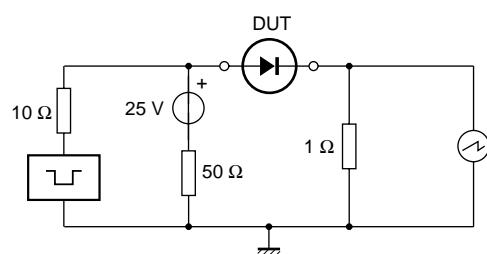


Dimensions in mm.

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

## Fast soft-recovery rectifier

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

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

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

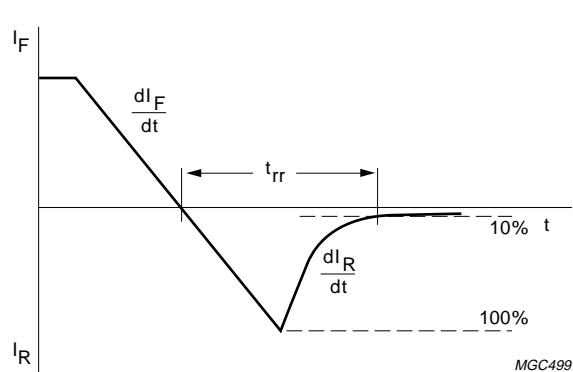
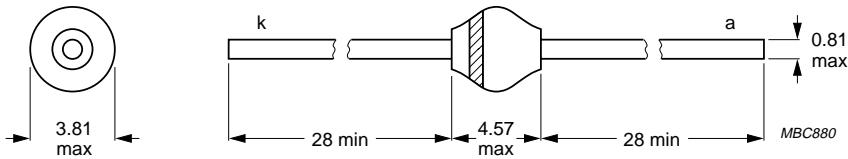


Fig.13 Reverse recovery definitions.

## Fast soft-recovery rectifier

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## PACKAGE OUTLINE



Dimensions in mm.

The marking band indicates the cathode.

Fig.14 SOD57.

## DEFINITIONS

<b>Data Sheet Status</b>	
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.
<b>Limiting values</b>	
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.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	

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