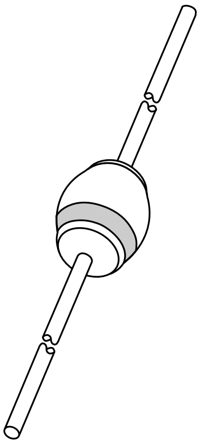
DATA SHEET



BYV99
Ultra fast low-loss controlled avalanche rectifier

Product specification
Supersedes data of 1996 Feb 19

2003 Mar 04

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Ultra fast low-loss controlled avalanche rectifier — BYV99

FEATURES

- Glass passivated
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- 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.

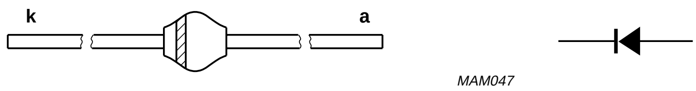


Fig.1 Simplified outline (SOD57) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	600	V
V_R	continuous reverse voltage		–	600	V
$I_{F(AV)}$	average forward current	T_{tp} = 50 °C; lead length = 10 mm; see Fig.2; averaged over any 20 ms period; see also Fig.6	–	1	A
		T_{amb} = 60 °C; see Fig.3; PCB mounting (see Fig.11); averaged over any 20 ms period; see also Fig.6	–	0.55	A
I_{FRM}	repetitive peak forward current	T_{tp} = 50 °C; see Fig.4	–	9	A
		T_{amb} = 60 °C; see Fig.5	–	5	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j(max)}$ prior to surge; $V_R = V_{RRMmax}$	–	20	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 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 also Fig.10	–65	+150	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j(max)}$; see Fig.7	–	–	1.5	V
		I_F = 1 A; see Fig.7	–	–	2.7	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA	700	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.8	–	–	5	µA
		$V_R = V_{RRMmax}$; T_j = 150 °C; see Fig.8	–	–	75	µA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.13	–	–	15	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Fig.9	–	75	–	pF
$\left\lvert \frac{dI_R}{dt} \right\rvert$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq 30$ V and dI_F/dt = –1 A/µs; see Fig.12	–	–	3	A/µs

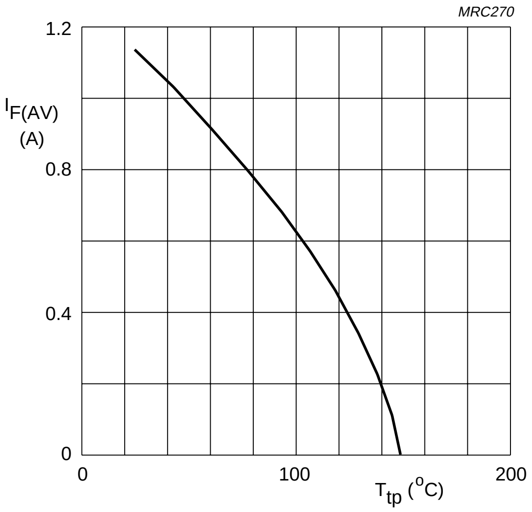
THERMAL CHARACTERISTICS

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

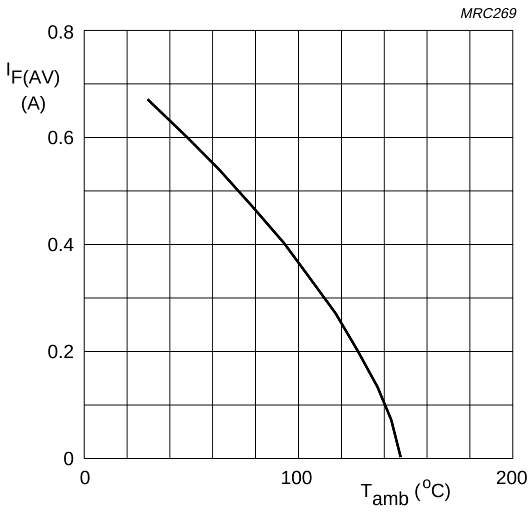
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm; see Fig.11. For more information please refer to the *"General Part of associated Handbook"*.

GRAPHICAL DATA



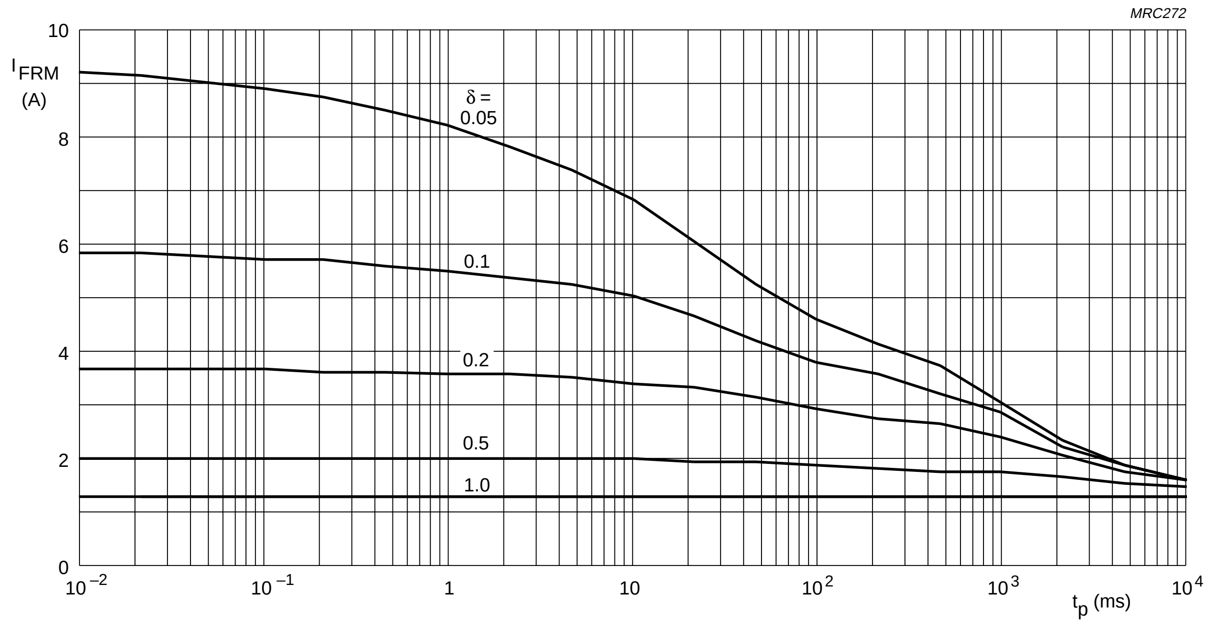
a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.
Switched mode application.

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



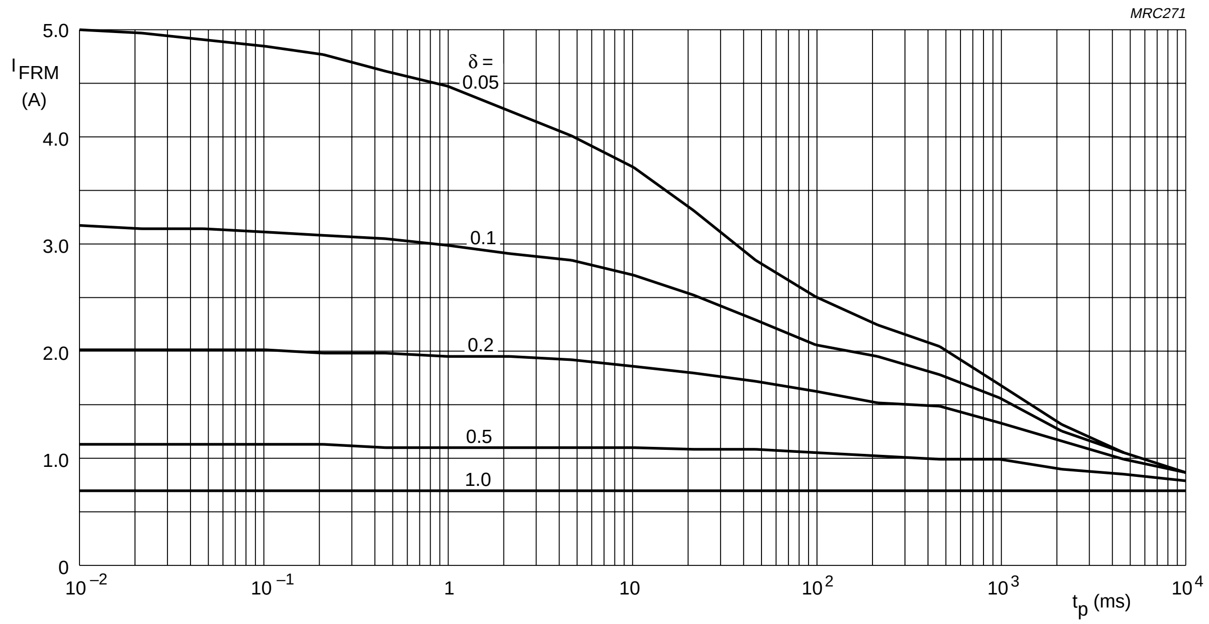
a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.
Device mounted as shown in Fig.11.
Switched mode application.

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



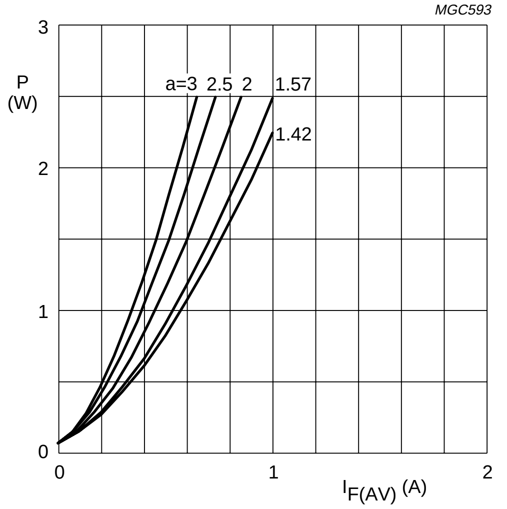
T_{tp} = 50°C; $R_{th\ j\text{-}tp}$ = 46 K/W.
V_{RRMmax} during 1 – δ; curves include derating for $T_{j(max)}$ at V_{RRM} = 600 V.

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



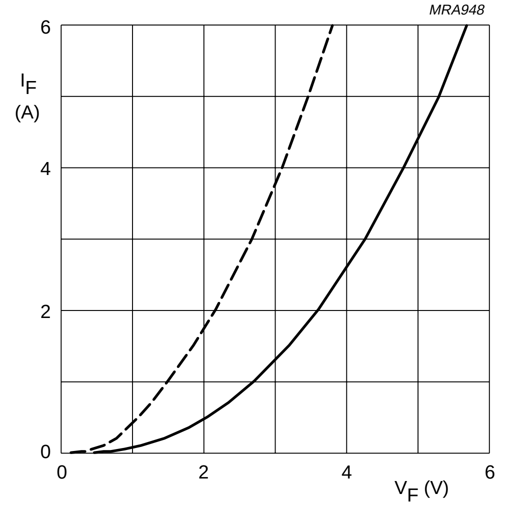
T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 100 K/W.
V_{RRMmax} during 1 – δ; curves include derating for $T_{j(max)}$ at V_{RRM} = 600 V.

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



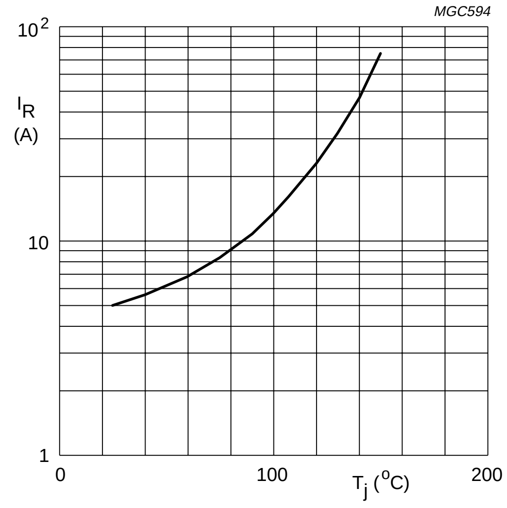
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; δ = 0.5.

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



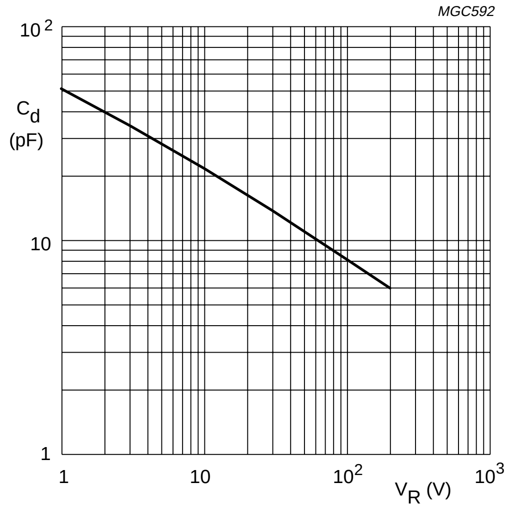
Dotted line: T_j = 150 °C.
Solid line: T_j = 25 °C.

Fig.7 Forward current as a function of forward voltage; maximum values.



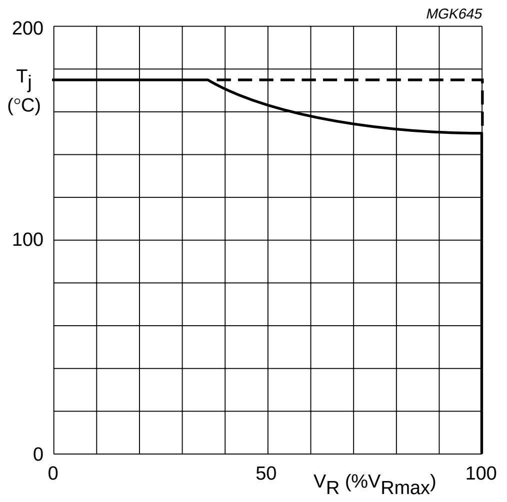
$V_R = V_{RRMmax}$.

Fig.8 Reverse current as a function of junction temperature; maximum values.



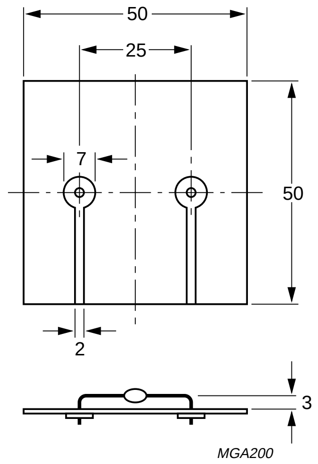
f = 1 MHz; T_j = 25 °C.

Fig.9 Diode capacitance as a function of reverse voltage; typical values.



Solid line = VR; dotted line = VRRM; δ = 0.5.

Fig.10 Maximum permissible junction temperature as a function of maximum reverse voltage percentage.



Dimensions in mm.

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

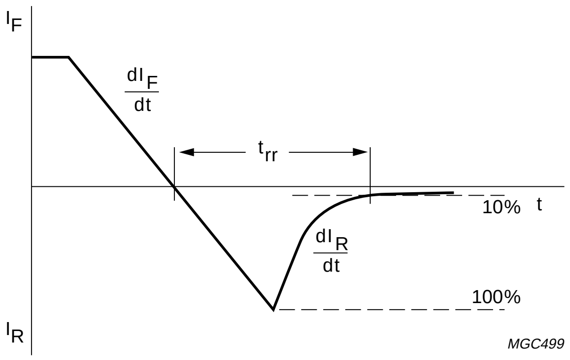
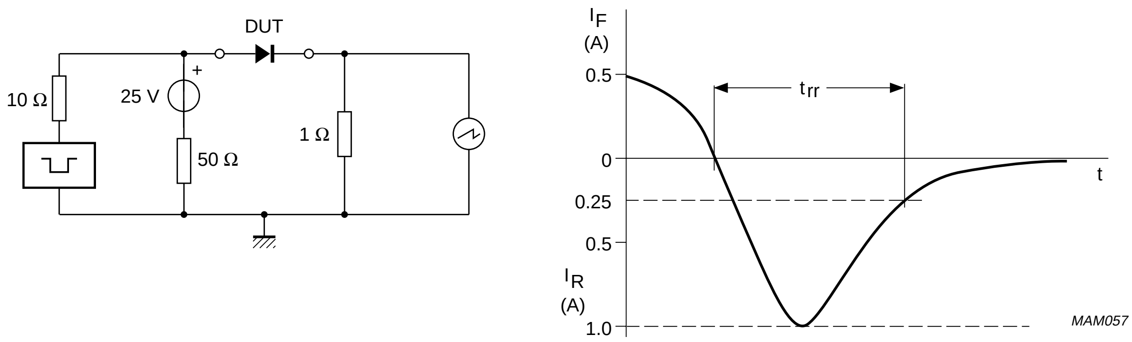


Fig.12 Reverse recovery definitions.

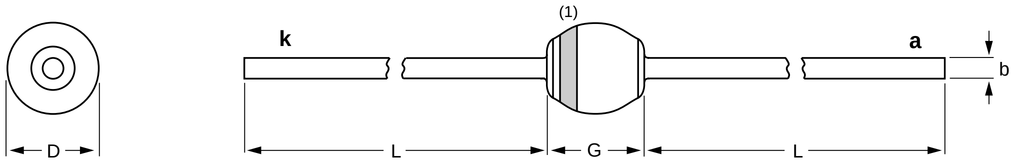


Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.13 Test circuit and reverse recovery time waveform and definition.

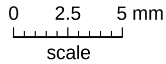
PACKAGE OUTLINE

Hermetically sealed glass package; axial leaded; 2 leads **SOD57**



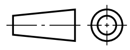
DIMENSIONS (mm are the original dimensions)

UNIT	b max.	D max.	G max.	L min.
mm	0.81	3.81	4.57	28



Note

1. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD57						97-10-14

DATA SHEET STATUS

LEVEL	DATA SHEET STATUS[1]	PRODUCT STATUS[2][3]	DEFINITION
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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3. For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

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Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). 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.

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Contact information

For additional information please visit **http://www.semiconductors.philips.com**. Fax: **+31 40 27 24825**
For sales offices addresses send e-mail to: **sales.addresses@www.semiconductors.philips.com**.

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