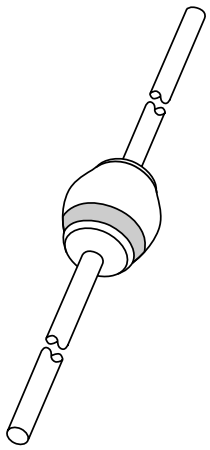
DATA SHEET



BYV4100
Fast soft-recovery controlled avalanche rectifier

Product specification

1996 Oct 07

Philips Semiconductors

PHILIPS

Fast soft-recovery controlled avalanche rectifier

BYV4100

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 SOD64 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.

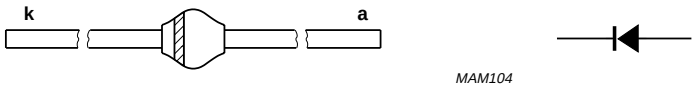


Fig.1 Simplified outline (SOD64) and symbol.

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	100	V
V_R	continuous reverse voltage		–	100	V
$I_{F(AV)}$	average forward current	T_{tp} = 65 °C; lead length = 10 mm; averaged over any 20 ms period; see Fig.2; see also Fig.4	–	4.0	A
		T_{amb} = 60 °C; PCB mounting (see Fig.12); averaged over any 20 ms period; see Fig.3; see also Fig.4	–	1.9	A
I_{FRM}	repetitive peak forward current	T_{tp} = 65 °C; see Fig.6	–	34	A
		T_{amb} = 60 °C; see Fig.7	–	17	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	90	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	20	mJ
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 3.5 A; $T_j = T_{j\,max}$; see Fig.5	–	–	0.78	V
		I_F = 3.5 A; see Fig.5	–	–	0.98	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA	120	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.8	–	–	5	µA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.8	–	–	150	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.10	–	–	15	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Fig.9	–	245	–	pF
$\left\|\frac{dI_R}{dt}\right\|$	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.11	–	–	2	A/µs

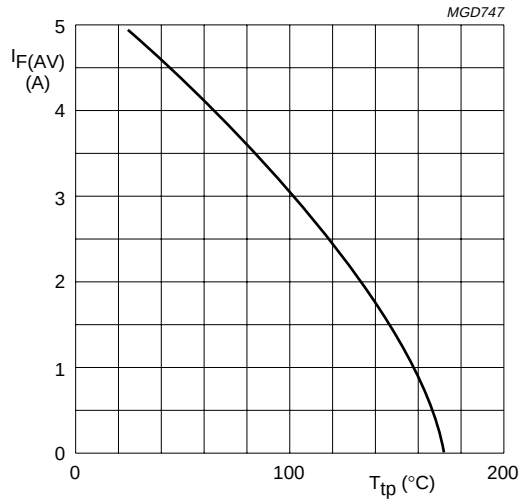
THERMAL CHARACTERISTICS

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

Note

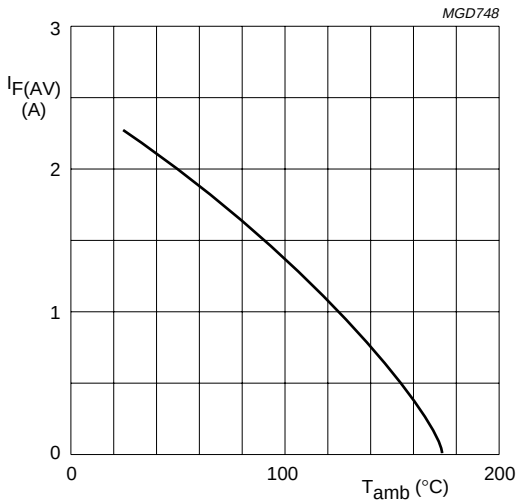
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm, see Fig.12. For more information please refer to the *"General Part of associated Handbook"*.

GRAPHICAL DATA



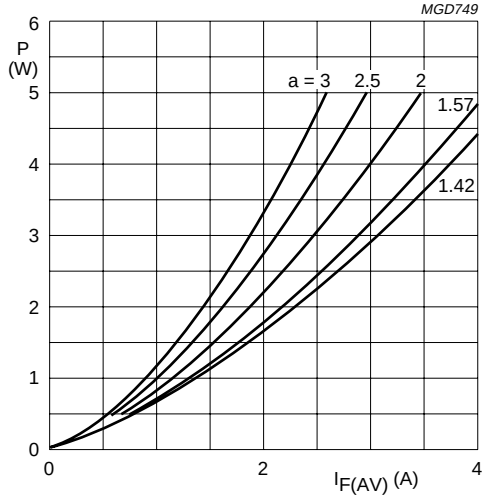
Switched mode application.
$a = 1.42$; $\delta = 0.5$; $V_R = V_{RRMmax}$.

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



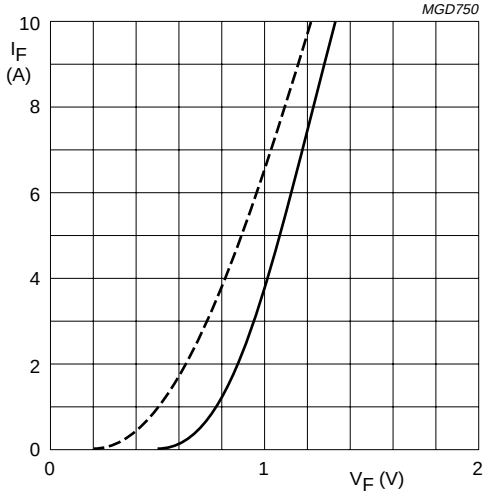
Switched mode application.
$a = 1.42$; $\delta = 0.5$; $V_R = V_{RRMmax}$.
Device mounted as shown in Fig.12.

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



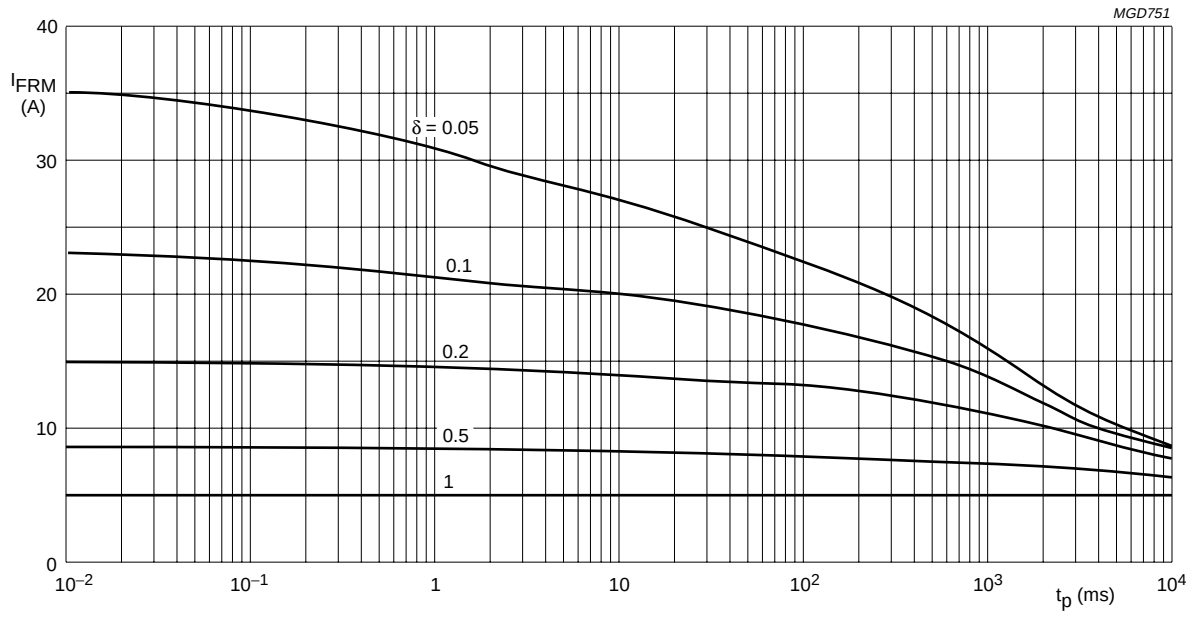
$a = I_{F(RMS)}/I_{F(AV)}$; $\delta = 0.5$; $V_R = V_{RRMmax}$.

Fig.4 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



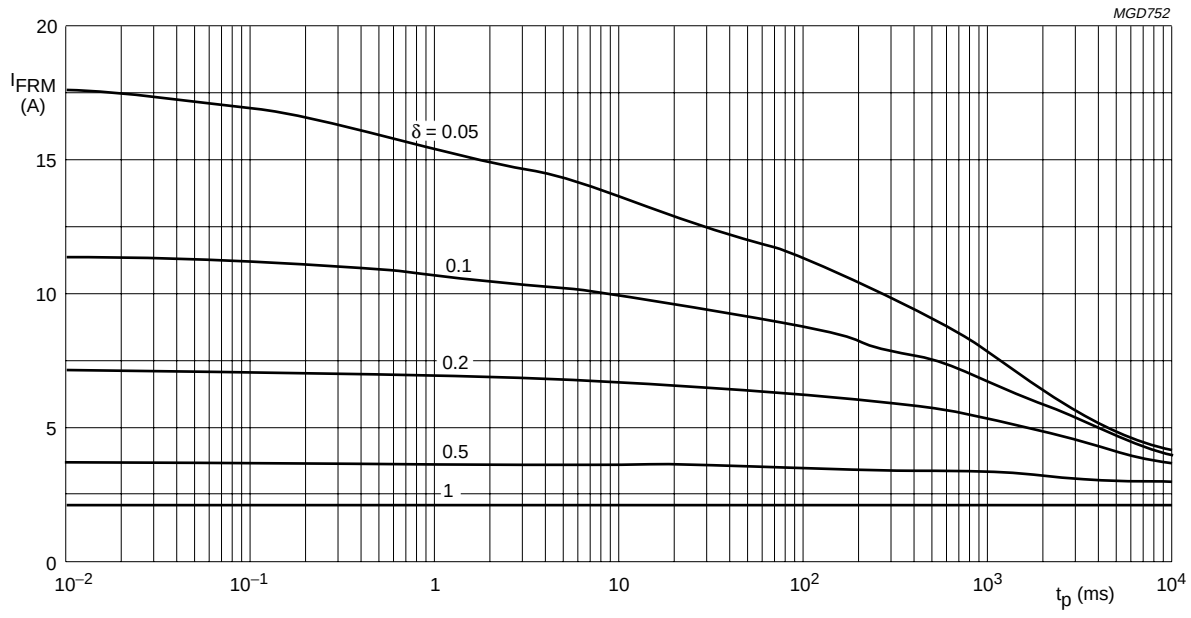
Dotted line: $T_j = 175$ °C.
Solid line: $T_j = 25$ °C.

Fig.5 Maximum forward voltage as a function of forward current.



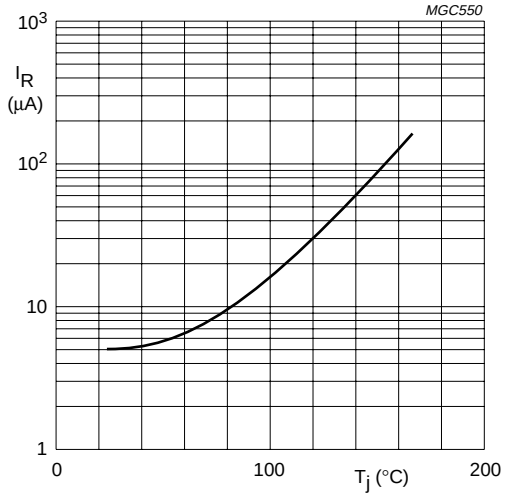
T_{tp} = 65 °C; $R_{th\ j\text{-}tp}$ = 25 K/W; $V_R = V_{RRMmax}$ during 1 – δ.

Fig.6 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



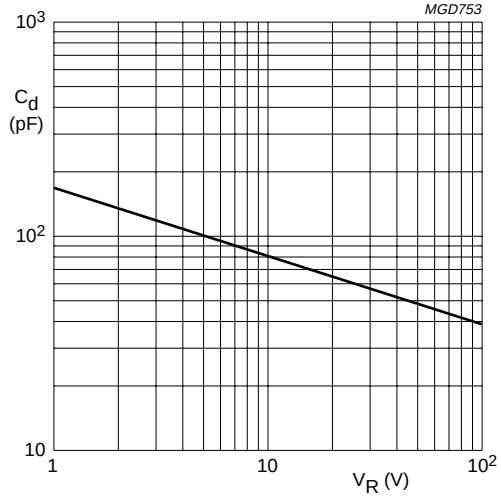
T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 75 K/W; $V_R = V_{RRMmax}$ during 1 – δ.

Fig.7 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



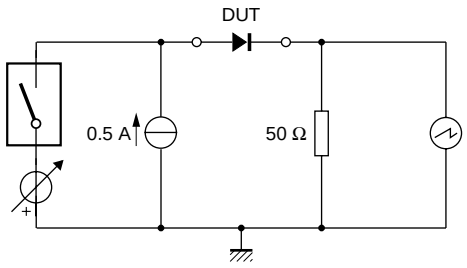
$V_R = V_{RRMmax}$.

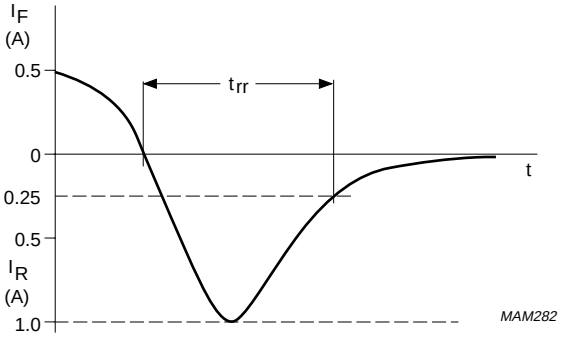
Fig.8 Reverse current as a function of junction temperature; maximum values.



f = 1 MHz; T_j = 25 °C.

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





Rise time oscilloscope: $t_r \leq 2$ ns.
Turn-on time switch: $t \leq 3$ ns.

Fig.10 Test circuit and reverse recovery time waveform and definition.

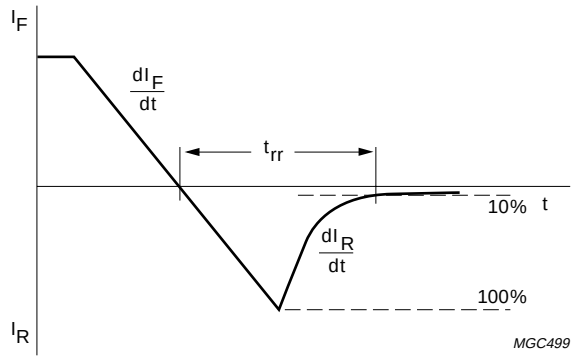
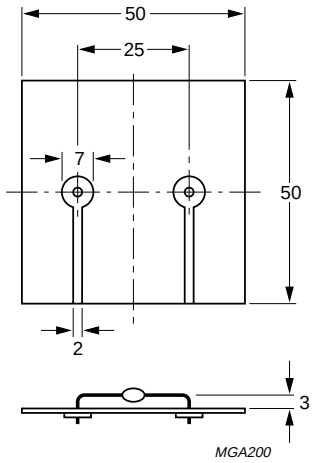


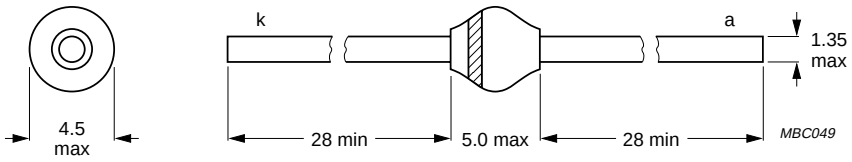
Fig.11 Reverse recovery definitions.



Dimensions in mm.

Fig.12 Device mounted on a printed-circuit board.

PACKAGE OUTLINE



Dimensions in mm.
The marking band indicates the cathode.

Fig.13 SOD64.

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

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