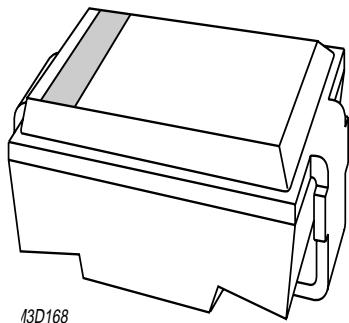


DATA SHEET



BYG50 series Controlled avalanche rectifiers

Preliminary specification

1996 May 24

Controlled avalanche rectifiers

BYG50 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- UL 94V-O classified plastic package
- Shipped in 12 mm embossed tape.

DESCRIPTION

DO-214AC; SOD106 surface mountable package with glass passivated chip.

The well-defined void-free case is of a transfer-moulded thermo-setting plastic.

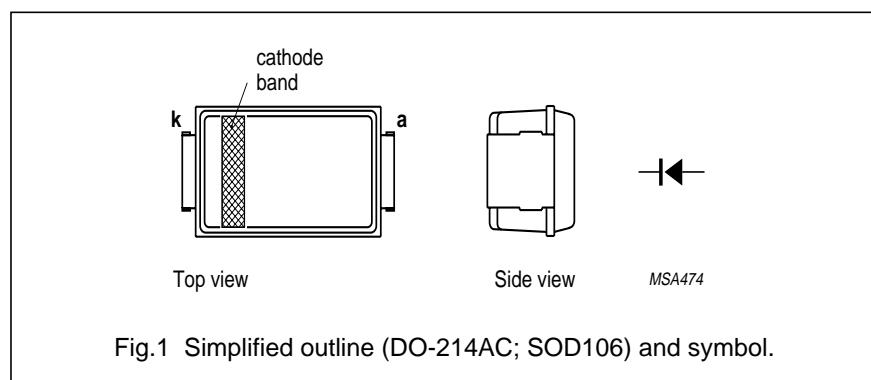


Fig.1 Simplified outline (DO-214AC; SOD106) and symbol.

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage BYG50D BYG50G BYG50J BYG50K BYG50M		–	200	V
V_R	continuous reverse voltage BYG50D BYG50G BYG50J BYG50K BYG50M		–	400	V
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; $T_{tp} = 100^\circ\text{C}$; see Fig.2	–	2.1	A
		averaged over any 20 ms period; Al_2O_3 PCB mounting (see Fig.7); $T_{amb} = 60^\circ\text{C}$; see Fig.3	–	1.0	A
		averaged over any 20 ms period; epoxy PCB mounting (see Fig.7); $T_{amb} = 60^\circ\text{C}$; see Fig.3	–	0.7	A
I_{FSM}	non-repetitive peak forward current	$t = 10\text{ ms}$ half sinewave; $T_j = T_{j\max}$ prior to surge; $V_R = V_{RRM\max}$	–	30	A

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SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
E_{RSM}	non-repetitive peak reverse avalanche energy BYG50D to J BYG50K and M	$L = 120 \text{ mH}$; $T_j = T_{j \text{ max}}$ prior to surge; inductive load switched off	—	10	mJ
T_{stg}	storage temperature		—65	+175	$^{\circ}\text{C}$
T_j	junction temperature	see Fig.4	—65	+175	$^{\circ}\text{C}$

ELECTRICAL CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	$I_F = 1 \text{ A}$; $T_j = T_{j \text{ max}}$; see Fig.5	—	—	0.85	V
		$I_F = 1 \text{ A}$; see Fig.5	—	—	1.00	V
$V_{(BR)R}$	reverse avalanche breakdown voltage BYG50D BYG50G BYG50J BYG50K BYG50M	$I_R = 0.1 \text{ mA}$	300	—	—	V
			500	—	—	V
			700	—	—	V
			900	—	—	V
			1100	—	—	V
I_R	reverse current	$V_R = V_{RRM\text{max}}$; see Fig.6	—	—	1	μA
		$V_R = V_{RRM\text{max}}$; $T_j = 165 \text{ }^{\circ}\text{C}$; see Fig.6	—	—	100	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.8	—	2	—	μs

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{\text{th j-tp}}$	thermal resistance from junction to tie-point		25	K/W
$R_{\text{th j-a}}$	thermal resistance from junction to ambient	note 1	100	K/W
		note 2	150	K/W

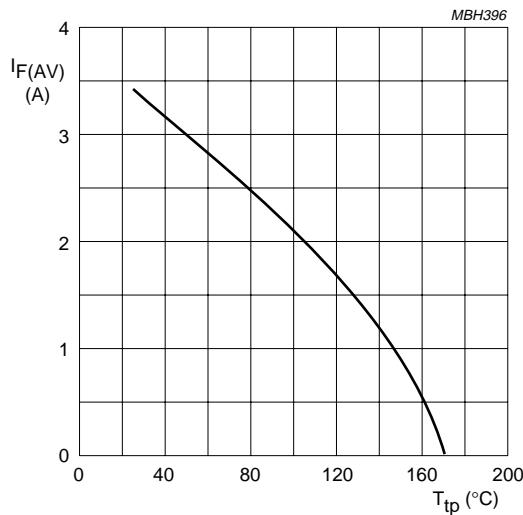
Notes

1. Device mounted on Al_2O_3 printed-circuit board, 0.7 mm thick; thickness of copper $\geq 35 \mu\text{m}$, see Fig.7.
2. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper $\geq 40 \mu\text{m}$, see Fig.7.
For more information please refer to the "General Part of associated Handbook".

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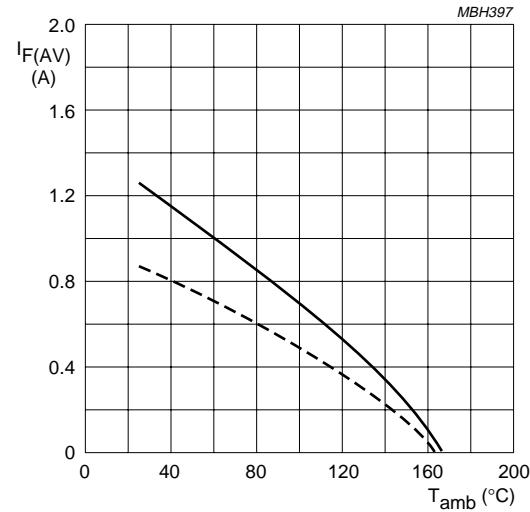
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GRAPHICAL DATA



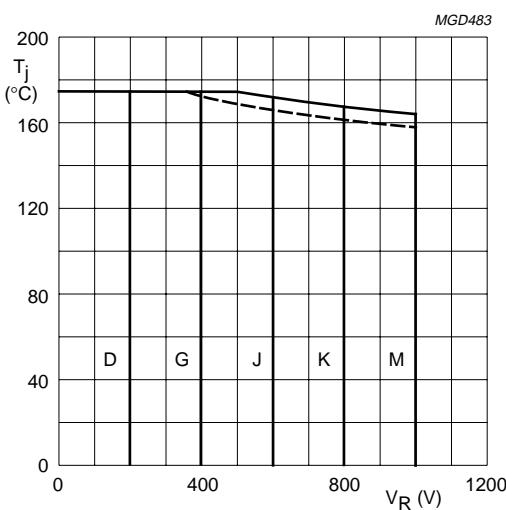
$V_R = V_{RRMmax}$; $\delta = 0.5$; $a = 1.57$.

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



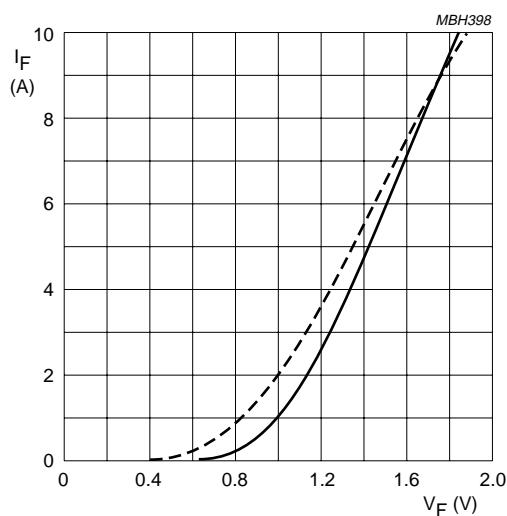
$V_R = V_{RRMmax}$; $\delta = 0.5$; $a = 1.57$.
Device mounted as shown in Fig.7
Solid line: Al_2O_3 PCB; dotted line: epoxy PCB.

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



Device mounted as shown in Fig.7.
Solid line: Al_2O_3 PCB.
Dotted line: epoxy PCB.

Fig.4 Maximum permissible junction temperature as a function of reverse voltage.

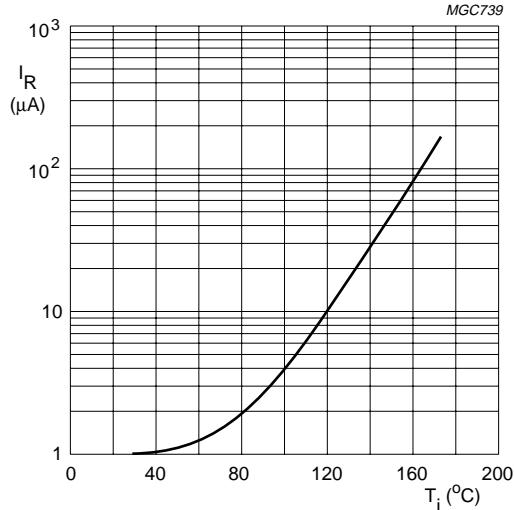


Solid line: $T_j = 25$ °C.
Dotted line: $T_j = 175$ °C.

Fig.5 Forward current as a function of forward voltage; maximum values.

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$$V_R = V_{RMMmax}$$

Fig.6 Reverse current as a function of junction temperature; maximum values.

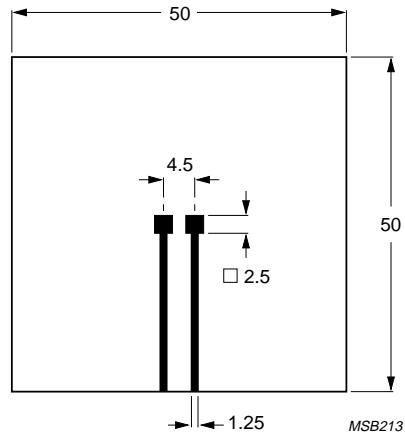
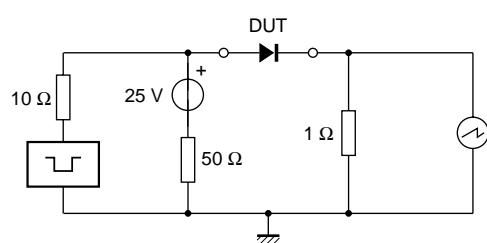


Fig.7 Printed-circuit board for surface mounting.



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

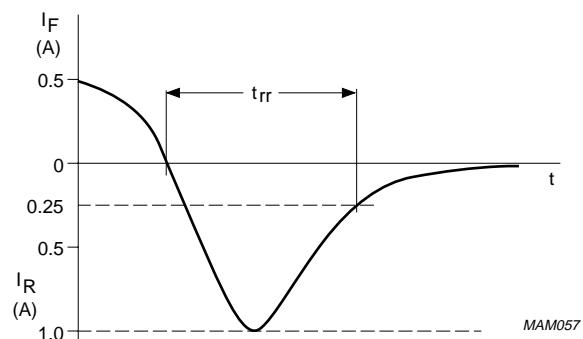
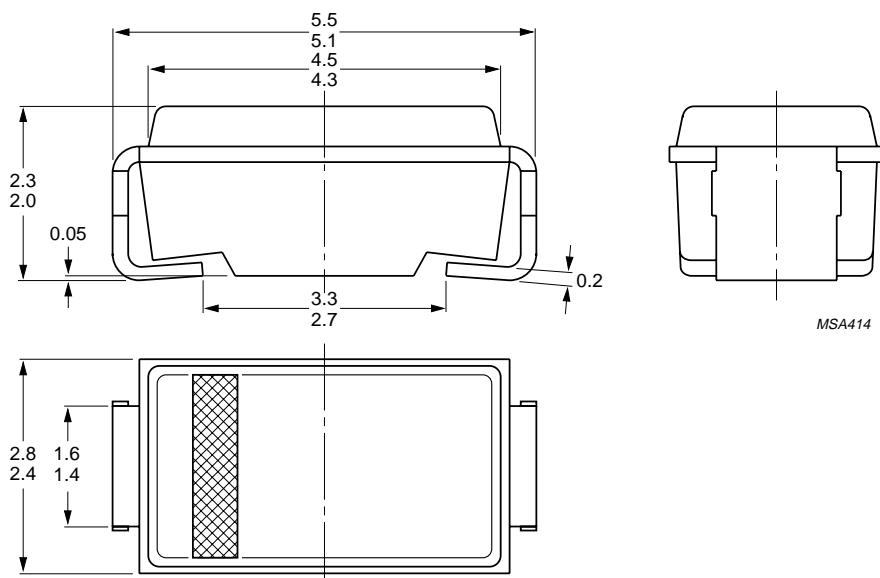


Fig.8 Test circuit and reverse recovery time waveform and definition.

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PACKAGE OUTLINE



Dimensions in mm.

Fig.9 SOD106.

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.