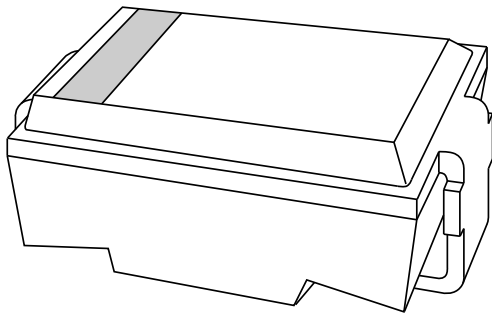


# DATA SHEET



## **BYG50 series** Controlled avalanche rectifiers

Preliminary specification  
File under Discrete Semiconductors, SC01

1996 May 24

**Controlled avalanche rectifiers**

**BYG50 series**

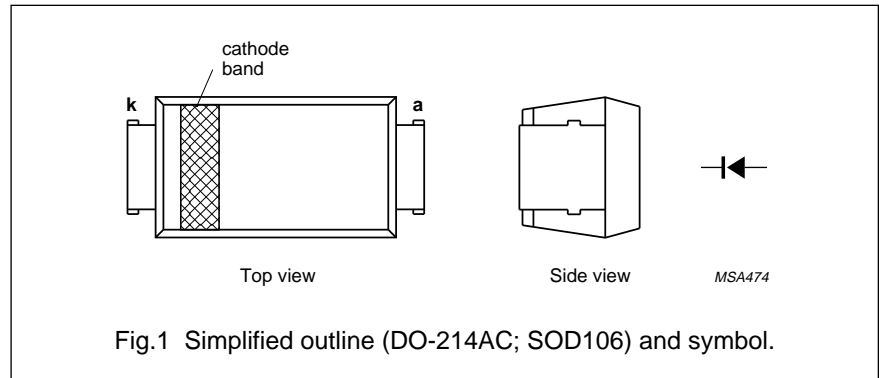
**FEATURES**

- 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.



**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>RRM</sub>	repetitive peak reverse voltage				
	BYG50D		–	200	V
	BYG50G		–	400	V
	BYG50J		–	600	V
	BYG50K		–	800	V
	BYG50M		–	1000	V
V <sub>R</sub>	continuous reverse voltage				
	BYG50D		–	200	V
	BYG50G		–	400	V
	BYG50J		–	600	V
	BYG50K		–	800	V
	BYG50M		–	1000	V
I <sub>F(AV)</sub>	average forward current	averaged over any 20 ms period; T <sub>TP</sub> = 100 °C; see Fig.2	–	2.1	A
		averaged over any 20 ms period; Al <sub>2</sub> O <sub>3</sub> PCB mounting (see Fig.7); T <sub>amb</sub> = 60 °C; see Fig.3	–	1.0	A
		averaged over any 20 ms period; epoxy PCB mounting (see Fig.7); T <sub>amb</sub> = 60 °C; see Fig.3	–	0.7	A
I <sub>FSM</sub>	non-repetitive peak forward current	t = 10 ms half sinewave; T <sub>j</sub> = T <sub>j,max</sub> prior to surge; V <sub>R</sub> = V <sub>RRMmax</sub>	–	30	A

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SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$E_{RSM}$	non-repetitive peak reverse avalanche energy	$L = 120 \text{ mH}$ ; $T_j = T_{j \text{ max}}$ prior to surge; inductive load switched off	–	10	mJ
	BYG50D to J				
	BYG50K and M		–	7	mJ
$T_{stg}$	storage temperature		–65	+175	°C
$T_j$	junction temperature	see Fig.4	–65	+175	°C

## ELECTRICAL CHARACTERISTICS

$T_j = 25 \text{ °C}$ ; 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	$I_R = 0.1 \text{ mA}$				V				
							BYG50D	300	–	–
							BYG50G	500	–	–
							BYG50J	700	–	–
							BYG50K	900	–	–
BYG50M	1100	–	–							
$I_R$	reverse current	$V_R = V_{RRM \text{ max}}$ ; see Fig.6	–	–	1	μA				
		$V_R = V_{RRM \text{ max}}$ ; $T_j = 165 \text{ °C}$ ; 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
$R_{th \text{ j-tp}}$	thermal resistance from junction to tie-point		25	K/W
$R_{th \text{ j-a}}$	thermal resistance from junction to ambient	note 1	100	K/W
		note 2	150	K/W

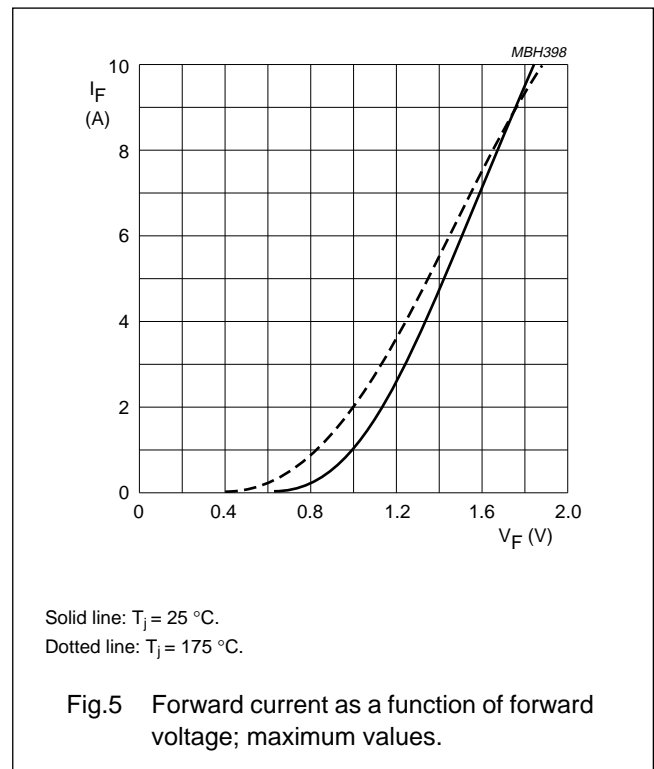
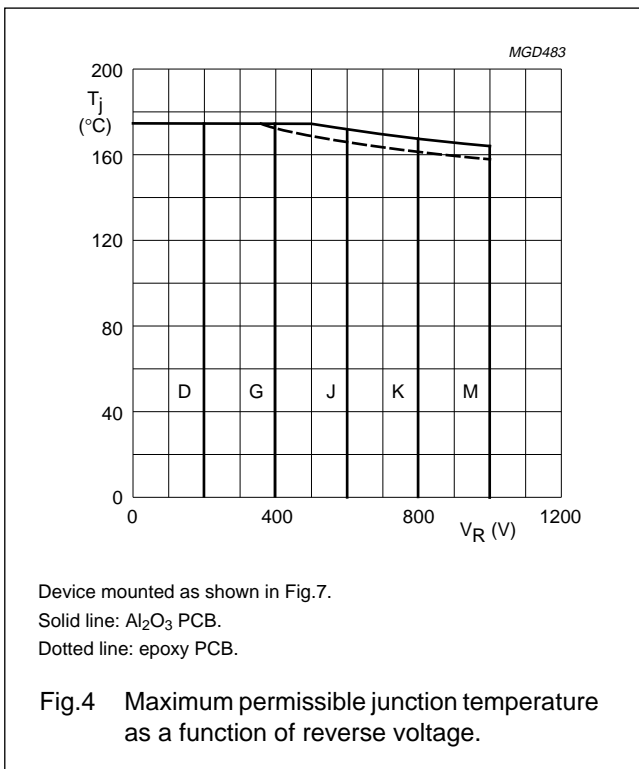
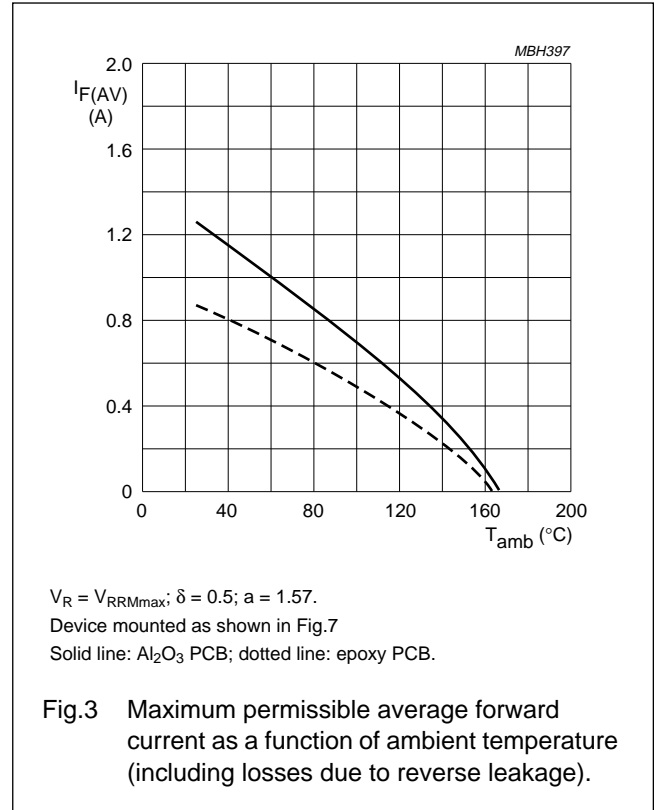
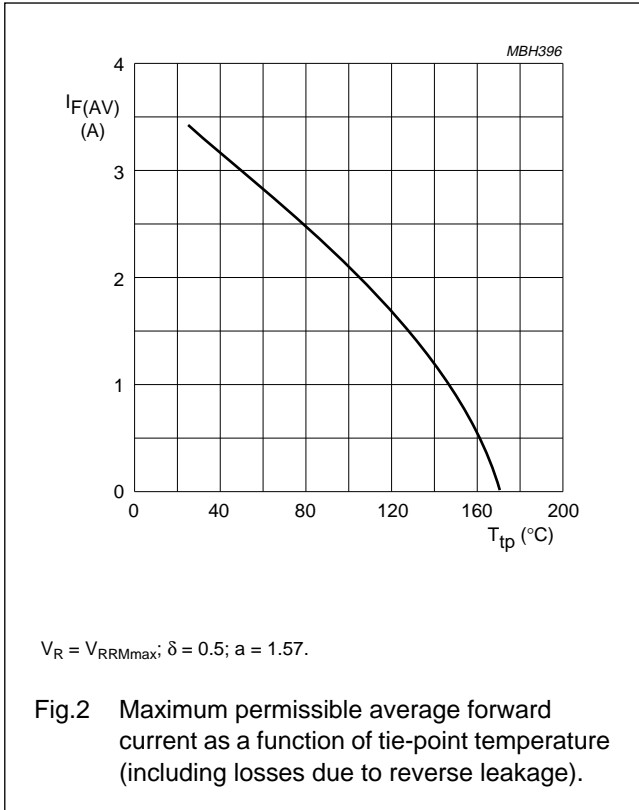
## Notes

1. Device mounted on  $\text{Al}_2\text{O}_3$  printed-circuit board, 0.7 mm thick; thickness of copper  $\geq 35 \text{ μm}$ , see Fig.7.
2. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper  $\geq 40 \text{ μm}$ , see Fig.7.  
For more information please refer to the "General Part of Handbook SC01".

Controlled avalanche rectifiers

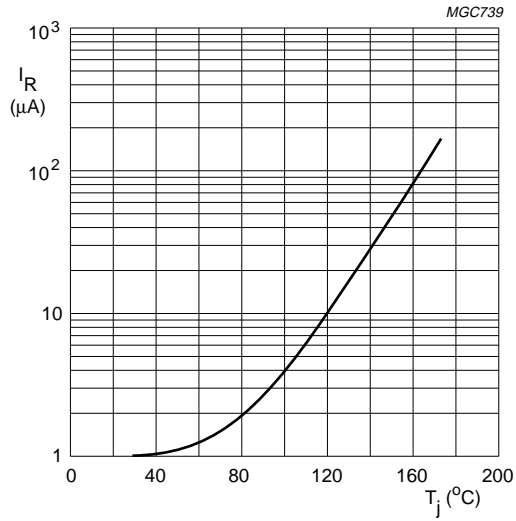
BYG50 series

GRAPHICAL DATA



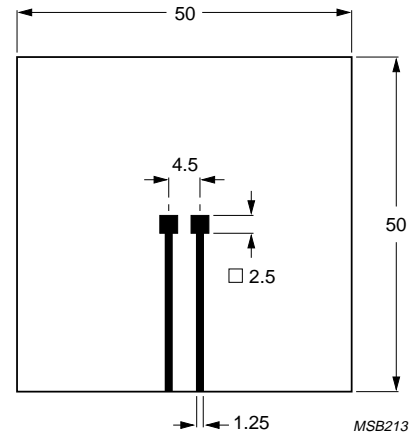
Controlled avalanche rectifiers

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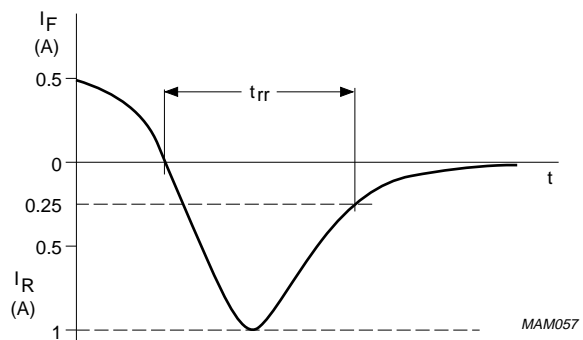
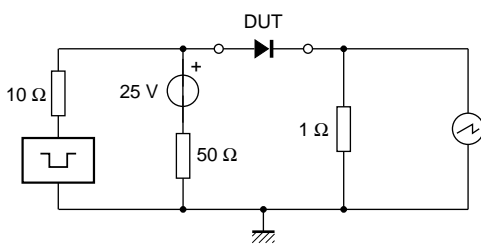
$V_R = V_{RMMmax}$

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



Dimensions in mm.

Fig.7 Printed-circuit board for surface mounting.



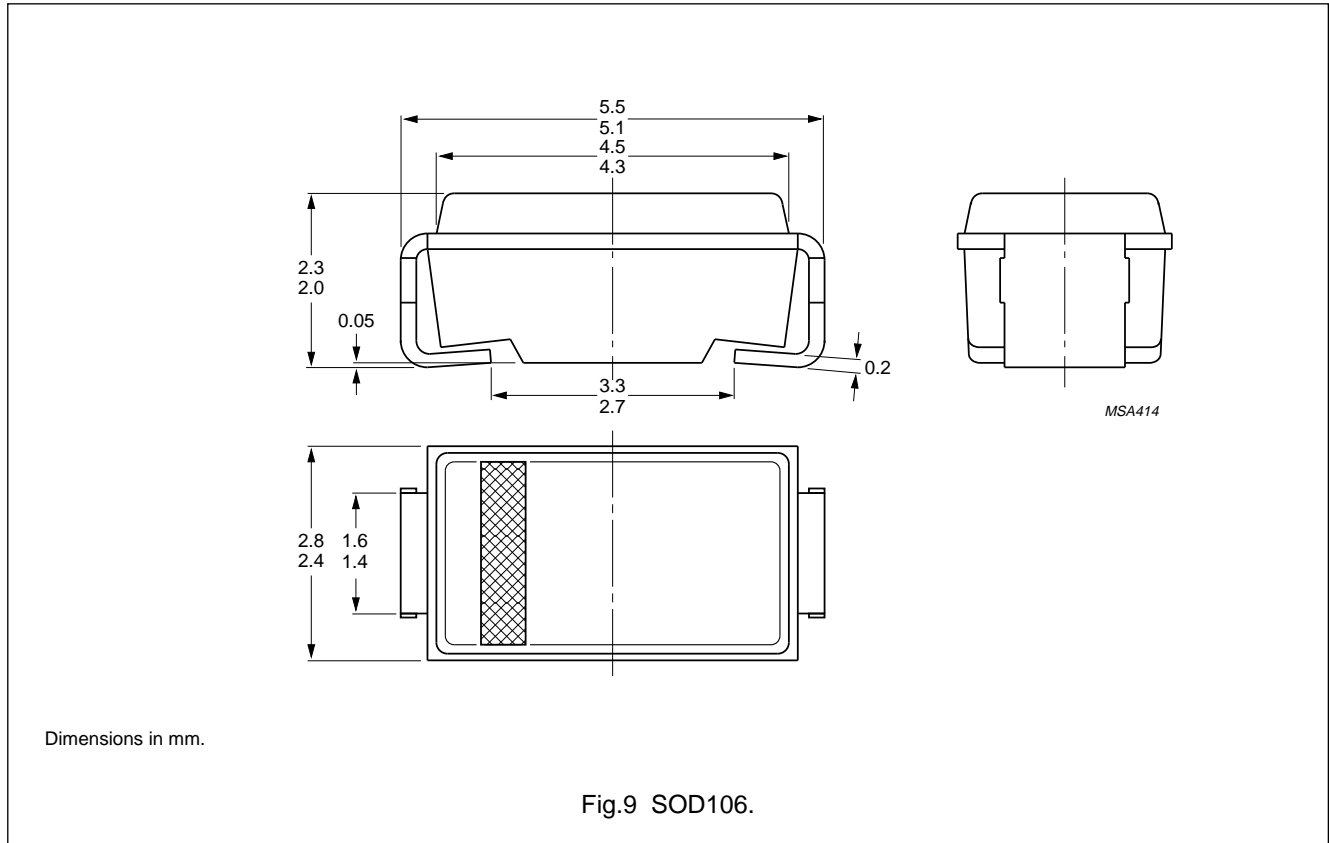
Input impedance oscilloscope: 1 MΩ, 22 pF;  $t_r \leq 7$  ns.  
 Source impedance: 50 Ω;  $t_r \leq 15$  ns.

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

Controlled avalanche rectifiers

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PACKAGE OUTLINE



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.	

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.