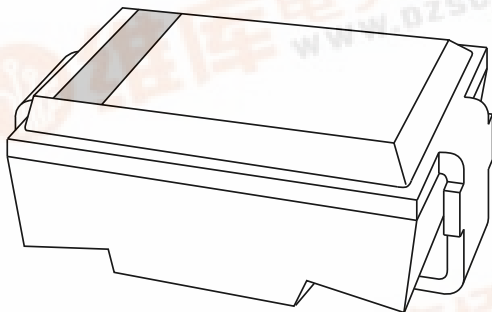


DISCRETE SEMICONDUCTORS

DATA SHEET



BYG60 series Fast soft-recovery controlled avalanche rectifiers

Preliminary specification
File under Discrete Semiconductors, SC01

1996 Jun 05

Fast soft-recovery controlled avalanche rectifiers

BYG60 series

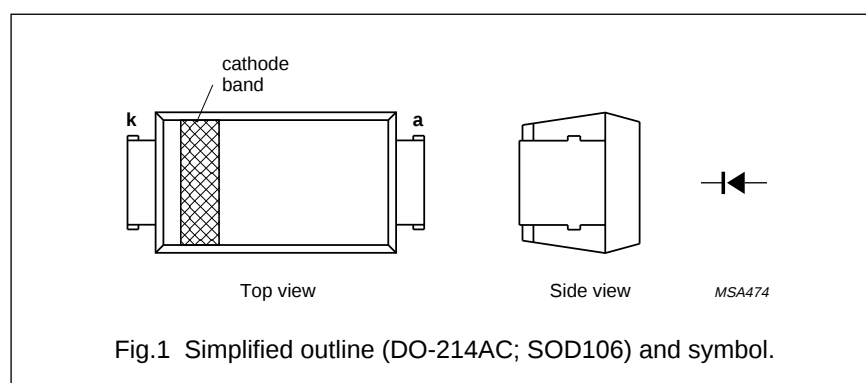
FEATURES

- 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 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_{RRM}	repetitive peak reverse voltage				
	BYG60D		—	200	V
	BYG60G		—	400	V
	BYG60J		—	600	V
	BYG60K		—	800	V
	BYG60M		—	1000	V
V_R	continuous reverse voltage				
	BYG60D		—	200	V
	BYG60G		—	400	V
	BYG60J		—	600	V
	BYG60K		—	800	V
	BYG60M		—	1000	V
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; $T_{tp} = 100\text{ }^{\circ}\text{C}$; see Fig.2	—	1.90	A
		averaged over any 20 ms period; Al_2O_3 PCB mounting (see Fig.7); $T_{amb} = 60\text{ }^{\circ}\text{C}$; see Fig.3	—	0.90	A
		averaged over any 20 ms period; epoxy PCB mounting (see Fig.7); $T_{amb} = 60\text{ }^{\circ}\text{C}$; see Fig.3	—	0.65	A
I_{FSM}	non-repetitive peak forward current	$t = 10\text{ ms}$ half sine wave; $T_j = T_{jmax}$ prior to surge; $V_R = V_{RRMmax}$	—	25	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			
	BYG60D to J		–	10	mJ
	BYG60K 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	–	–	0.98	V
		$I_F = 1 \text{ A}$; see Fig.5	–	–	1.20	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	$I_R = 0.1 \text{ mA}$				
	BYG60D		300	–	–	V
	BYG60G		500	–	–	V
	BYG60J		700	–	–	V
	BYG60K		900	–	–	V
	BYG60M		1100	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.6	–	–	5	µA
		$V_R = V_{RRMmax}$; $T_j = 165 \text{ °C}$; 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				
	BYG60D to J		–	–	250	ns
	BYG60K and M		–	–	300	ns
C_d	diode capacitance	$V_R = 0 \text{ V}$; $f = 1 \text{ MHz}$				
	BYG60D to J		–	30	–	pF
	BYG60K and M		–	25	–	pF

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

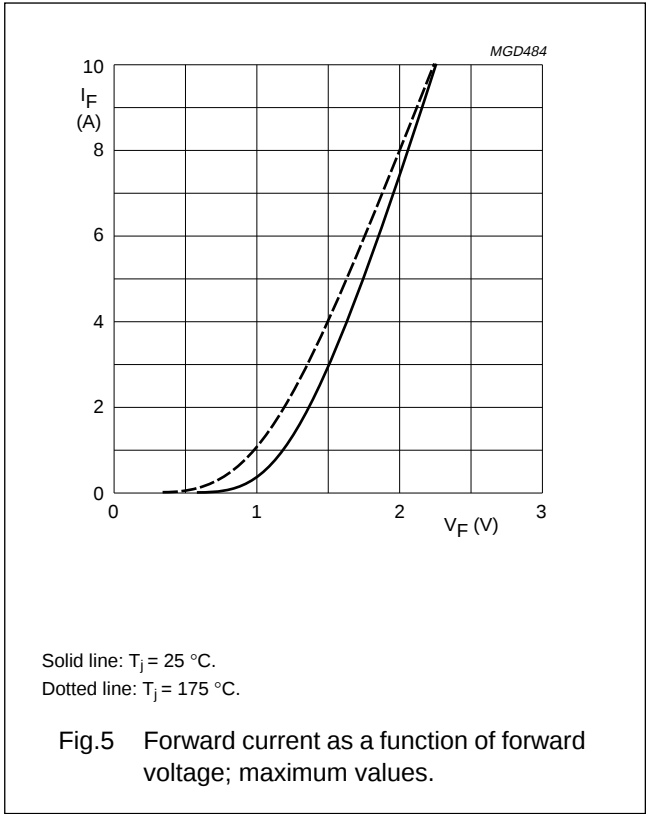
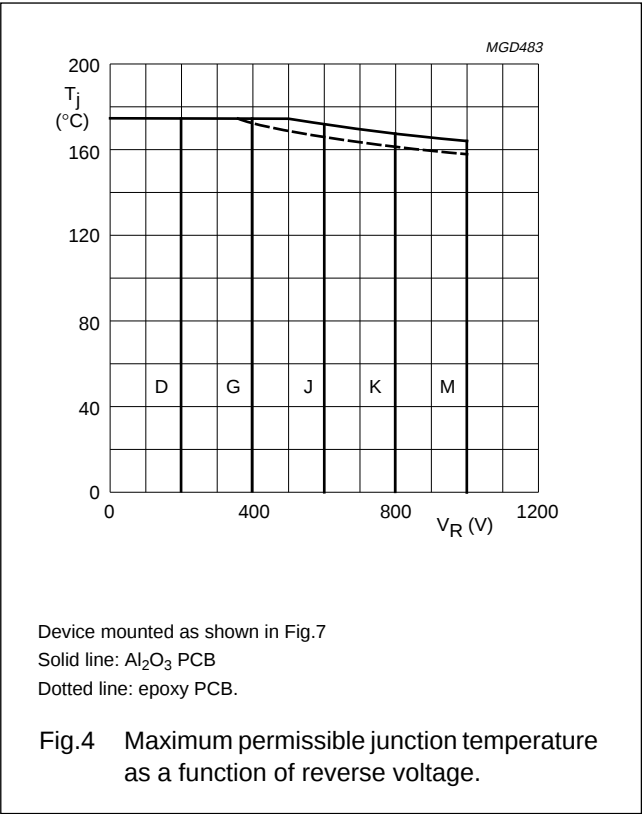
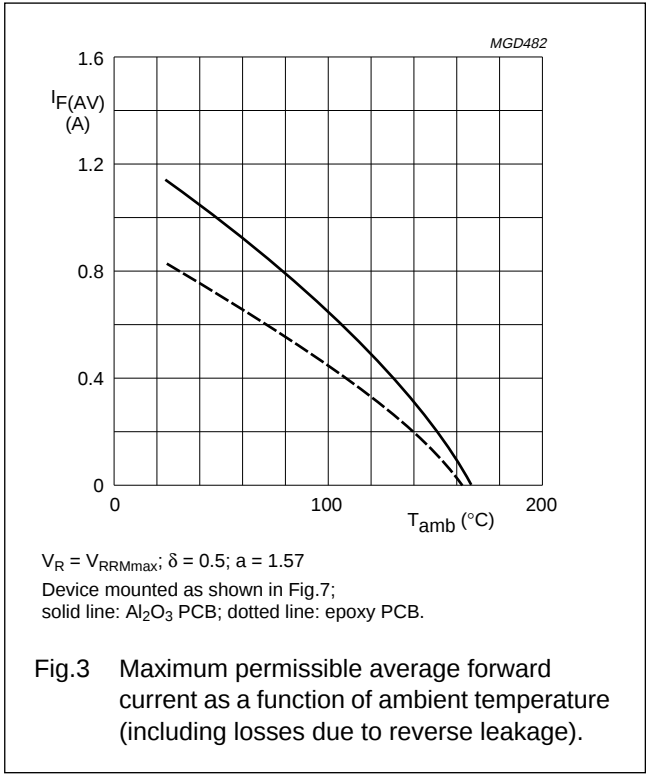
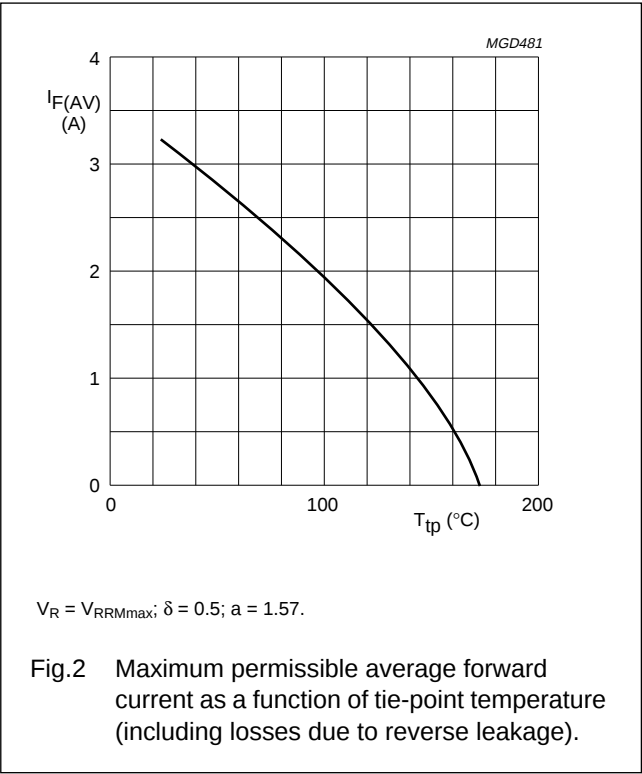
Notes

- Device mounted on Al_2O_3 printed-circuit board, 0.7 mm thick; thickness of copper $\geq 35 \text{ µm}$, see Fig.7.
- 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'.

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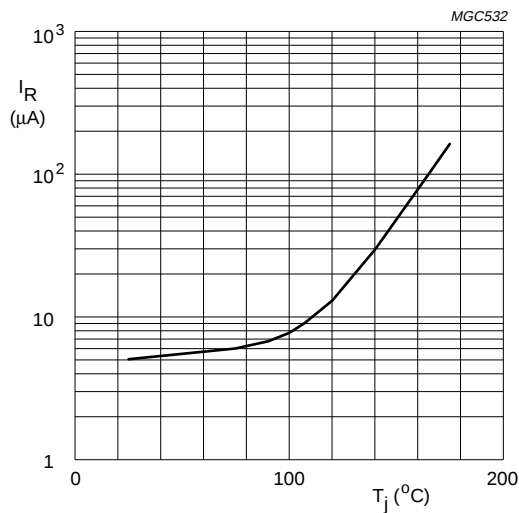
BYG60 series

GRAPHICAL DATA



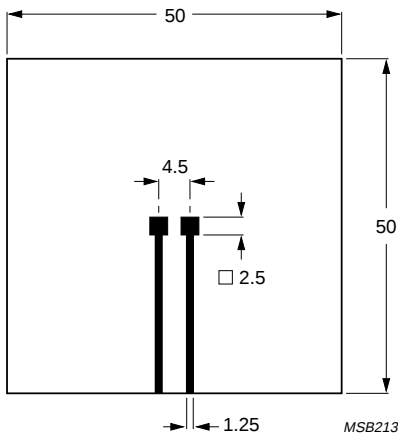
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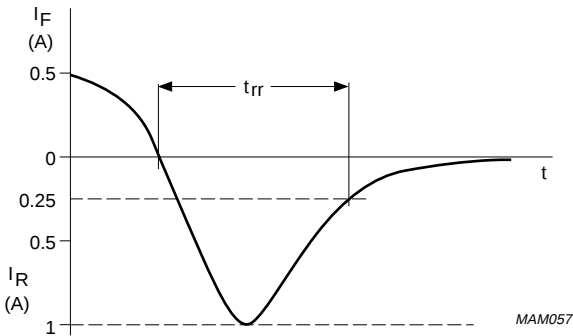
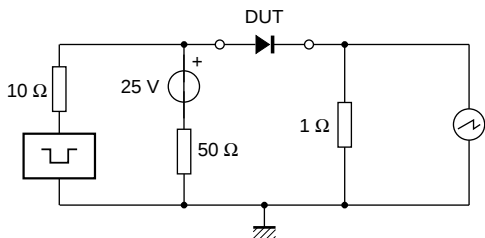
$V_R = V_{RMMmax}$

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



Dimensions in mm.
Material: Al_2O_3 or epoxy-glass.

Fig.7 Printed-circuit board for surface mounting.



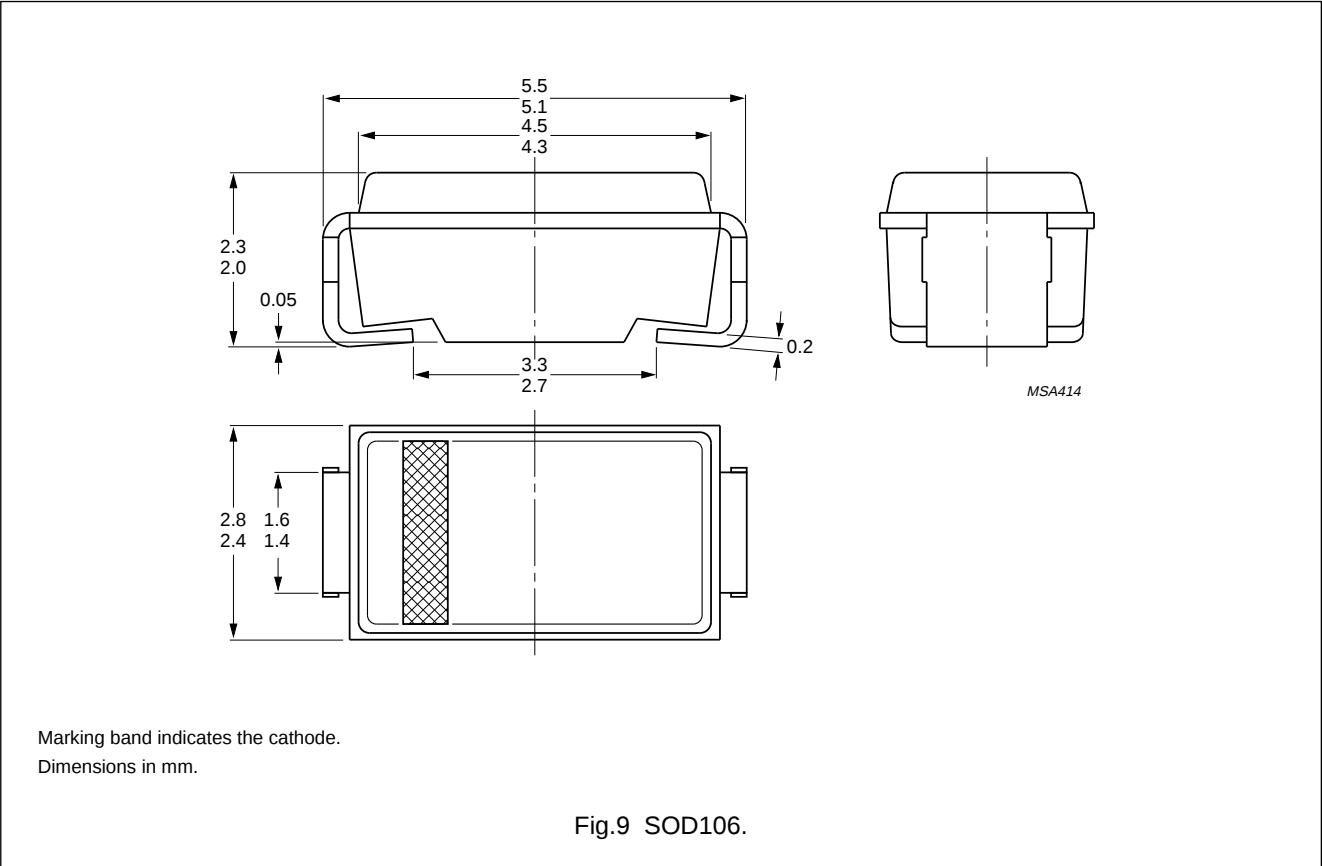
Input impedance oscilloscope: 1 M Ω , 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω ; $t_r \leq 15$ ns.

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

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PACKAGE OUTLINE



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.