Silicon Diode

BYG60G

400V/650mA

DATASHEET

OEM – Philips

Source: Philips Databook 1999

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.

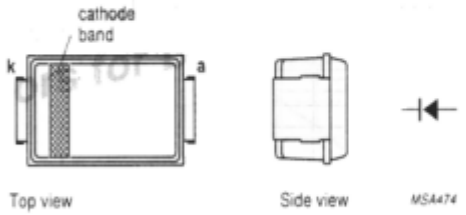

Fig.1 Simplified outline (DO-214AC; SOD106) and symbol.

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	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 °C; see Fig.2	–	1.90	A
		averaged over any 20 ms period; Al_2O_3 PCB mounting (see Fig.7); T_{amb} = 60 °C; see Fig.3	–	0.90	A
		averaged over any 20 ms period; epoxy PCB mounting (see Fig.7); T_{amb} = 60 °C; see Fig.3	–	0.65	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	25	A

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SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ 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 °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.5	–	–	0.98	V
		I_F = 1 A; see Fig.5	–	–	1.20	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 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 °C; see Fig.6	–	–	100	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.8				
	BYG60D to J		–	–	250	ns
	BYG60K and M		–	–	300	ns
C_d	diode capacitance	V_R = 0 V; f = 1 MHz				
	BYG60D to J		–	30	–	pF
	BYG60K and M		–	25	–	pF

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point		25	K/W
$R_{th\,j\text{-}a}$	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 ≥35 µm, see Fig.7.
2. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 µm, see Fig.7.
   For more information please refer to the *'General Part of Handbook SC01'*.

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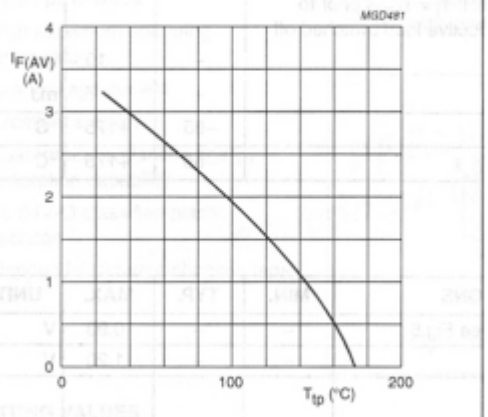
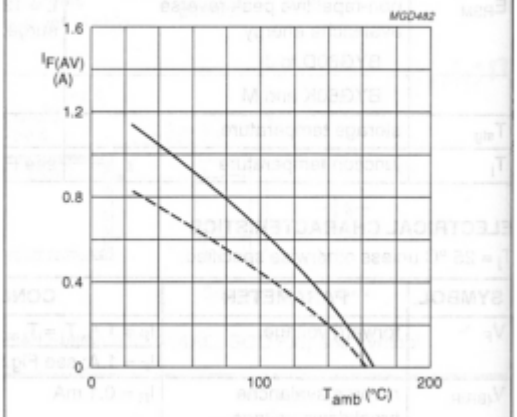
GRAPHICAL DATA



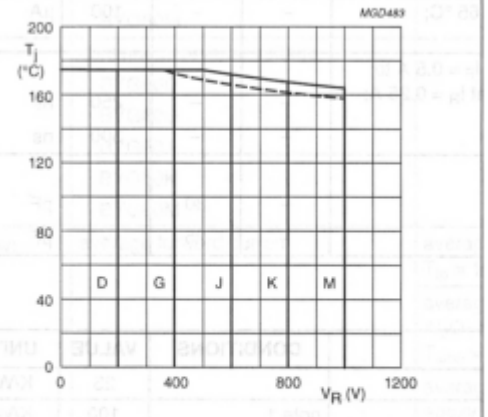
$V_R = V_{RRMmax}$; δ = 0.5; a = 1.57.

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



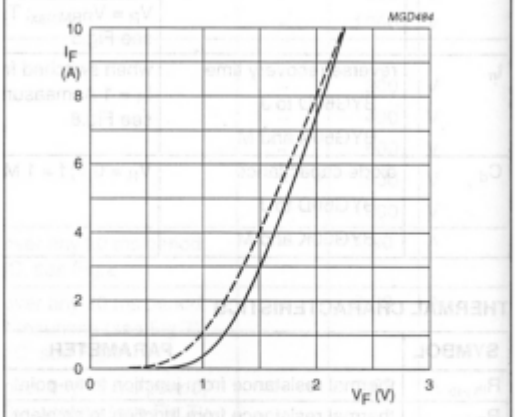
$V_R = V_{RRMmax}$; δ = 0.5; a = 1.57
Device mounted as shown in Fig.7;
solid line: Al_2O_3 PCB; dotted line: epoxy PCB.

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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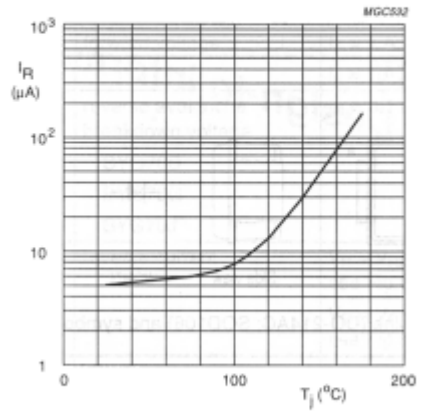
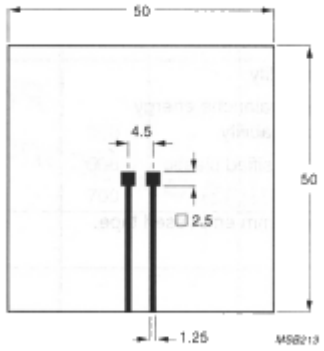


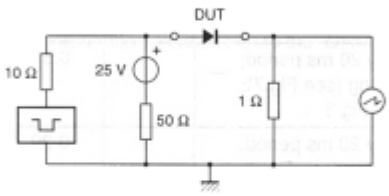
$V_R = V_{RMMmax}$.

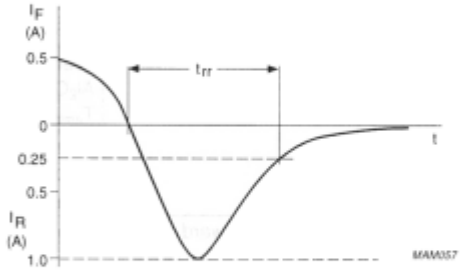
Fig.6 Reverse current as a function of junction temperature; maximum values.



Dimensions in mm.
Material: AL_2O_3 or epoxy-glass.

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.