Silicon Diode

BYW56

1kV/2A

DATASHEET

OEM – Philips

Source: Philips Databook 1999

Controlled avalanche rectifiers BYW54 to BYW56

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack.

DESCRIPTION

Rugged glass 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 (SOD57) 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				
	BYW54		–	600	V
	BYW55		–	800	V
	BYW56		–	1000	V
V_{RWM}	crest working reverse voltage				
	BYW54		–	600	V
	BYW55		–	800	V
	BYW56		–	1000	V
V_R	continuous reverse voltage				
	BYW54		–	600	V
	BYW55		–	800	V
	BYW56		–	1000	V
$I_{F(AV)}$	average forward current	T_{tp} = 45 °C; lead length = 10 mm; averaged over any 20 ms period; see Figs 2 and 4	–	2.0	A
		T_{amb} = 80 °C; PCB mounting (see Fig.9); averaged over any 20 ms period; see Figs 3 and 4	–	0.8	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave	–	50	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	see Fig.5	–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.6	–	–	0.8	V
		I_F = 1 A; see Fig.6	–	–	1.0	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYW54		650	–	–	V
	BYW55		900	–	–	V
	BYW56		1100	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.7	–	–	1	µA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.7	–	–	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	–	3	–	µs
C_d	diode capacitance	V_R = 0 V; f = 1 MHz; see Fig.8	–	50	–	pF

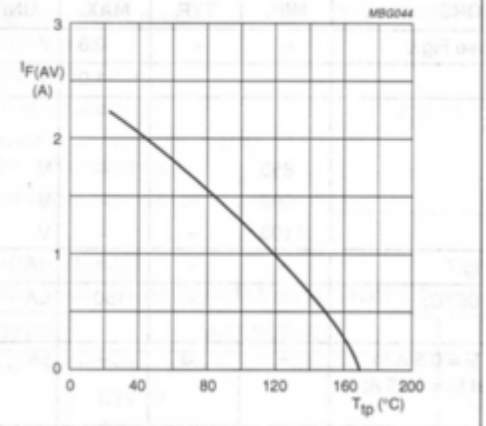
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	46	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	100	K/W

Note

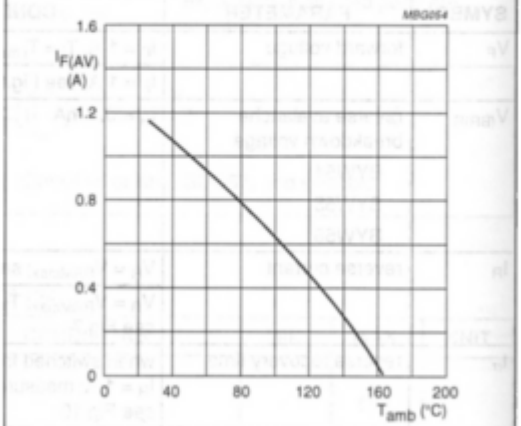
1. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 µm, see Fig.9. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA



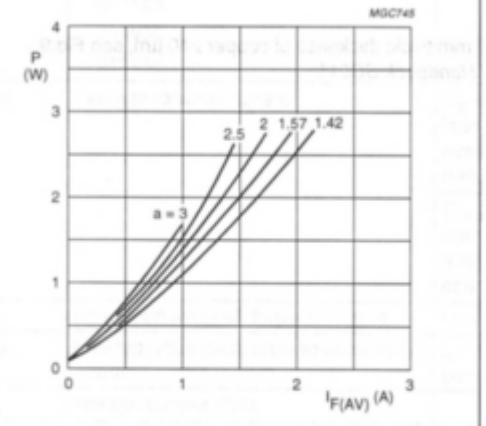
a = 1.57; $V_R = V_{RRMmax}$; δ = 0.5; lead length 10 mm.

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



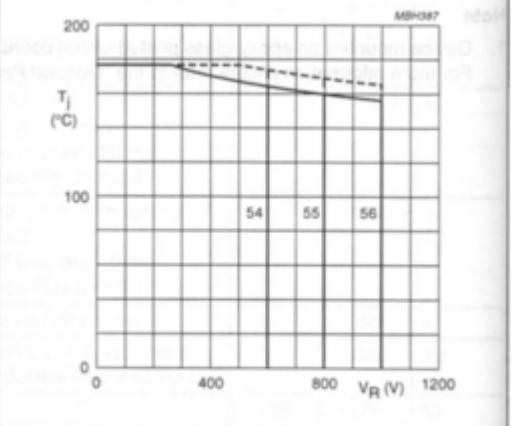
a = 1.57; $V_R = V_{RRMmax}$; δ = 0.5; device mounted as shown in Fig.9.

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



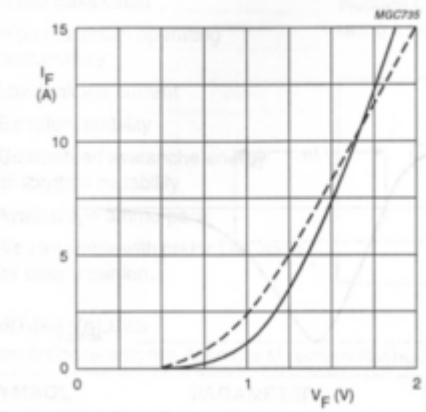
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; δ = 0.5.

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



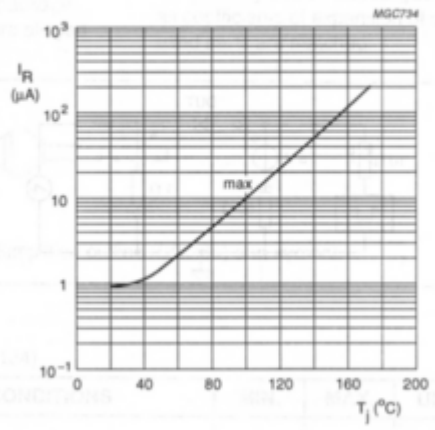
Solid line = V_R.
Dotted line = V_{RRM}; δ = 0.5.

Fig.5 Maximum permissible junction temperature as a function of reverse voltage.



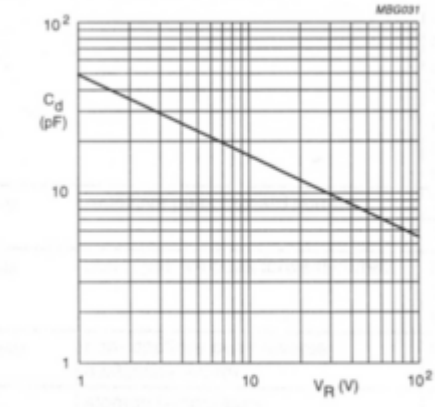
Solid line: $T_j = 25$ °C.
Dotted line: $T_j = T_{j\,max}$.

Fig.6 Forward current as a function of forward voltage; maximum values.



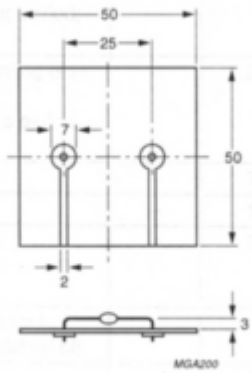
$V_R = V_{RRMmax}$.

Fig.7 Reverse current as a function of junction temperature; maximum values.



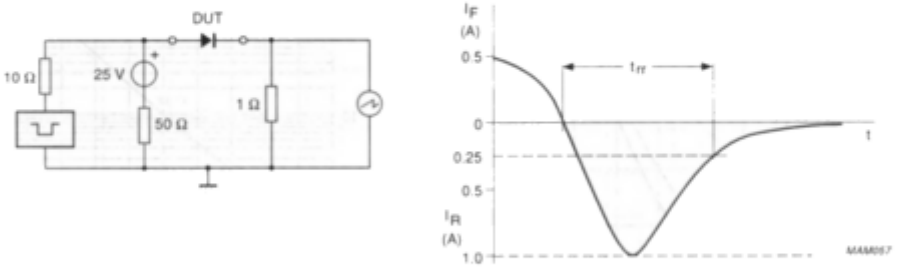
f = 1 MHz; $T_j = 25$ °C.

Fig.8 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.9 Device mounted on a printed-circuit board.



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

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