# SCHOTTKY BARRIER RECTIFIER

BYV97 series

FEATURES

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

DESCRIPTION

Rugged glass SOD57 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.

k   a

MAM047
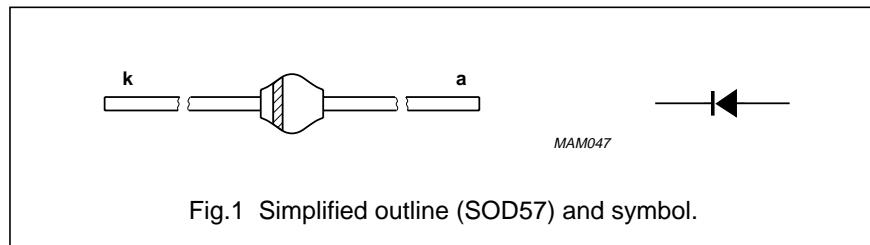
Fig.1 Simplified outline (SOD57) and symbol.

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYV97F		−	1200	V
	BYV97G		−	1400	V
V_R	continuous reverse voltage				
	BYV97F		−	1200	V
	BYV97G		−	1400	V
$I_{F(AV)}$	average forward current	$T_{tp} = 60\ °C$; lead length = 10 mm see Fig.2; averaged over any 20 ms period; see also Fig.6	−	1.6	A
$I_{F(AV)}$	average forward current	$T_{amb} = 50\ °C$; PCB mounting (see Fig. 12); see Fig.3; averaged over any 20 ms period; see also Fig.6	−	0.9	A
I_{FRM}	repetitive peak forward current	$T_{tp} = 65\ °C$; see Fig.4	−	15	A
		$T_{amb} = 65\ °C$; see Fig.5	−	8	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\ max}$ prior to surge; $V_R = V_{RRMmax}$	−	20	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\ max}$ prior to surge; inductive load switched off	−	10	mJ
T_{stg}	storage temperature		−65	+175	°C
T_j	junction temperature	see Fig.7	−65	+175	°C

BYV97 series

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 3 A; $T_j = T_{j\,max}$; see Fig.8			1.35	V
		I_F = 3 A; see Fig.8	–	–	1.65	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYV97F		1300	–	–	V
	BYV97G		1500	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.9	–	–	1	µA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.9	–	–	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.14	–	–	500	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Fig.11	–	35	–	pF
$\left\|\dfrac{dI_R}{dt}\right\|$	maximum slope of reverse recovery current	when switched from I_F = 1 A to $V_R \geq$ 30 V and dI_F/dt = −1 A/µs; see Figs 10 and 13	–	–	5	A/µs

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 an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 µm, see Fig. 12. For more information please refer to the *"General Part of associated Handbook"*.
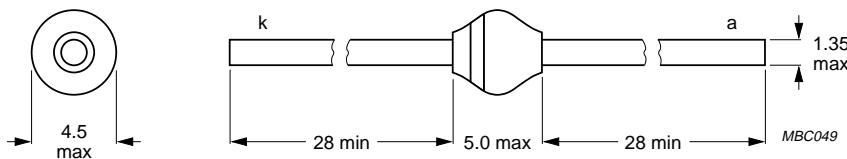

Dimensions in mm.
The marking band indicates the cathode.

Fig.12 SOD64.

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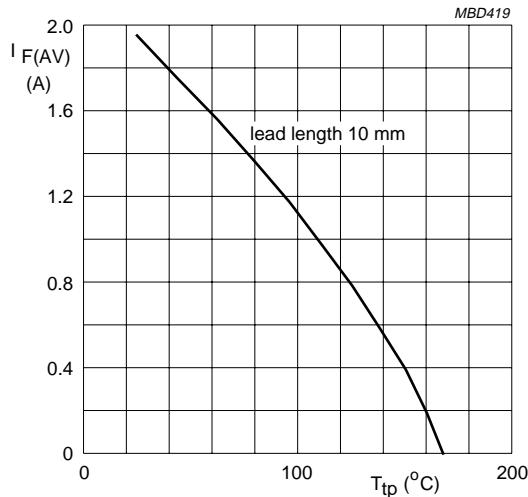
a = 1.57; $V_R = V_{RRMmax}$; $\delta = 0.5$.

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

a = 1.57; $V_R = V_{RRMmax}$; $\delta = 0.5$.
Device mounted as shown in Fig.12.
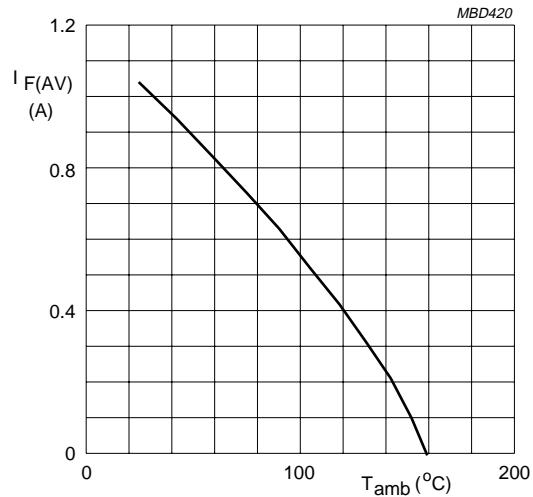
Fig.3   Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).
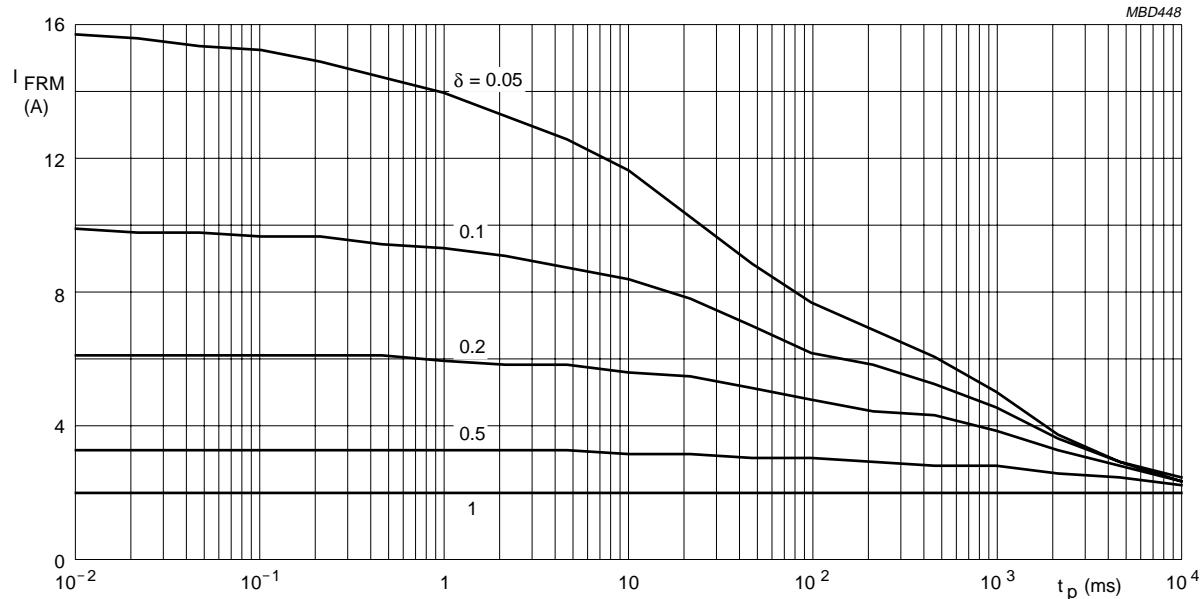
$T_{tp} = 65°C$; $R_{th\ j\text{-}tp} = 46$ K/W.
V_{RRMmax} during $1 - \delta$; curves include derating for $T_{j\ max}$ at $V_{RRM} = 1400$ V.

Fig.4   Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

BYV97 series

MBD442

I_{FRM} (A)

$\delta = 0.05$

0.1

0.2

0.5

1

t_p (ms)
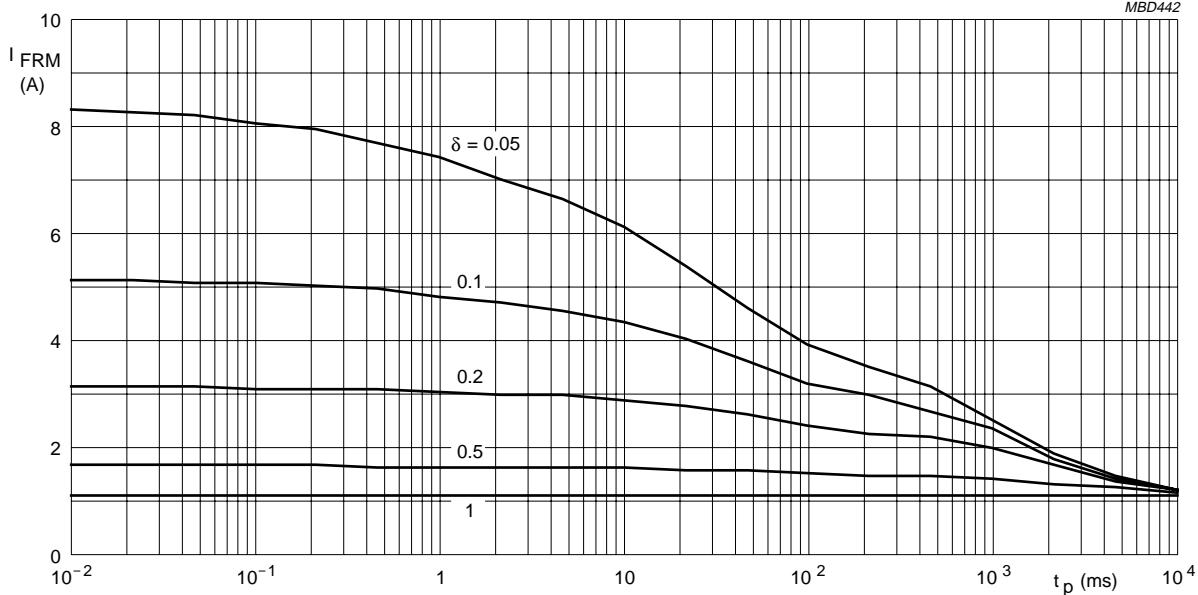
$T_{amb} = 65\ °C$; $R_{th\ j-a} = 100\ K/W$.

V_{RRMmax} during $1 - \delta$; curves include derating for $T_{j\ max}$ at $V_{RRM} = 1400\ V$.

Fig.5 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

MBD428

P
(W)

$a = 3$ 2.5   2   1.57

1.42

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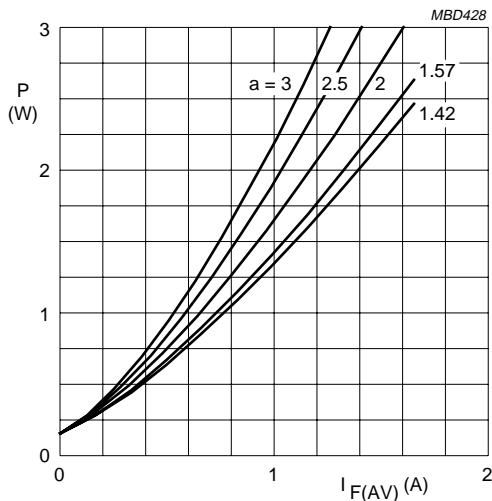
$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Fig.6   Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.

MBD433

T_j
(^oC)

BYV97F   BYV97G

V_R (V)

Solid line = V_R.
Dotted line = V_{RRM}; $\delta = 0.5$.
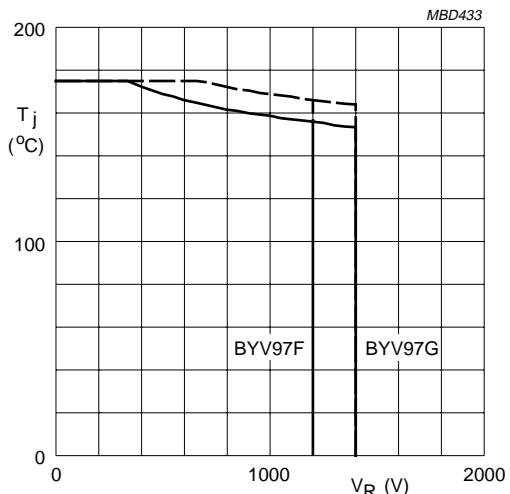
Fig.7   Maximum permissible junction temperature as a function of reverse voltage.

BYV97 series

MGD316

I_F
(A)
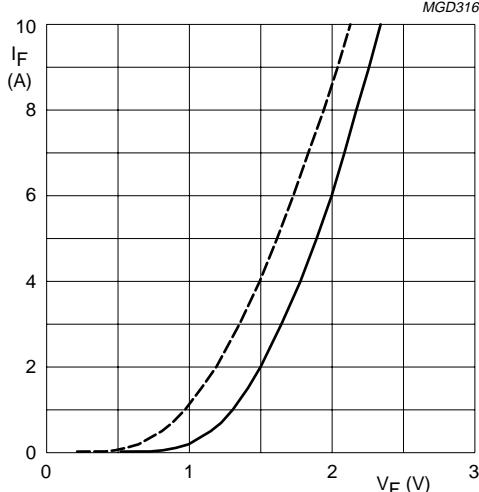
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

V_F (V)

Fig.8   Forward current as a function of forward
          voltage; maximum values.

MGC574

I_R
(µA)

T_j (°C)
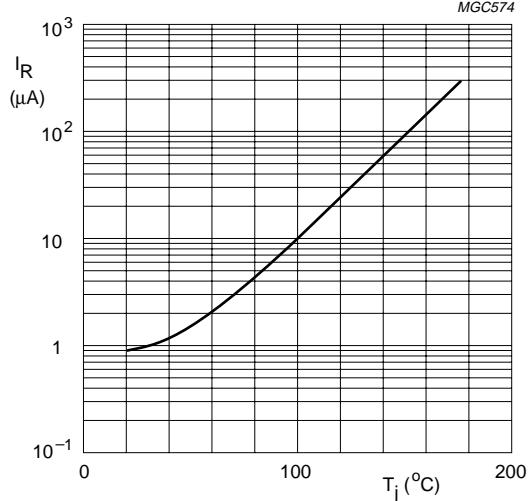
$V_R = V_{RRMmax}$.

Fig.9   Reverse current as a function of junction
          temperature; maximum values.

MBD439

t_{rr}
(µs)

I_F =
5 A

1 A

$-dI_F$/dt (A/µs)
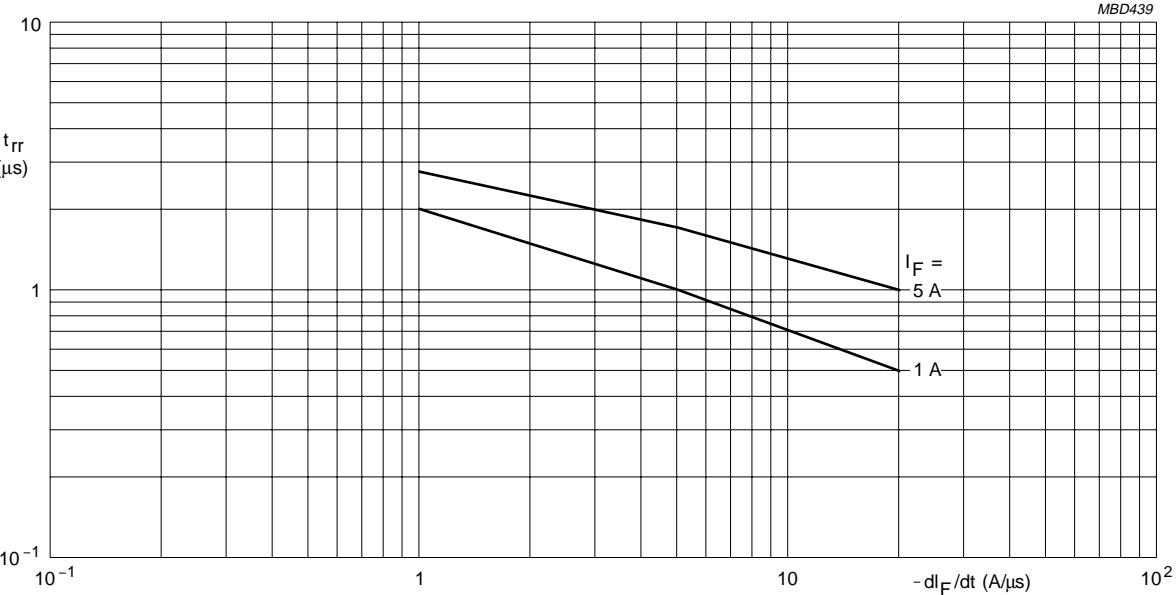
T_j = 25°C.
For definitions see Fig. 13.

Fig.10   Maximum reverse recovery time as a function of the rate of fall of forward current.

BYV97 series

MGD317

C_d (pF)

10^2

10

1

1   10 10^2 10^3

V_R (V)
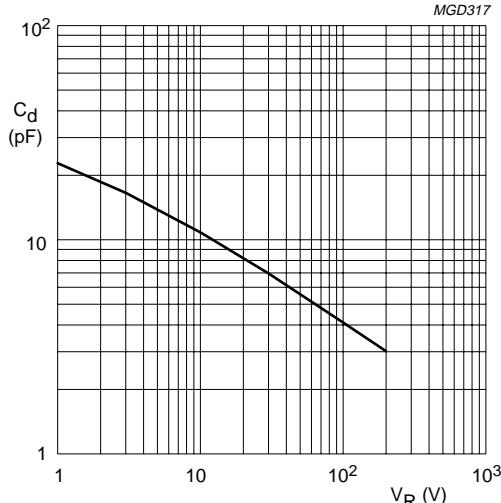
f = 1 MHz; T_j = 25 °C.

Fig.11   Diode capacitance as a function of reverse voltage; typical values.

50

25

7

50

2

3

MGA200
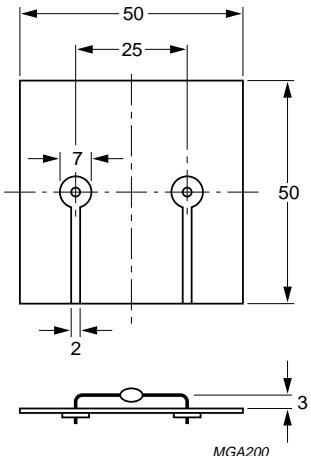
Dimensions in mm.

Fig.12   Device mounted on a printed-circuit board.

I_F

$\frac{dI_F}{dt}$

t_{rr}

10%   t

$\frac{dI_R}{dt}$

100%

I_R

MGC499
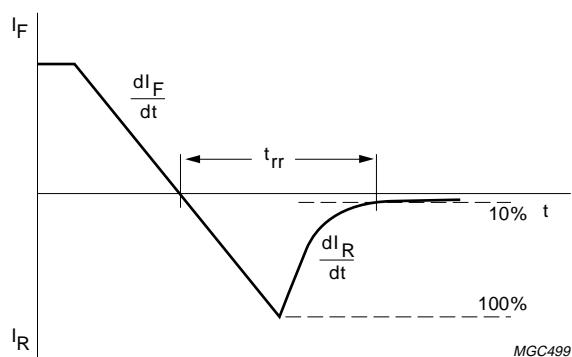
Fig.13   Reverse recovery definitions.
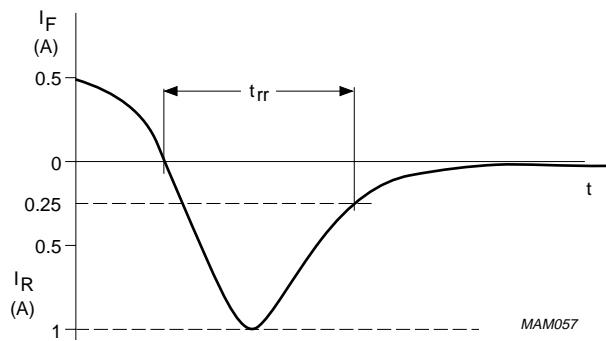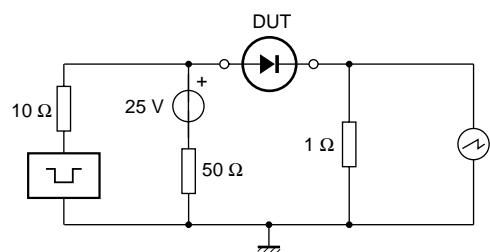
Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r < 7$ ns.
Source impedance: 50 Ω; $t_r < 15$ ns.

Fig.14 Test circuit and reverse recovery time waveform and definition.