

Fast soft-recovery controlled avalanche rectifiers

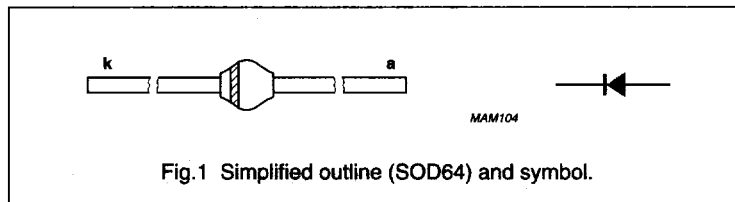
BYW97 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack
- Also available with preformed leads for easy insertion.

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.



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage BYW97F BYW97G		–	1200	V
			–	1400	V
V_R	continuous reverse voltage BYW97F BYW97G		–	1200	V
			–	1400	V
$I_{F(AV)}$	average forward current	$T_{tp} = 50\text{ °C}$; lead length = 10 mm see Fig.2; averaged over any 20 ms period; see also Fig.6	–	3.3	A
$I_{F(AV)}$	average forward current	$T_{amb} = 55\text{ °C}$; PCB mounting (see Fig.11); see Fig.3; averaged over any 20 ms period; see also Fig.6	–	1.3	A
I_{FRM}	repetitive peak forward current	$T_{tp} = 50\text{ °C}$; see Fig.4	–	33	A
		$T_{amb} = 55\text{ °C}$; see Fig.5	–	13	A
I_{FSM}	non-repetitive peak forward current	$t = 10\text{ ms}$ half sine wave; $T_j = T_{j\max}$ prior to surge; $V_R = V_{RRM\max}$	–	60	A
E_{RSM}	non-repetitive peak reverse avalanche energy	$L = 120\text{ mH}$; $T_j = T_{j\max}$ 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

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ELECTRICAL CHARACTERISTICS

$T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	$I_F = 5\text{ A}$; $T_j = T_{j,max}$; see Fig.8	–	–	1.25	V
		$I_F = 5\text{ A}$; see Fig.8	–	–	1.45	V
$V_{(BR)R}$	reverse avalanche breakdown voltage BYW97F BYW97G	$I_R = 0.1\text{ mA}$	1300	–	–	V
			1500	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.9	–	–	1	μA
		$V_R = V_{RRMmax}$; $T_j = 165\text{ }^\circ\text{C}$; see Fig.9	–	–	150	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.12	–	–	500	ns
C_d	diode capacitance	$f = 1\text{ MHz}$; $V_R = 0\text{ V}$; see Fig.10	–	65	–	pF
$\left \frac{dI_R}{dt} \right $	maximum slope of reverse recovery current	when switched from $I_F = 1\text{ A}$ to $V_R \geq 30\text{ V}$ and $dI_F/dt = -1\text{ A}/\mu\text{s}$; see Fig.13	–	–	5	$\text{A}/\mu\text{s}$

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	25	K/W
$R_{th\ j-a}$	thermal resistance from junction to ambient	note 1	75	K/W

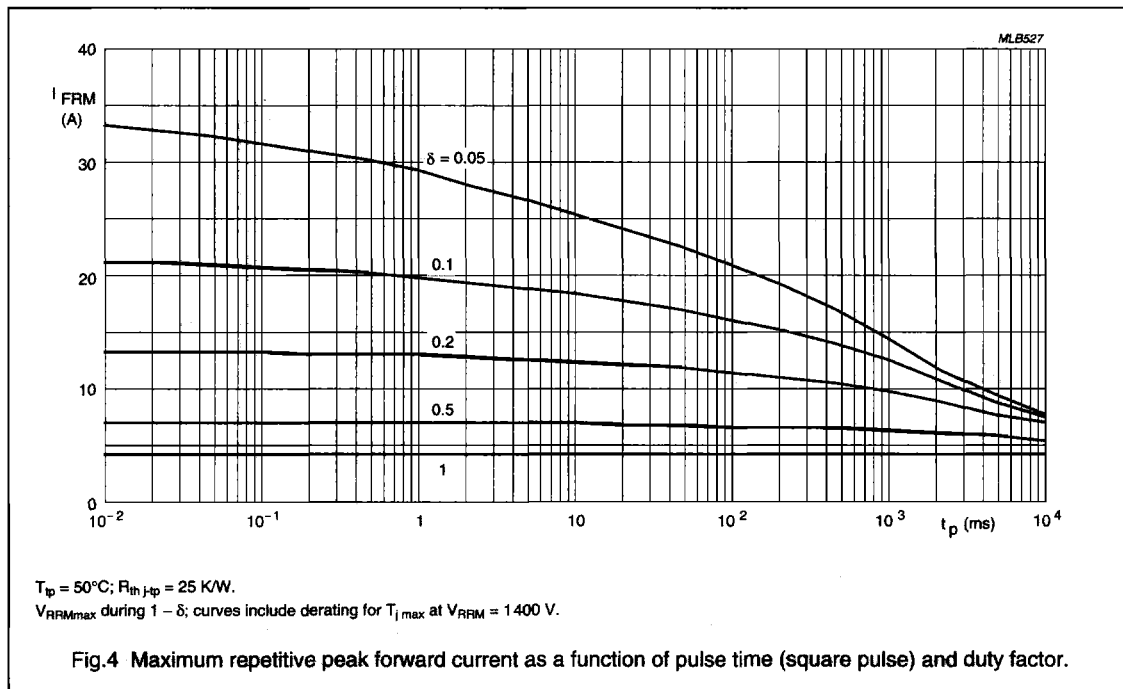
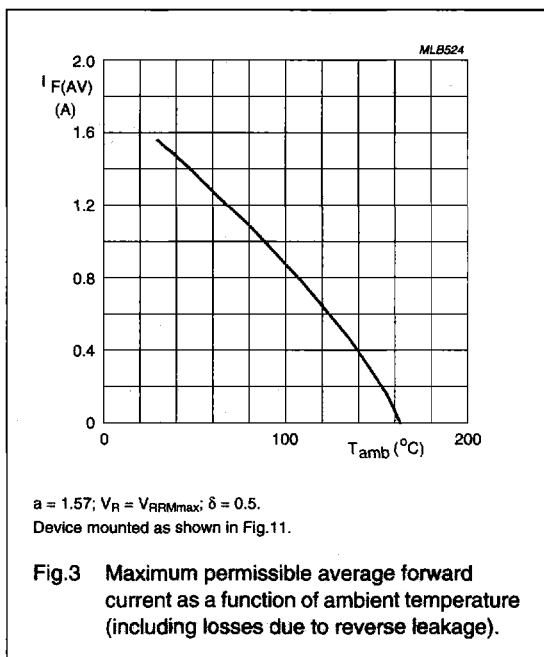
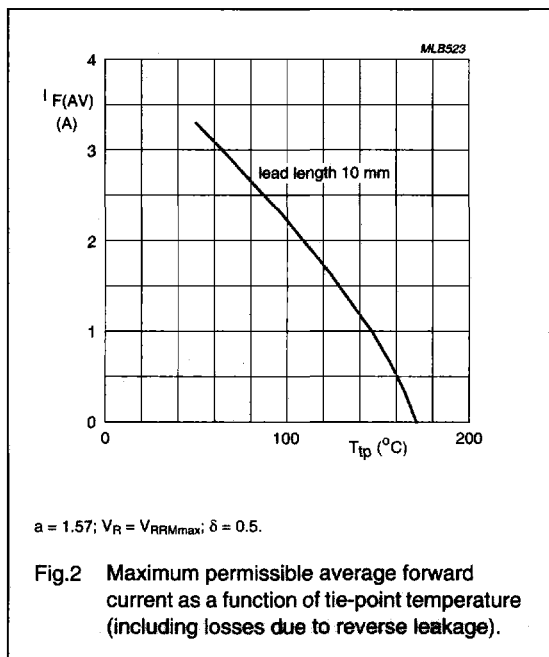
Note

- Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer $\geq 40\text{ }\mu\text{m}$, see Fig.11. For more information please refer to the 'General Part of Handbook SC01'.

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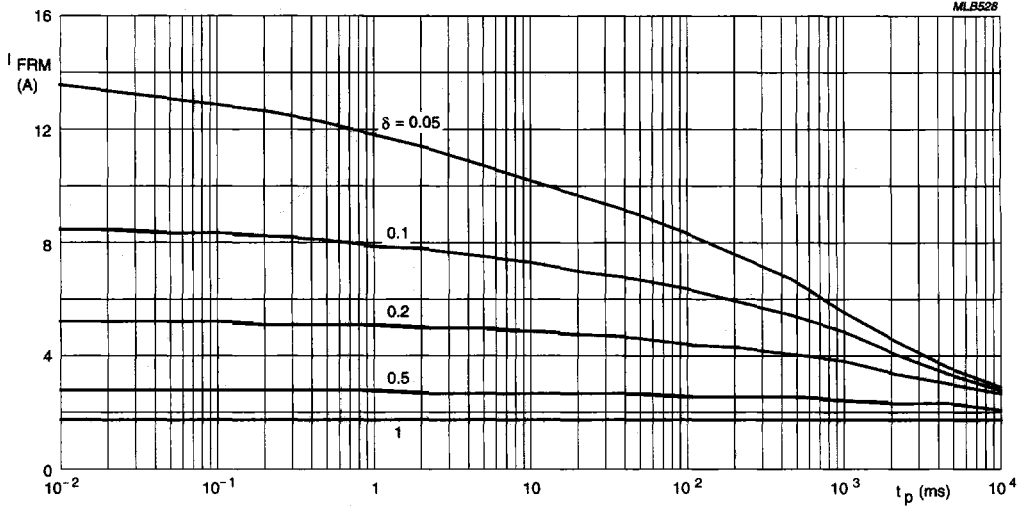
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GRAPHICAL DATA



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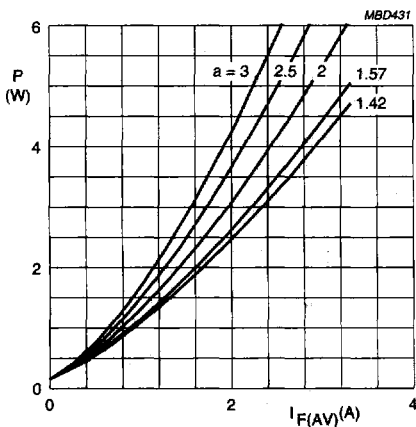
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$T_{amb} = 55^\circ\text{C}$; $R_{thj-a} = 75\text{ K/W}$.

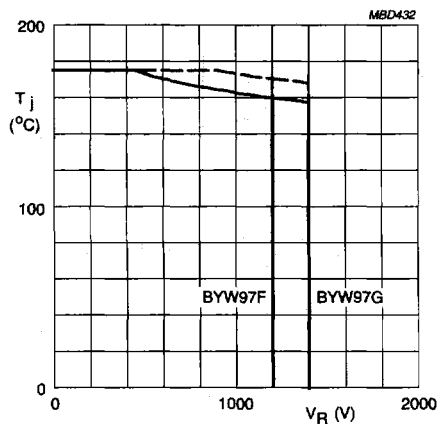
V_{RRMmax} during 1 - δ ; curves include derating for T_{jmax} at $V_{RRM} = 1400\text{ V}$.

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



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

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

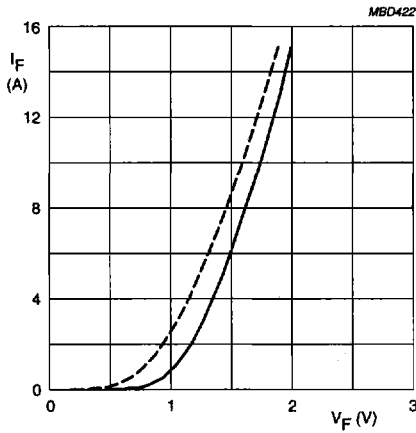


Solid line = V_R .
Dotted line = V_{RRM} ; $\delta = 0.5$.

Fig.7 Maximum permissible junction temperature as a function of reverse voltage.

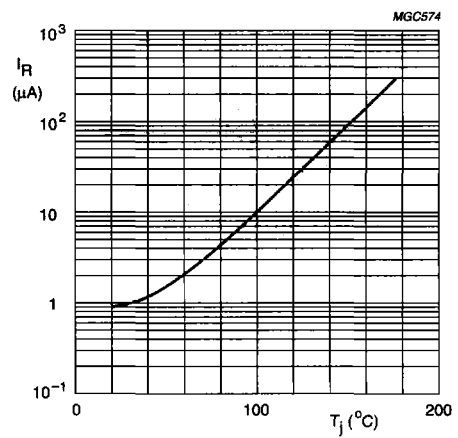
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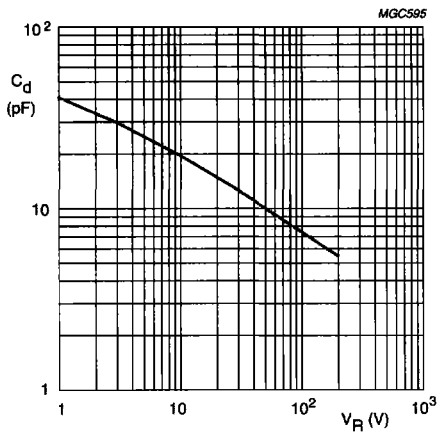
Dotted line: $T_j = 175\text{ }^\circ\text{C}$.
Solid line: $T_j = 25\text{ }^\circ\text{C}$.

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



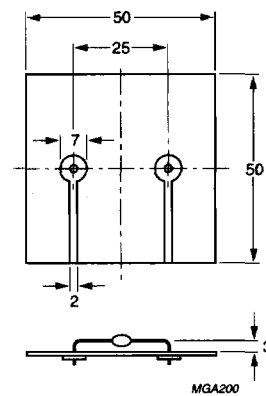
$V_R = V_{RRMmax}$.

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



$f = 1\text{ MHz}$; $T_j = 25\text{ }^\circ\text{C}$.

Fig.10 Diode capacitance as a function of reverse voltage; typical values.

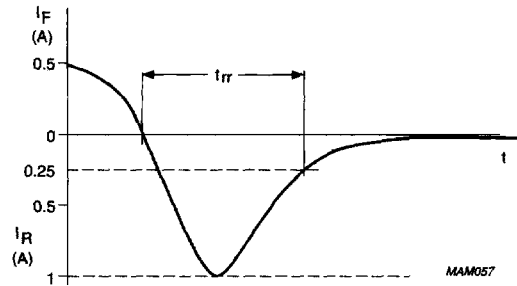
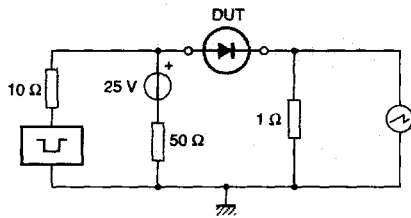


Dimensions in mm.

Fig.11 Device mounted on a printed-circuit board.

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

Fig.12 Test circuit and reverse recovery time waveform and definition.

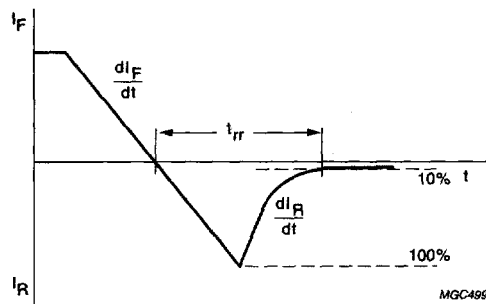


Fig.13 Reverse recovery definitions.