Silicon planar epitaxial high-speed diode

BAL99W

FEATURES

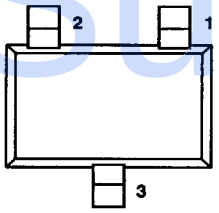
- Plastic SMD envelope
- High switching speed
- General application.

DESCRIPTION

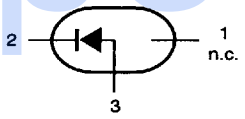
Epitaxial high-speed switching diode in a small rectangular SMD SOT323 envelope. The diode is intended for high-speed switching applications in surface mounted circuits.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_R	continuous reverse voltage		75	V
V_{RRM}	repetitive peak reverse voltage		85	V
I_{FRM}	repetitive peak forward current		500	mA
T_j	junction temperature		150	°C
V_F	forward voltage	I_F = 50 mA	1	V
t_{rr}	reverse recovery time	when switched from I_F = 10 mA to I_R = 10 mA; R_L = 100 Ω; measured at I_R = 1 mA	4	ns



Top view



MAM080

Marking code: JF

Fig.1 Simplified outline (SOT323) and symbol.

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LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_R	continuous reverse voltage		–	75	V
V_{RRM}	repetitive peak reverse voltage		–	85	V
I_F	DC forward current		–	150	mA
I_{FRM}	repetitive peak forward current		–	500	mA
I_{FSM}	non-repetitive peak forward current	$t = 1\ \mu s$	–	4	A
		$t = 1$ ms	–	1	A
		$t = 1$ s	–	0.5	A
P_{tot}	total power dissipation	$T_{amb} = 25$ °C; note 1	–	200	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	+150	°C

THERMAL RESISTANCE

SYMBOL	PARAMETER	CONDITIONS	THERMAL RESISTANCE
$R_{th\ j\text{-}a}$	from junction to ambient	note 1	625 K/W

Note

1. Device mounted on FR4 printed-circuit board.

CHARACTERISTICS

$T_j = 25$ °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	$I_F = 1$ mA	715	mV
		$I_F = 10$ mA	855	mV
		$I_F = 50$ mA	1	V
		$I_F = 150$ mA	1.25	V
I_R	reverse current	$V_R = 25$ V	30	nA
		$V_R = 25$ V; $T_j = 150$ °C	30	µA
		$V_R = 75$ V	1	µA
		$V_R = 75$ V; $T_j = 150$ °C	50	µA
C_d	diode capacitance	$V_R = 0$; $f = 1$ MHz	1.5	pF
V_{fr}	forward recovery voltage	switched to $I_F = 10$ mA; $t_p = 20$ ns; see Fig.2	1.75	V
t_{rr}	reverse recovery time	switching from $I_F = 10$ mA to $I_R = 10$ mA; $R_L = 100\ \Omega$; measured at $I_R = 1$mA; see Fig.3	4	ns

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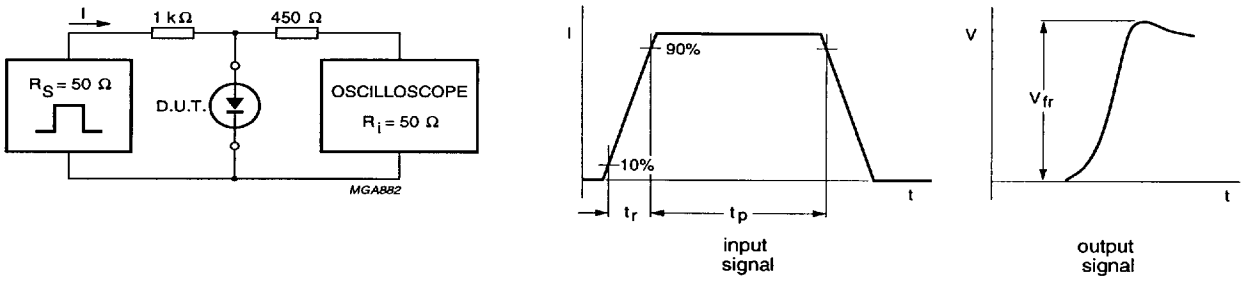
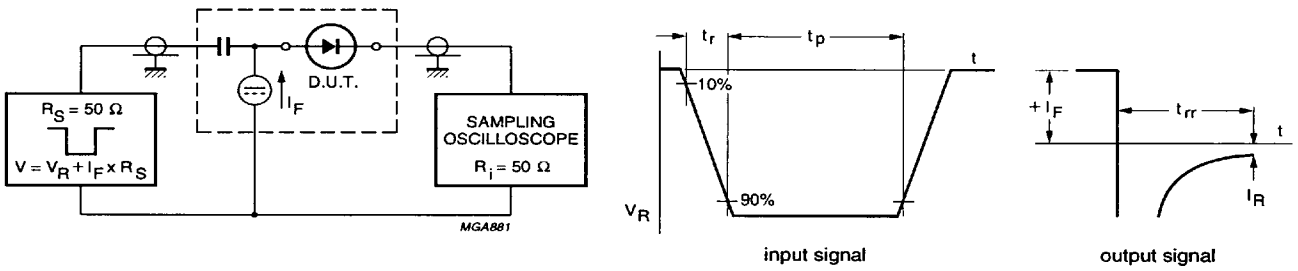


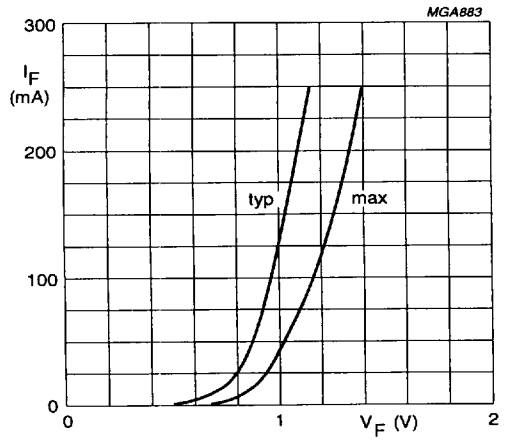
Input signal: forward pulse rise time t_r = 20 ns; forward pulse duration t_p = 120 ns; duty factor δ = 0.01.
Oscilloscope: rise time t_r = 0.35 ns.
Circuit capacitance: C ≤1 pF (oscilloscope input capacitance + parasitic capacitance).

Fig.2 Forward recovery voltage test circuit and waveforms.



Input signal: reverse pulse rise time t_r = 0.6 ns; reverse pulse duration t_p = 100 ns; duty factor δ = 0.05.
Oscilloscope: rise time t_r = 0.35 ns.
Circuit capacitance: C ≤1 pF (oscilloscope input capacitance + parasitic capacitance).

Fig.3 Reverse recovery time test circuit and waveforms.



T_j = 25 °C.

Fig.4 Forward current as a function of forward voltage.

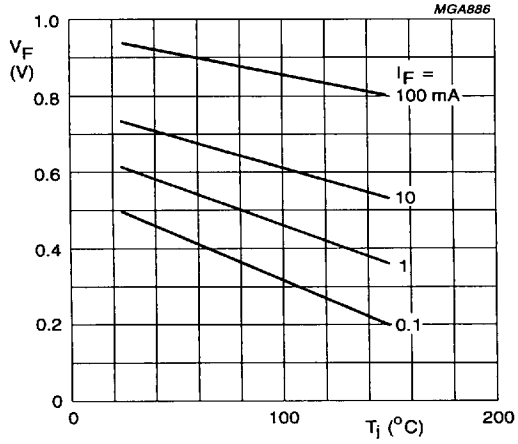


Fig.5 Forward voltage as a function of junction temperature; typical values.

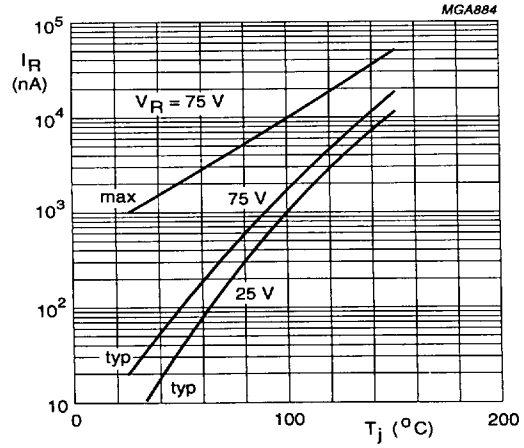
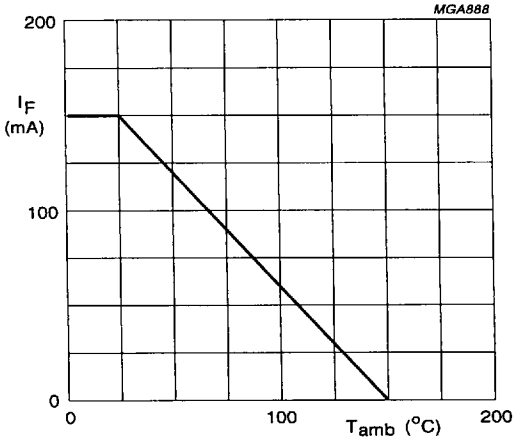


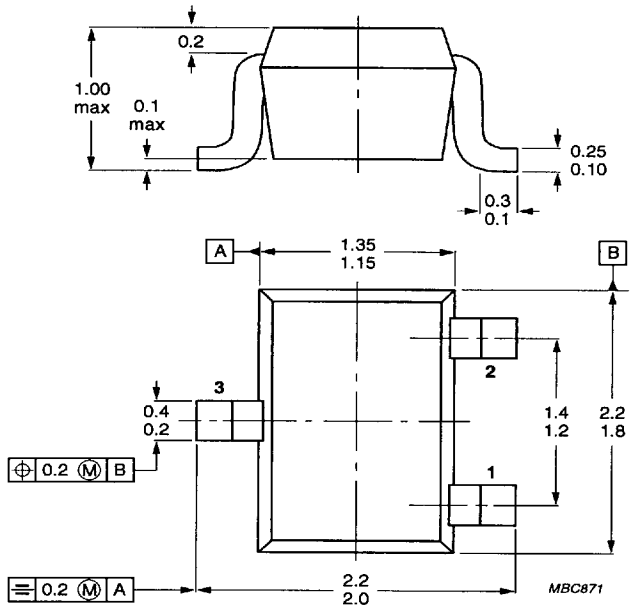
Fig.6 Reverse current as a function of junction temperature.



Device mounted on a FR4 printed circuit board.

Fig.7 Forward current derating curve.

PACKAGE OUTLINE



Dimensions in mm.

Fig.8 SOT323.

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

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