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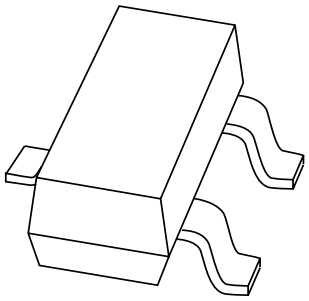
DATA SHEET



BAS29; BAS31; BAS35
General purpose controlled avalanche (double) diodes

Product data sheet
Supersedes data of 2001 Oct 10

2003 Mar 20

NXP founded by Philips

General purpose controlled avalanche (double) diodes

BAS29; BAS31; BAS35

FEATURES

- Small plastic SMD package
- Switching speed: max. 50 ns
- General application
- Continuous reverse voltage: max. 90 V
- Repetitive peak reverse voltage: max. 110 V
- Repetitive peak forward current: max. 600 mA
- Repetitive peak reverse current: max. 600 mA.

APPLICATIONS

- General purpose switching in e.g. surface mounted circuits.

DESCRIPTION

General purpose switching diodes fabricated in planar technology, and encapsulated in small rectangular plastic SMD SOT23 packages. The BAS29 consists of a single diode. The BAS31 has two diodes in series. The BAS35 has two diodes with a common anode.

MARKING

TYPE NUMBER	MARKING CODE(1)
BAS29	L20 or ∗A8
BAS31	L21 or ∗V1
BAS35	L22 or ∗V2

Note

1. ∗ = p : Made in Hong Kong.
   ∗ = t : Made in Malaysia.
   ∗ = W : Made in China.

PINNING

PIN	DESCRIPTION		
	BAS29	BAS31	BAS35
1	anode	anode	cathode (k1)
2	not connected	cathode	cathode (k2)
3	cathode	common connection	common anode

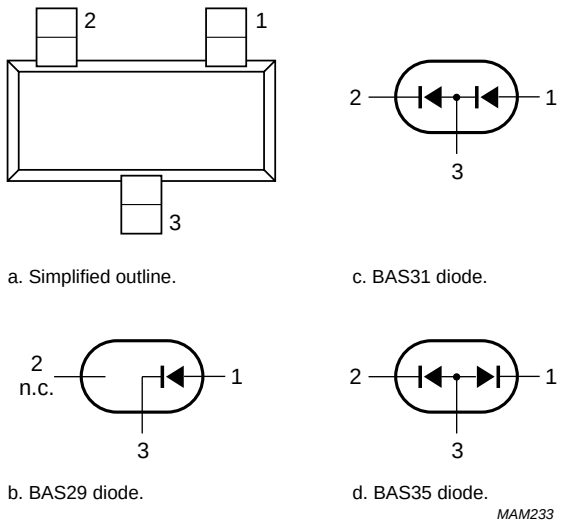


Fig.1 Simplified outline (SOT23) and symbols.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per diode					
V_{RRM}	repetitive peak reverse voltage		–	110	V
V_R	continuous reverse voltage		–	90	V
I_F	continuous forward current	single diode loaded; see Fig.2; note 1	–	250	mA
		double diode loaded; see Fig.2; note 1	–	150	mA
I_{FRM}	repetitive peak forward current		–	600	mA
I_{FSM}	non-repetitive peak forward current	square wave; T_j = 25 °C prior to surge; see Fig.4			
		t = 1 μs	–	10	A
		t = 100 μs	–	4	A
		t = 1 s	–	0.75	A
P_{tot}	total power dissipation	T_{amb} = 25 °C; note 1	–	250	mW
I_{RRM}	repetitive peak reverse current		–	600	mA
E_{RRM}	repetitive peak reverse energy	$t_p \geq 50$ μs; $f \leq 20$ Hz; T_j = 25 °C	–	5	mJ
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C

Note

1. Device mounted on an FR4 printed-circuit board.

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per diode					
V_F	forward voltage	see Fig.3			
		I_F = 10 mA	–	750	mV
		I_F = 50 mA	–	840	mV
		I_F = 100 mA	–	900	mV
		I_F = 200 mA	–	1	V
		I_F = 400 mA	–	1.25	V
I_R	reverse current	see Fig.5			
		V_R = 90 V	–	100	nA
		V_R = 90 V; T_j = 150 °C	–	100	μA
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 1 mA	120	170	V
C_d	diode capacitance	f = 1 MHz; V_R = 0; see Fig.6	–	35	pF
t_{rr}	reverse recovery time	when switched from I_F = 30 mA to I_R = 30 mA; R_L = 100 Ω; measured at I_R = 3 mA; see Fig.7	–	50	ns

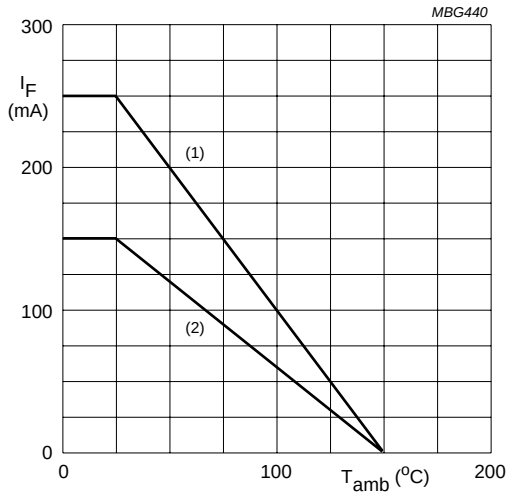
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point		360	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	500	K/W

Note

1. Device mounted on an FR4 printed-circuit board.

GRAPHICAL DATA

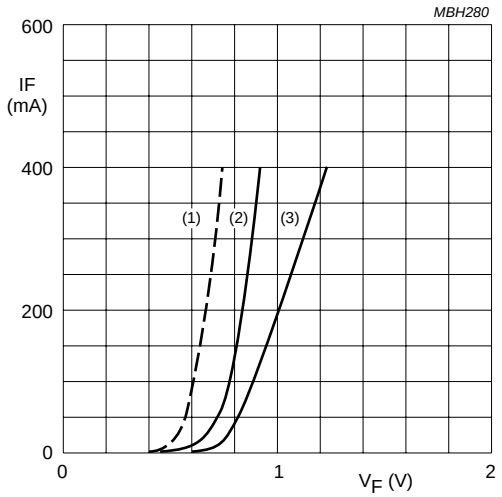


Device mounted on an FR4 printed-circuit board.

(1) Single diode loaded.

(2) Double diode loaded.

Fig.2 Maximum permissible continuous forward current as a function of ambient temperature.

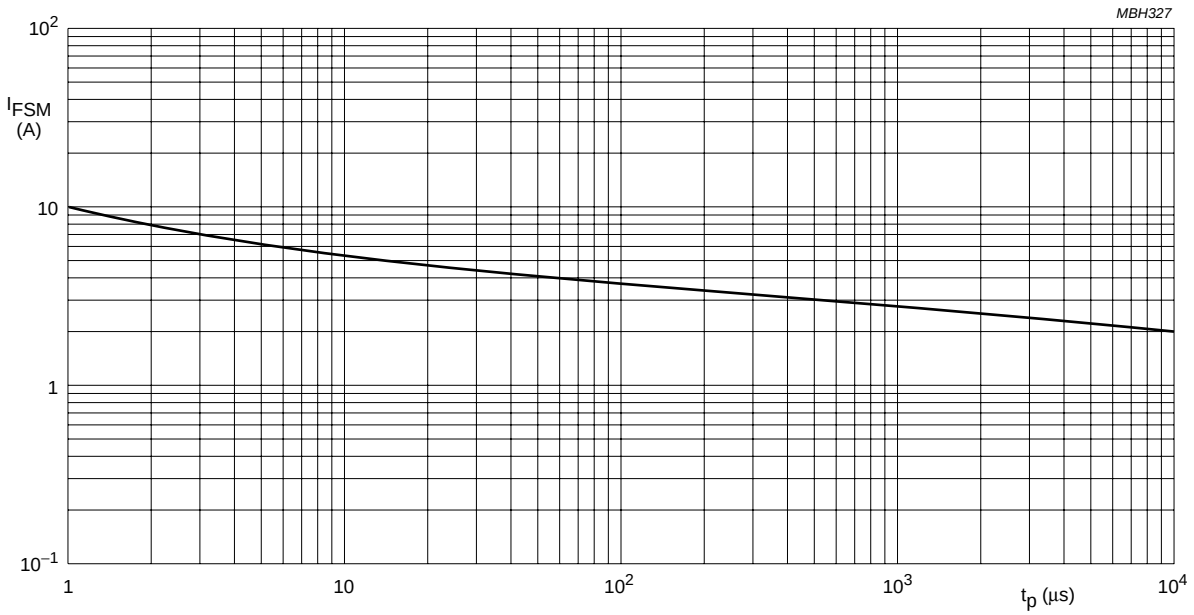


(1) T_j = 150 °C; typical values.

(2) T_j = 25 °C; typical values.

(3) T_j = 25 °C; maximum values.

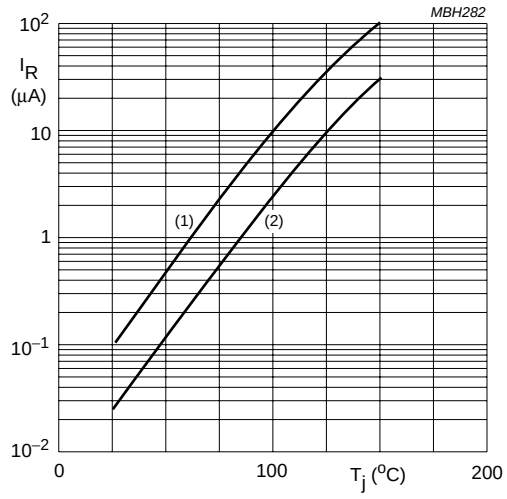
Fig.3 Forward current as a function of forward voltage.



Based on square wave currents.

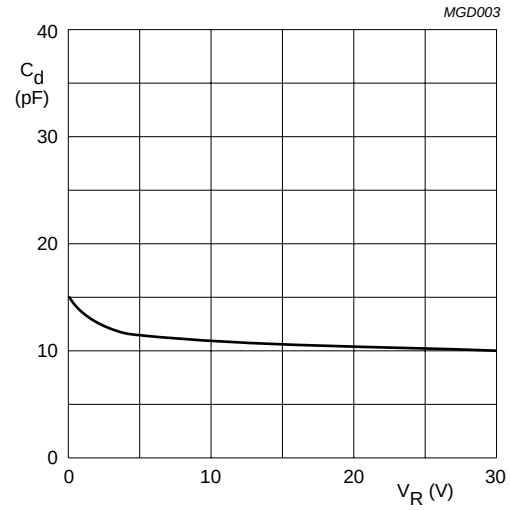
T_j = 25 °C prior to surge.

Fig.4 Maximum permissible non-repetitive peak forward current as a function of pulse duration.



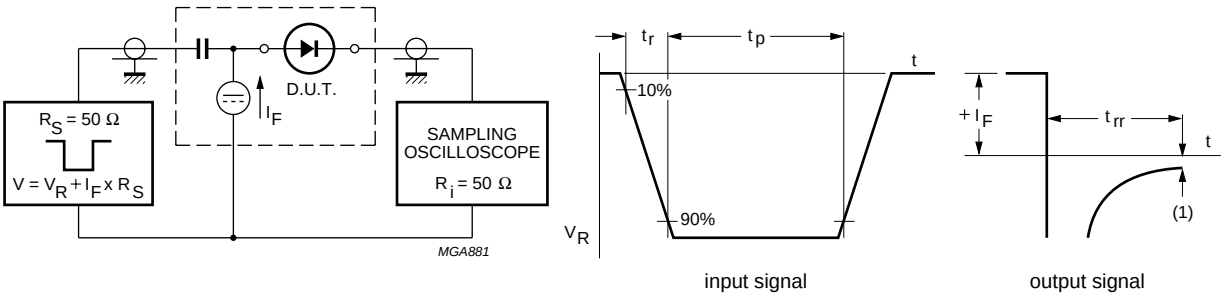
(1) V_R = 90 V; maximum values.
(2) V_R = 90 V; typical values.

Fig.5 Reverse current as a function of junction temperature.



f = 1 MHz; T_j = 25 °C.

Fig.6 Diode capacitance as a function of reverse voltage; typical values.

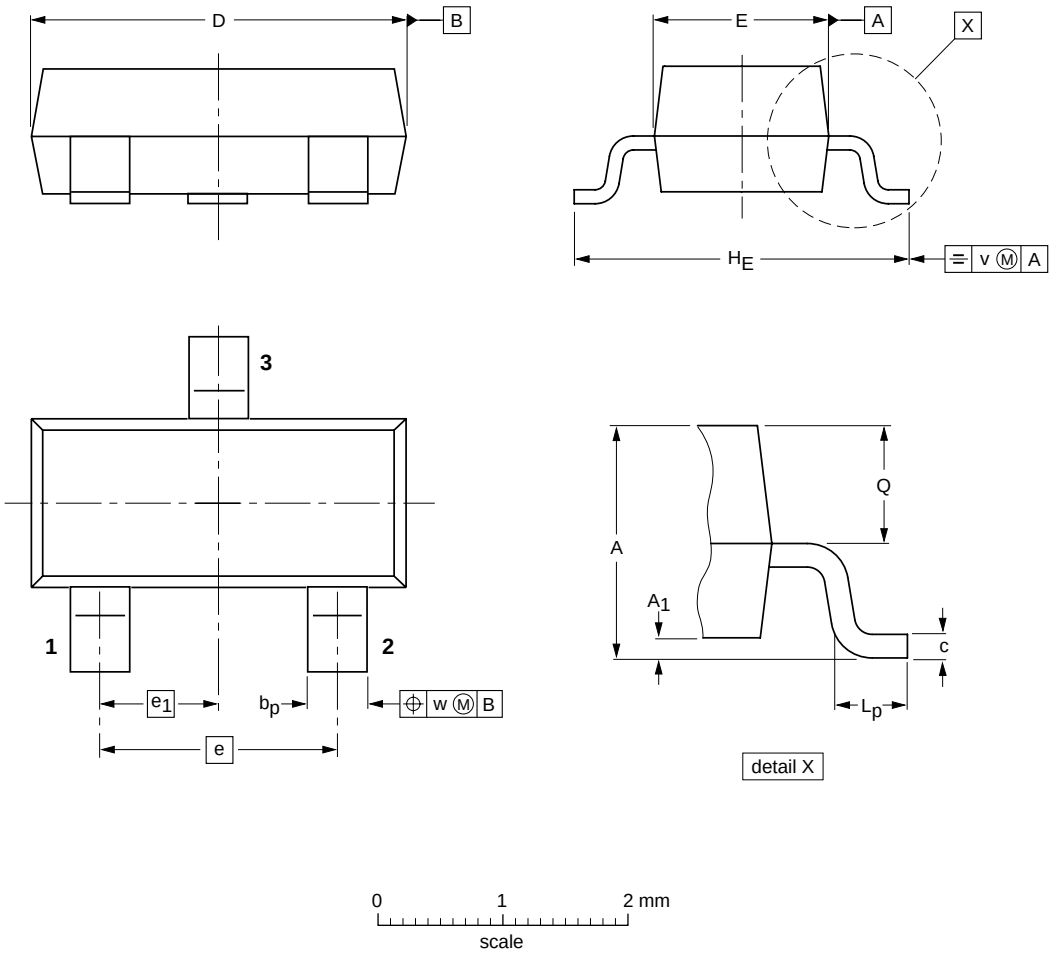


(1) I_R = 3 mA.

Fig.7 Reverse recovery voltage test circuit and waveforms.

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads **SOT23**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max.	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w
mm	1.1 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT23		TO-236AB				~~97-02-28~~ 99-09-13

DATA SHEET STATUS

DOCUMENT STATUS[1]	PRODUCT STATUS[2]	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

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NXP Semiconductors

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