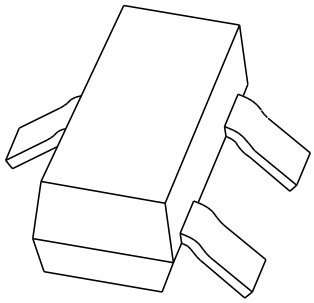
DATA SHEET



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

Product specification
Supersedes data of November 1993
File under Discrete Semiconductors, SC01

1996 Apr 23

Philips Semiconductors

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
- Forward voltage: max. 1 V.

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
BAS29	L20
BAS31	L21
BAS35	L22

PINNING

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

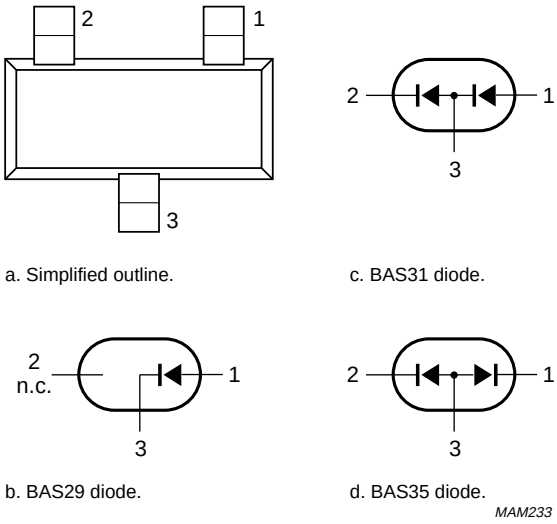


Fig.1 Simplified outline (SOT23) and symbols.

LIMITING VALUES

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

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	–	5.0	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	–	1.0	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

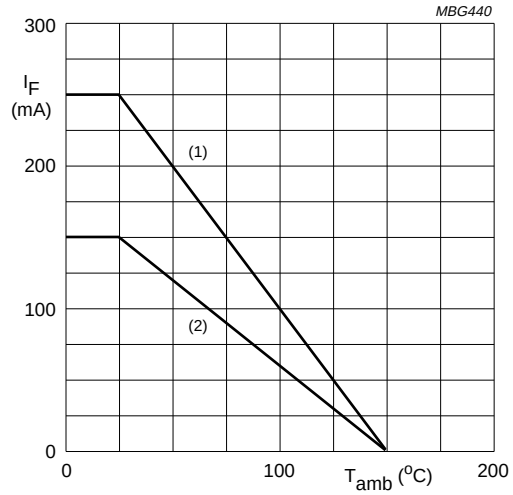
THERMAL CHARACTERISTICS

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

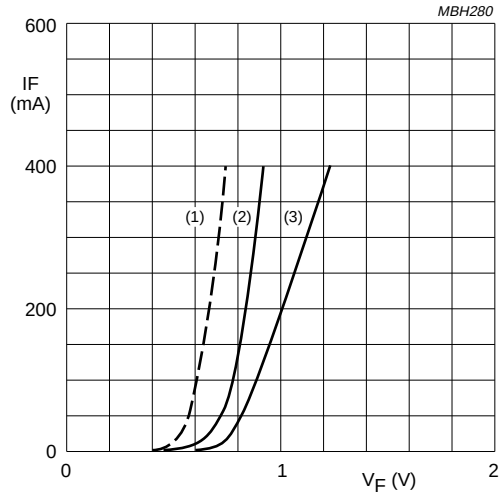
1. Device mounted on an FR4 printed-circuit board.

GRAPHICAL DATA



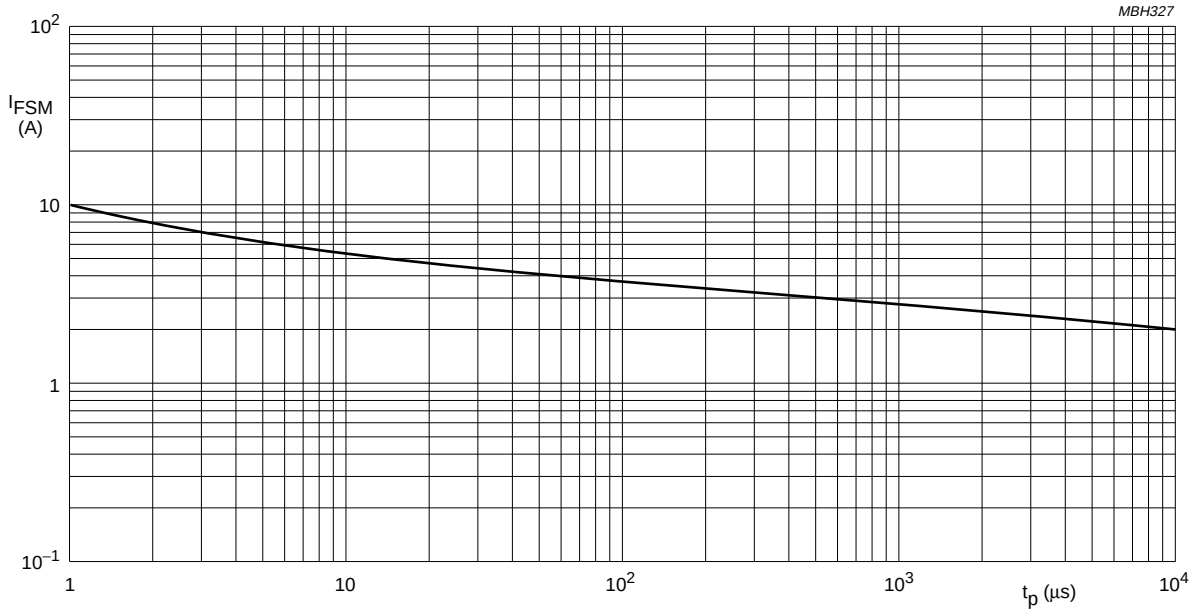
Device mounted on an FR4 printed-circuit board.
(1) Single diode loaded.
(2) Double diode loaded.

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



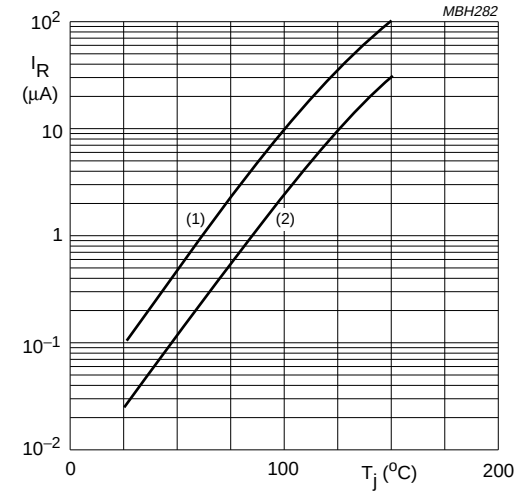
(1) T_j = 150 °C; typical values.
(2) T_j = 25 °C; typical values.
(3) T_j = 25 °C; maximum values.

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



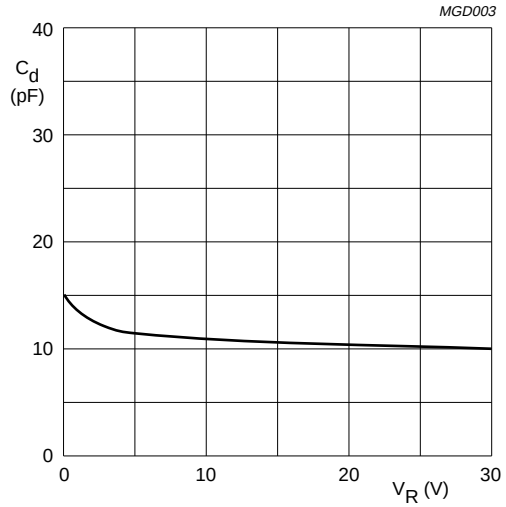
Based on square wave currents.
T_j = 25 °C prior to surge.

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



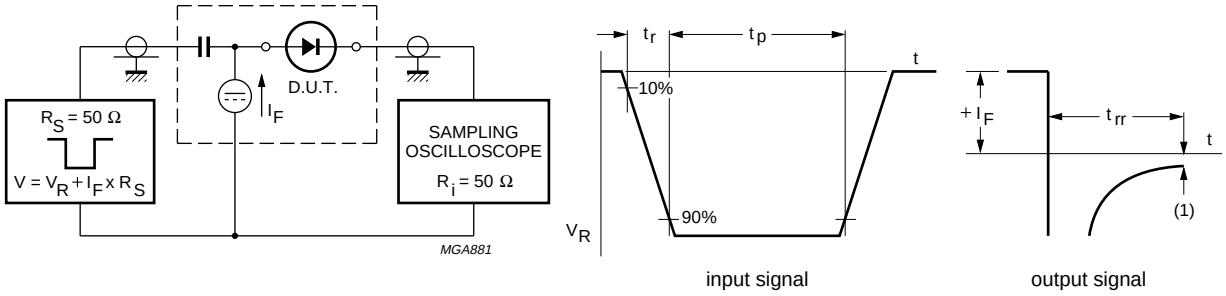
(1) V_R = 90 V; maximum values.
(2) V_R = 90 V; typical values.

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



f = 1 MHz; T_j = 25 °C.

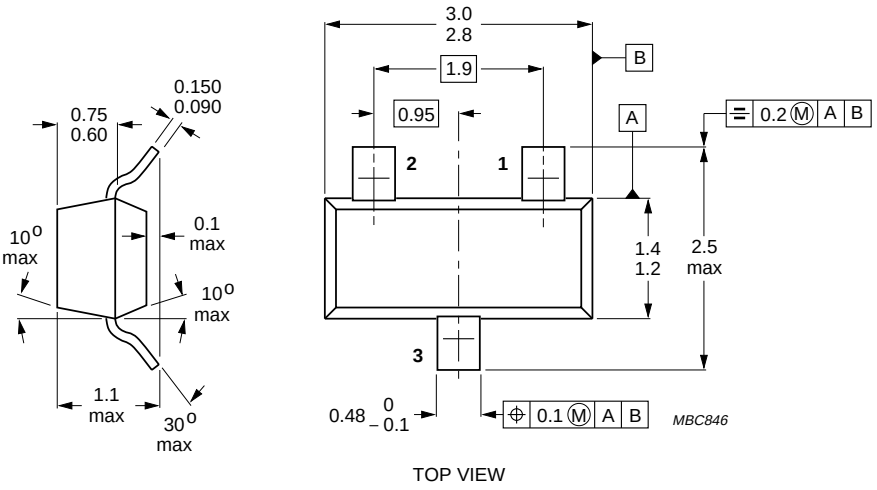
Fig.6 Diode capacitance as a function of reverse voltage; typical values.



(1) I_R = 3 mA.

Fig.7 Reverse recovery voltage test circuit and waveforms.

PACKAGE OUTLINE



Dimensions in mm.

Fig.8 SOT23.

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

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.