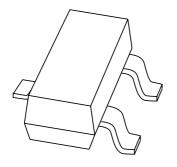
### DISCRETE SEMICONDUCTORS

# DATA SHEET



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

Product specification Supersedes data of 1999 May 21 2001 Oct 10





## 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**

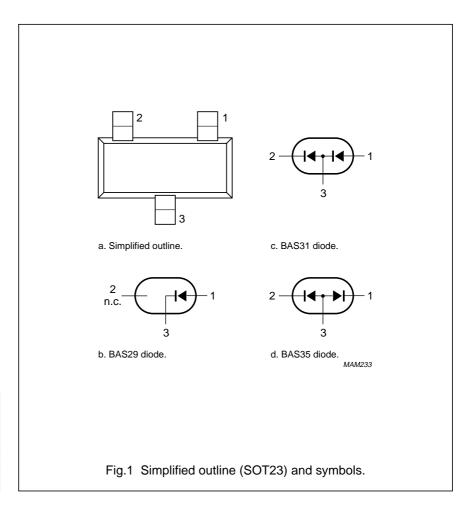
TYPE NUMBER	MARKING CODE <sup>(1)</sup>
BAS29	L20
BAS31	L21 or *V1
BAS35	L22 or *V2

#### 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		



# General purpose controlled avalanche (double) diodes

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#### **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 <sub>F</sub>	continuous forward current	single diode loaded; see Fig.2; note 1	_	250	mA
		double diode loaded; see Fig.2; note 1	_	150	mA
I <sub>FRM</sub>	repetitive peak forward current		_	600	mA
I <sub>FSM</sub>	non-repetitive peak forward current	square wave; T <sub>j</sub> = 25 °C prior to surge; see Fig.4			
		t = 1 μs	_	10	Α
		t = 100 μs	_	4	Α
		t = 1 s	_	0.75	Α
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> = 25 °C; note 1	_	250	mW
I <sub>RRM</sub>	repetitive peak reverse current		_	600	mA
E <sub>RRM</sub>	repetitive peak reverse energy	$t_p \ge 50 \ \mu s; \ f \le 20 \ Hz; \ T_j = 25 \ ^{\circ}C$	_	5	mJ
T <sub>stg</sub>	storage temperature		-65	+150	°C
Tj	junction temperature		_	150	°C

#### Note

<sup>1.</sup> Device mounted on an FR4 printed-circuit board.

# General purpose controlled avalanche (double) diodes

BAS29; BAS31; BAS35

#### **ELECTRICAL CHARACTERISTICS**

 $T_i = 25$  °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT	
Per diode	Per diode					
V <sub>F</sub>	forward voltage	see Fig.3				
		I <sub>F</sub> = 10 mA	_	750	mV	
		I <sub>F</sub> = 50 mA	_	840	mV	
		I <sub>F</sub> = 100 mA	_	900	mV	
		I <sub>F</sub> = 200 mA	_	1	V	
		I <sub>F</sub> = 400 mA	_	1.25	V	
I <sub>R</sub>	reverse current	see Fig.5				
		V <sub>R</sub> = 90 V	_	100	nA	
		V <sub>R</sub> = 90 V; T <sub>j</sub> = 150 °C	_	100	μΑ	
V <sub>(BR)R</sub>	reverse avalanche breakdown voltage	I <sub>R</sub> = 1 mA	120	170	V	
C <sub>d</sub>	diode capacitance	f = 1 MHz; V <sub>R</sub> = 0; see Fig.6	_	35	pF	
t <sub>rr</sub>	reverse recovery time	when switched from $I_F$ = 30 mA to $I_R$ = 30 mA; $R_L$ = 100 $\Omega$ ; measured at $I_R$ = 3 mA; see Fig.7	_	50	ns	

#### THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R <sub>th j-tp</sub>	thermal resistance from junction to tie-point		360	K/W
R <sub>th j-a</sub>	thermal resistance from junction to ambient	note 1	500	K/W

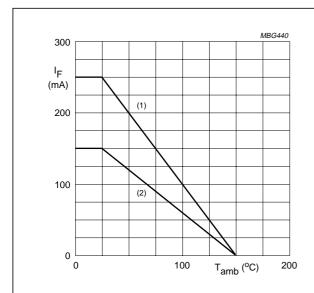
#### Note

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

## General purpose controlled avalanche (double) diodes

BAS29; BAS31; BAS35

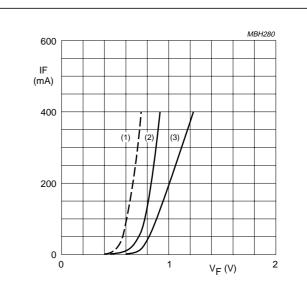
#### **GRAPHICAL DATA**



Device mounted on an FR4 printed-circuit board.

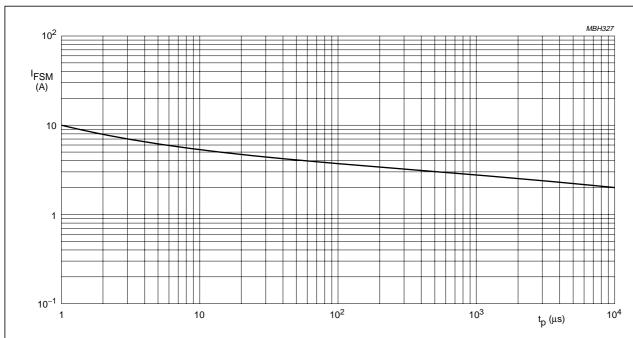
- (1) Single diode loaded.
- (2) Double diode loaded.

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



- (1)  $T_j = 150 \,^{\circ}\text{C}$ ; 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.



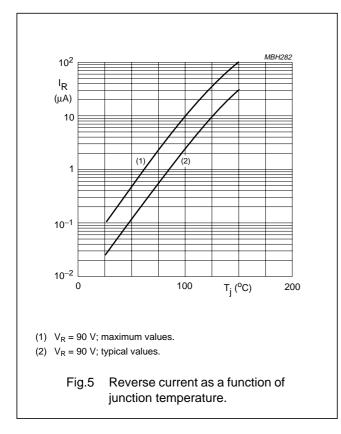
Based on square wave currents.

 $T_j$  = 25 °C prior to surge.

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

## General purpose controlled avalanche (double) diodes

BAS29; BAS31; BAS35



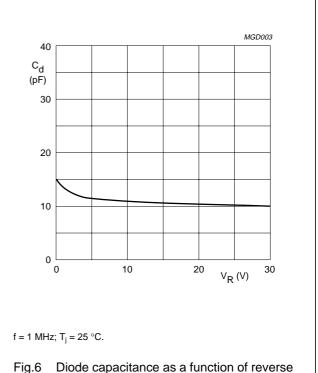
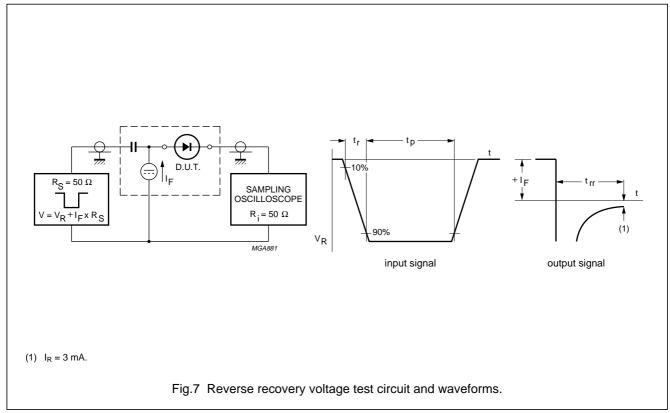


Fig.6 Diode capacitance as a function of reverse voltage; typical values.



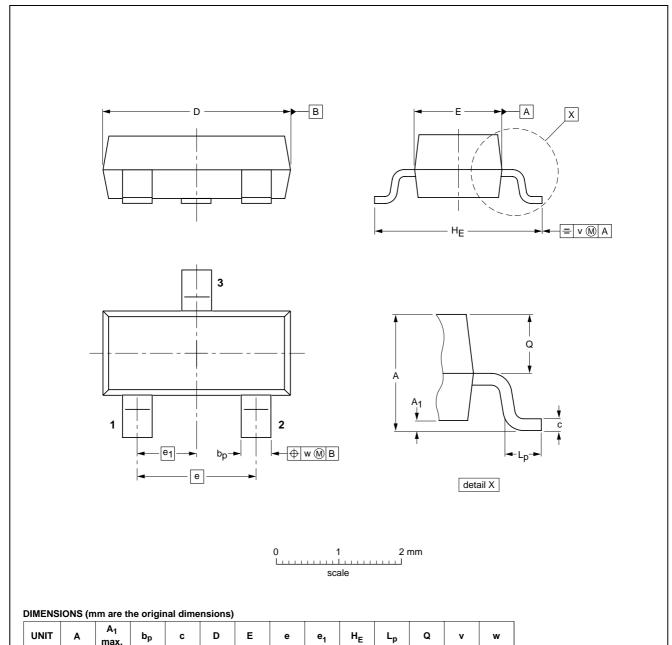
### General purpose controlled avalanche (double) diodes

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#### **PACKAGE OUTLINE**

Plastic surface mounted package; 3 leads

SOT23



OUTLINE	REFERENCES			EUROPEAN	ICCUE DATE	
VERSION	IEC	JEDEC	EIAJ		PROJECTION	ISSUE DATE
SOT23		TO-236AB				<del>-97-02-28-</del> 99-09-13

1.9

0.45

0.55

0.1

2001 Oct 10 7

max.

0.48

0.38

0.15

1.1

mm

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#### **DATA SHEET STATUS**

DATA SHEET STATUS(1)	PRODUCT STATUS <sup>(2)</sup>	DEFINITIONS
Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
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**NOTES** 

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BAS29; BAS31; BAS35

**NOTES** 

General purpose controlled avalanche (double) diodes

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**NOTES** 

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