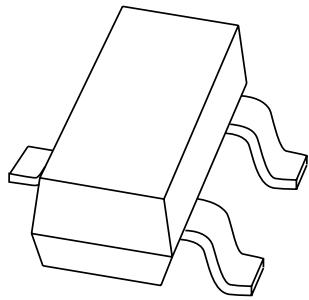


# DATA SHEET



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

Product specification  
Supersedes data of 1996 Sep 10

1999 May 21

# 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

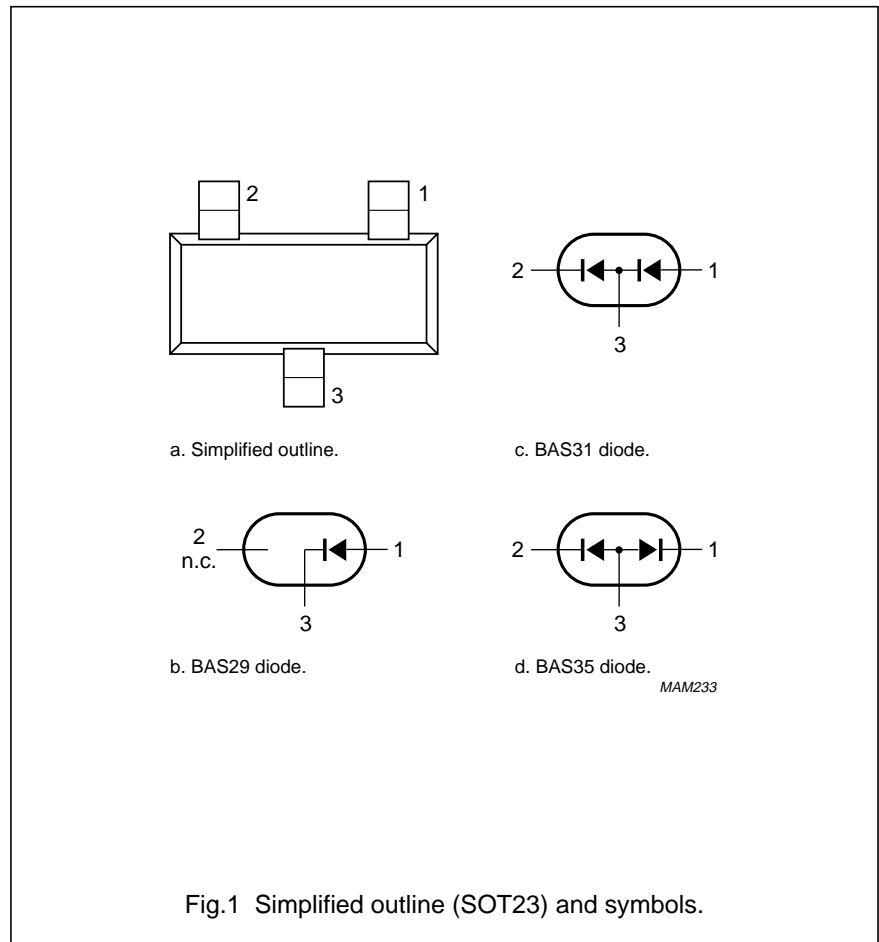
General purpose switching diodes fabricated in planar technology, and encapsulated in small rectangular plastic SMD SOT23 packages. The BAS29 consists of a single diode. The BAS31 has two diodes in series. The BAS35 has two diodes with a common anode.

### MARKING

| TYPE NUMBER | MARKING CODE |
|-------------|--------------|
| 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 |



## General purpose controlled avalanche (double) diodes

## BAS29; BAS31; BAS35

### LIMITING VALUES

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

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

## General purpose controlled avalanche (double) diodes

## BAS29; BAS31; BAS35

### ELECTRICAL CHARACTERISTICS

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

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

### THERMAL CHARACTERISTICS

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

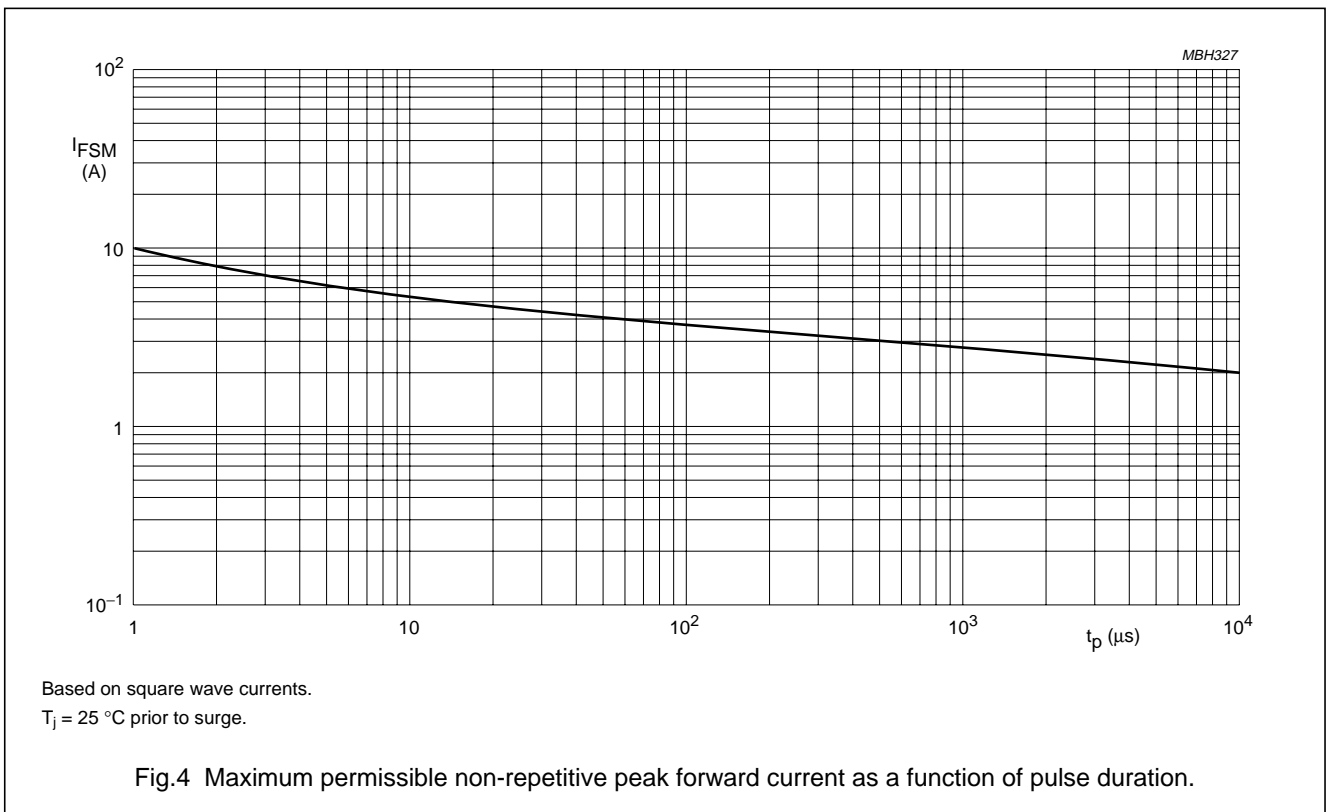
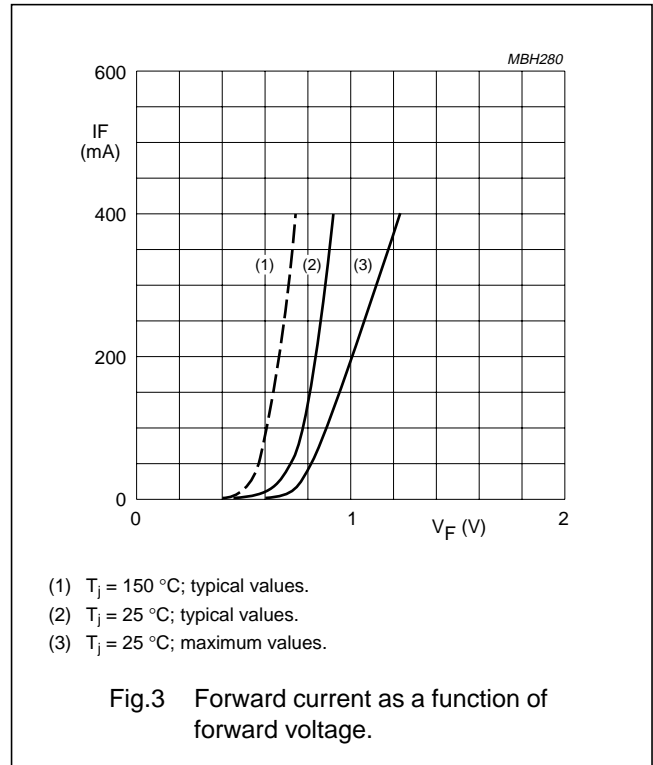
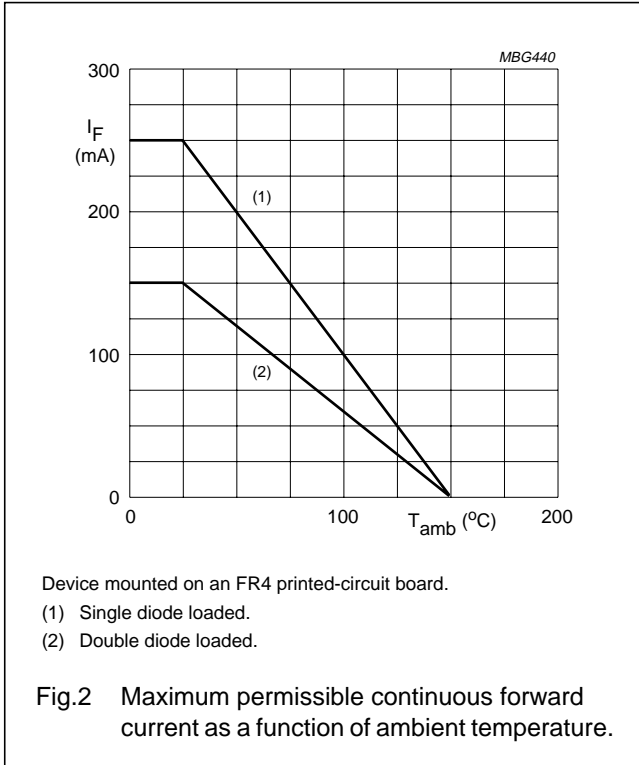
#### Note

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

General purpose controlled avalanche  
(double) diodes

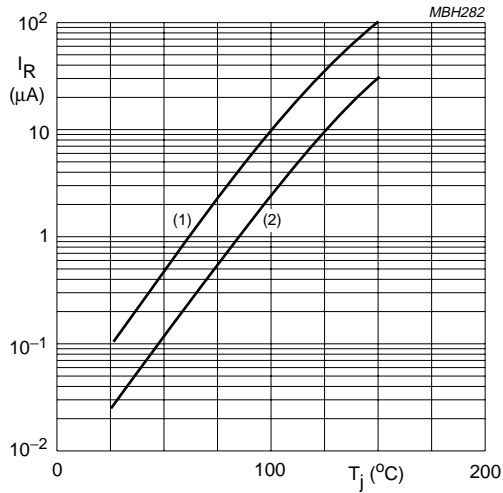
BAS29; BAS31; BAS35

GRAPHICAL DATA



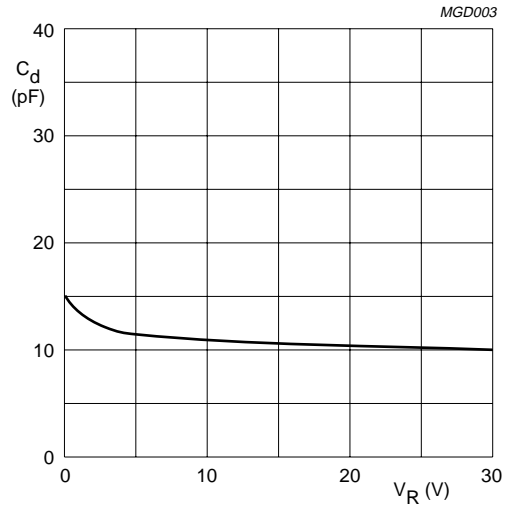
General purpose controlled avalanche  
(double) diodes

BAS29; BAS31; BAS35



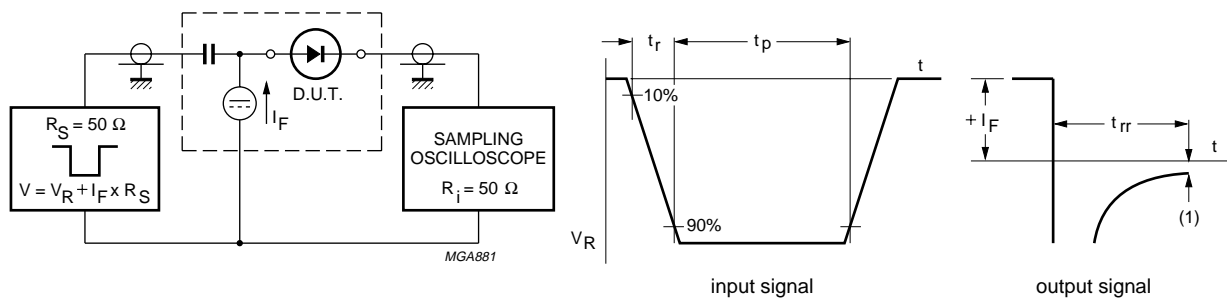
- (1)  $V_R = 90\text{ V}$ ; maximum values.
- (2)  $V_R = 90\text{ V}$ ; typical values.

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



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

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



(1)  $I_R = 3\text{ mA}$ .

Fig.7 Reverse recovery voltage test circuit and waveforms.

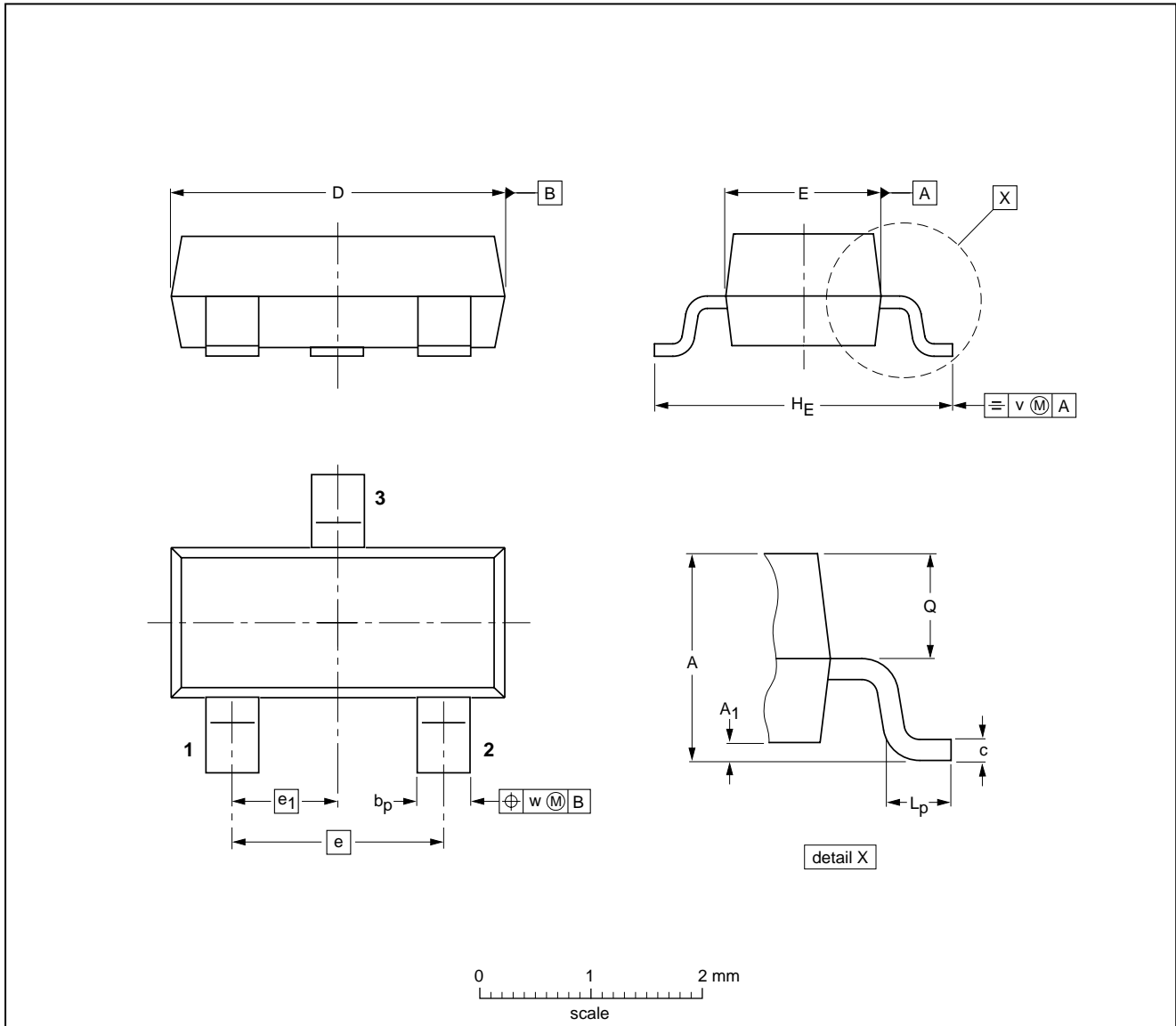
General purpose controlled avalanche  
(double) diodes

BAS29; BAS31; BAS35

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



DIMENSIONS (mm are the original dimensions)

| UNIT | A          | A <sub>1</sub><br>max. | b <sub>p</sub> | c            | D          | E          | e   | e <sub>1</sub> | H <sub>E</sub> | L <sub>p</sub> | Q            | v   | w   |
|------|------------|------------------------|----------------|--------------|------------|------------|-----|----------------|----------------|----------------|--------------|-----|-----|
| mm   | 1.1<br>0.9 | 0.1                    | 0.48<br>0.38   | 0.15<br>0.09 | 3.0<br>2.8 | 1.4<br>1.2 | 1.9 | 0.95           | 2.5<br>2.1     | 0.45<br>0.15   | 0.55<br>0.45 | 0.2 | 0.1 |

| OUTLINE VERSION | REFERENCES |       |      |  | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|-------|------|--|---------------------|------------|
|                 | IEC        | JEDEC | EIAJ |  |                     |            |
| SOT23           |            |       |      |  |                     | 97-02-28   |

## General purpose controlled avalanche (double) diodes

BAS29; BAS31; BAS35

### DEFINITIONS

| <b>Data Sheet Status</b>  |   |
|---|---|
| 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.                                |
| <b>Limiting values</b>  |   |
| 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. |   |
| <b>Application information</b>  |   |
| Where application information is given, it is advisory and does not form part of the specification.   |   |

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General purpose controlled avalanche  
(double) diodes

BAS29; BAS31; BAS35

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**NOTES**

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**NOTES**

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General purpose controlled avalanche  
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**NOTES**

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