



# BAS16

## High-speed switching diode

1 October 2022

Product data sheet

### 1. General description

High-speed switching diode, encapsulated in small SOT23 Surface-Mounted Device (SMD) plastic package.

### 2. Features and benefits

- High switching speed:  $t_{rr} \leq 4$  ns
- Low capacitance
- Low leakage current
- Reverse voltage:  $V_R \leq 100$  V
- Repetitive peak reverse voltage:  $V_{RRM} \leq 100$  V

### 3. Applications

- High-speed switching
- General-purpose switching

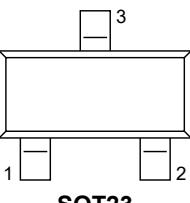
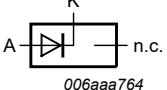
### 4. Quick reference data

Table 1. Quick reference data

| Symbol           | Parameter             | Conditions  | Min | Typ | Max | Unit |
|------------------|-----------------------|---|-----|-----|-----|------|
| <b>Per diode</b> |                       |   |     |     |     |      |
| $V_R$            | reverse voltage       |   | -   | -   | 100 | V    |
| $I_R$            | reverse current       | $V_R = 80$ V; $T_{amb} = 25$ °C   | -   | -   | 0.5 | µA   |
| $t_{rr}$         | reverse recovery time | $I_F = 10$ mA; $I_R = 10$ mA; $R_L = 100$ Ω;<br>$I_{R(meas)} = 1$ mA; $T_{amb} = 25$ °C | -   | -   | 4   | ns   |

### 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description     | Simplified outline   | Graphic symbol  |
|-----|--------|-----------------|--|---|
| 1   | A1     | anode (diode 1) |  |   |
| 2   | n.c.   | not connected   |  |   |
| 3   | K      | cathode         | <br>SOT23 |  |

## 6. Ordering information

**Table 3. Ordering information**

| Type number | Package |  |                       |
|-------------|---------|--|-----------------------|
|             | Name    | Description  | Version               |
| BAS16       | SOT23   | plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body | <a href="#">SOT23</a> |

## 7. Marking

**Table 4. Marking codes**

| Type number | Marking code <sup>[1]</sup> |
|-------------|-----------------------------|
| BAS16       | A6%                         |

[1] % = placeholder for manufacturing site code

## 8. Limiting values

**Table 5. Limiting values**

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

| Symbol            | Parameter                           | Conditions  |     | Min | Max | Unit |
|-------------------|-------------------------------------|---|-----|-----|-----|------|
| <b>Per diode</b>  |                                     |   |     |     |     |      |
| $V_{RRM}$         | repetitive peak reverse voltage     |   |     | -   | 100 | V    |
| $V_R$             | reverse voltage                     |   |     | -   | 100 | V    |
| $I_F$             | forward current                     |   | [1] | -   | 215 | mA   |
| $I_{FSM}$         | non-repetitive peak forward current | $t_p = 1 \mu s$ ; square wave; $T_{j(init)} = 25^\circ C$ |     | -   | 4   | A    |
|                   |                                     | $t_p = 1 ms$ ; square wave; $T_{j(init)} = 25^\circ C$    |     | -   | 1   | A    |
|                   |                                     | $t_p = 1 s$ ; square wave; $T_{j(init)} = 25^\circ C$     |     | -   | 0.5 | A    |
| $I_{FRM}$         | repetitive peak forward current     | $t_p \leq 0.5 ms$ ; $\delta \leq 0.25$                    |     | -   | 500 | mA   |
| $P_{tot}$         | total power dissipation             | $T_{amb} \leq 25^\circ C$                                 | [1] | -   | 250 | mW   |
| <b>Per device</b> |                                     |   |     |     |     |      |
| $T_j$             | junction temperature                |   |     | -   | 150 | °C   |
| $T_{amb}$         | ambient temperature                 |   |     | -65 | 150 | °C   |
| $T_{stg}$         | storage temperature                 |   |     | -65 | 150 | °C   |

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

## 9. Thermal characteristics

**Table 6. Thermal characteristics**

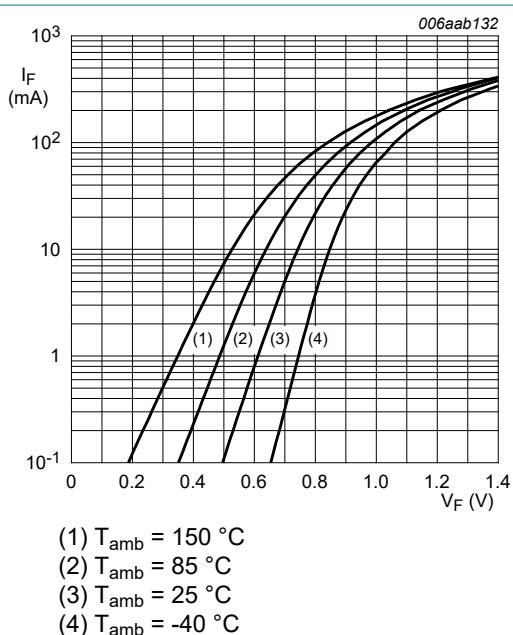
| Symbol         | Parameter  | Conditions  |     | Min | Typ | Max | Unit |
|----------------|--|-------------|-----|-----|-----|-----|------|
| $R_{th(j-a)}$  | thermal resistance from junction to ambient      | in free air | [1] | -   | -   | 500 | K/W  |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point |             |     | -   | -   | 330 | K/W  |

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

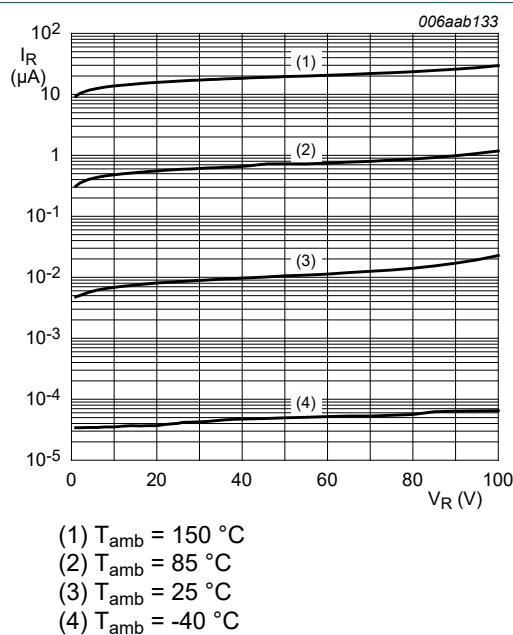
## 10. Characteristics

**Table 7. Characteristics**

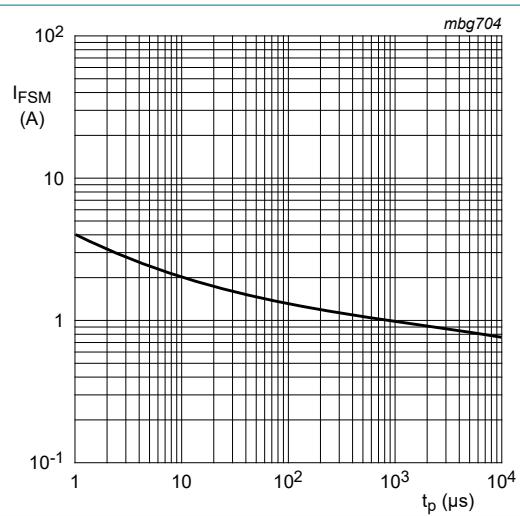
| Symbol           | Parameter                     | Conditions  |  | Min | Typ | Max  | Unit          |
|------------------|-------------------------------|---|--|-----|-----|------|---------------|
| <b>Per diode</b> |                               |   |  |     |     |      |               |
| $V_F$            | forward voltage               | $I_F = 1 \text{ mA}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02;$<br>pulsed; $T_{amb} = 25^\circ\text{C}$                 |  | -   | -   | 715  | mV            |
|                  |                               | $I_F = 10 \text{ mA}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02;$<br>pulsed; $T_{amb} = 25^\circ\text{C}$                |  | -   | -   | 855  | mV            |
|                  |                               | $I_F = 50 \text{ mA}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02;$<br>pulsed; $T_{amb} = 25^\circ\text{C}$                |  | -   | -   | 1    | V             |
|                  |                               | $I_F = 150 \text{ mA}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02;$<br>pulsed; $T_{amb} = 25^\circ\text{C}$               |  | -   | -   | 1.25 | V             |
| $I_R$            | reverse current               | $V_R = 25 \text{ V}; T_{amb} = 25^\circ\text{C}$  |  | -   | -   | 30   | nA            |
|                  |                               | $V_R = 80 \text{ V}; T_{amb} = 25^\circ\text{C}$  |  | -   | -   | 0.5  | $\mu\text{A}$ |
|                  |                               | $V_R = 25 \text{ V}; T_j = 150^\circ\text{C}$   |  | -   | -   | 30   | $\mu\text{A}$ |
|                  |                               | $V_R = 80 \text{ V}; T_j = 150^\circ\text{C}$   |  | -   | -   | 50   | $\mu\text{A}$ |
| $C_d$            | diode capacitance             | $V_R = 0 \text{ V}; f = 1 \text{ MHz}; T_{amb} = 25^\circ\text{C}$  |  | -   | -   | 1.5  | pF            |
| $t_{rr}$         | reverse recovery time         | $I_F = 10 \text{ mA}; I_R = 10 \text{ mA}; R_L = 100 \Omega;$<br>$I_{R(meas)} = 1 \text{ mA}; T_{amb} = 25^\circ\text{C}$ |  | -   | -   | 4    | ns            |
| $V_{FRM}$        | peak forward recovery voltage | $I_F = 10 \text{ mA}; t_r = 20 \text{ ns}; T_{amb} = 25^\circ\text{C}$  |  | -   | -   | 1.75 | V             |



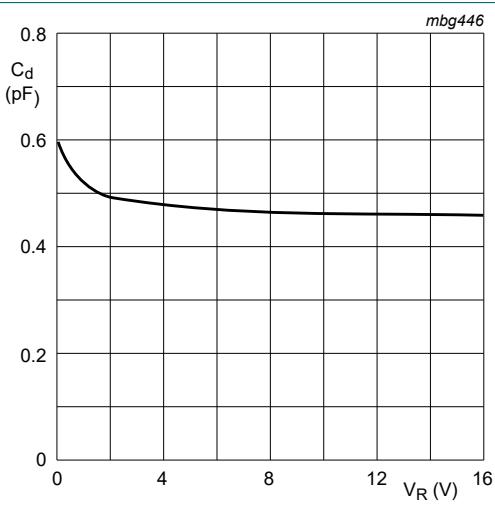
**Fig. 1.** Forward current as a function of forward voltage; typical values



**Fig. 3.** Reverse current as a function of reverse voltage; typical values



**Fig. 2.** Non-repetitive peak forward current as a function of pulse duration; typical values



**Fig. 4.** Diode capacitance as a function of reverse voltage; typical values

## 11. Test information

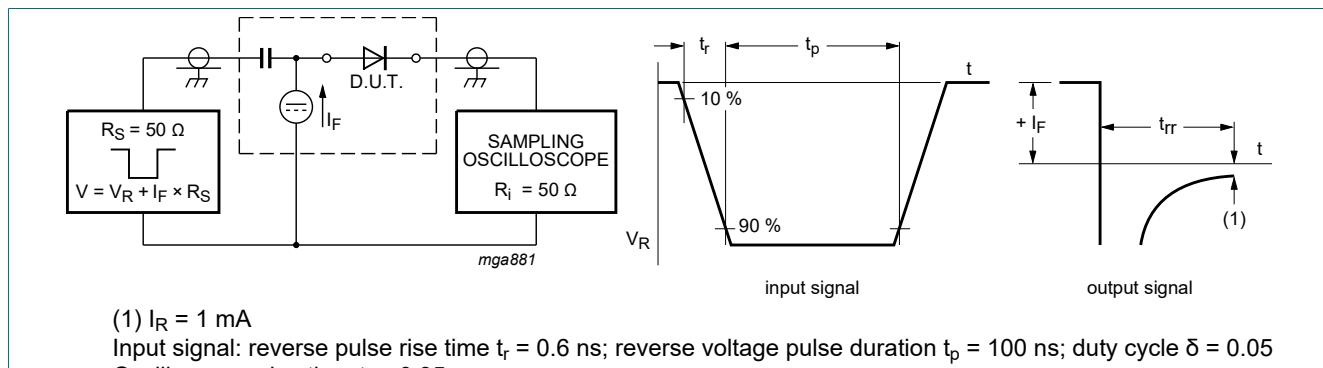


Fig. 5. Reverse recovery time test circuit and waveforms

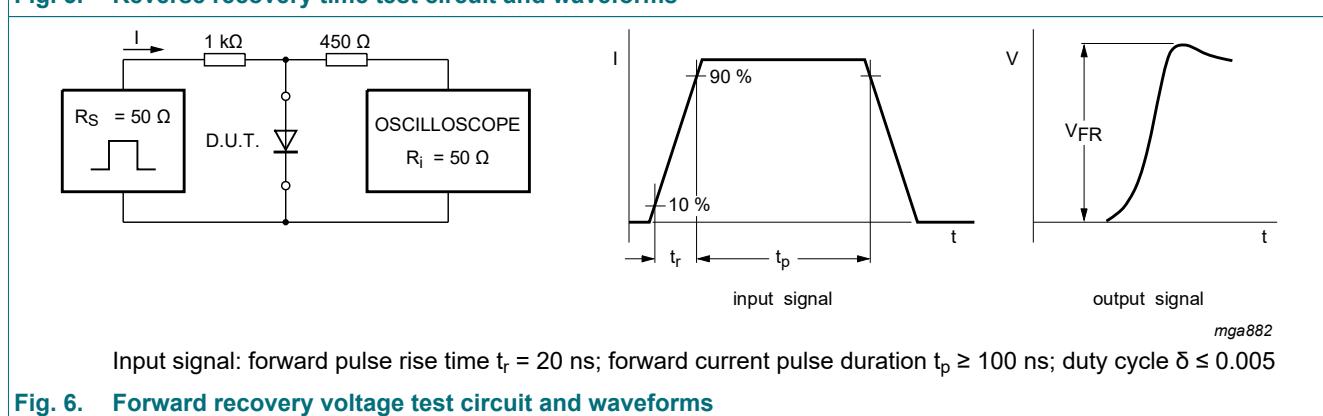


Fig. 6. Forward recovery voltage test circuit and waveforms

## 12. Package outline

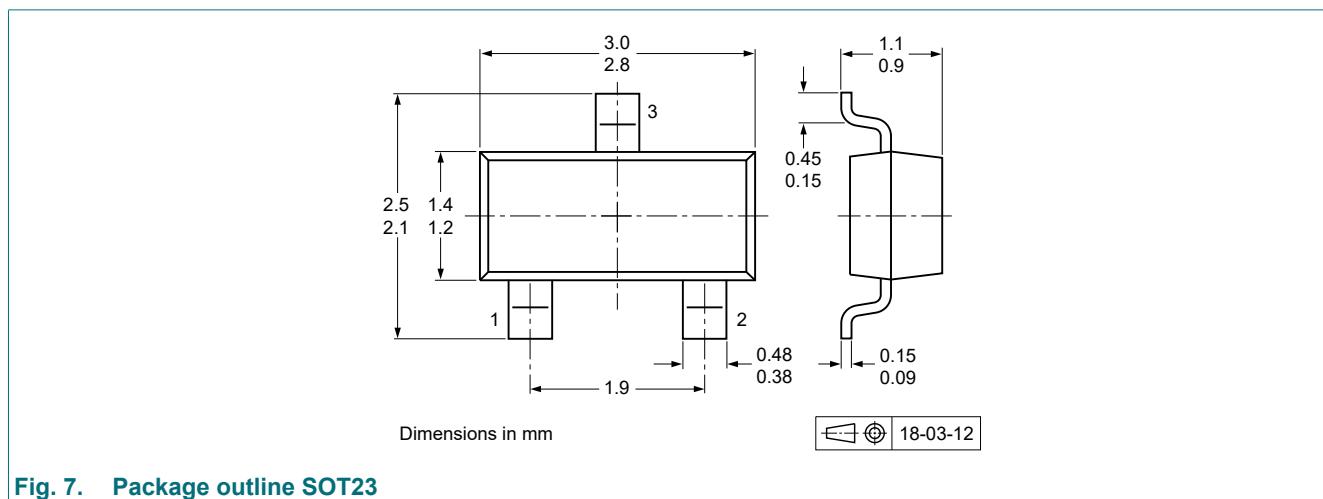
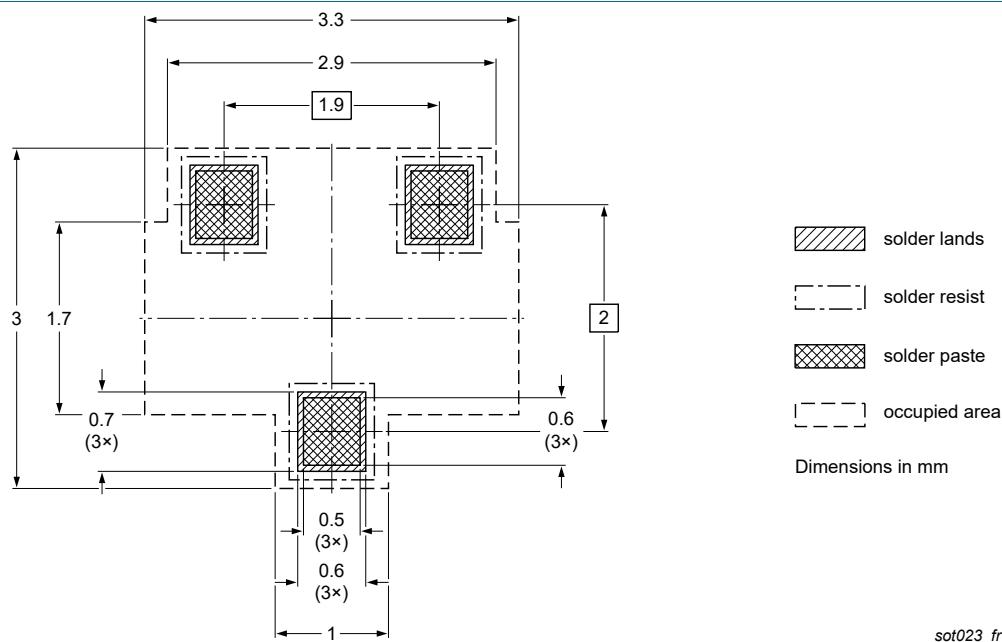
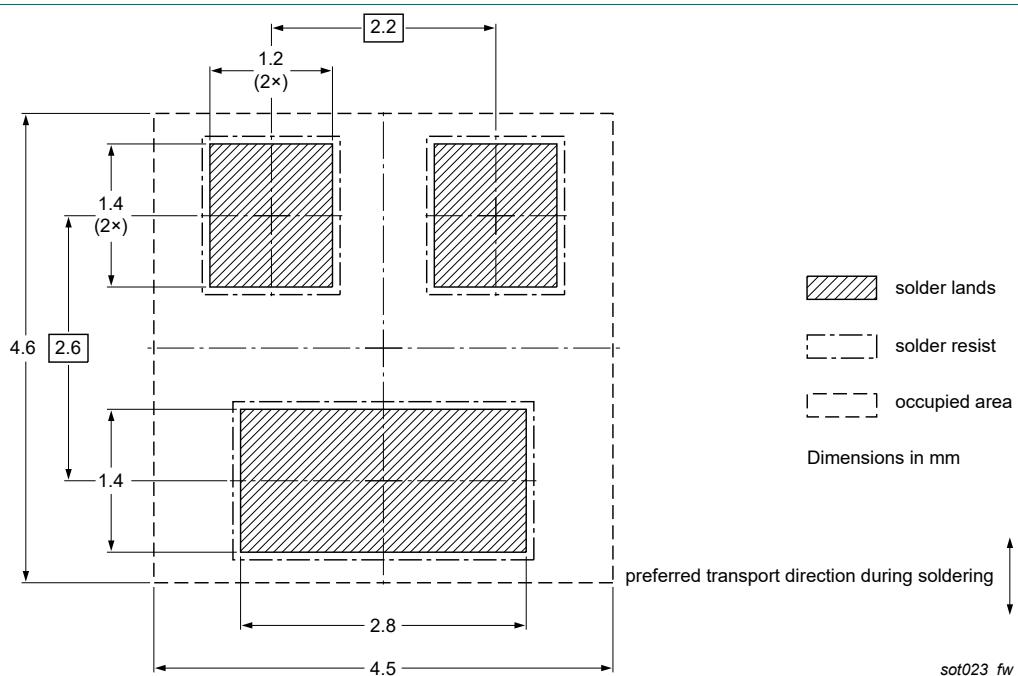


Fig. 7. Package outline SOT23

## 13. Soldering



**Fig. 8. Reflow soldering footprint for SOT23**



**Fig. 9. Wave soldering footprint for SOT23**

## 14. Revision history

**Table 8. Revision history**

| Data sheet ID     | Release date | Data sheet status  | Change notice | Supersedes  |
|-------------------|--------------|--|---------------|---|
| BAS16 v.7         | 20221001     | Product data sheet   | -             | BAS16_SER_6   |
| Modifications:    |              | <ul style="list-style-type: none"> <li>Family data sheet splitted to single type data sheet.</li> <li>Product changed to non-automotive qualification. Please refer to <a href="http://nexperia.com">nexperia.com</a> for automotive (-Q) product alternative(s).</li> </ul> |               |   |
| BAS16_SER_6       | 20140924     | Product data sheet   | -             | BAS16_SER_5   |
| BAS16_SER_5       | 20080825     | Product data sheet   | -             | BAS16_4 BAS16H_1<br>BAS16J_1 BAS16L_1<br>BAS16T_1<br>BAS16VV_BAS16VY_3<br>BAS16W_4 BAS316_4<br>BAS516_1 |
| BAS16_4           | 20011010     | Product specification  | -             | BAS16_3   |
| BAS16H_1          | 20050415     | Product data sheet   | -             | -   |
| BAS16J_1          | 20070308     | Product data sheet   | -             | -   |
| BAS16L_1          | 20030623     | Product specification  | -             | -   |
| BAS16T_1          | 19980120     | Product specification  | -             | -   |
| BAS16VV_BAS16VY_3 | 20070420     | Product data sheet   | -             | BAS16VV_BAS16VY_2   |
| BAS16W_4          | 19990506     | Product specification  | -             | BAS16W_3  |
| BAS316_4          | 20040204     | Product specification  | -             | BAS316_3  |
| BAS516_1          | 19980831     | Product specification  | -             | -   |

## 15. Legal information

### Data sheet status

| Document status [1][2]         | Product status [3] | Definition  |
|--------------------------------|--------------------|---|
| Objective [short] data sheet   | Development        | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification      | This document contains data from the preliminary specification.                       |
| Product [short] data sheet     | Production         | This document contains the product specification.                                     |

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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## Contents

|                                 |   |
|---------------------------------|---|
| 1. General description.....     | 1 |
| 2. Features and benefits.....   | 1 |
| 3. Applications.....            | 1 |
| 4. Quick reference data.....    | 1 |
| 5. Pinning information.....     | 1 |
| 6. Ordering information.....    | 2 |
| 7. Marking.....                 | 2 |
| 8. Limiting values.....         | 2 |
| 9. Thermal characteristics..... | 3 |
| 10. Characteristics.....        | 3 |
| 11. Test information.....       | 5 |
| 12. Package outline.....        | 5 |
| 13. Soldering.....              | 6 |
| 14. Revision history.....       | 7 |
| 15. Legal information.....      | 8 |

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