



# BAS16J

## High-speed switching diode

1 October 2022

Product data sheet

## 1. General description

High-speed switching diode, encapsulated in a very small and flat lead SOD323F Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

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

## 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       | $V_R = 80 \text{ V}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$   | -   | -   | 0.5 | $\mu\text{A}$ |
| $t_{rr}$         | reverse recovery time | $I_F = 10 \text{ mA}$ ; $I_R = 10 \text{ mA}$ ; $R_L = 100 \text{ }\Omega$ ;<br>$I_{R(meas)} = 1 \text{ mA}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$ | -   | -   | 4   | ns            |

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline  | Graphic symbol |
|-----|--------|-------------|---------------------|----------------|
| 1   | K      | cathode     | <br>SC-90 (SOD323F) | <br>006aab040  |
| 2   | A      | anode       |                     |                |

## 6. Ordering information

Table 3. Ordering information

| Type number            | Package |   |                         |
|------------------------|---------|---|-------------------------|
|                        | Name    | Description   | Version                 |
| <a href="#">BAS16J</a> | SC-90   | plastic, surface-mounted package; 2 leads; 1.7 mm x 1.25 mm x 0.7 mm body | <a href="#">SOD323F</a> |

## 7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| BAS16J      | AR           |

## 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] | -   | 250 | 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             | $T_{amb} \leq 25^\circ C$                                 | [2] | -   | 550 | mW         |
| <b>Per device</b> |                                     |   |     |     |     |            |
| $T_j$             | junction temperature                |   |     | -   | 150 | $^\circ C$ |
| $T_{amb}$         | ambient temperature                 |   |     | -65 | 150 | $^\circ C$ |
| $T_{stg}$         | storage temperature                 |   |     | -65 | 150 | $^\circ C$ |

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

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm<sup>2</sup>.

## 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] | -   | -   | 230 | K/W  |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point |             | [2] | -   | -   | 55  | K/W  |

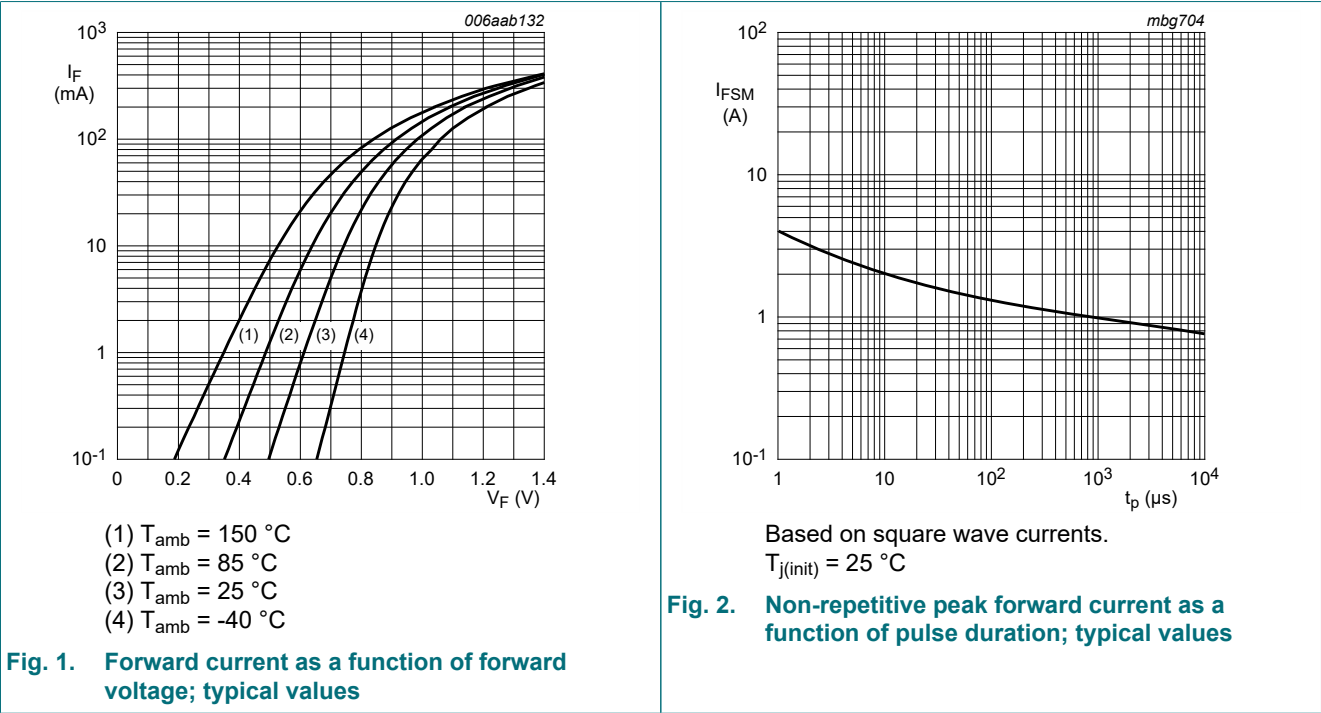
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm<sup>2</sup>.

[2] Soldering point of cathode tab.

10. Characteristics

Table 7. Characteristics

| Symbol           | Parameter                     | Conditions  | Min | Typ | Max  | Unit |
|------------------|-------------------------------|---|-----|-----|------|------|
| Per diode        |                               |   |     |     |      |      |
| V <sub>F</sub>   | forward voltage               | I <sub>F</sub> = 1 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; pulsed; T <sub>amb</sub> = 25 °C                                    | -   | -   | 715  | mV   |
|                  |                               | I <sub>F</sub> = 10 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; pulsed; T <sub>amb</sub> = 25 °C                                   | -   | -   | 855  | mV   |
|                  |                               | I <sub>F</sub> = 50 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; pulsed; T <sub>amb</sub> = 25 °C                                   | -   | -   | 1    | V    |
|                  |                               | I <sub>F</sub> = 150 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; pulsed; T <sub>amb</sub> = 25 °C                                  | -   | -   | 1.25 | V    |
| I <sub>R</sub>   | reverse current               | V <sub>R</sub> = 25 V; T <sub>amb</sub> = 25 °C   | -   | -   | 30   | nA   |
|                  |                               | V <sub>R</sub> = 80 V; T <sub>amb</sub> = 25 °C   | -   | -   | 0.5  | μA   |
|                  |                               | V <sub>R</sub> = 25 V; T <sub>j</sub> = 150 °C  | -   | -   | 30   | μA   |
|                  |                               | V <sub>R</sub> = 80 V; T <sub>j</sub> = 150 °C  | -   | -   | 50   | μA   |
| C <sub>d</sub>   | diode capacitance             | V <sub>R</sub> = 0 V; f = 1 MHz; T <sub>amb</sub> = 25 °C   | -   | -   | 1.5  | pF   |
| t <sub>rr</sub>  | reverse recovery time         | I <sub>F</sub> = 10 mA; I <sub>R</sub> = 10 mA; R <sub>L</sub> = 100 Ω; I <sub>R(meas)</sub> = 1 mA; T <sub>amb</sub> = 25 °C | -   | -   | 4    | ns   |
| V <sub>FRM</sub> | peak forward recovery voltage | I <sub>F</sub> = 10 mA; t <sub>r</sub> = 20 ns; T <sub>amb</sub> = 25 °C  | -   | -   | 1.75 | V    |



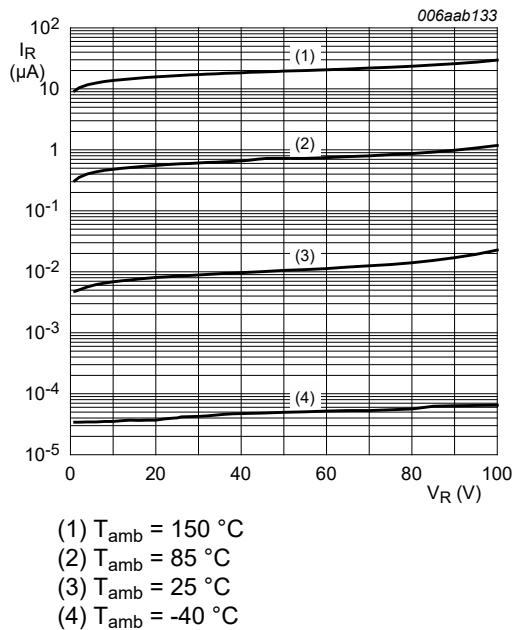


Fig. 3. Reverse current as a function of reverse voltage; typical values

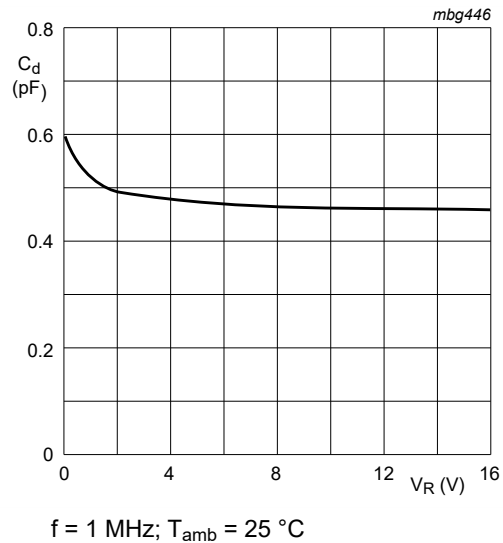


Fig. 4. Diode capacitance as a function of reverse voltage; typical values

11. Test information

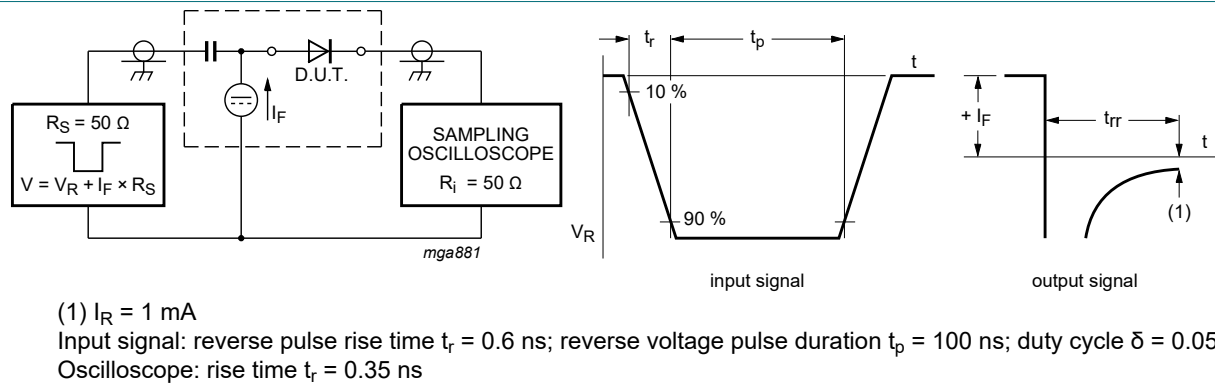


Fig. 5. Reverse recovery time test circuit and waveforms

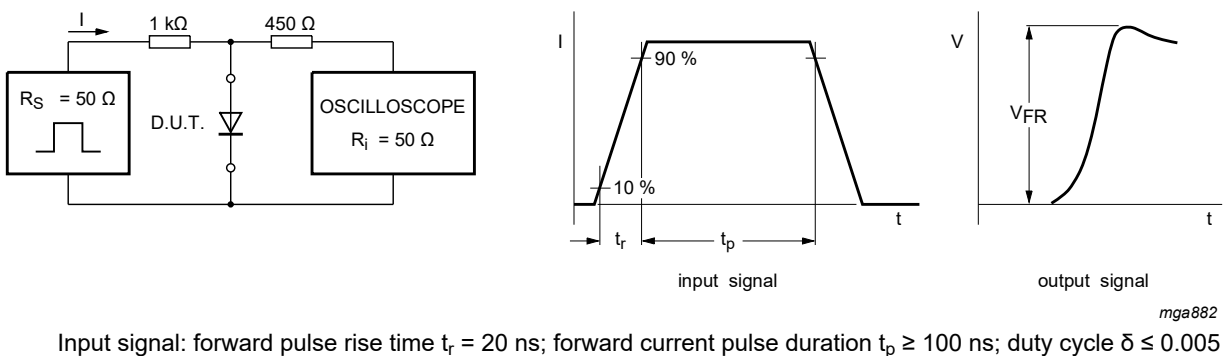
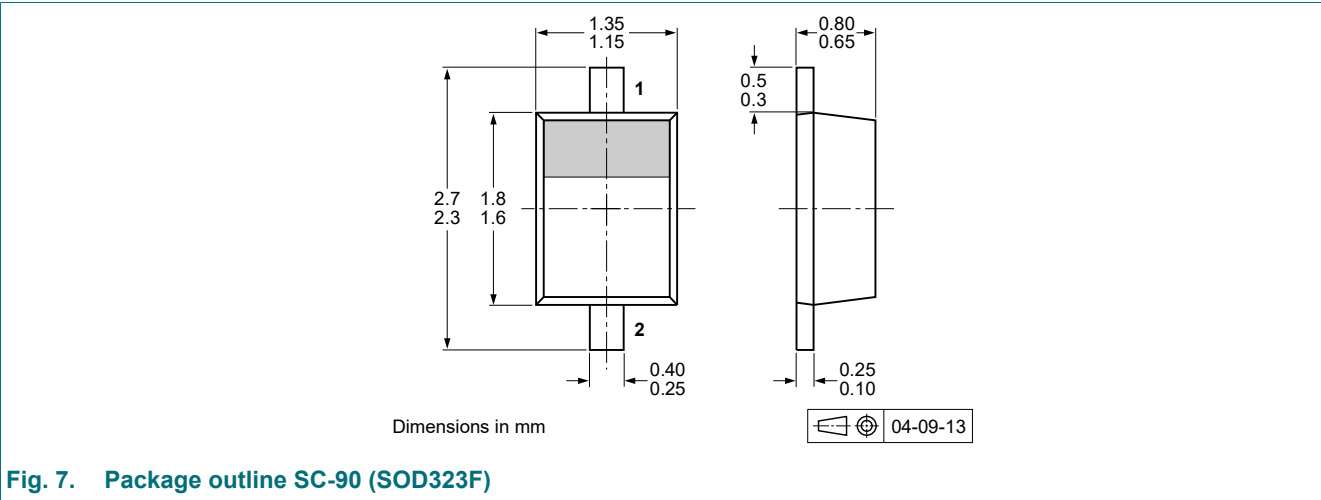
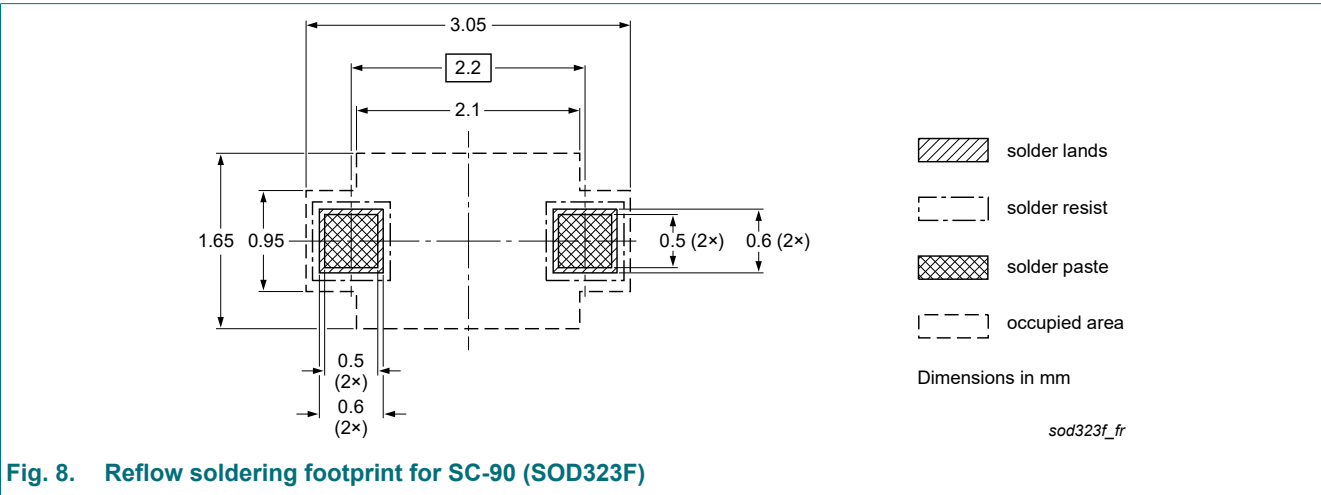


Fig. 6. Forward recovery voltage test circuit and waveforms

12. Package outline



13. Soldering



## 14. Revision history

Table 8. Revision history

| Data sheet ID     | Release date   | Data sheet status     | Change notice | Supersedes  |
|-------------------|--|-----------------------|---------------|---|
| BAS16J 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 nexperia.com 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<br>[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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Date of release: 1 October 2022



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