



# BAS101-Q

## High-voltage switching diode

5 April 2024

Product data sheet

## 1. General description

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

## 2. Features and benefits

- High switching speed:  $t_{rr} \leq 50$  ns
- Low leakage current
- Repetitive peak reverse voltage:  $V_{RRM} \leq 300$
- Low capacitance:  $C_d \leq 2$  pF
- Reverse voltage:  $V_R \leq 300$  V
- Small SMD plastic package
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

- High-speed switching
- High-voltage switching
- Voltage clamping
- Reverse polarity protection

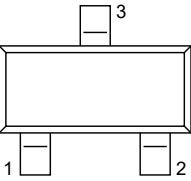
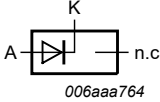
## 4. Quick reference data

Table 1. Quick reference data

| Symbol           | Parameter             | Conditions  | Min | Typ | Max | Unit |
|------------------|-----------------------|---|-----|-----|-----|------|
| <b>Per diode</b> |                       |   |     |     |     |      |
| $I_F$            | forward current       |   | -   | -   | 200 | mA   |
| $I_R$            | reverse current       | $V_R = 250$ V; $T_{amb} = 25$ °C  | -   | -   | 150 | nA   |
| $V_R$            | reverse voltage       |   | -   | -   | 300 | V    |
| $t_{rr}$         | 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; $T_{amb} = 25$ °C | -   | -   | 50  | ns   |

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description     | Simplified outline  | Graphic symbol   |
|-----|--------|-----------------|---|--|
| 1   | A1     | anode (diode 1) |  <p style="text-align: center;"><b>SOT23</b></p> |  <p style="text-align: center;">006aaa764</p> |
| 2   | n.c.   | not connected   |   |  |
| 3   | K      | cathode         |   |  |

## 6. Ordering information

Table 3. Ordering information

| Type number              | Package |  |                       |
|--------------------------|---------|--|-----------------------|
|                          | Name    | Description  | Version               |
| <a href="#">BAS101-Q</a> | 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> |
|-------------|-----------------------------|
| BAS101-Q    | %HQ                         |

[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     |  |     | -   | 300 | V                |
| $V_R$             | reverse voltage                     |  |     | -   | 300 | V                |
| $I_F$             | forward current                     |  |     | -   | 200 | mA               |
| $I_{FSM}$         | non-repetitive peak forward current | $t_p \leq 1 \mu\text{s}$ ; square wave; $T_{j(\text{init})} = 25 \text{ }^\circ\text{C}$ |     | -   | 9   | A                |
| $I_{FRM}$         | repetitive peak forward current     | $t_p \leq 1 \text{ ms}$ ; $\delta \leq 0.25$   |     | -   | 1   | A                |
| <b>Per device</b> |                                     |  |     |     |     |                  |
| $P_{\text{tot}}$  | total power dissipation             | $T_{\text{amb}} \leq 25 \text{ }^\circ\text{C}$  | [1] | -   | 250 | mW               |
| $T_j$             | junction temperature                |  |     | -   | 150 | $^\circ\text{C}$ |
| $T_{\text{amb}}$  | ambient temperature                 |  |     | -65 | 150 | $^\circ\text{C}$ |
| $T_{\text{stg}}$  | storage temperature                 |  |     | -65 | 150 | $^\circ\text{C}$ |

[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**

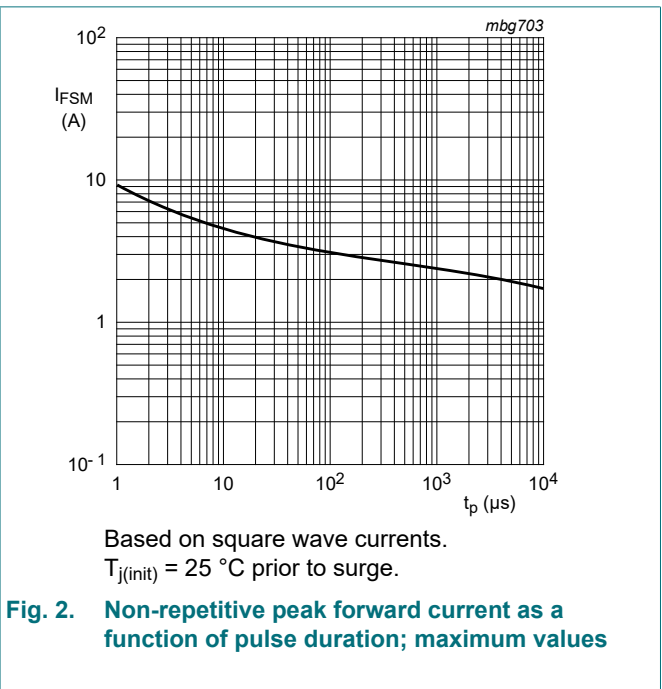
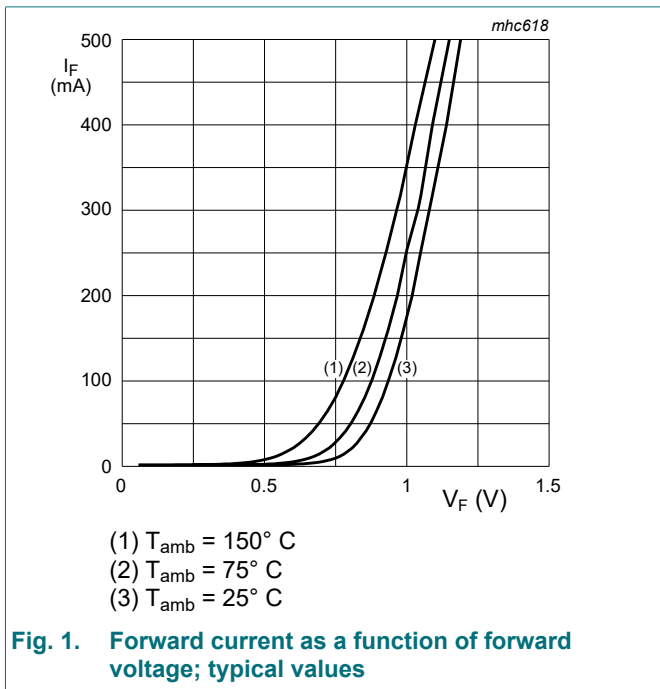
| Symbol               | Parameter                                   | Conditions  |     | Min | Typ | Max | Unit |
|----------------------|---|-------------|-----|-----|-----|-----|------|
| <b>Per device</b>    |   |             |     |     |     |     |      |
| $R_{\text{th}(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] | -   | -   | 500 | K/W  |

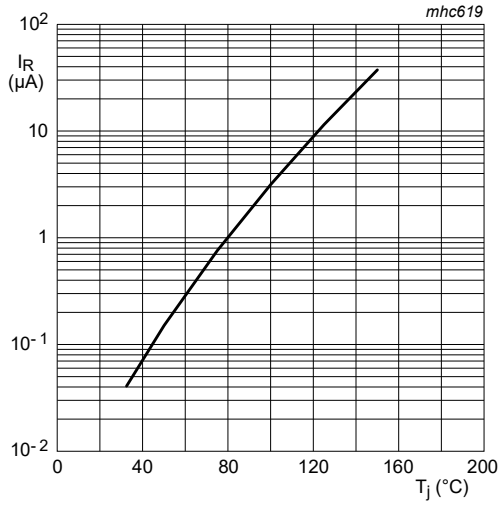
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

### 10. Characteristics

Table 7. Characteristics

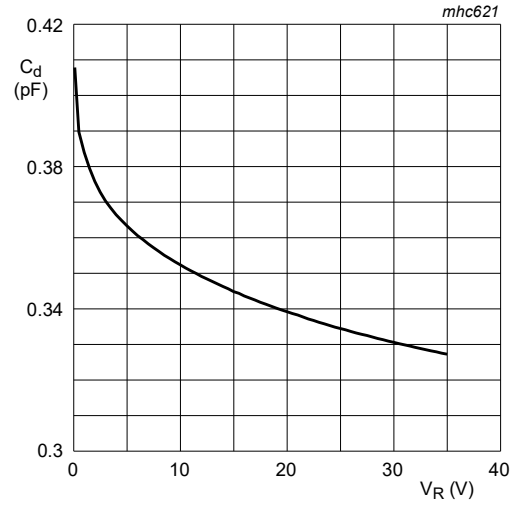
| Symbol           | Parameter             | Conditions   | Min | Typ | Max | Unit          |
|------------------|-----------------------|--|-----|-----|-----|---------------|
| <b>Per diode</b> |                       |  |     |     |     |               |
| $V_F$            | forward voltage       | $I_F = 100 \text{ mA}$ ; $t_p \leq 300 \mu\text{s}$ ; $\delta \leq 0.02$ ; pulsed; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$  | -   | -   | 1.1 | V             |
| $I_R$            | reverse current       | $V_R = 250 \text{ V}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$   | -   | -   | 150 | nA            |
|                  |                       | $V_R = 250 \text{ V}$ ; $T_j = 150 \text{ }^\circ\text{C}$   | -   | -   | 100 | $\mu\text{A}$ |
| $C_d$            | diode capacitance     | $V_R = 0 \text{ V}$ ; $f = 1 \text{ MHz}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$   | -   | -   | 2   | 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 $I_R = 3 \text{ mA}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ | -   | -   | 50  | ns            |





$V_R = 300 \text{ V}$

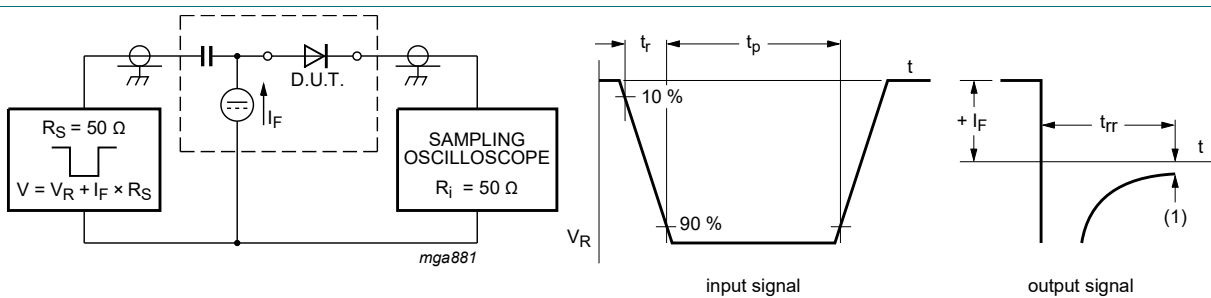
**Fig. 3. Reverse current as a function of junction temperature; typical values**



$f = 1 \text{ MHz}$   
 $T_{\text{amb}} = 25 \text{ °C}$

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

## 11. Test information



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

**Fig. 5. Reverse recovery time test circuit and waveforms**

### Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard *Q101 - Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

## 12. Package outline

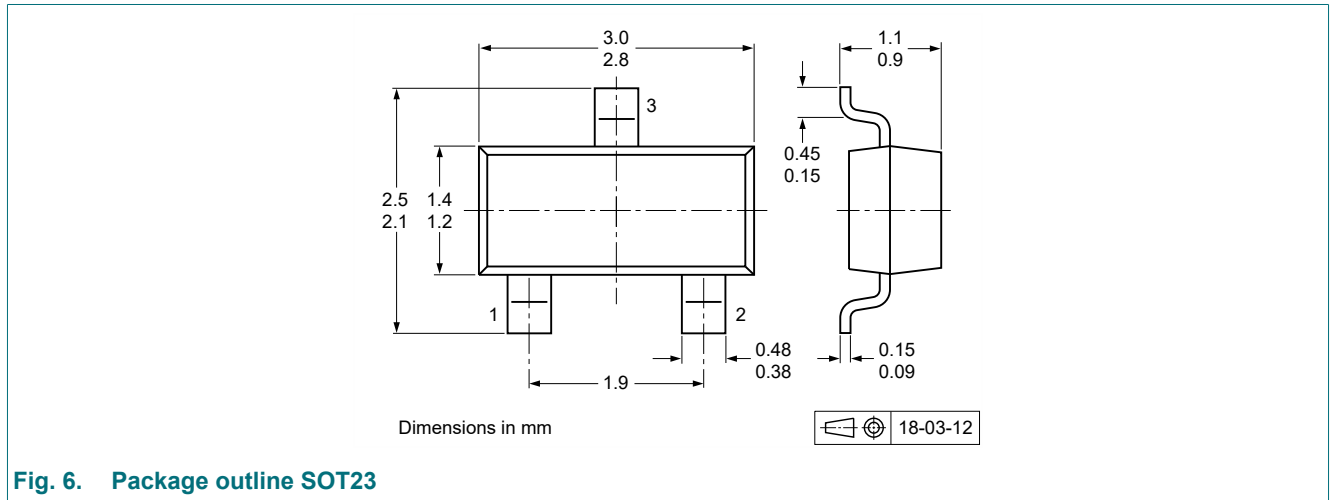


Fig. 6. Package outline SOT23

## 13. Soldering

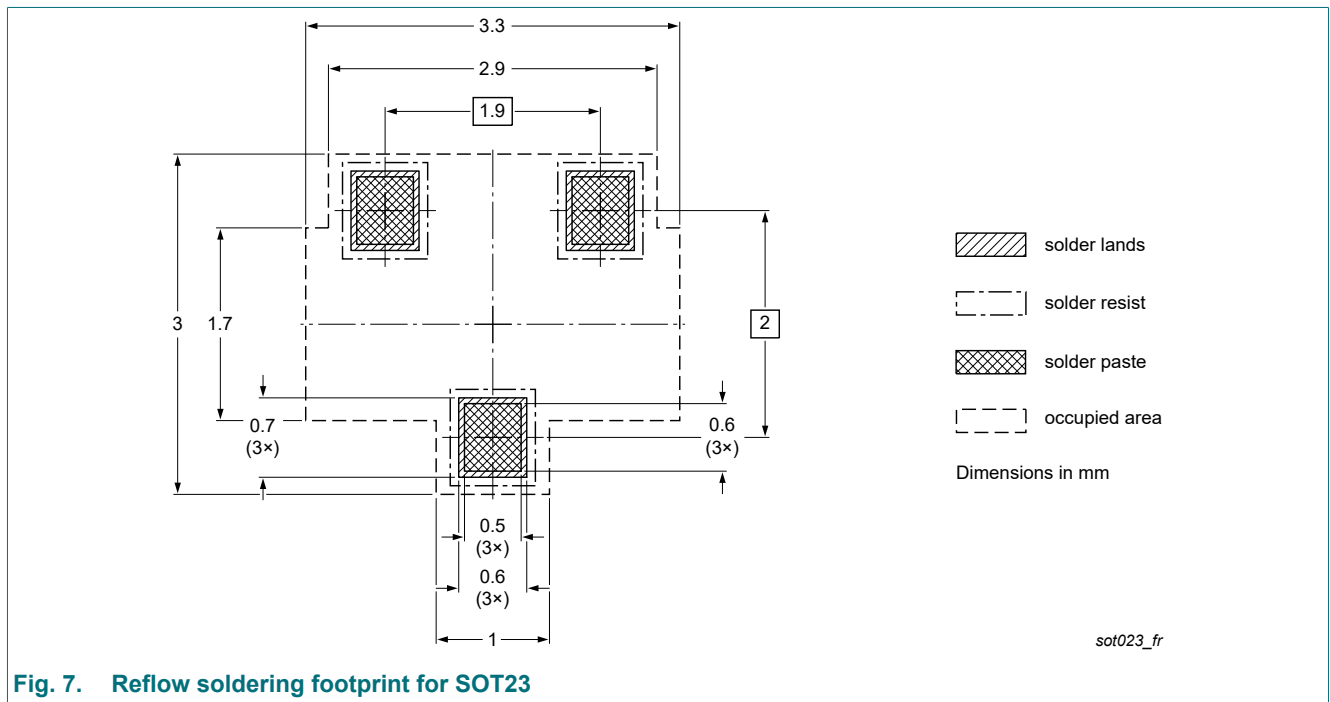


Fig. 7. Reflow soldering footprint for SOT23

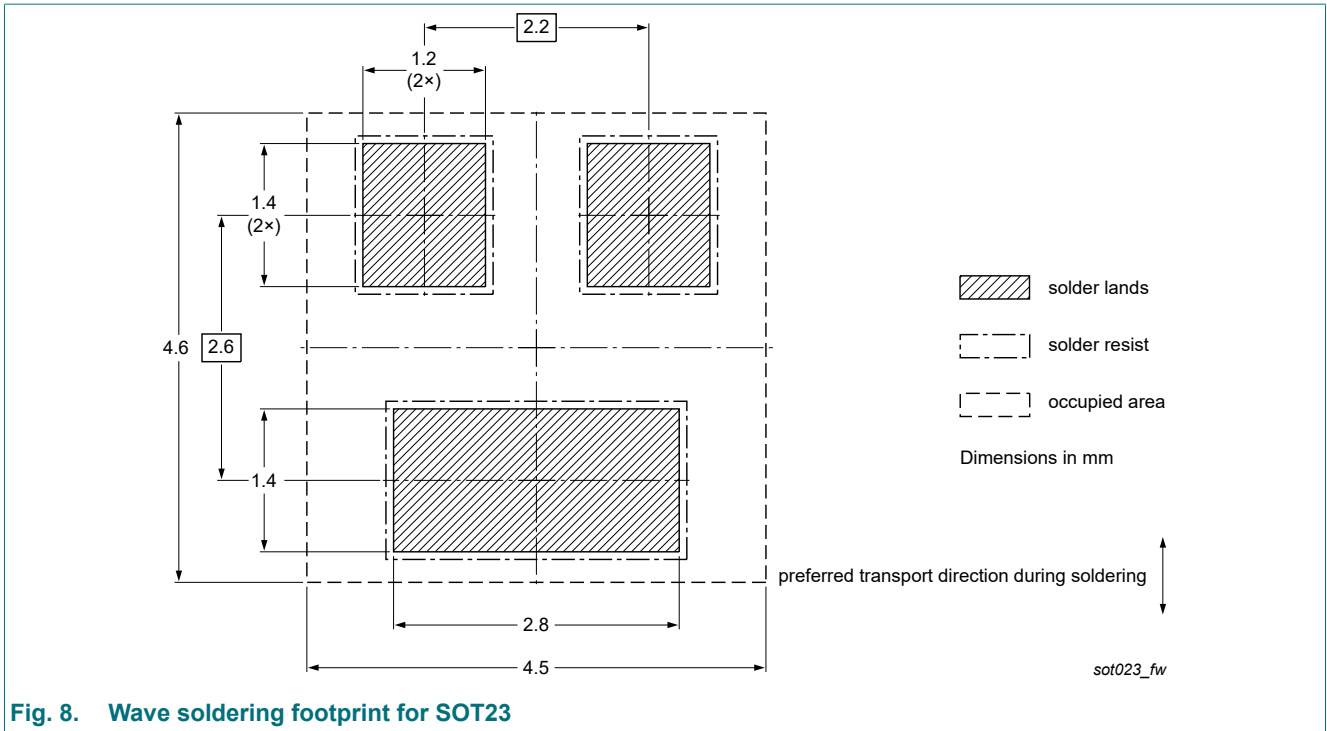


Fig. 8. Wave soldering footprint for SOT23

## 14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status  | Change notice | Supersedes |
|---------------|--------------|--------------------|---------------|------------|
| BAS101-Q v.1  | 20240405     | Product data sheet | -             | -          |



## 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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Date of release: 5 April 2024

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