



# BAS101; BAS101S

## High-voltage switching diodes

Rev. 02 — 14 December 2009

Product data sheet

## 1. Product profile

### 1.1 General description

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

Table 1. Product overview

| Type number | Package  |       | Configuration |
|-------------|----------|-------|---------------|
|             | Nexperia | JEITA |               |
| BAS101      | SOT23    | -     | single        |
| BAS101S     | SOT23    | -     | dual series   |

### 1.2 Features

- High switching speed:  $t_{rr} \leq 50$  ns
- Low leakage current
- Repetitive peak reverse voltage:  $V_{RRM} \leq 300$  V
- Low capacitance:  $C_d \leq 2$  pF
- Reverse voltage:  $V_R \leq 300$  V
- Small SMD plastic package

### 1.3 Applications

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

### 1.4 Quick reference data

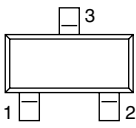
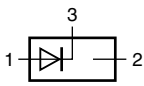
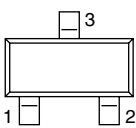
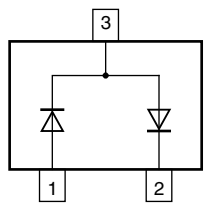
Table 2. Quick reference data

| 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 | -   | -   | 150 | nA   |
| $V_R$            | reverse voltage       |               | -   | -   | 300 | V    |
| $t_{rr}$         | reverse recovery time |               | [1] | -   | 50  | ns   |

[1] When switched from  $I_F = 30$  mA to  $I_R = 30$  mA;  $R_L = 100$   $\Omega$ ; measured at  $I_R = 3$  mA.

## 2. Pinning information

Table 3. Pinning

| Pin            | Description                           | Simplified outline  | Symbol   |
|----------------|---------------------------------------|---|--|
| <b>BAS101</b>  |                                       |   |  |
| 1              | anode                                 |  | <br>006aaa764 |
| 2              | not connected                         |   |  |
| 3              | cathode                               |   |  |
| <b>BAS101S</b> |                                       |   |  |
| 1              | anode (diode 1)                       |  | <br>006aaa763 |
| 2              | cathode (diode 2)                     |   |  |
| 3              | cathode (diode 1),<br>anode (diode 2) |   |  |

## 3. Ordering information

Table 4. Ordering information

| Type number | Package |  | Version |
|-------------|---------|--|---------|
|             | Name    | Description                              |         |
| BAS101      | -       | plastic surface-mounted package; 3 leads | SOT23   |
| BAS101S     |         |  |         |

## 4. Marking

Table 5. Marking codes

| Type number | Marking code <sup>[1]</sup> |
|-------------|-----------------------------|
| BAS101      | *HQ                         |
| BAS101S     | *HR                         |

- [1] \* = -: made in Hong Kong  
 \* = p: made in Hong Kong  
 \* = t: made in Malaysia  
 \* = W: made in China

## 5. Limiting values

**Table 6. 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    |
|                   |                                     | series connection                      | -     | 600  | V    |
| $V_R$             | reverse voltage                     |  | -     | 300  | V    |
|                   |                                     | series connection                      | -     | 600  | V    |
| $I_F$             | forward current                     |  | -     | 200  | mA   |
|                   |                                     | series connection                      | -     | 100  | mA   |
| $I_{FRM}$         | repetitive peak forward current     | $t_p \leq 1$ ms;<br>$\delta \leq 0.25$ | -     | 1    | A    |
| $I_{FSM}$         | non-repetitive peak forward current | square wave;<br>$t_p \leq 1$ $\mu$ s   | [1] - | 9    | A    |
| <b>Per device</b> |                                     |  |       |      |      |
| $P_{tot}$         | total power dissipation             | $T_{amb} \leq 25$ °C                   | [2] - | 250  | mW   |
| $T_j$             | junction temperature                |  | -     | 150  | °C   |
| $T_{amb}$         | ambient temperature                 |  | -65   | +150 | °C   |
| $T_{stg}$         | storage temperature                 |  | -65   | +150 | °C   |

[1]  $T_j = 25$  °C prior to surge

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

## 6. Thermal characteristics

**Table 7. Thermal characteristics**

| Symbol            | Parameter                                   | Conditions  | Min   | Typ | Max | Unit |
|-------------------|---|-------------|-------|-----|-----|------|
| <b>Per device</b> |   |             |       |     |     |      |
| $R_{th(j-a)}$     | 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.

## 7. Characteristics

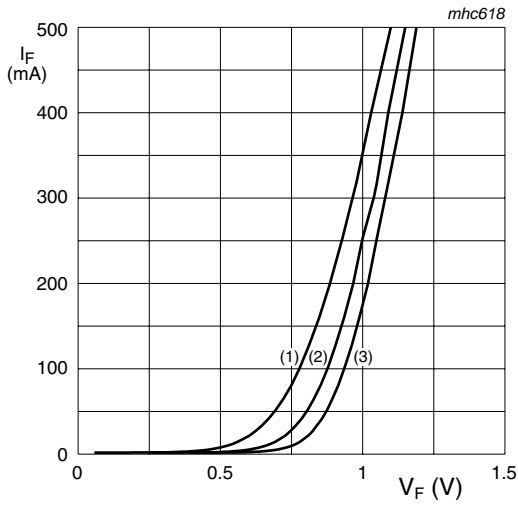
**Table 8. Characteristics**

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

| Symbol           | Parameter             | Conditions                                | Min | Typ | Max | Unit          |
|------------------|-----------------------|---|-----|-----|-----|---------------|
| <b>Per diode</b> |                       |   |     |     |     |               |
| $V_F$            | forward voltage       | $I_F = 100\text{ mA}$                     | [1] | -   | 1.1 | V             |
| $I_R$            | reverse current       | $V_R = 250\text{ V}$                      | -   | -   | 150 | nA            |
|                  |                       | $V_R = 250\text{ V}; T_j = 150\text{ °C}$ | -   | -   | 100 | $\mu\text{A}$ |
| $C_d$            | diode capacitance     | $V_R = 0\text{ V}; f = 1\text{ MHz}$      | -   | -   | 2   | pF            |
| $t_{rr}$         | reverse recovery time |   | [2] | -   | 50  | ns            |

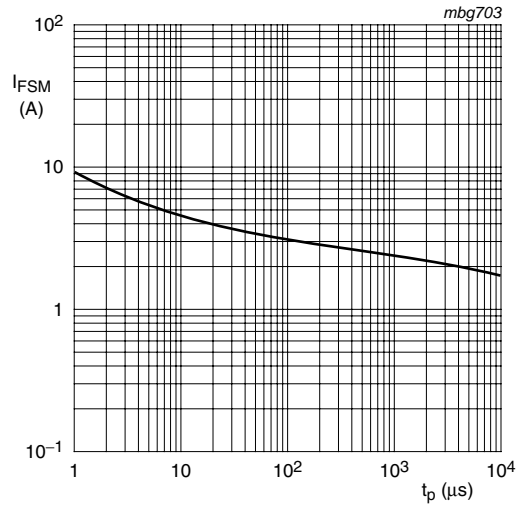
[1] Pulse test:  $t_p \leq 300\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$ .

[2] When switched from  $I_F = 30\text{ mA}$  to  $I_R = 30\text{ mA}$ ;  $R_L = 100\text{ }\Omega$ ; measured at  $I_R = 3\text{ mA}$ .



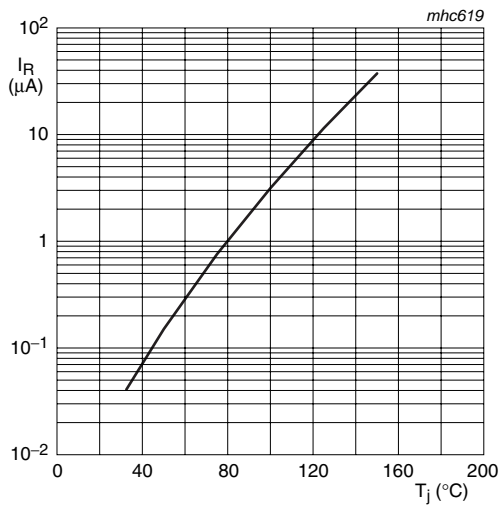
- (1)  $T_{amb} = 150\text{ °C}$
- (2)  $T_{amb} = 75\text{ °C}$
- (3)  $T_{amb} = 25\text{ °C}$

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



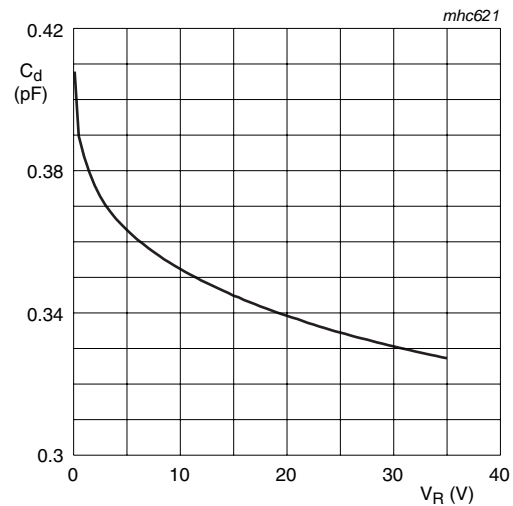
Based on square wave currents  
 $T_j = 25\text{ °C}$ ; prior to surge

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



$V_R = 300\text{ V}$

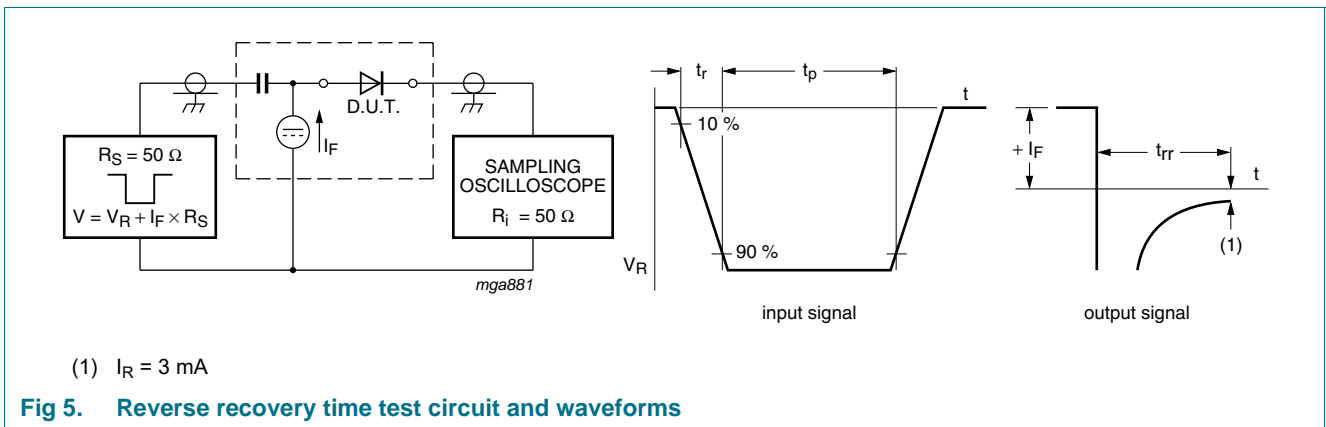
**Fig 3. Reverse current as a function of junction temperature; typical values**



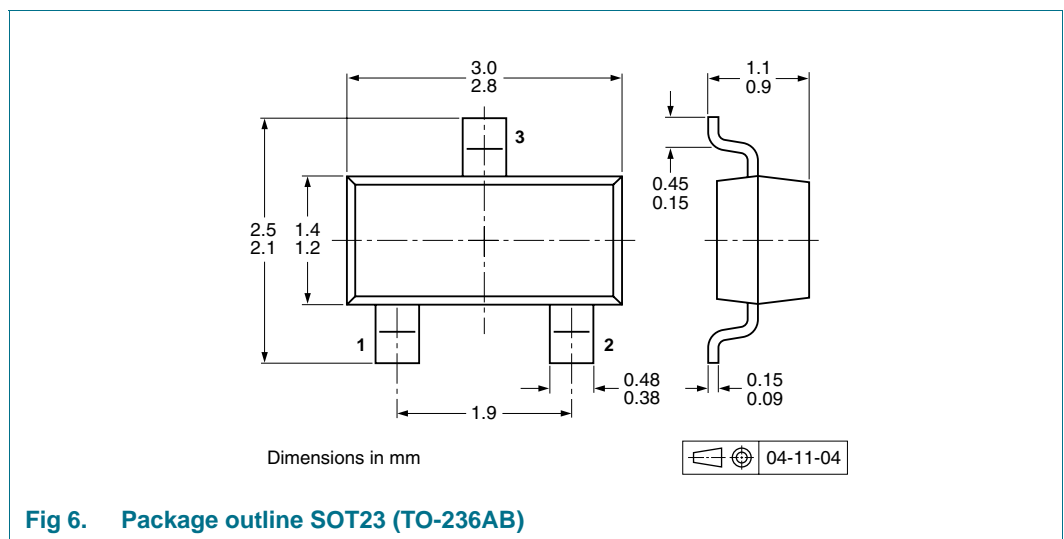
$f = 1\text{ MHz}$ ;  $T_{amb} = 25\text{ °C}$

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

## 8. Test information



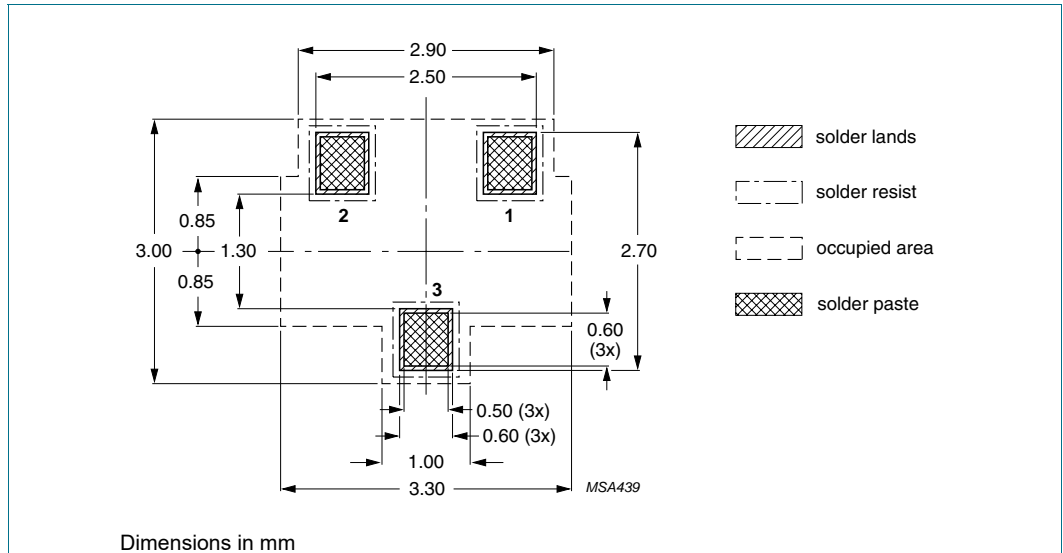
## 9. Package outline



## 10. Packing information

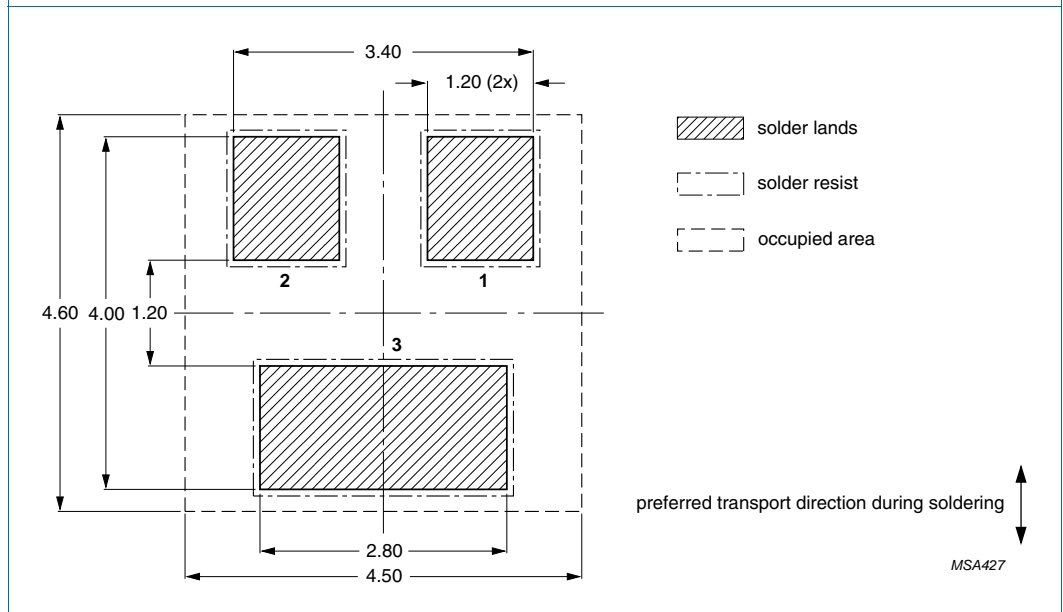
Please refer to packing information on [www.nexperia.com](http://www.nexperia.com).

**11. Soldering**



Dimensions in mm

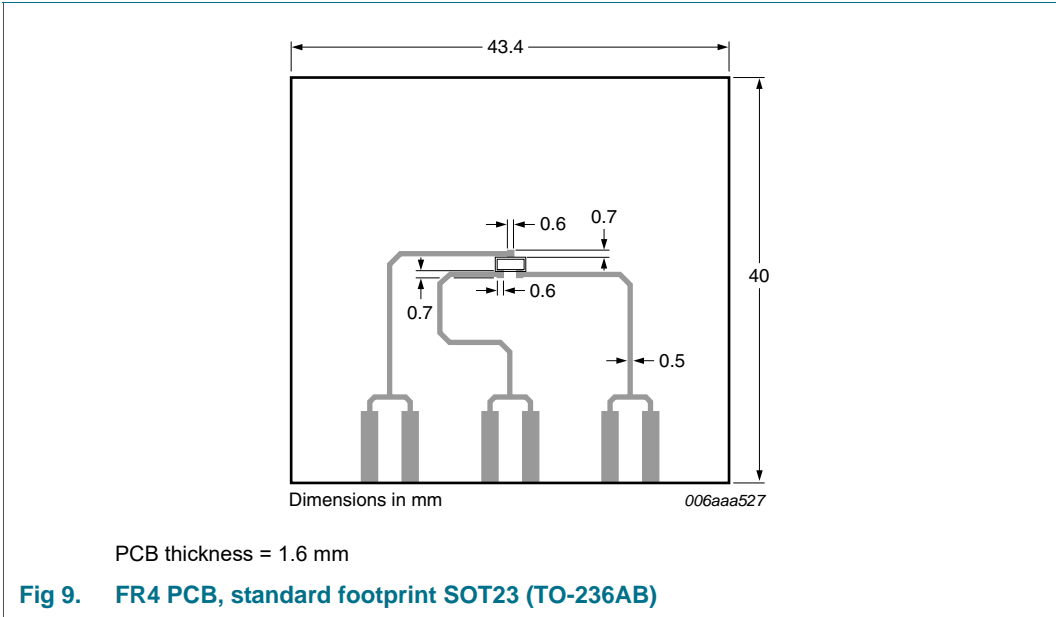
**Fig 7. Reflow soldering footprint SOT23 (TO-236AB)**



Dimensions in mm

**Fig 8. Wave soldering footprint SOT23 (TO-236AB)**

12. Mounting





## 13. Revision history

Table 10. Revision history

| Document ID      | Release date   | Data sheet status  | Change notice | Supersedes       |
|------------------|--|--------------------|---------------|------------------|
| BAS101_BAS101S_2 | 20091214   | Product data sheet | -             | BAS101_BAS101S_1 |
| Modifications:   | <ul style="list-style-type: none"><li>• This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content.</li><li>• <a href="#">Table 3 “Pinning”</a>: updated</li></ul> |                    |               |                  |
| BAS101_BAS101S_1 | 20060908   | Product data sheet | -             | -                |

## 14. Legal information

### 14.1 Data sheet status

| Document status <sup>[1][2]</sup> | Product status <sup>[3]</sup> | 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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nexperia.com>.

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