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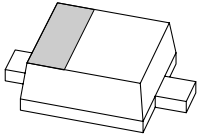
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Kind regards,

Team Nexperia



# BAS21J

## Single high-speed switching diode

Rev. 01 — 8 March 2007

Product data sheet

## 1. Product profile

### 1.1 General description

Single high-speed switching diode, encapsulated in a SOD323F (SC-90) very small and flat lead Surface-Mounted Device (SMD) plastic package.

### 1.2 Features

- High switching speed:  $t_{rr} \leq 50$  ns
- Low leakage current
- Repetitive peak reverse voltage:  $V_{RRM} \leq 300$  V
- Excellent coplanarity and improved thermal behavior
- Low capacitance:  $C_d \leq 2$  pF
- Reverse voltage:  $V_R \leq 300$  V
- Very small and flat lead SMD plastic package

### 1.3 Applications

- High-speed switching
- General-purpose switching
- Voltage clamping
- Reverse polarity protection

### 1.4 Quick reference data

Table 1. Quick reference data

| Symbol   | Parameter             | Conditions    | Min   | Typ | Max | Unit |
|----------|-----------------------|---------------|-------|-----|-----|------|
| $I_F$    | forward current       |               | [1] - | -   | 250 | mA   |
| $I_R$    | reverse current       | $V_R = 250$ V | -     | -   | 150 | nA   |
| $V_R$    | reverse voltage       |               | -     | -   | 300 | V    |
| $t_{rr}$ | reverse recovery time |               | [2] - | -   | 50  | ns   |

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

[2] 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 2. Pinning

| Pin | Description | Simplified outline                                                                  | Symbol                                                                              |
|-----|-------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1   | cathode     |  |  |
| 2   | anode       |                                                                                     |                                                                                     |

sym006

[1] The marking bar indicates the cathode.

## 3. Ordering information

Table 3. Ordering information

| Type number | Package |                                          |         |
|-------------|---------|------------------------------------------|---------|
|             | Name    | Description                              | Version |
| BAS21J      | SC-90   | plastic surface-mounted package; 2 leads | SOD323F |

## 4. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| BAS21J      | AN           |

## 5. Limiting values

**Table 5. Limiting values**

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

| Symbol    | Parameter                           | Conditions                               | Min      | Max  | Unit |
|-----------|-------------------------------------|------------------------------------------|----------|------|------|
| $V_{RRM}$ | repetitive peak reverse voltage     |                                          | -        | 300  | V    |
| $V_R$     | reverse voltage                     |                                          | -        | 300  | V    |
| $I_F$     | forward current                     |                                          | [1] -    | 250  | mA   |
| $I_{FRM}$ | repetitive peak forward current     | $t_p \leq 0.5$ ms;<br>$\delta \leq 0.25$ | -        | 1    | A    |
| $I_{FSM}$ | non-repetitive peak forward current | square wave                              | [2]      |      |      |
|           |                                     | $t_p = 100$ $\mu$ s                      | -        | 3    | A    |
|           |                                     | $t_p = 1$ ms                             | -        | 2.3  | A    |
|           |                                     | $t_p = 10$ ms                            | -        | 1.7  | A    |
| $P_{tot}$ | total power dissipation             | $T_{amb} \leq 25$ °C                     | [3][4] - | 550  | mW   |
| $T_j$     | junction temperature                |                                          | -        | 150  | °C   |
| $T_{amb}$ | ambient temperature                 |                                          | -65      | +150 | °C   |
| $T_{stg}$ | storage temperature                 |                                          | -65      | +150 | °C   |

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

[2]  $T_j = 25$  °C prior to surge.

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

[4] Reflow soldering is the only recommended soldering method.

## 6. 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][2] - | -   | 230 | K/W  |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point |             | [3] -    | -   | 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] Reflow soldering is the only recommended soldering method.

[3] Soldering point of cathode tab.

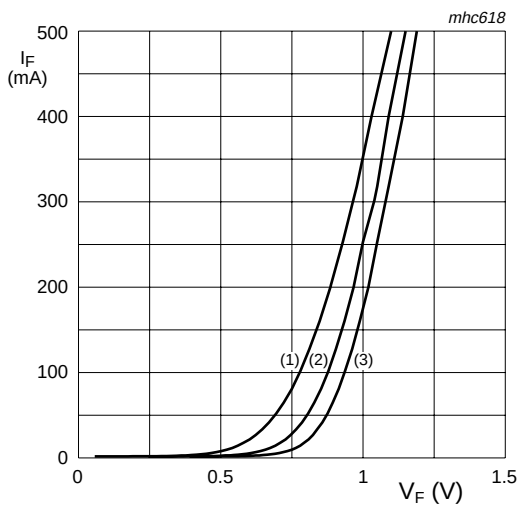
## 7. Characteristics

**Table 7. Characteristics***T<sub>amb</sub> = 25 °C unless otherwise specified.*

| Symbol          | Parameter             | Conditions                                      | Min | Typ | Max | Unit |
|-----------------|-----------------------|-------------------------------------------------|-----|-----|-----|------|
| V <sub>F</sub>  | forward voltage       | I <sub>F</sub> = 100 mA                         | [1] | -   | 1.1 | V    |
| I <sub>R</sub>  | reverse current       | V <sub>R</sub> = 250 V                          | -   | -   | 150 | nA   |
|                 |                       | V <sub>R</sub> = 250 V; T <sub>j</sub> = 150 °C | -   | -   | 50  | μA   |
| C <sub>d</sub>  | diode capacitance     | V <sub>R</sub> = 0 V; f = 1 MHz                 | -   | -   | 2   | pF   |
| t <sub>rr</sub> | reverse recovery time |                                                 | [2] | -   | 50  | ns   |

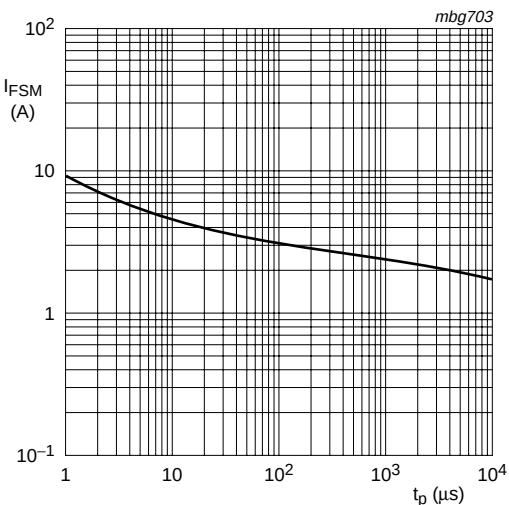
[1] Pulse test: t<sub>p</sub> ≤ 300 μs; δ ≤ 0.02.

[2] When switched from I<sub>F</sub> = 30 mA to I<sub>R</sub> = 30 mA; R<sub>L</sub> = 100 Ω; measured at I<sub>R</sub> = 3 mA.



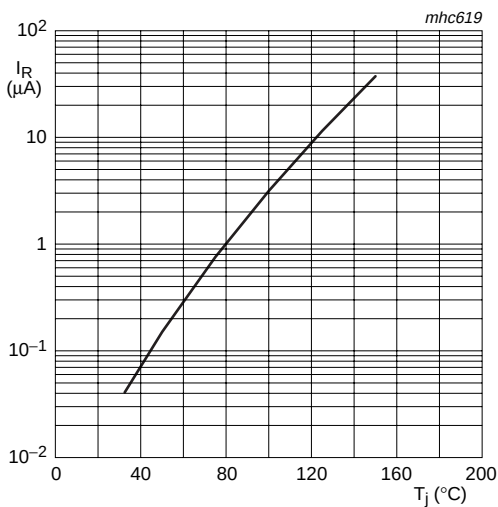
- (1)  $T_{amb} = 150\text{ }^{\circ}\text{C}$
- (2)  $T_{amb} = 75\text{ }^{\circ}\text{C}$
- (3)  $T_{amb} = 25\text{ }^{\circ}\text{C}$

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



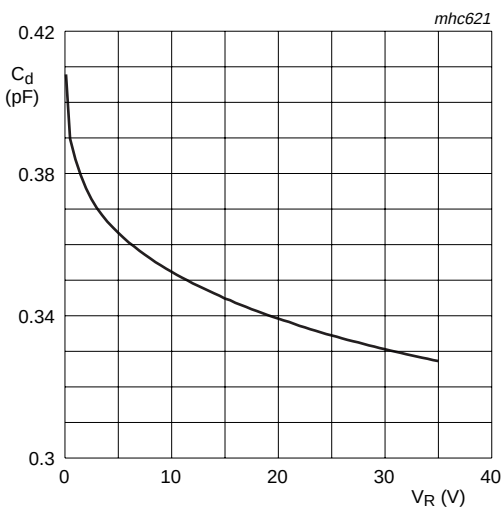
Based on square wave currents.  
 $T_j = 25\text{ }^{\circ}\text{C}$ ; prior to surge

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



$V_R = 250\text{ V}$

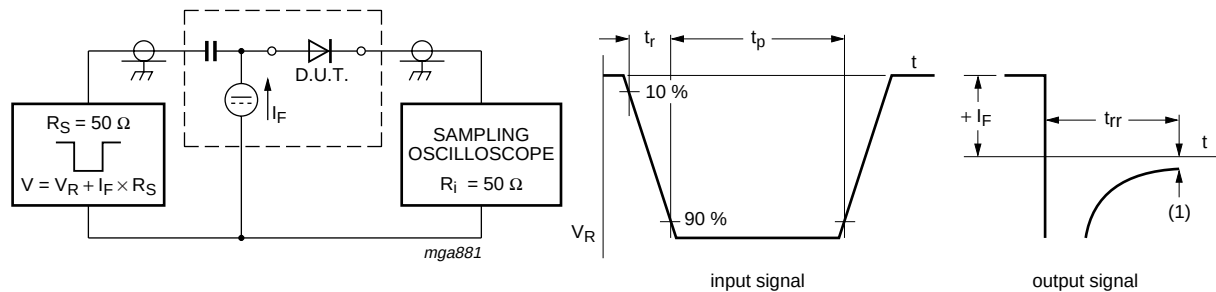
Fig 3. Reverse current as a function of junction temperature; typical values



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

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

## 8. Test information



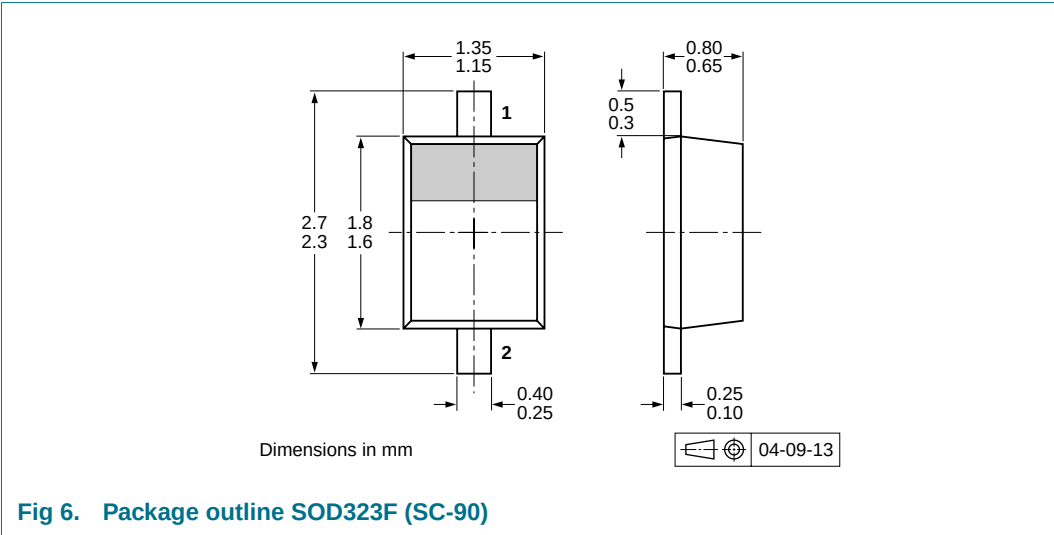
(1)  $I_R = 1\ \text{mA}$

Input signal: reverse pulse rise time  $t_r = 0.6\ \text{ns}$ ; reverse voltage pulse duration  $t_p = 100\ \text{ns}$ ; duty cycle  $\delta = 0.05$

Oscilloscope: rise time  $t_r = 0.35\ \text{ns}$

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

9. Package outline



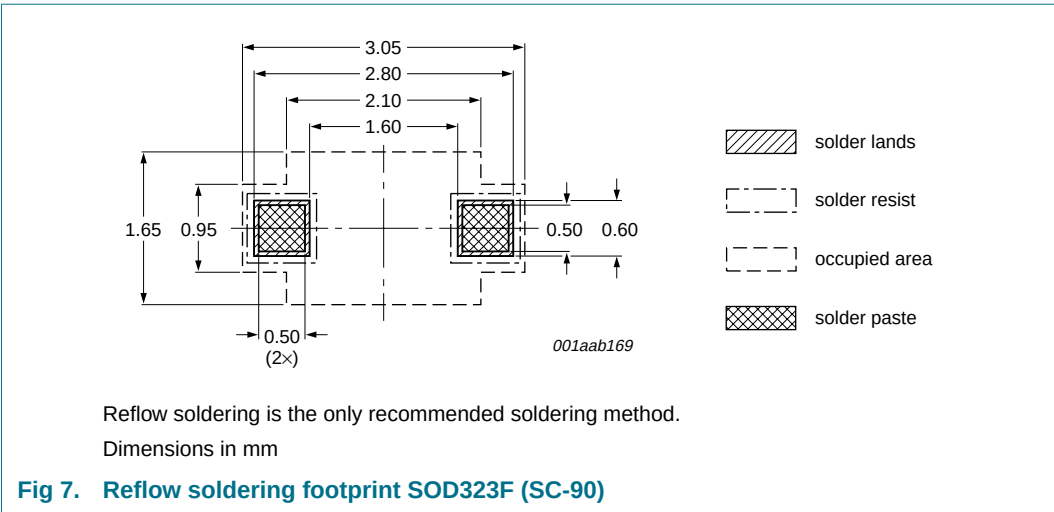
10. Packing information

**Table 8. Packing methods**  
The indicated -xxx are the last three digits of the 12NC ordering code.<sup>[1]</sup>

| Type number | Package | Description                    | Packing quantity |       |
|-------------|---------|--------------------------------|------------------|-------|
|             |         |                                | 3000             | 10000 |
| BAS21J      | SOD323F | 4 mm pitch, 8 mm tape and reel | -115             | -135  |

[1] For further information and the availability of packing methods, see [Section 14](#).

11. Soldering





12. Revision history

Table 9. Revision history

| Document ID | Release date | Data sheet status  | Change notice | Supersedes |
|-------------|--------------|--------------------|---------------|------------|
| BAS21J_1    | 20070308     | Product data sheet | -             | -          |

## 13. Legal information

### 13.1 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.nxp.com>.

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