



# BAS116H

Low leakage switching diode

Rev. 3 — 31 May 2011

Product data sheet

## 1. Product profile

### 1.1 General description

Low leakage switching diode, encapsulated in a SOD123F small and flat lead Surface-Mounted Device (SMD) plastic package.

### 1.2 Features and benefits

- Small and flat lead SMD plastic package
- Low leakage current
- Excellent coplanarity and improved thermal behavior
- AEC-Q101 qualified

### 1.3 Applications

- General-purpose switching

### 1.4 Quick reference data

Table 1. Quick reference data

| Symbol   | Parameter             | Conditions          | Min    | Typ   | Max | Unit          |
|----------|-----------------------|---------------------|--------|-------|-----|---------------|
| $I_F$    | forward current       |                     | [1][2] | -     | 215 | mA            |
| $I_R$    | reverse current       | $V_R = 75\text{ V}$ | -      | 0.003 | 5.0 | nA            |
| $V_R$    | reverse voltage       |                     | -      | -     | 75  | V             |
| $t_{rr}$ | reverse recovery time |                     | [3]    | 0.8   | 3.0 | $\mu\text{s}$ |

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

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

[3] When switched from  $I_F = 10\text{ mA}$  to  $I_R = 10\text{ mA}$ ;  $R_L = 100\text{ }\Omega$ ; measured at  $I_R = 1\text{ mA}$ .

## 2. Pinning information

Table 2. Pinning

| Pin | Description | Simplified outline | Graphic symbol |
|-----|-------------|--------------------|----------------|
| 1   | cathode     |                    |                |
| 2   | anode       |                    |                |

sym001

[1] The marking bar indicates the cathode.

### 3. Ordering information

Table 3. Ordering information

| Type number | Package |                                          |         |
|-------------|---------|------------------------------------------|---------|
|             | Name    | Description                              | Version |
| BAS116H     | -       | plastic surface-mounted package; 2 leads | SOD123F |

### 4. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| BAS116H     | B1           |

### 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     |                                         | -   | 85   | V          |
| $V_R$     | reverse voltage                     |                                         | -   | 75   | V          |
| $I_F$     | forward current                     | [1][2]                                  | -   | 215  | mA         |
| $I_{FRM}$ | repetitive peak forward current     |                                         | -   | 500  | mA         |
| $I_{FSM}$ | non-repetitive peak forward current | square wave [3]                         |     |      |            |
|           |                                     | $t_p = 1 \mu s$                         | -   | 4    | A          |
|           |                                     | $t_p = 1 ms$                            | -   | 1    | A          |
|           |                                     | $t_p = 1 s$                             | -   | 0.5  | A          |
| $P_{tot}$ | total power dissipation             | $T_{amb} \leq 25^\circ C$ [1][4]<br>[5] | -   | 375  | mW         |
| $T_j$     | 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 PCB, single-sided copper, tin-plated and standard footprint.

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

[3]  $T_j = 25^\circ C$  prior to surge.

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

[5] Soldering point of cathode tab.

## 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] - | -   | 330 | K/W  |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point |             | [3] -    | -   | 70  | K/W  |

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

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

[3] Soldering point of cathode tab.

## 7. Characteristics

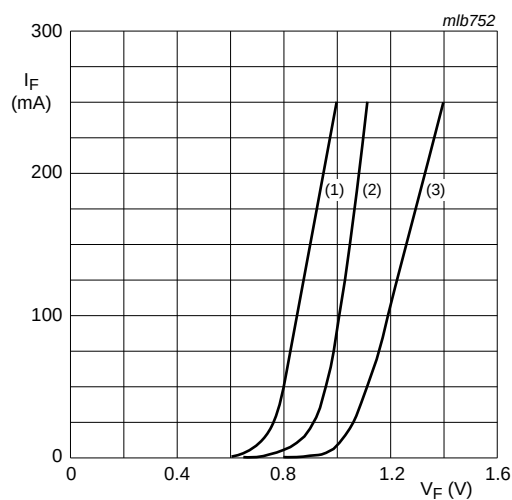
**Table 7. Characteristics**

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

| Symbol   | Parameter             | Conditions                               | Min   | Typ   | Max  | Unit |
|----------|-----------------------|------------------------------------------|-------|-------|------|------|
| $V_F$    | forward voltage       |                                          | [1]   |       |      |      |
|          |                       | $I_F = 1\text{ mA}$                      | -     | -     | 0.90 | V    |
|          |                       | $I_F = 10\text{ mA}$                     | -     | -     | 1.00 | V    |
|          |                       | $I_F = 50\text{ mA}$                     | -     | -     | 1.10 | V    |
|          |                       | $I_F = 150\text{ mA}$                    | -     | -     | 1.25 | V    |
| $I_R$    | reverse current       | $V_R = 75\text{ V}$                      | -     | 0.003 | 5.0  | nA   |
|          |                       | $V_R = 75\text{ V}; T_j = 150\text{ °C}$ | -     | 3     | 80.0 | nA   |
| $C_d$    | diode capacitance     | $V_R = 0\text{ V}; f = 1\text{ MHz}$     | -     | 2     | -    | pF   |
| $t_{rr}$ | reverse recovery time |                                          | [2] - | 0.8   | 3.0  | μs   |

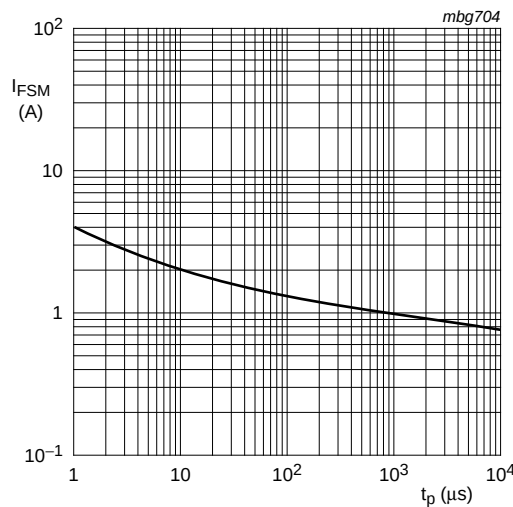
[1] Pulse test:  $t_p \leq 300\text{ μs}$ ;  $\delta \leq 0.02$ .

[2] When switched from  $I_F = 10\text{ mA}$  to  $I_R = 10\text{ mA}$ ;  $R_L = 100\text{ Ω}$ ; measured at  $I_R = 1\text{ mA}$ .



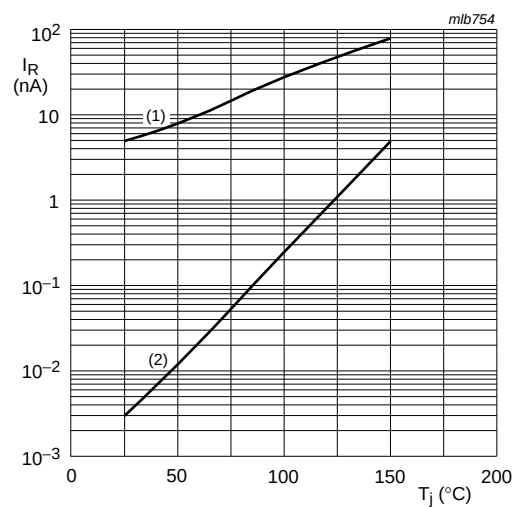
- (1)  $T_{amb} = 150\text{ °C}$ ; typical values
- (2)  $T_{amb} = 25\text{ °C}$ ; typical values
- (3)  $T_{amb} = 25\text{ °C}$ ; maximum values

Fig 1. Forward current as a function of forward voltage



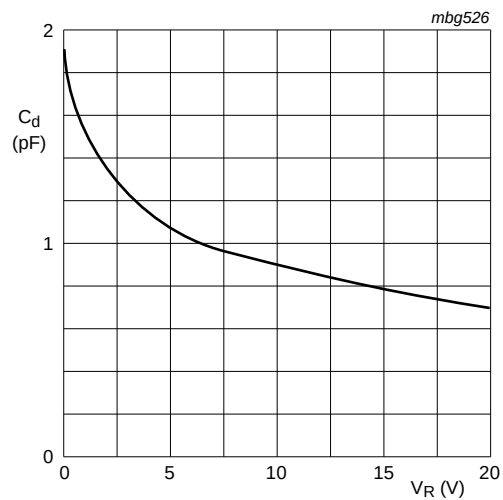
Based on square wave currents  
 $T_J = 25\text{ °C}$ ; prior to surge

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



- $V_R = 75\text{ V}$
- (1) Maximum values
  - (2) Typical values

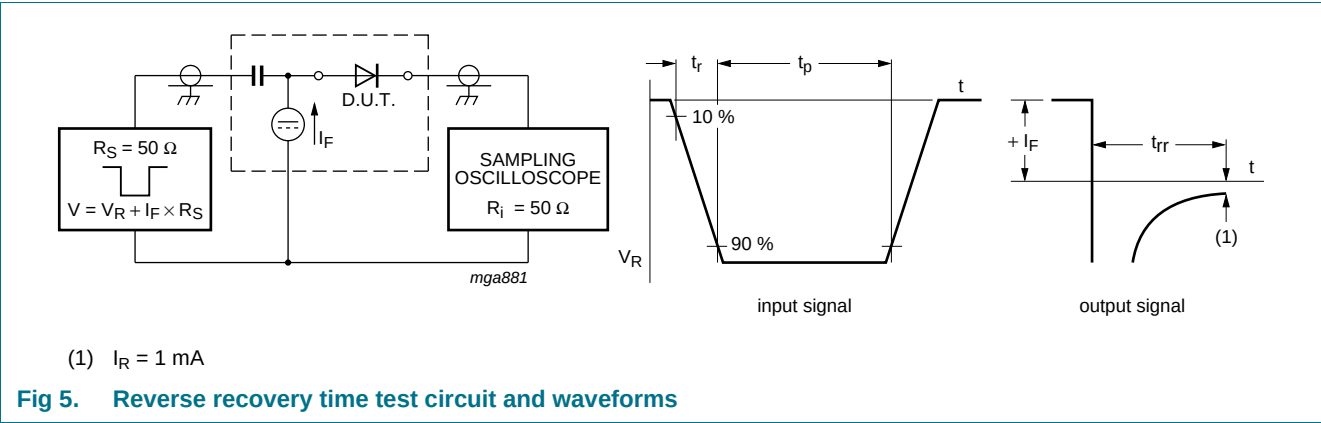
Fig 3. Reverse current as a function of junction temperature



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

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

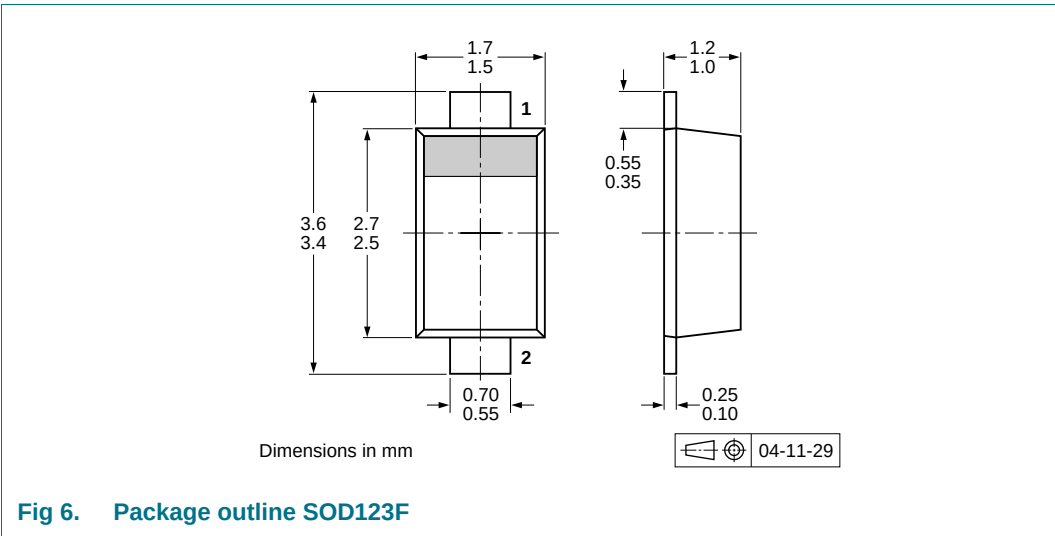
8. Test information



8.1 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.

9. Package outline



10. Packing information

**Table 8. Packing methods**

The -xxx numbers are the last three digits of the 12NC ordering code.[\[1\]](#)

| Type number | Package | Description                    | Packing quantity |       |
|-------------|---------|--------------------------------|------------------|-------|
|             |         |                                | 3000             | 10000 |
| BAS116H     | SOD123F | 4 mm pitch, 8 mm tape and reel | -115             | -135  |

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



## 12. Revision history

Table 9. Revision history

| Document ID    | Release date                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Data sheet status  | Change notice | Supersedes  |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|-------------|
| BAS116H v.3    | 20110531                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Product data sheet | -             | BAS116H v.2 |
| Modifications: | <ul style="list-style-type: none"><li>• <a href="#">Section 1 "Product profile"</a>: updated.</li><li>• <a href="#">Table 5</a> and <a href="#">6</a>: updated.</li><li>• <a href="#">Table 7</a>: <math>V_F</math> values changed from mV to V.</li><li>• <a href="#">Figure 2</a>: updated.</li><li>• <a href="#">Section 8.1 "Quality information"</a>: added.</li><li>• <a href="#">Figure 7</a>: updated.</li><li>• <a href="#">Section 13 "Legal information"</a>: updated.</li></ul> |                    |               |             |
| BAS116H v.2    | 20091214                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Product data sheet | -             | BAS116H v.1 |
| BAS116H v.1    | 20050411                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 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.nexperia.com>.

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