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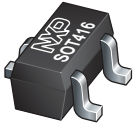
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Kind regards,

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# BAS116T

Single low leakage current switching diode

Rev. 2 — 9 July 2012

Product data sheet

## 1. Product profile

### 1.1 General description

Single low leakage current switching diode, encapsulated in an ultra small SOT416 (SC-75) Surface-Mounted Device (SMD) plastic package.

### 1.2 Features and benefits

- High switching speed:  $t_{rr} = 0.8 \mu\text{s}$
- Low capacitance:  $C_d = 2 \text{ pF}$
- Low leakage current: 3 pA
- Reverse voltage:  $V_R \leq 75 \text{ V}$
- Repetitive peak reverse voltage:  $V_{RRM} \leq 85 \text{ V}$
- Ultra small SMD plastic package
- AEC-Q101 qualified

### 1.3 Applications

- Low leakage current applications
- Voltage clamping
- General-purpose switching
- 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] - | -   | 215 | mA            |
| $I_R$    | reverse current       | $V_R = 75 \text{ V}$ | -     | -   | 5   | nA            |
| $V_R$    | reverse voltage       |                      | -     | -   | 75  | V             |
| $t_{rr}$ | reverse recovery time |                      | [2] - | -   | 3   | $\mu\text{s}$ |

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

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

## 2. Pinning information

Table 2. Pinning

| Pin | Description   | Simplified outline | Graphic symbol |
|-----|---------------|--------------------|----------------|
| 1   | anode         |                    |                |
| 2   | not connected |                    |                |
| 3   | cathode       |                    |                |



### 3. Ordering information

Table 3. Ordering information

| Type number | Package |  |         |
|-------------|---------|--|---------|
|             | Name    | Description                              | Version |
| BAS116T     | SC-75   | plastic surface-mounted package; 3 leads | SOT416  |

### 4. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| BAS116T     | ZY           |

### 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] - | 215  | mA               |
| $I_{FRM}$ | repetitive peak forward current     |  | -     | 500  | mA               |
| $I_{FSM}$ | non-repetitive peak forward current | square wave                              | [2]   |      |                  |
|           |                                     | $t_p = 1 \mu\text{s}$                    | -     | 4    | A                |
|           |                                     | $t_p = 1 \text{ms}$                      | -     | 1    | A                |
|           |                                     | $t_p = 1 \text{s}$                       | -     | 0.5  | A                |
| $P_{tot}$ | total power dissipation             | $T_{amb} \leq 25 \text{ }^\circ\text{C}$ | [3] - | 150  | mW               |
| $T_j$     | junction temperature                |  | -     | 150  | $^\circ\text{C}$ |
| $T_{amb}$ | ambient temperature                 |  | -55   | +150 | $^\circ\text{C}$ |
| $T_{stg}$ | storage temperature                 |  | -65   | +150 | $^\circ\text{C}$ |

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

[2]  $T_j = 25 \text{ }^\circ\text{C}$  before surge.

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

## 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] | -   | 833 | K/W  |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point |             | [2] | -   | 350 | K/W  |

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

[2] Soldering point of cathode tab.

## 7. Characteristics

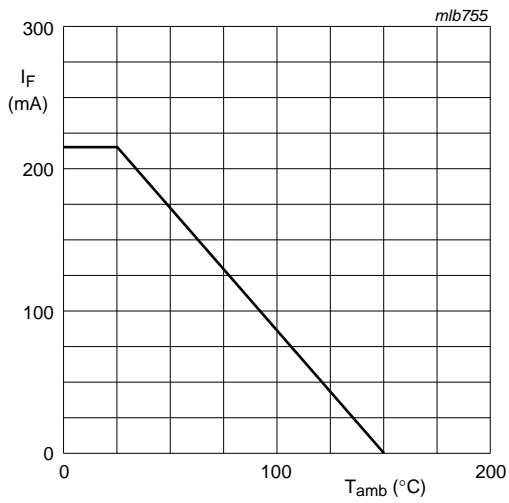
**Table 7. Characteristics**

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

| Symbol   | Parameter             | Conditions                               | Min | Typ   | Max  | Unit          |
|----------|-----------------------|--|-----|-------|------|---------------|
| $V_F$    | forward voltage       |  | [1] |       |      |               |
|          |                       | $I_F = 1\text{ mA}$                      | -   | -     | 0.9  | V             |
|          |                       | $I_F = 10\text{ mA}$                     | -   | -     | 1    | V             |
|          |                       | $I_F = 50\text{ mA}$                     | -   | -     | 1.1  | V             |
|          |                       | $I_F = 150\text{ mA}$                    | -   | -     | 1.25 | V             |
| $I_R$    | reverse current       | $V_R = 75\text{ V}$                      | -   | 0.003 | 5    | nA            |
|          |                       | $V_R = 75\text{ V}; T_j = 150\text{ °C}$ | -   | 3     | 80   | nA            |
| $t_{rr}$ | reverse recovery time |  | [2] | 0.8   | 3    | $\mu\text{s}$ |
| $C_d$    | diode capacitance     | $V_R = 0\text{ V}; f = 1\text{ MHz}$     | -   | 2     | -    | pF            |

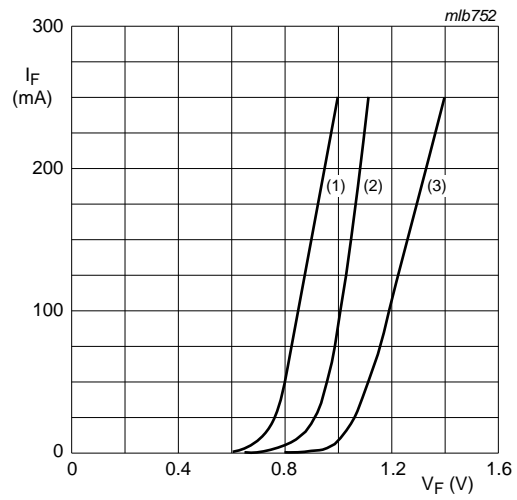
[1] Pulse test:  $t_p \leq 300\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$ .

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



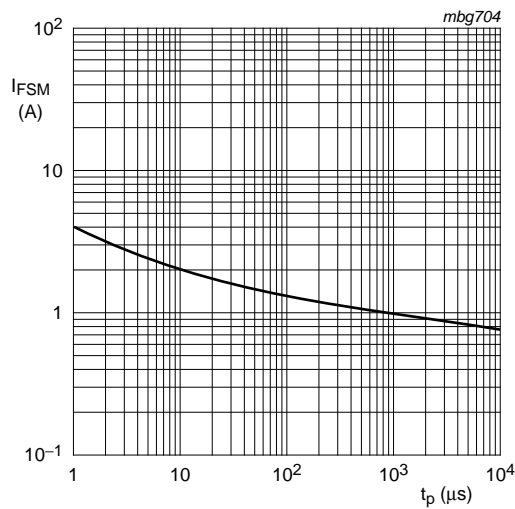
FR4 PCB, standard footprint

**Fig 1. Forward current as a function of ambient temperature; derating curve**



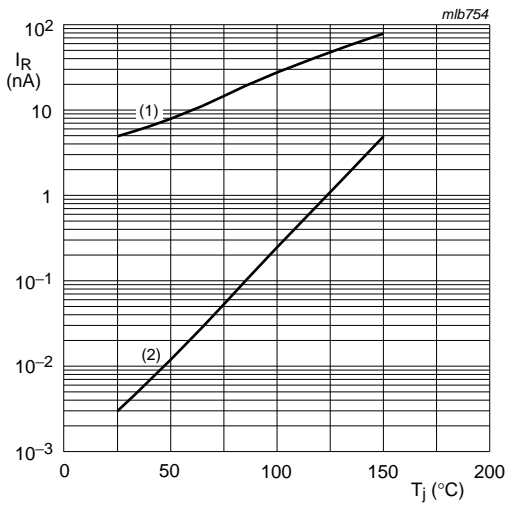
- (1)  $T_{amb} = 150\text{ }^{\circ}\text{C}$ ; typical values
- (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$ ; typical values
- (3)  $T_{amb} = 25\text{ }^{\circ}\text{C}$ ; maximum values

**Fig 2. Forward current as a function of forward voltage**



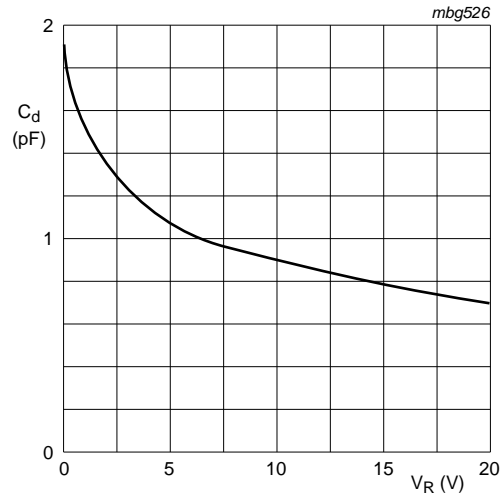
Based on square wave currents.  
 $T_j = 25\text{ }^{\circ}\text{C}$  before surge

**Fig 3. Non-repetitive peak forward current as a function of pulse duration; maximum values**



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

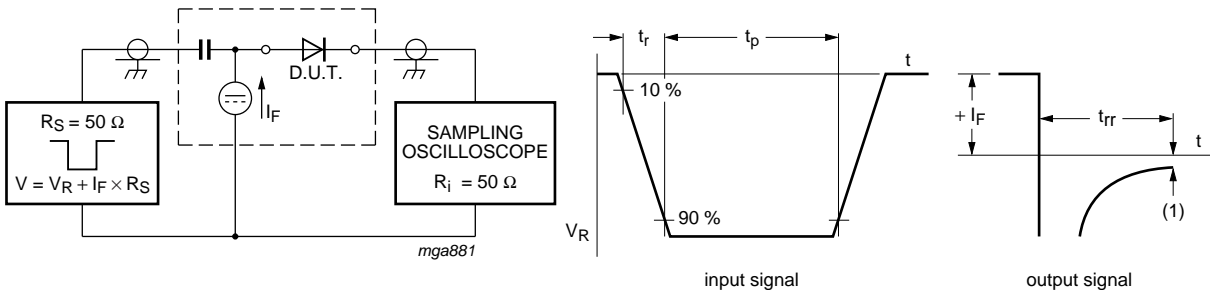
**Fig 4. Reverse current as a function of junction temperature**



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

**Fig 5. Diode capacitance as a function of reverse voltage; typical values**

## 8. Test information



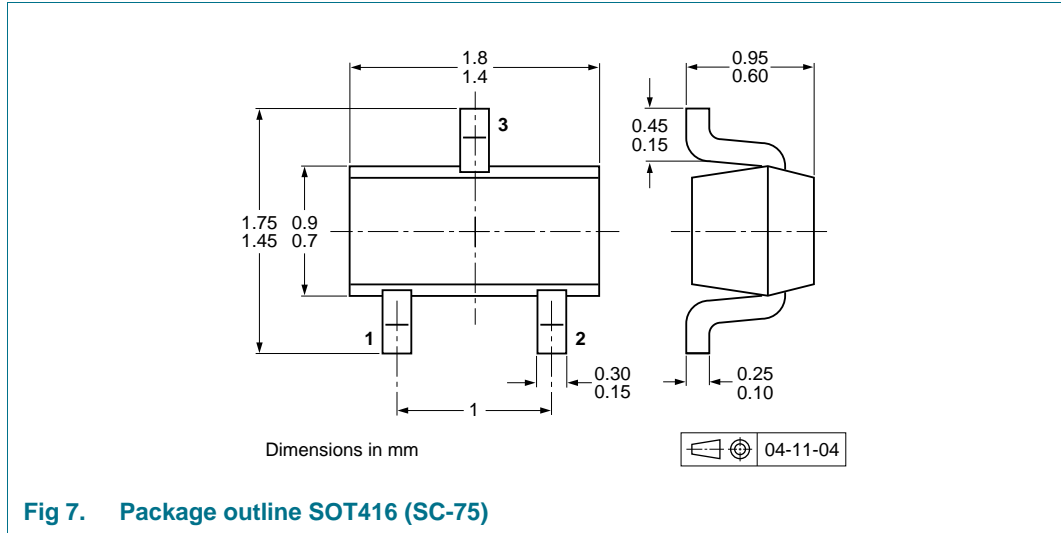
(1)  $I_R = 1\text{ mA}$

**Fig 6. Reverse recovery time test circuit and waveforms**

### 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**

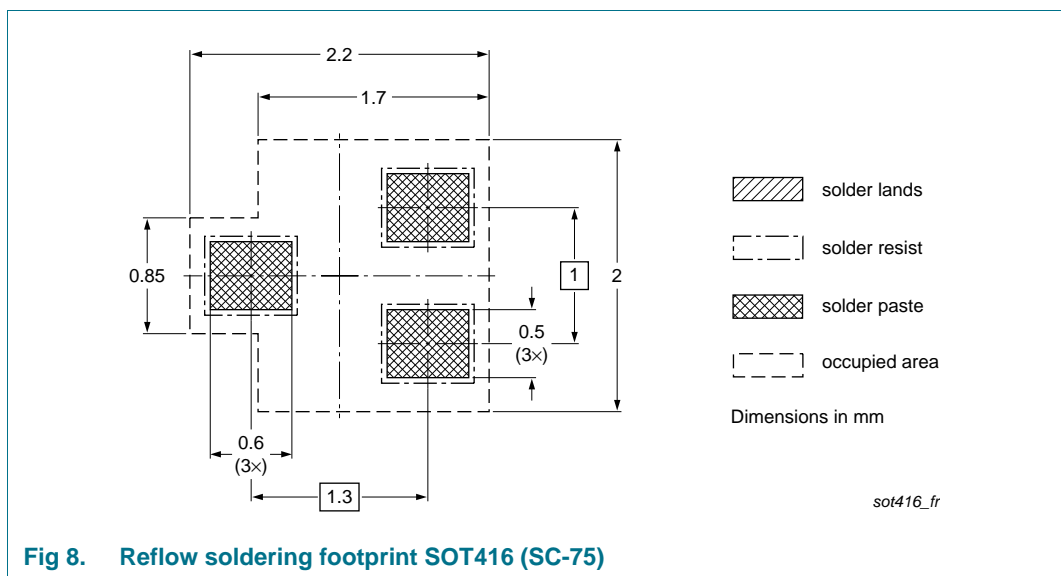
**Table 8. Packing methods**

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

| Type number | Package | Description                    | Packing quantity |       |
|-------------|---------|--------------------------------|------------------|-------|
|             |         |                                | 3000             | 10000 |
| BAS116T     | SOT416  | 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  |
|----------------|--------------|--|---------------|-------------|
| BAS116T v.2    | 20120709     | Product data sheet   | -             | BAS116T v.1 |
| Modifications: |              | <ul style="list-style-type: none"><li>• <a href="#">Section 2 "Pinning information"</a>: corrected graphic symbol</li><li>• <a href="#">Section 8.1 "Quality information"</a>: added</li><li>• <a href="#">Section 13 "Legal information"</a>: updated</li></ul> |               |             |
| BAS116T v.1    | 20091214     | 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".

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