

# BAS45AL

Low-leakage diode

Rev. 5 — 6 August 2010

Product data sheet

## 1. Product profile

### 1.1 General description

Epitaxial medium-speed switching diode with a low leakage current, encapsulated in a small hermetically sealed glass SOD80C Surface-Mounted Device (SMD) package.

### 1.2 Features and benefits

- Continuous reverse voltage: max. 125 V
- Repetitive peak forward current: max. 625 mA
- Low reverse current: max. 1 nA
- Switching time: typ. 1.5  $\mu$ s

### 1.3 Applications

- Low leakage current applications

### 1.4 Quick reference data

Table 1. Quick reference data

| Symbol | Parameter       | Conditions     | Min | Typ | Max  | Unit |
|--------|-----------------|----------------|-----|-----|------|------|
| $I_F$  | forward current | [1]            | -   | -   | 250  | mA   |
| $V_R$  | reverse voltage |                | -   | -   | 125  | V    |
| $V_F$  | forward voltage | $I_F = 100$ mA | -   | -   | 1000 | mV   |

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

## 2. Pinning information

Table 2. Pinning

| Pin | Description | Simplified outline | Graphic symbol |
|-----|-------------|--------------------|----------------|
| 1   | cathode     | [1]                | <br>006aab040  |
| 2   | anode       |                    |                |

[1] The marking band indicates the cathode.

### 3. Ordering information

Table 3. Ordering information

| Type number | Package |  |         |
|-------------|---------|--|---------|
|             | Name    | Description  | Version |
| BAS45AL     | -       | hermetically sealed glass surface-mounted package;<br>2 connectors | SOD80C  |

### 4. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| BAS45AL     | marking band |

### 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     |  | -     | 125  | V                |
| $V_R$     | reverse voltage                     |  | -     | 125  | V                |
| $I_F$     | forward current                     |  | [1] - | 250  | mA               |
| $I_{FRM}$ | repetitive peak forward current     |  | -     | 625  | mA               |
| $I_{FSM}$ | non-repetitive peak forward current | square wave                              | [2]   |      |                  |
|           |                                     | $t_p = 1 \mu s$                          | -     | 4    | A                |
|           |                                     | $t_p = 1 ms$                             | -     | 1    | A                |
|           |                                     | $t_p = 1 s$                              | -     | 0.5  | A                |
| $P_{tot}$ | total power dissipation             | $T_{amb} \leq 25 \text{ }^\circ\text{C}$ | [1] - | 400  | mW               |
| $T_j$     | junction temperature                |  | -     | 175  | $^\circ\text{C}$ |
| $T_{stg}$ | storage temperature                 |  | -65   | +175 | $^\circ\text{C}$ |

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

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

## 6. Thermal characteristics

**Table 6. Thermal characteristics**

| Symbol        | Parameter                                     | Conditions  | Min | Typ | Max | Unit |
|---------------|---|-------------|-----|-----|-----|------|
| $R_{th(j-t)}$ | thermal resistance from junction to tie-point |             | -   | -   | 300 | K/W  |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient   | in free air | [1] | -   | 375 | K/W  |

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

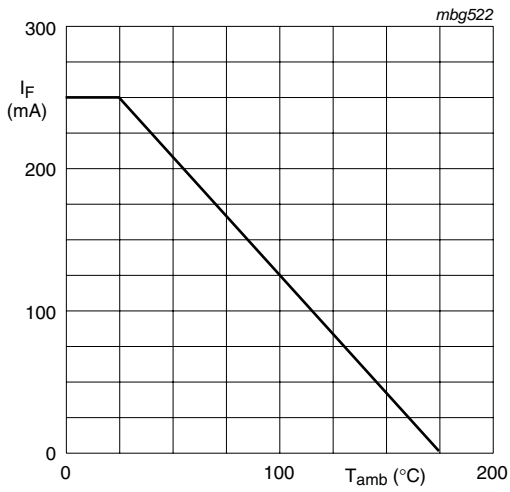
## 7. Characteristics

**Table 7. Characteristics**

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

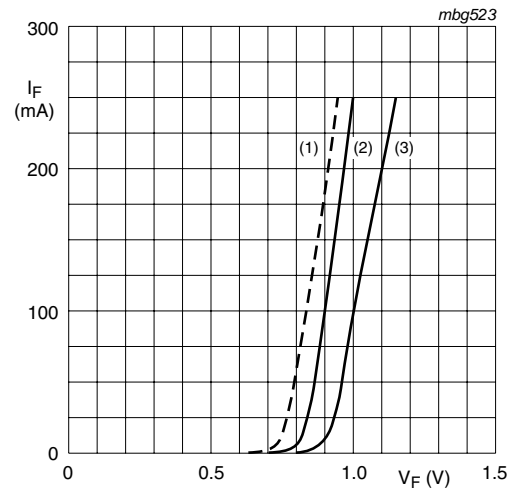
| Symbol   | Parameter             | Conditions                                | Min | Typ | Max  | Unit          |
|----------|-----------------------|---|-----|-----|------|---------------|
| $V_F$    | forward voltage       | $I_F = 1\text{ mA}$                       | -   | -   | 780  | mV            |
|          |                       | $I_F = 10\text{ mA}$                      | -   | -   | 860  | mV            |
|          |                       | $I_F = 100\text{ mA}$                     | -   | -   | 1000 | mV            |
| $I_R$    | reverse current       | $E_{max} = 100\text{ lx}$                 |     |     |      |               |
|          |                       | $V_R = 125\text{ V}$                      | -   | -   | 1    | nA            |
|          |                       | $V_R = 30\text{ V}; T_j = 125\text{ °C}$  | -   | -   | 300  | nA            |
|          |                       | $V_R = 125\text{ V}; T_j = 125\text{ °C}$ | -   | -   | 500  | nA            |
|          |                       | $V_R = 125\text{ V}; T_j = 150\text{ °C}$ | -   | -   | 2    | $\mu\text{A}$ |
| $C_d$    | diode capacitance     | $V_R = 0\text{ V}; f = 1\text{ MHz}$      | -   | -   | 4    | pF            |
| $t_{rr}$ | reverse recovery time |   | [1] | 1.5 | -    | $\mu\text{s}$ |

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



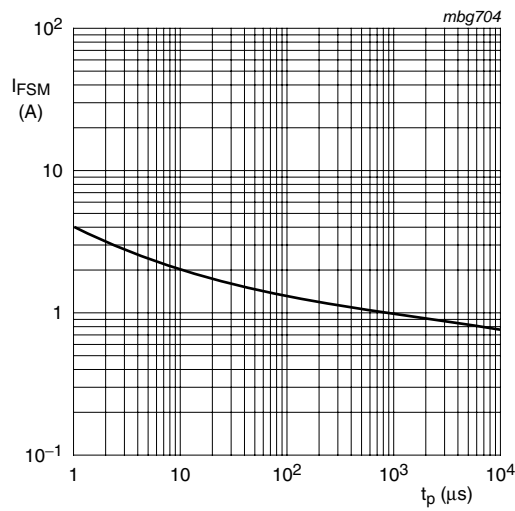
FR4 PCB, standard footprint

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



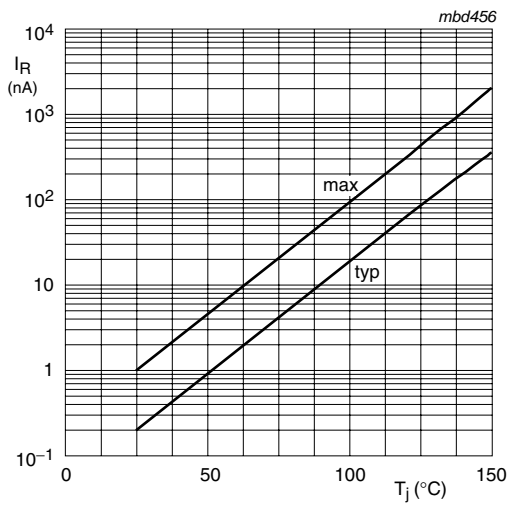
- (1)  $T_j = 150\text{ }^\circ\text{C}$ ; typical values
- (2)  $T_j = 25\text{ }^\circ\text{C}$ ; typical values
- (3)  $T_j = 25\text{ }^\circ\text{C}$ ; maximum values

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



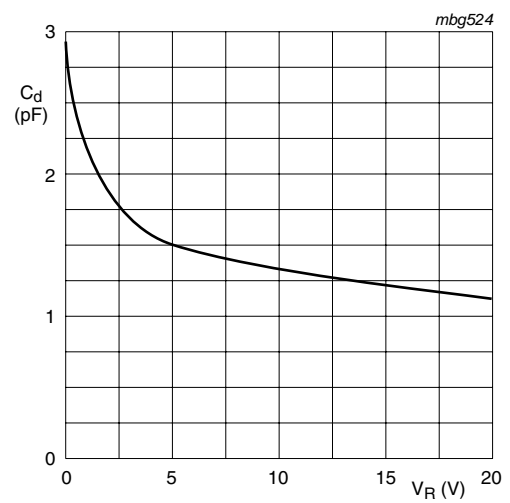
Based on square wave currents.  
 $T_j = 25\text{ }^\circ\text{C}$  prior to surge

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



$V_R = 125\text{ V}$

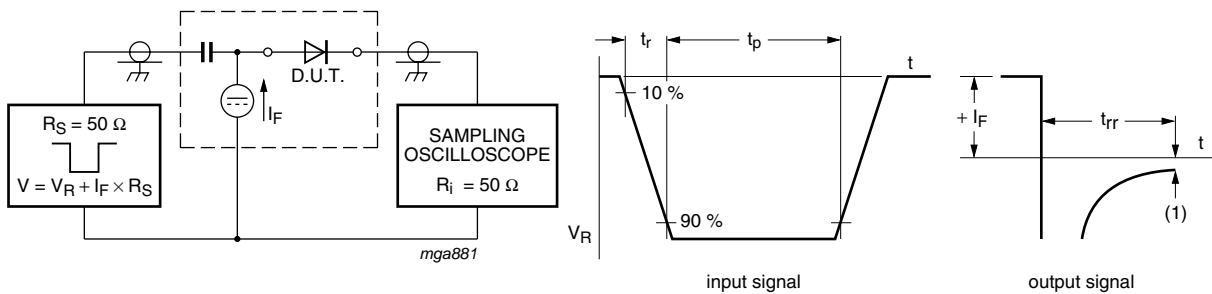
**Fig 4. Reverse current as a function of junction temperature**



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

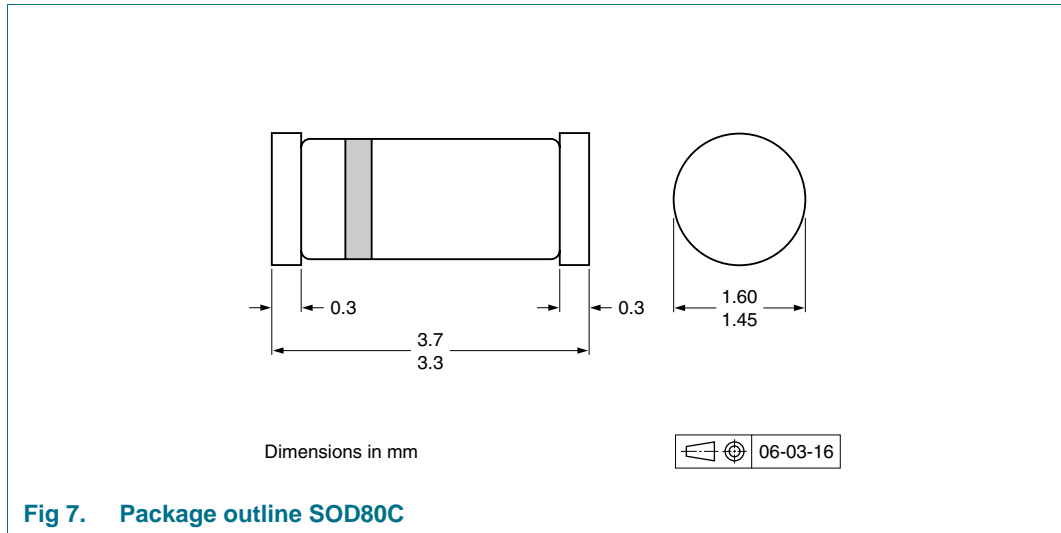
**Fig 5. Diode capacitance as a function of reverse voltage; typical values**

## 8. Test information



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

## 9. Package outline



## 10. Packing information

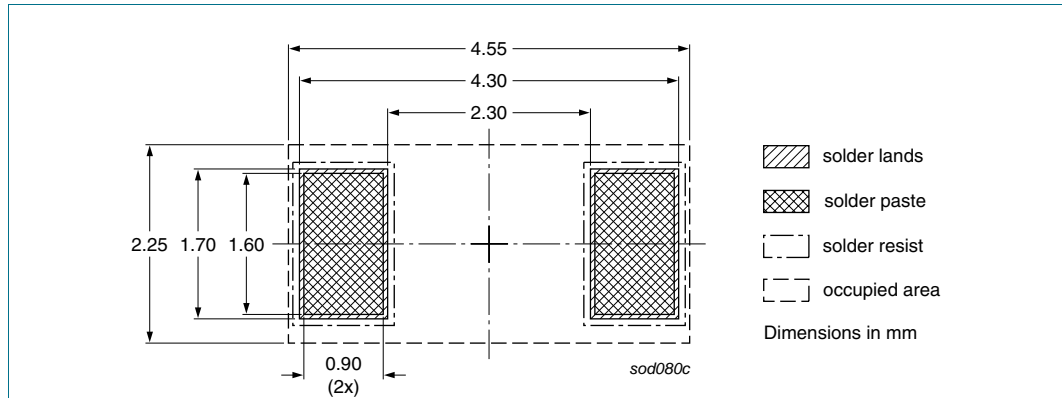
**Table 8. Packing methods**

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

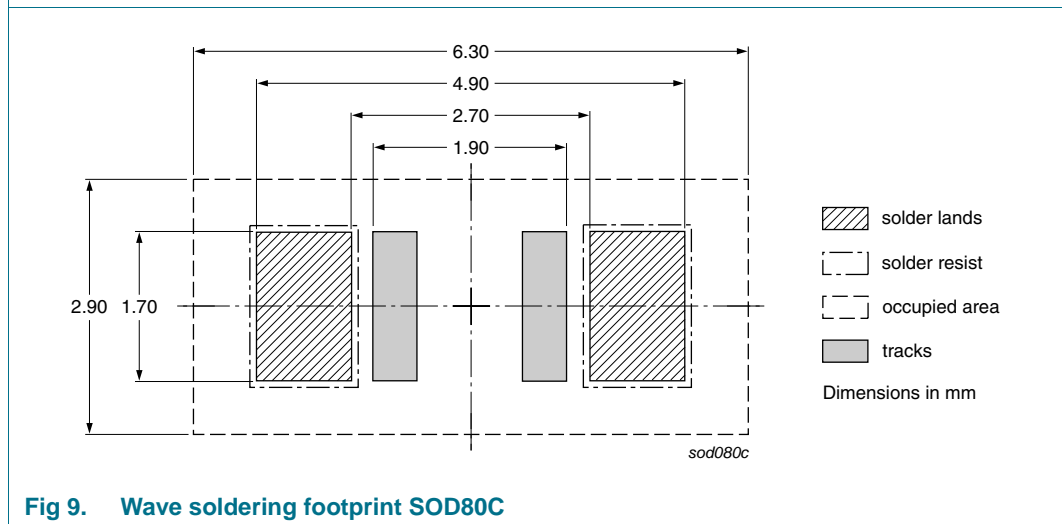
| Type number | Package | Description                    | Packing quantity |       |
|-------------|---------|--------------------------------|------------------|-------|
|             |         |                                | 2500             | 10000 |
| BAS45AL     | SOD80C  | 4 mm pitch, 8 mm tape and reel | -115             | -135  |

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

## 11. Soldering



**Fig 8. Reflow soldering footprint SOD80C**



**Fig 9. Wave soldering footprint SOD80C**

## 12. Revision history

**Table 9. Revision history**

| Document ID    | Release date   | Data sheet status     | Change notice | Supersedes |
|----------------|--|-----------------------|---------------|------------|
| BAS45AL v.5    | 20100806   | Product data sheet    | -             | BAS45AL_4  |
| Modifications: | <ul style="list-style-type: none"> <li>• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li> <li>• Legal texts have been adapted to the new company name where appropriate.</li> <li>• <a href="#">Table 1 “Quick reference data”</a>: added</li> <li>• <a href="#">Section 4 “Marking”</a>: added</li> <li>• <a href="#">Figure 7</a>: superseded by minimized package outline drawing</li> <li>• <a href="#">Section 10 “Packing information”</a>: added</li> <li>• <a href="#">Section 11 “Soldering”</a>: added</li> <li>• <a href="#">Section 13 “Legal information”</a>: updated</li> </ul> |                       |               |            |
| BAS45AL_4      | 19990528   | Product specification | -             | BAS45AL_3  |
| BAS45AL_3      | 19990504   | Product specification | -             | BAS45AL_2  |
| BAS45AL_2      | 19960313   | Product specification | -             | BAS45AL_1  |



## 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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