

# BAT74

## Schottky barrier double diode

Rev. 03 — 19 April 2010

Product data sheet

## 1. Product profile

### 1.1 General description

Planar Schottky barrier double diode with an integrated guard ring for stress protection. Two electrically isolated Schottky barrier diodes, encapsulated in a small SOT143B Surface-Mounted Device (SMD) plastic package.

### 1.2 Features and benefits

- Low forward voltage
- Guard-ring protected
- Small SMD plastic package

### 1.3 Applications

- Ultra high-speed switching
- Voltage clamping
- Protection circuits
- Blocking diodes

### 1.4 Quick reference data

Table 1. Quick reference data

| Symbol           | Parameter       | Conditions             | Min | Typ | Max | Unit |
|------------------|-----------------|------------------------|-----|-----|-----|------|
| <b>Per diode</b> |                 |                        |     |     |     |      |
| $I_F$            | forward current |                        | -   | -   | 200 | mA   |
| $V_R$            | reverse voltage |                        | -   | -   | 30  | V    |
| $V_F$            | forward voltage | $I_F = 100 \text{ mA}$ | -   | -   | 800 | mV   |

## 2. Pinning information

Table 2. Pinning

| Pin | Description       | Simplified outline | Graphic symbol |
|-----|-------------------|--------------------|----------------|
| 1   | cathode (diode 1) |                    |                |
| 2   | cathode (diode 2) |                    |                |
| 3   | anode (diode 2)   |                    |                |
| 4   | anode (diode 1)   |                    |                |

### 3. Ordering information

Table 3. Ordering information

| Type number | Package |  |         |
|-------------|---------|--|---------|
|             | Name    | Description                              | Version |
| BAT74       | -       | plastic surface-mounted package; 4 leads | SOT143B |

### 4. Marking

Table 4. Marking codes

| Type number | Marking code <sup>[1]</sup> |
|-------------|-----------------------------|
| BAT74       | *L4                         |

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

### 5. Limiting values

Table 5. Limiting values

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

| Symbol                        | Parameter                           | Conditions                        | Min | Max  | Unit |
|-------------------------------|-------------------------------------|-----------------------------------|-----|------|------|
| <b>Per diode</b>              |                                     |                                   |     |      |      |
| $V_R$                         | reverse voltage                     |                                   | -   | 30   | V    |
| $I_F$                         | forward current                     |                                   | -   | 200  | mA   |
| $I_{FRM}$                     | repetitive peak forward current     | $t_p \leq 1$ s; $\delta \leq 0.5$ | -   | 300  | mA   |
| $I_{FSM}$                     | non-repetitive peak forward current | $t_p < 10$ ms                     | -   | 600  | mA   |
| $P_{tot}$                     | total power dissipation             | $T_{amb} \leq 25$ °C              | -   | 230  | mW   |
| $T_j$                         | junction temperature                |                                   | -   | 125  | °C   |
| $T_{amb}$                     | ambient temperature                 |                                   | -65 | +125 | °C   |
| $T_{stg}$                     | storage temperature                 |                                   | -65 | +150 | °C   |
| <b>Double diode operation</b> |                                     |                                   |     |      |      |
| $V_R$                         | reverse voltage                     |                                   | -   | 30   | V    |
|                               |                                     |                                   | [1] | 60   | V    |
| $I_F$                         | forward current                     |                                   | [2] | 110  | mA   |
| $I_{FRM}$                     | repetitive peak forward current     | $t_p \leq 1$ s; $\delta \leq 0.5$ | -   | 200  | mA   |

[1] Series connection.

[2] If both diodes are in forward operation at the same moment, total device current is max. 110 mA. If one diode is in reverse operation and the other is in forward operation at the same moment, total device current is max. 200 mA.

## 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] | -   | 500 | K/W  |

[1] Refer to SOT143B standard mounting conditions.

## 7. Characteristics

**Table 7. Characteristics**

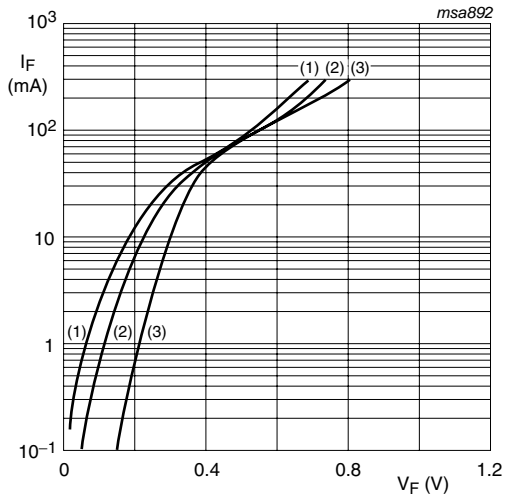
$T_{amb} = 25\text{ °C}$  unless otherwise specified.

| Symbol           | Parameter             | Conditions                           | Min | Typ | Max | Unit          |
|------------------|-----------------------|--------------------------------------|-----|-----|-----|---------------|
| <b>Per diode</b> |                       |                                      |     |     |     |               |
| $V_F$            | forward voltage       | $I_F = 0.1\text{ mA}$                | -   | -   | 240 | mV            |
|                  |                       | $I_F = 1\text{ mA}$                  | [1] | -   | 320 | mV            |
|                  |                       | $I_F = 10\text{ mA}$                 | -   | -   | 400 | mV            |
|                  |                       | $I_F = 30\text{ mA}$                 | -   | -   | 500 | mV            |
|                  |                       | $I_F = 100\text{ mA}$                | -   | -   | 800 | mV            |
| $I_R$            | reverse current       | $V_R = 25\text{ V}$                  | [2] | -   | 2   | $\mu\text{A}$ |
| $C_d$            | diode capacitance     | $V_R = 1\text{ V}; f = 1\text{ MHz}$ | -   | -   | 10  | pF            |
| $t_{rr}$         | reverse recovery time |                                      | [3] | -   | 5   | ns            |

[1] Temperature coefficient of forward voltage  $-0.6\text{ %/K}$ .

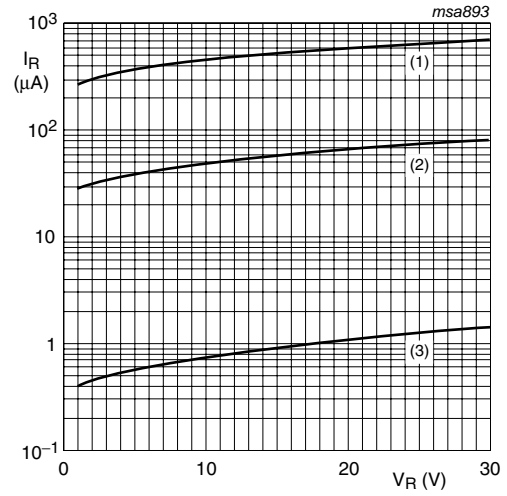
[2] Pulse test:  $t_p = 300\text{ }\mu\text{s}$ ;  $\delta = 0.02$ .

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



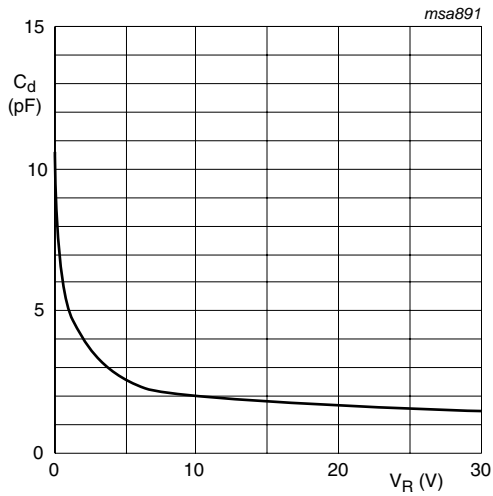
- (1)  $T_{amb} = 125\text{ °C}$
- (2)  $T_{amb} = 85\text{ °C}$
- (3)  $T_{amb} = 25\text{ °C}$

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



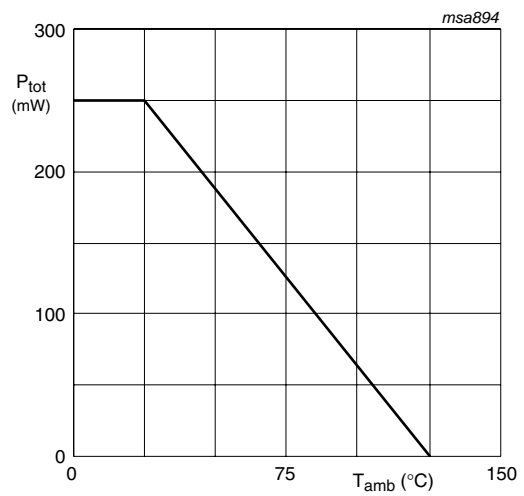
- (1)  $T_{amb} = 125\text{ °C}$
- (2)  $T_{amb} = 85\text{ °C}$
- (3)  $T_{amb} = 25\text{ °C}$

**Fig 2. Reverse current as a function of reverse voltage; typical values**



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

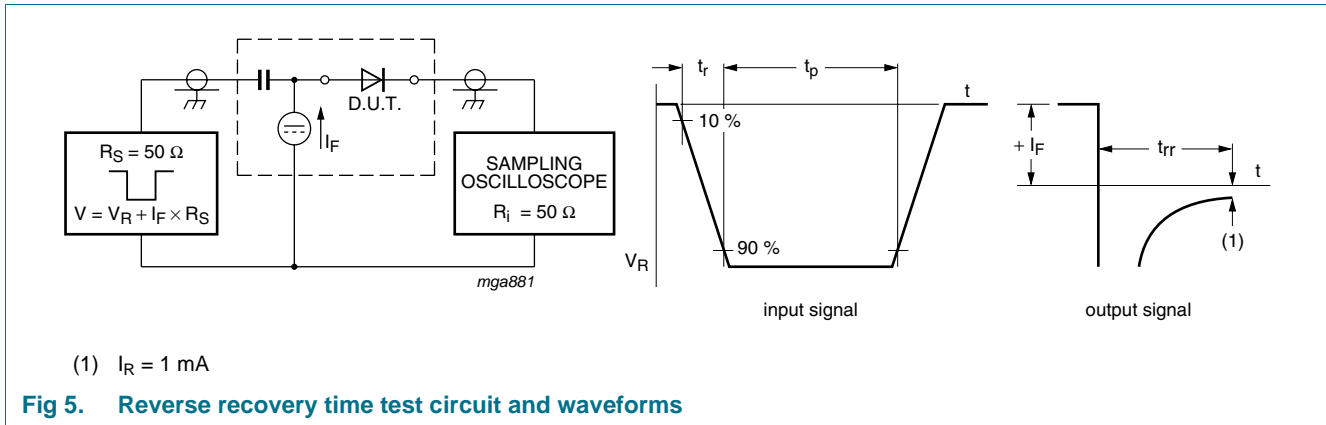
**Fig 3. Diode capacitance as a function of reverse voltage; typical values**



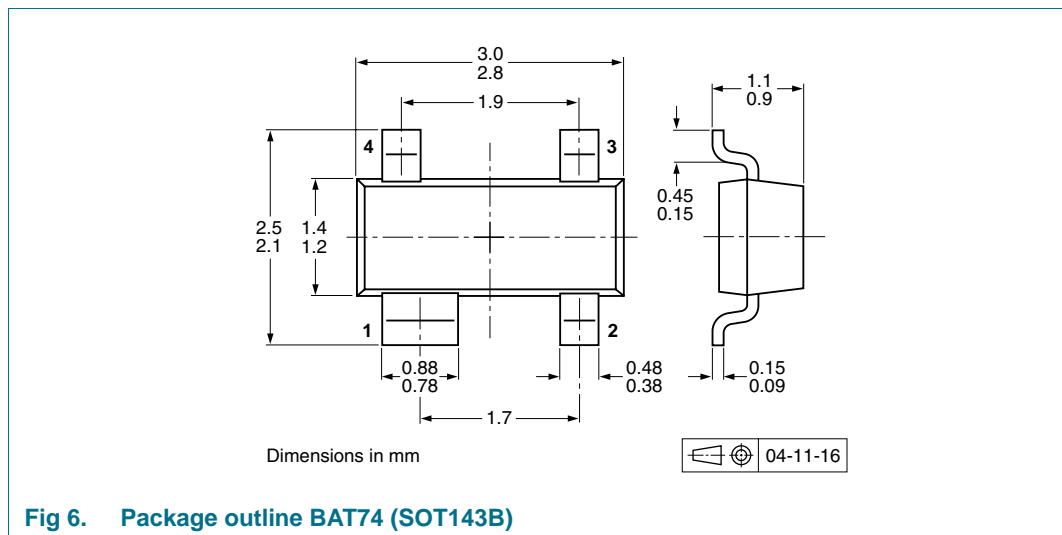
Standard footprint

**Fig 4. Power derating curve**

## 8. Test information



## 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 |
| BAT74       | SOT143B | 4 mm pitch, 8 mm tape and reel | -215             | -235  |

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

11. Soldering

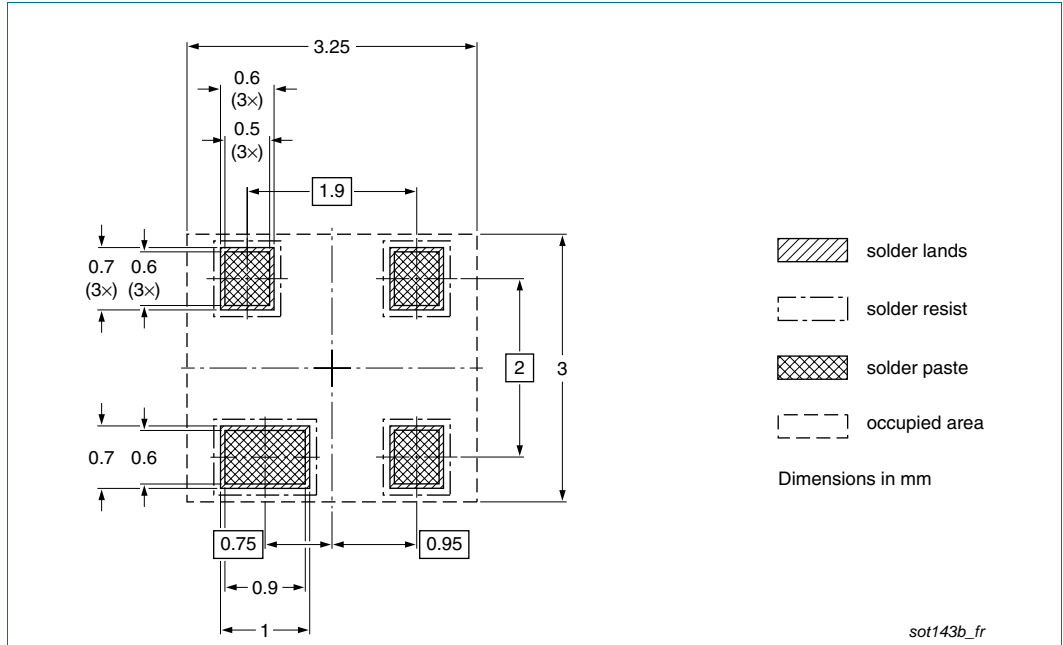


Fig 7. Reflow soldering footprint BAT74 (SOT143B)

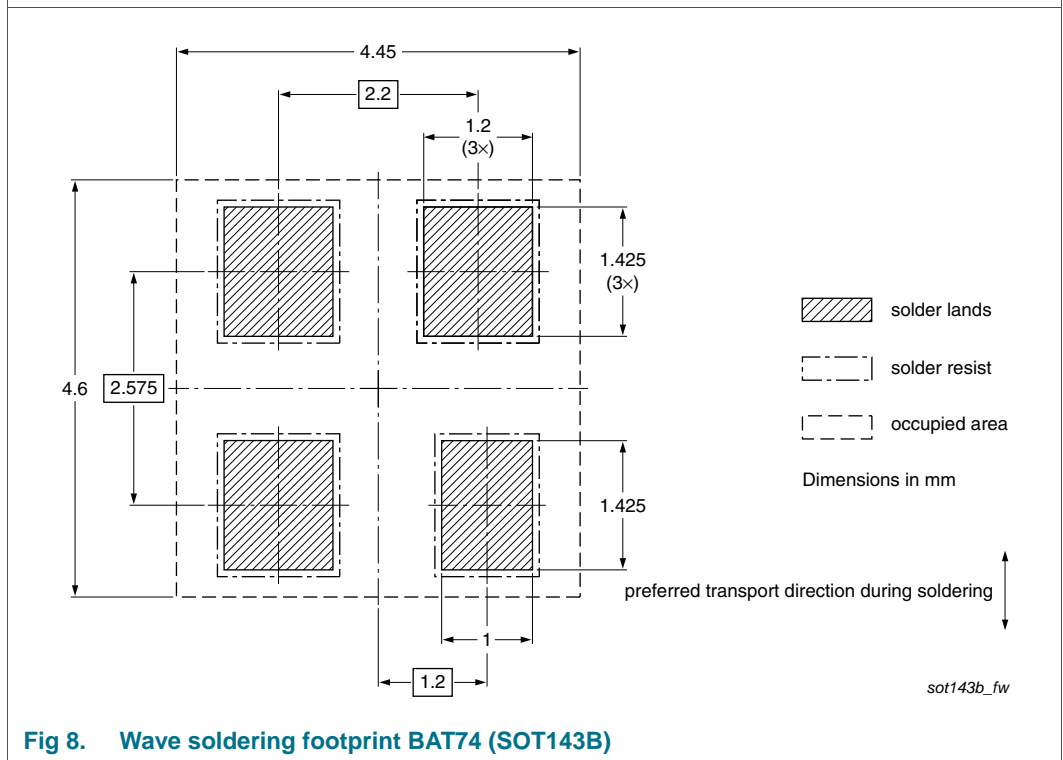


Fig 8. Wave soldering footprint BAT74 (SOT143B)

## 12. Revision history

**Table 9.** Revision history

| Document ID    | Release date  | Data sheet status     | Change notice | Supersedes |
|----------------|---|-----------------------|---------------|------------|
| BAT74_3        | 20100419  | Product data sheet    | -             | BAT74_2    |
| 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="#">Section 1.1 “General description”</a>: amended</li> <li>• <a href="#">Table 1 “Quick reference data”</a>: added</li> <li>• <a href="#">Section 4 “Marking”</a>: updated</li> <li>• <a href="#">Section 8 “Test information”</a>: added</li> <li>• <a href="#">Figure 5</a>: enhanced</li> <li>• <a href="#">Figure 6</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> |                       |               |            |
| BAT74_2        | 20010905  | Product specification | -             | BAT74_1    |
| BAT74_1        | 19960319  | Product specification | -             | -          |

## 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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