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Kind regards,

Team Nexperia



# BAT54XY

Schottky barrier quadruple diode

Rev. 3 — 8 October 2012

Product data sheet

## 1. Product profile

### 1.1 General description

Schottky barrier quadruple diode with an integrated guard ring for stress protection. Two electrically isolated dual Schottky barrier diodes series, encapsulated in a very small SOT363 (SC-88) Surface-Mounted Device (SMD) plastic package.

### 1.2 Features and benefits

- Low forward voltage
- Low capacitance
- AEC-Q101 qualified

### 1.3 Applications

- Ultra high-speed switching
- Line termination
- Voltage clamping
- Reverse polarity protection

### 1.4 Quick reference data

Table 1. Quick reference data

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

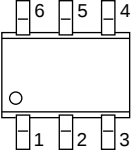
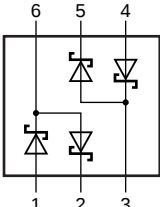
| Symbol    | Parameter       | Conditions           | Min              | Typ | Max | Unit |
|-----------|-----------------|----------------------|------------------|-----|-----|------|
| Per diode |                 |                      |                  |     |     |      |
| $V_R$     | reverse voltage |                      | -                | -   | 30  | V    |
| $I_F$     | forward current |                      | -                | -   | 200 | mA   |
| $V_F$     | forward voltage | $I_F = 10\text{ mA}$ | <sup>[1]</sup> - | -   | 400 | mV   |

[1] Pulse test:  $t_p \leq 30\text{ ms}$ ;  $\delta \leq 0.02$ .



## 2. Pinning information

Table 2. Pinning

| Pin | Description       | Simplified outline                                                                  | Graphic symbol                                                                      |
|-----|-------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1   | anode 1           |  |  |
| 2   | cathode 2         |                                                                                     |                                                                                     |
| 3   | anode 3/cathode 4 |                                                                                     |                                                                                     |
| 4   | anode 4           |                                                                                     |                                                                                     |
| 5   | cathode 3         |                                                                                     |                                                                                     |
| 6   | cathode 1/anode 2 |                                                                                     |                                                                                     |

## 3. Ordering information

Table 3. Ordering information

| Type number | Package |                                          |         |
|-------------|---------|------------------------------------------|---------|
|             | Name    | Description                              | Version |
| BAT54XY     | SC-88   | plastic surface-mounted package; 6 leads | SOT363  |

## 4. Marking

Table 4. Marking codes

| Type number | Marking code <sup>[1]</sup> |
|-------------|-----------------------------|
| BAT54XY     | *C5                         |

[1] \* = placeholder for manufacturing site code.

## 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   |
| $T_j$            | junction temperature                |                                   | -   | 125  | °C   |
| $T_{amb}$        | ambient temperature                 |                                   | -55 | +125 | °C   |
| $T_{stg}$        | storage temperature                 |                                   | -65 | +150 | °C   |

6. Thermal characteristics

Table 6. Thermal characteristics

| Symbol         | Parameter                                        | Conditions  | Min | Typ | Max | Unit |
|----------------|--------------------------------------------------|-------------|-----|-----|-----|------|
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | in free air | [1] | -   | 260 | K/W  |

[1] Soldering point at pins 2, 3, 5 and 6.

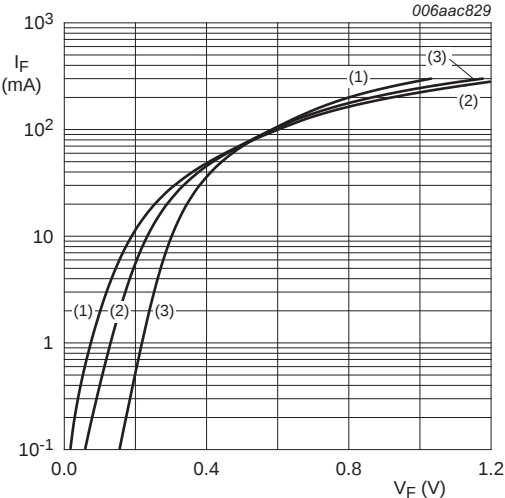
7. Characteristics

Table 7. Characteristics

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

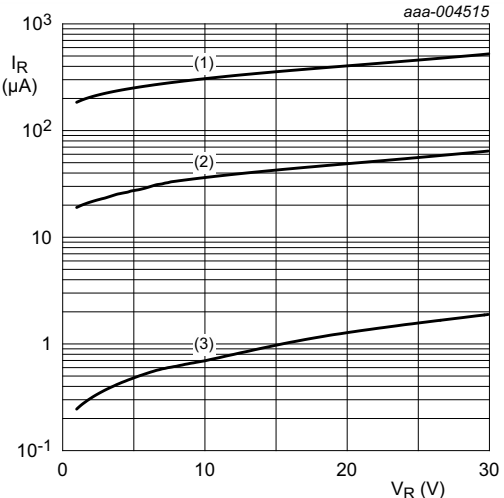
| Symbol    | Parameter         | Conditions                           | Min | Typ | Max | Unit          |
|-----------|-------------------|--------------------------------------|-----|-----|-----|---------------|
| Per diode |                   |                                      |     |     |     |               |
| $V_F$     | forward voltage   |                                      | [1] |     |     |               |
|           |                   | $I_F = 0.1\text{ mA}$                | -   | -   | 240 | mV            |
|           |                   | $I_F = 1\text{ mA}$                  | -   | -   | 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   | $\mu\text{A}$ |
| $C_d$     | diode capacitance | $V_R = 1\text{ V}; f = 1\text{ MHz}$ | -   | -   | 10  | pF            |

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



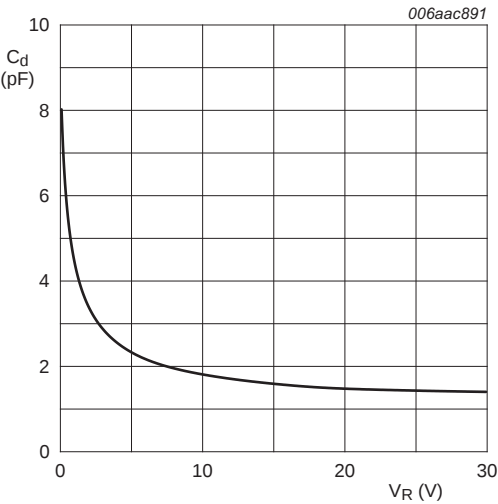
- (1)  $T_{amb} = 125\text{ }^{\circ}\text{C}$
- (2)  $T_{amb} = 85\text{ }^{\circ}\text{C}$
- (3)  $T_{amb} = 25\text{ }^{\circ}\text{C}$

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



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

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



T<sub>amb</sub> = 25 °C; f = 1 MHz

Fig 3. 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

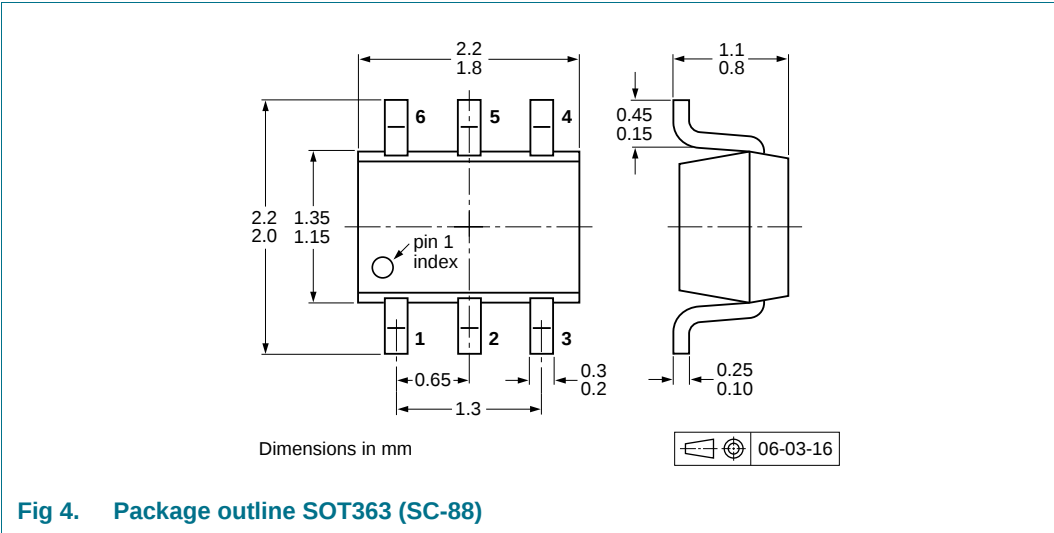


Fig 4. Package outline SOT363 (SC-88)

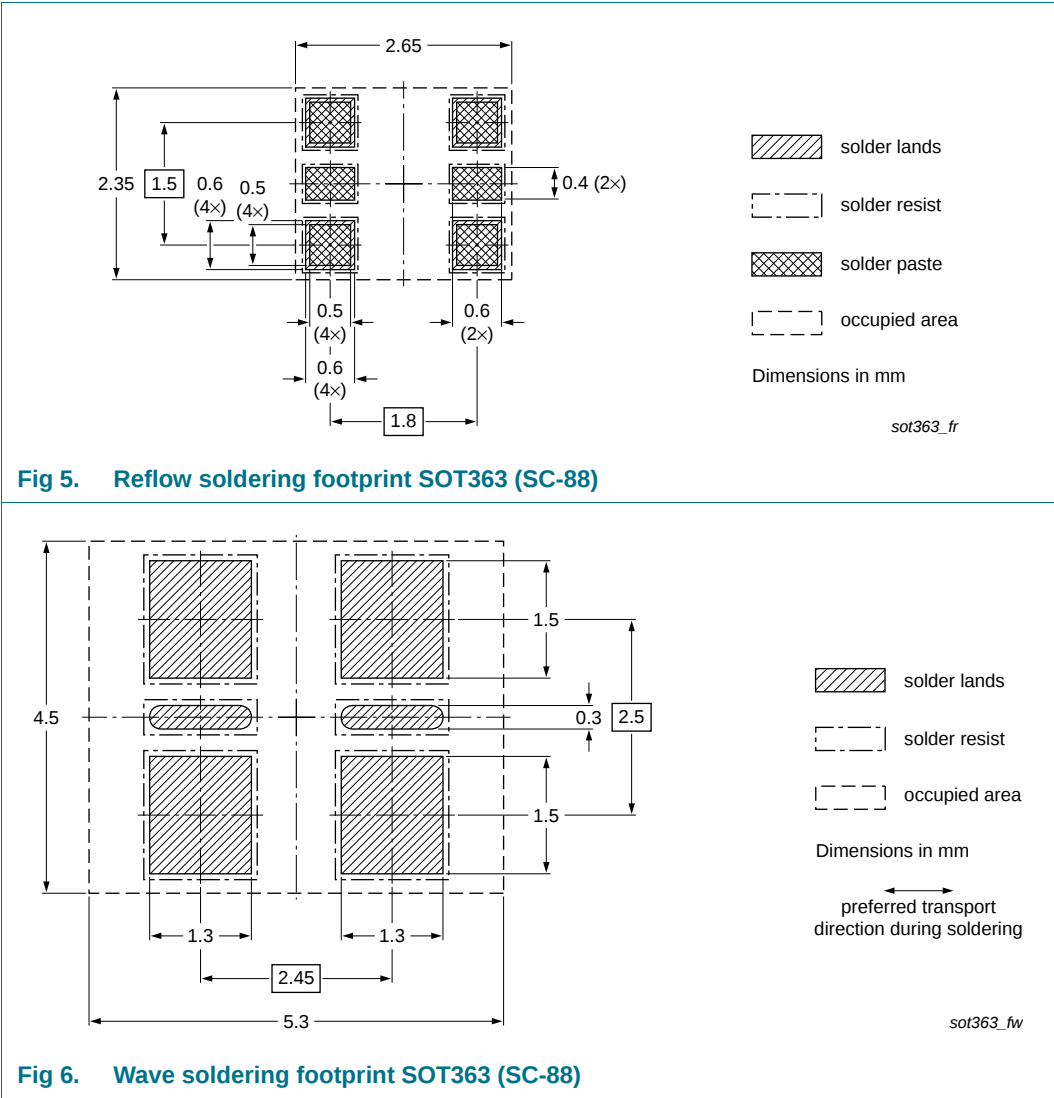
10. Packing information

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 |
| BAT54XY     | SOT363  | 4 mm pitch, 8 mm tape and reel; T1 | <sup>[2]</sup> -115 | -135  |
|             |         | 4 mm pitch, 8 mm tape and reel; T2 | <sup>[3]</sup> -125 | -165  |

- [1] For further information and the availability of packing methods, see [Section 14](#).  
[2] T1: normal taping  
[3] T2: reverse taping

11. Soldering



## 12. Revision history

Table 9. Revision history

| Document ID    | Release date                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Data sheet status  | Change notice | Supersedes  |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|-------------|
| BAT54XY v.3    | 20121008                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Product data sheet | -             | BAT54XY v.2 |
| Modifications: | <ul style="list-style-type: none"><li>• <a href="#">Section 1</a>: updated</li><li>• <a href="#">Section 4</a>: updated</li><li>• <a href="#">Table 7</a>: updated</li><li>• <a href="#">Figure 1</a> to <a href="#">2</a>: updated</li><li>• <a href="#">Section 8 "Test information"</a>: added</li><li>• <a href="#">Figure 4</a>: replaced by minimized package outline drawing</li><li>• <a href="#">Section 11 "Soldering"</a>: added</li><li>• <a href="#">Section 13 "Legal information"</a>: updated</li></ul> |                    |               |             |
| BAT54XY v.2    | 20100113                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Product data sheet | -             | BAT54XY v.1 |
| BAT54XY v.1    | 20050117                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 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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