



# BAT54XY

## Schottky barrier quadruple diode

12 February 2019

Product data sheet

### 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.

### 2. Features and benefits

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

### 3. Applications

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

### 4. Quick reference data

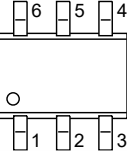
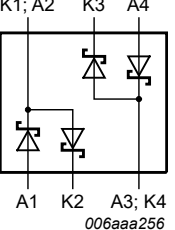
Table 1. Quick reference data

| 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 | $I_F = 10 \text{ mA}$ | [1] | -   | -   | 400 | mV   |

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

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol  | Description       | Simplified outline                                                                                   | Graphic symbol                                                                      |
|-----|---------|-------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1   | A1      | anode 1           | <br>TSSOP6 (SOT363) |  |
| 2   | K2      | cathode 2         |                                                                                                      |                                                                                     |
| 3   | A3 / K4 | anode3 / cathode4 |                                                                                                      |                                                                                     |
| 4   | A4      | anode4            |                                                                                                      |                                                                                     |
| 5   | K3      | cathode3          |                                                                                                      |                                                                                     |
| 6   | K1 / A2 | cathode1 / anode2 |                                                                                                      |                                                                                     |

## 6. Ordering information

Table 3. Ordering information

| Type number | Package |                                                                                           |         |
|-------------|---------|-------------------------------------------------------------------------------------------|---------|
|             | Name    | Description                                                                               | Version |
| BAT54XY     | TSSOP6  | plastic, surface-mounted package; 6 leads; 0.65 mm pitch; 2.1 mm x 1.25 mm x 0.95 mm body | SOT363  |

## 7. Marking

Table 4. Marking codes

| Type number | Marking code[1] |
|-------------|-----------------|
| BAT54XY     | %C5             |

[1] % = placeholder for manufacturing site code

## 8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC60134).

| 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     | $t_p \leq 1 \text{ s}$ ; $\delta \leq 0.5$                      |     | -   | 300 | mA               |
| $I_{FSM}$        | non-repetitive peak forward current | $t_p < 10 \text{ ms}$ ; $T_{j(\text{init})} = 25^\circ\text{C}$ |     | -   | 600 | mA               |
| $P_{\text{tot}}$ | total power dissipation             | $T_{\text{amb}} \leq 25^\circ\text{C}$                          | [1] | -   | 220 | mW               |
| $T_j$            | junction temperature                |                                                                 |     | -   | 125 | $^\circ\text{C}$ |
| $T_{\text{amb}}$ | ambient temperature                 |                                                                 |     | -55 | 125 | $^\circ\text{C}$ |
| $T_{\text{stg}}$ | storage temperature                 |                                                                 |     | -65 | 150 | $^\circ\text{C}$ |

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

9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol        | Parameter                                   | Conditions  |     | Min | Typ | Max | Unit |
|---------------|---------------------------------------------|-------------|-----|-----|-----|-----|------|
| Per diode     |                                             |             |     |     |     |     |      |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] | -   | -   | 460 | K/W  |

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

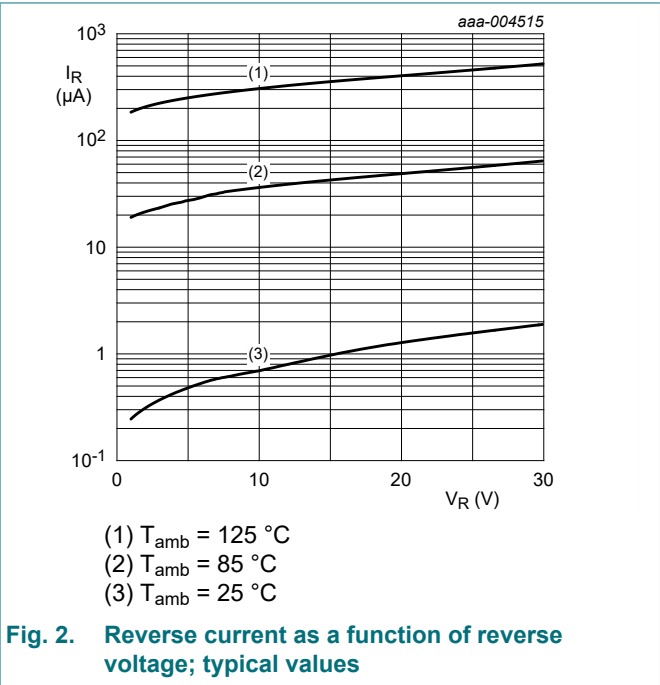
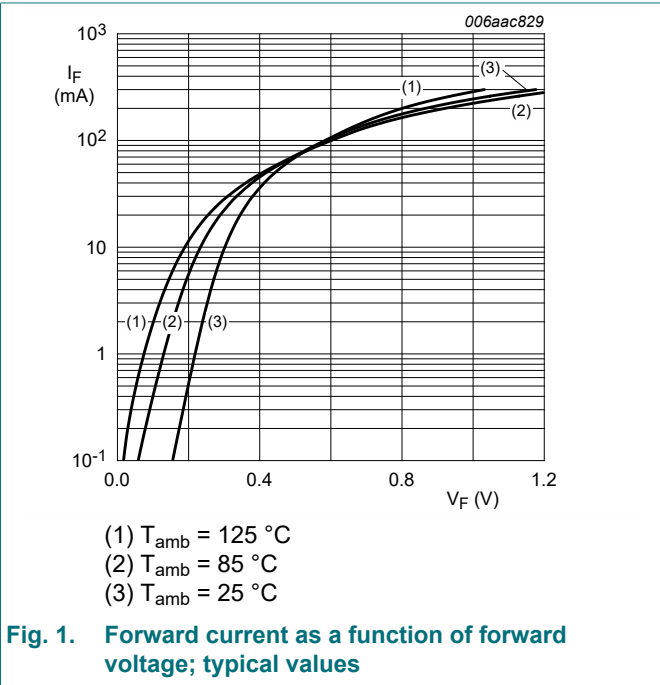
10. Characteristics

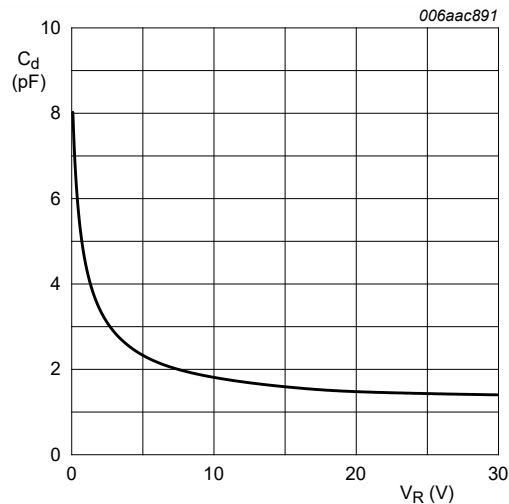
Table 7. Characteristics

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

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

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





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

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

11. Test information

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.

12. Package outline

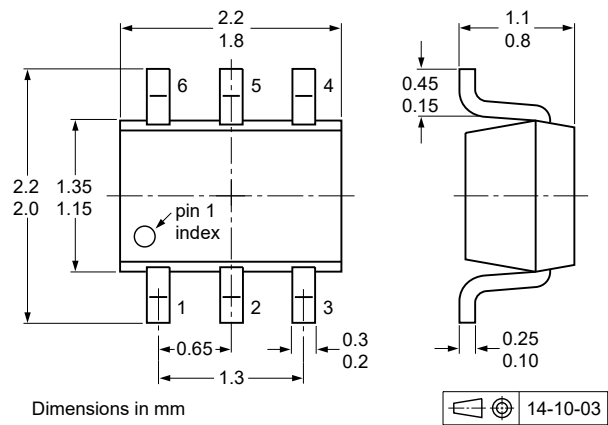


Fig. 4. Package outline TSSOP6 (SOT363)

13. Soldering

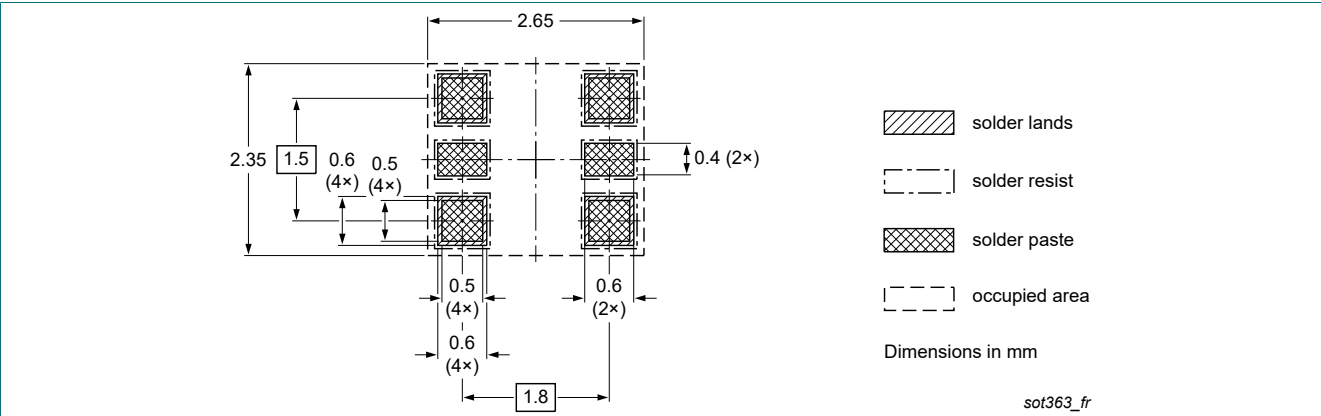


Fig. 5. Reflow soldering footprint for TSSOP6 (SOT363)

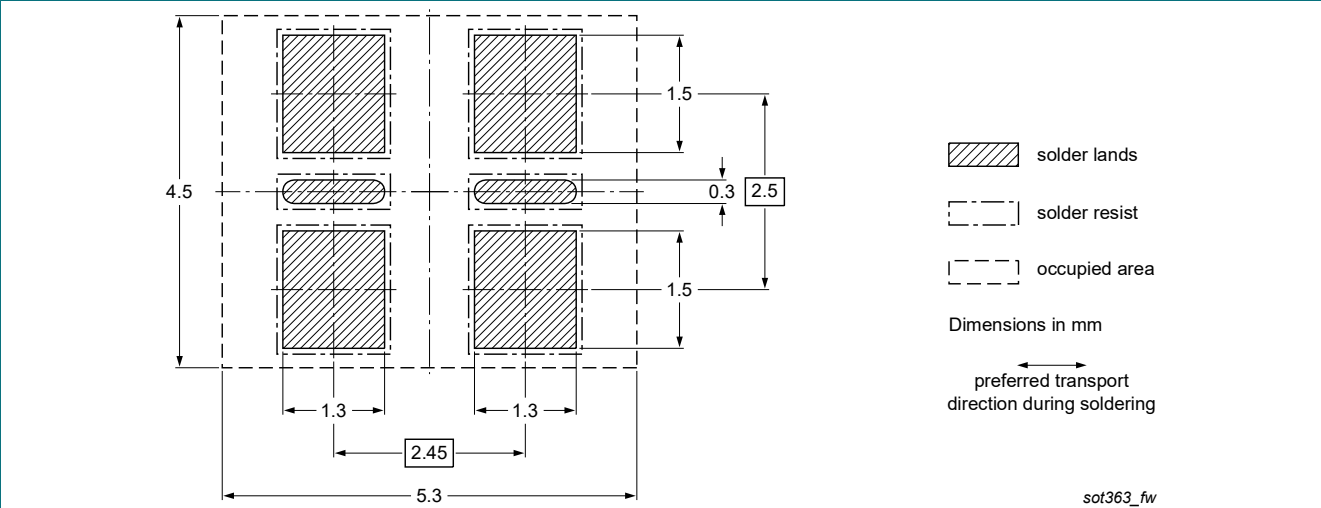


Fig. 6. Wave soldering footprint for TSSOP6 (SOT363)

## 14. Revision history

**Table 8. Revision history**

| Data sheet ID  | Release date                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Data sheet status  | Change notice | Supersedes  |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|-------------|
| BAT54XY v.4    | 20190212                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Product data sheet | -             | BAT54XY v.3 |
| Modifications: | <ul style="list-style-type: none"><li>• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li><li>• Thermal Characteristics: <math>R_{th(j-sp)}</math> removed and <math>R_{th(j-a)}</math> inserted</li><li>• Limiting values: <math>P_{tot}</math> inserted</li><li>• Packing information: section removed</li></ul> |                    |               |             |
| BAT54XY v.3    | 20121008                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Product data sheet | -             | BAT54XY v.2 |
| BAT54XY v.2    | 20100113                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Product data sheet | -             | BAT54XY v.1 |
| BAT54XY v.1    | 20050117                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Product data sheet | -             | -           |

## 15. Legal information

### Data sheet status

| Document status<br>[1][2]      | Product status [3] | 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 <https://www.nexperia.com>.

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