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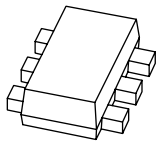
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Kind regards,

Team Nexperia



# BAT54CV

## Two Schottky barrier double diodes

Rev. 3 — 15 November 2010

Product data sheet

## 1. Product profile

### 1.1 General description

Two planar Schottky barrier double diodes with common cathodes and an integrated guard ring for stress protection encapsulated in a SOT666 ultra small and flat lead Surface-Mounted Device (SMD) plastic package.

### 1.2 Features and benefits

- Low forward voltage
- Low capacitance
- AEC-Q101 qualified
- Ultra small and flat lead SMD plastic package
- Excellent coplanarity and improved thermal behavior

### 1.3 Applications

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

### 1.4 Quick reference data

Table 1. Quick reference data

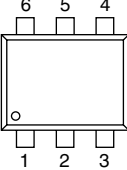
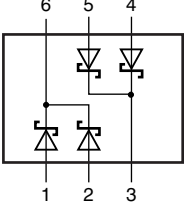
| Symbol           | Parameter       | Conditions             | Min | Typ | Max | Unit |
|------------------|-----------------|------------------------|-----|-----|-----|------|
| <b>Per diode</b> |                 |                        |     |     |     |      |
| $I_F$            | forward current |                        | -   | -   | 200 | mA   |
| $V_R$            | reverse voltage |                        | -   | -   | 30  | V    |
| $V_F$            | forward voltage |                        | [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   |

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



## 2. Pinning information

Table 2. Pinning

| Pin | Description                 | Simplified outline  | Graphic symbol  |
|-----|-----------------------------|---|---|
| 1   | anode (diode 1)             |  |  |
| 2   | anode (diode 2)             |   |   |
| 3   | common cathode (diode 3, 4) |   |   |
| 4   | anode (diode 3)             |   |   |
| 5   | anode (diode 4)             |   |   |
| 6   | common cathode (diode 1, 2) |   |   |

sym057

## 3. Ordering information

Table 3. Ordering information

| Type number | Package |  |         |
|-------------|---------|--|---------|
|             | Name    | Description                              | Version |
| BAT54CV     | -       | plastic surface-mounted package; 6 leads | SOT666  |

## 4. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| BAT54CV     | C5           |

## 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     | $t_p \leq 10$ ms; $\delta \leq 0.5$ | -     | 0.85 | A    |
| $I_{FSM}$        | non-repetitive peak forward current | square wave;<br>$t_p = 8.3$ ms      | [1] - | 2    | A    |

**Table 5. Limiting values ...continued**  
*In accordance with the Absolute Maximum Rating System (IEC 60134).*

| Symbol                              | Parameter               | Conditions                                      | Min   | Max  | Unit             |
|-------------------------------------|-------------------------|---|-------|------|------------------|
| <b>Per device, one diode loaded</b> |                         |   |       |      |                  |
| $P_{\text{tot}}$                    | total power dissipation | $T_{\text{amb}} \leq 25 \text{ }^\circ\text{C}$ | [2]   |      |                  |
|                                     |                         |   | [3] - | 350  | mW               |
|                                     |                         |   | [4] - | 420  | mW               |
| $T_j$                               | junction temperature    |   | -     | 125  | $^\circ\text{C}$ |
| $T_{\text{amb}}$                    | ambient temperature     |   | -65   | +125 | $^\circ\text{C}$ |
| $T_{\text{stg}}$                    | storage temperature     |   | -65   | +150 | $^\circ\text{C}$ |

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

[2] Reflow soldering is the only recommended soldering method.

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

[4] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode  $1 \text{ cm}^2$ .

## 6. Thermal characteristics

**Table 6. Thermal characteristics**

| Symbol                              | Parameter  | Conditions  | Min    | Typ | Max | Unit |
|-------------------------------------|--|-------------|--------|-----|-----|------|
| <b>Per device, one diode loaded</b> |  |             |        |     |     |      |
| $R_{\text{th}(j-a)}$                | thermal resistance from junction to ambient      | in free air | [1][2] |     |     |      |
|                                     |  |             | [3] -  | -   | 360 | K/W  |
|                                     |  |             | [4] -  | -   | 300 | K/W  |
| $R_{\text{th}(j-sp)}$               | thermal resistance from junction to solder point |             | [5] -  | -   | 175 | K/W  |

[1] For Schottky barrier diodes thermal runaway has to be considered, as in some applications the reverse power losses  $P_R$  are a significant part of the total power losses.

[2] Reflow soldering is the only recommended soldering method.

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

[4] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode  $1 \text{ cm}^2$ .

[5] Soldering point of cathode tab.

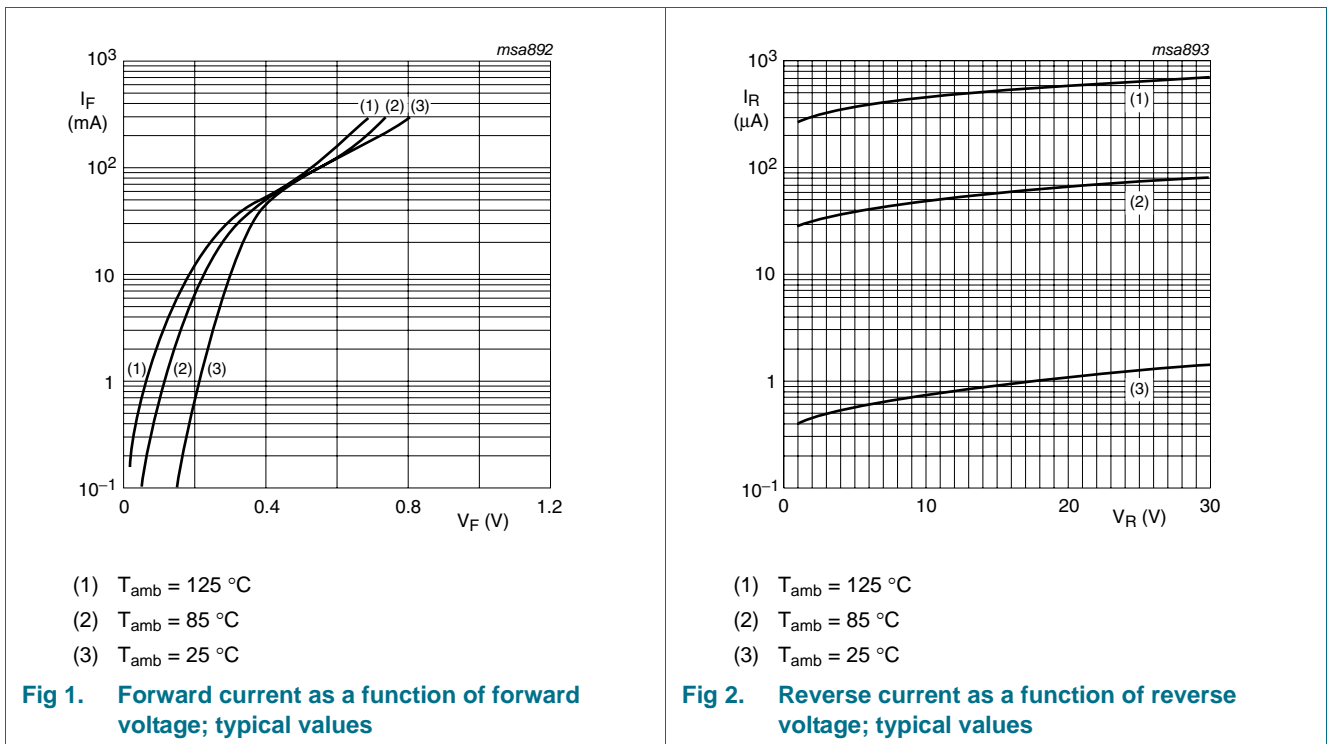
**7. Characteristics**

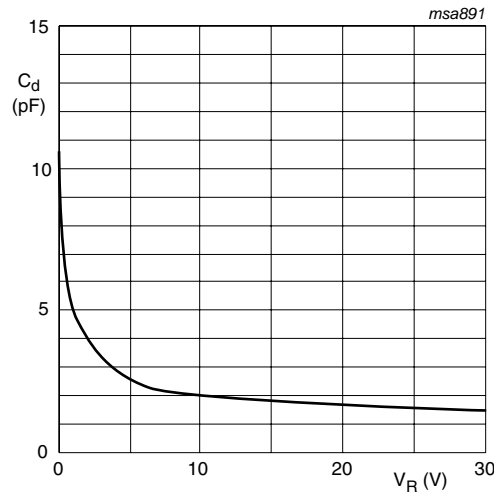
**Table 7. Characteristics**

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

| Symbol                | Parameter         | Conditions                           | Min | Typ | Max | Unit          |
|-----------------------|-------------------|--------------------------------------|-----|-----|-----|---------------|
| <b>Per diode</b>      |                   |                                      |     |     |     |               |
| $V_F$                 | 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:  $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02$ .





T<sub>amb</sub> = 25 °C; f = 1 MHz

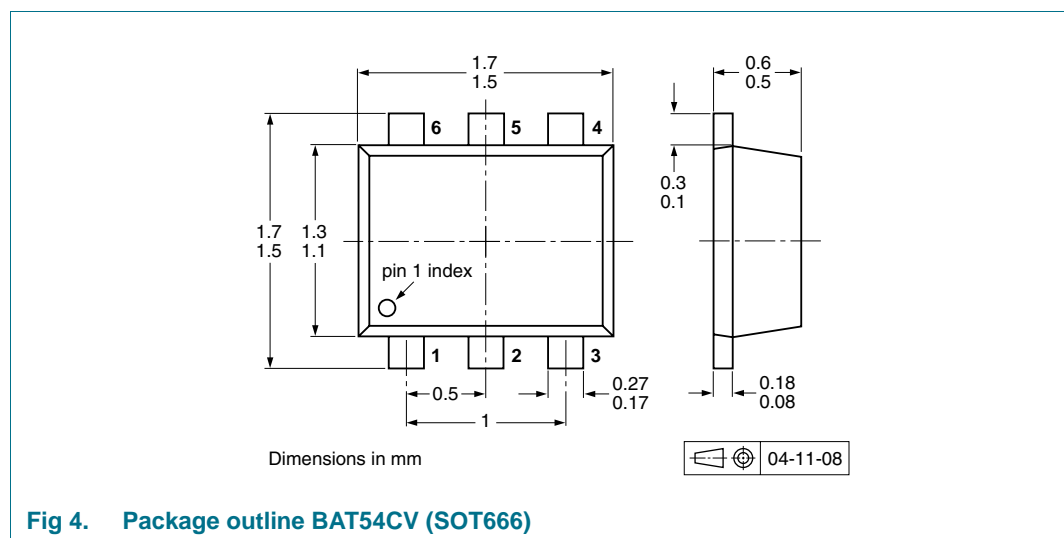
**Fig 3. Diode capacitance as a function of reverse voltage; typical values**

## 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 BAT54CV (SOT666)**

## 10. Packing information

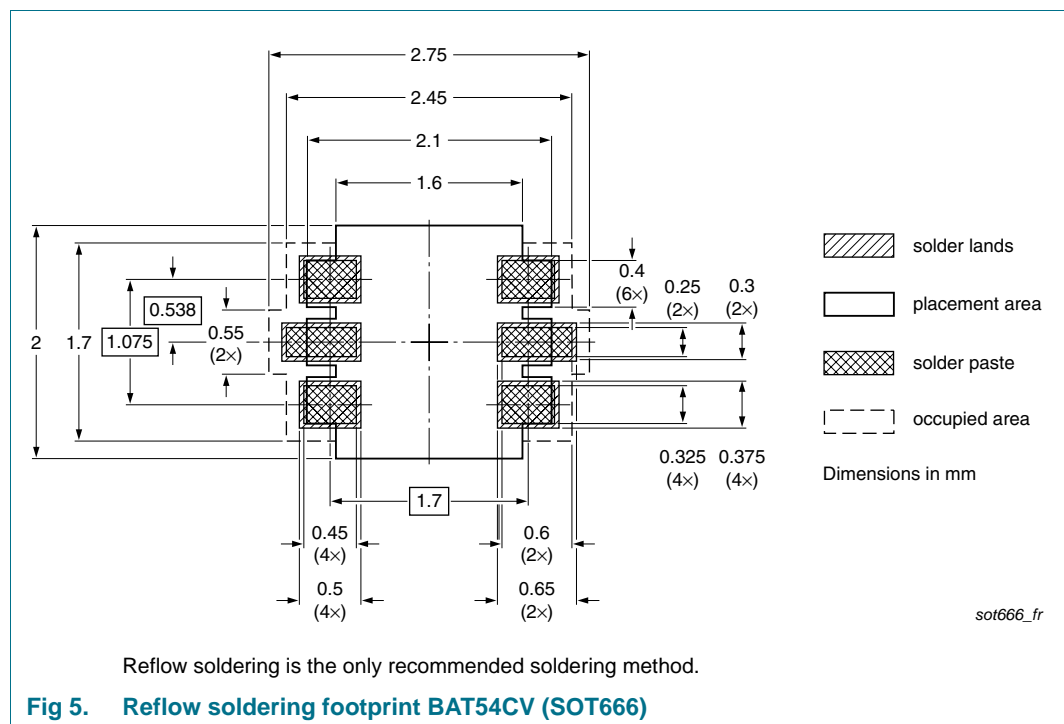
**Table 8. Packing methods**

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

| Type number | Package | Description                    | Packing quantity |
|-------------|---------|--------------------------------|------------------|
|             |         |                                | 4000             |
| BAT54CV     | SOT666  | 4 mm pitch, 8 mm tape and reel | -115             |

[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 |
|----------------|--------------|--|---------------|------------|
| BAT54CV v.3    | 20101115     | Product data sheet   | -             | BAT54CV_2  |
| Modifications: |              | <ul style="list-style-type: none"> <li>• <a href="#">Section 1.2 “Features and benefits”</a>: amended.</li> <li>• <a href="#">Table 1 “Quick reference data”</a>: updated.</li> <li>• <a href="#">Table 5 “Limiting values”</a>: <math>P_{tot}</math> amended.</li> <li>• <a href="#">Table 6 “Thermal characteristics”</a>: <math>R_{th(j-a)}</math> amended, <math>R_{th(j-sp)}</math> added.</li> <li>• <a href="#">Figure 4</a>: superseded by minimized outline drawing.</li> <li>• <a href="#">Section 8 “Test information”</a>: added.</li> <li>• <a href="#">Section 11 “Soldering”</a>: added.</li> <li>• <a href="#">Section 13 “Legal information”</a>: updated.</li> </ul> |               |            |
| BAT54CV_2      | 20100115     | Objective data sheet   | -             | BAT54CV_1  |
| BAT54CV_1      | 20040922     | Objective 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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Date of release: 15 November 2010

Document identifier: BAT54CV