

# 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

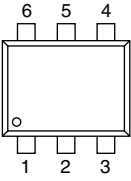
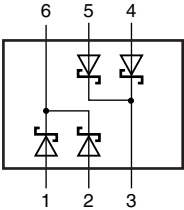
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
$I_F$	forward current		-	-	200	mA
$V_R$	reverse voltage		-	-	30	V
$V_F$	forward voltage		<a href="#">[1]</a>			
		$I_F = 0.1 \text{ mA}$	-	-	240	mV
		$I_F = 1 \text{ mA}$	-	-	320	mV
		$I_F = 10 \text{ mA}$	-	-	400	mV
		$I_F = 30 \text{ mA}$	-	-	500	mV
		$I_F = 100 \text{ mA}$	-	-	800	mV

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



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)		

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
Per diode					
$V_R$	reverse voltage		-	30	V
$I_F$	forward current		-	200	mA
$I_{FRM}$	repetitive peak forward current	$t_p \leq 10\text{ ms}$ ; $\delta \leq 0.5$	-	0.85	A
$I_{FSM}$	non-repetitive peak forward current	square wave; $t_p = 8.3\text{ ms}$	[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	$T_{\text{amb}} \leq 25\text{ °C}$	[2]		
			[3] -	350	mW
			[4] -	420	mW
$T_j$	junction temperature		-	125	°C
$T_{\text{amb}}$	ambient temperature		-65	+125	°C
$T_{\text{stg}}$	storage temperature		-65	+150	°C

[1]  $T_j = 25\text{ °C}$  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 cm<sup>2</sup>.

## 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 cm<sup>2</sup>.

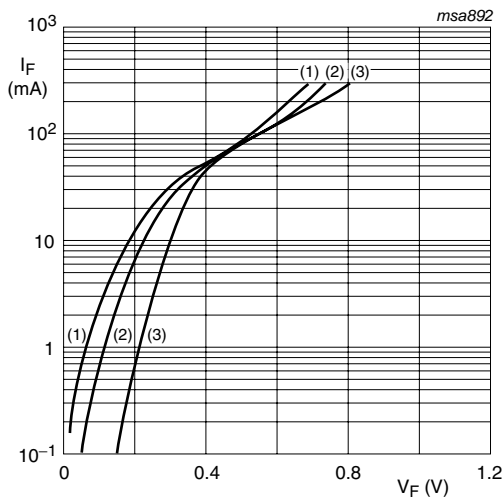
[5] Soldering point of cathode tab.

7. Characteristics

Table 7. Characteristics
   
 $T_{amb} = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

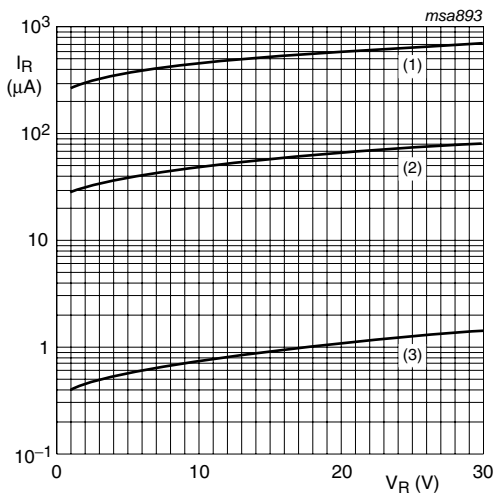
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
$V_F$	forward voltage		[1]			
		$I_F = 0.1\text{ mA}$	-	-	240	mV
		$I_F = 1\text{ mA}$	-	-	320	mV
		$I_F = 10\text{ mA}$	-	-	400	mV
		$I_F = 30\text{ mA}$	-	-	500	mV
		$I_F = 100\text{ mA}$	-	-	800	mV
$I_R$	reverse current	$V_R = 25\text{ V}$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

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



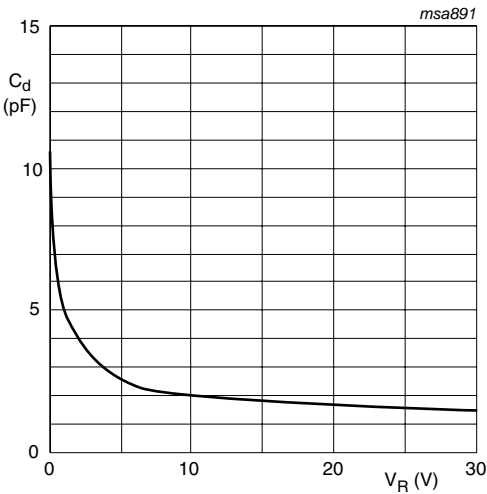
- (1)  $T_{amb} = 125\text{ }^{\circ}\text{C}$
- (2)  $T_{amb} = 85\text{ }^{\circ}\text{C}$
- (3)  $T_{amb} = 25\text{ }^{\circ}\text{C}$

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



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

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

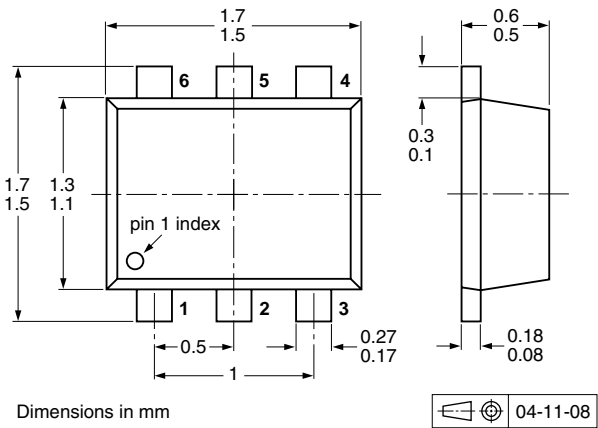


Fig 4. Package outline BAT54CV (SOT666)

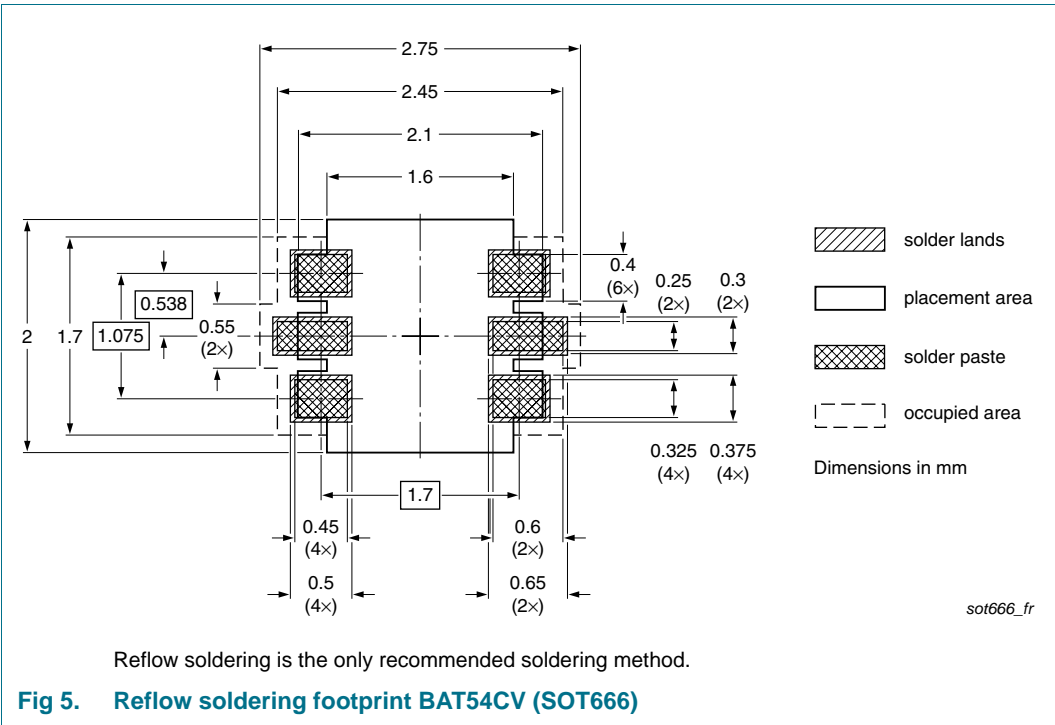
10. Packing information

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>: P<sub>tot</sub> amended.</li> <li>• <a href="#">Table 6 “Thermal characteristics”</a>: R<sub>th(j-a)</sub> amended, R<sub>th(j-sp)</sub> 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".

[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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