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

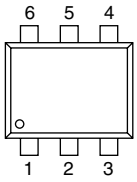
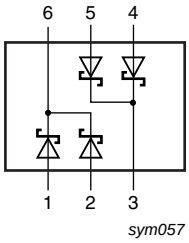
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
I_F	forward current		-	-	200	mA
V_R	reverse voltage		-	-	30	V
V_F	forward voltage	[1]				
		I_F = 0.1 mA	-	-	240	mV
		I_F = 1 mA	-	-	320	mV
		I_F = 10 mA	-	-	400	mV
		I_F = 30 mA	-	-	500	mV
		I_F = 100 mA	-	-	800	mV

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

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	$t_p \leq 10$ ms; $\delta \leq 0.5$		-	0.85	A
I_{FSM}	non-repetitive peak forward current	square wave; $t_p = 8.3$ 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
Per device, one diode loaded						
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[2]			
			[3]	-	350	mW
			[4]	-	420	mW
T_j	junction temperature			-	125	°C
T_{amb}	ambient temperature			−65	+125	°C
T_{stg}	storage temperature			−65	+150	°C

[1] T_j = 25 °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^2.

6. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per device, one diode loaded							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1][2]				
			[3]	-	-	360	K/W
			[4]	-	-	300	K/W
$R_{th(j-sp)}$	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^2.

[5] Soldering point of cathode tab.

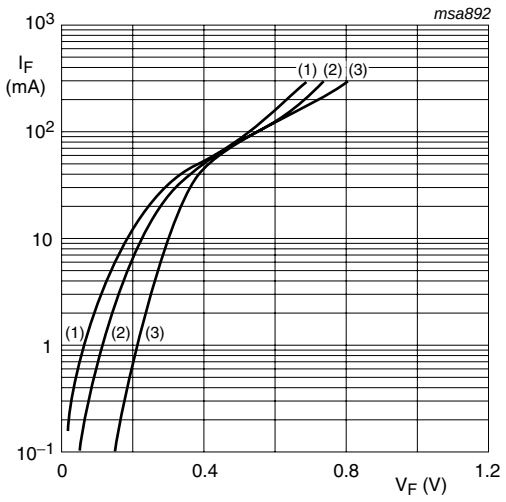
7. Characteristics

Table 7. Characteristics

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

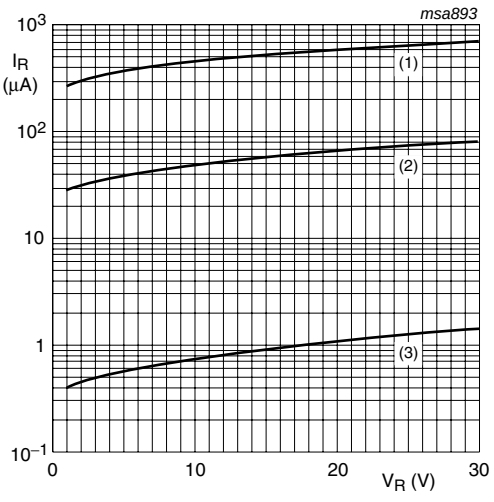
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
V_F	forward voltage		[1]				
		I_F = 0.1 mA		-	-	240	mV
		I_F = 1 mA		-	-	320	mV
		I_F = 10 mA		-	-	400	mV
		I_F = 30 mA		-	-	500	mV
		I_F = 100 mA		-	-	800	mV
I_R	reverse current	V_R = 25 V		-	-	2	µA
C_d	diode capacitance	V_R = 1 V; f =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

[1] Pulse test: $t_p \leq 300$ µs; $\delta \leq 0.02$.



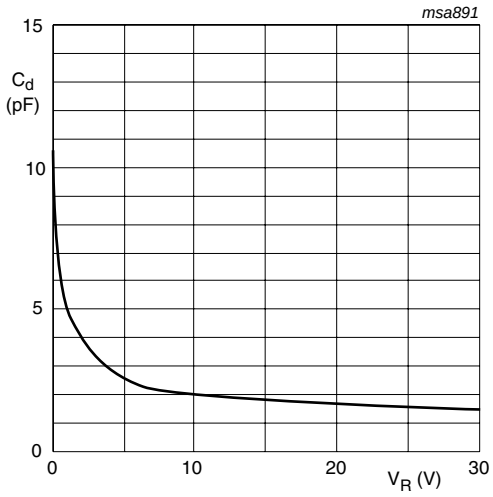
(1) T_{amb} = 125 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C

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



(1) T_{amb} = 125 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C

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



T_{amb} = 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

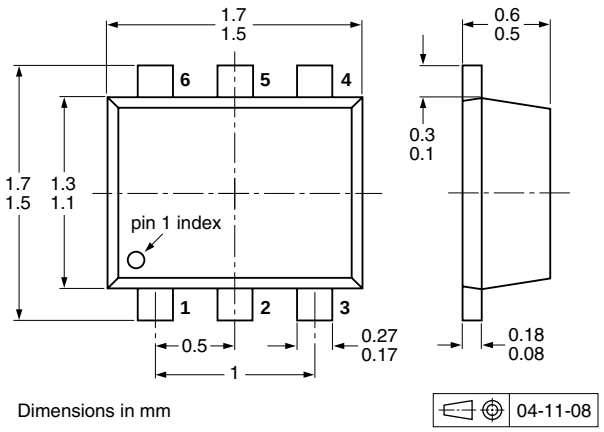
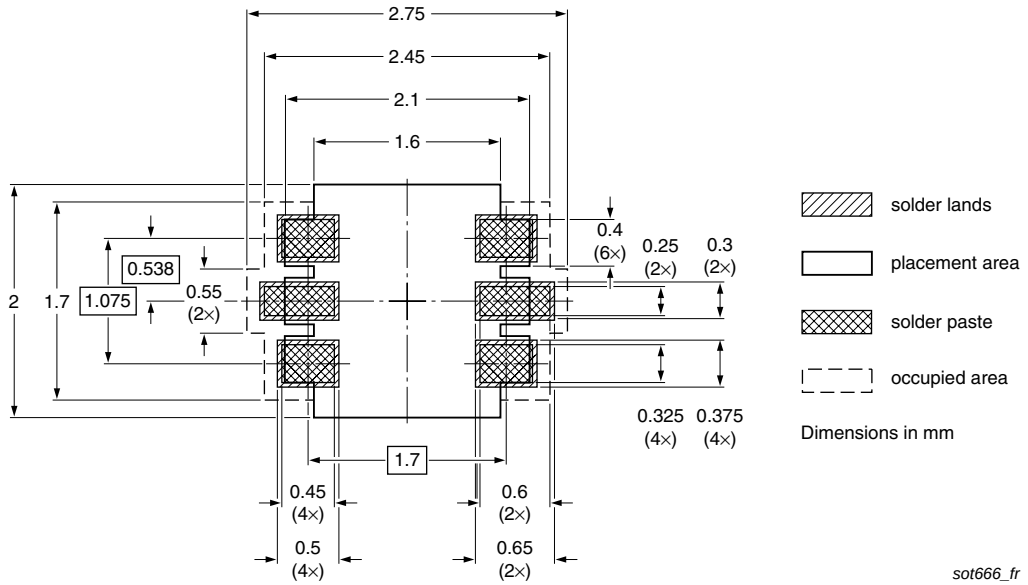


Fig 4. Package outline BAT54CV (SOT666)

10. Packing information

Please refer to packing information on www.nexperia.com.

11. Soldering



Reflow soldering is the only recommended soldering method.

Fig 5. Reflow soldering footprint BAT54CV (SOT666)

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:	• Section 1.2 “Features and benefits”: amended. • Table 1 “Quick reference data”: updated. • Table 5 “Limiting values”: P_{tot} amended. • Table 6 “Thermal characteristics”: $R_{th(j-a)}$ amended, $R_{th(j-sp)}$ added. • Figure 4: superseded by minimized outline drawing. • Section 8 “Test information”: added. • Section 11 “Soldering”: added. • Section 13 “Legal information”: updated.			
BAT54CV_2	20100115	Objective data sheet	-	BAT54CV_1
BAT54CV_1	20040922	Objective data sheet	-	-

13. Legal information

13.1 Data sheet status

Document status[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 URL http://www.nexperia.com.

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14. Contents

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