



# BAT54CW

## Schottky barrier diode

1 April 2023

Product data sheet

### 1. General description

Planar Schottky barrier diode with an integrated guard ring for stress protection, encapsulated in a very small SOT323 (SC-70) Surface-Mounted Device (SMD) plastic package.

### 2. Features and benefits

- Low forward voltage
- Low capacitance

### 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	$T_J = 25\text{ }^{\circ}\text{C}$	-	-	30	V
$V_F$	forward voltage	$I_F = 100\text{ mA}$ ; pulsed; $t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$	-	-	800	mV
$I_R$	reverse current	$V_R = 25\text{ V}$ ; $t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.02$ ; pulsed; $T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$	-	-	2	$\mu\text{A}$

### 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode (diode 1)	 SC-70 (SOT323)	 006aac984
2	A2	anode (diode 2)		
3	K1, K2	common cathode (diode 1 and diode 2)		

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6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAT54CW	SC-70	plastic, surface-mounted package; 3 leads; 1.3 mm pitch; 2 mm x 1.25 mm x 0.95 mm body	SOT323

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
BAT54CW	43 %

[1] % = placeholder for manufacturing site code

8. 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 <sub>R</sub>	reverse voltage	T <sub>j</sub> = 25 °C		-	30	V
I <sub>F</sub>	forward current			-	200	mA
I <sub>FRM</sub>	repetitive peak forward current	t <sub>p</sub> ≤ 1 s; δ ≤ 0.5		-	300	mA
I <sub>FSM</sub>	non-repetitive peak forward current	t <sub>p</sub> < 10 ms; T <sub>j(init)</sub> = 25 °C	[1]	-	600	mA
Per device; one diode loaded						
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	[2]	-	200	mW
T <sub>j</sub>	junction temperature			-	150	°C
T <sub>amb</sub>	ambient temperature			-55	150	°C
T <sub>stg</sub>	storage temperature			-65	150	°C

- [1] T<sub>j</sub> = 25 °C before surge.  
[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

9. Thermal characteristics

Table 6. Thermal characteristics

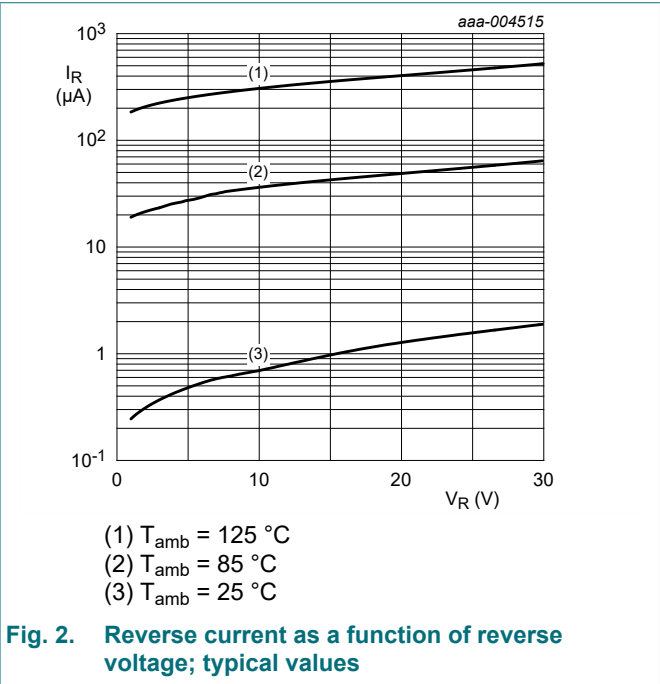
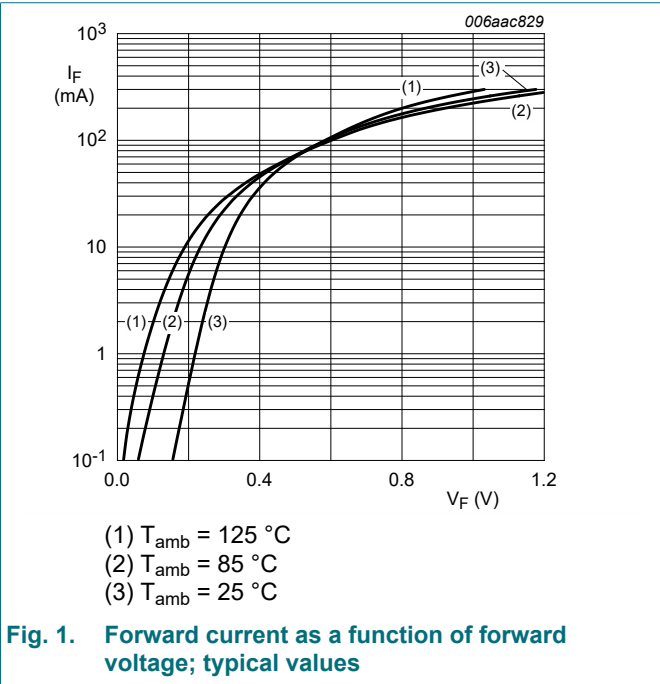
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per device; one diode loaded							
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient	in free air	[1]	-	-	625	K/W

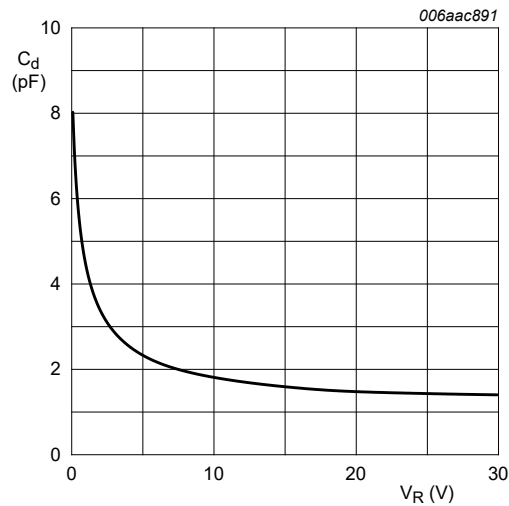
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 0.1 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C		-	-	240	mV
		I <sub>F</sub> = 1 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C		-	-	320	mV
		I <sub>F</sub> = 10 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C		-	-	400	mV
		I <sub>F</sub> = 30 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C		-	-	500	mV
		I <sub>F</sub> = 100 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C		-	-	800	mV
I <sub>R</sub>	reverse current	V <sub>R</sub> = 25 V; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; pulsed; T <sub>amb</sub> = 25 °C		-	-	2	μA
C <sub>d</sub>	diode capacitance	V <sub>R</sub> = 1 V; f = 1 MHz; T <sub>amb</sub> = 25 °C		-	-	10	pF
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 10 mA; I <sub>R</sub> = 10 mA; I <sub>R(meas)</sub> = 1 mA; R <sub>L</sub> = 100 Ω; T <sub>amb</sub> = 25 °C		-	-	5	ns





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

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

11. Test information

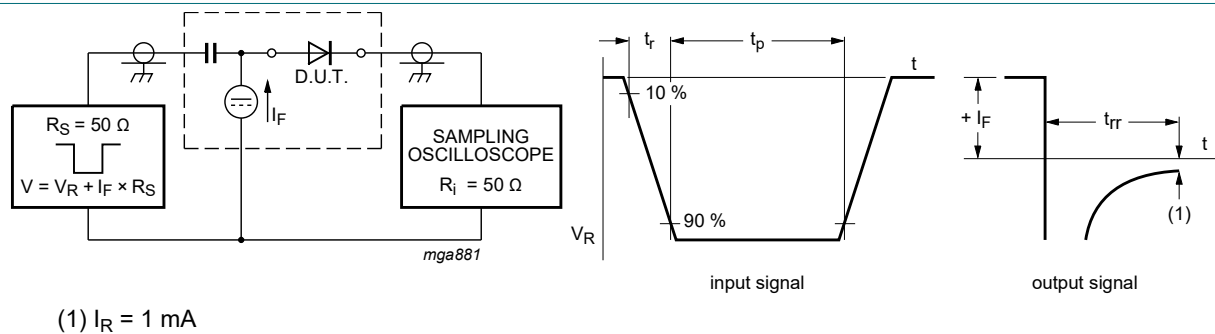


Fig. 4. Reverse recovery time test circuit and waveforms

12. Package outline

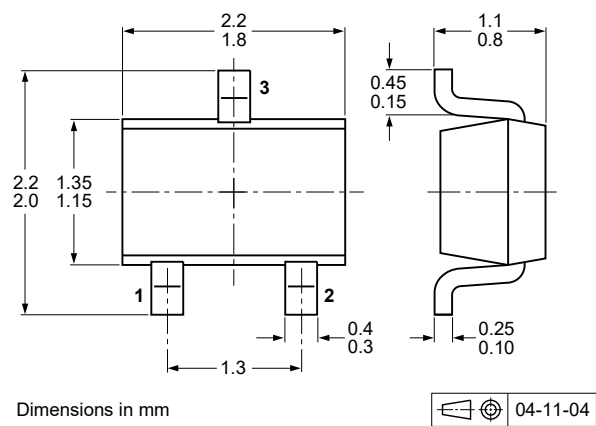


Fig. 5. Package outline SC-70 (SOT323)

13. Soldering

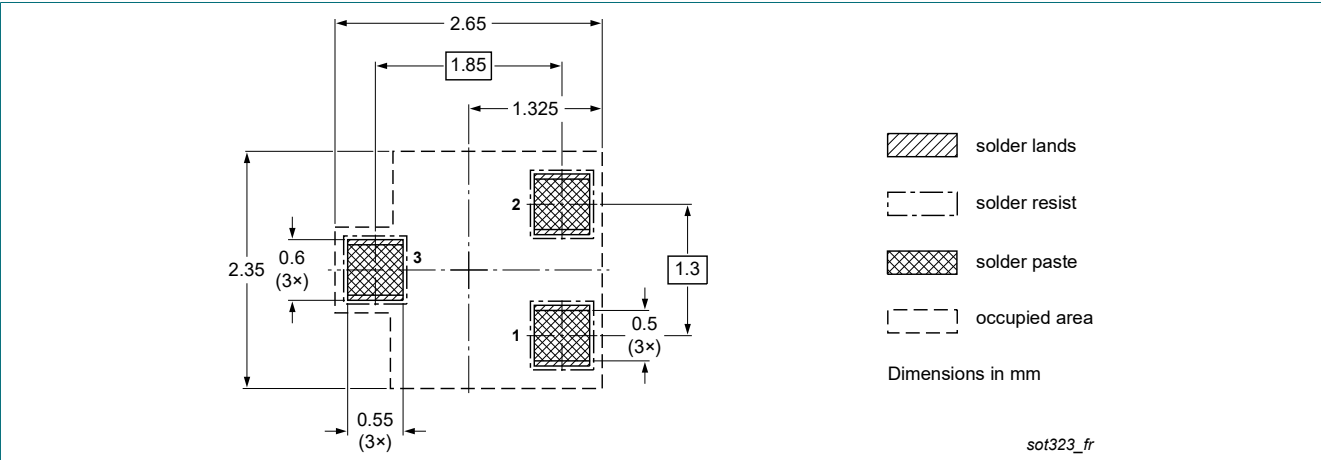


Fig. 6. Reflow soldering footprint for SC-70 (SOT323)

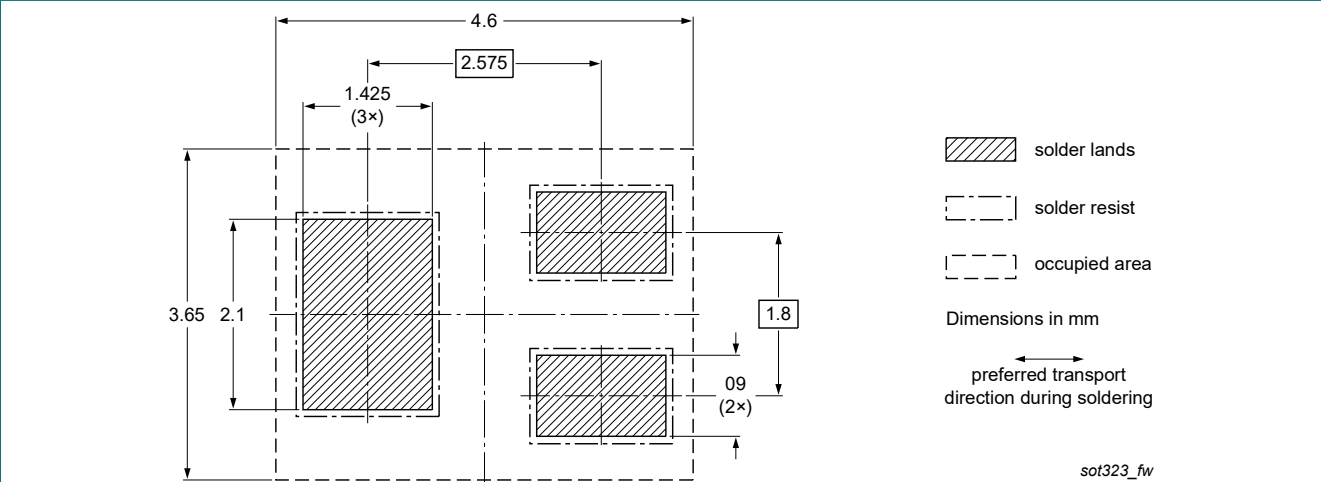


Fig. 7. Wave soldering footprint for SC-70 (SOT323)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAT54CW v.4	20230401	Product data sheet	-	BAT54W_SER v.3
Modifications:	<ul style="list-style-type: none"><li>Product changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).</li><li>Family data sheet splitted to single type data sheets.</li><li>Packing information removed.</li></ul>			
BAT54W_SER v.3	20121120	Product data sheet	-	BAT54W v.2
BAT54W v.2	9960319	Product specification	-	BAT54W v.1

## 15. Legal information

### 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 <https://www.nexperia.com>.

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