



# BAT54W

## Schottky barrier diode

1 October 2022

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

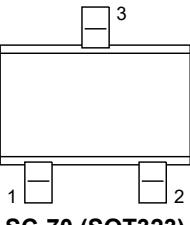
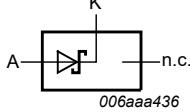
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
<b>Per diode</b>							
$V_R$	reverse voltage			-	-	30	V
$V_F$	forward voltage	$I_F = 100 \text{ mA}$ ; $t_p \leq 300 \mu\text{s}$ ; $\delta \leq 0.02$ ; pulsed; $T_{amb} = 25^\circ\text{C}$		-	-	800	mV
$I_R$	reverse current	$V_R = 25 \text{ V}$ ; $t_p \leq 300 \mu\text{s}$ ; $\delta \leq 0.02$ ; pulsed; $T_{amb} = 25^\circ\text{C}$		-	-	2	$\mu\text{A}$

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode		
2	n.c.	not connected		
3	K	cathode	 SC-70 (SOT323)	

## 6. Ordering information

**Table 3. Ordering information**

Type number	Package		
	Name	Description	Version
BAT54W	SC-70	plastic, surface-mounted package; 3 leads; 1.3 mm pitch; 2 mm x 1.25 mm x 0.95 mm body	<a href="#">SOT323</a>

## 7. Marking

**Table 4. Marking codes**

Type number	Marking code <sup>[1]</sup>
BAT54W	L4%

[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
<b>Per diode</b>						
V <sub>R</sub>	reverse voltage			-	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; square wave; T <sub>j(init)</sub> = 25 °C	[1]	-	600	mA
<b>Per device; one diode loaded</b>						
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
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
<b>Per diode</b>							
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 0.1 mA; t <sub>p</sub> ≤ 300 µs; δ ≤ 0.02; pulsed; T <sub>amb</sub> = 25 °C		-	-	240	mV
		I <sub>F</sub> = 1 mA; t <sub>p</sub> ≤ 300 µs; δ ≤ 0.02; pulsed; T <sub>amb</sub> = 25 °C		-	-	320	mV
		I <sub>F</sub> = 10 mA; t <sub>p</sub> ≤ 300 µs; δ ≤ 0.02; pulsed; T <sub>amb</sub> = 25 °C		-	-	400	mV
		I <sub>F</sub> ≤ 300 mA; t <sub>p</sub> ≤ 0.02 µs; pulsed; T <sub>amb</sub> = 25 °C		-	-	500	mV
		I <sub>F</sub> = 100 mA; t <sub>p</sub> ≤ 300 µs; δ ≤ 0.02; pulsed; 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

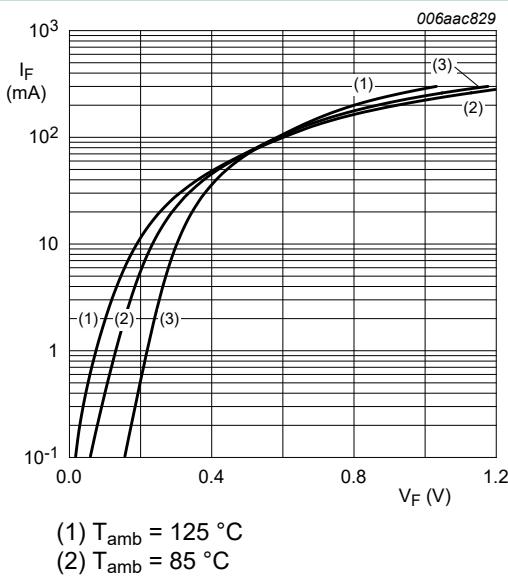


Fig. 1. Forward current as a function of forward voltage; typical values

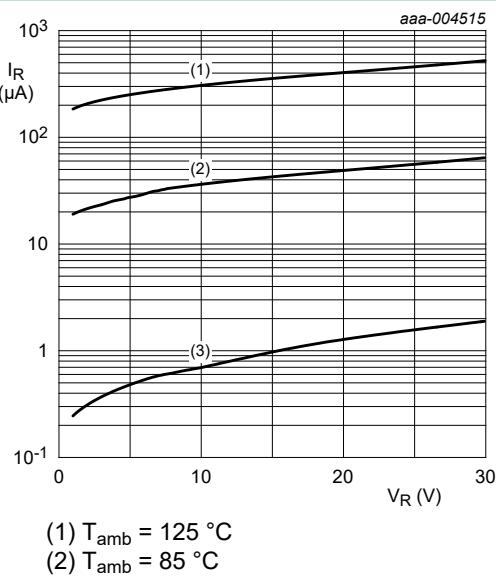
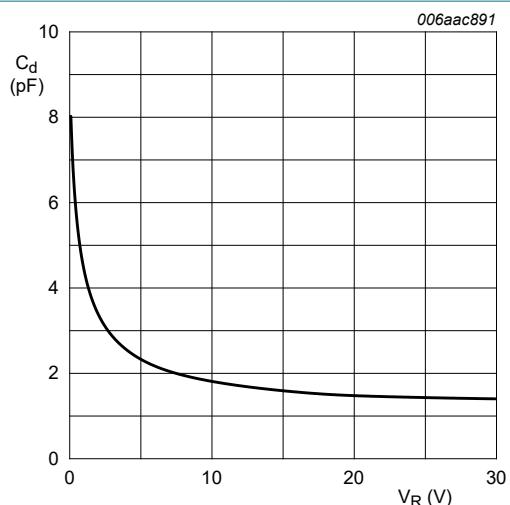


Fig. 2. Reverse current as a function of reverse voltage; typical values



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

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

## 11. Test information

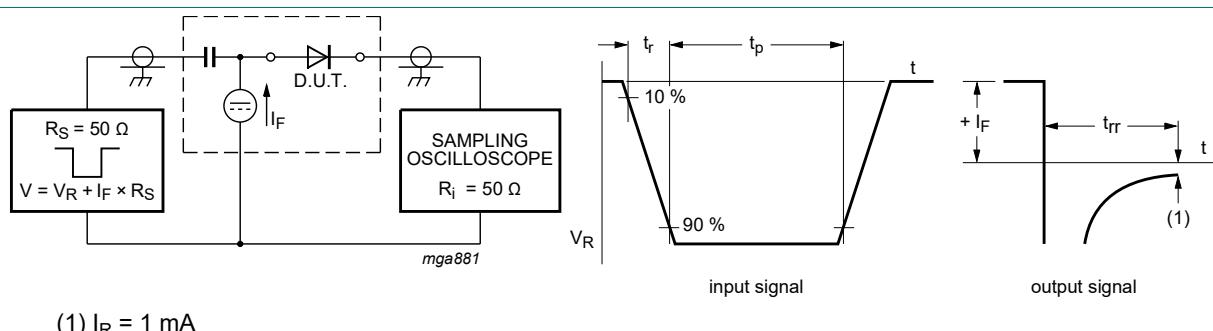
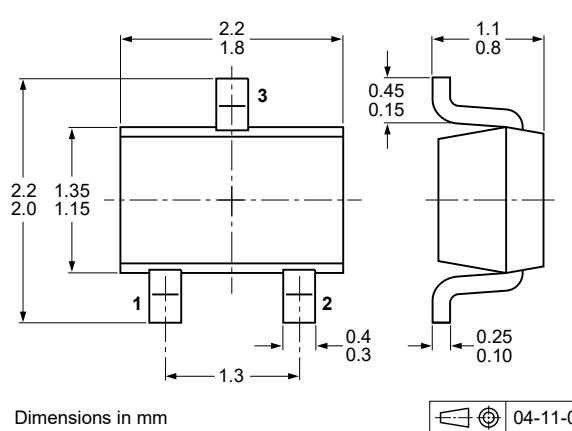


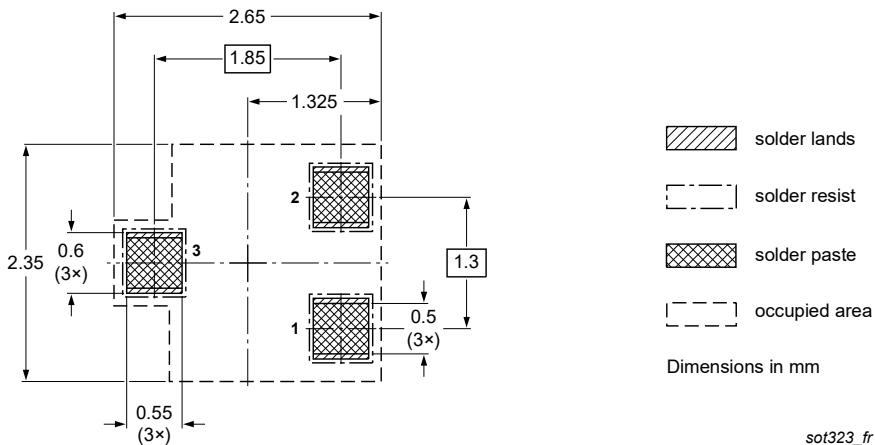
Fig. 4. Reverse recovery time test circuit and waveforms

## 12. Package outline



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

## 13. Soldering



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

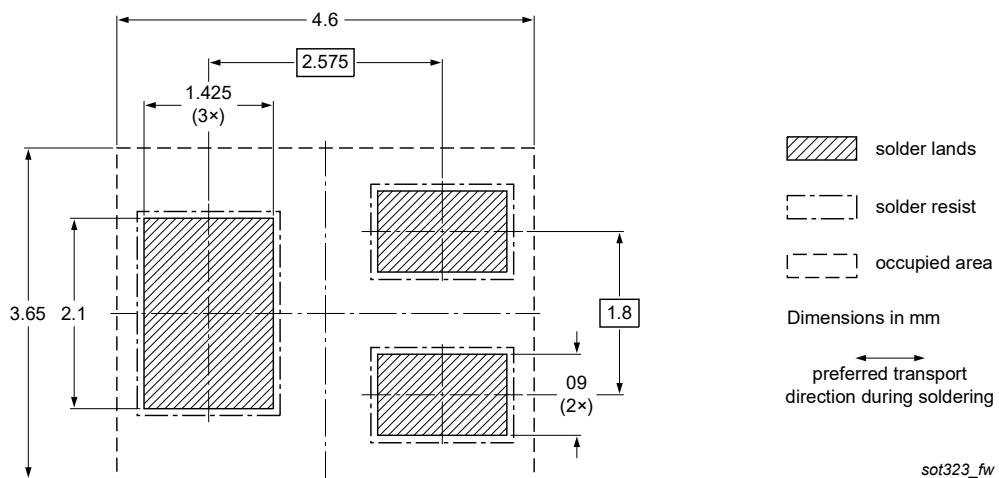


Fig. 7. Wave soldering footprint for SC-70 (SOT323)

## 14. Revision history

**Table 8. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAT54W v.4	20221001	Product data sheet	-	BAT54W_SER v.3
Modifications:		<ul style="list-style-type: none"><li>Product changed to non-automotive qualification. Please refer to <a href="http://nexperia.com">nexperia.com</a> 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".
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## Contents

1. General description.....	1
2. Features and benefits.....	1
3. Applications.....	1
4. Quick reference data.....	1
5. Pinning information.....	1
6. Ordering information.....	2
7. Marking.....	2
8. Limiting values.....	2
9. Thermal characteristics.....	2
10. Characteristics.....	3
11. Test information.....	4
12. Package outline.....	4
13. Soldering.....	5
14. Revision history.....	6
15. Legal information.....	7

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