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Team Nexperia

BAT54W series

Schottky barrier diodes

Rev. 3 — 20 November 2012 Product data sheet

1. Product profile

1.1 General description

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

1.2 Features and benefits

- Low forward voltage
- Low capacitance
- AEC-Q101 qualified

1.3 Applications

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

1.4 Quick reference data

Table 1. Quick reference data

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
V_R	reverse voltage			-	-	30	V
V_F	forward voltage	I_F = 100 mA	[1]	-	-	800	mV
I_R	reverse current	V_R = 25 V	[1]	-	-	2	µA

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

2. Pinning information

Table 2. Pinning

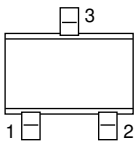
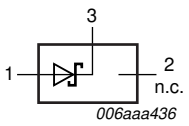
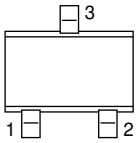
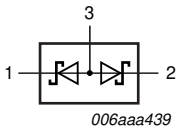
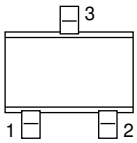
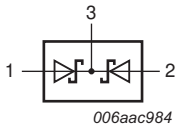
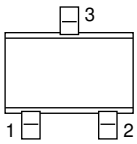
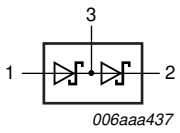
Pin	Description	Simplified outline	Graphic symbol
BAT54W			
1	anode		
2	not connected		
3	cathode		

Table 2. Pinning *...continued*

Pin	Description	Simplified outline	Graphic symbol
BAT54AW			
1	cathode (diode 1)		
2	cathode (diode 2)		
3	common anode		
BAT54CW			
1	anode (diode 1)		
2	anode (diode 2)		
3	common cathode		
BAT54SW			
1	anode (diode 1)		
2	cathode (diode 2)		
3	cathode (diode 1), anode (diode 2)		

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAT54W series	SC-70	plastic surface-mounted package; 3 leads	SOT323

4. Marking

Table 4. Marking codes

Type number	Marking code[1]
BAT54W	L4*
BAT54AW	42*
BAT54CW	43*
BAT54SW	44*

[1] * = placeholder for manufacturing site code.

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	$t_p \leq 1$ s; $\delta \leq 0.5$			300	mA
I_{FSM}	non-repetitive peak forward current	square wave; $t_p < 10$ ms	[1]	-	600	mA
Per device; one diode loaded						
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[2]	-	200	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			−55	+150	°C
T_{stg}	storage temperature			−65	+150	°C

[1] $T_j = 25$ °C before surge.

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

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]	-	-	625	K/W

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

7. Characteristics

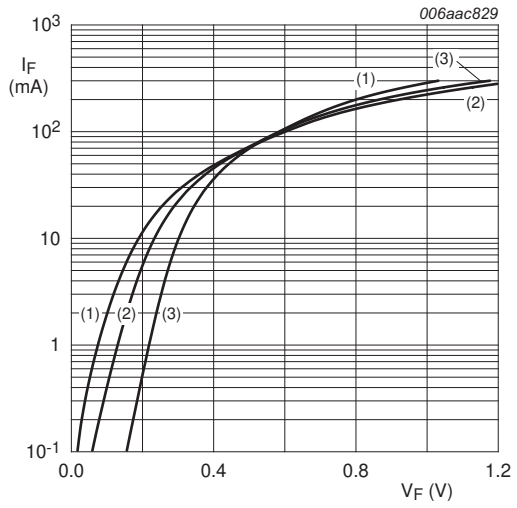
Table 7. Characteristics

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	[1]	-	-	2	µA
C_d	diode capacitance	f = 1 MHz; V_R = 1 V		-	-	10	pF
t_{rr}	reverse recovery time		[2]	-	-	5	ns

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

[2] When switched from I_F = 10 mA to I_R = 10 mA; R_L = 100 Ω; measured at I_R = 1 mA.

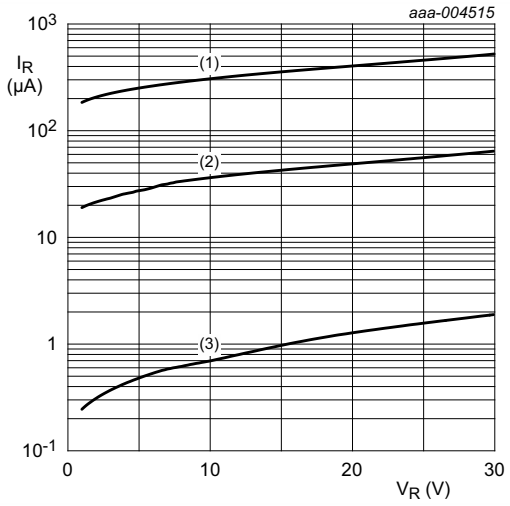


(1) T_{amb} = 125 °C

(2) T_{amb} = 85 °C

(3) T_{amb} = 25 °C

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

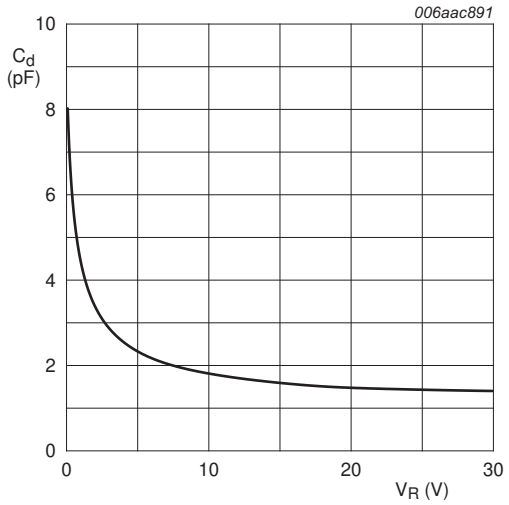


(1) T_{amb} = 125 °C

(2) T_{amb} = 85 °C

(3) T_{amb} = 25 °C

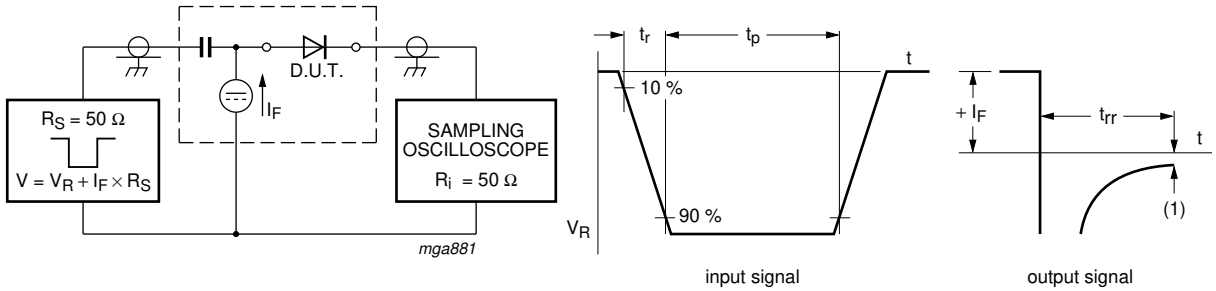
Fig 2. Reverse current as a function of reverse voltage; typical values



f = 1 MHz; T_{amb} = 25 °C

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

8. Test information



(1) I_R = 1 mA

Fig 4. Reverse recovery time test circuit and waveforms

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

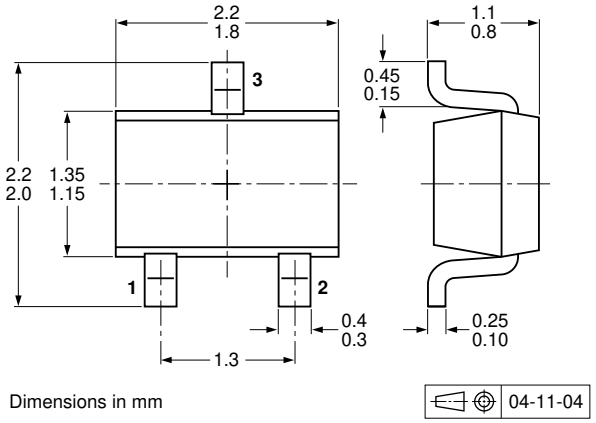


Fig 5. Package outline SOT323 (SC-70)

10. Packing information

Table 8. Packing methods

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

Type number	Package	Description	Packing quantity	
			3000	10000
BAT54W series	SOT323	4 mm pitch, 8 mm tape and reel	-115	-135

[1] For further information and the availability of packing methods, see Section 14.

11. Soldering

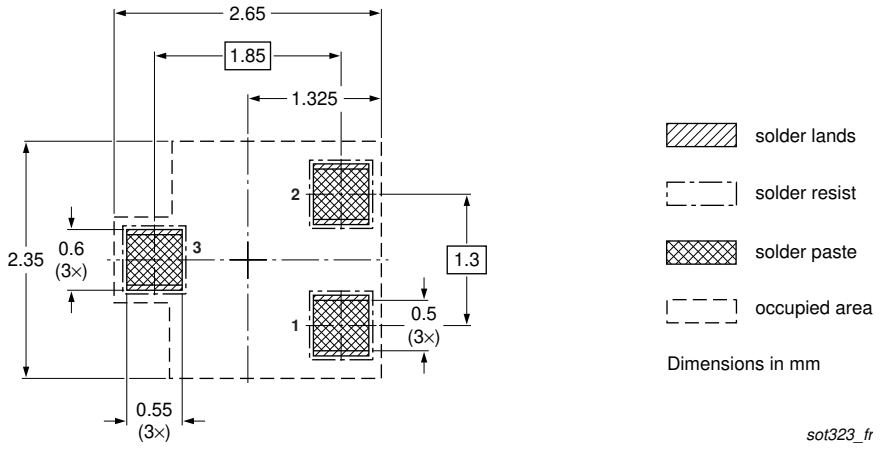


Fig 6. Reflow soldering footprint SOT323 (SC-70)

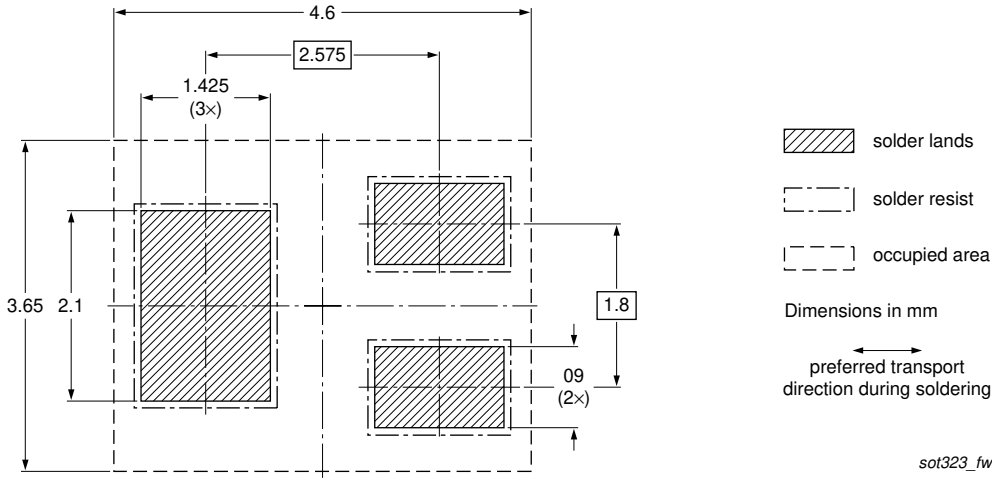


Fig 7. Wave soldering footprint SOT323 (SC-70)

12. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BAT54W_SER v.3	20121120	Product data sheet	-	BAT54W v.2
Modifications:	• The format of this document has been redesigned to comply with the new identity guidelines of NXP Semiconductors. • Legal texts have been adapted to the new company name where appropriate. • Section 1: updated • Section 4: updated • Table 5: updated ambient temperature T_{amb} maximum value to 150 °C • Figure 1 to 4: updated • Section 8 “Test information”: added • Figure 5: replaced by minimized package outline drawing • Section 10 “Packing information”: added • Section 11 “Soldering”: added • Section 13 “Legal information”: updated			
BAT54W v.2	19960319	Product specification	-	BAT54W v.1

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.nxp.com.

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15. Contents

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Document identifier: BAT54W_SER