

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

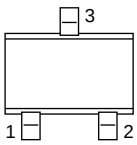
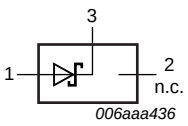
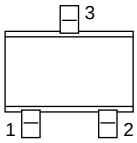
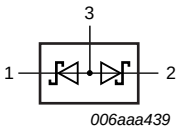
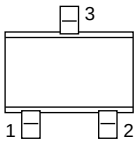
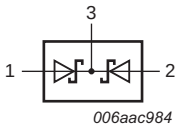
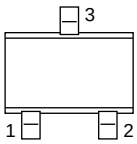
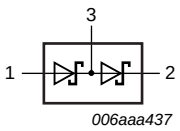
Pin	Description	Simplified outline	Graphic symbol
BAT54W			
1	anode		
2	not connected		
3	cathode		

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.

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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.

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7. Characteristics

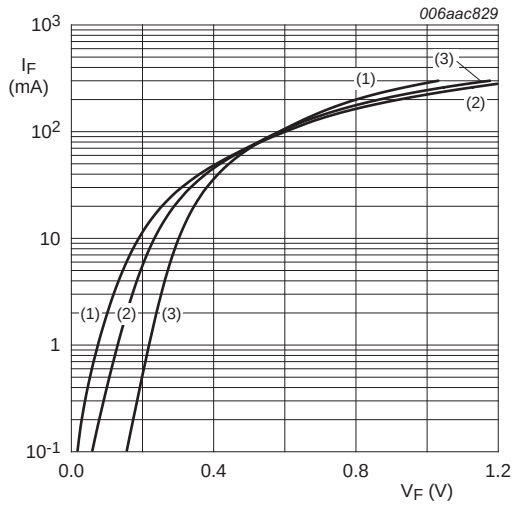
Table 7. Characteristics

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.

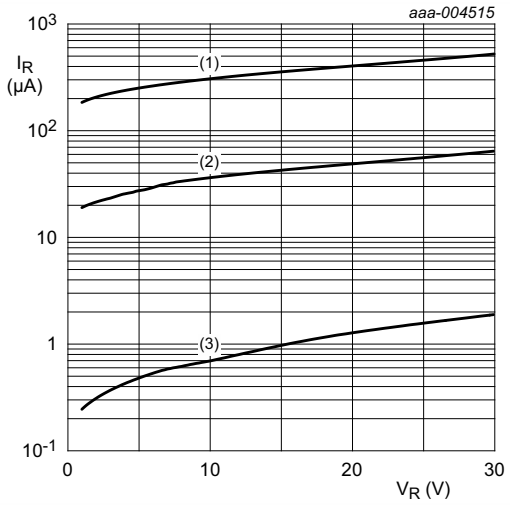


(1) T_{amb} = 125 °C

(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

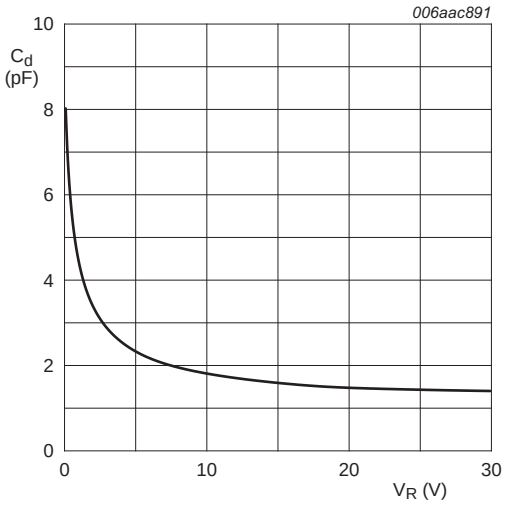
(2) T_{amb} = 85 °C

(3) T_{amb} = 25 °C

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

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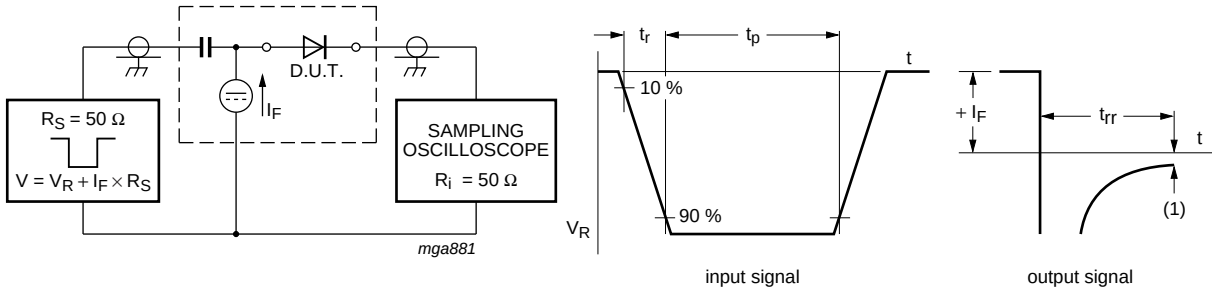
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f = 1 MHz; T_{amb} = 25 °C

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.

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9. Package outline

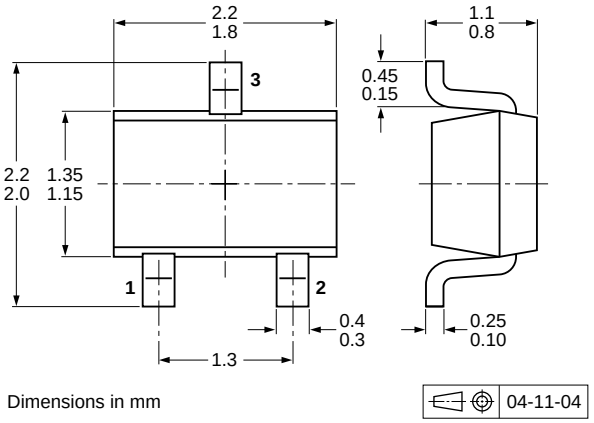


Fig 5. Package outline SOT323 (SC-70)

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.

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11. Soldering

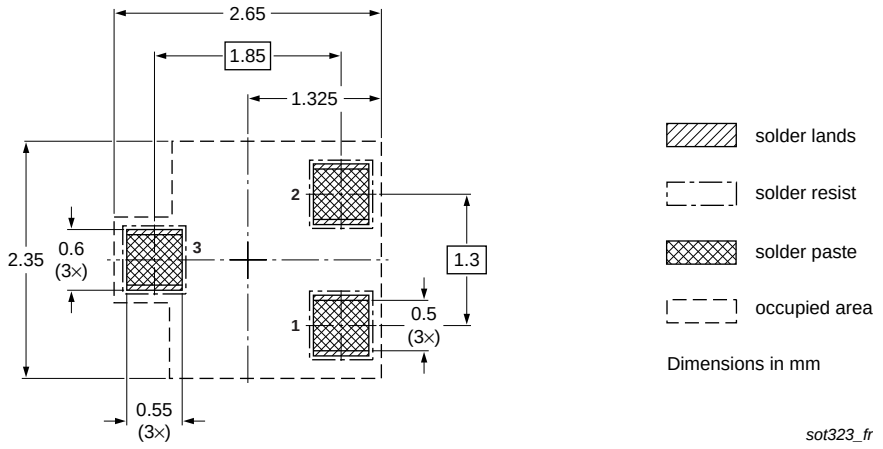


Fig 6. Reflow soldering footprint SOT323 (SC-70)

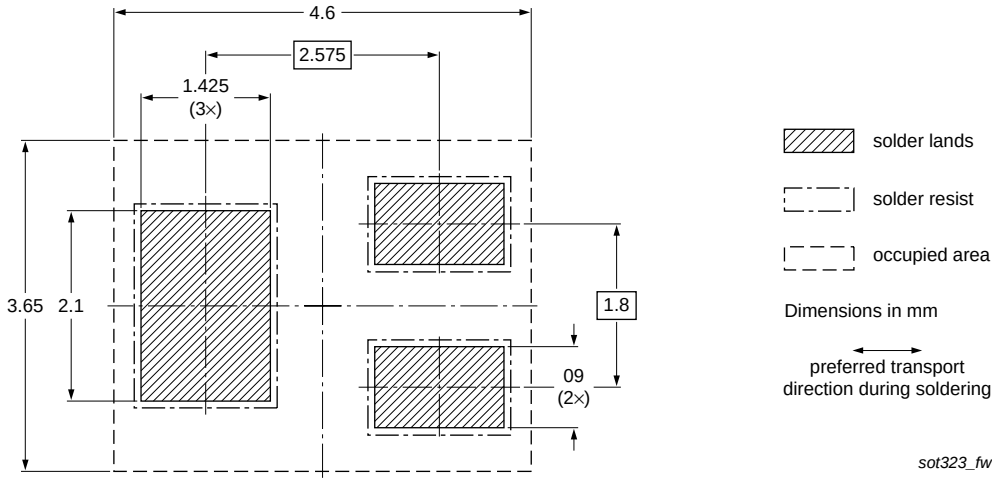


Fig 7. Wave soldering footprint SOT323 (SC-70)

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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

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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".

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