



# BAT54 series

## Schottky barrier diodes

Rev. 5 — 5 October 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 small SOT23 (TO-236AB) 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

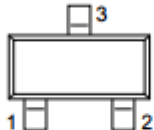
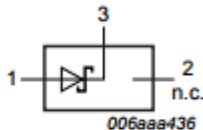
Table 1. Quick reference data  
 $T_{amb} = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
$V_R$	reverse voltage		-	-	30	V
$V_F$	forward voltage	$I_F = 100\text{ mA}$	[1]	-	800	mV
$I_R$	reverse current	$V_R = 25\text{ V}$	[1]	-	2	$\mu\text{A}$

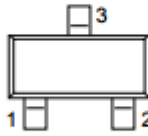
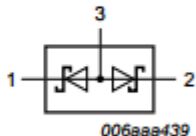
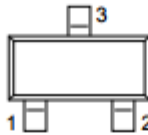
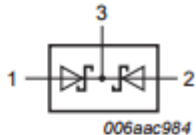
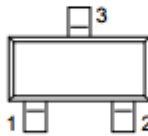
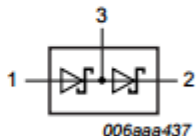
[1] Pulse test:  $t_p \leq 300\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$ .

## 2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
BAT54			
1	anode		
2	not connected		
3	cathode		

**Table 2. Pinning ...continued**

Pin	Description	Simplified outline	Graphic symbol
<b>BAT54A</b>			
1	cathode (diode 1)		 006aaa439
2	cathode (diode 2)		
3	common anode		
<b>BAT54C</b>			
1	anode (diode 1)		 006aac984
2	anode (diode 2)		
3	common cathode		
<b>BAT54S</b>			
1	anode (diode 1)		 006aaa437
2	cathode (diode 2)		
3	cathode (diode 1), anode (diode 2)		

### 3. Ordering information

**Table 3. Ordering information**

Type number	Package		Version
	Name	Description	
BAT54 series	-	plastic surface-mounted package; 3 leads	SOT23

### 4. Marking

**Table 4. Marking codes**

Type number	Marking code <sup>[1]</sup>
BAT54	L4*
BAT54A	*V3
BAT54C	*W1
BAT54S	*V4

[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
<b>Per diode</b>					
$V_R$	reverse voltage		-	30	V
$I_F$	forward current	$T_{amb} = 25\text{ °C}$	-	200	mA
$I_{FRM}$	repetitive peak forward current	$t_p \leq 1\text{ s}$ ; $\delta \leq 0.5$ ; $T_{amb} = 25\text{ °C}$	-	300	mA
$I_{FSM}$	non-repetitive peak forward current	square wave; $t_p < 10\text{ ms}$	[1] -	600	mA
<b>Per device; one diode loaded</b>					
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[2] -	250	mW
$T_j$	junction temperature		-	150	°C
$T_{amb}$	ambient temperature		-55	+150	°C
$T_{stg}$	storage temperature		-65	+150	°C

[1]  $T_j = 25\text{ °C}$  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
<b>Per device; one diode loaded</b>						
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1][2] -	-	500	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] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

## 7. Characteristics

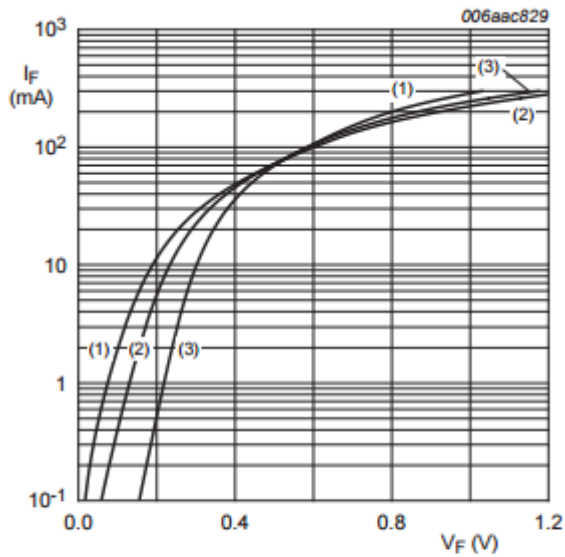
**Table 7. Characteristics**

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
$V_F$	forward voltage		[1]			
		$I_F = 0.1\text{ mA}$	-	-	240	mV
		$I_F = 1\text{ mA}$	-	-	320	mV
		$I_F = 10\text{ mA}$	-	-	400	mV
		$I_F = 30\text{ mA}$	-	-	500	mV
		$I_F = 100\text{ mA}$	-	-	800	mV
$I_R$	reverse current	$V_R = 25\text{ V}$	[1] -	-	2	$\mu\text{A}$
$C_d$	diode capacitance	$f = 1\text{ MHz}$ ; $V_R = 1\text{ V}$	-	-	10	pF
$t_{rr}$	reverse recovery time		[2] -	-	5	ns

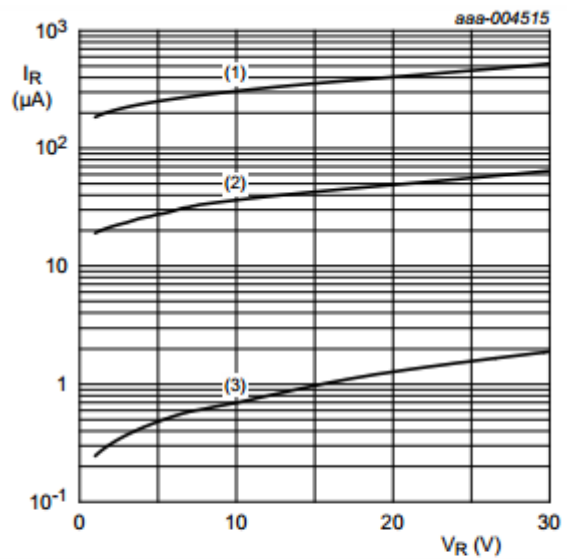
[1] Pulse test:  $t_p \leq 300\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$ .

[2] When switched from  $I_F = 10\text{ mA}$  to  $I_R = 10\text{ mA}$ ;  $R_L = 100\text{ }\Omega$ ; measured at  $I_R = 1\text{ mA}$ .



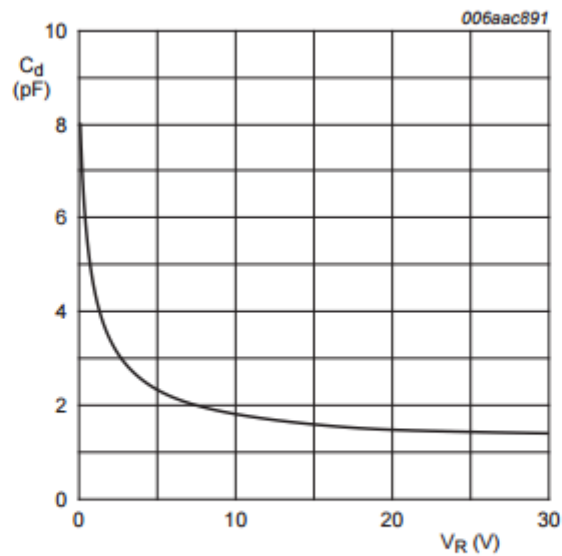
- (1)  $T_{amb} = 125^\circ\text{C}$
- (2)  $T_{amb} = 85^\circ\text{C}$
- (3)  $T_{amb} = 25^\circ\text{C}$

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



- (1)  $T_{amb} = 125^\circ\text{C}$
- (2)  $T_{amb} = 85^\circ\text{C}$
- (3)  $T_{amb} = 25^\circ\text{C}$

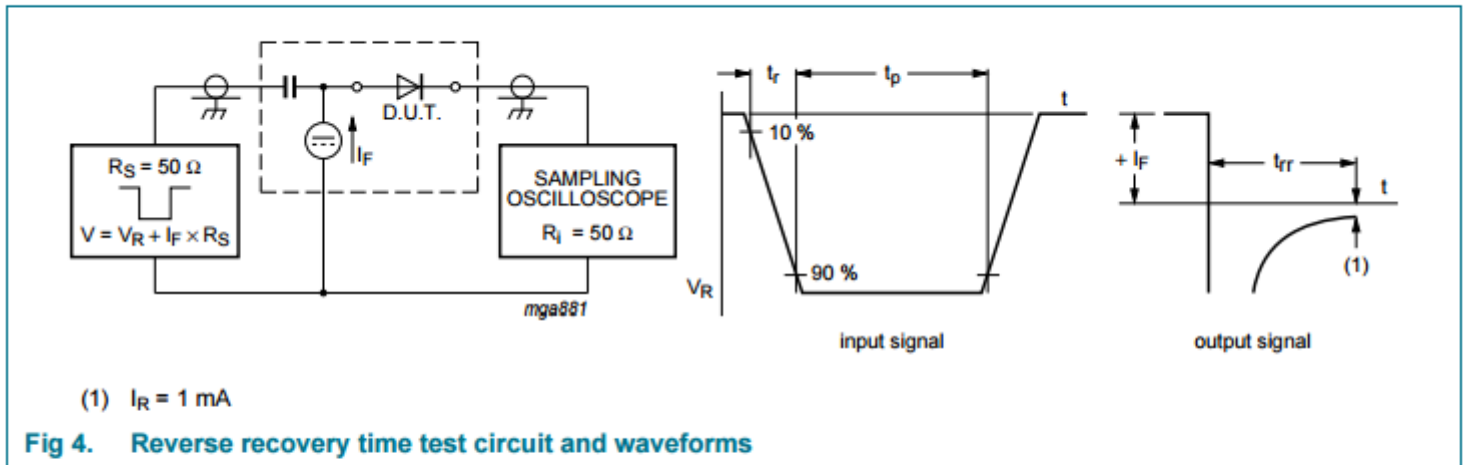
**Fig 2. Reverse current as a function of reverse voltage; typical values**



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

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

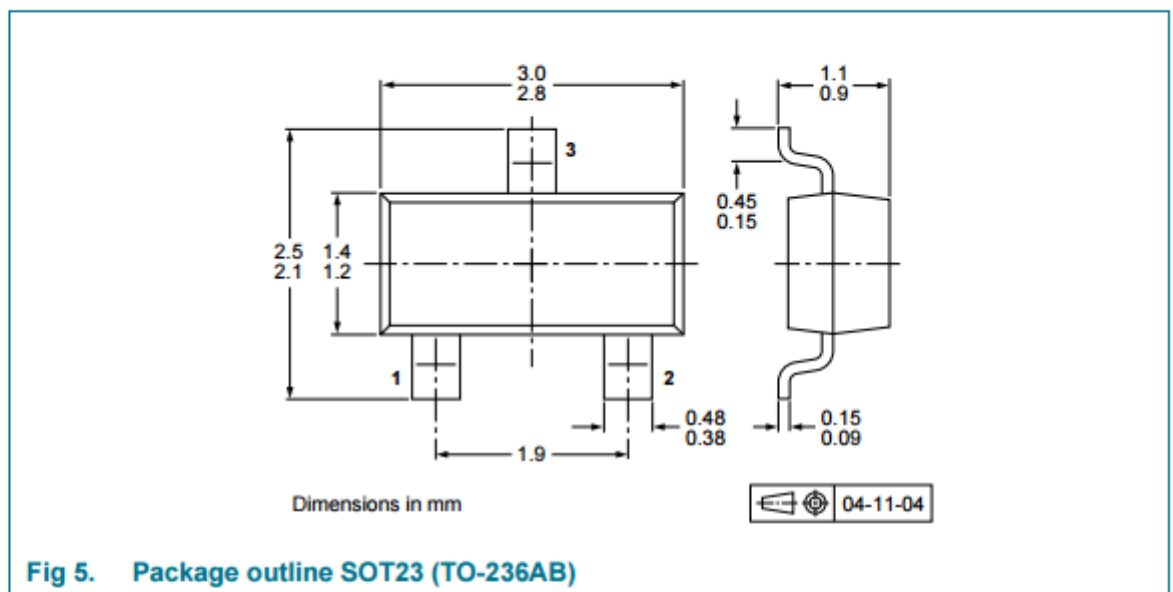
## 8. Test information



### 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



## 10. Packing information

**Table 8. Packing methods**

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

Type number	Package	Description	Packing quantity	
			3000	10000
BAT54 series	SOT23	4 mm pitch, 8 mm tape and reel	-215	-235

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

# 11. Soldering

