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BAT54GW

30 V, 200 mA Schottky barrier diodes

24 November 2016

Product data sheet

1. General description

Planar Schottky barrier diode with an integrated guard ring for stress protection, encapsulated in an SOD123 small Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Low forward voltage: $V_F \leq 400$ mV
- Low leakage current: $I_R \leq 2$ μ A
- Reverse voltage $V_R \leq 30$ V
- Low capacitance
- Small SMD plastic package
- AEC-Q101 qualified

3. Applications

- Ultra high-speed switching
- Line termination

4. Quick reference data



Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_F	forward current	$T_j = 25$ °C		-	-	200	mA
V_F	forward voltage	$I_F = 10$ mA; $t_p \leq 300$ μ s; $\delta \leq 0.02$; $T_j = 25$ °C		-	-	400	mV
I_R	reverse current	$V_R = 25$ V; pulsed; $T_j = 25$ °C	[1]	-	-	2	μ A
V_R	reverse voltage	$T_j = 25$ °C		-	-	30	V

[1] Very short test pulse to prevent junction self-heating.

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode ^[1]	 SOD123	 sym001
2	A	anode		

[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAT54GW	SOD123	Plastic surface-mounted package; 2 leads	SOD123

7. Marking

Table 4. Marking codes

Type number	Marking code
BAT54GW	G9

8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
V_R	reverse voltage	$T_j = 25\text{ }^{\circ}\text{C}$		-	30	V
I_F	forward current			-	200	mA
I_{FRM}	repetitive peak forward current	$t_p \leq 1\text{ s}; \delta \leq 0.5$		-	300	mA
I_{FSM}	non-repetitive peak forward current	$t_p < 10\text{ ms}; T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}; \text{square wave}$		-	600	mA
P_{tot}	total power dissipation	$T_{\text{amb}} \leq 25\text{ }^{\circ}\text{C}$	[1]	-	357	mW
			[2]	-	600	mW
T_j	junction temperature			-	150	$^{\circ}\text{C}$
T_{amb}	ambient temperature			-55	150	$^{\circ}\text{C}$
T_{stg}	storage temperature			-65	150	$^{\circ}\text{C}$

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

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2 .

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{\text{th}(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	350	K/W
			[2]	-	-	210	K/W
$R_{\text{th}(j-sp)}$	thermal resistance from junction to solder point		[3]	-	-	58	K/W

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

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2 .

[3] Soldering point of cathode tab.

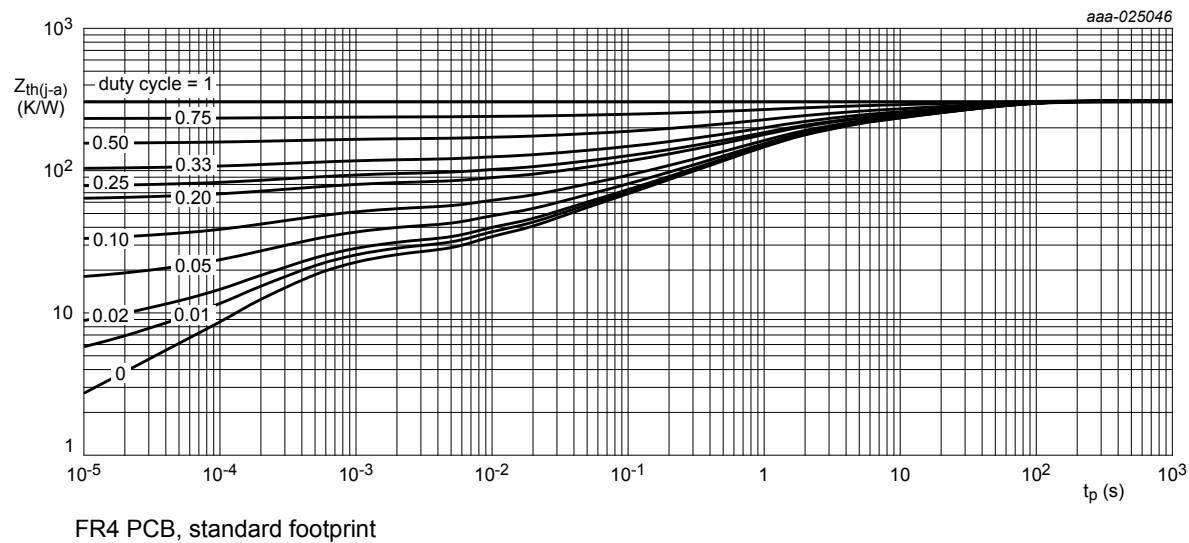


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

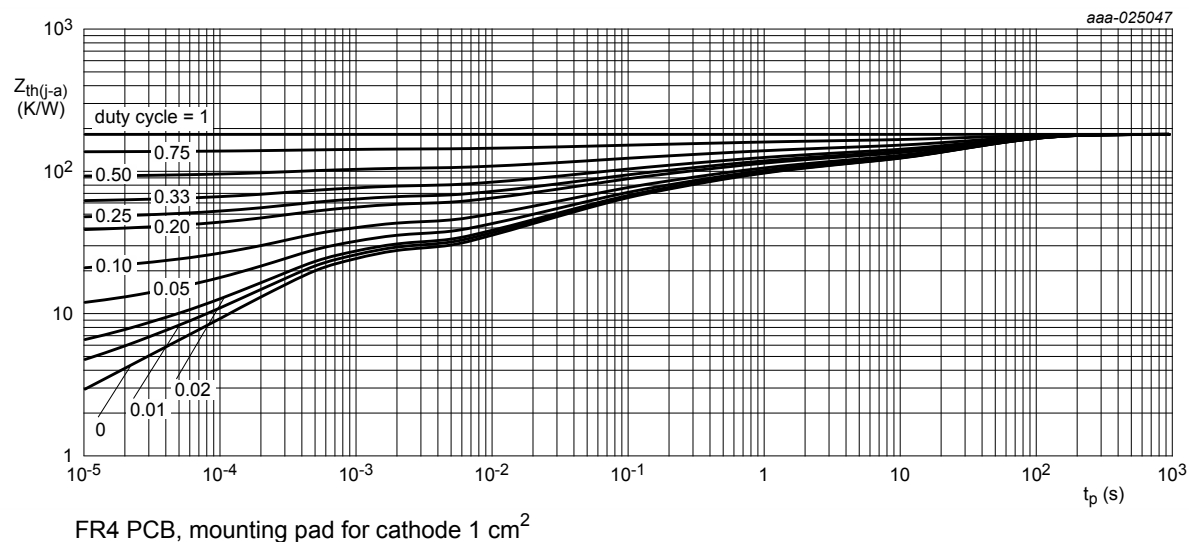


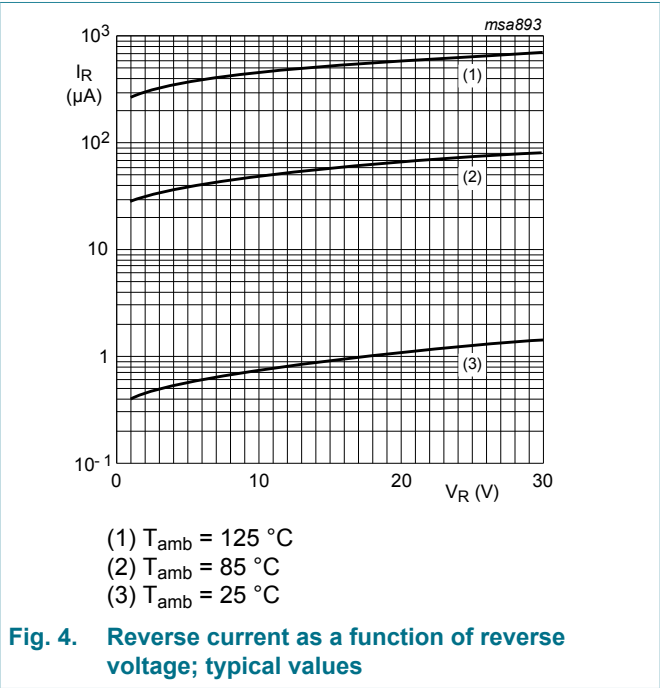
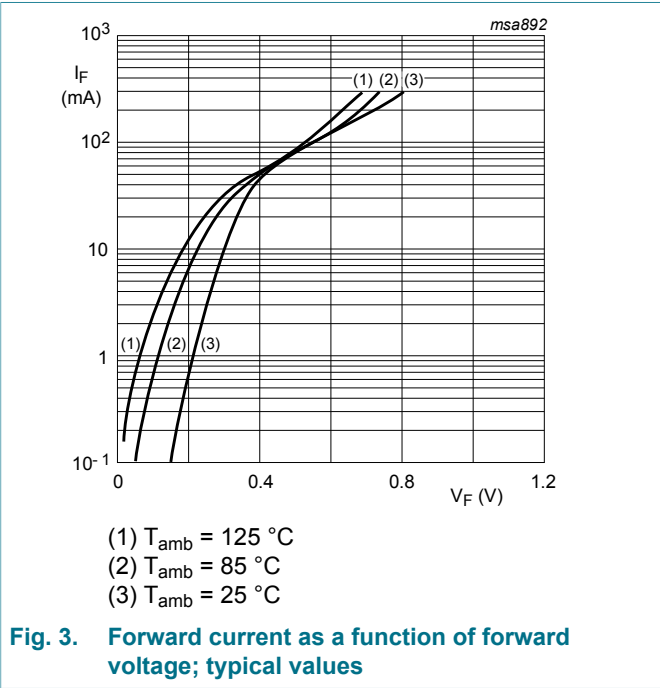
Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

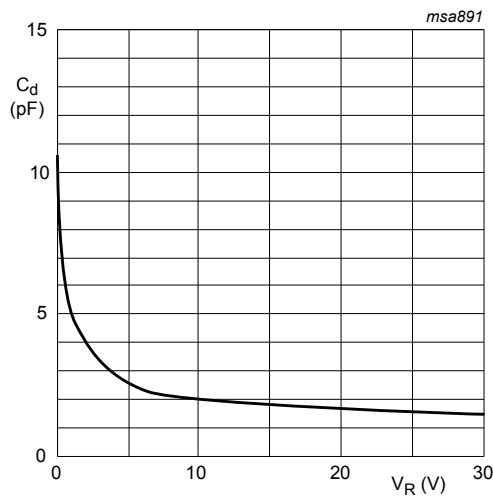
10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)R}$	reverse breakdown voltage	$I_R = 1\text{ mA}$; $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_j = 25\text{ }^\circ\text{C}$		30	-	-	V
V_F	forward voltage	$I_F = 0.1\text{ mA}$; $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_j = 25\text{ }^\circ\text{C}$		-	-	240	mV
		$I_F = 1\text{ mA}$; $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_j = 25\text{ }^\circ\text{C}$		-	-	320	mV
		$I_F = 10\text{ mA}$; $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_j = 25\text{ }^\circ\text{C}$		-	-	400	mV
		$I_F = 30\text{ mA}$; $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_j = 25\text{ }^\circ\text{C}$		-	-	500	mV
		$I_F = 100\text{ mA}$; $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_j = 25\text{ }^\circ\text{C}$		-	-	800	mV
I_R	reverse current	$V_R = 25\text{ V}$; pulsed; $T_j = 25\text{ }^\circ\text{C}$	[1]	-	-	2	μA
C_d	diode capacitance	$V_R = 1\text{ V}$; $f = 1\text{ MHz}$; $T_j = 25\text{ }^\circ\text{C}$		-	-	10	pF

[1] Very short test pulse to prevent junction self-heating.





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

Fig. 5. Diode capacitance as a function of reverse voltage; typical values

11. Test information

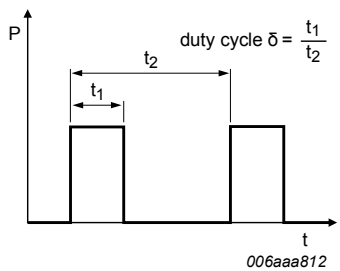


Fig. 6. Duty cycle definition

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.

12. Package outline

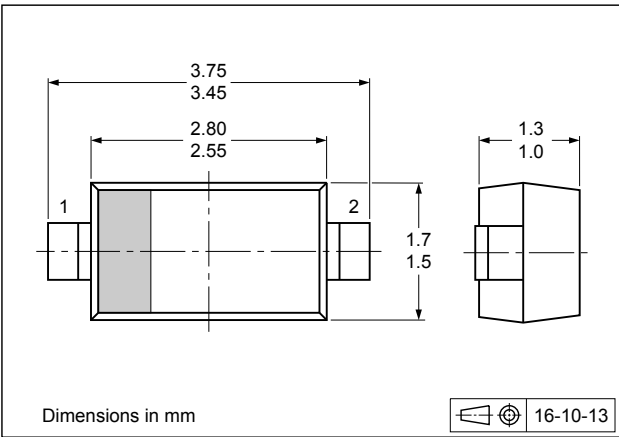


Fig. 7. Package outline SOD123

13. Soldering

SOD123

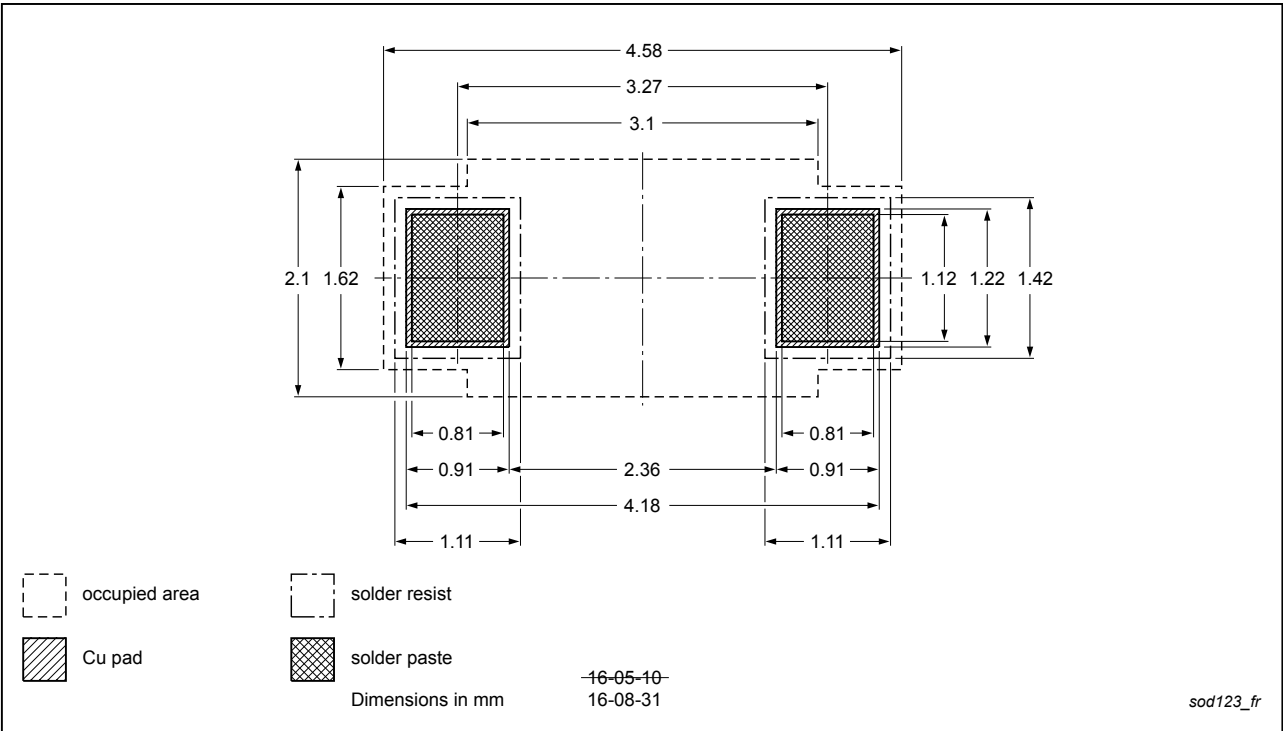


Fig. 8. Reflow soldering footprint for SOD123

SOD123

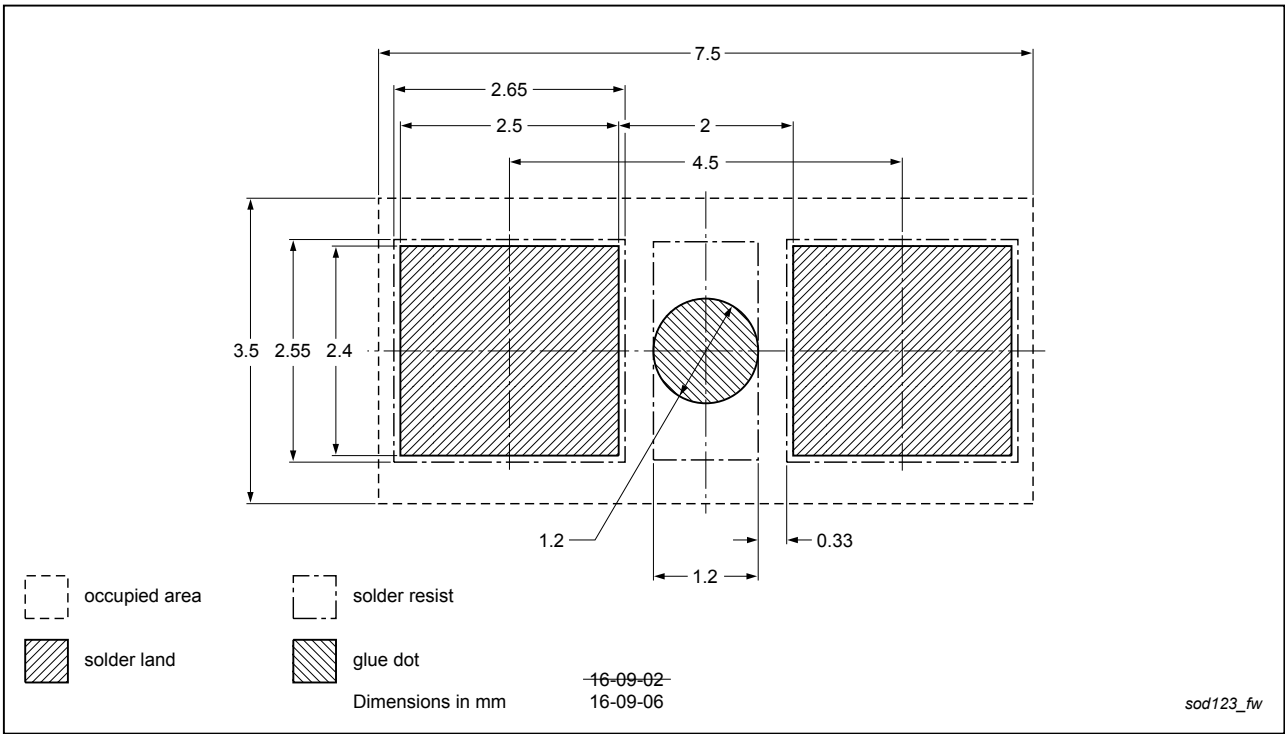


Fig. 9. Wave soldering footprint for SOD123

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAT54GW v.1	20161124	Product data sheet	-	-

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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