



# THE DATASHEET OF BAT54GWJ





# 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:  $I_R \leq 2$   $\mu$ 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; $t_p \leq 300$ $\mu$ 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	$\mu$ 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 <sup>[1]</sup>	 SOD123	 <i>sym001</i>
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	$T_j = 25\text{ °C}$		-	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	$t_p < 10\text{ ms}; T_{j(\text{init})} = 25\text{ °C}; \text{square wave}$		-	600	mA
$P_{\text{tot}}$	total power dissipation	$T_{\text{amb}} \leq 25\text{ °C}$	[1]	-	357	mW
			[2]	-	600	mW
$T_j$	junction temperature			-	150	°C
$T_{\text{amb}}$	ambient temperature			-55	150	°C
$T_{\text{stg}}$	storage temperature			-65	150	°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  $1\text{ cm}^2$ .

## 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  $1\text{ cm}^2$ .

[3] Soldering point of cathode tab.

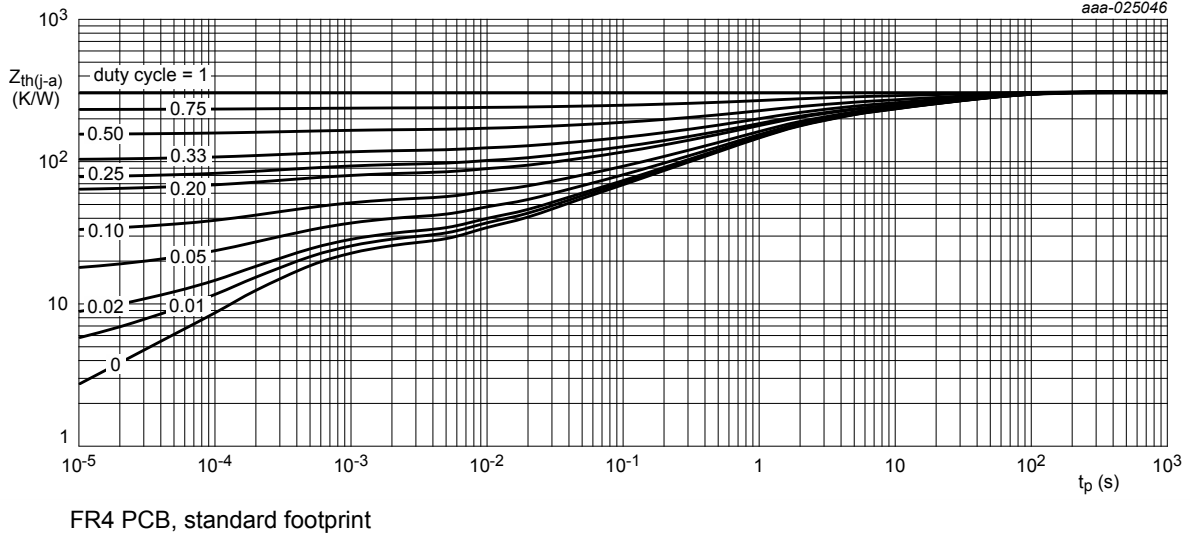


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

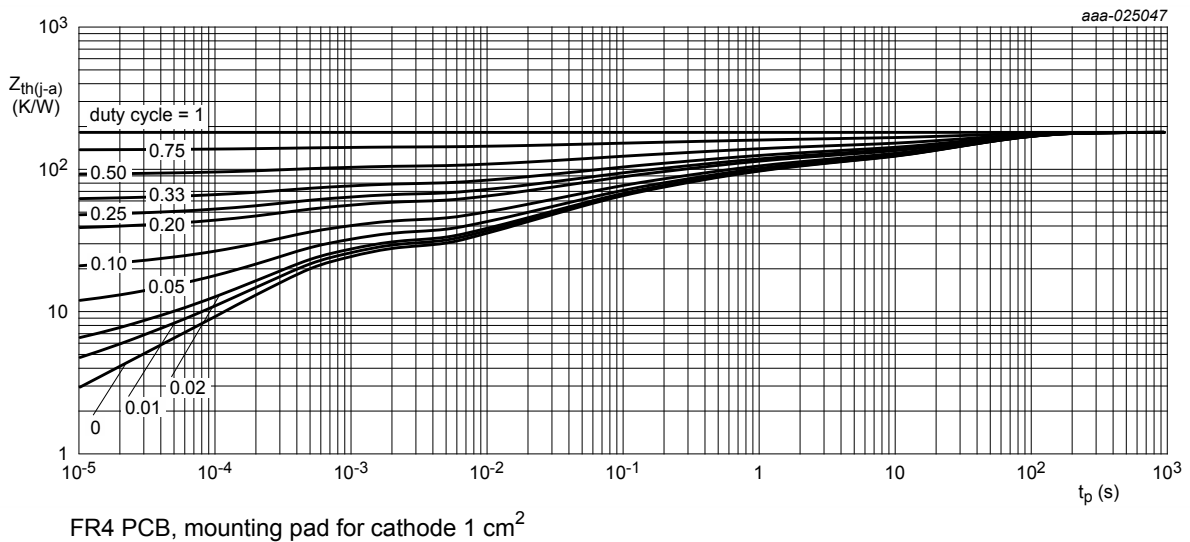


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

## 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	$\mu\text{A}$
$C_d$	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.

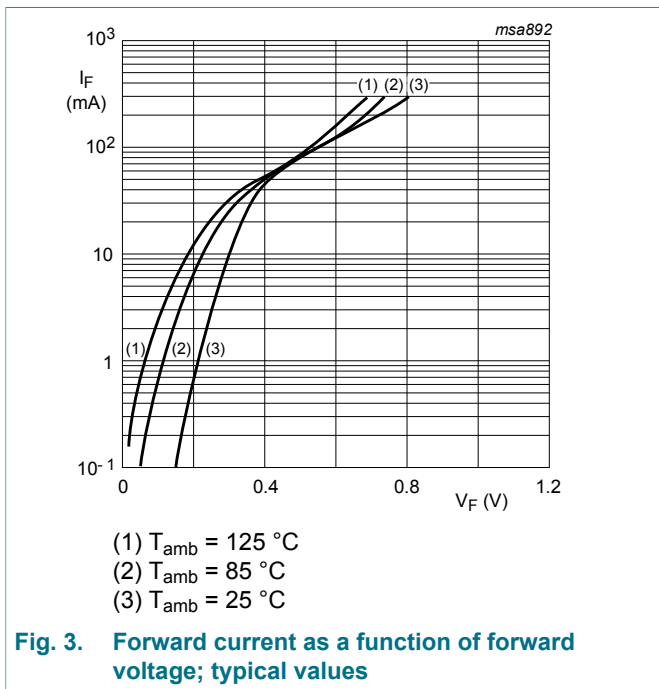


Fig. 3. Forward current as a function of forward voltage; typical values

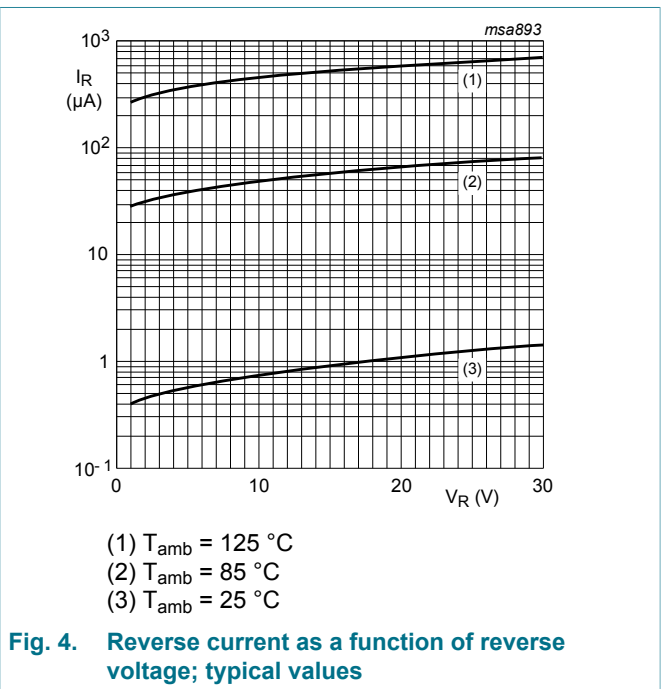
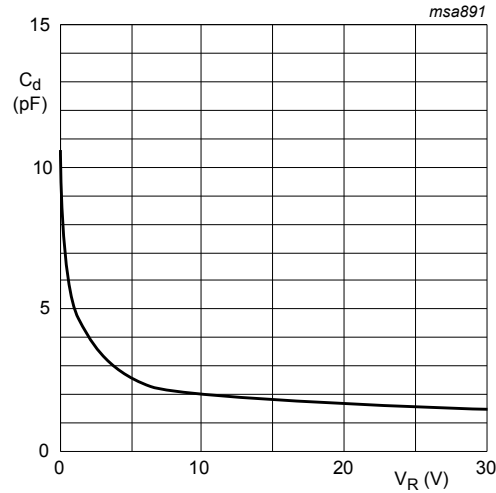


Fig. 4. Reverse current as a function of reverse voltage; typical values



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

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

## 11. Test information

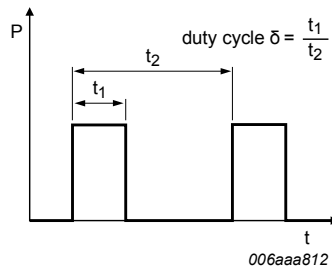


Fig. 6. Duty cycle definition

### 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

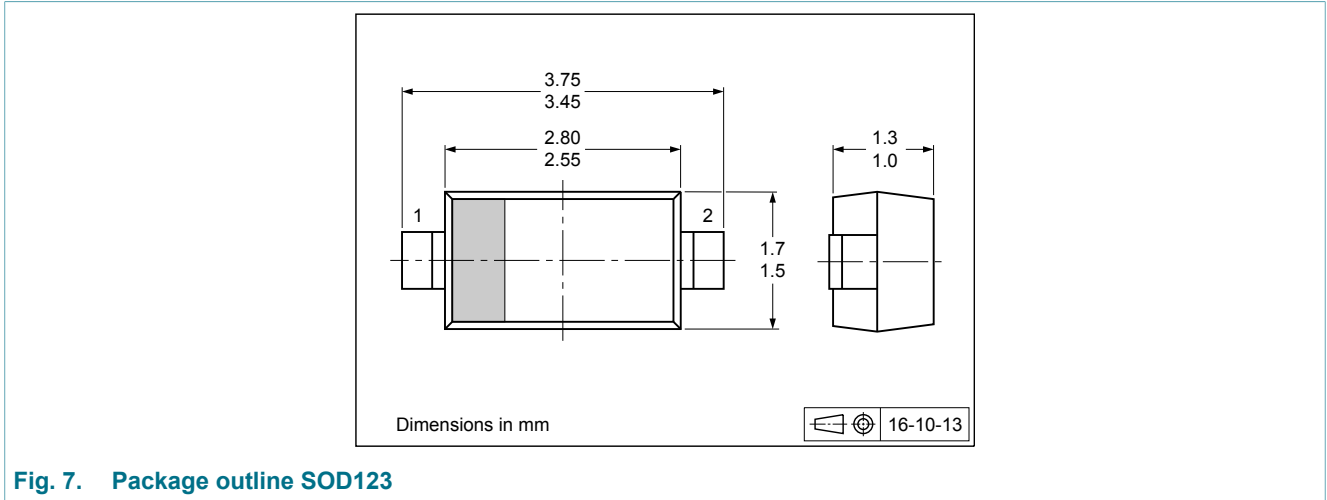


Fig. 7. Package outline SOD123

## 13. Soldering

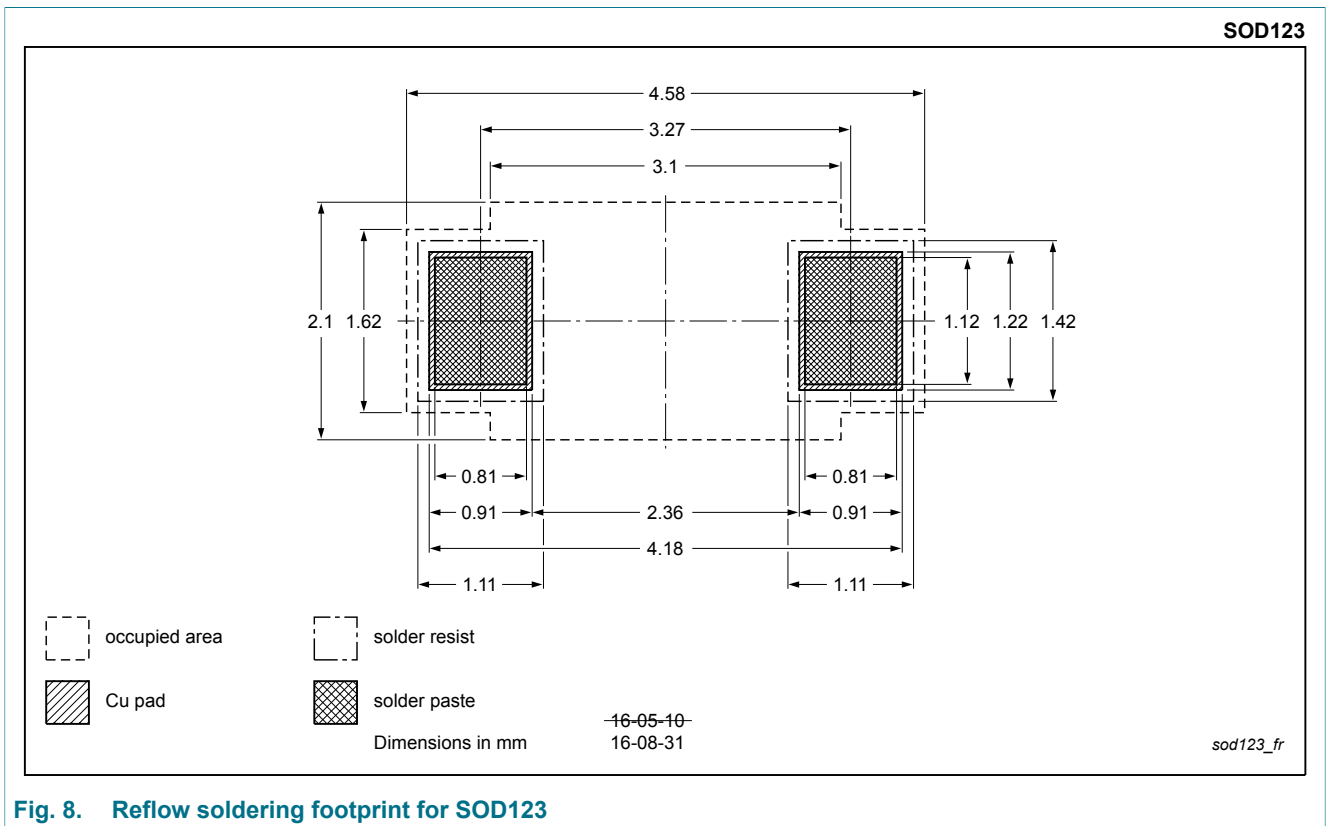


Fig. 8. Reflow soldering footprint for SOD123

SOD123

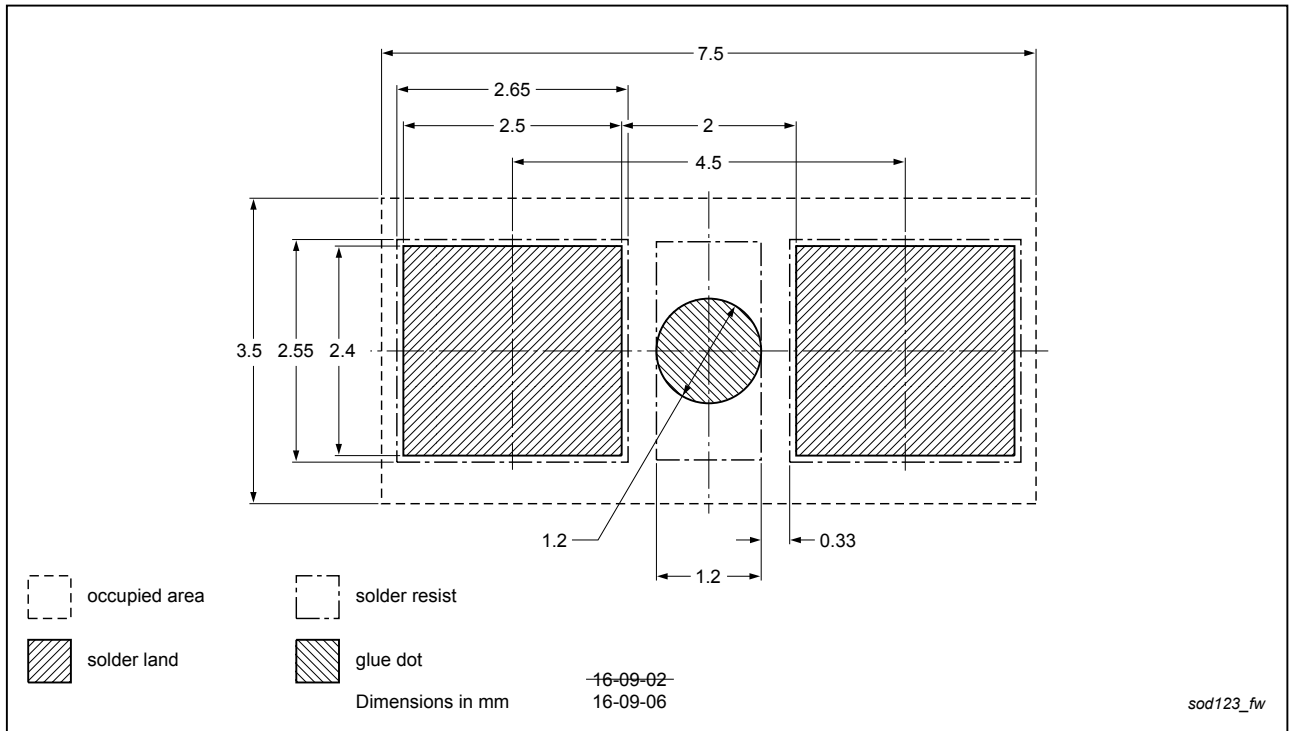


Fig. 9. Wave soldering footprint for SOD123

## 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 <sup>[1] [2]</sup>	Product status <sup>[3]</sup>	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.
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