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 ≤ 850 mV
- Low leakage current: I_R ≤ 4 μA
- Reverse voltage V_R ≤ 100 V
- Low capacitance
- Small SMD plastic package
- AEC-Q101 qualified

3. Applications

- · High-speed switching
- Line termination
- Voltage clamping
- · Reverse polarity protection

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V_R	reverse voltage	T _j = 25 °C	-	-	100	٧
V _F	forward voltage	$I_F = 250 \text{ mA}; t_p \le 300 \mu\text{s}; \delta \le 0.02 ;$ $T_j = 25 ^{\circ}\text{C}$	-	710	850	mV
I _R	reverse current	V_R = 75 V; pulsed; T_j = 25 °C	-	1	4	μA



100 V, 250 mA Schottky barrier diode

5. Pinning information

Table 2. Pinning information

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

^[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAT46GW	SOD123	Plastic surface-mounted package; 2 leads	SOD123

7. Marking

Table 4. Marking codes

Type number	Marking code
BAT46GW	G8

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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 °C		-	100	V
I _F	forward current			-	250	mA
I _{FSM}	non-repetitive peak forward current	t_p < 10 ms; $T_{j(init)}$ = 25 °C; square wave		-	2.5	А
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	390	mW
			[2]	-	660	mW
Tj	junction temperature			-	150	°C
T _{amb}	ambient temperature			-55	150	°C
T _{stg}	storage temperature			-65	150	°C

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

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
R _{th(j-a)}	thermal resistance from junction to ambient	III II CC all	[1]	-	-	320	K/W
			[2]	_	_	190	K/W
R _{th(j-sp)}	thermal resistance from junction to solder point		[3]	-	-	35	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 cm².

^{2]} Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm².

^[3] Soldering point of cathode tab.

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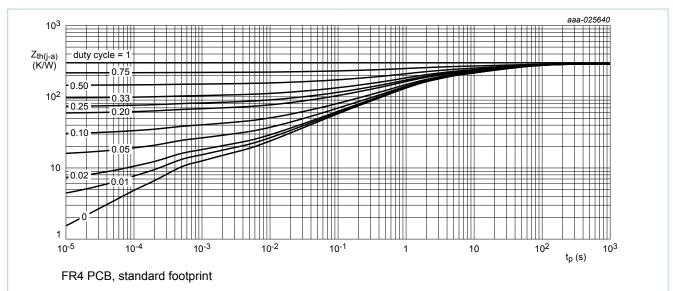


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

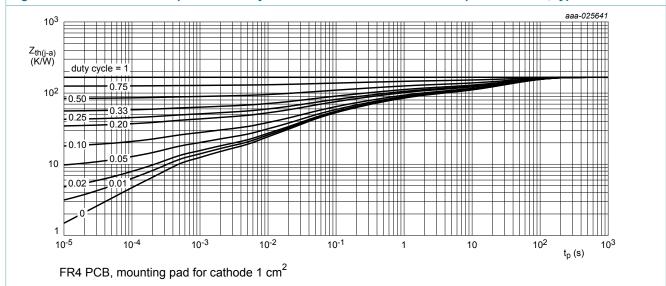


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

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10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
$V_{(BR)R}$	reverse breakdown voltage	$I_R = 1 \text{ mA}; t_p \le 300 \mu\text{s}; \delta \le 0.02 ;$ $T_j = 25 ^{\circ}\text{C}$	100	-	-	V
V _F	forward voltage	$I_F = 0.1 \text{ mA}; t_p \le 300 \text{ µs}; \delta \le 0.02 ;$ $T_j = 25 \text{ °C}$	-	175	200	mV
		I_F = 10 mA; $t_p \le 300$ μs; $\delta \le 0.02$; T_j = 25 °C	-	315	350	mV
		I_F = 10 mA; $t_p \le 300 \ \mu s$; $\delta \le 0.02$; T_j = -40 °C	-	-	470	mV
		I_F = 50 mA; $t_p \le 300 \ \mu s; \ \delta \le 0.02$; T_j = 25 °C	-	415	475	mV
		I_F = 50 mA; $t_p \le 300~\mu s; \delta \le 0.02~;$ T_j = -40 °C	-	-	560	mV
		I_F = 250 mA; $t_p \le 300 \ \mu s$; $\delta \le 0.02$; T_j = 25 °C	-	710	850	mV
I _R	reverse current	V _R = 1.5 V; T _j = 25 °C	-	0.2	0.5	μΑ
		V_R = 1.5 V; pulsed; T_j = 60 °C	-	-	12	μA
		V_R = 10 V; pulsed; T_j = 25 °C	-	0.3	0.8	μΑ
		V_R = 10 V; pulsed; T_j = 60 °C	-	-	20	μΑ
		V_R = 50 V; pulsed; T_j = 25 °C	-	0.7	2	μA
		V_R = 50 V; pulsed; T_j = 60 °C	-	-	44	μA
		V_R = 75 V; pulsed; T_j = 25 °C	-	1	4	μA
		V_R = 75 V; pulsed; T_j = 60 °C	-	-	80	μΑ
		V _R = 100 V; pulsed; T _j = 25 °C	-	2	9	μΑ
		V _R = 100 V; pulsed; T _j = 60 °C	-	-	120	μΑ
		V _R = 100 V; pulsed; T _j = 85 °C	-	-	600	μΑ
C _d	diode capacitance	V _R = 0 V; f = 1 MHz; T _j = 25 °C	-	-	39	pF
		V _R = 1 V; f = 1 MHz; T _j = 25 °C	-	-	21	pF
t _{rr}	reverse recovery time	I_F = 10 mA; I_R = 10 mA; $I_{R(meas)}$ = 1 mA; I_{L} = 100 Ω; I_{L} = 25 °C	-	5.9	-	ns

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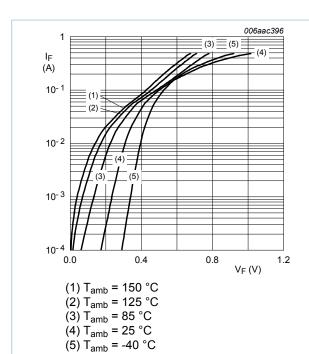


Fig. 3. Forward current as a function of forward voltage; typical values

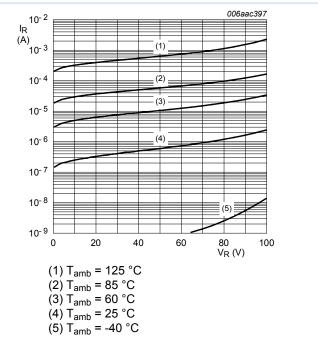


Fig. 4. Reverse current as a function of reverse voltage; typical values

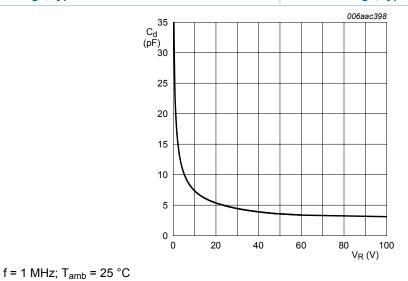
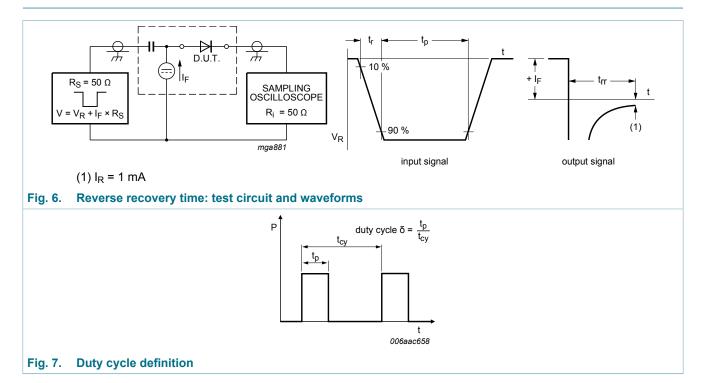


Fig. 5. Diode capacitance as a function of reverse voltage; typical values

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11. Test information

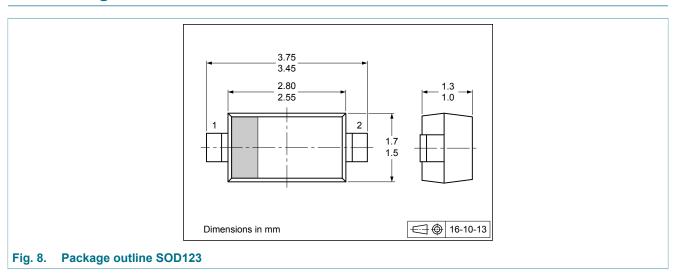


The current ratings for the typical waveforms are calculated according to the equations: $I_{F(AV)} = I_M \times \delta$ with I_M defined as peak current, $I_{RMS} = I_{F(AV)}$ at DC, and $I_{RMS} = I_M \times \sqrt{\delta}$ with I_{RMS} defined as RMS current.

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.

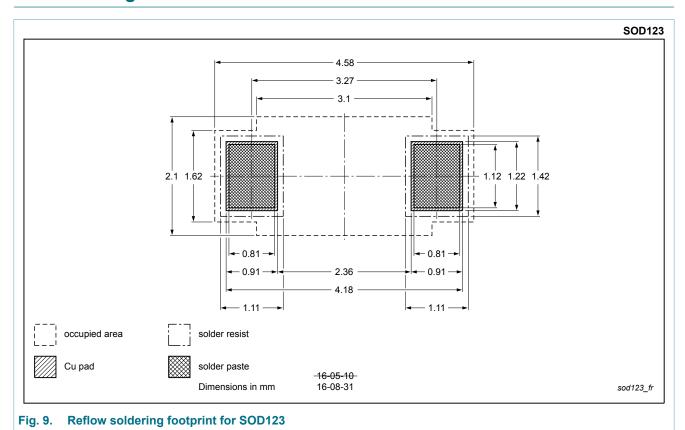
12. Package outline



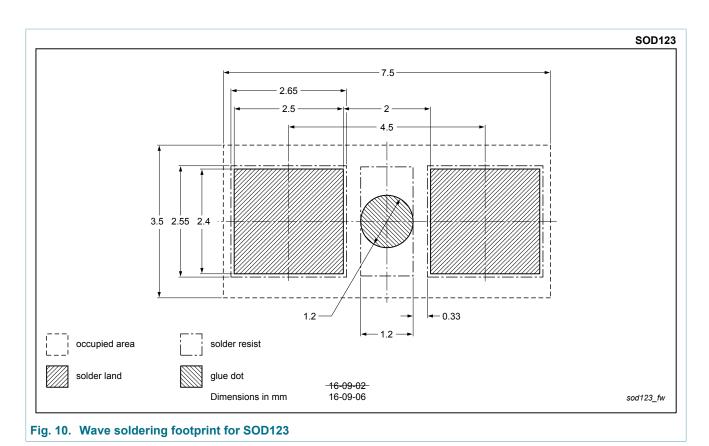
BAT46GW

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13. Soldering



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14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAT46GW v.1	20161124	Product data sheet	-	-

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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.

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