BAS116GW

Low leakage switching diode

5 April 2018 Product data sheet

1. General description

Low leakage switching diode, encapsulated in an SOD123 small Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- High switching speed: t_{rr} = 0.8 µs
- Low leakage current: I_R = 3 pA
- Repetitive peak reverse voltage $V_{RRM} \leq$ 85 V
- Low capacitance: C_d = 2 pF
- Small SMD plastic package
- AEC-Q101 qualified

3. Applications

- Low-leakage current applications
- General-purpose switching

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{RRM}	repetitive peak reverse voltage	T_j = 25 °C		-	-	85	V
I_F	forward current	$t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		-	-	215	mA
V_R	reverse voltage	T_j = 25 °C		-	-	75	V
V_F	forward voltage	I_F = 150 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_j = 25 °C		-	-	1.25	V
I_R	reverse current	V_R = 75 V; pulsed; T_j = 25 °C		-	0.003	5	nA
t_{rr}	reverse recovery time	I_F = 10 mA; I_R = 10 mA; R_L = 100 Ω; $I_{R(meas)}$ = 1 mA; T_j = 25 °C		-	0.8	3	µs

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	Cathode	 SOD123	 sym001
2	A	Anode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAS116GW	SOD123	Plastic surface-mounted package; 2 leads	SOD123

7. Marking

Table 4. Marking codes

Type number	Marking code
BAS116GW	GB

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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_{RRM}	repetitive peak reverse voltage	T_j = 25 °C		-	85	V
V_R	reverse voltage			-	75	V
I_F	forward current	$t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		-	215	mA
I_{FSM}	non-repetitive peak forward current	t_p = 1 µs; $T_{j(init)}$ = 25 °C; square wave		-	4	A
		t_p = 1 ms; $T_{j(init)}$ = 25 °C; square wave		-	1	A
		t_p = 1 s; $T_{j(init)}$ = 25 °C; square wave		-	0.5	A
I_{FRM}	repetitive peak forward current			-	500	mA
P_{tot}	total power dissipation	$T_{amb} \leq$ 25 °C	[1]	-	357	mW
			[2]	-	600	mW
Per device, one diode loaded						
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-55	150	°C
T_{stg}	storage temperature			-65	150	°C

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated mounting pad for cathode 1cm^2.

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	In free air	[1]	-	-	350	K/W
			[2]	-	-	210	K/W
$R_{th(j-sp)}$	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 1cm^2.
[3] Soldering point of cathode tab.

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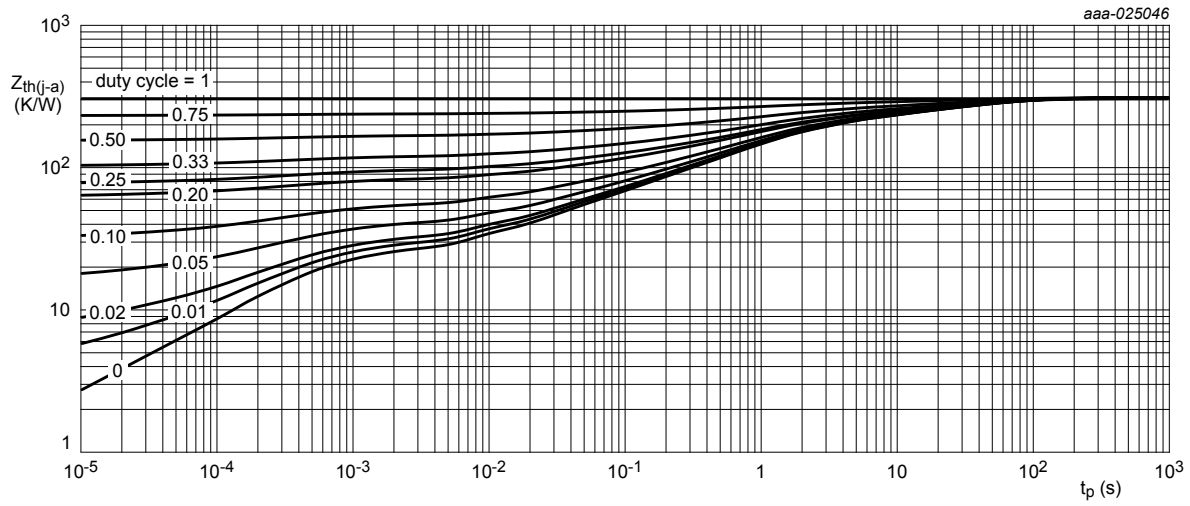
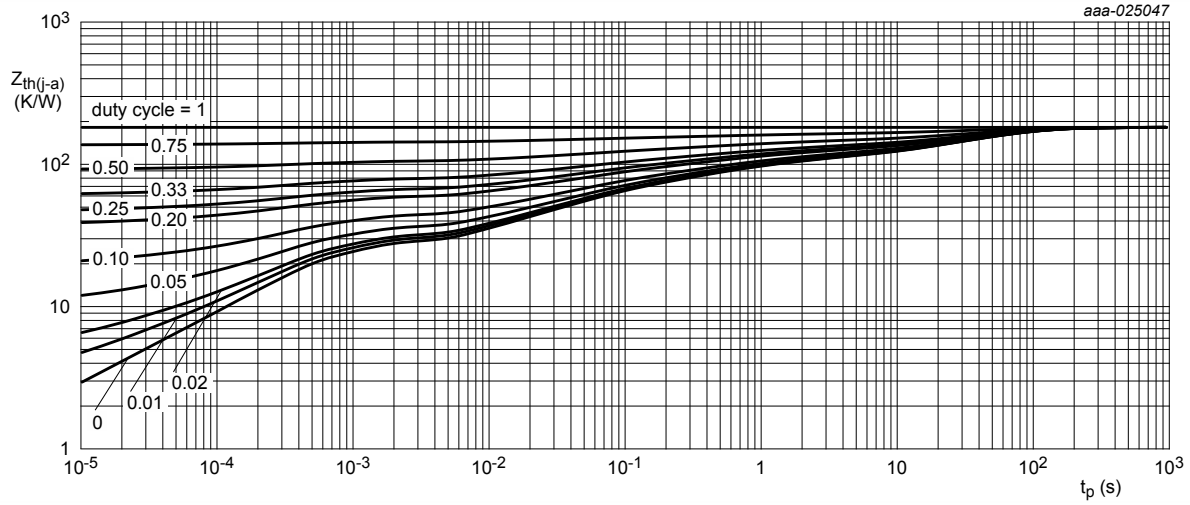


FR4 PCB, standard footprint

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



FR4 PCB, mounting pad for cathode 1 cm^2

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

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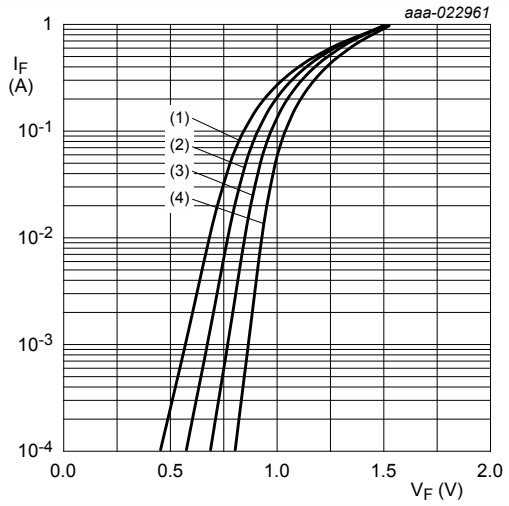
10. Characteristics

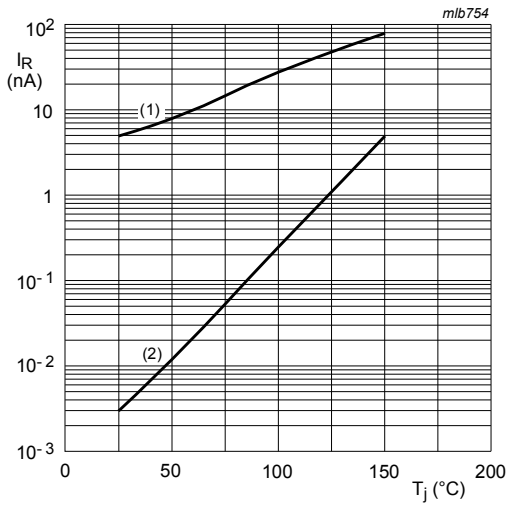
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage	I_F = 1 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_j = 25 °C		-	-	0.9	V
		I_F = 10 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_j = 25 °C		-	-	1	V
		I_F = 50 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_j = 25 °C		-	-	1.1	V
		I_F = 150 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_j = 25 °C		-	-	1.25	V
I_R	reverse current	V_R = 75 V; pulsed; T_j = 25 °C		-	0.003	5	nA
		V_R = 75 V; pulsed; T_j = 150 °C		-	3	80	nA
C_d	diode capacitance	V_R = 0 V; f = 1 MHz; T_j = 25 °C		-	2	-	pF
t_{rr}	reverse recovery time	I_F = 10 mA; I_R = 10 mA; R_L = 100 Ω; $I_{R(meas)}$ = 1 mA; T_j = 25 °C		-	0.8	3	µs



(1) T_j = 150 °C
(2) T_j = 85 °C
(3) T_j = 25 °C
(4) T_j = −40 °C

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



V_R = 75 V
(1) Maximum values
(2) Typical values

Fig. 4. Reverse current as a function of junction temperature

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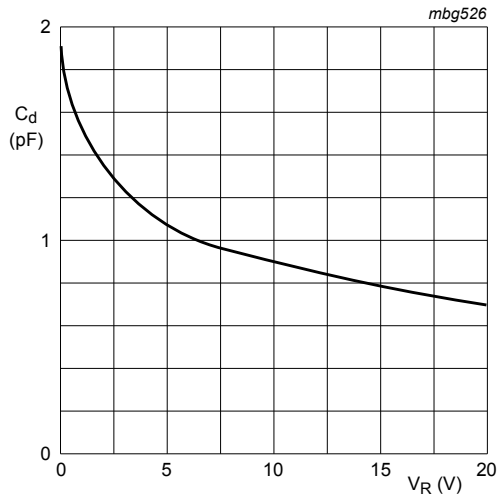
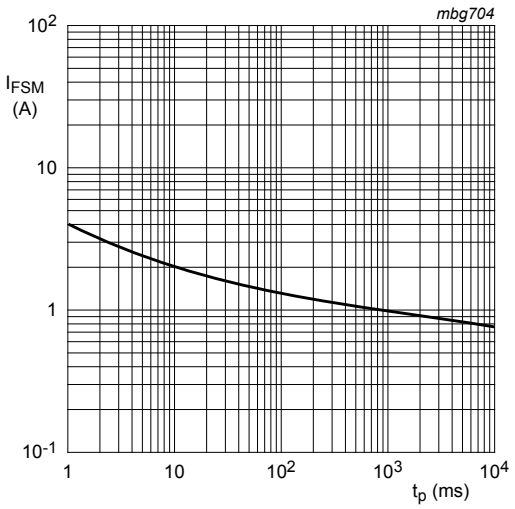


f = 1 MHz; T_{amb} = 25 °C

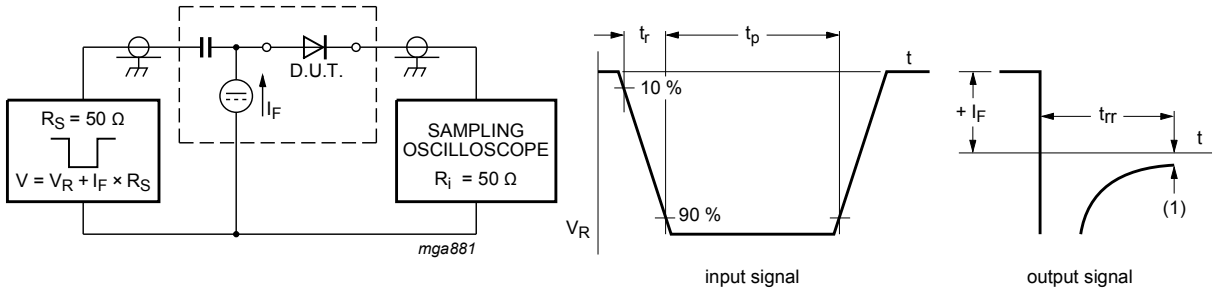
Fig. 5. Diode capacitance as a function of reverse voltage; typical values



Based on square wave currents.
$T_{j(init)}$ = 25 °C

Fig. 6. Non-repetitive peak forward current as a function of pulse duration; maximum values

11. Test information



(1) I_R = 1 mA

Fig. 7. Reverse recovery time test circuit and waveforms

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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12. Package outline

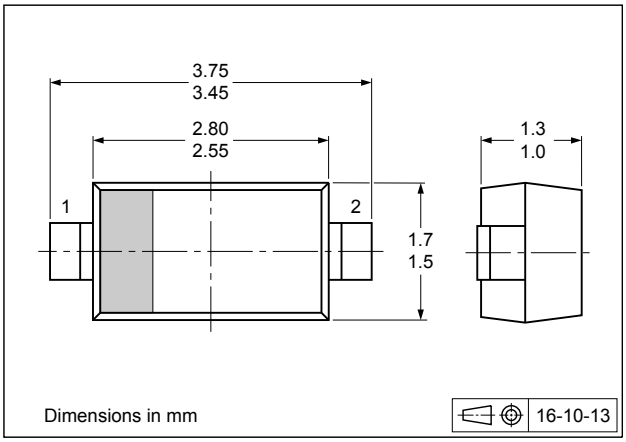

Fig. 8. Package outline SOD123

13. Soldering

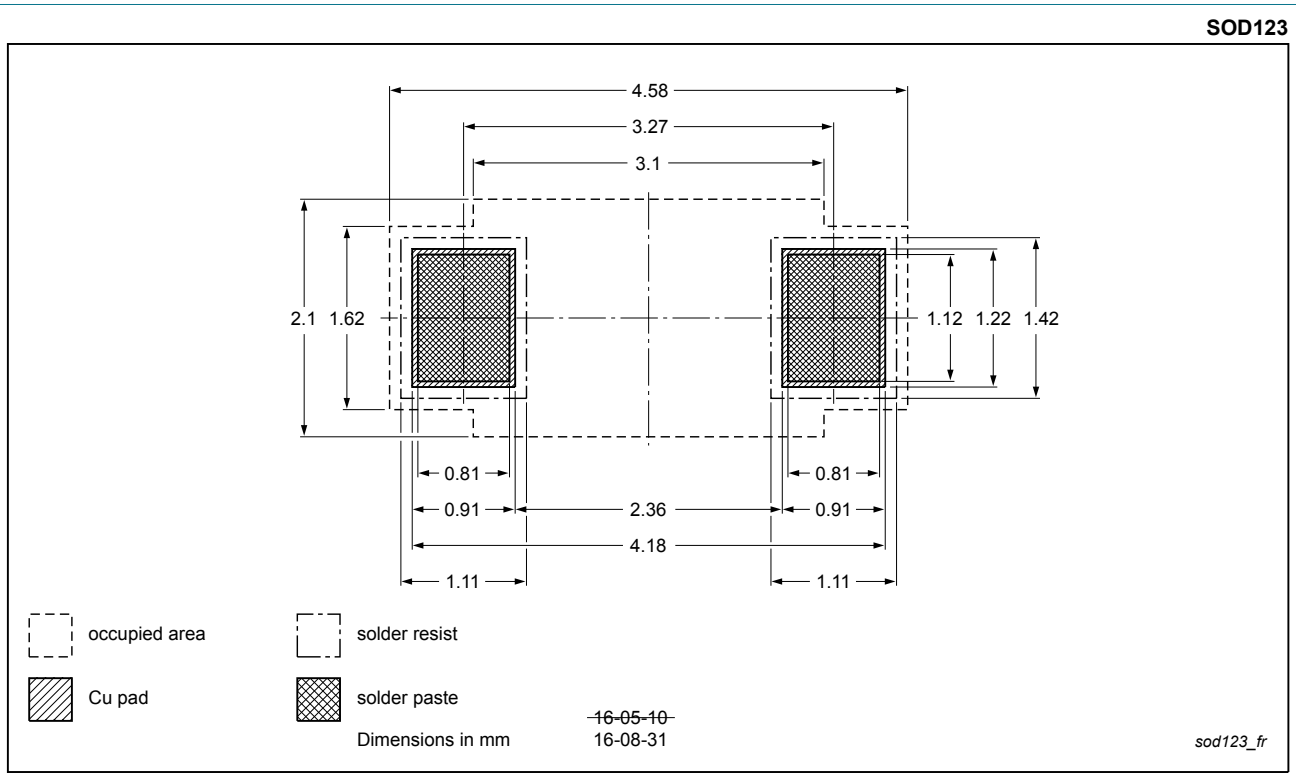

Fig. 9. Reflow soldering footprint for SOD123

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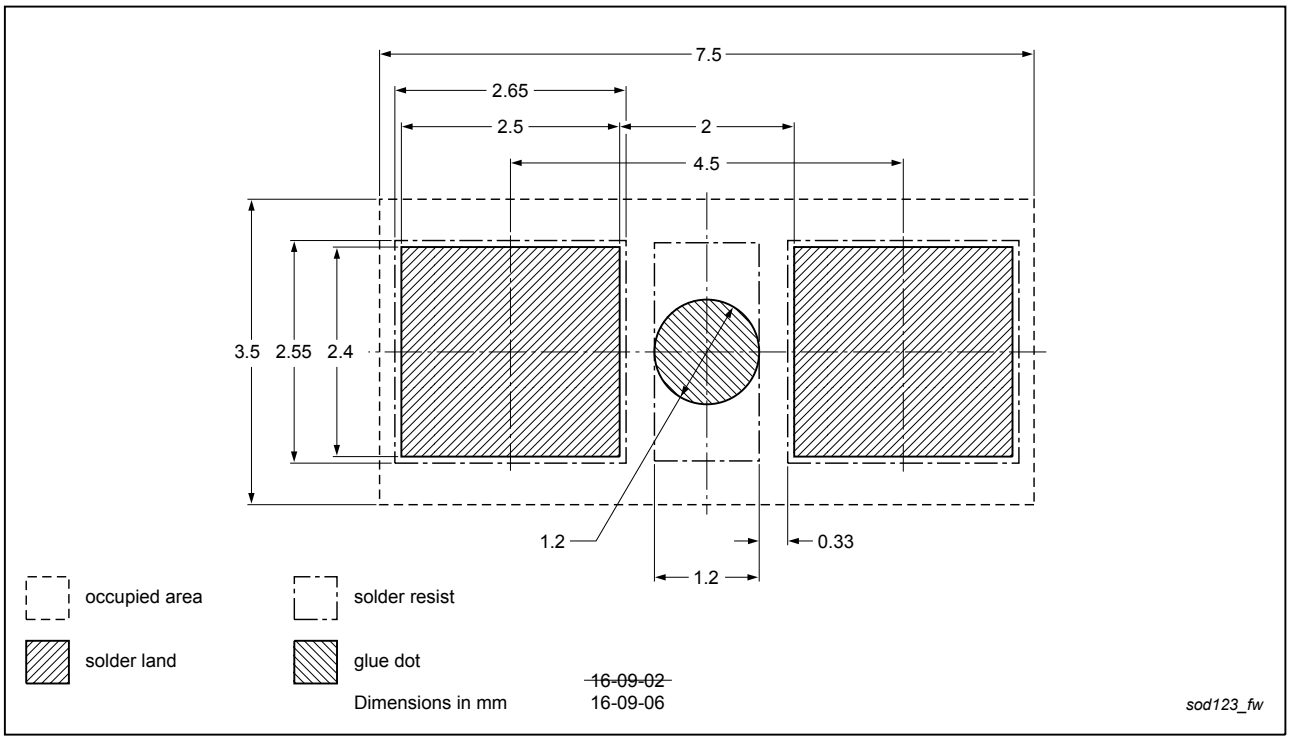

Fig. 10. Wave soldering footprint for SOD123

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14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS116GW v.2	20180405	Product data sheet	-	BAS116GW v.1
Modifications:	• Unit corrected to nA in Table 7, reverse current at 150 °C			
BAS116GW v.1	20161124	Product data sheet	-	

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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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