BAS16GW

High-speed switching diode

23 November 2016 **Product data sheet**

1. General description

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

2. Features and benefits

- High switching speed: $t_{rr} \leq 4$ ns
- Low leakage current
- Reverse voltage $V_R \leq 100$ V
- Low capacitance: $C_d \leq 1.5$ pF
- Small SMD plastic package
- AEC-Q101 qualified

3. Applications

- High-speed switching at high voltage
- General-purpose switching

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_R	reverse voltage	$T_j = 25$ °C		-	-	100	V
I_R	reverse current	$V_R = 80$ V; pulsed; $T_j = 25$ °C		-	-	0.5	µA
t_{rr}	reverse recovery time	$I_F = 10$ mA; $I_R = 10$ mA; $R_L = 100$ Ω; $I_{R(meas)} = 1$ mA; Switched from $I_F = 10$ mA to $I_R = 10$ mA; $T_j = 25$ °C		-	-	4	ns

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
BAS16GW	SOD123	Plastic surface-mounted package; 2 leads	SOD123

7. Marking

Table 4. Marking codes

Type number	Marking code
BAS16GW	GA

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		-	100	V
V_R	reverse voltage			-	100	V
I_F	forward current			-	215	mA
I_{FRM}	repetitive peak forward current	$t_p \leq$ 0.5 ms; $\delta \leq$ 0.25		-	500	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
P_{tot}	total power dissipation	$T_{amb} \leq$ 25 °C	[1]	-	357	mW
			[2]	-	600	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-55	150	°C
T_{stg}	storage temperature			-65	150	°C

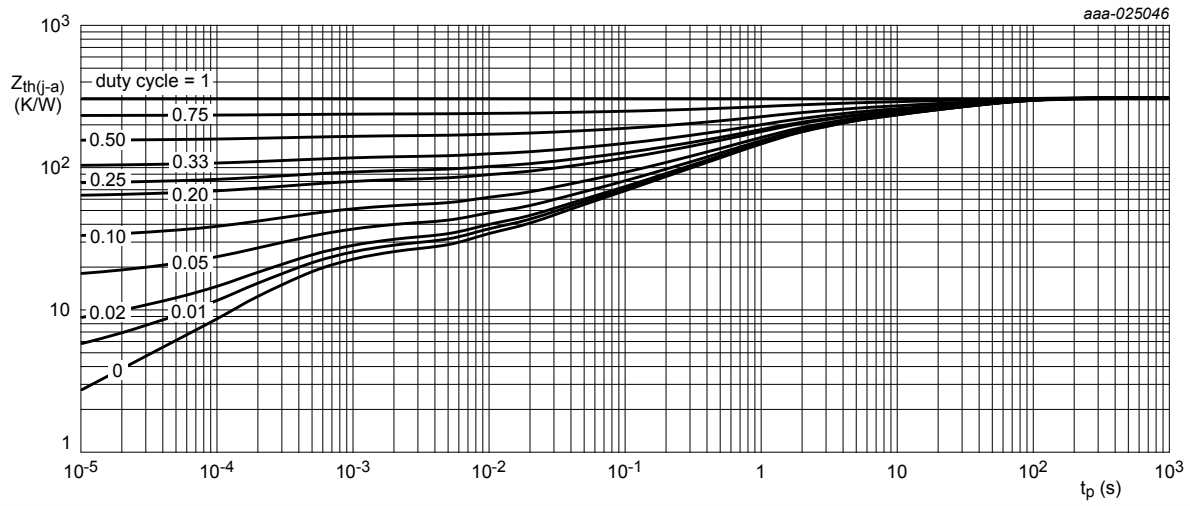
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated mounting pad for cathode 1cm^2.

9. Thermal characteristics

Table 6. Thermal characteristics

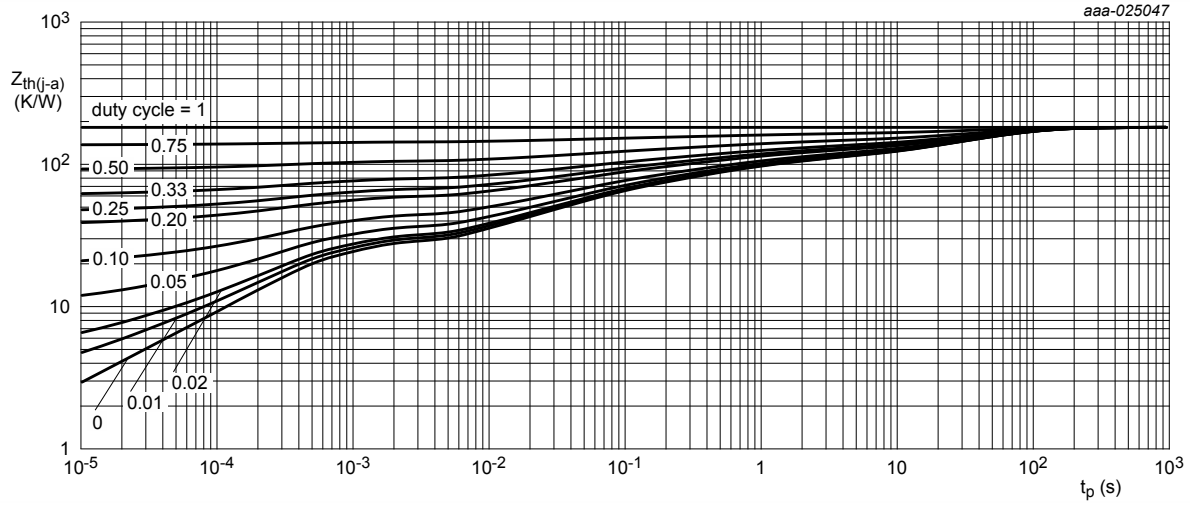
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	In free air	[1]	-	-	350	K/W
			[2]	-	-	210	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[3]	-	-	58	K/W

[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.



FR4 PCB, standard footprint

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



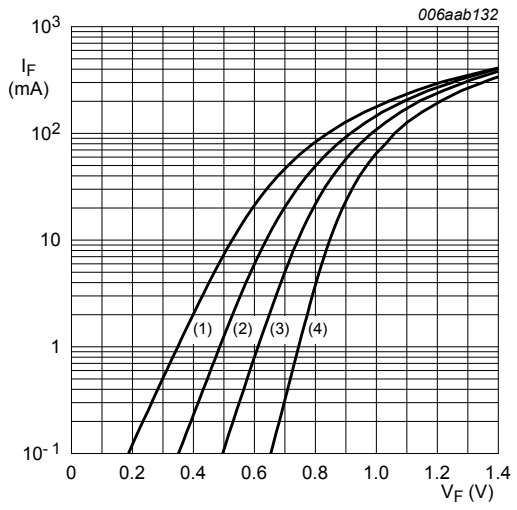
FR4 PCB, mounting pad for cathode 1 cm^2

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

10. Characteristics

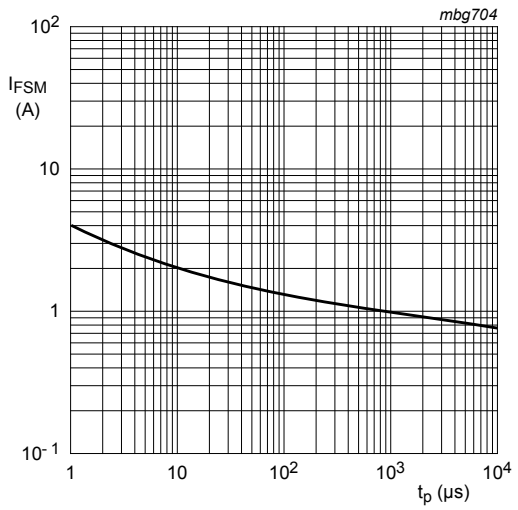
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage	I_F = 1 mA; $t_p \leq$ 300 µs; δ = 0.02 ; T_j = 25 °C		-	-	715	mV
		I_F = 10 mA; $t_p \leq$ 300 µs; δ = 0.02 ; T_j = 25 °C		-	-	855	mV
		I_F = 50 mA; $t_p \leq$ 300 µs; δ = 0.02 ; T_j = 25 °C		-	-	1	V
		I_F = 150 mA; $t_p \leq$ 300 µs; δ = 0.02 ; T_j = 25 °C		-	-	1.25	V
I_R	reverse current	V_R = 25 V; pulsed; T_j = 25 °C		-	-	30	nA
		V_R = 80 V; pulsed; T_j = 25 °C		-	-	0.5	µA
		V_R = 25 V; pulsed; T_j = 150 °C		-	-	30	µA
		V_R = 80 V; pulsed; T_j = 150 °C		-	-	50	µA
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; T_j = 25 °C		-	-	1.5	pF
t_{rr}	reverse recovery time	I_F = 10 mA; I_R = 10 mA; R_L = 100 Ω; $I_{R(meas)}$ = 1 mA; Switched from I_F = 10 mA to I_R = 10 mA; T_j = 25 °C		-	-	4	ns
V_{FR}	forward recovery voltage	I_F = 10 mA; t_r = 20 ns		-	-	1.75	V



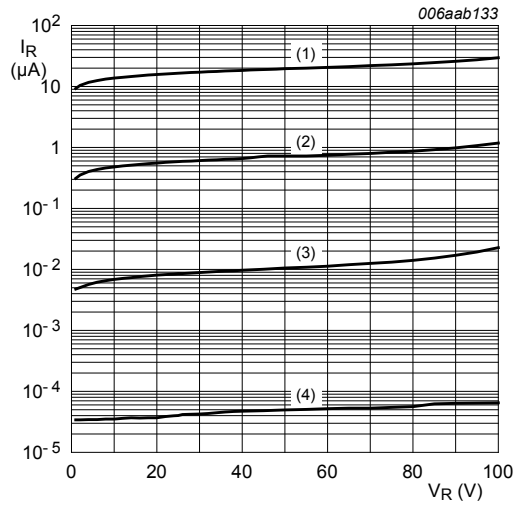
(1) T_{amb} = 150 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = -40 °C

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



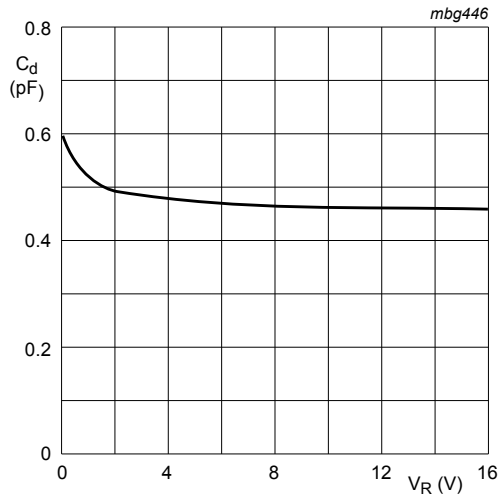
Based on square wave currents.
$T_{j(init)}$ = 25 °C

Fig. 4. Non-repetitive peak forward current as a function of pulse duration; maximum values



(1) T_{amb} = 150 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = -40 °C

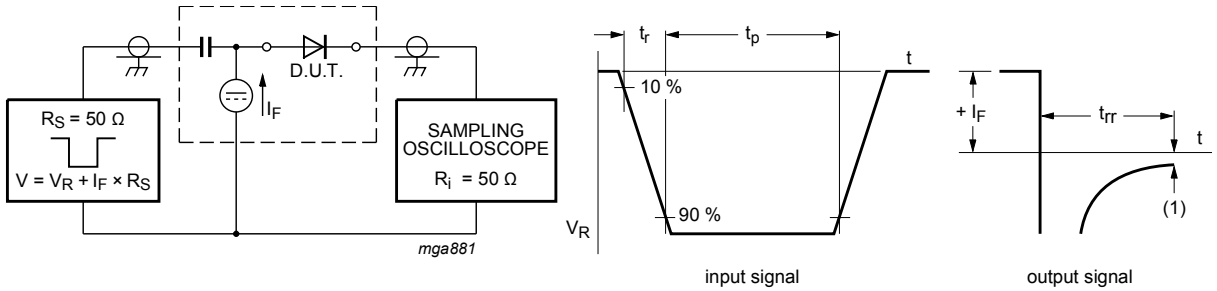
Fig. 5. Reverse current as a function of reverse voltage; typical values



f = 1 MHz; T_{amb} = 25 °C

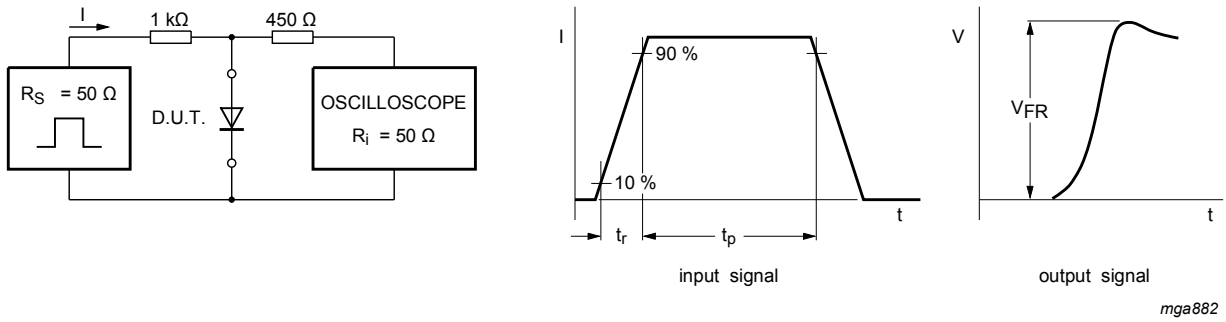
Fig. 6. Diode capacitance as a function of reverse voltage; typical values

11. Test information



(1) I_R = 1 mA
Input signal: reverse pulse rise time t_r = 0.6 ns; reverse voltage pulse duration t_p = 100 ns; duty cycle δ = 0.05
Oscilloscope: rise time t_r = 0.35 ns

Fig. 7. Reverse recovery time test circuit and waveforms



Input signal: forward pulse rise time t_r = 20 ns; forward current pulse duration t_p ≥ 100 ns; duty cycle δ ≤ 0.005

Fig. 8. Forward recovery voltage test circuit and waveforms

12. Package outline

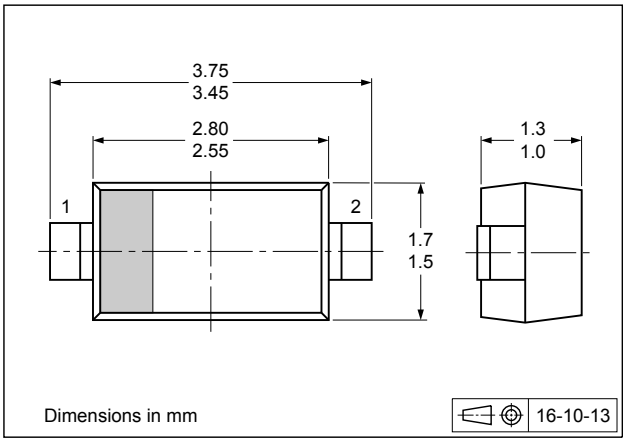


Fig. 9. Package outline SOD123

13. Soldering

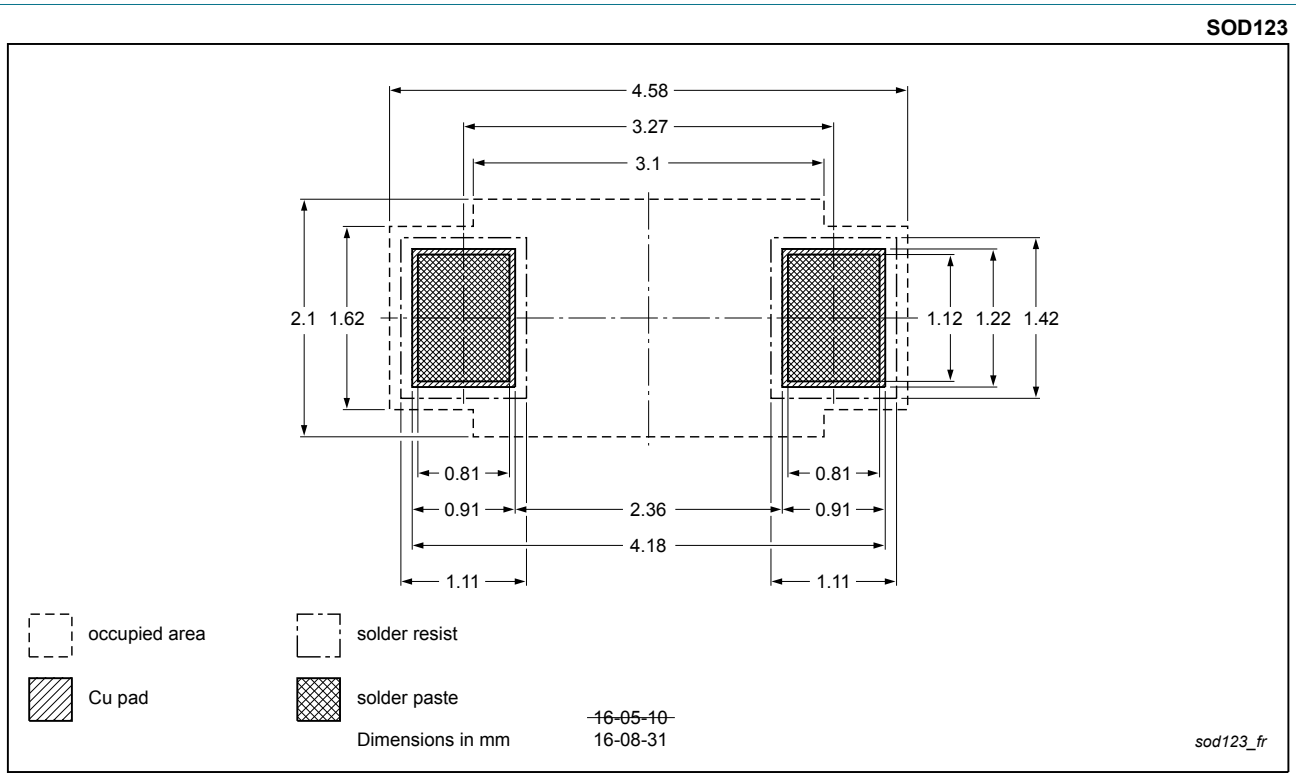


Fig. 10. Reflow soldering footprint for SOD123

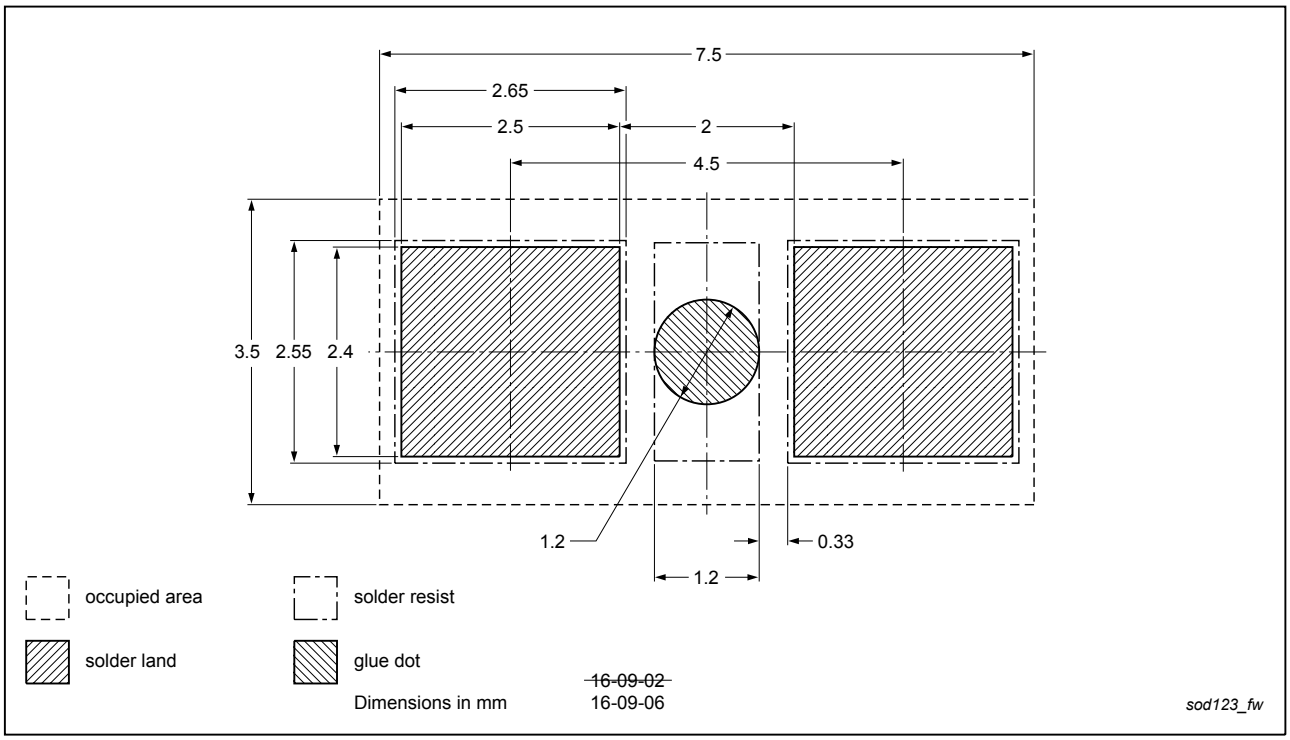


Fig. 11. Wave soldering footprint for SOD123

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS16GW v.1	20161123	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.
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16. Contents

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