BAS21GW

High-voltage switching diode

15 June 2017 Product data sheet

1. General description

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

2. Features and benefits

- High switching speed: $t_{rr} \leq 50$ ns
- Low leakage current: $I_R \leq 100$ nA
- High reverse voltage $V_R \leq 200$ V
- Low capacitance: $C_d \leq 2$ pF
- Small SMD plastic package
- AEC-Q101 qualified

3. Applications

- High-speed switching
- General-purpose switching

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_F	forward current	$T_j = 25$ °C		-	-	225	mA
V_R	reverse voltage			-	-	200	V
V_F	forward voltage	$I_F = 200$ mA; $t_p \leq 300$ µs; $\delta \leq 0.02$; $T_j = 25$ °C		-	-	1.25	V
I_R	reverse current	$V_R = 200$ V; pulsed; $T_j = 25$ °C		-	-	100	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		-	-	50	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
BAS21GW	SOD123	Plastic surface-mounted package; 2 leads	SOD123

7. Marking

Table 4. Marking codes

Type number	Marking code
BAS21GW	GC

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		-	250	V
V_R	reverse voltage			-	200	V
I_F	forward current			-	225	mA
I_{FSM}	non-repetitive peak forward current	t_p = 1 µs; $T_{j(init)}$ = 25 °C; square wave		-	9	A
		t_p = 100 µs; $T_{j(init)}$ = 25 °C; square wave		-	3	A
		t_p = 10 ms; $T_{j(init)}$ = 25 °C; square wave		-	1.7	A
I_{FRM}	repetitive peak forward current	t_p = 1 ms; δ = 0.25		-	625	mA
P_{tot}	total power dissipation	T_{amb} ≤ 25 °C	[1]	-	380	mW
			[2]	-	660	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-55	150	°C
T_{stg}	storage temperature			-65	150	°C

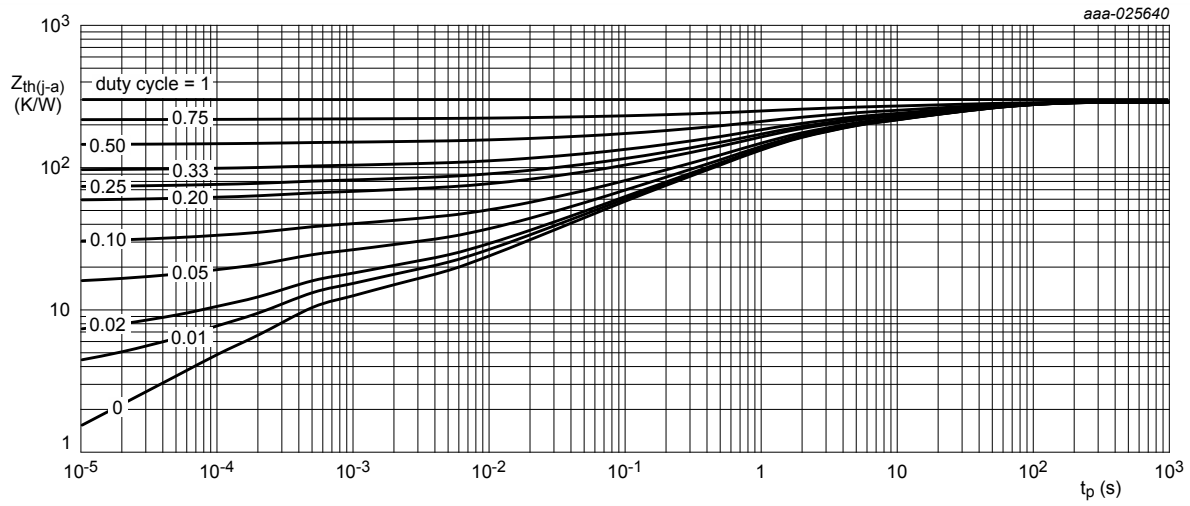
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated mounting pad for cathode 1cm^2.

9. Thermal characteristics

Table 6. Thermal characteristics

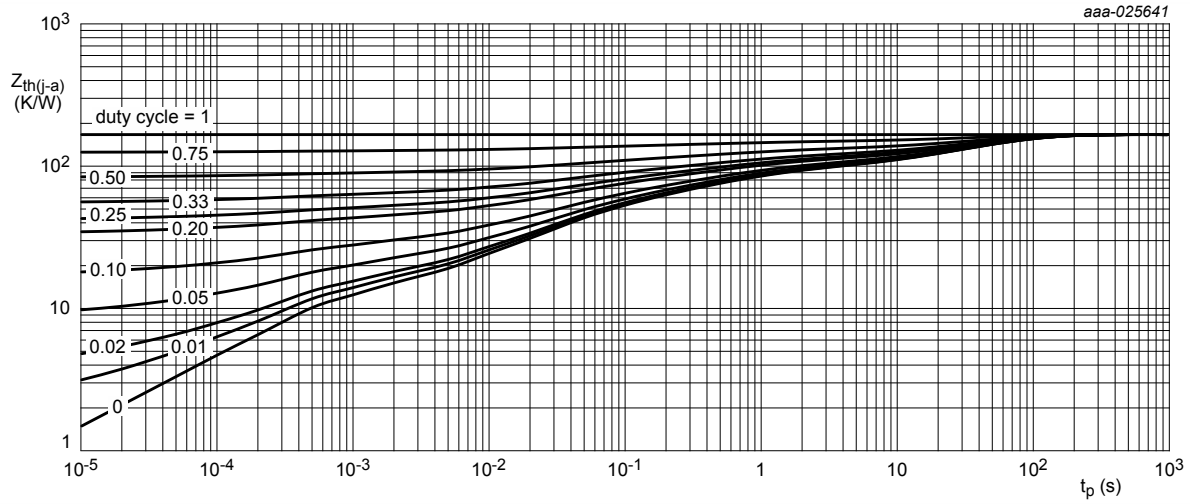
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	In free air	[1]	-	-	330	K/W
			[2]	-	-	190	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[3]	-	-	44	K/W

[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



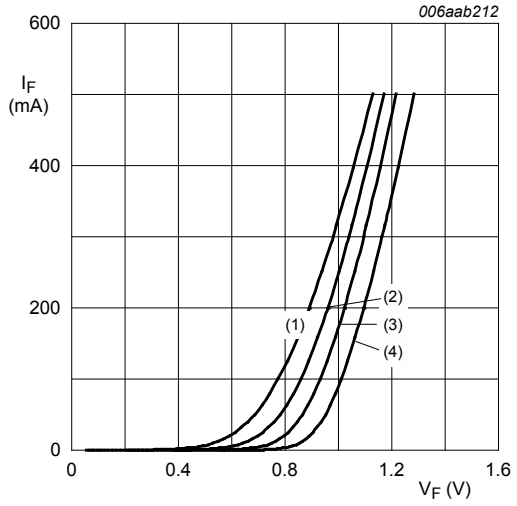
FR4 PCB, mounting pad for cathode 1 cm^2

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

10. Characteristics

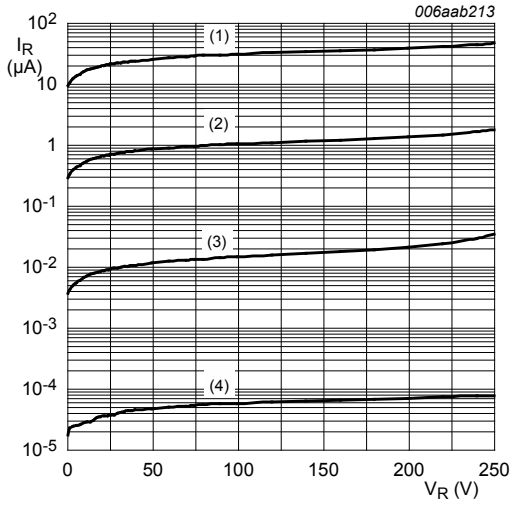
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage	I_F = 100 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02 ; T_j = 25 °C		-	-	1	V
		I_F = 200 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02 ; T_j = 25 °C		-	-	1.25	V
I_R	reverse current	V_R = 200 V; pulsed; T_j = 25 °C		-	-	100	nA
		V_R = 200 V; pulsed; T_j = 150 °C		-	-	100	µA
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		-	-	50	ns



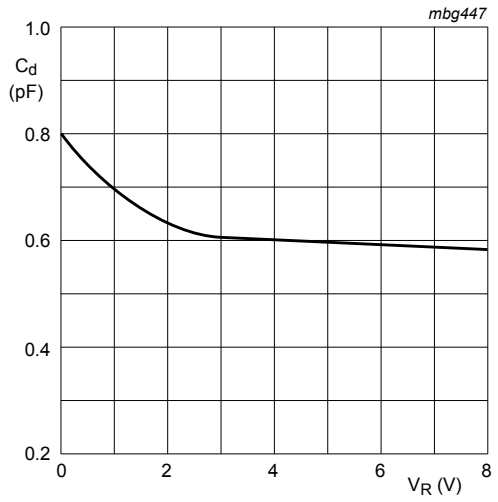
(1) T_{amb} = 150° C
(2) T_{amb} = 85° C
(3) T_{amb} = 25° C
(4) T_{amb} = -40° C

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



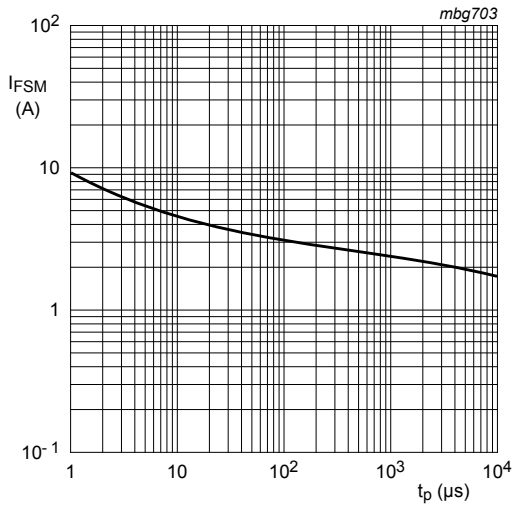
(1) T_{amb} = 150° C
(2) T_{amb} = 85° C
(3) T_{amb} = 25° C
(4) T_{amb} = -40° C

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



f = 1 MHz
T_j = 25 °C.

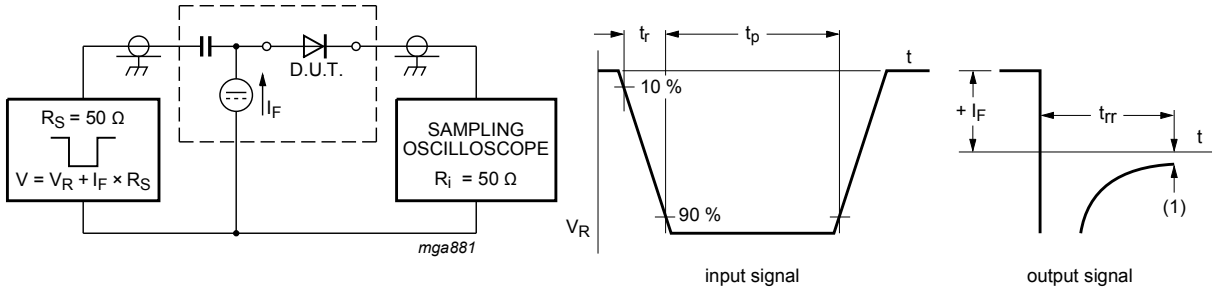
Fig. 5. Diode capacitance as a function of reverse voltage; typical values.



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.

12. Package outline

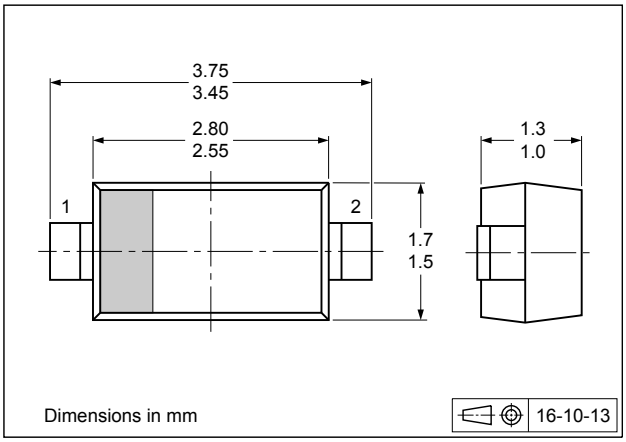


Fig. 8. Package outline SOD123

13. Soldering

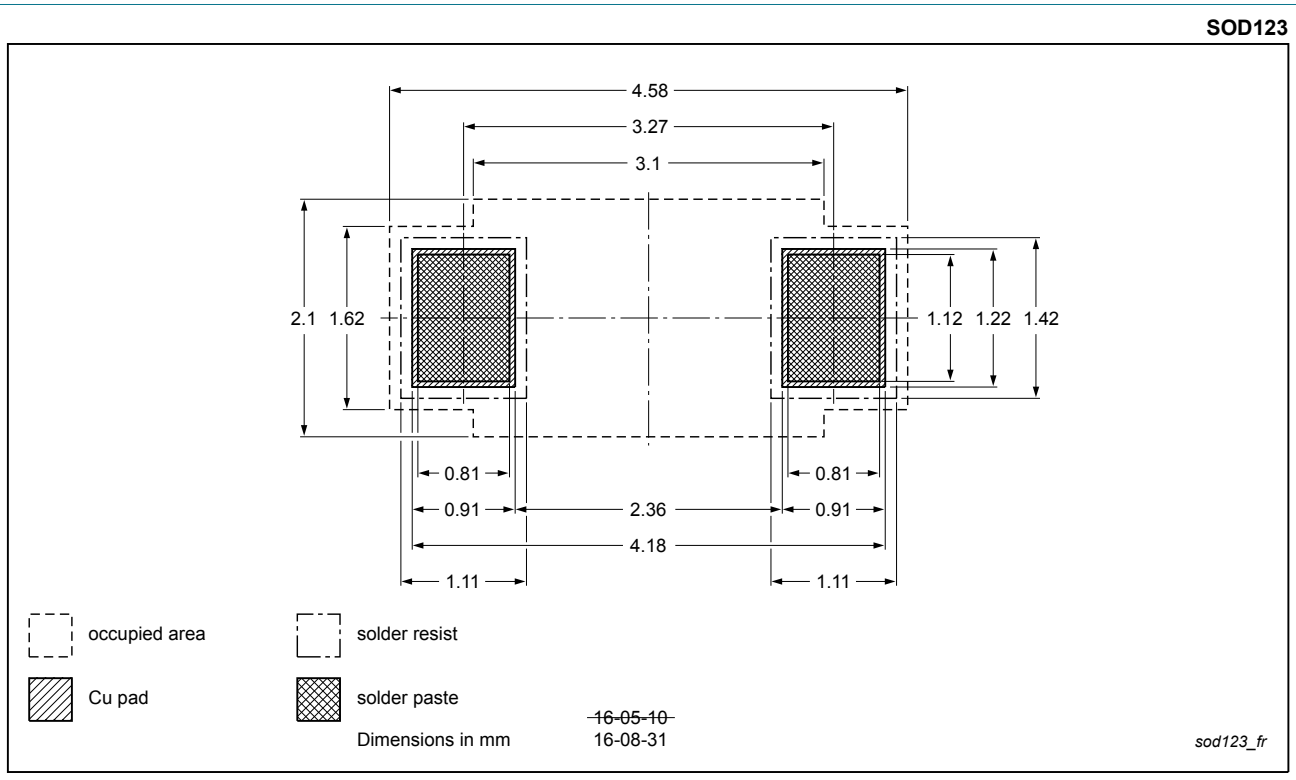


Fig. 9. Reflow soldering footprint for SOD123

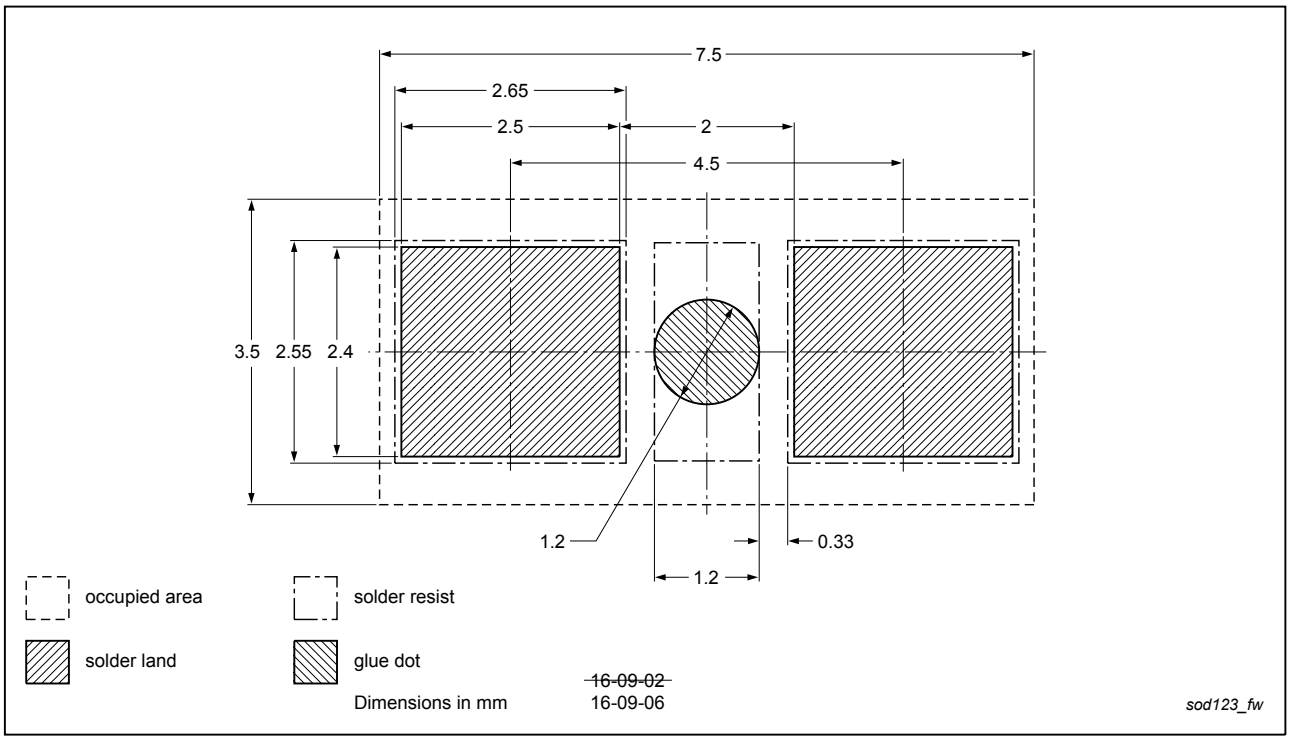


Fig. 10. Wave soldering footprint for SOD123

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS21GW v.2	20170615	Product data sheet	-	-
Modifications:	• Value of maximum reverse voltage revised • Parameter for repetitive peak reverse voltage inserted • Figure 4: unit at y-axis corrected			
BAS21GW 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.

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