



# 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; $t_p \leq 300$ $\mu$ s; $\delta \leq 0.02$ ; $T_j = 25$ °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; $R_L = 100$ $\Omega$ ; $I_{R(meas)} = 1$ 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	$T_j = 25\text{ }^\circ\text{C}$		-	250	V
$V_R$	reverse voltage			-	200	V
$I_F$	forward current			-	225	mA
$I_{FSM}$	non-repetitive peak forward current	$t_p = 1\text{ }\mu\text{s}; T_{j(\text{init})} = 25\text{ }^\circ\text{C}; \text{square wave}$		-	9	A
		$t_p = 100\text{ }\mu\text{s}; T_{j(\text{init})} = 25\text{ }^\circ\text{C}; \text{square wave}$		-	3	A
		$t_p = 10\text{ ms}; T_{j(\text{init})} = 25\text{ }^\circ\text{C}; \text{square wave}$		-	1.7	A
$I_{FRM}$	repetitive peak forward current	$t_p = 1\text{ ms}; \delta = 0.25$		-	625	mA
$P_{\text{tot}}$	total power dissipation	$T_{\text{amb}} \leq 25\text{ }^\circ\text{C}$	[1]	-	380	mW
			[2]	-	660	mW
$T_j$	junction temperature			-	150	$^\circ\text{C}$
$T_{\text{amb}}$	ambient temperature			-55	150	$^\circ\text{C}$
$T_{\text{stg}}$	storage temperature			-65	150	$^\circ\text{C}$

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

## 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]	-	-	330	K/W
			[2]	-	-	190	K/W
$R_{\text{th}(j-sp)}$	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  $1\text{ cm}^2$ .

[3] Soldering point of cathode tab.

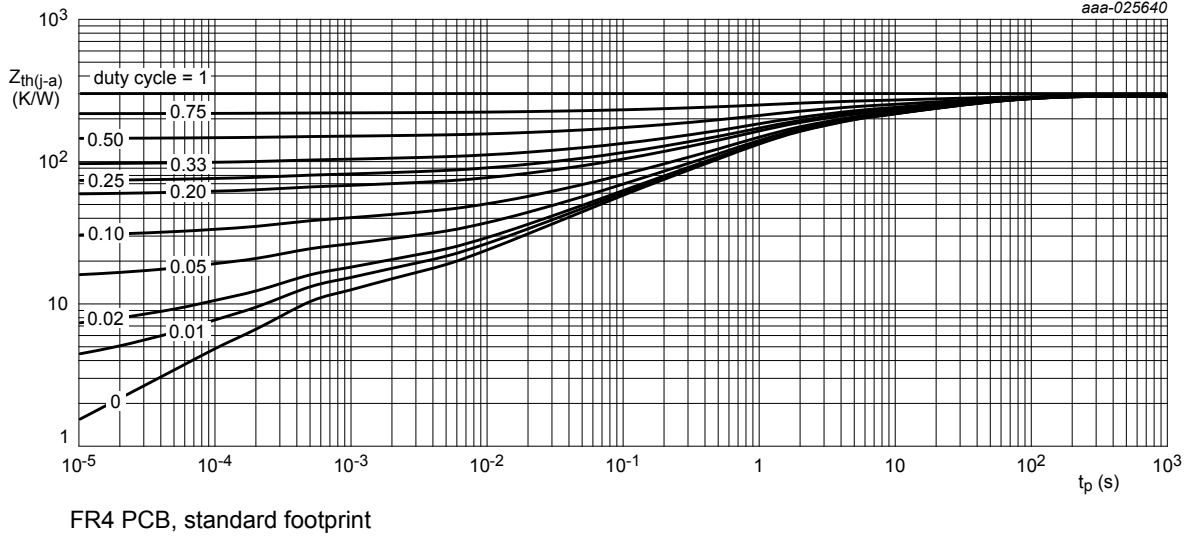


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

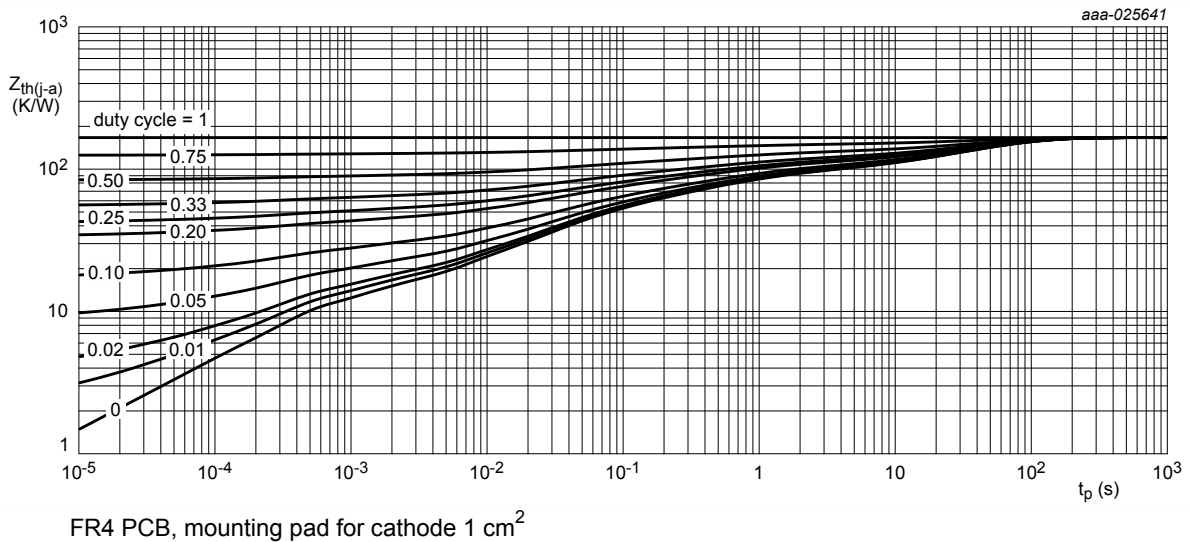
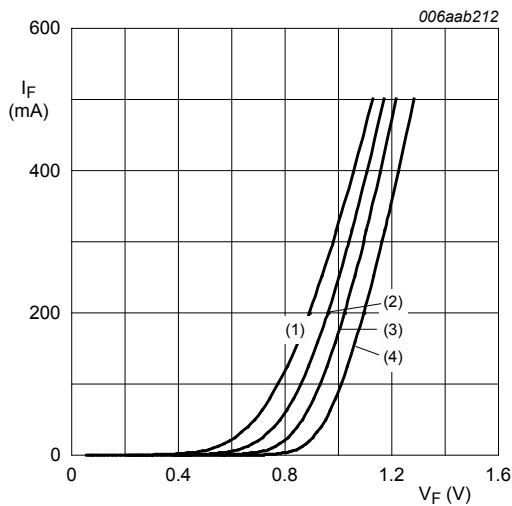


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

## 10. Characteristics

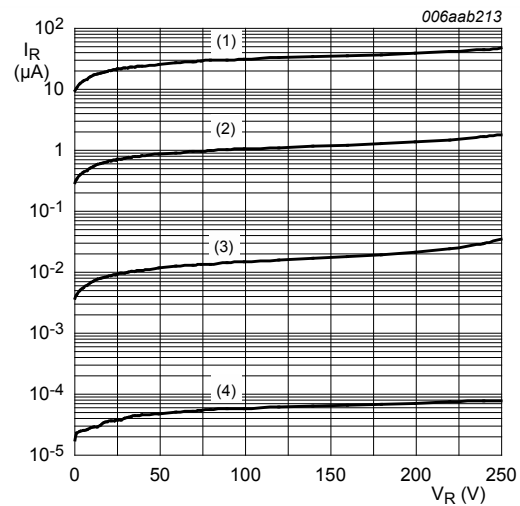
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 100 \text{ mA}$ ; $t_p \leq 300 \text{ }\mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25 \text{ }^\circ\text{C}$	-	-	1	V
		$I_F = 200 \text{ mA}$ ; $t_p \leq 300 \text{ }\mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25 \text{ }^\circ\text{C}$	-	-	1.25	V
$I_R$	reverse current	$V_R = 200 \text{ V}$ ; pulsed; $T_j = 25 \text{ }^\circ\text{C}$	-	-	100	nA
		$V_R = 200 \text{ V}$ ; pulsed; $T_j = 150 \text{ }^\circ\text{C}$	-	-	100	$\mu\text{A}$
$C_d$	diode capacitance	$V_R = 0 \text{ V}$ ; $f = 1 \text{ MHz}$ ; $T_j = 25 \text{ }^\circ\text{C}$	-	-	2	pF
$t_{rr}$	reverse recovery time	$I_F = 10 \text{ mA}$ ; $I_R = 10 \text{ mA}$ ; $R_L = 100 \text{ }\Omega$ ; $I_{R(\text{meas})} = 1 \text{ mA}$ ; $T_j = 25 \text{ }^\circ\text{C}$	-	-	50	ns



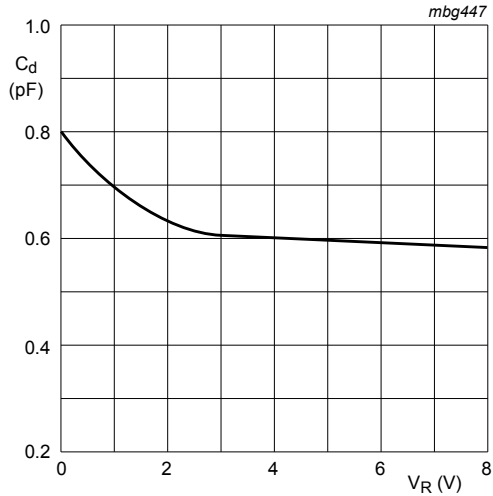
- (1)  $T_{\text{amb}} = 150^\circ \text{C}$
- (2)  $T_{\text{amb}} = 85^\circ \text{C}$
- (3)  $T_{\text{amb}} = 25^\circ \text{C}$
- (4)  $T_{\text{amb}} = -40^\circ \text{C}$

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



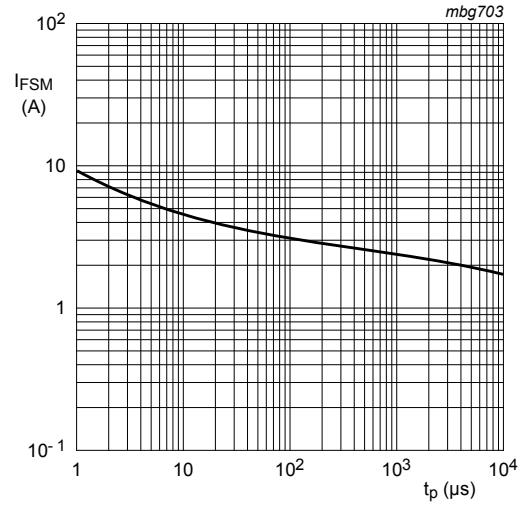
- (1)  $T_{\text{amb}} = 150^\circ \text{C}$
- (2)  $T_{\text{amb}} = 85^\circ \text{C}$
- (3)  $T_{\text{amb}} = 25^\circ \text{C}$
- (4)  $T_{\text{amb}} = -40^\circ \text{C}$

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



$f = 1 \text{ MHz}$   
 $T_j = 25 \text{ }^\circ\text{C}$ .

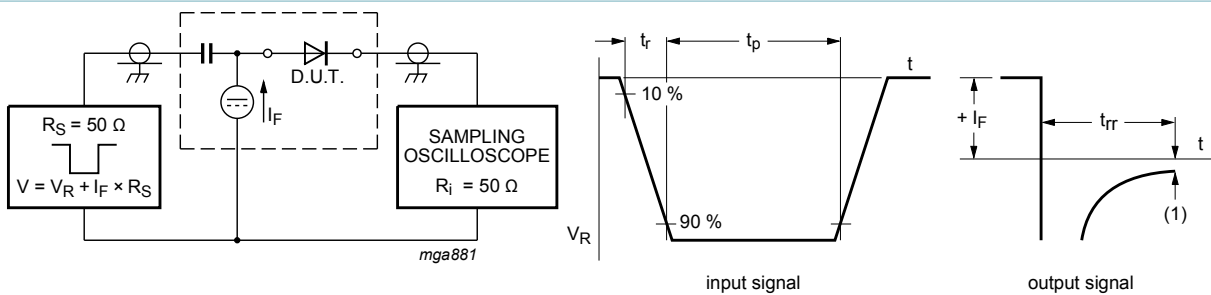
**Fig. 5.** Diode capacitance as a function of reverse voltage; typical values.



Based on square wave currents.  
 $T_{j(\text{init})} = 25 \text{ }^\circ\text{C}$

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

## 11. Test information



**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

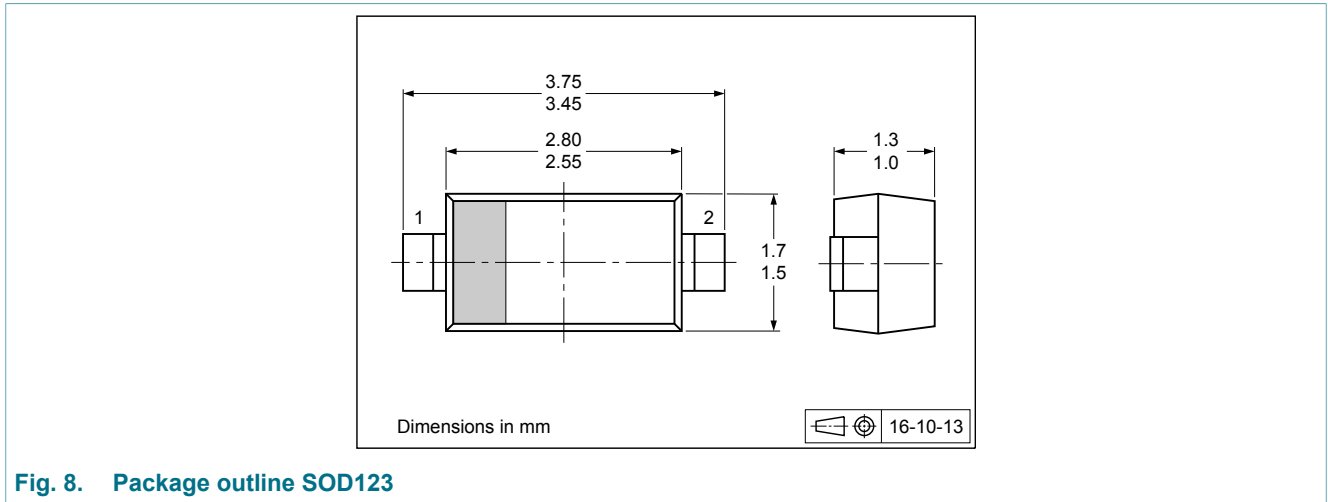


Fig. 8. Package outline SOD123

## 13. Soldering

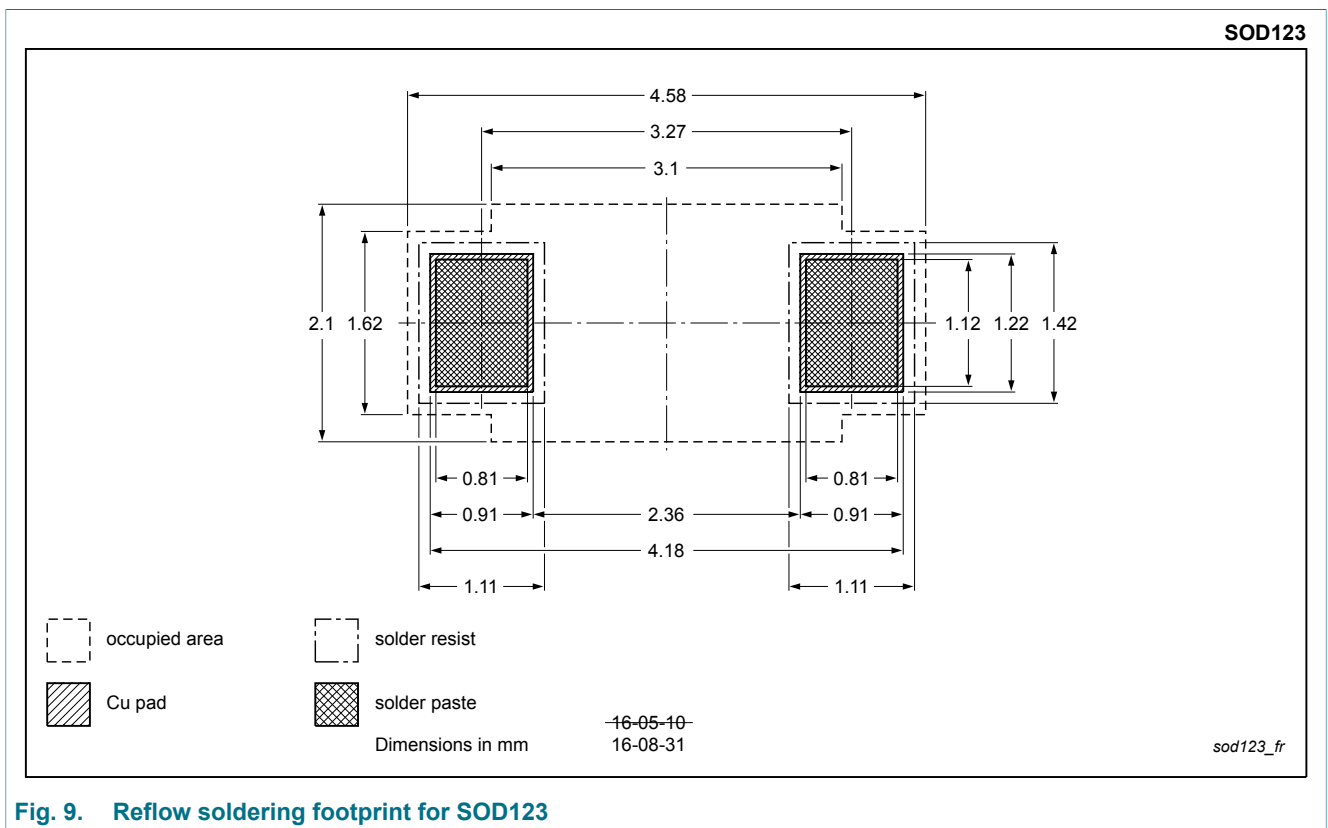


Fig. 9. Reflow soldering footprint for SOD123

SOD123

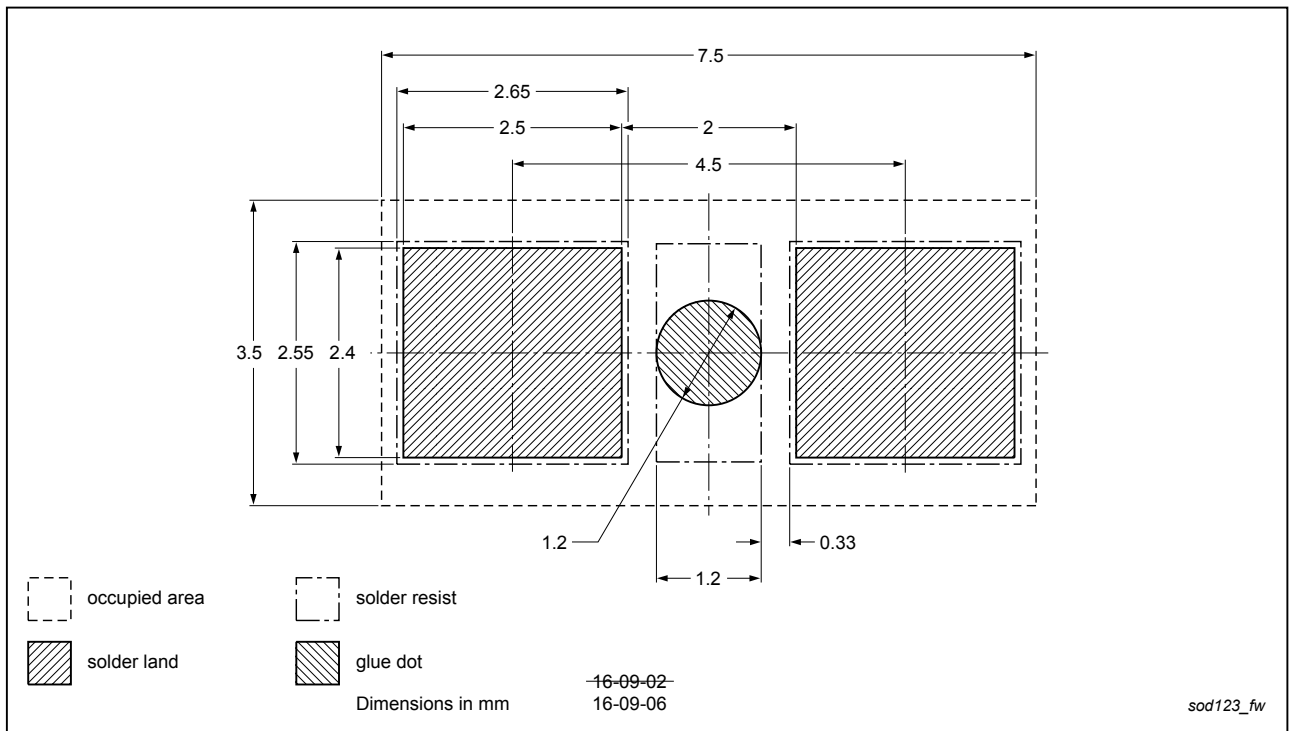


Fig. 10. Wave soldering footprint for SOD123



## 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:	<ul style="list-style-type: none"><li>• Value of maximum reverse voltage revised</li><li>• Parameter for repetitive peak reverse voltage inserted</li><li>• Figure 4: unit at y-axis corrected</li></ul>			
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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- [2] The term 'short data sheet' is explained in section "Definitions".
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Date of release: 15 June 2017

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