



# 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:  $t_{rr} = 0.8 \mu\text{s}$
- Low leakage current:  $I_R = 3 \text{ pA}$
- Repetitive peak reverse voltage  $V_{RRM} \leq 85 \text{ V}$
- Low capacitance:  $C_d = 2 \text{ pF}$
- 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	$T_j = 25 \text{ }^\circ\text{C}$	-	-	85	V
$I_F$	forward current	$t_p \leq 300 \mu\text{s}; \delta \leq 0.02; T_{amb} = 25 \text{ }^\circ\text{C}$	-	-	215	mA
$V_R$	reverse voltage	$T_j = 25 \text{ }^\circ\text{C}$	-	-	75	V
$V_F$	forward voltage	$I_F = 150 \text{ mA}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02; T_j = 25 \text{ }^\circ\text{C}$	-	-	1.25	V
$I_R$	reverse current	$V_R = 75 \text{ V}; \text{pulsed}; T_j = 25 \text{ }^\circ\text{C}$	-	0.003	5	nA
$t_{rr}$	reverse recovery time	$I_F = 10 \text{ mA}; I_R = 10 \text{ mA}; R_L = 100 \Omega; I_{R(\text{meas})} = 1 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$	-	0.8	3	$\mu\text{s}$

## 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

## 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	$T_j = 25\text{ °C}$		-	85	V
$V_R$	reverse voltage			-	75	V
$I_F$	forward current	$t_p \leq 300\ \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25\text{ °C}$		-	215	mA
$I_{FSM}$	non-repetitive peak forward current	$t_p = 1\ \mu\text{s}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; square wave		-	4	A
		$t_p = 1\ \text{ms}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; square wave		-	1	A
		$t_p = 1\ \text{s}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; square wave		-	0.5	A
$I_{FRM}$	repetitive peak forward current			-	500	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[1]	-	357	mW
			[2]	-	600	mW
<b>Per device, one diode loaded</b>						
$T_j$	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  $1\text{ cm}^2$ .

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

[3] Soldering point of cathode tab.

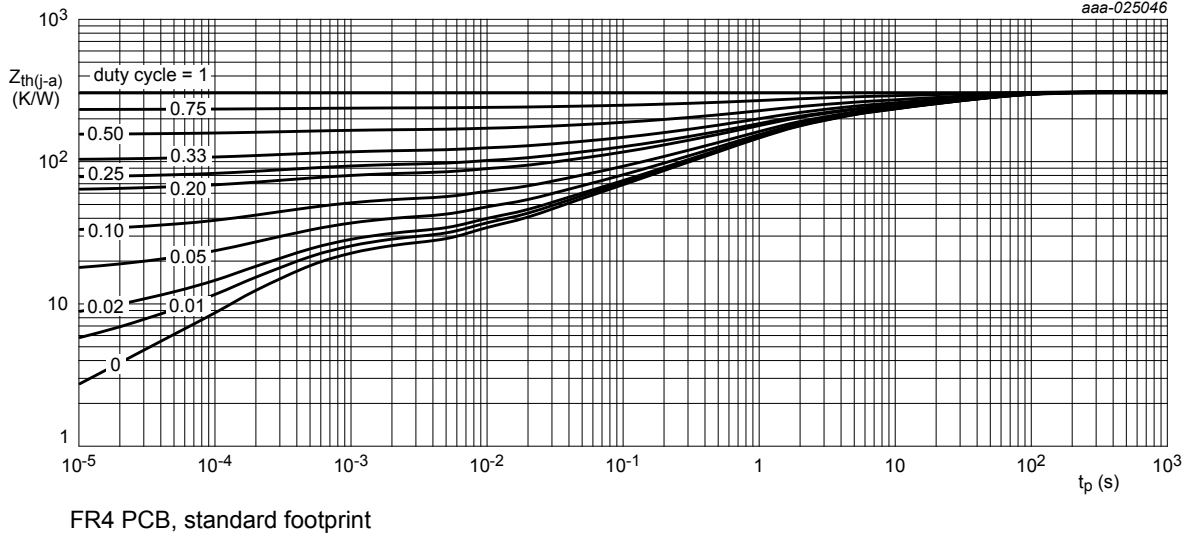


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

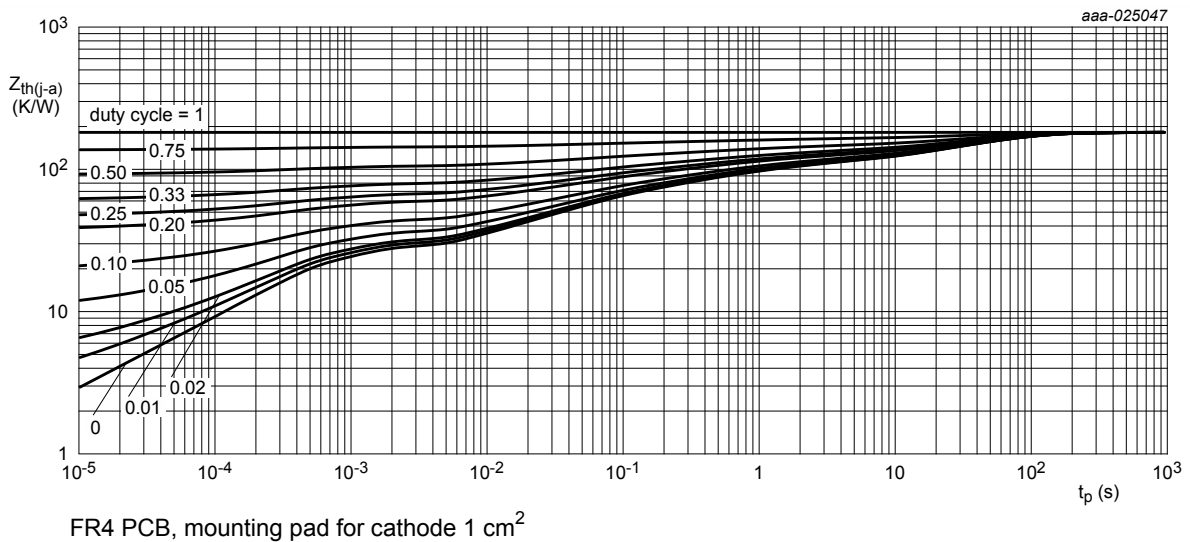
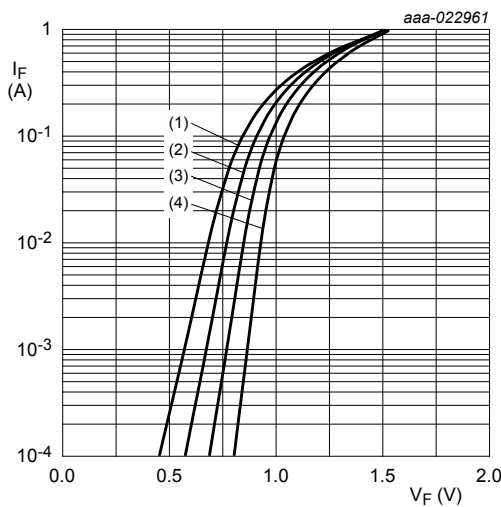


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

## 10. Characteristics

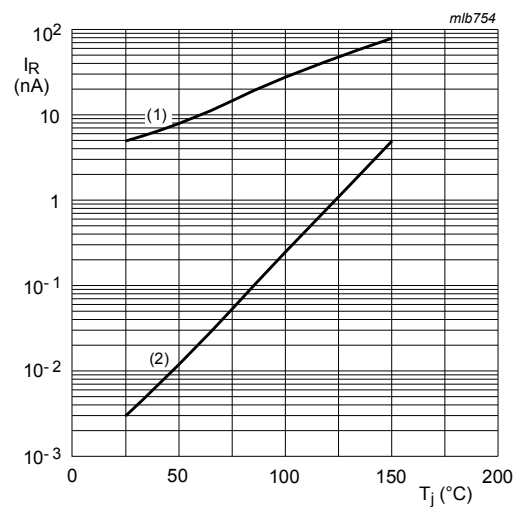
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 1 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>J</sub> = 25 °C	-	-	0.9	V
		I <sub>F</sub> = 10 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>J</sub> = 25 °C	-	-	1	V
		I <sub>F</sub> = 50 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>J</sub> = 25 °C	-	-	1.1	V
		I <sub>F</sub> = 150 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>J</sub> = 25 °C	-	-	1.25	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 75 V; pulsed; T <sub>J</sub> = 25 °C	-	0.003	5	nA
		V <sub>R</sub> = 75 V; pulsed; T <sub>J</sub> = 150 °C	-	3	80	nA
C <sub>d</sub>	diode capacitance	V <sub>R</sub> = 0 V; f = 1 MHz; T <sub>J</sub> = 25 °C	-	2	-	pF
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 10 mA; I <sub>R</sub> = 10 mA; R <sub>L</sub> = 100 Ω; I <sub>R(meas)</sub> = 1 mA; T <sub>J</sub> = 25 °C	-	0.8	3	μs



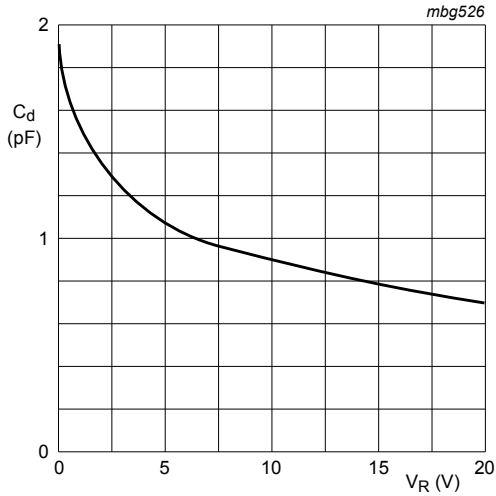
- (1) T<sub>J</sub> = 150 °C
- (2) T<sub>J</sub> = 85 °C
- (3) T<sub>J</sub> = 25 °C
- (4) T<sub>J</sub> = -40 °C

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



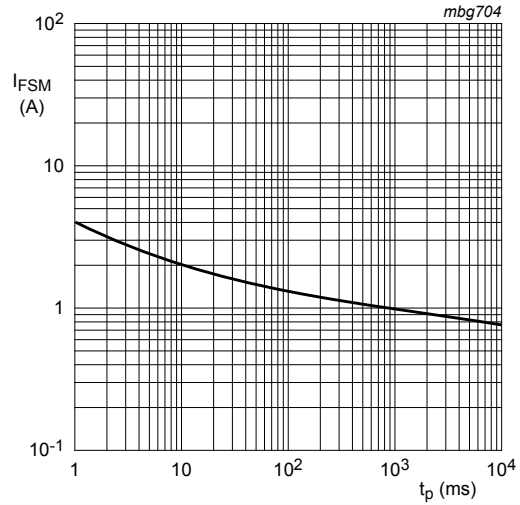
- V<sub>R</sub> = 75 V
- (1) Maximum values
- (2) Typical values

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



$f = 1 \text{ MHz}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$

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

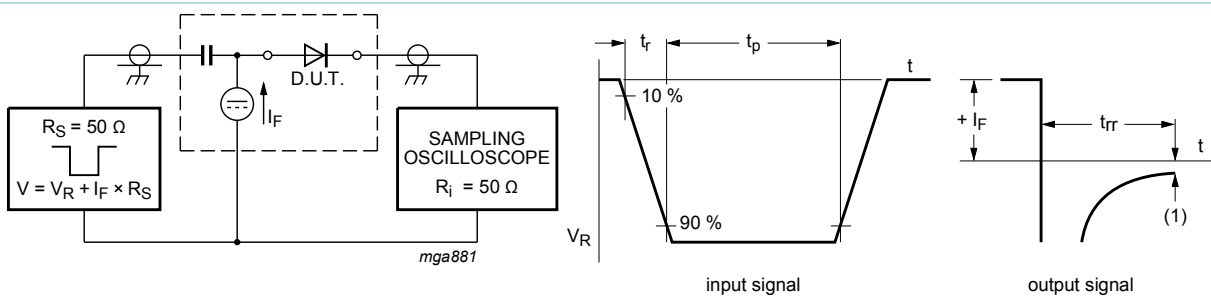


Based on square wave currents.

$T_{j(\text{init})} = 25 \text{ }^\circ\text{C}$

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

## 11. Test information



(1)  $I_R = 1 \text{ mA}$

**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

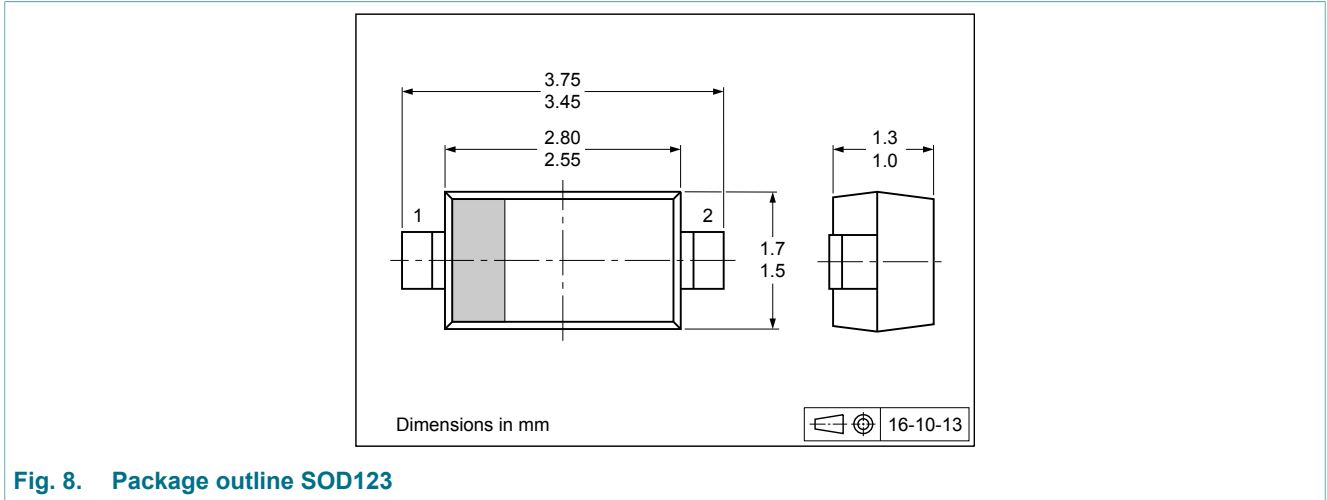


Fig. 8. Package outline SOD123

## 13. Soldering

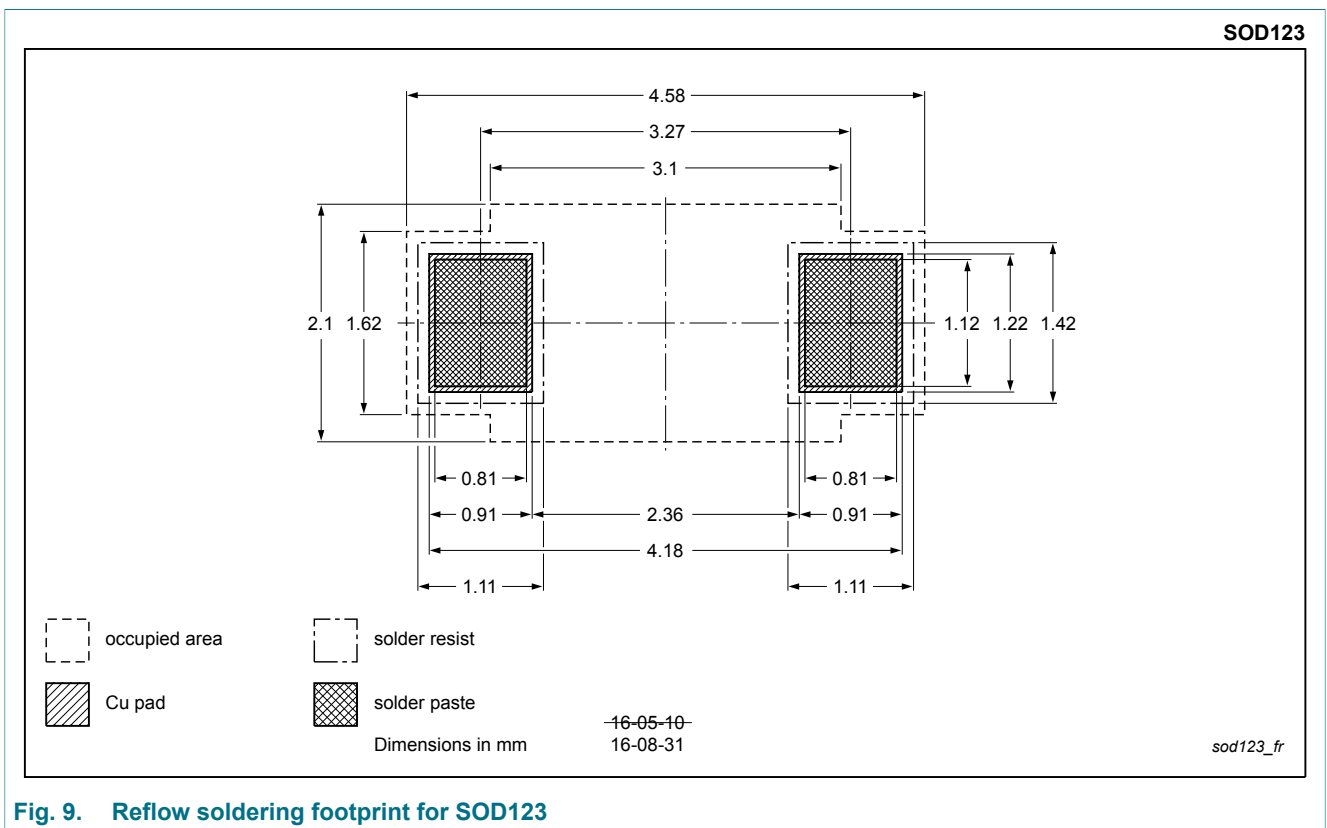


Fig. 9. Reflow soldering footprint for SOD123

SOD123

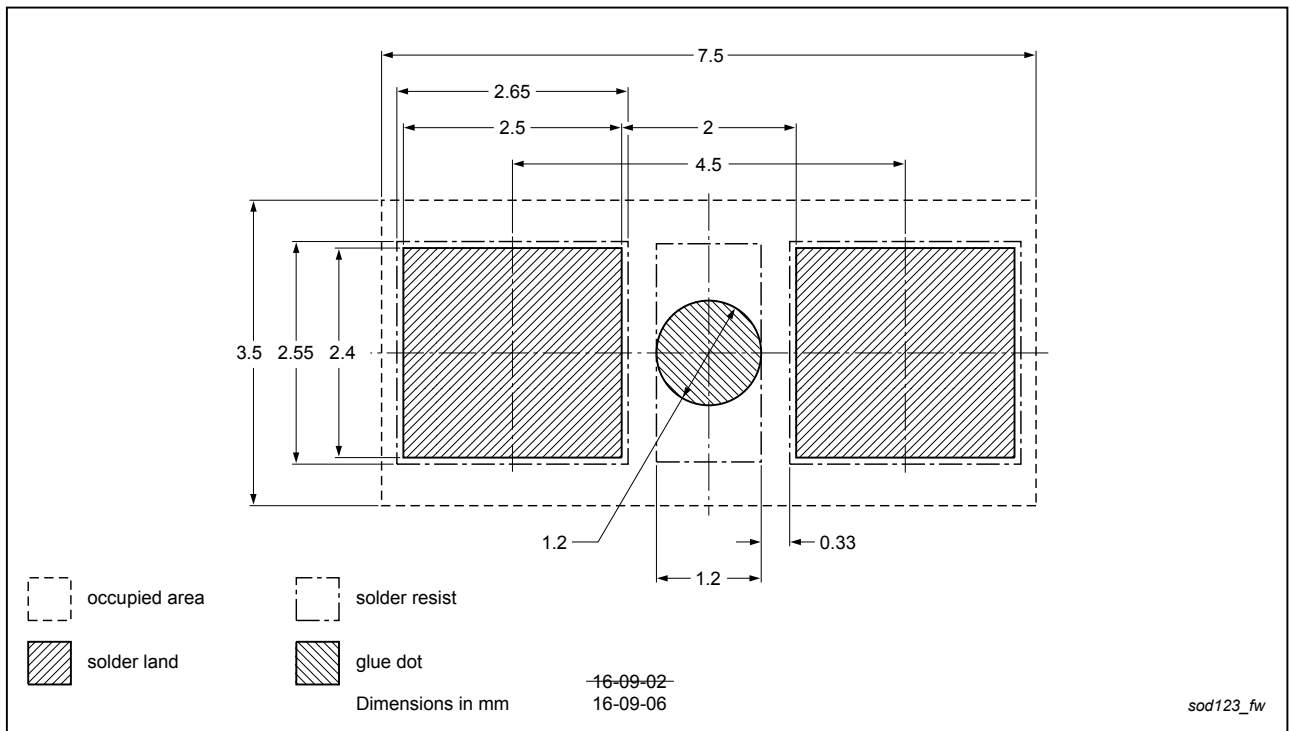


Fig. 10. Wave soldering footprint for SOD123



## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS116GW v.2	20180405	Product data sheet	-	BAS116GW v.1
Modifications:	<ul style="list-style-type: none"><li>Unit corrected to nA in Table 7, reverse current at 150 °C</li></ul>			
BAS116GW 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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Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А