



# BAS116

## Low-leakage diode

5 August 2020

Product data sheet

## 1. General description

Epitaxial medium-speed switching diode with a low leakage current in a small SOT23 plastic SMD package.

## 2. Features and benefits

- Plastic SMD package
- Low leakage current: typ. 3 pA
- Switching time: typ. 0.8  $\mu$ s
- Continuous reverse voltage: max. 75 V
- Repetitive peak reverse voltage: max. 85 V
- Repetitive peak forward current: max. 500 mA.
- AEC-Q101 qualified

## 3. Applications

- Low leakage current applications in surface mounted circuits.

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_F$	forward current	$t_p \leq 300 \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	215	mA
$V_{\text{RRM}}$	repetitive peak reverse voltage	$T_j = 25 \text{ }^\circ\text{C}$	-	-	85	V
$V_F$	forward voltage	$I_F = 50 \text{ mA}$ ; $t_p \leq 300 \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25 \text{ }^\circ\text{C}$	-	-	1.1	V
$I_R$	reverse current	$V_R = 75 \text{ V}$ ; pulsed; $T_j = 25 \text{ }^\circ\text{C}$	-	0.003	5	nA
$t_{\text{rr}}$	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	A	anode	<p>SOT23</p>	<p>006aaa764</p>
2	n.c.	not connected		
3	K	cathode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAS116	SOT23	plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body	SOT23

## 7. Marking

Table 4. Marking codes

Type number	Marking code[1]
BAS116	JV%

[1] % = placeholder for manufacturing site code

## 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	$t_p = 1\ \mu\text{s}$ ; square wave; $T_{j(\text{init})} = 25\text{ °C}$	-	4	A
		$t_p = 1\ \text{ms}$ ; square wave; $T_{j(\text{init})} = 25\text{ °C}$	-	1	A
		$t_p = 1\ \text{s}$ ; square wave; $T_{j(\text{init})} = 25\text{ °C}$	-	0.5	A
$I_{FRM}$	repetitive peak forward current		-	500	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[1]	250	mW
<b>Per device, one diode loaded</b>					
$T_j$	junction temperature		-	150	°C
$T_{amb}$	ambient temperature		-65	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.

## 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]	-	-	500	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[2]	-	-	330	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[2] Soldering point of cathode tab.

## 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 1 \text{ mA}$ ; $t_p \leq 300 \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25 \text{ }^\circ\text{C}$		-	-	0.9	V
		$I_F = 10 \text{ mA}$ ; $t_p \leq 300 \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25 \text{ }^\circ\text{C}$		-	-	1	V
		$I_F = 50 \text{ mA}$ ; $t_p \leq 300 \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25 \text{ }^\circ\text{C}$		-	-	1.1	V
		$I_F = 150 \text{ mA}$ ; $t_p \leq 300 \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25 \text{ }^\circ\text{C}$		-	-	1.25	V
$I_R$	reverse current	$V_R = 75 \text{ V}$ ; pulsed; $T_j = 25 \text{ }^\circ\text{C}$		-	0.003	5	nA
		$V_R = 75 \text{ V}$ ; pulsed; $T_j = 150 \text{ }^\circ\text{C}$		-	3	80	nA
$C_d$	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	$I_F = 10 \text{ mA}$ ; $I_R = 10 \text{ mA}$ ; $R_L = 100 \Omega$ ; $I_{R(\text{meas})} = 1 \text{ mA}$ ; $T_j = 25 \text{ }^\circ\text{C}$		-	0.8	3	$\mu\text{s}$

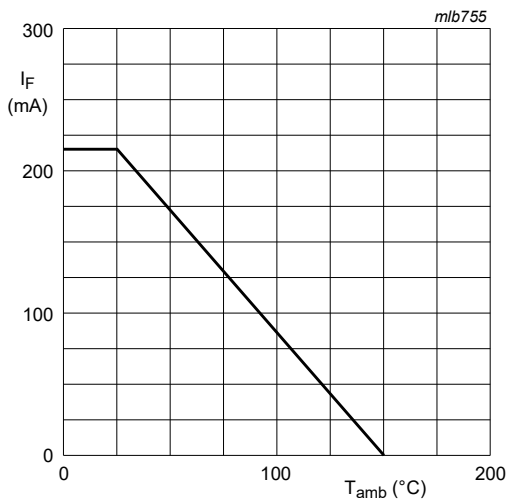
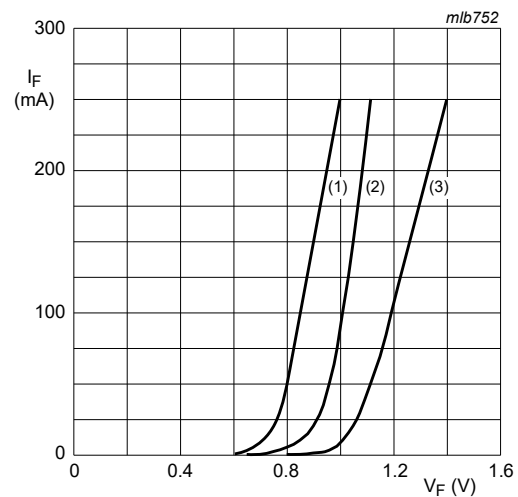
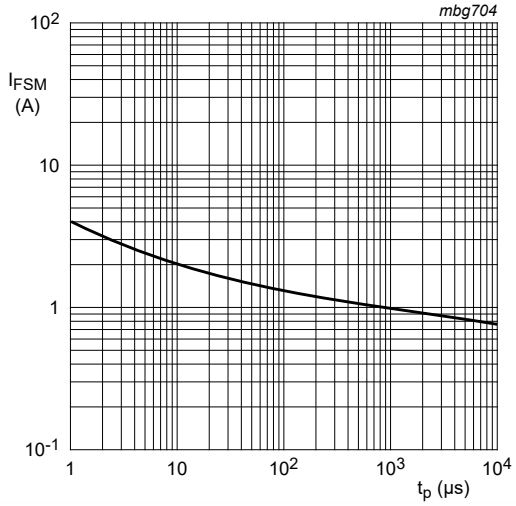


Fig. 1. Forward current as a function of ambient temperature; derating curve



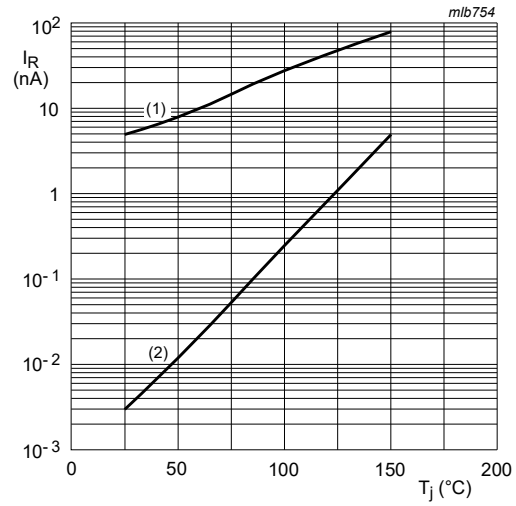
- (1)  $T_{amb} = 150 \text{ }^\circ\text{C}$ ; typical values  
 (2)  $T_{amb} = 25 \text{ }^\circ\text{C}$ ; typical values  
 (3)  $T_{amb} = 25 \text{ }^\circ\text{C}$ ; maximum values

Fig. 2. Forward current as a function of forward voltage; per diode



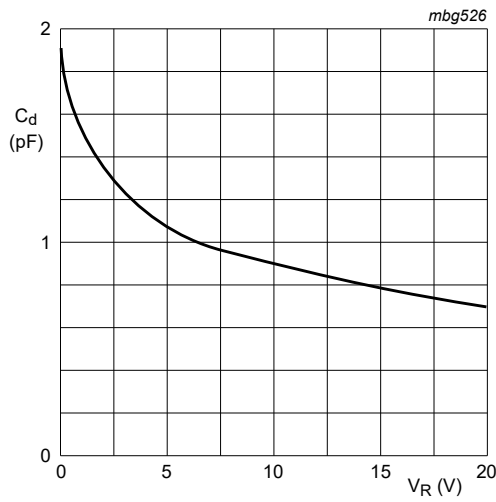
Based on square wave currents.  
 $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$

**Fig. 3. Non-repetitive peak forward current as a function of pulse duration; typical values**



$V_R = 75\text{ V}$   
 (1) Maximum values  
 (2) Typical values

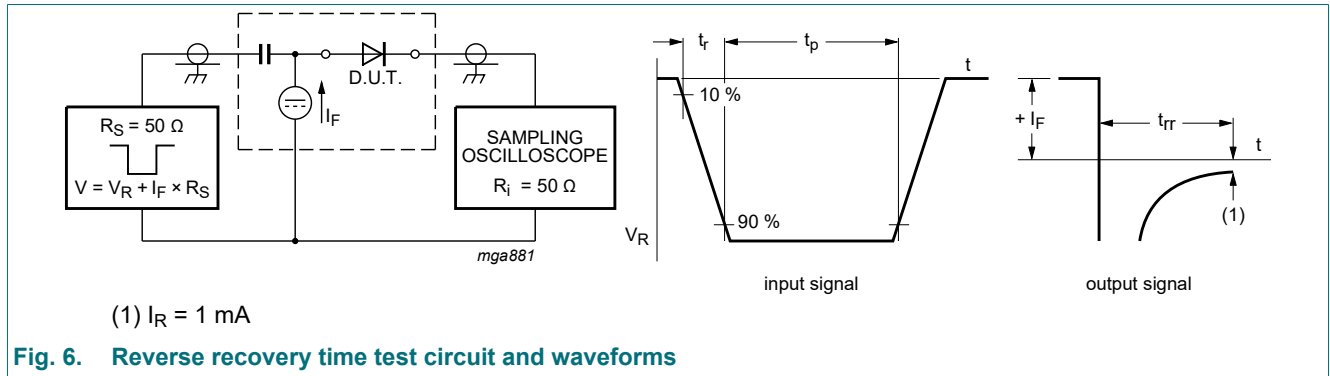
**Fig. 4. Reverse current as a function of junction temperature**



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

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

## 11. Test information



### 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

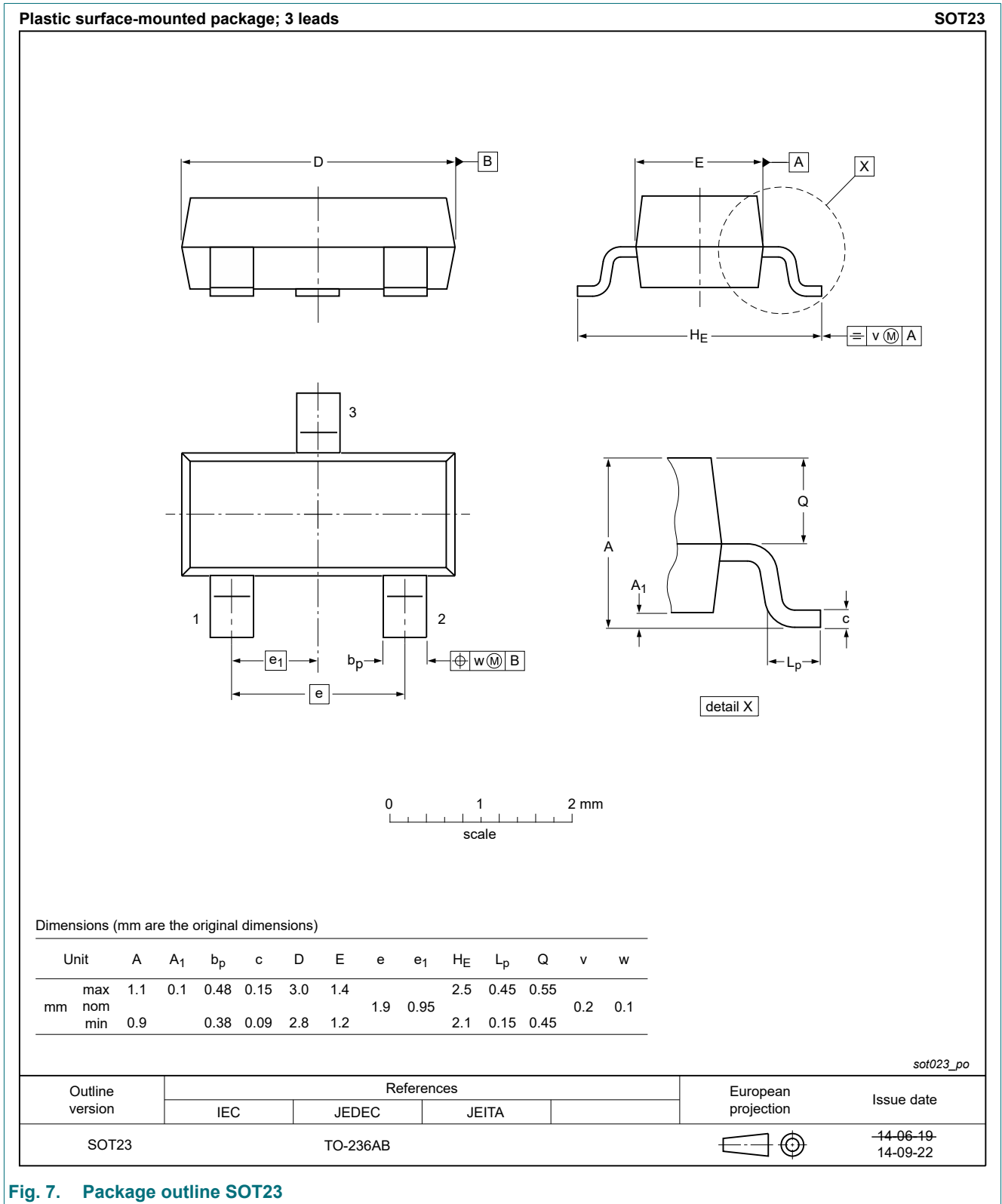


Fig. 7. Package outline SOT23

### 13. Soldering

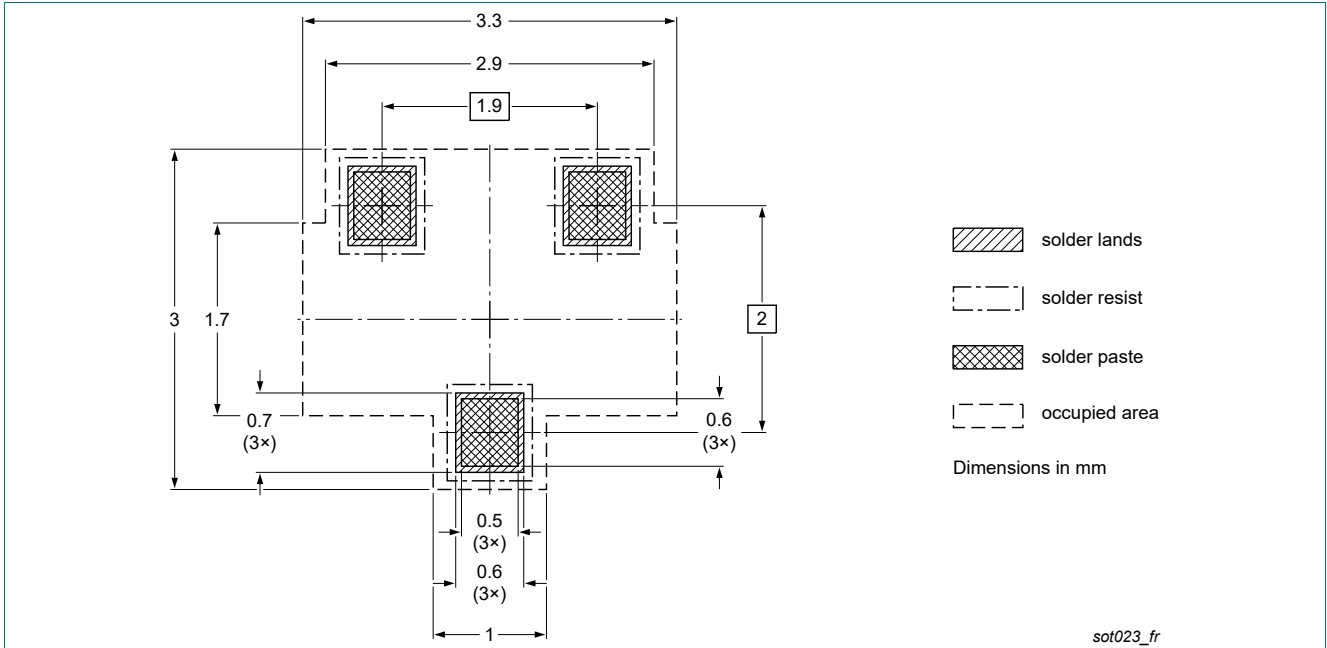


Fig. 8. Reflow soldering footprint for SOT23

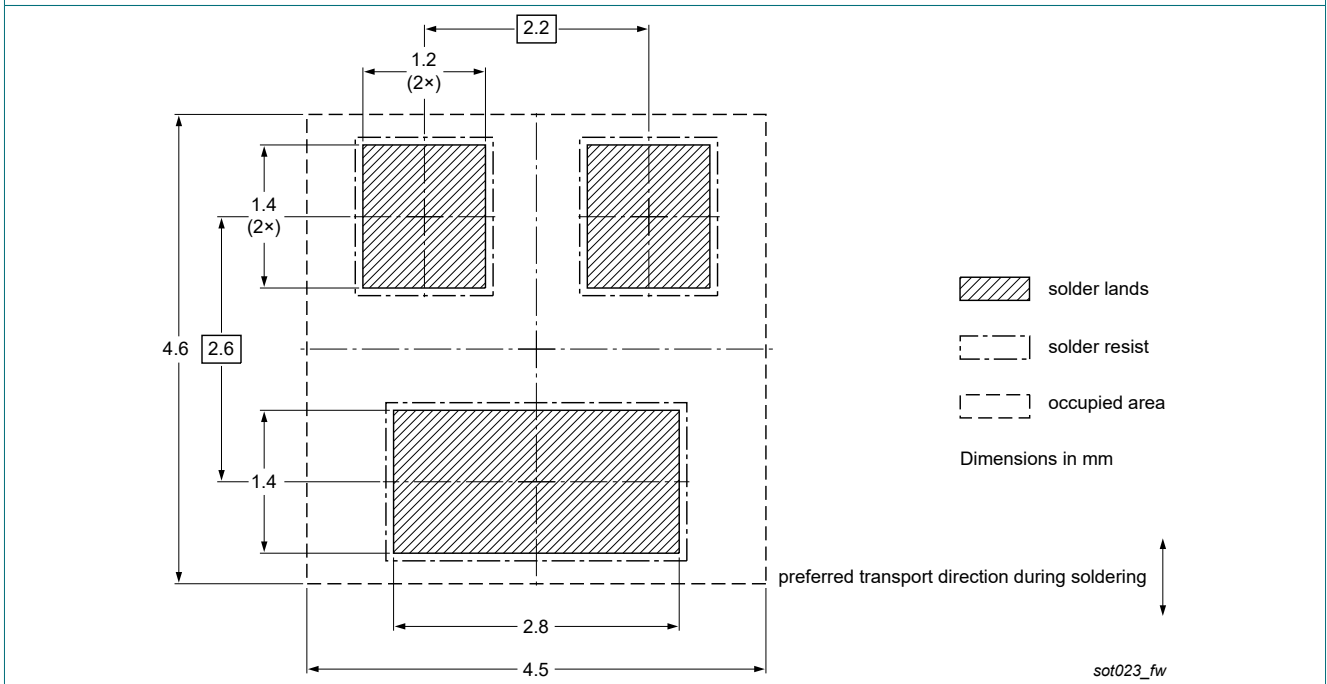


Fig. 9. Wave soldering footprint for SOT23

## 14. Revision history

**Table 8. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS116 v.3	20200805	Product data sheet	-	BAS116 v.2
Modifications:	<ul style="list-style-type: none"><li>• AEC-Q101 qualified attributes inserted in sections "Features and benefits", "Test information" and "Legal information".</li><li>• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li></ul>			
BAS116 v.2	20031212	Product data sheet	-	BAS116 v.1
BAS116 v.1	19990526	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.
- [2] The term 'short data sheet' is explained in section "Definitions".
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