



# BAS21

## High-voltage switching diode

1 July 2022

Product data sheet

### 1. General description

High-voltage switching diode encapsulated in a small SOT23 Surface-Mounted Device (SMD) plastic package.

### 2. Features and benefits

- High switching speed:  $t_{rr} \leq 50$  ns
- Low leakage current
- Reverse voltage  $V_R \leq 200$  V
- Low capacitance:  $C_d \leq 5$  pF
- Small SMD plastic package

### 3. Applications

- High-speed switching at high voltage
- High-voltage general-purpose switching
- Voltage clamping
- Reverse polarity protection

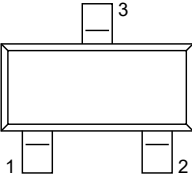
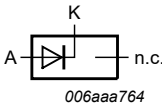
### 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	-	250	V
$V_R$	reverse voltage		-	-	200	V
$V_F$	forward voltage	$I_F = 100$ mA; $T_j = 25$ °C	-	-	1	V
		$I_F = 200$ mA; $T_j = 25$ °C	-	-	1.25	V
$I_R$	reverse current	$V_R = 200$ V; $T_j = 25$ °C	-	-	100	nA
		$V_R = 200$ V; $T_j = 150$ °C	-	-	100	µA

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode	 SOT23	 006aaa764
2	n.c.	not connected		
3	K	cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAS21	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 <sup>[1]</sup>
BAS21	JS%

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

[1] Device mounted on an FR4 printed-circuit board.

## 9. Thermal characteristics

**Table 6. Thermal characteristics**

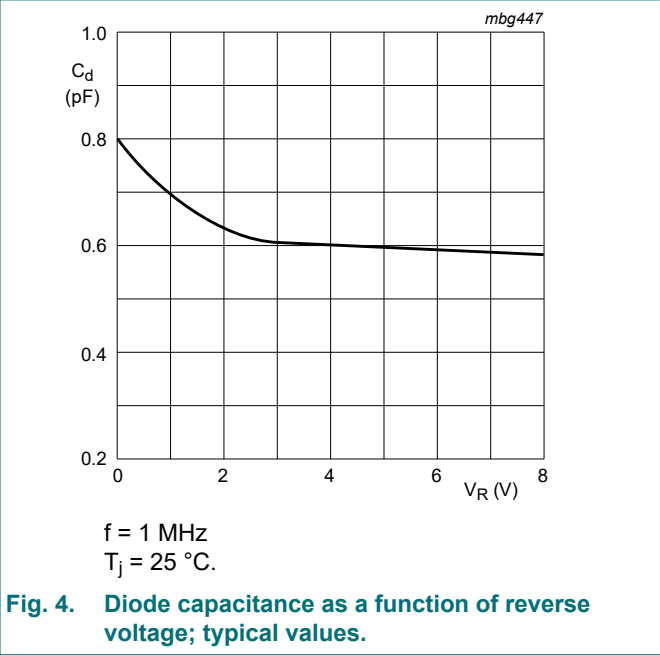
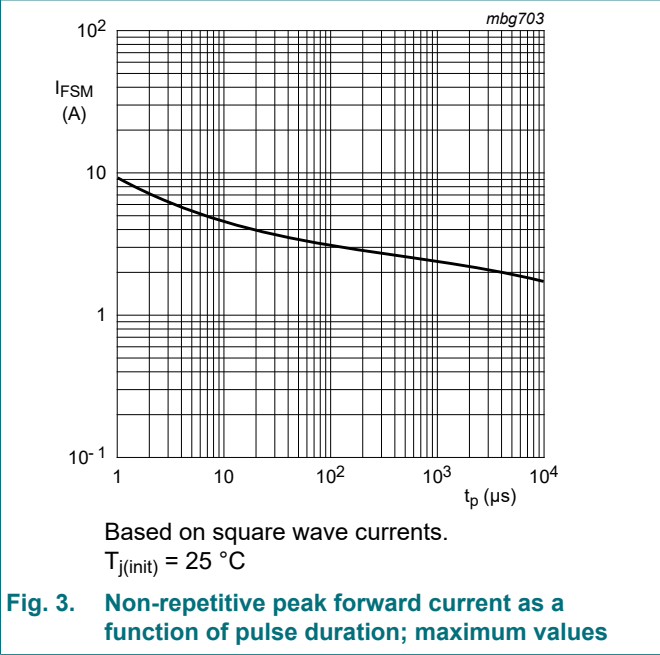
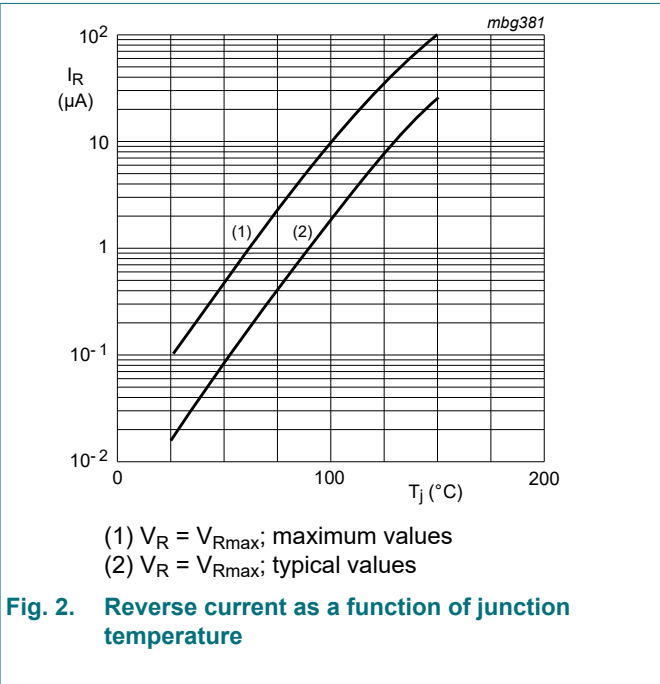
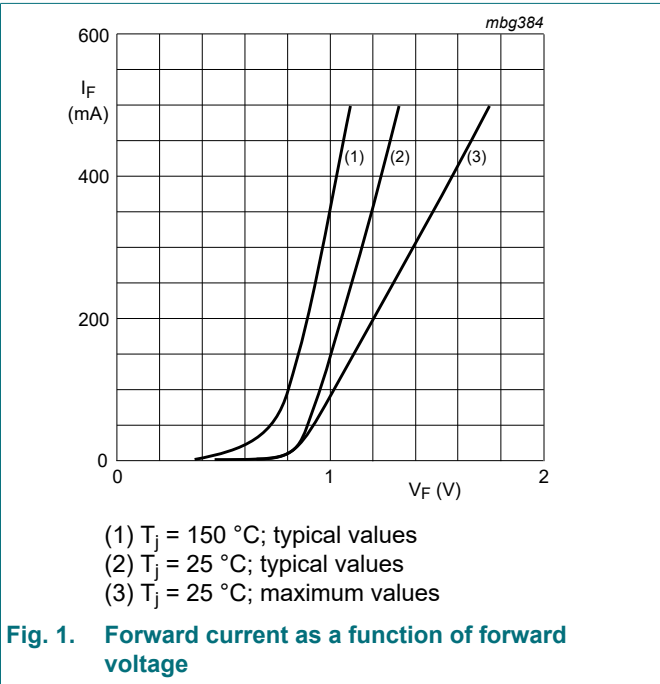
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient		[1]	-	-	500	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	330	K/W

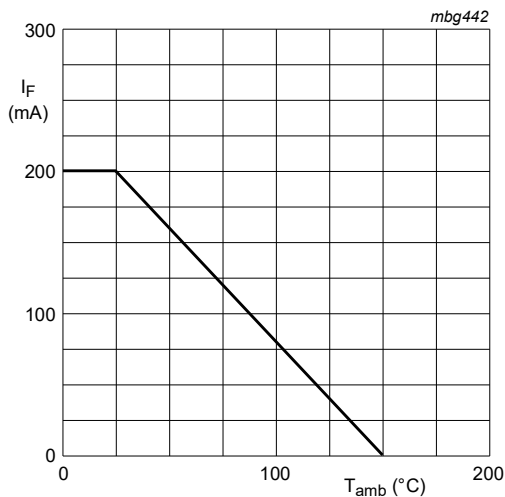
[1] Device mounted on an FR4 printed-circuit board.

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 100\text{ mA}; T_j = 25\text{ }^\circ\text{C}$	-	-	1	V
		$I_F = 200\text{ mA}; T_j = 25\text{ }^\circ\text{C}$	-	-	1.25	V
$I_R$	reverse current	$V_R = 200\text{ V}; T_j = 25\text{ }^\circ\text{C}$	-	-	100	nA
		$V_R = 200\text{ V}; T_j = 150\text{ }^\circ\text{C}$	-	-	100	$\mu\text{A}$
$C_d$	diode capacitance	$V_R = 0\text{ V}; f = 1\text{ MHz}; T_{\text{amb}} = 25\text{ }^\circ\text{C}$	-	-	5	pF
$t_{rr}$	reverse recovery time	$I_F = 30\text{ mA}; I_R = 30\text{ mA}; R_L = 100\text{ }\Omega;$ $I_{R(\text{meas})} = 3\text{ mA}; T_{\text{amb}} = 25\text{ }^\circ\text{C}$	-	-	50	ns





FR4 PCB, standard footprint

Fig. 5. Maximum forward current as a function of ambient temperature; derating curve

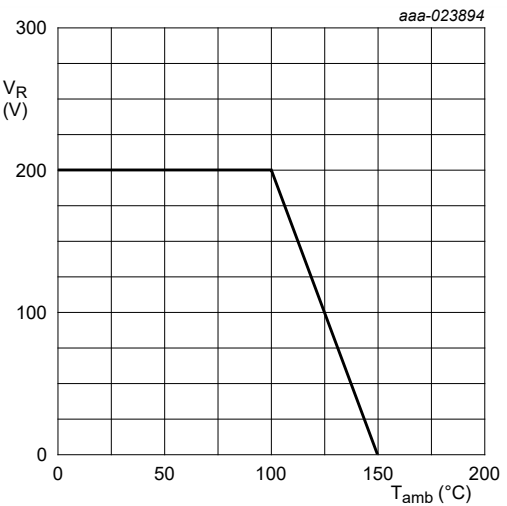


Fig. 6. Maximum continuous reverse voltage as a function of the ambient temperature

## 11. Test information

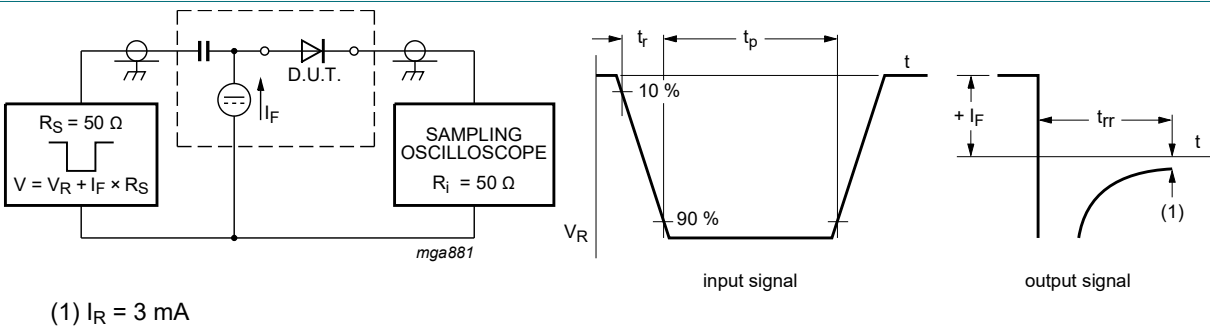


Fig. 7. Reverse recovery time test circuit and waveforms

12. Package outline

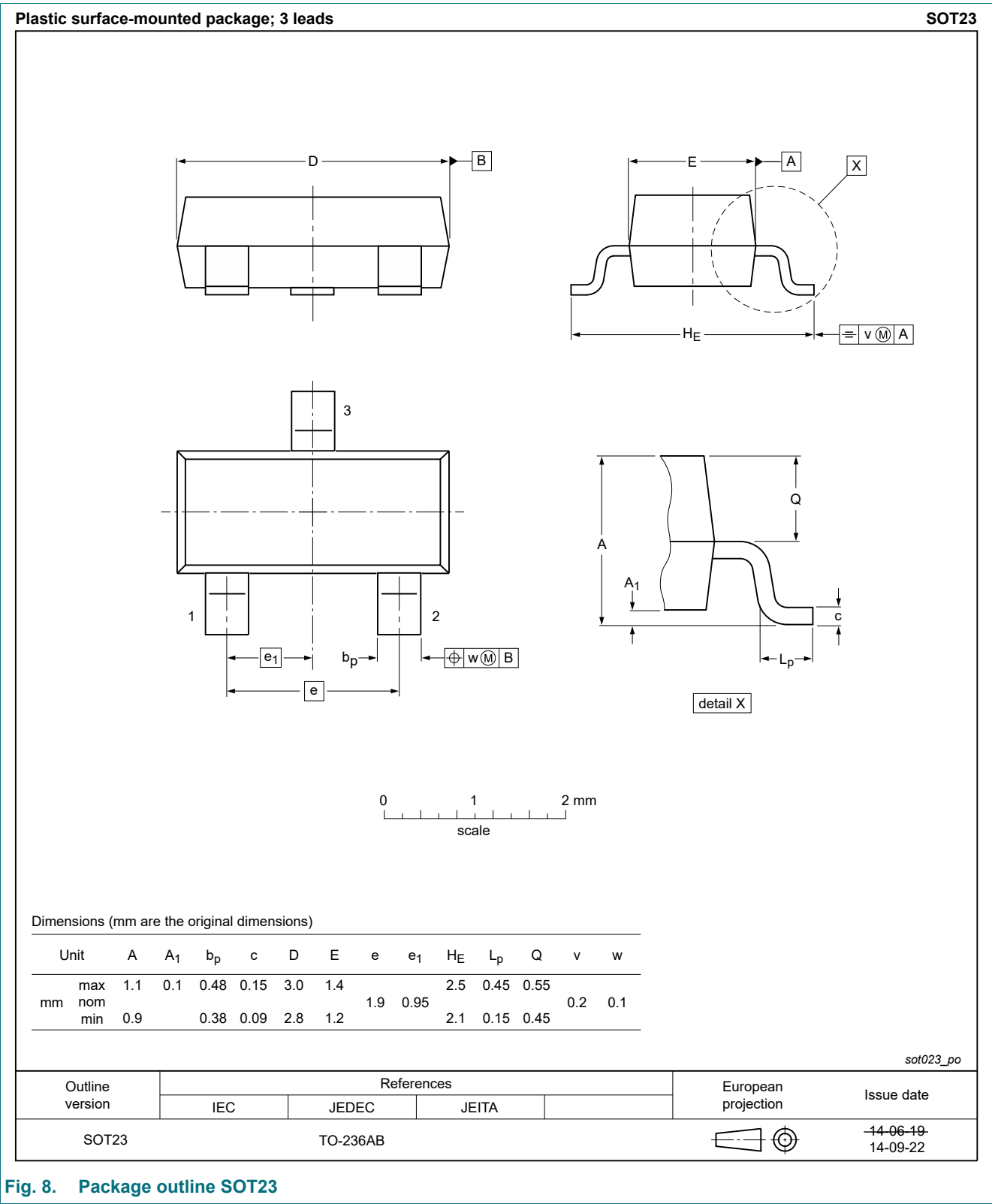
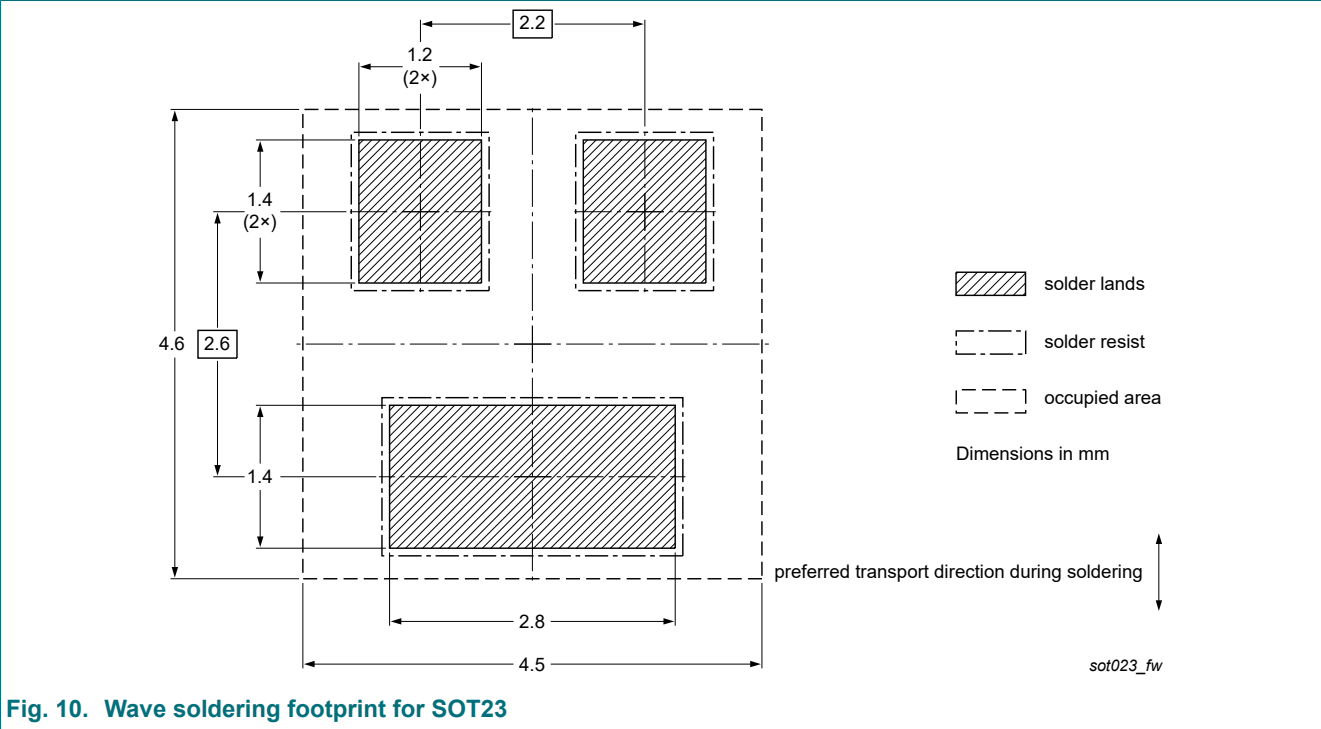
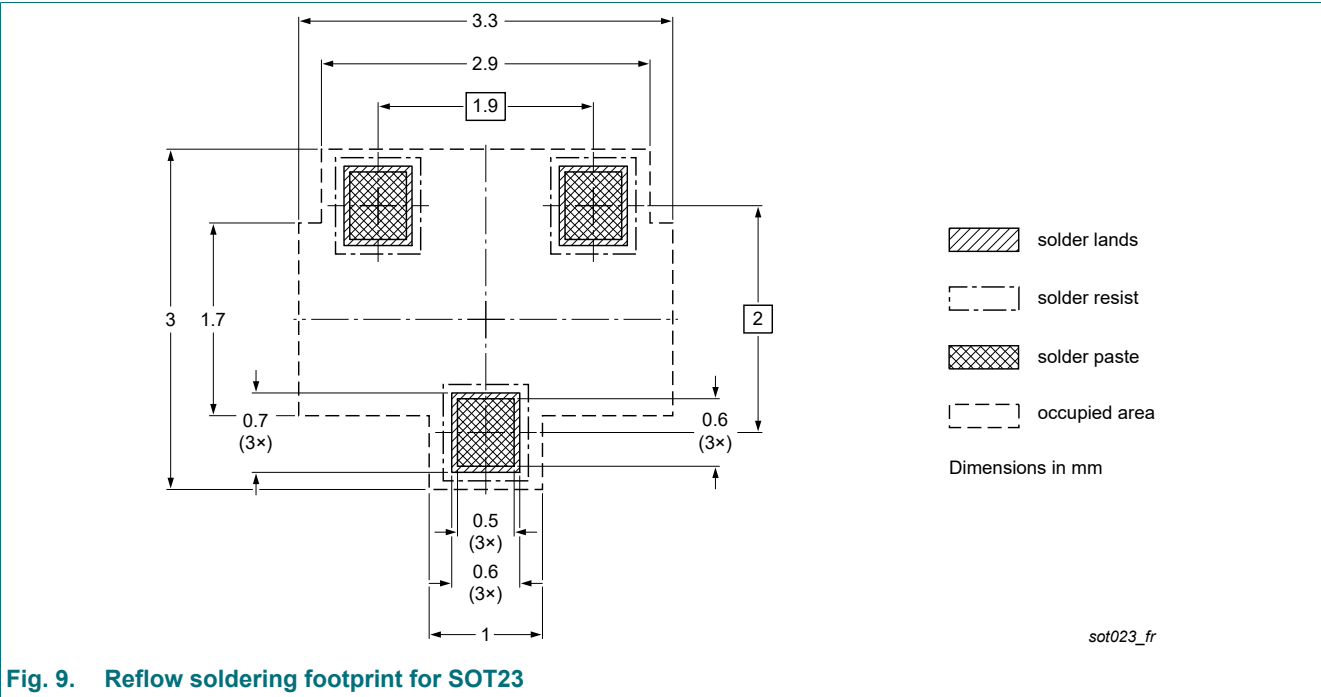


Fig. 8. Package outline SOT23

13. Soldering



## 14. Revision history

**Table 8. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS21 v.4	20220701	Product data sheet	-	BAS21 v.3
Modifications:	<ul style="list-style-type: none"><li>Product changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).</li></ul>			
BAS21 v.3	20190322	Product data sheet	-	BAS19_20_21 v.2
BAS19_20_21 v.2	20030320	Product data sheet	-	BAS19_20_21 v.1
BAS19_20_21 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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