

# BAV23 series

## Dual high-voltage switching diodes

Rev. 07 — 19 March 2010

Product data sheet

## 1. Product profile

### 1.1 General description

Dual high-voltage switching diodes, encapsulated in small Surface-Mounted Device (SMD) plastic packages.

Table 1. Product overview

Type number	Package		Configuration
	Nexperia	JEDEC	
BAV23A	SOT23	TO-236AB	dual common anode
BAV23C	SOT23	TO-236AB	dual common cathode
BAV23S	SOT23	TO-236AB	dual series
BAV23	SOT143B	-	dual isolated

### 1.2 Features and benefits

- High switching speed:  $t_{rr} \leq 50$  ns
- Low leakage current
- Repetitive peak reverse voltage:  $V_{RRM} \leq 250$  V
- Low capacitance:  $C_d \leq 2$  pF
- Small SMD plastic package

### 1.3 Applications

- High-speed switching at high voltage
- High-voltage general-purpose switching

### 1.4 Quick reference data

Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
$I_R$	reverse current	$V_R = 200$ V	-	-	100	nA
$V_R$	reverse voltage		-	-	200	V
$t_{rr}$	reverse recovery time		[1]	-	50	ns

[1] When switched from  $I_F = 10$  mA to  $I_R = 10$  mA;  $R_L = 100$   $\Omega$ ; measured at  $I_R = 1$  mA.

## 2. Pinning information

**Table 3. Pinning**

Pin	Description	Simplified outline	Graphic symbol
<b>BAV23A</b>			
1	cathode (diode 1)		<p>006aab099</p>
2	cathode (diode 2)		
3	common anode		
<b>BAV23C</b>			
1	anode (diode 1)		<p>006aab034</p>
2	anode (diode 2)		
3	common cathode		
<b>BAV23S</b>			
1	anode (diode 1)		<p>006aaa763</p>
2	cathode (diode 2)		
3	cathode (diode 1), anode (diode 2)		
<b>BAV23</b>			
1	cathode (diode 1)		<p>006aab100</p>
2	cathode (diode 2)		
3	anode (diode 2)		
4	anode (diode 1)		

### 3. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BAV23A	-	plastic surface-mounted package; 3 leads	SOT23
BAV23C			
BAV23S			
BAV23	-	plastic surface-mounted package; 4 leads	SOT143B

### 4. Marking

Table 5. Marking codes

Type number	Marking code <sup>[1]</sup>
BAV23A	*V0
BAV23C	*V9
BAV23S	*V5
BAV23	*L3

- [1] \* = -: made in Hong Kong  
 \* = p: made in Hong Kong  
 \* = t: made in Malaysia  
 \* = W: made in China

### 5. Limiting values

Table 6. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
<b>Per diode</b>					
$V_{RRM}$	repetitive peak reverse voltage		-	250	V
$V_R$	reverse voltage		-	200	V
$I_F$	forward current		[1] -	225	mA
			[2] -	125	mA
$I_{FRM}$	repetitive peak forward current		-	625	mA
$I_{FSM}$	non-repetitive peak forward current	square wave	[3]		
		$t_p = 1 \mu s$	-	9	A
		$t_p = 100 \mu s$	-	3	A
		$t_p = 10 ms$	-	1.7	A

**Table 6. Limiting values ...continued**

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
<b>Per device</b>					
$P_{\text{tot}}$	total power dissipation	$T_{\text{amb}} \leq 25 \text{ }^\circ\text{C}$	[4] -	250	mW
$T_j$	junction temperature		-	150	$^\circ\text{C}$
$T_{\text{amb}}$	ambient temperature		-65	+150	$^\circ\text{C}$
$T_{\text{stg}}$	storage temperature		-65	+150	$^\circ\text{C}$

[1] Single diode loaded.

[2] Double diode loaded.

[3]  $T_j = 25 \text{ }^\circ\text{C}$  prior to surge.

[4] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

## 6. Thermal characteristics

**Table 7. Thermal characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per device</b>						
$R_{\text{th}(j-a)}$	thermal resistance from junction to ambient	in free air	[1] -	-	500	K/W
$R_{\text{th}(j-sp)}$	thermal resistance from junction to solder point		-	-	360	K/W

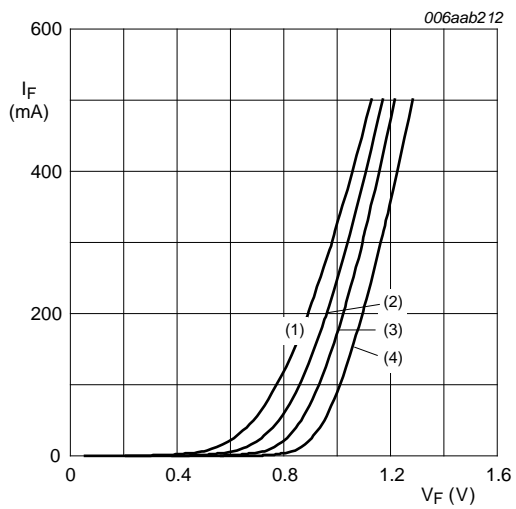
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

## 7. Characteristics

**Table 8. Characteristics** $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$  unless otherwise specified.

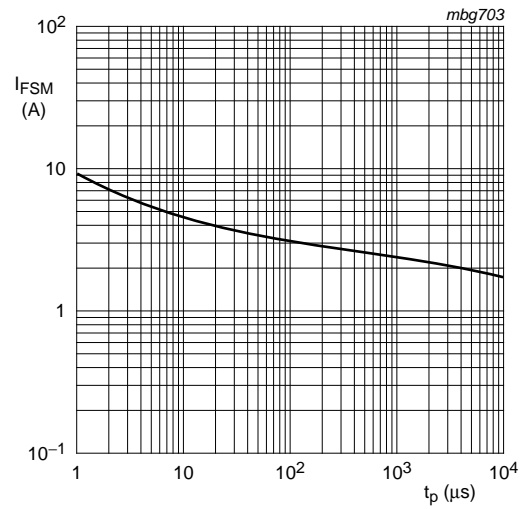
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
$V_F$	forward voltage	$I_F = 100 \text{ mA}$	-	-	1.0	V
		$I_F = 200 \text{ mA}$	-	-	1.25	V
$I_R$	reverse current	$V_R = 200 \text{ V}$	-	-	100	nA
		$V_R = 200 \text{ V}; T_j = 150 \text{ }^\circ\text{C}$	-	-	100	$\mu\text{A}$
$C_d$	diode capacitance	$f = 1 \text{ MHz}; V_R = 0 \text{ V}$	-	-	2	pF
$t_{\text{rr}}$	reverse recovery time		[1] -	-	50	ns

[1] When switched from  $I_F = 10 \text{ mA}$  to  $I_R = 10 \text{ mA}$ ;  $R_L = 100 \text{ } \Omega$ ; measured at  $I_R = 1 \text{ mA}$ .



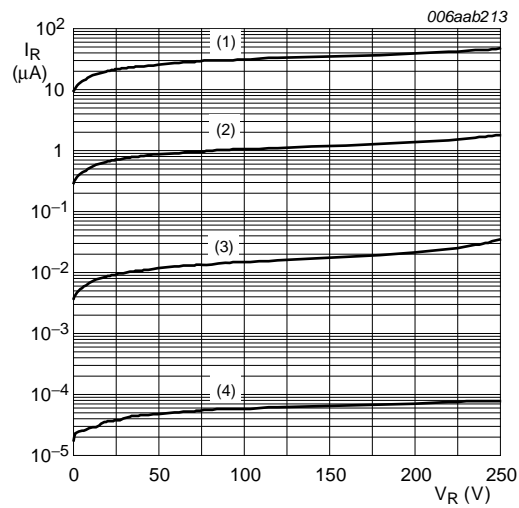
- (1)  $T_{amb} = 150\text{ °C}$
- (2)  $T_{amb} = 85\text{ °C}$
- (3)  $T_{amb} = 25\text{ °C}$
- (4)  $T_{amb} = -40\text{ °C}$

Fig 1. Forward current as a function of forward voltage; typical values



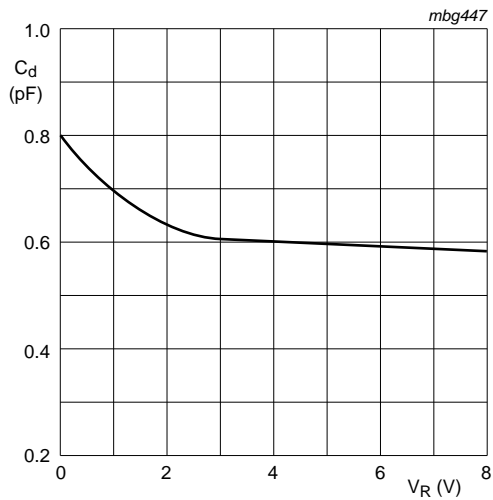
Based on square wave currents.  
 $T_j = 25\text{ °C}$ ; prior to surge

Fig 2. Non-repetitive peak forward current as a function of pulse duration; maximum values



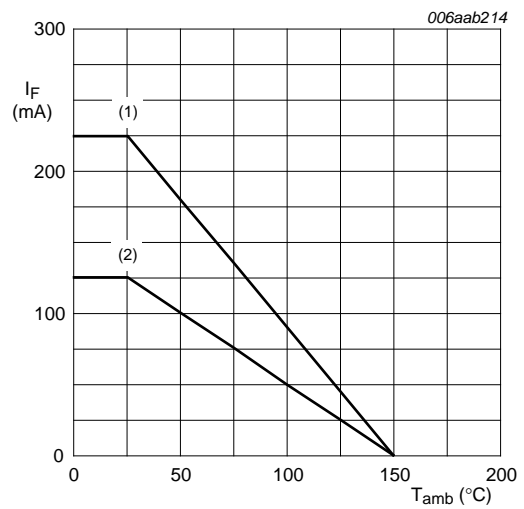
- (1)  $T_{amb} = 150\text{ °C}$
- (2)  $T_{amb} = 85\text{ °C}$
- (3)  $T_{amb} = 25\text{ °C}$
- (4)  $T_{amb} = -40\text{ °C}$

Fig 3. Reverse current as a function of reverse voltage; typical values



f = 1 MHz; T<sub>amb</sub> = 25 °C

**Fig 4.** Diode capacitance as a function of reverse voltage; typical values

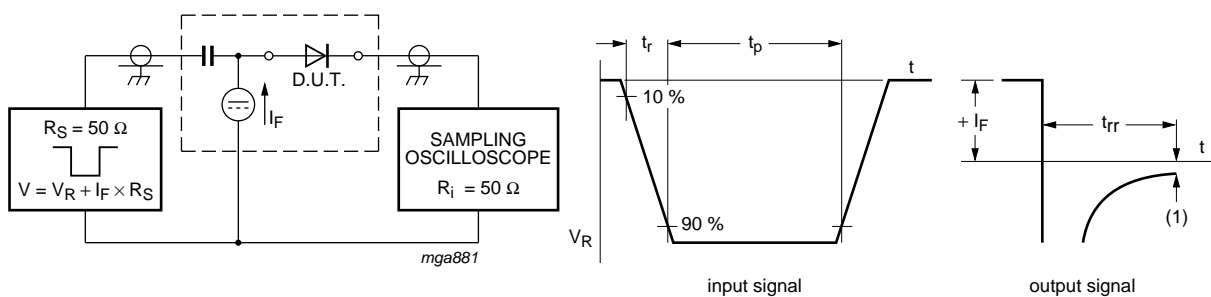


FR4 PCB, standard footprint

- (1) Single diode loaded.
- (2) Double diode loaded.

**Fig 5.** Forward current as a function of ambient temperature; derating curves

## 8. Test information



(1) I<sub>R</sub> = 1 mA

**Fig 6.** Reverse recovery time test circuit and waveforms

## 9. Package outline

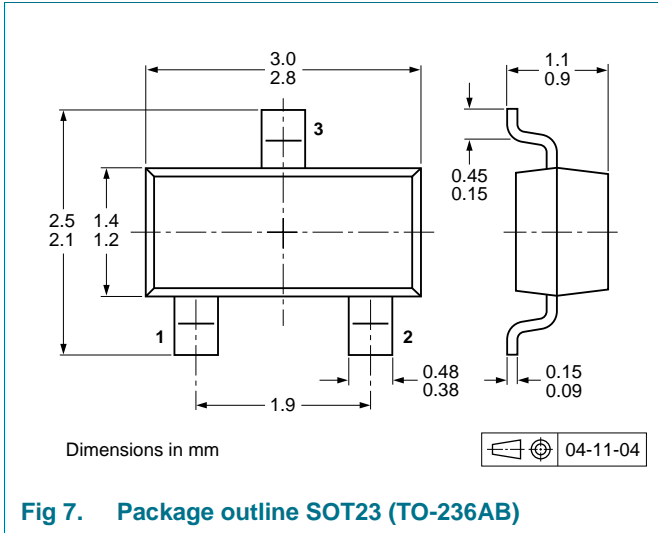


Fig 7. Package outline SOT23 (TO-236AB)

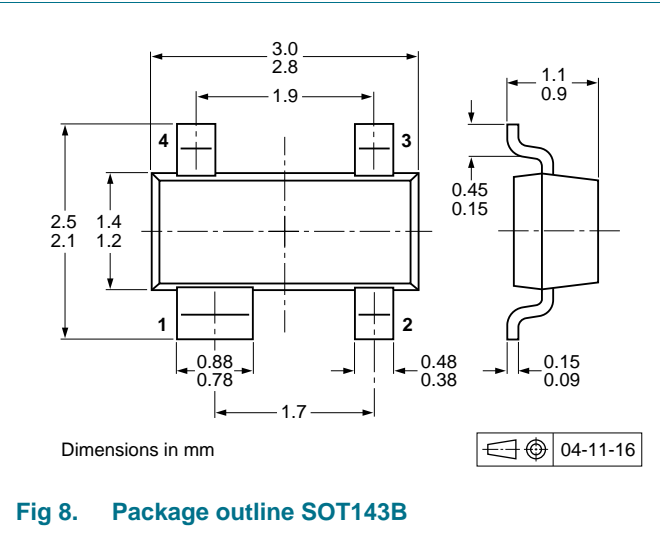


Fig 8. Package outline SOT143B

## 10. Packing information

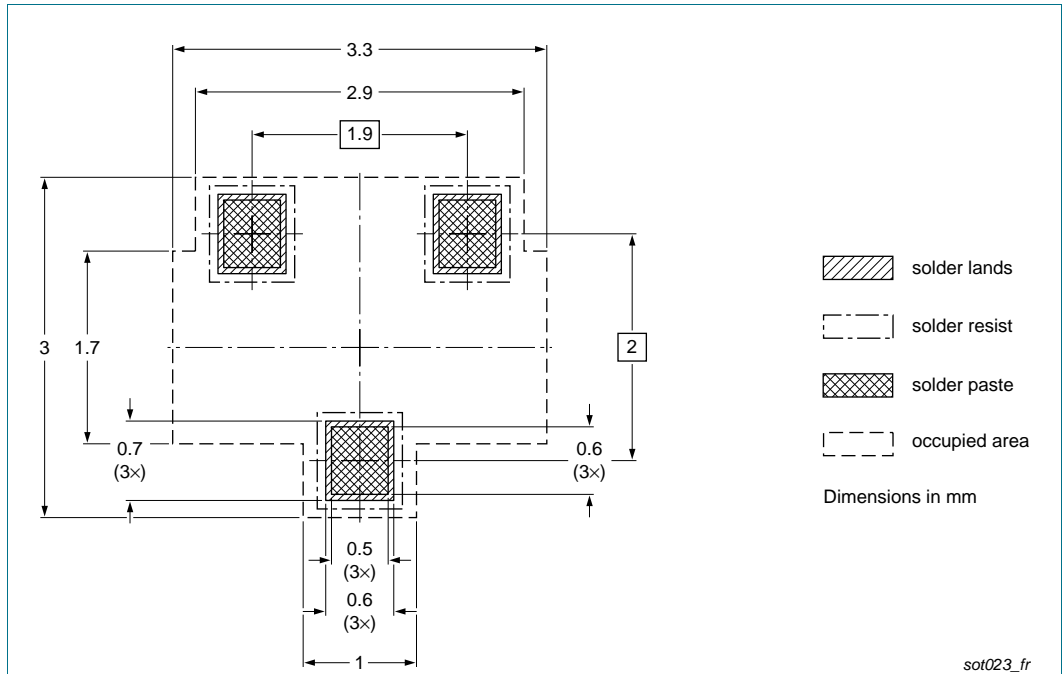
**Table 9. Packing methods**

The indicated -xxx are the last three digits of the 12NC ordering code.<sup>[1]</sup>

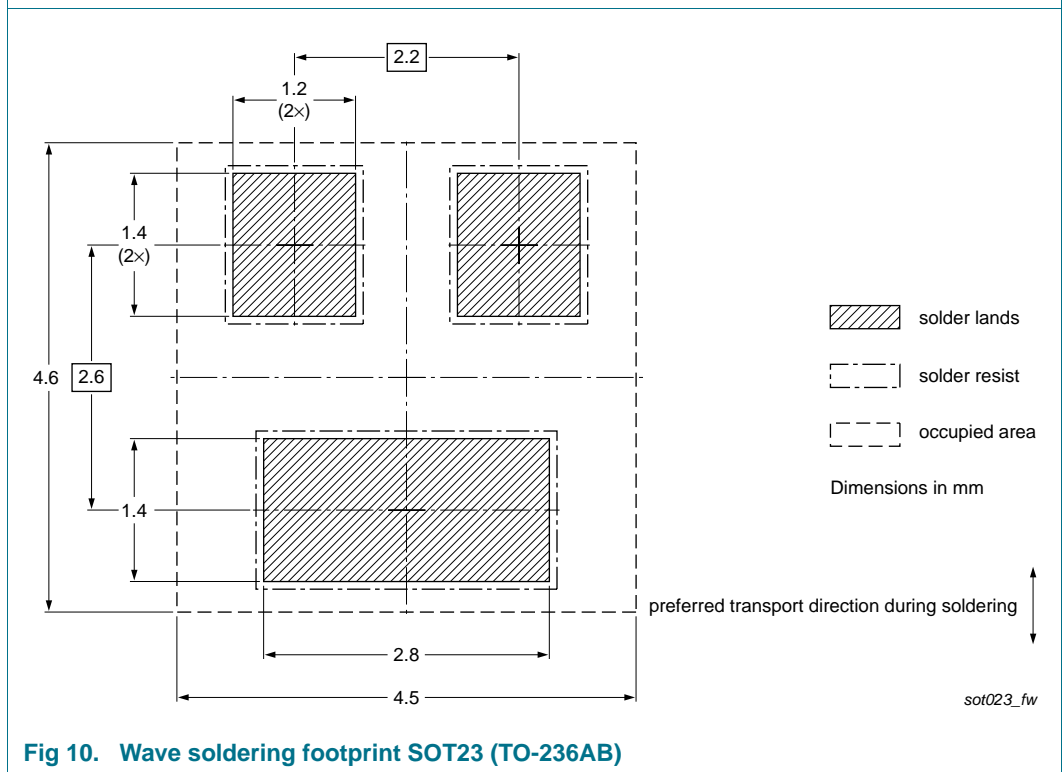
Type number	Package	Description	Packing quantity	
			3000	10000
BAV23A	SOT23	4 mm pitch, 8 mm tape and reel	-215	-235
BAV23C				
BAV23S				
BAV23	SOT143B	4 mm pitch, 8 mm tape and reel	-215	-235

[1] For further information and the availability of packing methods, see [Section 14](#).

**11. Soldering**

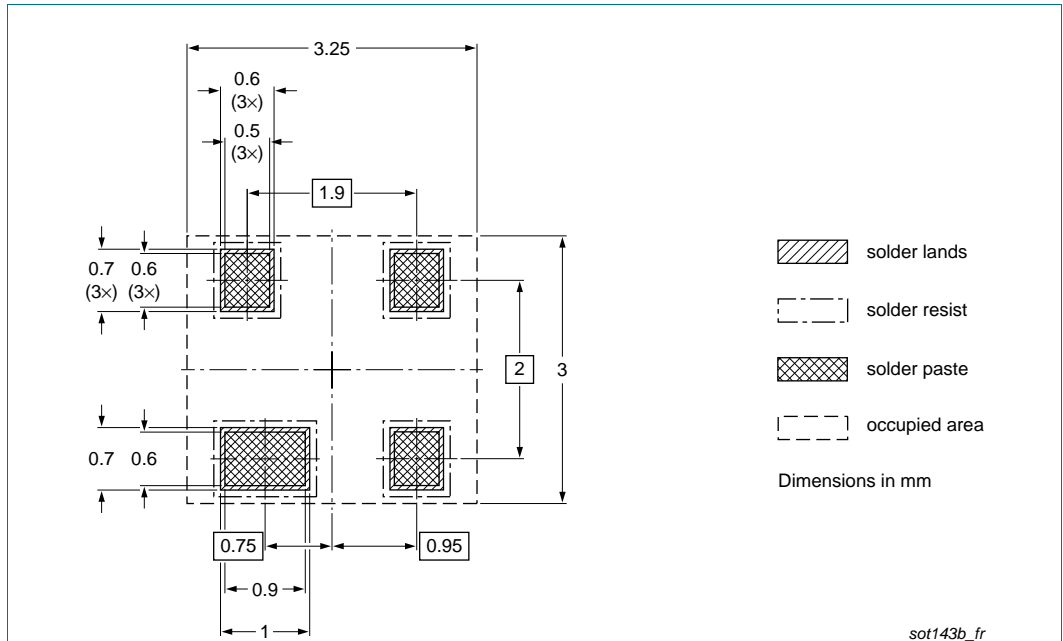


**Fig 9. Reflow soldering footprint SOT23 (TO-236AB)**

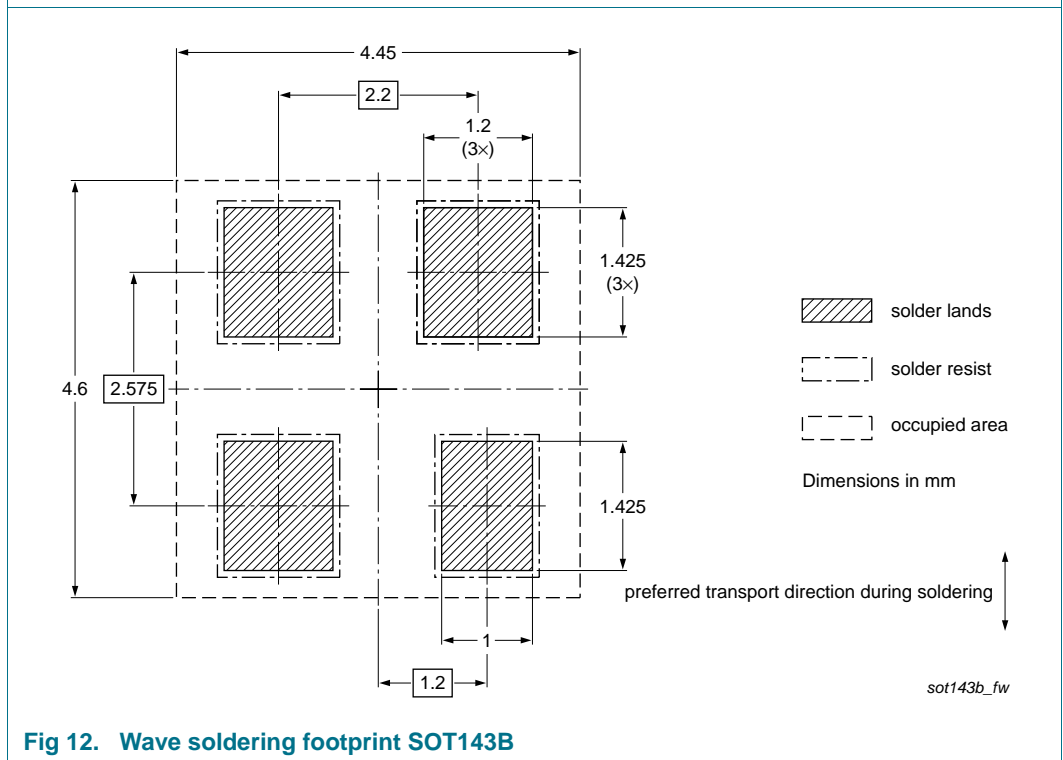


**Fig 10. Wave soldering footprint SOT23 (TO-236AB)**





**Fig 11. Reflow soldering footprint SOT143B**



**Fig 12. Wave soldering footprint SOT143B**

## 12. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BAV23_SER_7	20100319	Product data sheet	-	BAV23_SER_6
Modifications:	<ul style="list-style-type: none"> <li>• Type numbers BAV23A/DG, BAV23C/DG, BAV23S/DG and BAV23/DG deleted</li> <li>• Type numbers BAV23A and BAV23C added</li> <li>• <a href="#">Table 5 “Marking codes”</a>: updated</li> <li>• <a href="#">Figure 6</a>: adaptation of test condition to specified characteristics in <a href="#">Table 8</a></li> <li>• <a href="#">Figure 9, 10, 11 and 12</a>: updated</li> <li>• <a href="#">Section 13 “Legal information”</a>: updated</li> </ul>			
BAV23_SER_6	20080303	Product data sheet	-	BAV23S_5 BAV23_2
BAV23S_5	20011012	Product specification	-	BAV23S_4
BAV23_2	19960917	Product specification	-	BAV23_1

## 13. Legal information

### 13.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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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