

# BAS40 series; 1PSxxSB4x series

General-purpose Schottky diodes

Rev. 08 — 13 January 2010

Product data sheet

## 1. Product profile

### 1.1 General description

General-purpose Schottky diodes in small Surface-Mounted Device (SMD) plastic packages.

Table 1. Product overview

Type number	Package		Configuration
	NXP	JEITA	
1PS70SB40	SOT323	SC-70	single diode
1PS76SB40	SOD323	SC-76	single diode
1PS79SB40	SOD523	SC-79	single diode
BAS40	SOT23	-	single diode
BAS40H	SOD123F	-	single diode
BAS40L	SOD882	-	single diode
BAS40W	SOT323	SC-70	single diode
1PS70SB44	SOT323	SC-70	dual series
BAS40-04	SOT23	-	dual series
BAS40-04W	SOT323	SC-70	dual series
1PS70SB45	SOT323	SC-70	dual common cathode
1PS75SB45	SOT416	SC-75	dual common cathode
BAS40-05	SOT23	-	dual common cathode
BAS40-05W	SOT323	SC-70	dual common cathode
1PS70SB46	SOT323	SC-70	dual common anode
BAS40-06	SOT23	-	dual common anode
BAS40-06W	SOT323	SC-70	dual common anode
BAS40-07	SOT143B	-	dual isolated
BAS40-07V	SOT666	-	dual isolated
BAS40-05V	SOT666	-	quadruple common cathode/ common cathode
1PS88SB48	SOT363	SC-88	quadruple common cathode/ common cathode
BAS40XY	SOT363	SC-88	quadruple; 2 series

## 1.2 Features

- High switching speed
- Low leakage current
- High breakdown voltage
- Low capacitance

## 1.3 Applications

- Ultra high-speed switching
- Voltage clamping

## 1.4 Quick reference data

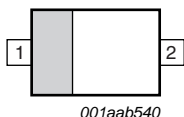



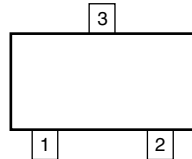
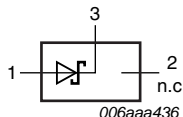
Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
$I_F$	forward current		-	-	120	mA
$V_F$	forward voltage	$I_F = 1 \text{ mA}$	[1]	-	380	mV
$V_R$	reverse voltage		-	-	40	V

[1] Pulse test:  $t_p \leq 300 \mu\text{s}$ ;  $\delta \leq 0.02$ .

## 2. Pinning information

Table 3. Pinning

Pin	Description	Conditions	Simplified outline	Symbol
<b>BAS40H; 1PS76SB40; 1PS79SB40</b>				
1	cathode	[1]	 <p>001aab540</p>	 sym001
2	anode			
<b>BAS40L</b>				
1	cathode	[1]	 <p>Transparent top view</p>	 sym001
2	anode			
<b>BAS40; BAS40W; 1PS70SB40</b>				
1	anode		 <p>006aaa144</p>	 006aaa436
2	not connected			
3	cathode			

**Table 3. Pinning ...continued**

Pin	Description	Simplified outline	Symbol
<b>BAS40-04; BAS40-04W; 1PS70SB44</b>			
1	anode (diode 1)	<p>006aaa144</p>	<p>006aaa437</p>
2	cathode (diode 2)		
3	cathode (diode 1), anode (diode 2)		
<b>BAS40-05; BAS40-05W; 1PS70SB45; 1PS75SB45</b>			
1	anode (diode 1)	<p>006aaa144</p>	<p>006aaa438</p>
2	anode (diode 2)		
3	cathode (diode 1), cathode (diode 2)		
<b>BAS40-06; BAS40-06W; 1PS70SB46</b>			
1	cathode (diode 1)	<p>006aaa144</p>	<p>006aaa439</p>
2	cathode (diode 2)		
3	anode (diode 1), anode (diode 2)		
<b>BAS40-07</b>			
1	cathode (diode 1)		<p>006aaa434</p>
2	cathode (diode 2)		
3	anode (diode 2)		
4	anode (diode 1)		
<b>BAS40-07V</b>			
1	anode (diode 1)		<p>006aaa440</p>
2	not connected		
3	cathode (diode 2)		
4	anode (diode 2)		
5	not connected		
6	cathode (diode 1)		

**Table 3. Pinning ...continued**

Pin	Description	Simplified outline	Symbol
<b>BAS40-05V; 1PS88SB48</b>			
1	anode (diode 1)	<p>001aab555</p>	<p>006aaa446</p>
2	anode (diode 2)		
3	cathode (diode 3), cathode (diode 4)		
4	anode (diode 3)		
5	anode (diode 4)		
6	cathode (diode 1), cathode (diode 2)		
<b>BAS40XY</b>			
1	anode (diode 1)		<p>006aaa256</p>
2	cathode (diode 2)		
3	anode (diode 3), cathode (diode 4)		
4	anode (diode 4)		
5	cathode (diode 3)		
6	cathode (diode 1), anode (diode 2)		

[1] The marking bar indicates the cathode.

### 3. Ordering information

**Table 4. Ordering information**

Type number	Package		Version
	Name	Description	
1PS70SB40	SC-70	plastic surface-mounted package; 3 leads	SOT323
1PS76SB40	SC-76	plastic surface-mounted package; 2 leads	SOD323
1PS79SB40	SC-79	plastic surface-mounted package; 2 leads	SOD523
BAS40	-	plastic surface-mounted package; 3 leads	SOT23
BAS40H	-	plastic surface-mounted package; 2 leads	SOD123F
BAS40L	-	leadless ultra small plastic package; 2 terminals; body 1.0 × 0.6 × 0.5 mm	SOD882
BAS40W	SC-70	plastic surface-mounted package; 3 leads	SOT323
1PS70SB44	SC-70	plastic surface-mounted package; 3 leads	SOT323
BAS40-04	-	plastic surface-mounted package; 3 leads	SOT23
BAS40-04W	SC-70	plastic surface-mounted package; 3 leads	SOT323
1PS70SB45	SC-70	plastic surface-mounted package; 3 leads	SOT323
1PS75SB45	SC-75	plastic surface-mounted package; 3 leads	SOT416
BAS40-05	-	plastic surface-mounted package; 3 leads	SOT23
BAS40-05W	SC-70	plastic surface-mounted package; 3 leads	SOT323
1PS70SB46	SC-70	plastic surface-mounted package; 3 leads	SOT323
BAS40-06	-	plastic surface-mounted package; 3 leads	SOT23
BAS40-06W	SC-70	plastic surface-mounted package; 3 leads	SOT323
BAS40-07	-	plastic surface-mounted package; 4 leads	SOT143B
BAS40-07V	-	plastic surface-mounted package; 6 leads	SOT666
BAS40-05V	-	plastic surface-mounted package; 6 leads	SOT666
1PS88SB48	SC-88	plastic surface-mounted package; 6 leads	SOT363
BAS40XY	SC-88	plastic surface-mounted package; 6 leads	SOT363

## 4. Marking

**Table 5. Marking codes**

Type number	Marking code <sup>[1]</sup>	Type number	Marking code <sup>[1]</sup>
1PS70SB40	6*3	1PS75SB45	45
1PS76SB40	S4	BAS40-05	45*
1PS79SB40	T	BAS40-05W	65*
BAS40	43*	1PS70SB46	6*6
BAS40H	AJ	BAS40-06	46*
BAS40L	S6	BAS40-06W	66*
BAS40W	63*	BAS40-07	47*
1PS70SB44	6*4	BAS40-07V	67
BAS40-04	44*	BAS40-05V	65
BAS40-04W	64*	1PS88SB48	8*5
1PS70SB45	6*5	BAS40XY	40*

- [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>					
$V_R$	reverse voltage		-	40	V
$I_F$	forward current		-	120	mA
$I_{FRM}$	repetitive peak forward current	$t_p \leq 1 \text{ s}; \delta \leq 0.5$	-	120	mA
$I_{FSM}$	non-repetitive peak forward current	$t_p \leq 10 \text{ ms}$	[1] -	200	mA
$T_j$	junction temperature		-	150	°C
$T_{amb}$	ambient temperature		-65	+150	°C
$T_{stg}$	storage temperature		-65	+150	°C

- [1]  $T_j = 25 \text{ °C}$  prior to surge.

## 6. Thermal characteristics

**Table 7. Thermal characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per device</b>						
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]			
	SOT23		-	-	500	K/W
	SOT143B		-	-	500	K/W
	SOT363 (1PS88SB48)		-	-	416	K/W
	SOT416		-	-	833	K/W
	SOT666 (BAS40-05V)		[2]	-	225	K/W
	SOT666 (BAS40-07V)		[2]	-	416	K/W
	SOD123F		[2]	-	330	K/W
	SOD323		-	-	450	K/W
	SOD523		[2]	-	450	K/W
	SOD882		[2]	-	500	K/W
	SOT323		-	-	625	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point					
	SOT363 (BAS40XY)		[3]	-	260	K/W

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

[2] Reflow soldering is the only recommended soldering method.

[3] Soldering point at pins 2, 3, 5 and 6.

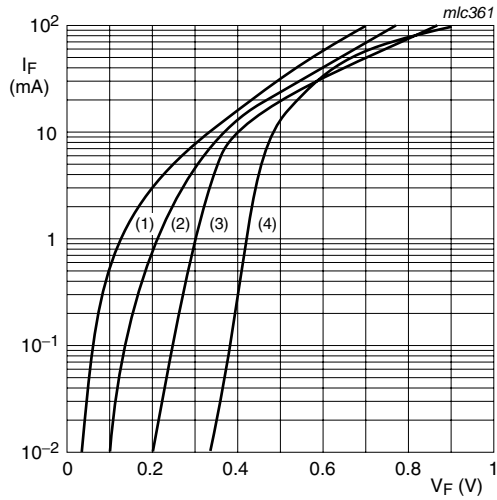
## 7. Characteristics

**Table 8. Characteristics**

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

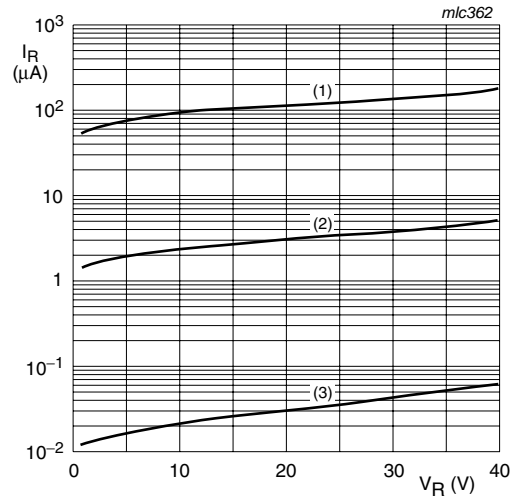
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
$V_F$	forward voltage		[1]			
		$I_F = 1\text{ mA}$	-	-	380	mV
		$I_F = 10\text{ mA}$	-	-	500	mV
		$I_F = 40\text{ mA}$	-	-	1	V
$I_R$	reverse current	$V_R = 30\text{ V}$	-	-	1	$\mu\text{A}$
		$V_R = 40\text{ V}$	-	-	10	$\mu\text{A}$
$C_d$	diode capacitance	$V_R = 0\text{ V}; f = 1\text{ MHz}$	-	-	5	pF

[1] Pulse test:  $t_p \leq 300\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$ .



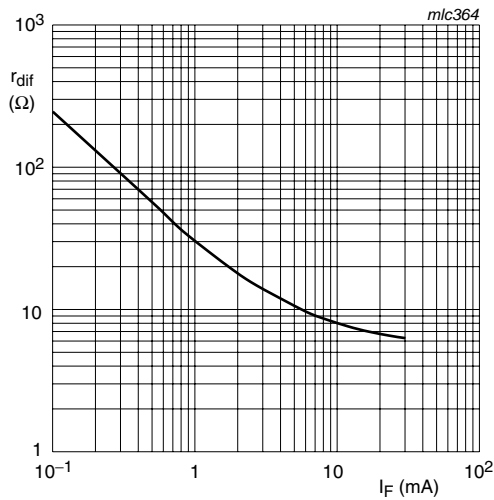
- (1)  $T_{amb} = 125\text{ }^{\circ}\text{C}$
- (2)  $T_{amb} = 85\text{ }^{\circ}\text{C}$
- (3)  $T_{amb} = 25\text{ }^{\circ}\text{C}$
- (4)  $T_{amb} = -40\text{ }^{\circ}\text{C}$

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



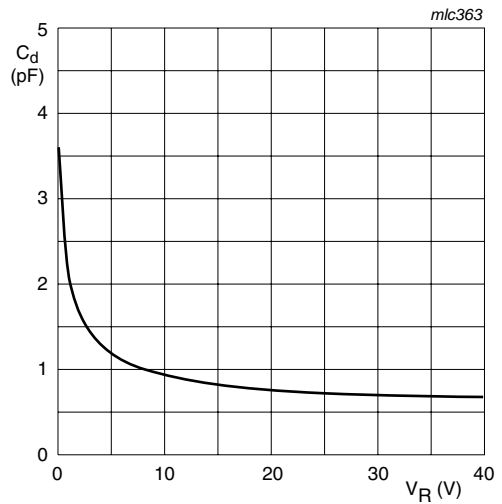
- (1)  $T_{amb} = 125\text{ }^{\circ}\text{C}$
- (2)  $T_{amb} = 85\text{ }^{\circ}\text{C}$
- (3)  $T_{amb} = 25\text{ }^{\circ}\text{C}$

**Fig 2. Reverse current as a function of reverse voltage; typical values**



$f = 10\text{ kHz}$

**Fig 3. Differential resistance as a function of forward current; typical values**

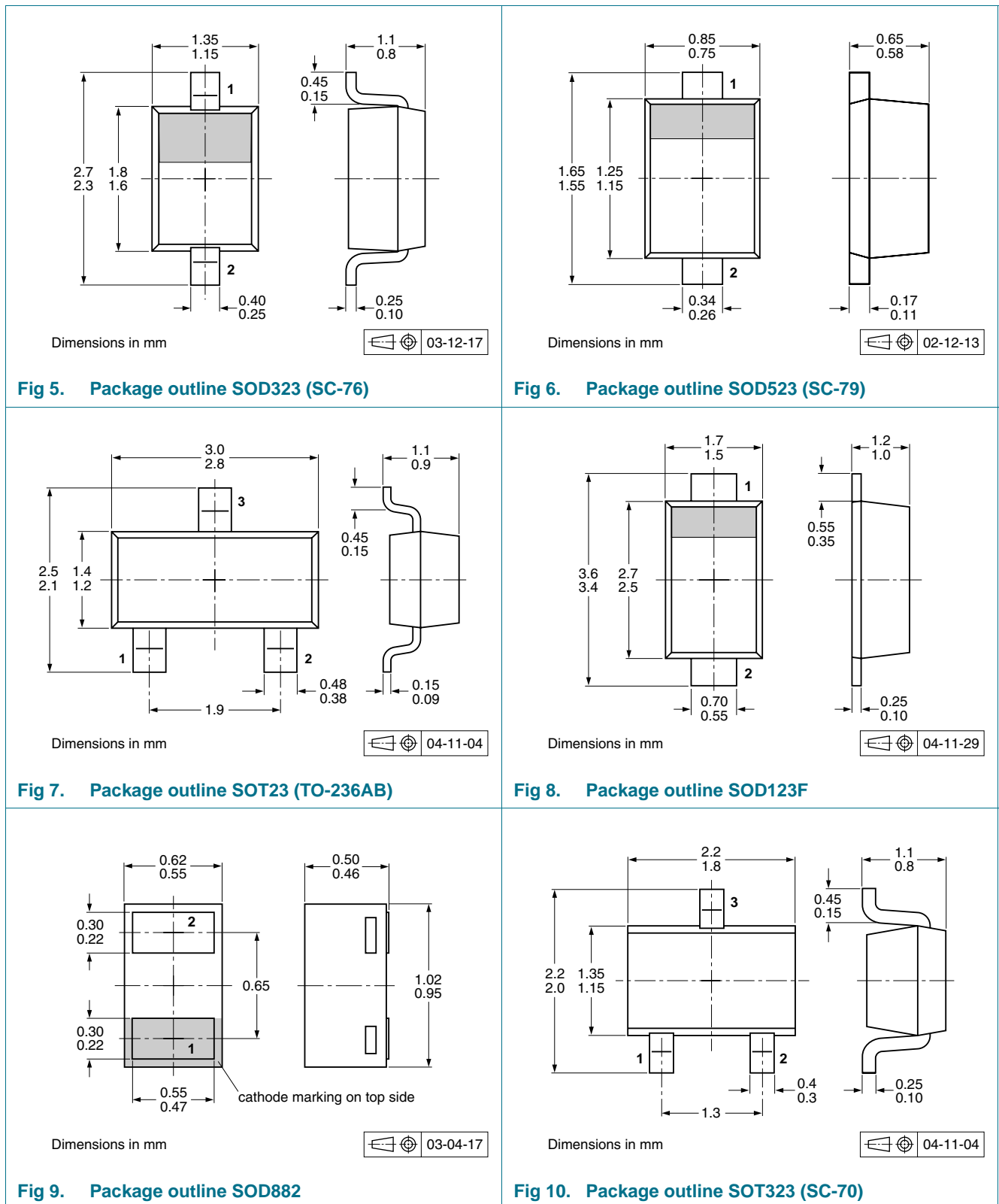


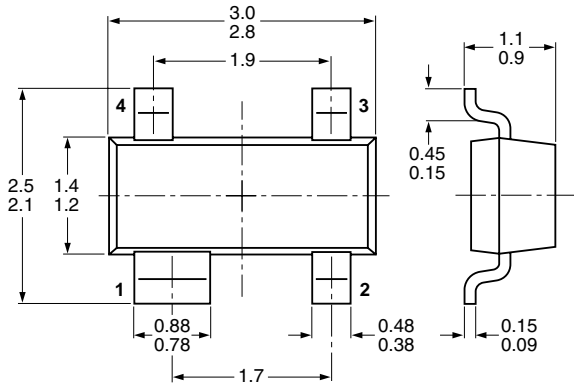
$T_{amb} = 25\text{ }^{\circ}\text{C}; f = 1\text{ MHz}$

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

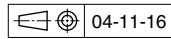


## 8. Package outline

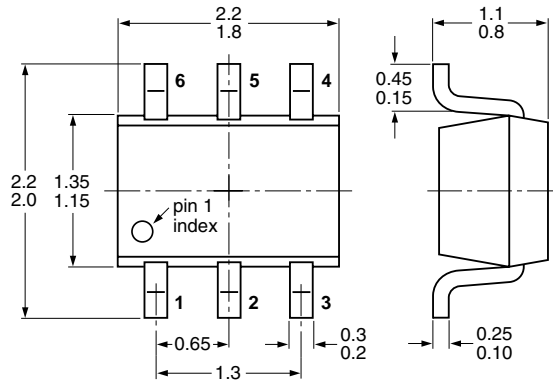




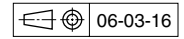
Dimensions in mm



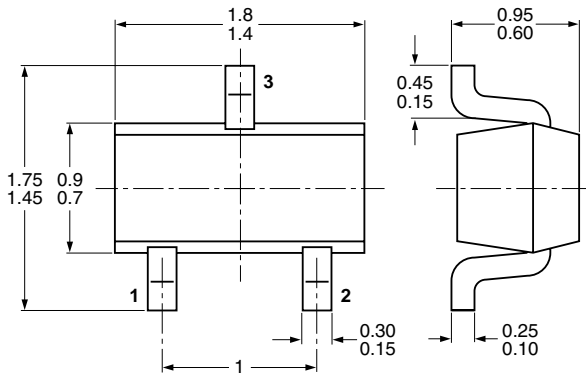
**Fig 11. Package outline SOT143B**



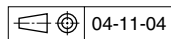
Dimensions in mm



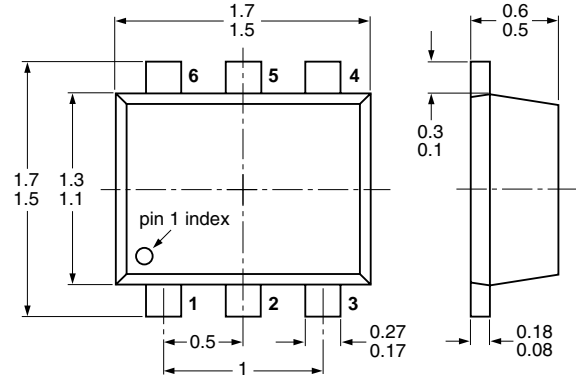
**Fig 12. Package outline SOT363 (SC-88)**



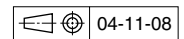
Dimensions in mm



**Fig 13. Package outline SOT416 (SC-75)**



Dimensions in mm



**Fig 14. Package outline SOT666**

## 9. Packing information

**Table 9. Packing methods**

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

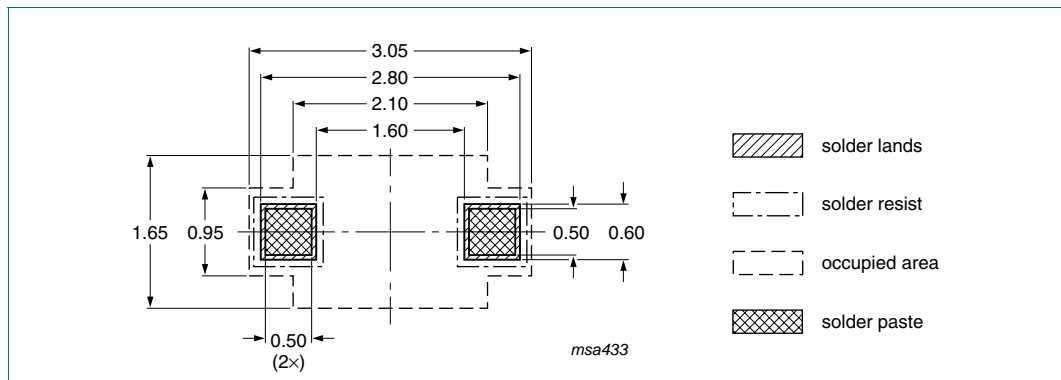
Type number	Package	Description	Packing quantity			
			3000	4000	8000	10000
1PS70SB40	SOT323	4 mm pitch, 8 mm tape and reel	-115	-	-	-135
1PS76SB40	SOD323	4 mm pitch, 8 mm tape and reel	-115	-	-	-135
1PS79SB40	SOD523	2 mm pitch, 8 mm tape and reel	-	-	-315	-
		4 mm pitch, 8 mm tape and reel	-115	-	-	-135
BAS40	SOT23	4 mm pitch, 8 mm tape and reel	-215	-	-	-235
BAS40H	SOD123F	4 mm pitch, 8 mm tape and reel	-115	-	-	-135
BAS40L	SOD882	2 mm pitch, 8 mm tape and reel	-	-	-	-315
BAS40W	SOT323	4 mm pitch, 8 mm tape and reel	-115	-	-	-135
1PS70SB44	SOT323	4 mm pitch, 8 mm tape and reel	-115	-	-	-135
BAS40-04	SOT23	4 mm pitch, 8 mm tape and reel	-215	-	-	-235
BAS40-04W	SOT323	4 mm pitch, 8 mm tape and reel	-115	-	-	-135
1PS70SB45	SOT323	4 mm pitch, 8 mm tape and reel	-115	-	-	-135
1PS75SB45	SOT416	4 mm pitch, 8 mm tape and reel	-115	-	-	-135
BAS40-05	SOT23	4 mm pitch, 8 mm tape and reel	-215	-	-	-235
BAS40-05W	SOT323	4 mm pitch, 8 mm tape and reel	-115	-	-	-135
1PS70SB46	SOT323	4 mm pitch, 8 mm tape and reel	-115	-	-	-135
BAS40-06	SOT23	4 mm pitch, 8 mm tape and reel	-215	-	-	-235
BAS40-06W	SOT323	4 mm pitch, 8 mm tape and reel	-115	-	-	-135
BAS40-07	SOT143B	4 mm pitch, 8 mm tape and reel	-215	-	-	-235
BAS40-07V	SOT666	2 mm pitch, 8 mm tape and reel	-	-	-315	-
		4 mm pitch, 8 mm tape and reel	-	-115	-	-
BAS40-05V	SOT666	2 mm pitch, 8 mm tape and reel	-	-	-315	-
		4 mm pitch, 8 mm tape and reel	-	-115	-	-
1PS88SB48	SOT363	4 mm pitch, 8 mm tape and reel; T1 <sup>[2]</sup>	-115	-	-	-135
		4 mm pitch, 8 mm tape and reel; T2 <sup>[3]</sup>	-125	-	-	-165
BAS40XY	SOT363	4 mm pitch, 8 mm tape and reel; T1 <sup>[2]</sup>	-115	-	-	-135
		4 mm pitch, 8 mm tape and reel; T2 <sup>[3]</sup>	-125	-	-	-165

[1] For further information and the availability of packing methods, see [Section 13](#).

[2] T1: normal taping

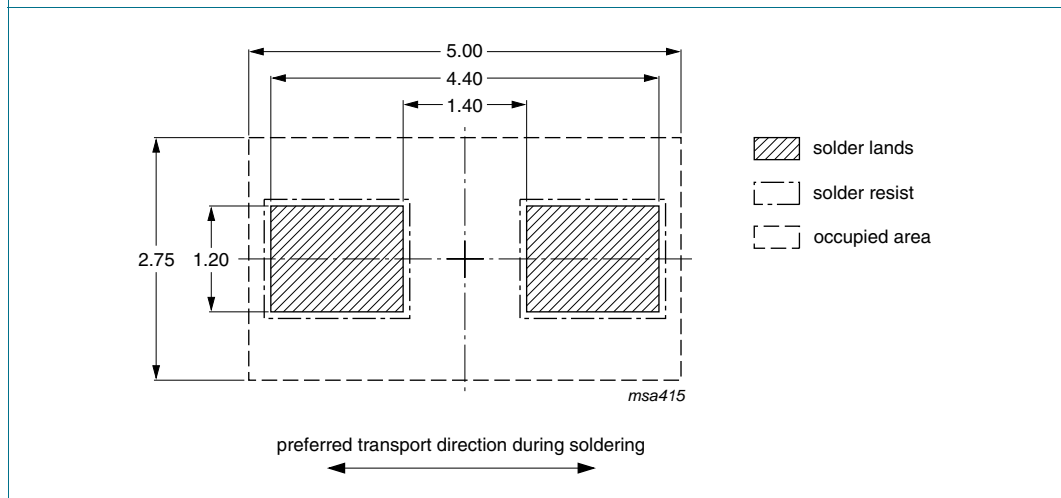
[3] T2: reverse taping

## 10. Soldering



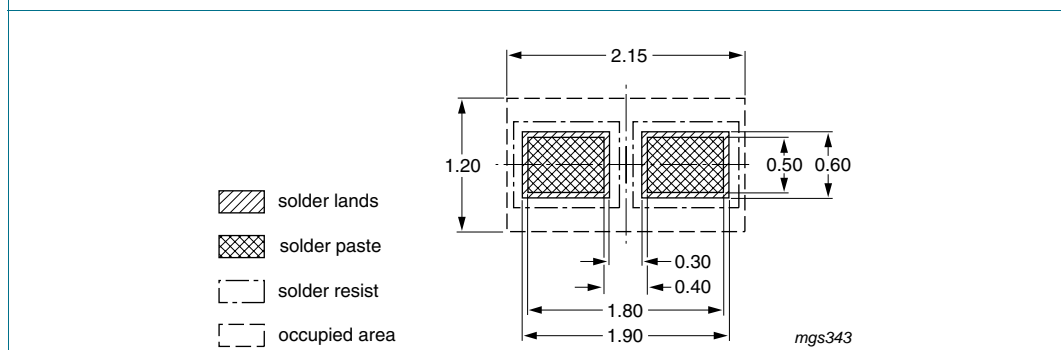
Dimensions in mm

**Fig 15. Reflow soldering footprint SOD323 (SC-76)**



Dimensions in mm

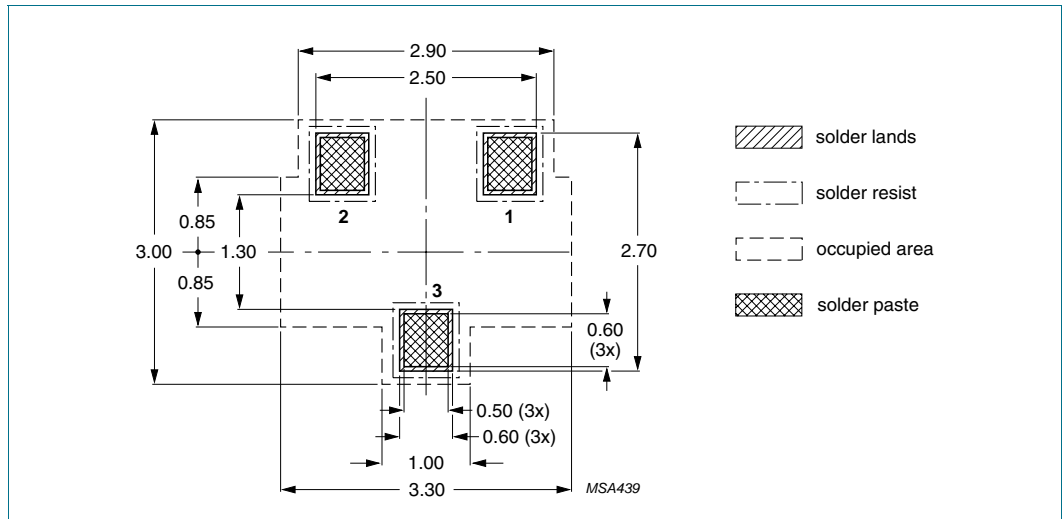
**Fig 16. Wave soldering footprint SOD323 (SC-76)**



Reflow soldering is the only recommended soldering method.

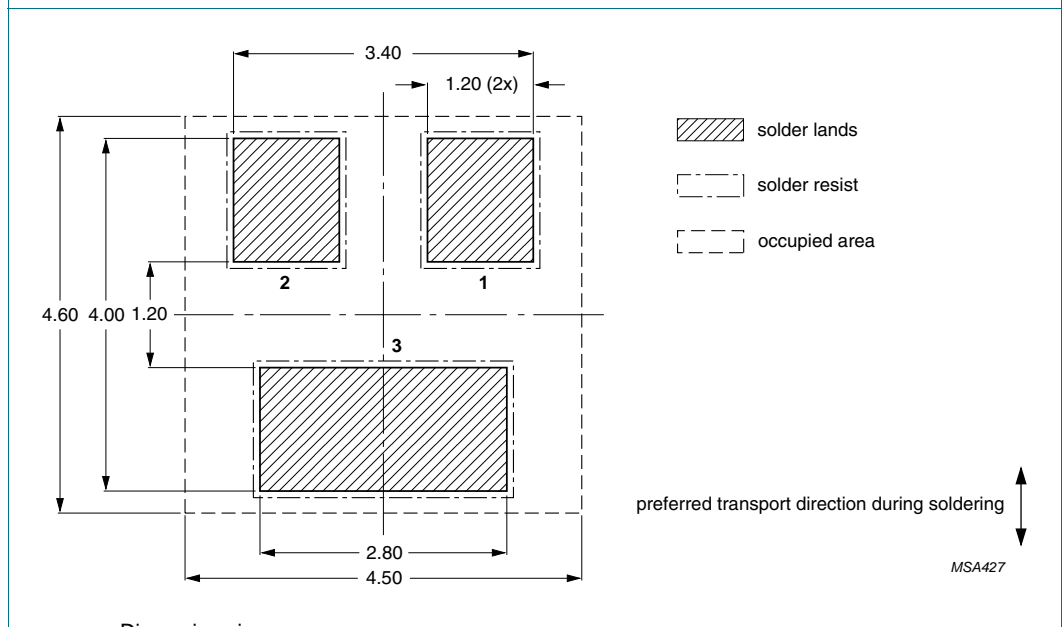
Dimensions in mm

**Fig 17. Reflow soldering footprint SOD523 (SC-79)**



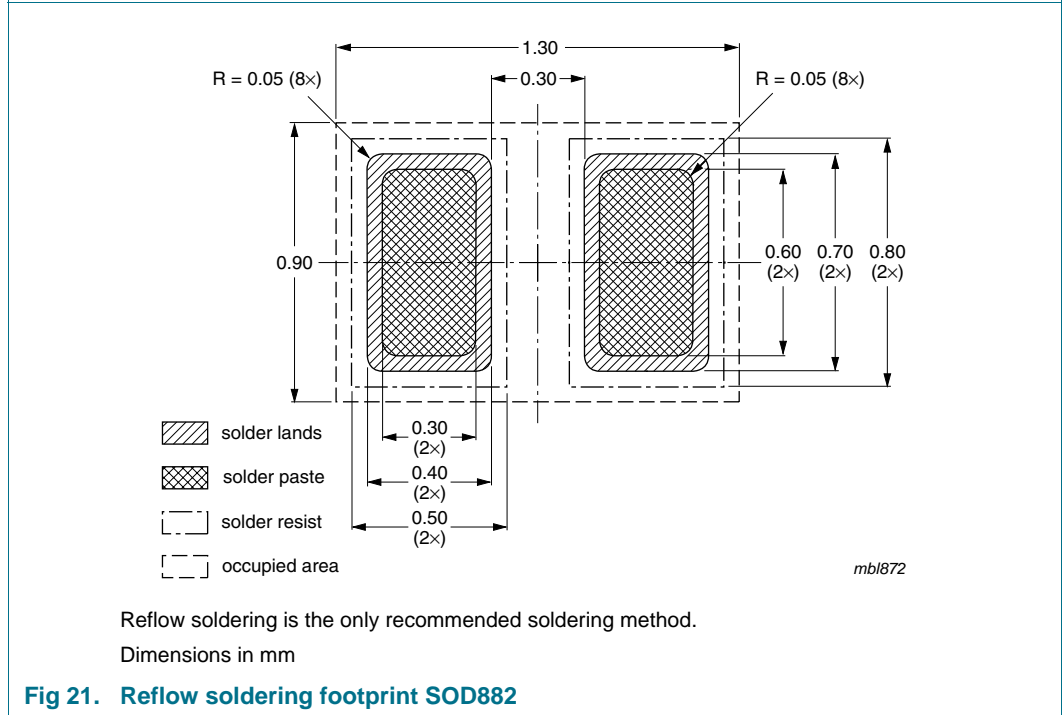
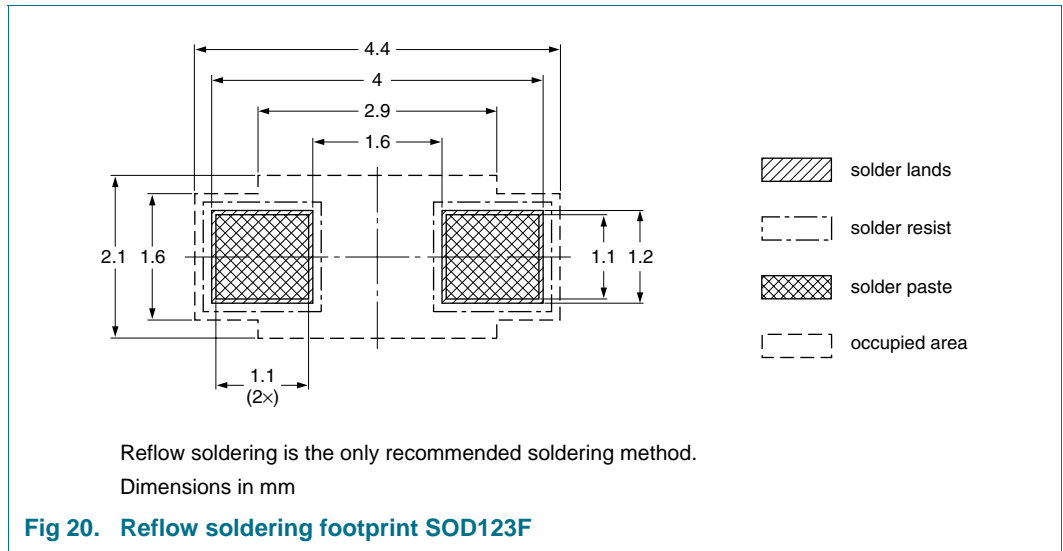
Dimensions in mm

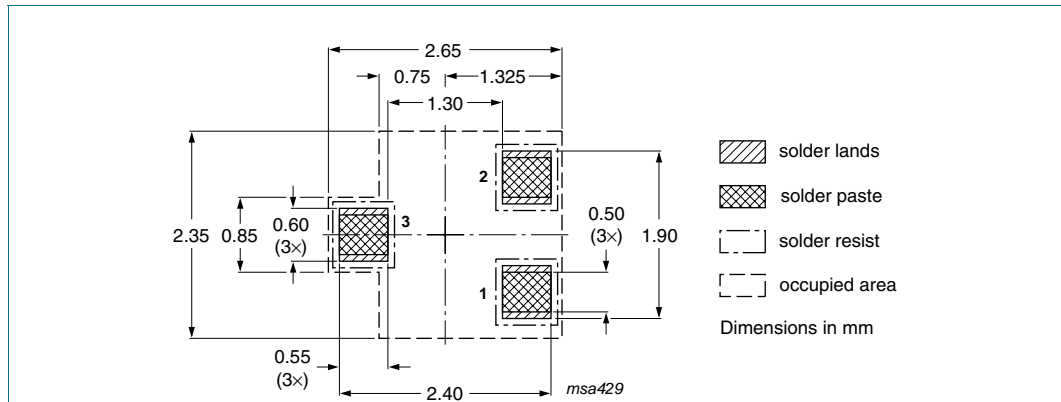
**Fig 18. Reflow soldering footprint SOT23 (TO-236AB)**



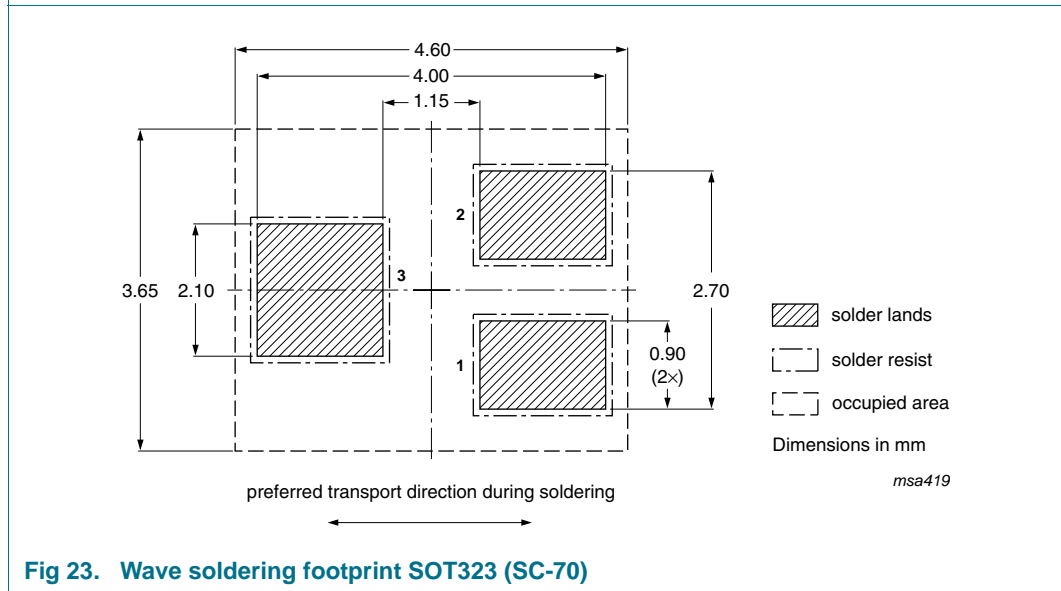
Dimensions in mm

**Fig 19. Wave soldering footprint SOT23 (TO-236AB)**

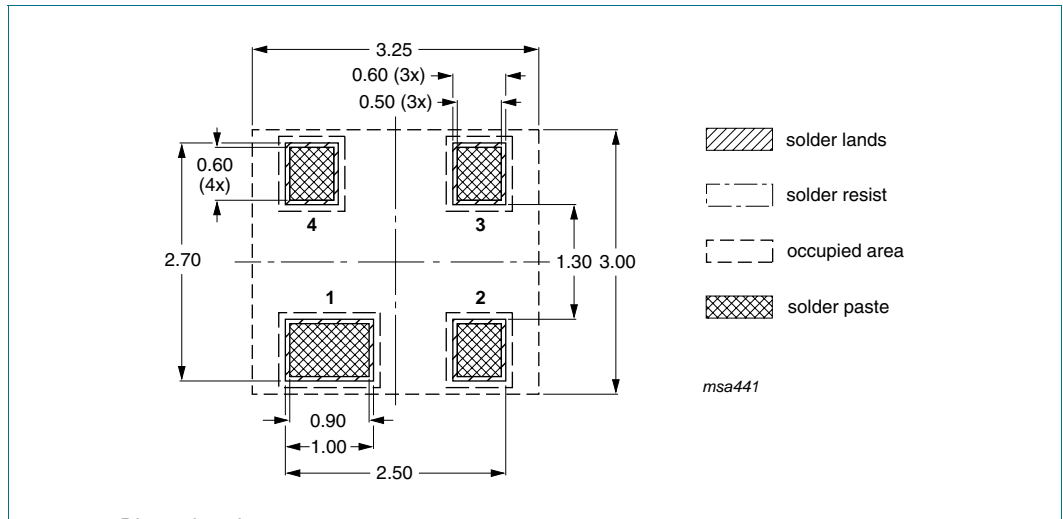




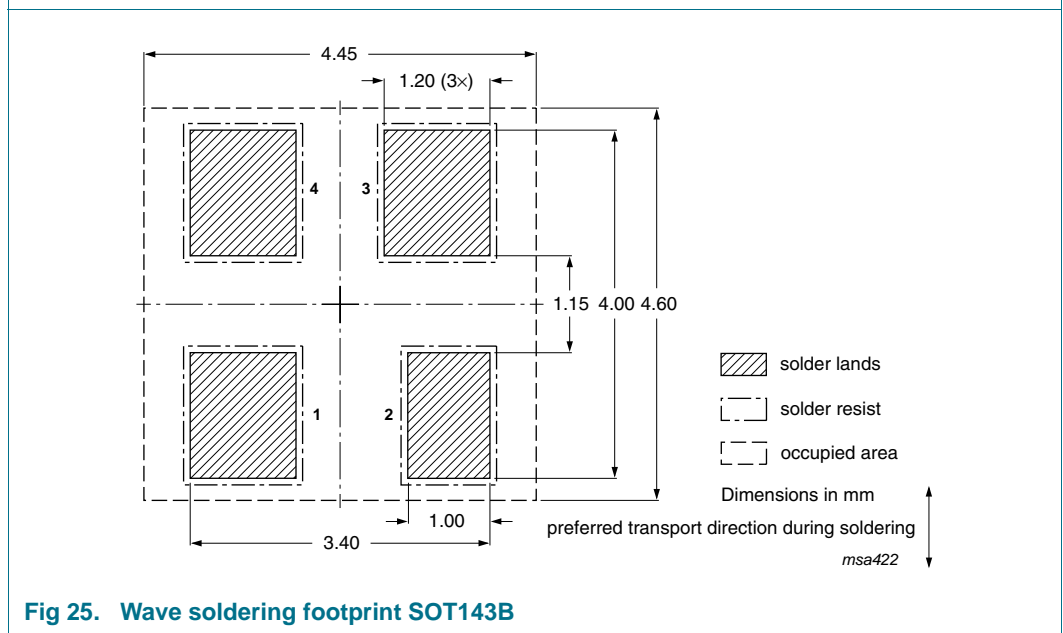
**Fig 22. Reflow soldering footprint SOT323 (SC-70)**



**Fig 23. Wave soldering footprint SOT323 (SC-70)**

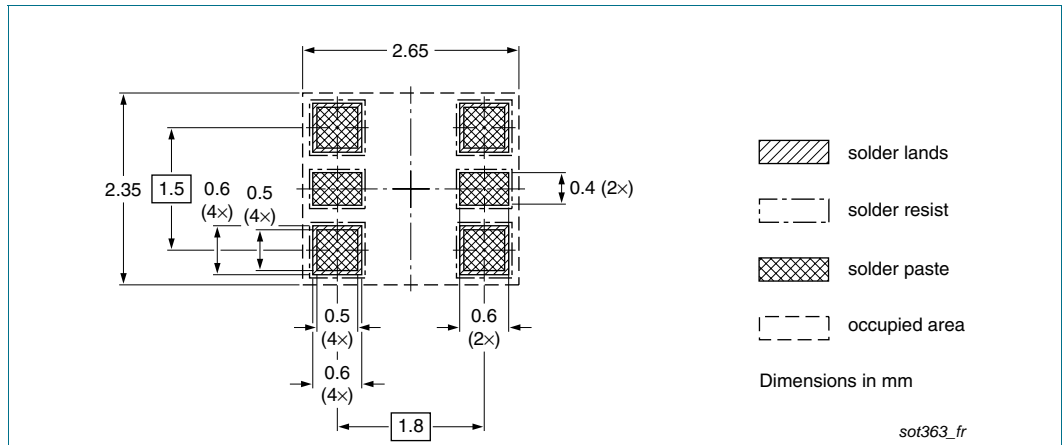


**Fig 24. Reflow soldering footprint SOT143B**

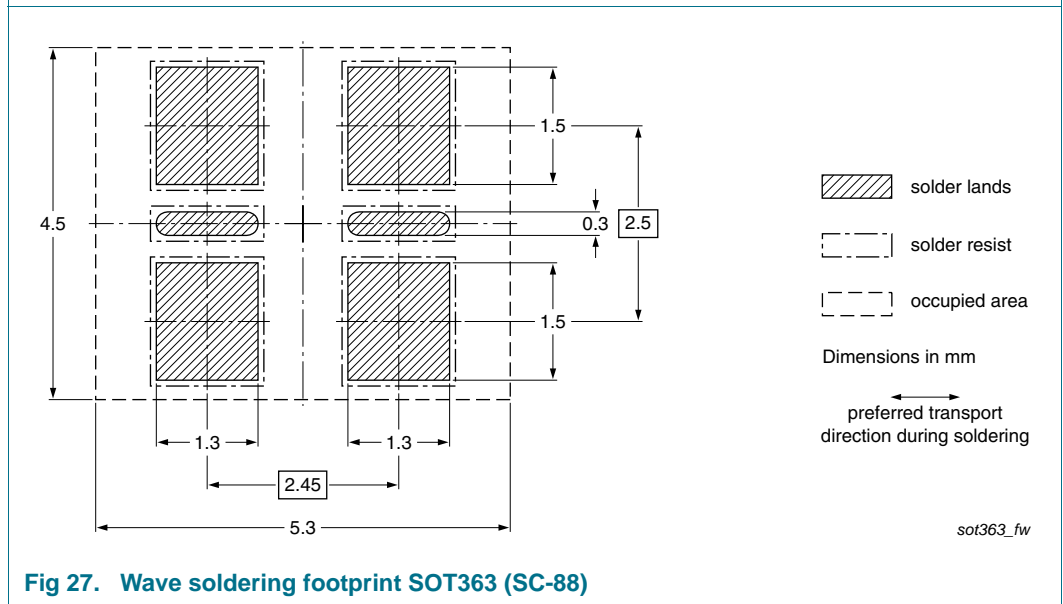


**Fig 25. Wave soldering footprint SOT143B**

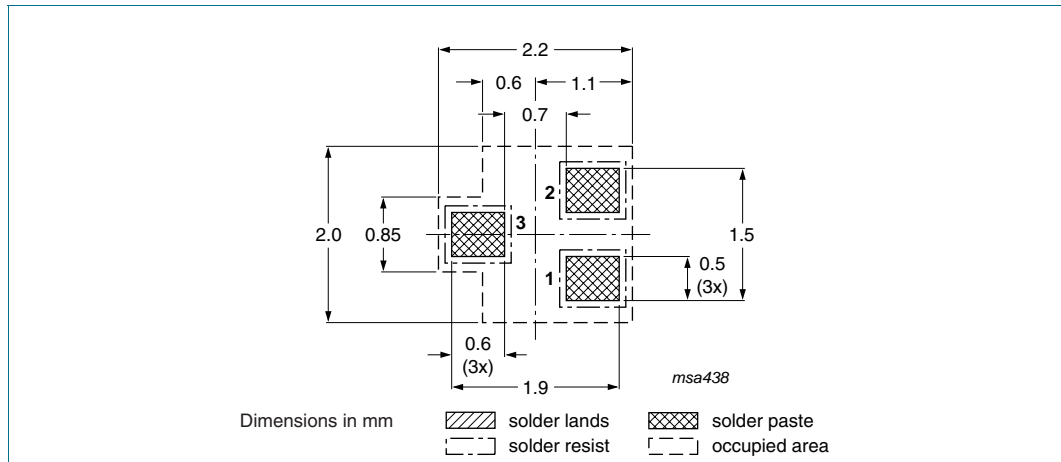




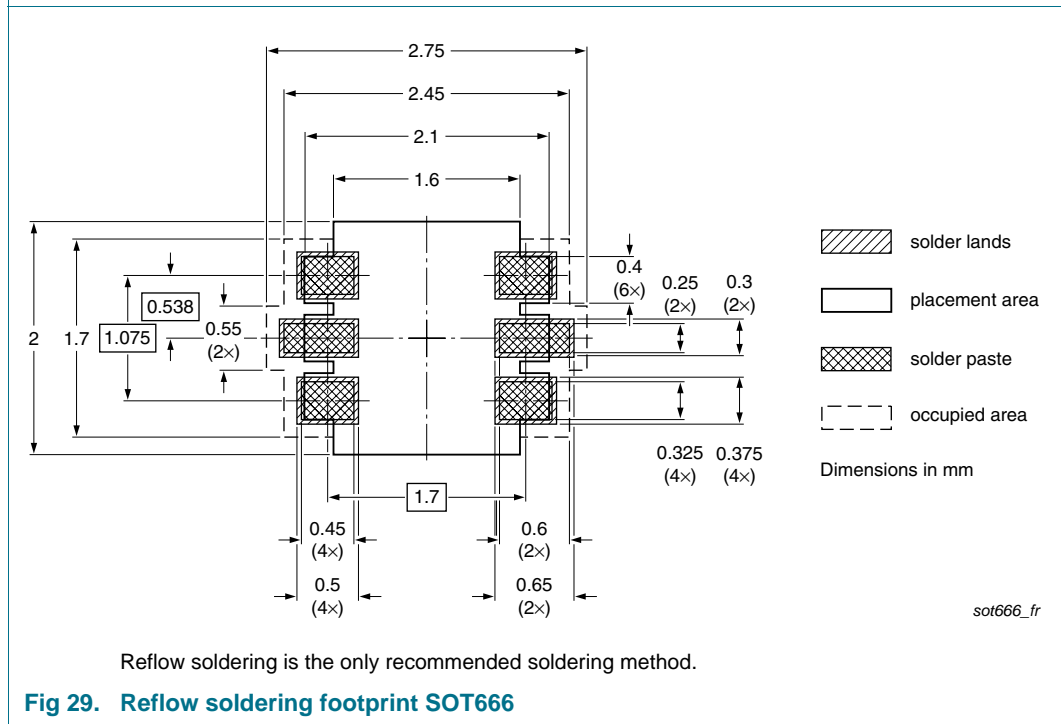
**Fig 26. Reflow soldering footprint SOT363 (SC-88)**



**Fig 27. Wave soldering footprint SOT363 (SC-88)**



**Fig 28. Reflow soldering footprint SOT416**



**Fig 29. Reflow soldering footprint SOT666**

## 11. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BAS40_1PSXXSB4X_SER_8	20100113	Product data sheet	-	BAS40_1PSXXSB4X_SER_7
Modifications:		<ul style="list-style-type: none"> <li>• This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content.</li> <li>• <a href="#">Figure 12 “Package outline SOT363 (SC-88)”</a>: updated</li> <li>• <a href="#">Figure 16 “Wave soldering footprint SOD323 (SC-76)”</a>: updated</li> <li>• <a href="#">Figure 17 “Reflow soldering footprint SOD523 (SC-79)”</a>: updated</li> <li>• <a href="#">Figure 21 “Reflow soldering footprint SOD882”</a>: updated</li> <li>• <a href="#">Figure 22 “Reflow soldering footprint SOT323 (SC-70)”</a>: updated</li> <li>• <a href="#">Figure 23 “Wave soldering footprint SOT323 (SC-70)”</a>: updated</li> <li>• <a href="#">Figure 25 “Wave soldering footprint SOT143B”</a>: updated</li> <li>• <a href="#">Figure 26 “Reflow soldering footprint SOT363 (SC-88)”</a>: updated</li> <li>• <a href="#">Figure 27 “Wave soldering footprint SOT363 (SC-88)”</a>: updated</li> <li>• <a href="#">Figure 28 “Reflow soldering footprint SOT416”</a>: updated</li> <li>• <a href="#">Figure 29 “Reflow soldering footprint SOT666”</a>: updated</li> </ul>		
BAS40_1PSXXSB4X_SER_7	20060512	Product data sheet	-	BAS40_1PSXXSB4X_SER_6
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## 12. Legal information

### 12.1 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.

[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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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