

# BAS40 series; 1PSxxSB4x series

General-purpose Schottky diodes

Rev. 06 — 9 August 2005

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
	Philips	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

**PHILIPS**

## 1.2 Features

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

## 1.3 Applications

- Ultra high-speed switching
- Voltage clamping

## 1.4 Quick reference data

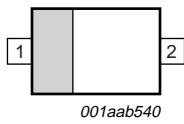

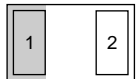

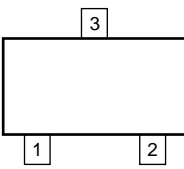
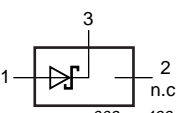
Table 2: Quick reference data

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

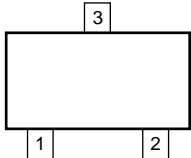
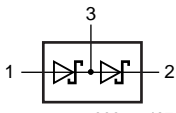
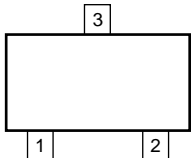
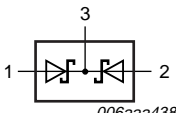
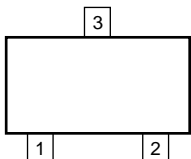
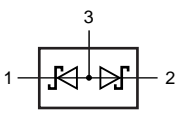
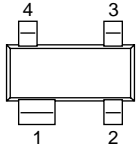
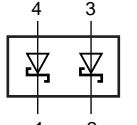
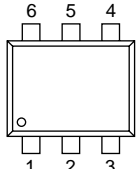
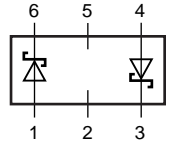
[1] Pulse test:  $t_p \leq 300 \mu\text{s}$ ;  $\delta \leq 0.02$

## 2. Pinning information

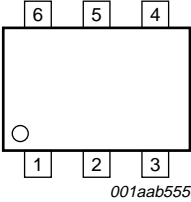
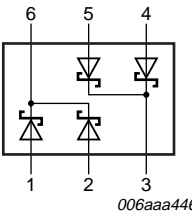
Table 3: Pinning

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)		

[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

## 4. Marking

**Table 5: Marking codes**

Type number	Marking code [1]	Type number	Marking code [1]
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	-	-

- [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	$t_p \leq 1$ s; $\delta \leq 0.5$	-	120	mA
$I_{FSM}$	non-repetitive peak forward current	$t_p \leq 10$ 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]  $T_j = 25$  °C prior to surge

## 6. Thermal characteristics

**Table 7: Thermal characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]			
	SOT23		-	-	500	K/W
	SOT143B		-	-	500	K/W
	SOT363		-	-	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

[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.

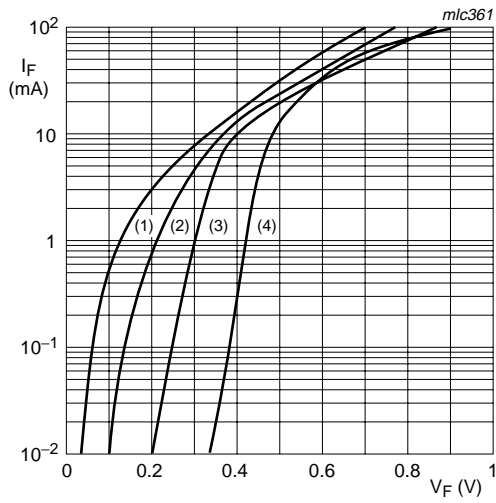
## 7. Characteristics

**Table 8: Characteristics**

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

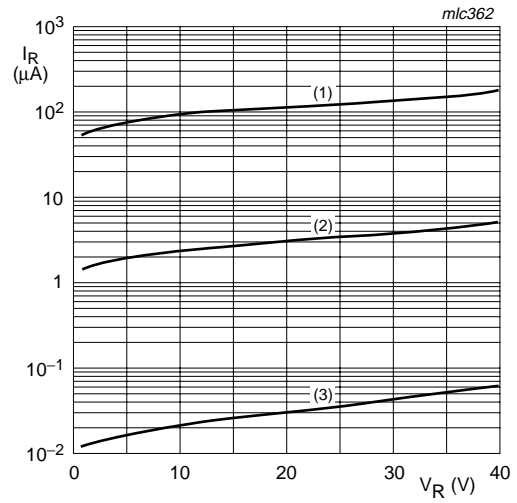
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
$V_F$	forward voltage	$I_F = 1\text{ mA}$	[1]	-	380	mV
		$I_F = 10\text{ mA}$	[1]	-	500	mV
		$I_F = 40\text{ mA}$	[1]	-	1	V
$I_R$	reverse current	$V_R = 30\text{ V}$	-	-	1	$\mu\text{A}$
		$V_R = 40\text{ V}$	-	-	10	$\mu\text{A}$
$C_d$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

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



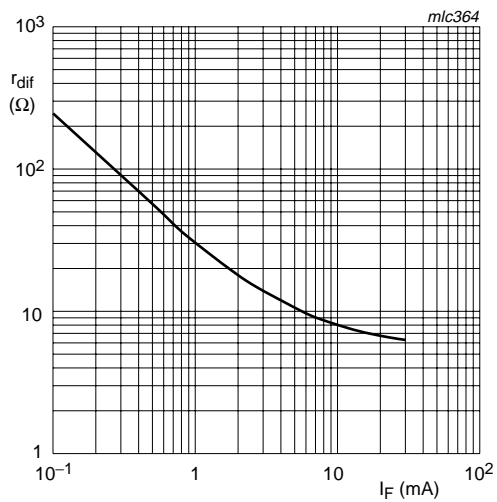
- (1)  $T_{amb} = 125\text{ }^{\circ}\text{C}$
- (2)  $T_{amb} = 85\text{ }^{\circ}\text{C}$
- (3)  $T_{amb} = 25\text{ }^{\circ}\text{C}$
- (4)  $T_{amb} = -40\text{ }^{\circ}\text{C}$

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



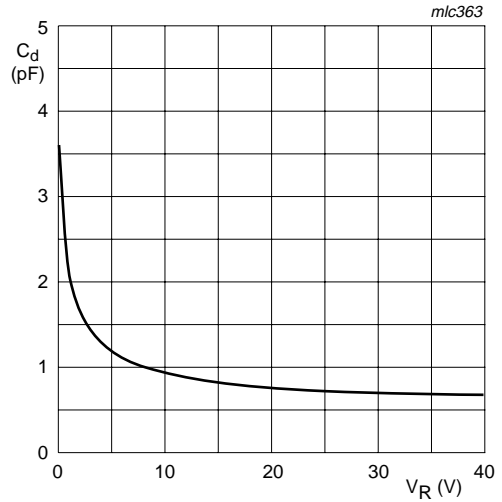
- (1)  $T_{amb} = 125\text{ }^{\circ}\text{C}$
- (2)  $T_{amb} = 85\text{ }^{\circ}\text{C}$
- (3)  $T_{amb} = 25\text{ }^{\circ}\text{C}$

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



$f = 10\text{ kHz}$

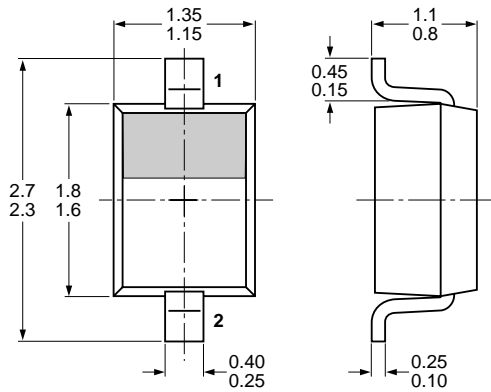
**Fig 3. Differential resistance as a function of forward current; typical values**



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

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

## 8. Package outline



Dimensions in mm

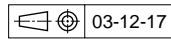
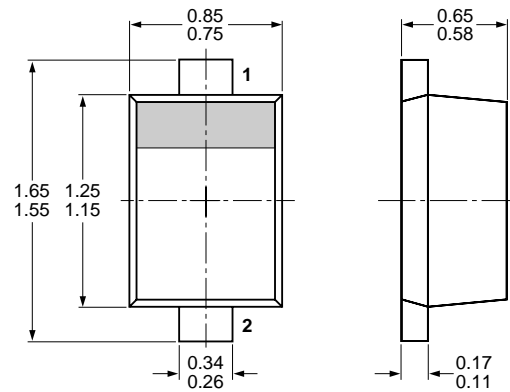


Fig 5. Package outline SOD323 (SC-76)



Dimensions in mm

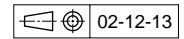
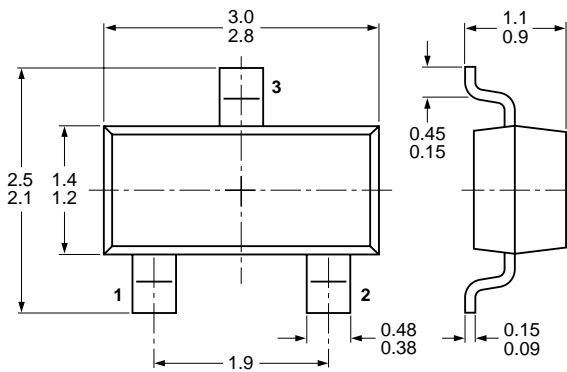


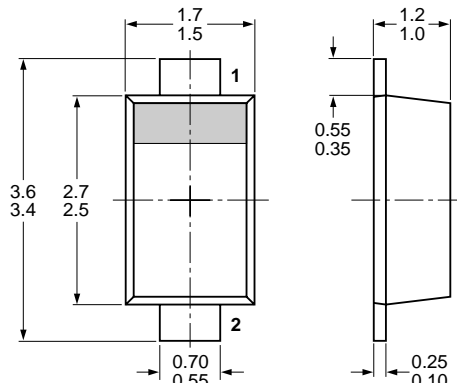
Fig 6. Package outline SOD523 (SC-79)



Dimensions in mm



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



Dimensions in mm

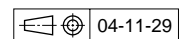
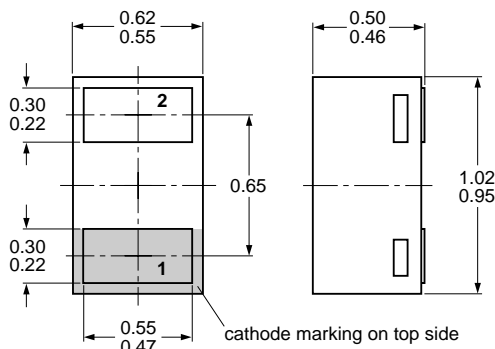


Fig 8. Package outline SOD123F



Dimensions in mm

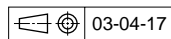
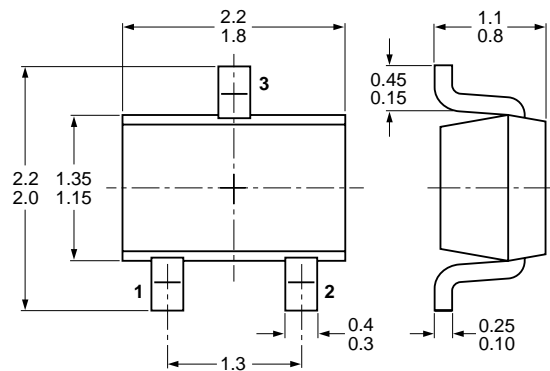


Fig 9. Package outline SOD882



Dimensions in mm

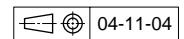
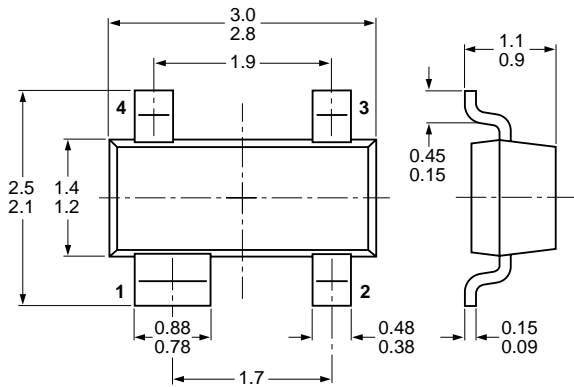


Fig 10. Package outline SOT323 (SC-70)

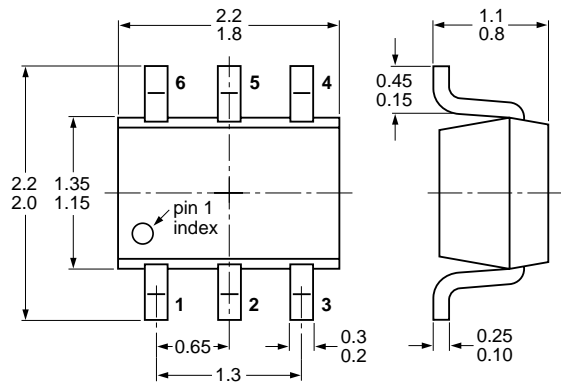




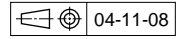
Dimensions in mm



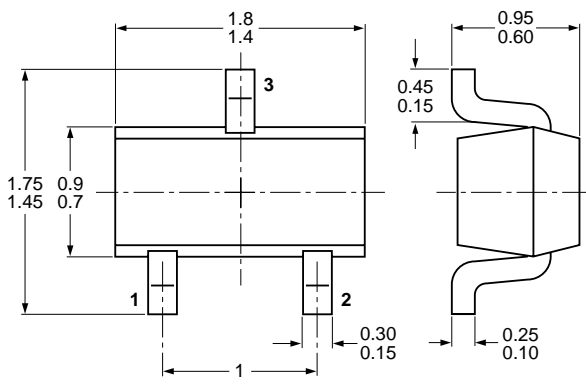
**Fig 11. Package outline SOT143B**



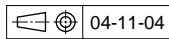
Dimensions in mm



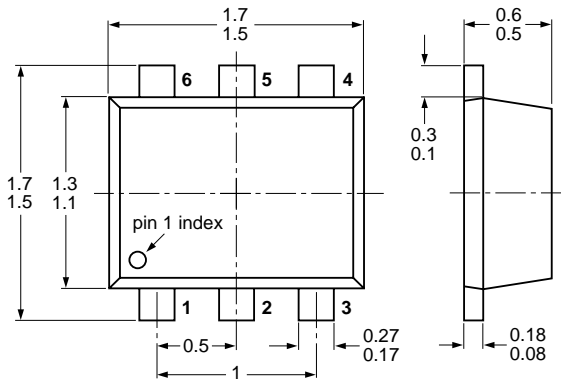
**Fig 12. Package outline SOT363 (SC-88)**



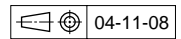
Dimensions in mm



**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. [\[1\]](#)

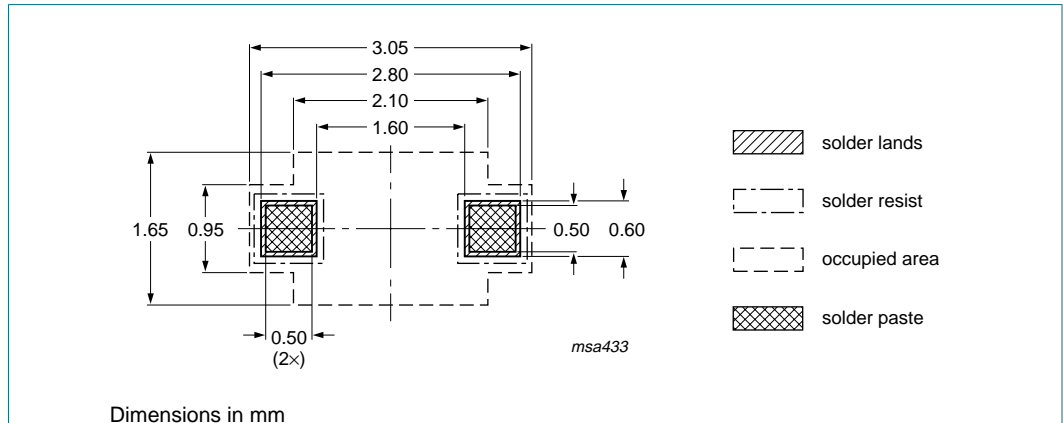
Type number	Package	Description	Packing quantity			
			3000	4000	8000	10000
1PS70SB40	SOT323	4 mm pitch, 8 mm tape and reel	-115	-	-	-135
1PS76SB40	SOD323	4 mm pitch, 8 mm tape and reel	-115	-	-	-135
1PS79SB40	SOD523	4 mm pitch, 8 mm tape and reel	-115	-	-	-135
BAS40	SOT23	4 mm pitch, 8 mm tape and reel	-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	4 mm pitch, 8 mm tape and reel	-	-115	-	-
		2 mm pitch, 8 mm tape and reel	-	-	-315	-
BAS40-05V	SOT666	4 mm pitch, 8 mm tape and reel	-	-115	-	-
		2 mm pitch, 8 mm tape and reel	-	-	-315	-
1PS88SB48	SOT363	4 mm pitch, 8 mm tape and reel; T1 <a href="#">[2]</a>	-115	-	-	-135
		4 mm pitch, 8 mm tape and reel; T2 <a href="#">[3]</a>	-125	-	-	-165

[1] For further information and the availability of packing methods, see [Section 16](#).

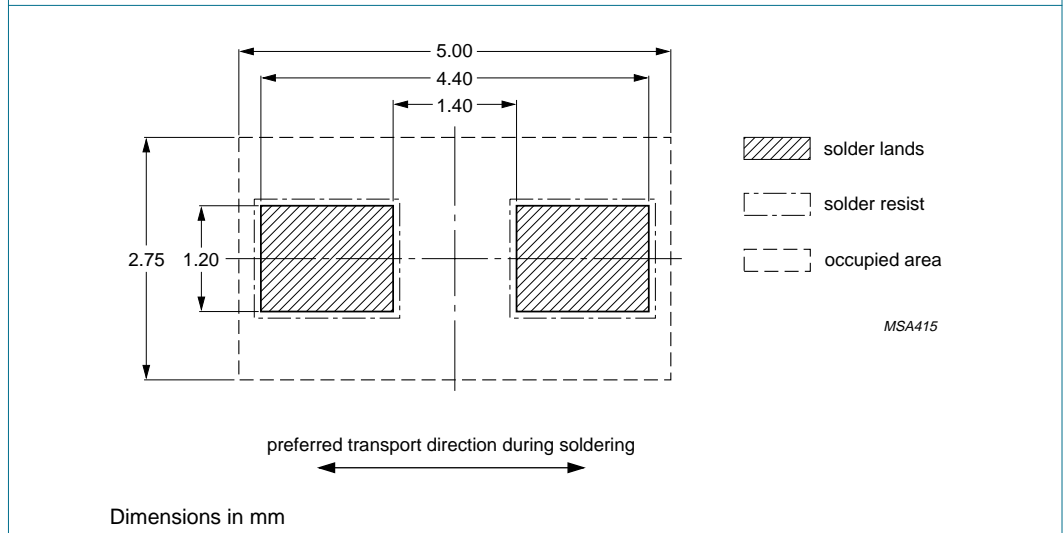
[2] T1: normal taping

[3] T2: reverse taping

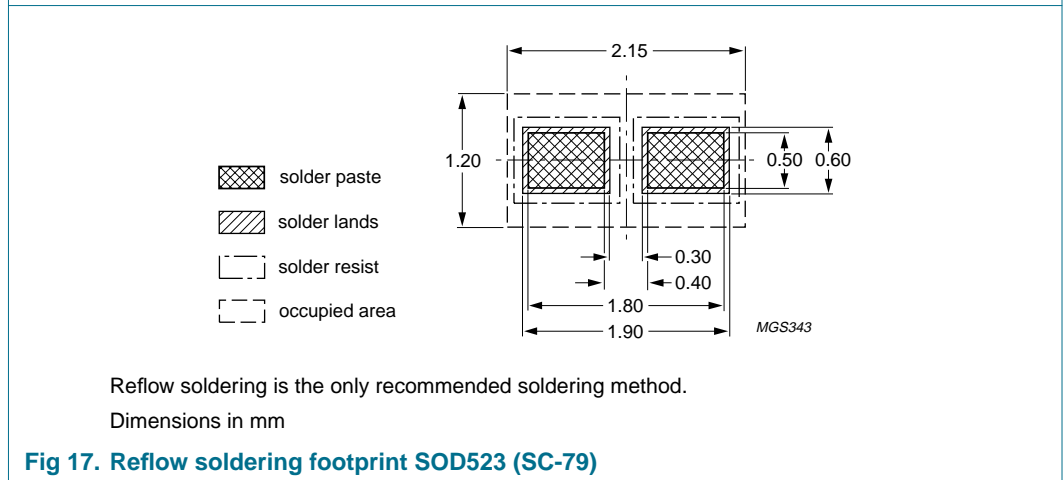
**10. Soldering**



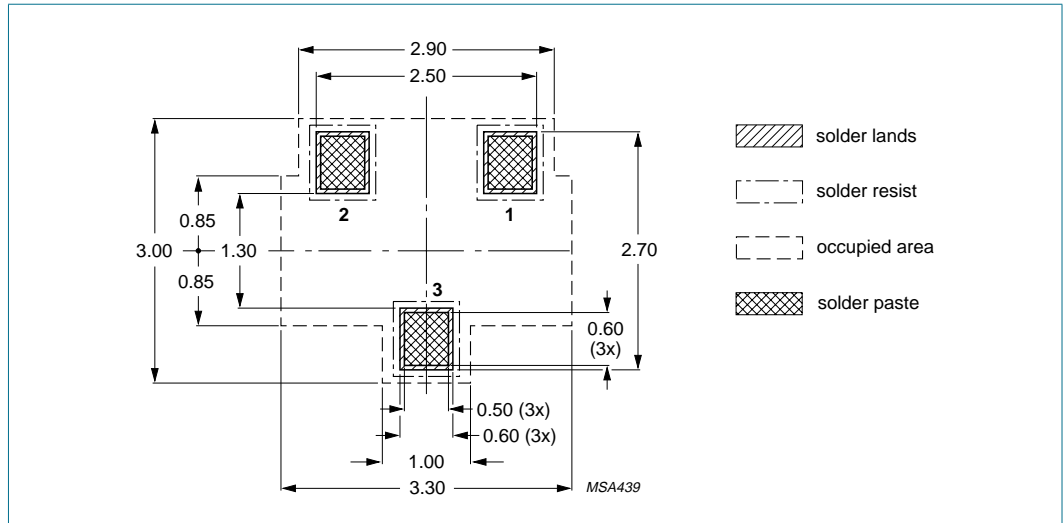
**Fig 15. Reflow soldering footprint SOD323 (SC-76)**



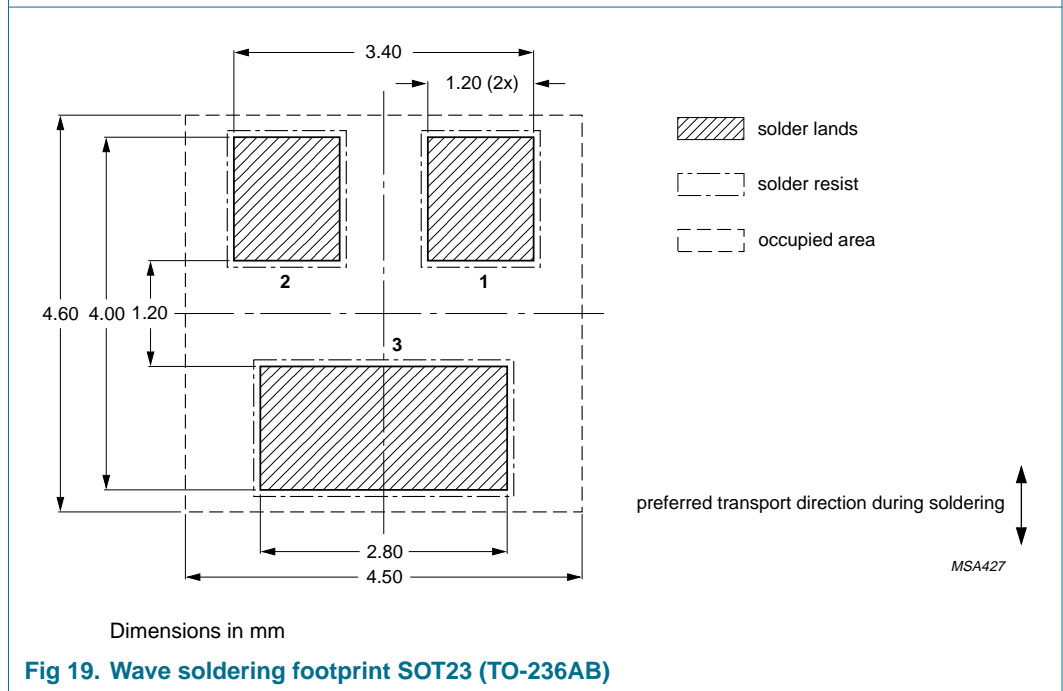
**Fig 16. Wave soldering footprint SOD323 (SC-76)**



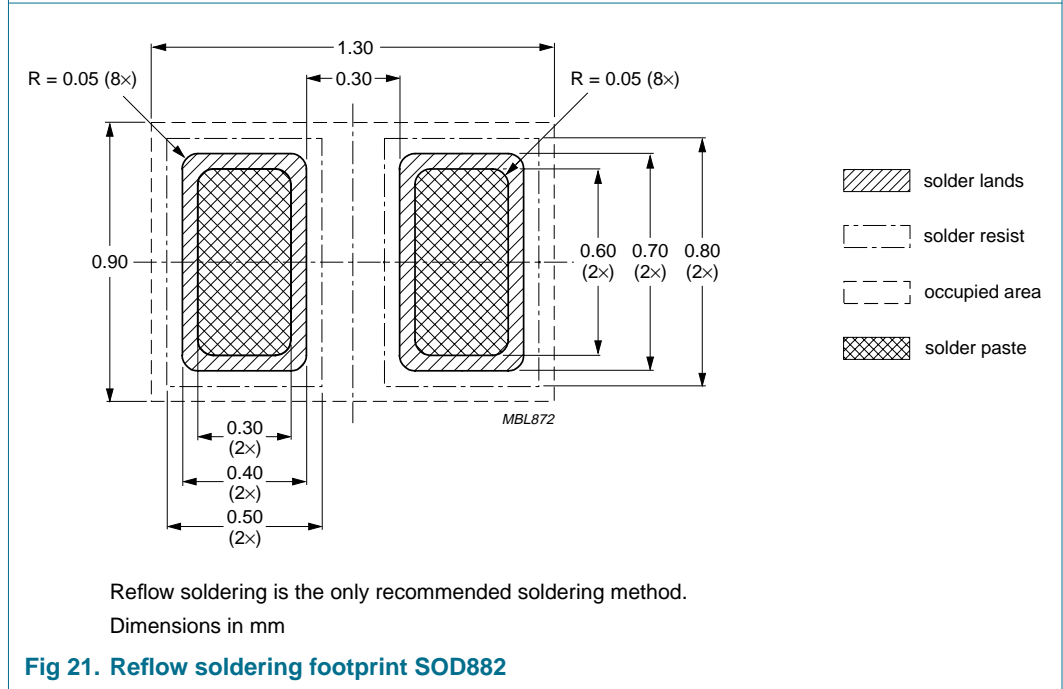
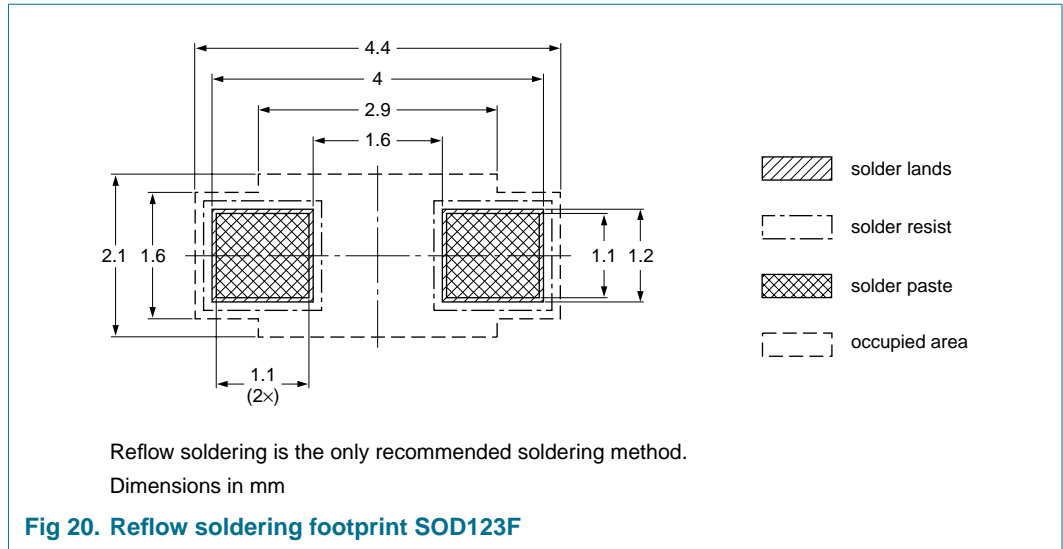
**Fig 17. Reflow soldering footprint SOD523 (SC-79)**

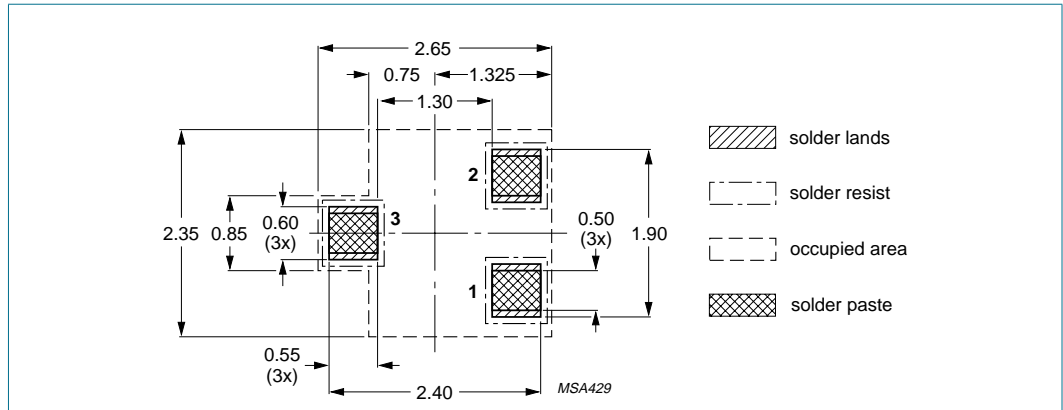


**Fig 18. Reflow soldering footprint SOT23 (TO-236AB)**



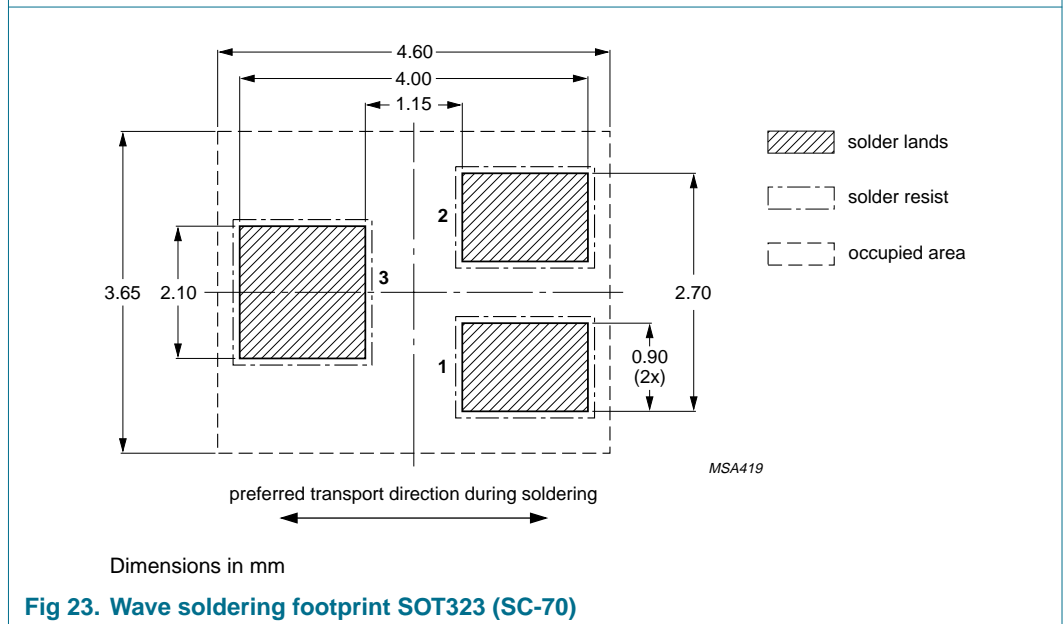
**Fig 19. Wave soldering footprint SOT23 (TO-236AB)**





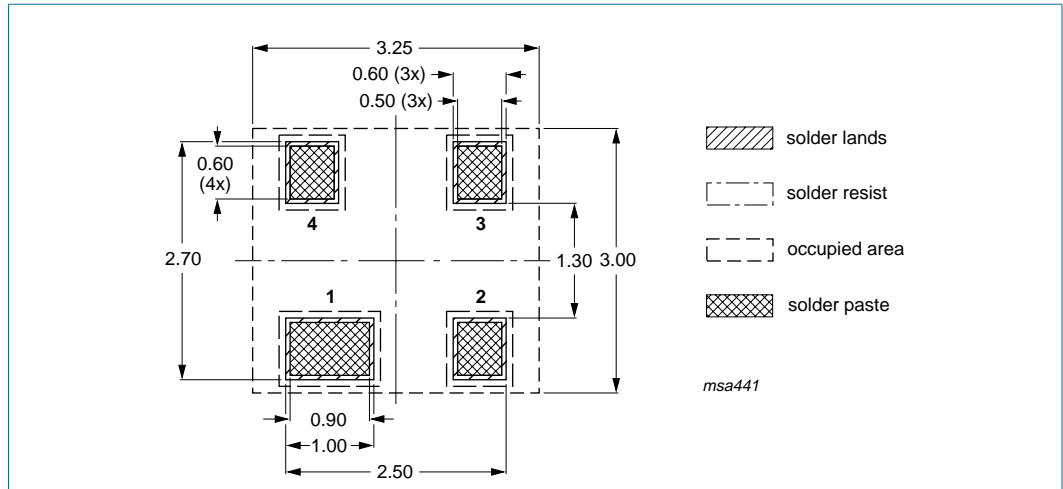
Dimensions in mm

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



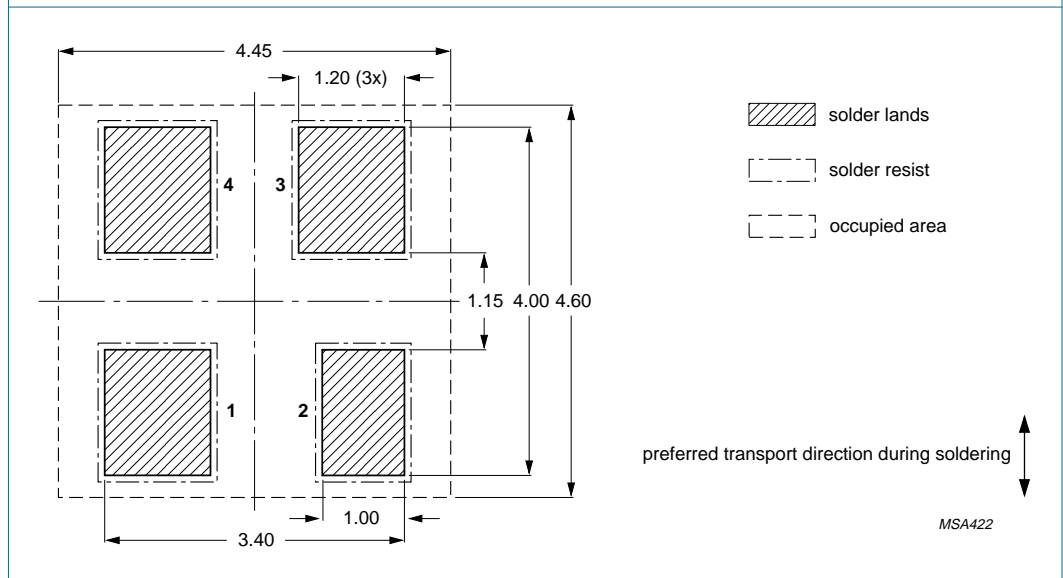
Dimensions in mm

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



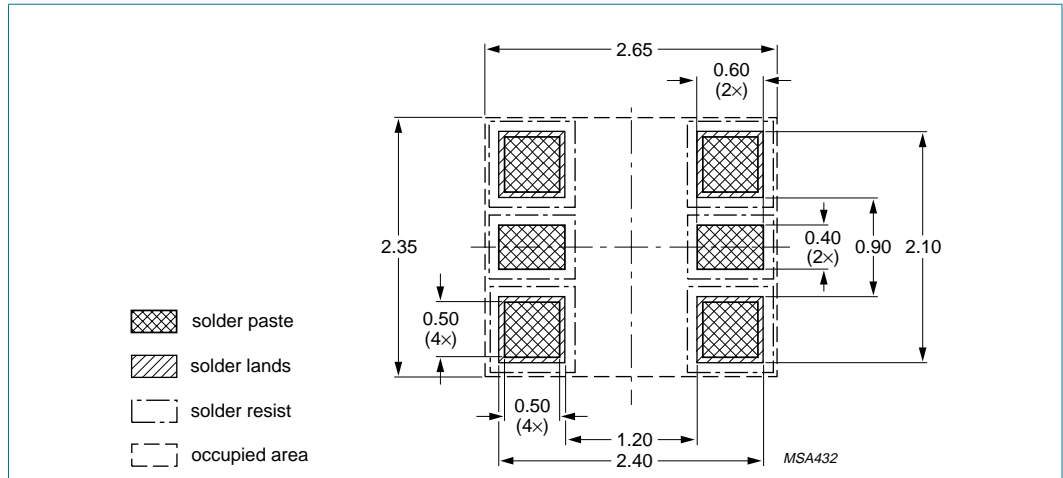
Dimensions in mm

**Fig 24. Reflow soldering footprint SOT143B**



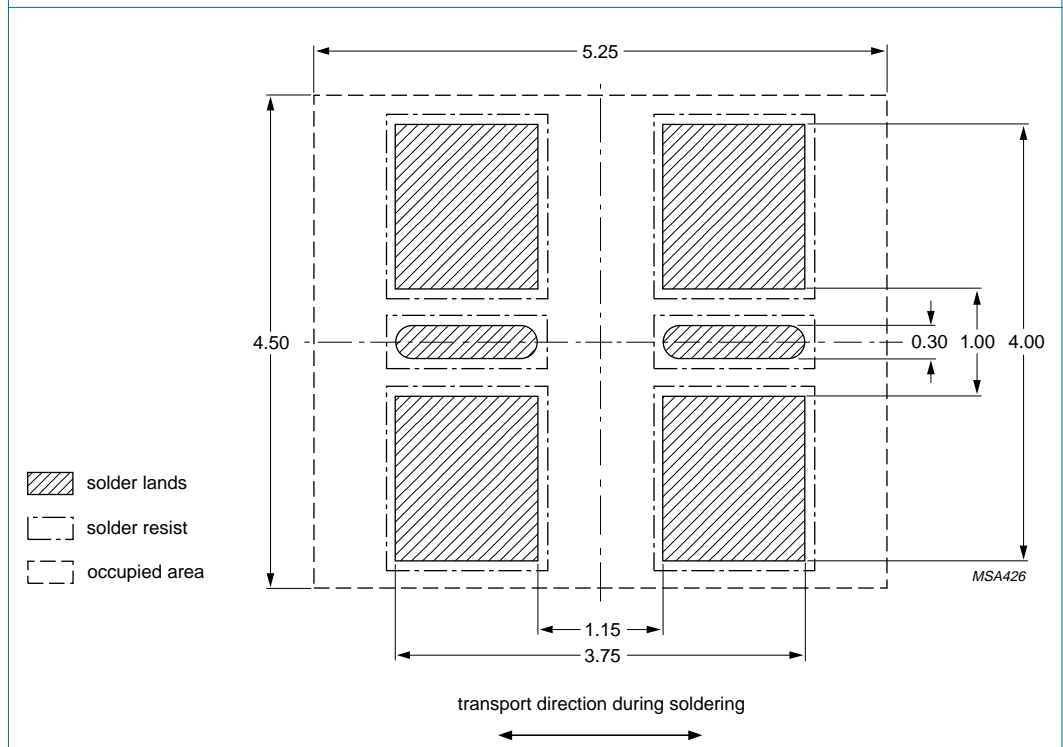
Dimensions in mm

**Fig 25. Wave soldering footprint SOT143B**



Dimensions in mm

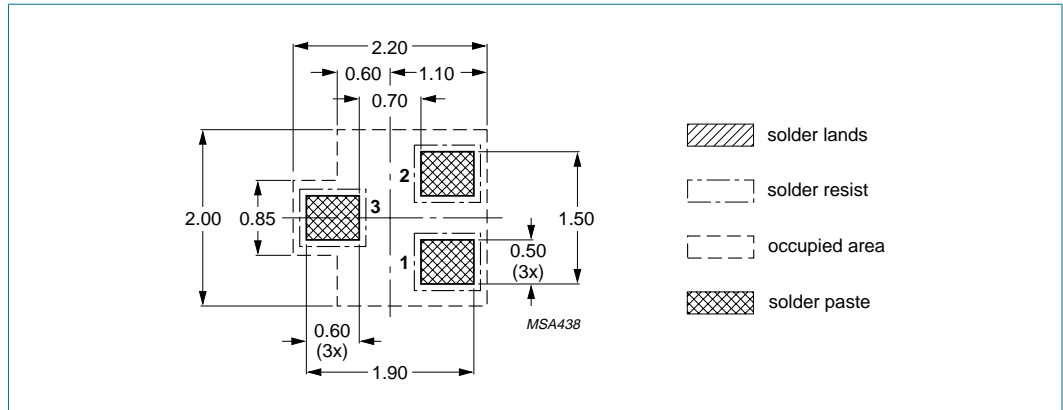
**Fig 26. Reflow soldering footprint SOT363 (SC-88)**



Dimensions in mm

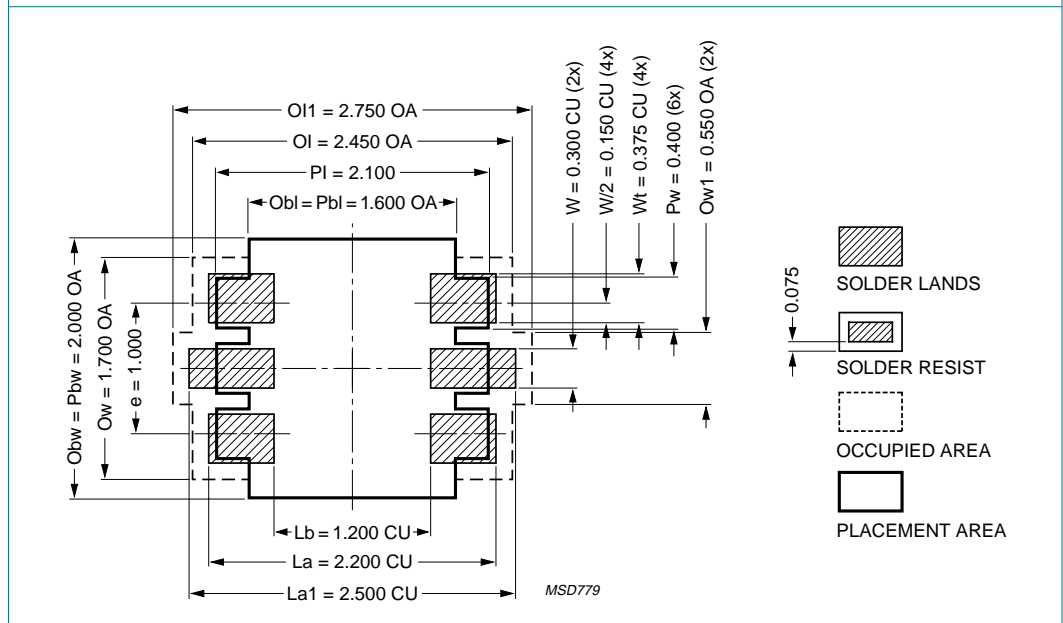
**Fig 27. Wave soldering footprint SOT363 (SC-88)**





Dimensions in mm

**Fig 28. Reflow soldering footprint SOT416**



Reflow soldering is the only recommended soldering method.

Dimensions in mm

**Fig 29. Reflow soldering footprint SOT666**

## 11. Revision history

Table 10: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
BAS40_1PSXXSB4X_SER_6	20050809	Product data sheet	-	-	1PS70SB40_3 1PS75SB45_2 1PS76SB40_3 1PS79SB40_2 1PS88SB48_3 BAS40H_1 BAS40L_1 BAS40-05V_1 BAS40-07V_1 BAS40W_3 BAS40_SERIES_5
Modifications:					<ul style="list-style-type: none"> <li>• The format of this data sheet has been redesigned to comply with the new presentation and information standard of Philips Semiconductors.</li> <li>• This data sheet is a combination of data sheets 1PS70SB40_3, 1PS75SB45_2, 1PS76SB40_3, 1PS79SB40_2, 1PS88SB48_3, BAS40H_1, BAS40L_1, BAS40-05V_1, BAS40-07V_1, BAS40W_3 and BAS40_SERIES_5.</li> <li>• <a href="#">Table 1 “Product overview”</a>: added</li> <li>• <a href="#">Table 5 “Marking codes”</a>: amended for 1PS88SB48, BAS40-07, BAS40W, BAS40-04W, BAS40-05W and BAS40-06W</li> <li>• <a href="#">Figure 5, 6 and 7</a>: superseded by minimized package outline drawings</li> <li>• <a href="#">Figure 9, 10, 11, 12, 13 and 14</a>: superseded by minimized package outline drawings</li> <li>• <a href="#">Section 9 “Packing information”</a>: added</li> <li>• <a href="#">Section 10 “Soldering”</a>: added</li> <li>• <a href="#">Section 15 “Trademarks”</a>: added</li> </ul>
1PS70SB40_3	19990426	Product specification	-	9397 750 05792	1PS70SB40_2
1PS75SB45_2	19990426	Product specification	-	9397 750 05791	1PS75SB45_1
1PS76SB40_3	20040126	Product specification	-	9397 750 12621	1PS76SB40_2
1PS79SB40_2	19990426	Product specification	-	9397 750 05794	1PS79SB40_1
1PS88SB48_3	20021107	Product specification	-	9397 750 10283	1PS88SB48_2
BAS40H_1	20050425	Product data sheet	-	9397 750 14968	-
BAS40L_1	20030520	Product specification	-	9397 750 11311	-
BAS40-05V_1	20021121	Product specification	-	9397 750 10546	-
BAS40-07V_1	20020327	Product specification	-	9397 750 09377	-
BAS40W_3	19990426	Product specification	-	9397 750 05797	BAS40W_2
BAS40_SERIES_5	20011010	Product specification	-	9397 750 08759	BAS40_4

## 12. Data sheet status

Level	Data sheet status <sup>[1]</sup>	Product status <sup>[2]</sup> <sup>[3]</sup>	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

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[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

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**Limiting values definition** — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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