BAS40 series; 1PSXXSB4X series

General-purpose Schottky diodes

Rev. 10 — 7 April 2021 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
	Nexperia	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
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 and benefits

- High switching speed
- Low leakage current
- High breakdown voltage
- Low capacitance
- AEC-Q101 qualified

1.3. Applications

- Ultra high-speed switching
- Voltage clamping

1.4. Quick reference data

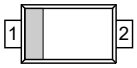
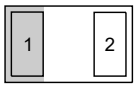
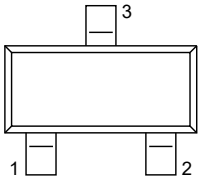
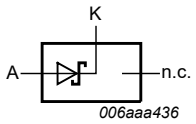
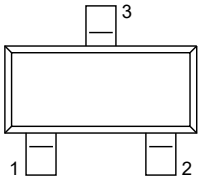
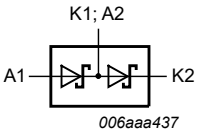
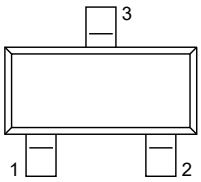
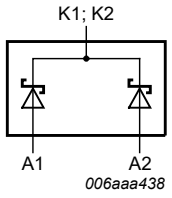
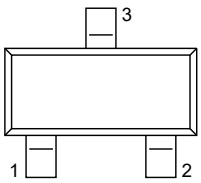
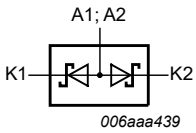
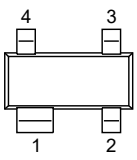
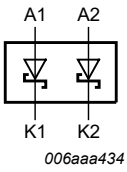
Table 2. Quick reference data

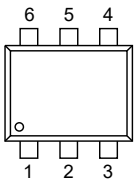
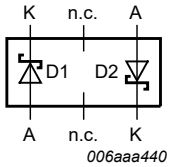
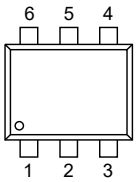
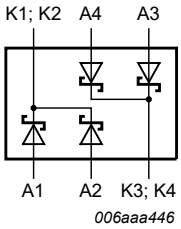
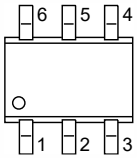
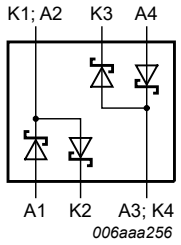
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
I_F	forward current			-	-	120	mA
V_F	forward voltage	I_F = 1 mA	[1]	-	-	380	mV
V_R	reverse voltage	T_j = 25 °C		-	-	40	V

[1] Pulse test: $t_p \leq 300$ µs; $\delta \leq 0.02$.

2. Pinning information

Table 3. Pinning

Pin	Symbol	Description		Simplified outline	Symbol
BAS40H; 1PS76SB40; 1PS79SB40					
1	K	cathode	[1]		
2	A	anode			
BAS40L					
1	K	cathode	[1]	 Transparent top view	
2	A	anode			
BAS40; BAS40W; 1PS70SB40					
1	A	anode			
2	n.c.	not connected			
3	K	cathode			
BAS40-04; BAS40-04W; 1PS70SB44					
1	A1	anode (diode 1)			
2	K2	cathode (diode 2)			
3	K1; A2	cathode (diode 1),anode (diode 2)			
BAS40-05; BAS40-05W; 1PS70SB45					
1	A1	anode (diode 1)			
2	A2	anode (diode 2)			
3	K1; K2	cathode (diode 1), cathode (diode 2)			
BAS40-06; BAS40-06W; 1PS70SB46					
1	K1	cathode (diode 1)			
2	K2	cathode (diode 2)			
3	A1; A2	anode (diode 1), anode (diode 2)			
BAS40-07					
1	K1	cathode (diode 1)			
2	K2	cathode (diode 2)			
3	A2	anode (diode 2)			
4	A1	anode (diode 1)			

Pin	Symbol	Description		Simplified outline	Symbol
BAS40-07V					
1	A1	anode (diode 1)			
2	n.c.	not connected			
3	K2	cathode (diode 2)			
4	A2	anode (diode 2)			
5	n.c.	not connected			
6	K1	cathode (diode 1)			
BAS40-05V; 1PS88SB48					
1	A1	anode (diode 1)			
2	A2	anode (diode 2)			
3	K3; K4	cathode (diode 3), cathode (diode 4)			
4	A3	anode (diode 3)			
5	A4	anode (diode 4)			
6	K1; K2	cathode (diode 1), cathode (diode 2)			
BAS40XY					
1	A1	anode (diode 1)			
2	K2	cathode (diode 2)			
3	A3; K4	anode (diode 3), cathode (diode 4)			
4	A4	anode (diode 4)			
5	K3	cathode (diode 3)			
6	K1; A2	cathode (diode 1), anode (diode 2)			

[1] The marking bar indicates the cathode.

3. Ordering information

Table 4. Ordering information

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

[1] % indicates the assembly center

5. Limiting values

Table 6. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
Per diode						
V_R	reverse voltage	T_j = 25 °C		-	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
Per device							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]				
	• SOT23			-	-	500	K/W
	• SOT143B			-	-	500	K/W
	• SOT363 (1PS88SB48)			-	-	416	K/W
	• 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.

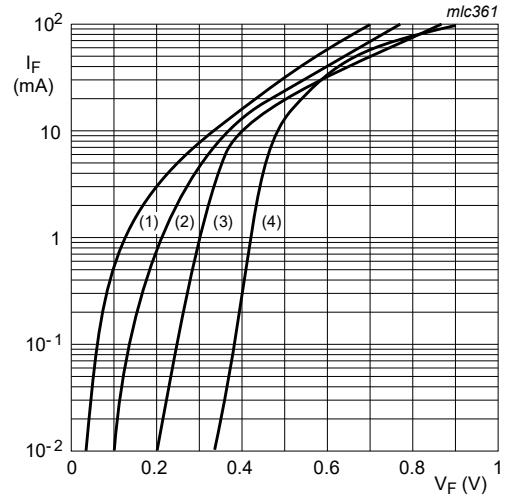
7. Characteristics

Table 8. Characteristics

T_{amb} = 25 °C unless otherwise specified.

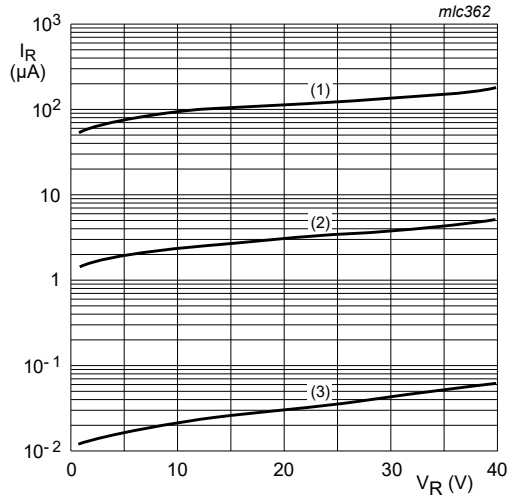
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
V_F	forward voltage		[1]				
		I_F = 1 mA		-	-	380	mV
		I_F = 10 mA		-	-	500	mV
		I_F = 40 mA		-	-	1	V
I_R	reverse current	V_R = 30 V		-	-	1	µA
		V_R = 40 V		-	-	10	µA
C_d	diode capacitance	V_R = 0 V; f = 1 MHz		-	-	5	pF

[1] Pulse test: $t_p \leq 300$ µs; $\delta \leq 0.02$.



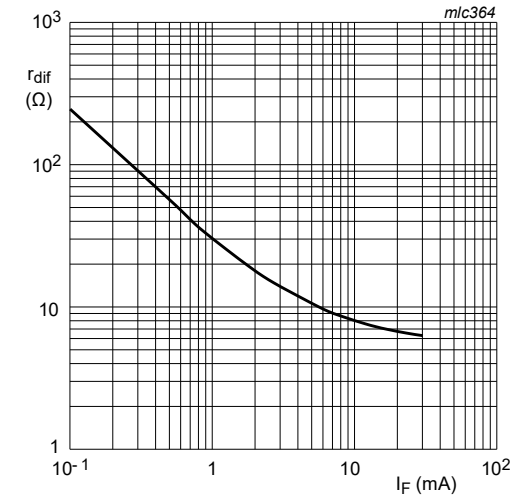
(1) T_{amb} = 125 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = -40 °C

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



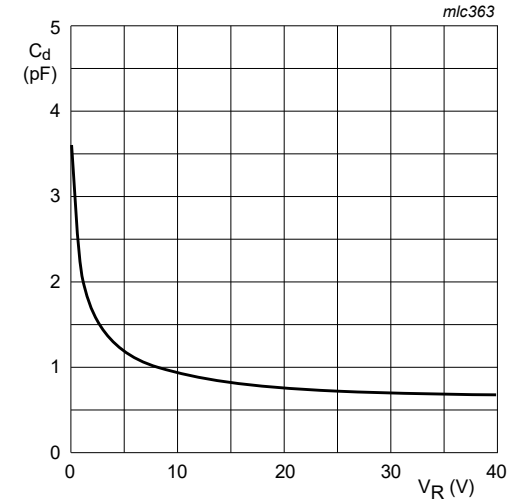
(1) T_{amb} = 125 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C

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



f = 10 kHz

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



T_{amb} = 25 °C; f = 1 MHz

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

8. Test information

8.1. 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.

9. Package outline

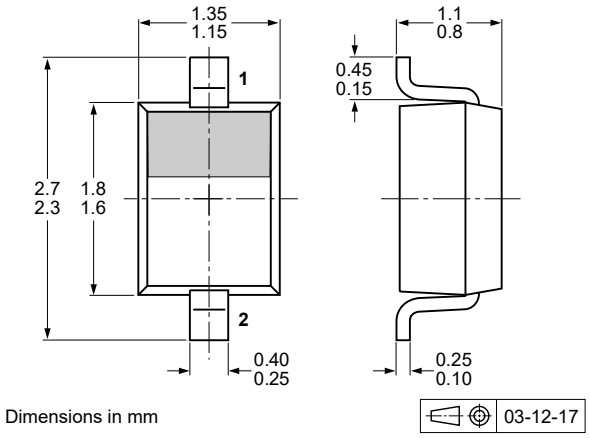


Fig. 5. Package outline SOD323 (SC-76)

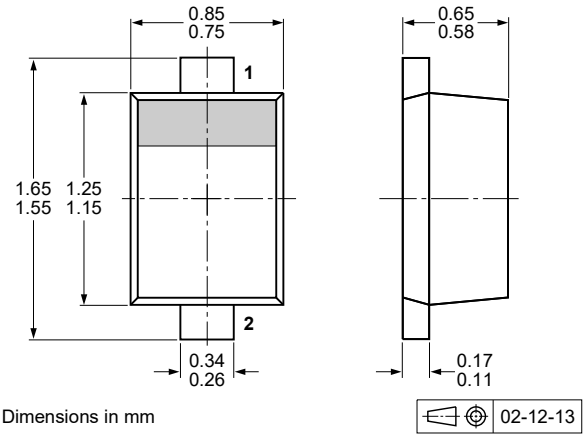


Fig. 6. Package outline SOD523 (SC-79)

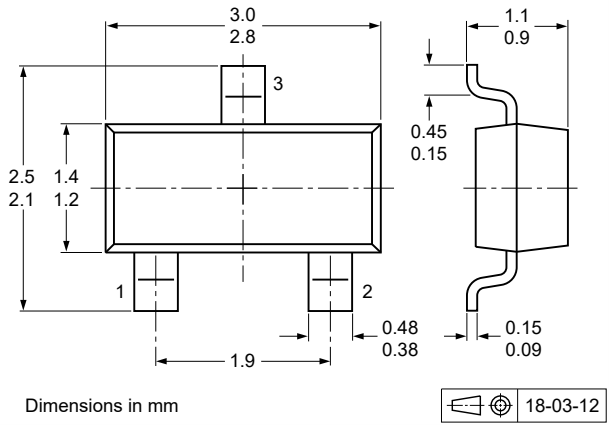


Fig. 7. Package outline SOT23 (TO-236AB)

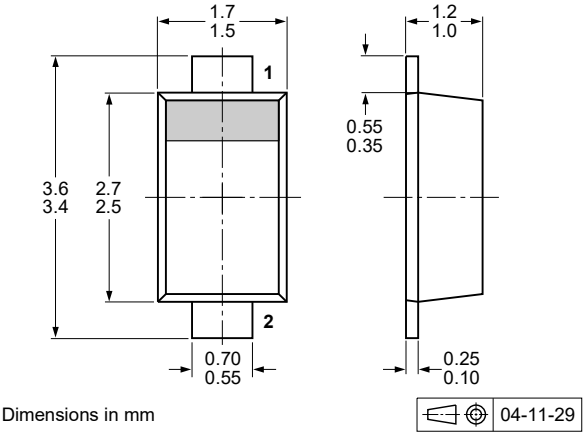


Fig. 8. Package outline SOD123F

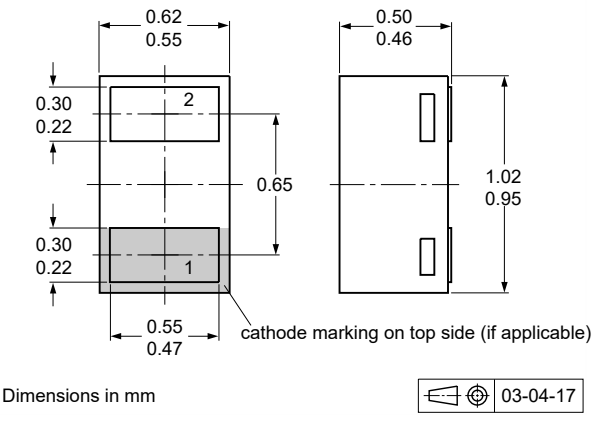


Fig. 9. Package outline SOD882 (DFN1006-2)

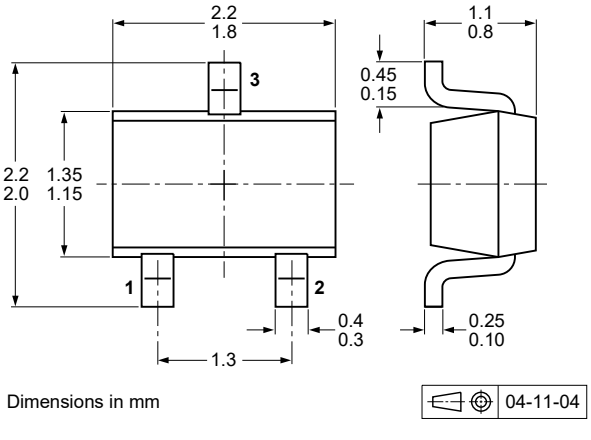


Fig. 10. Package outline SOT323 (SC-70)

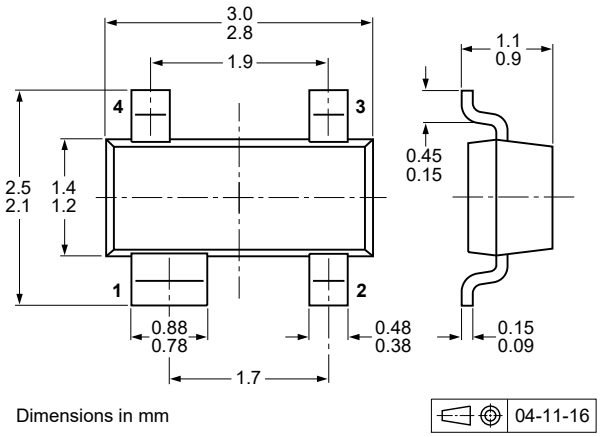


Fig. 11. Package outline SOT143B

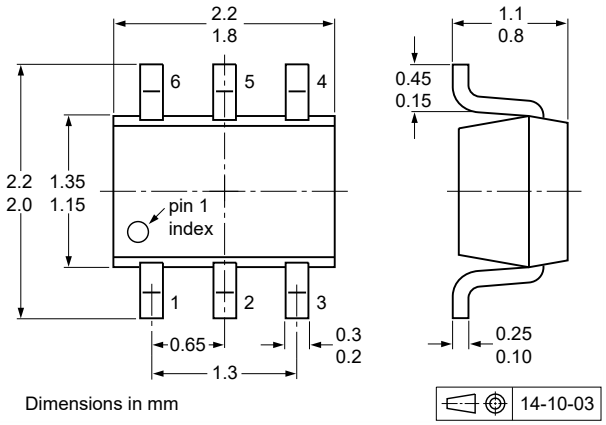


Fig. 12. Package outline SOT363 (SC-88)

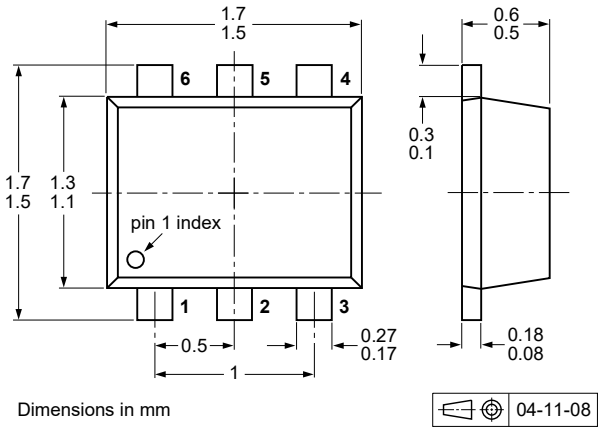


Fig. 13. Package outline SOT666

10. Soldering

Table 9. Soldering

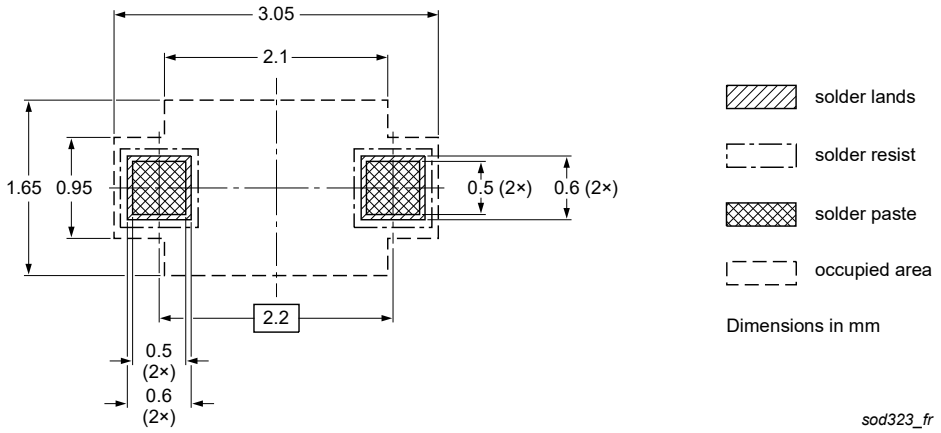


Fig. 14. Reflow soldering footprint SOD323 (SC-76)

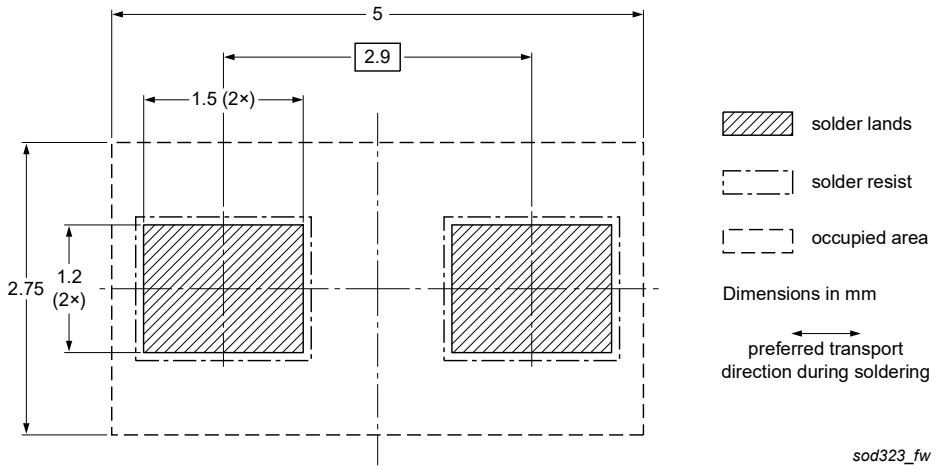


Fig. 15. Wave soldering footprint SOD323 (SC-76)

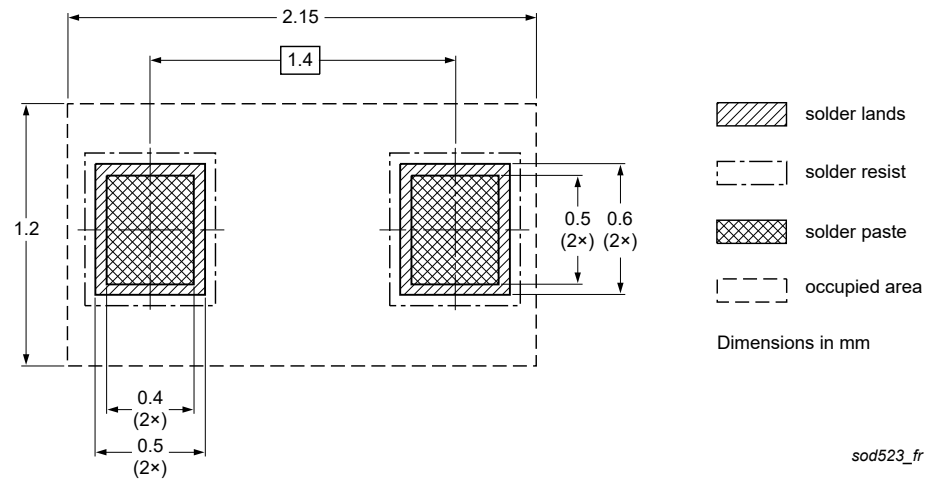


Fig. 16. Reflow soldering footprint SOD523 (SC-79)

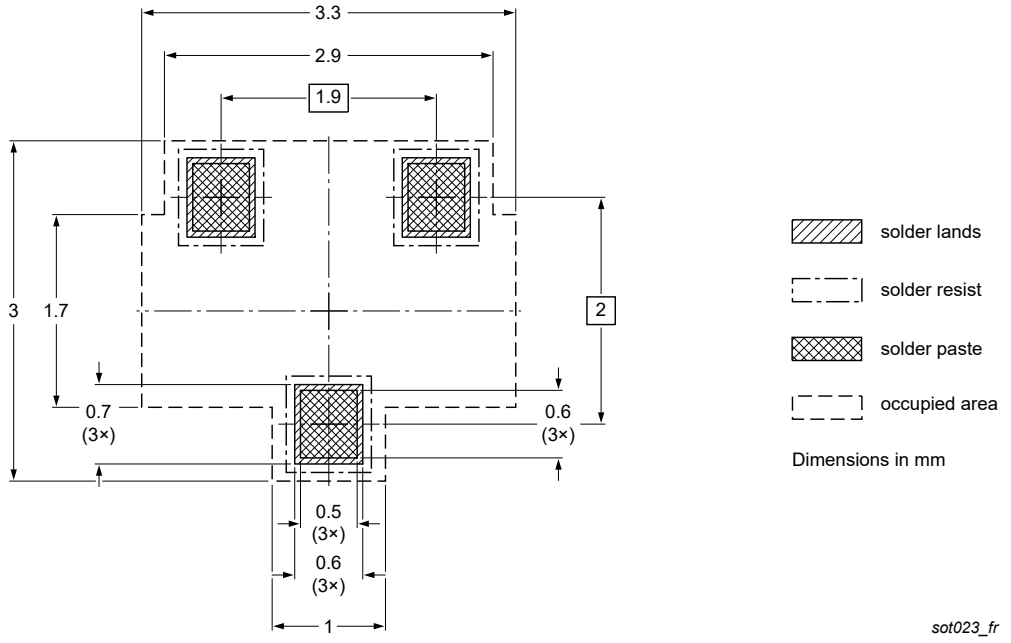


Fig. 17. Reflow soldering footprint SOT23 (TO-236AB)

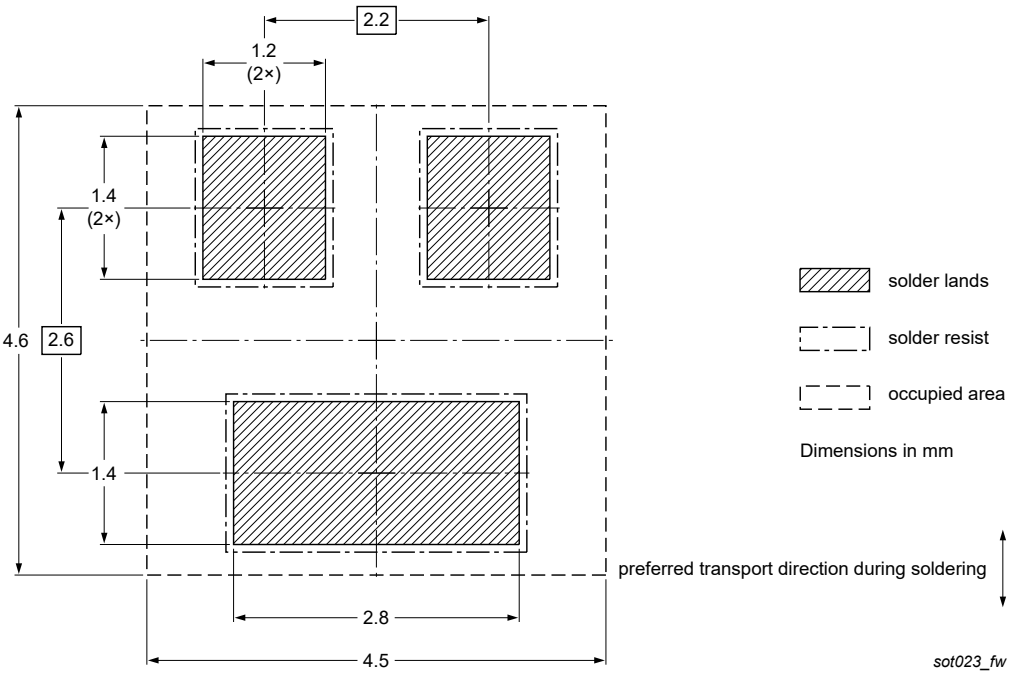


Fig. 18. Wave soldering footprint SOT23 (TO-236AB)

Footprint information for reflow soldering of plastic surface-mounted, 2 leads package **SOD123F**

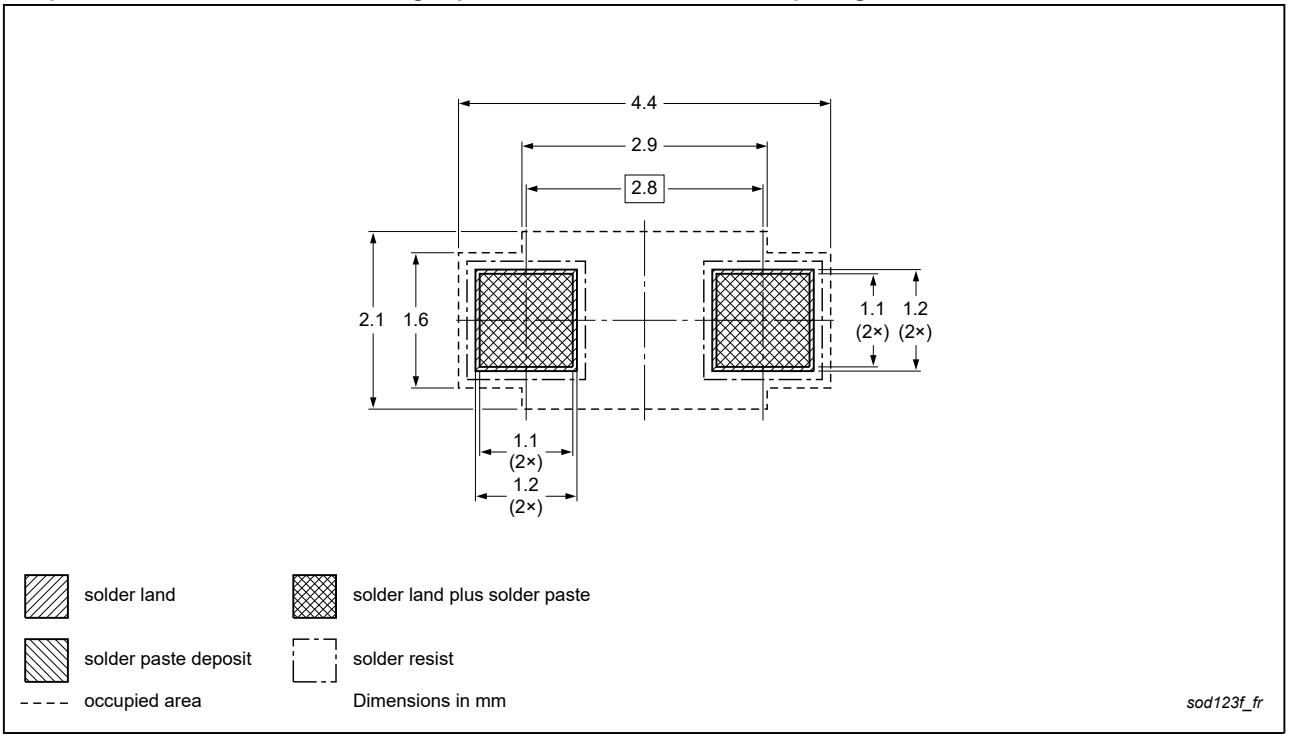


Fig. 19. Reflow soldering footprint SOD123F

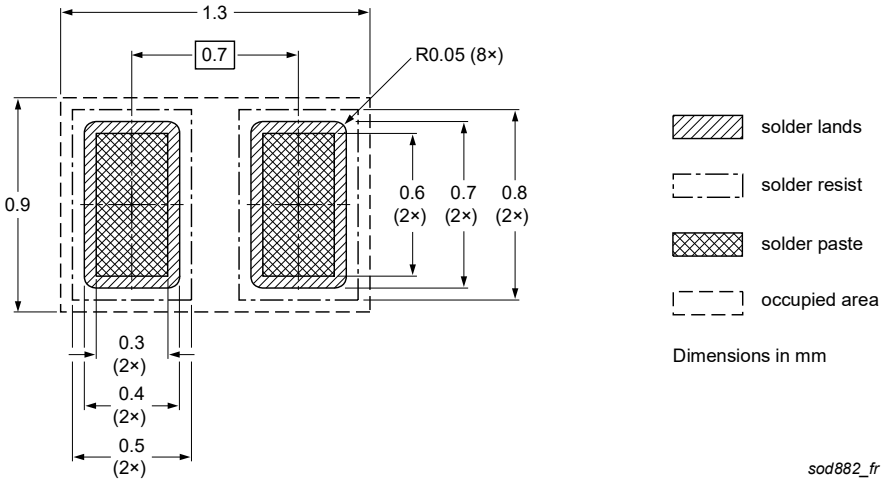


Fig. 20. Reflow soldering footprint SOD882

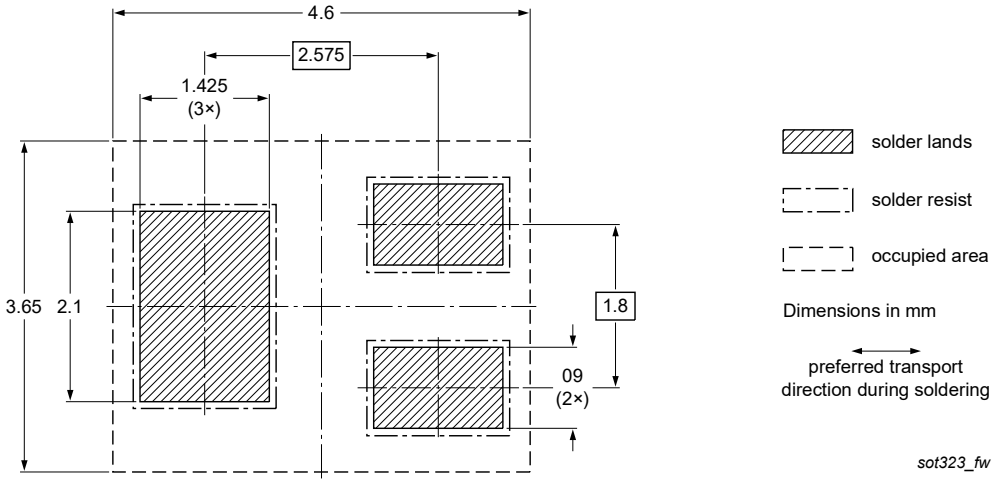


Fig. 21. Wave soldering footprint SOT323 (SC-70)

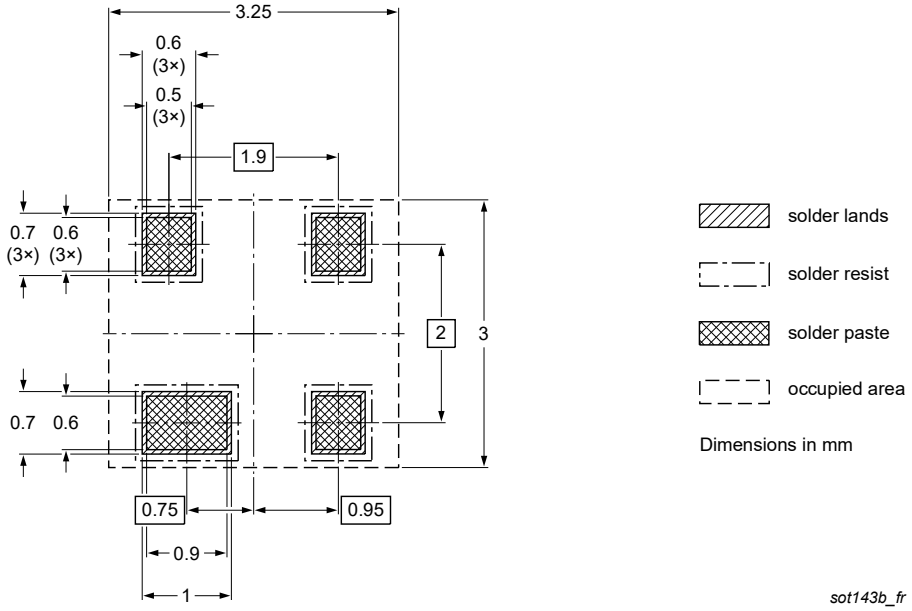


Fig. 22. Reflow soldering footprint SOT143B

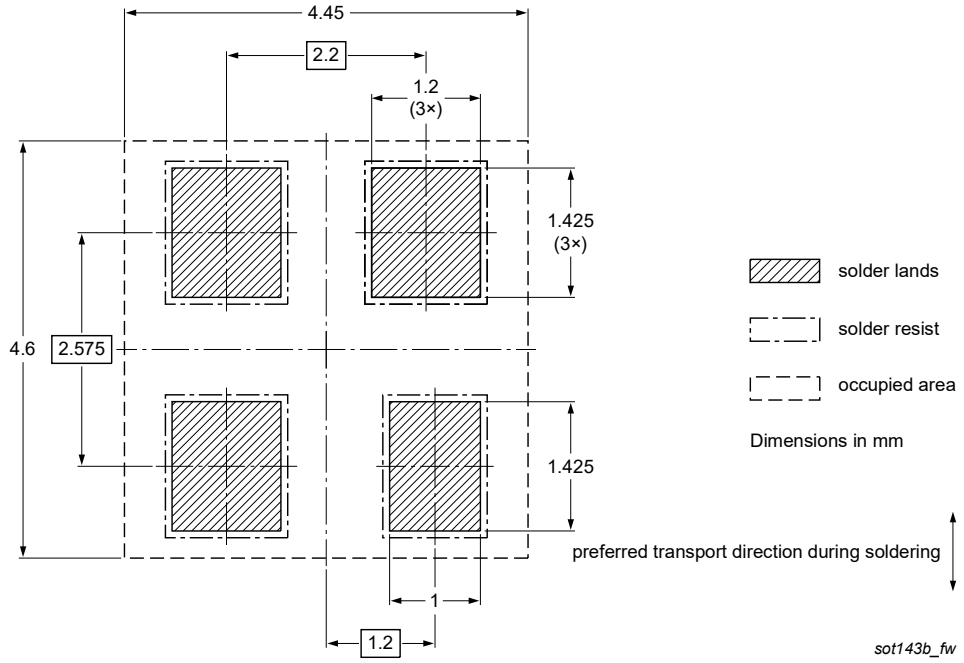


Fig. 23. Wave soldering footprint SOT143B

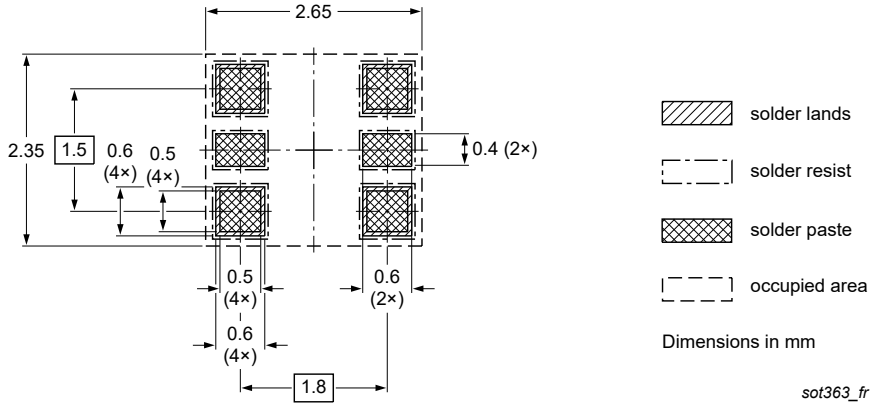


Fig. 24. Reflow soldering footprint SOT363 (SC-88)

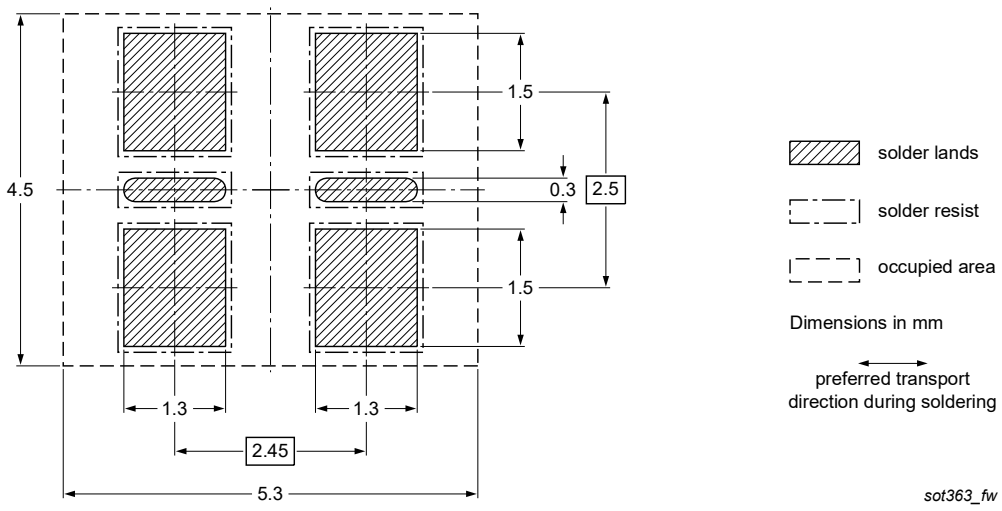


Fig. 25. Wave soldering footprint SOT363 (SC-88)

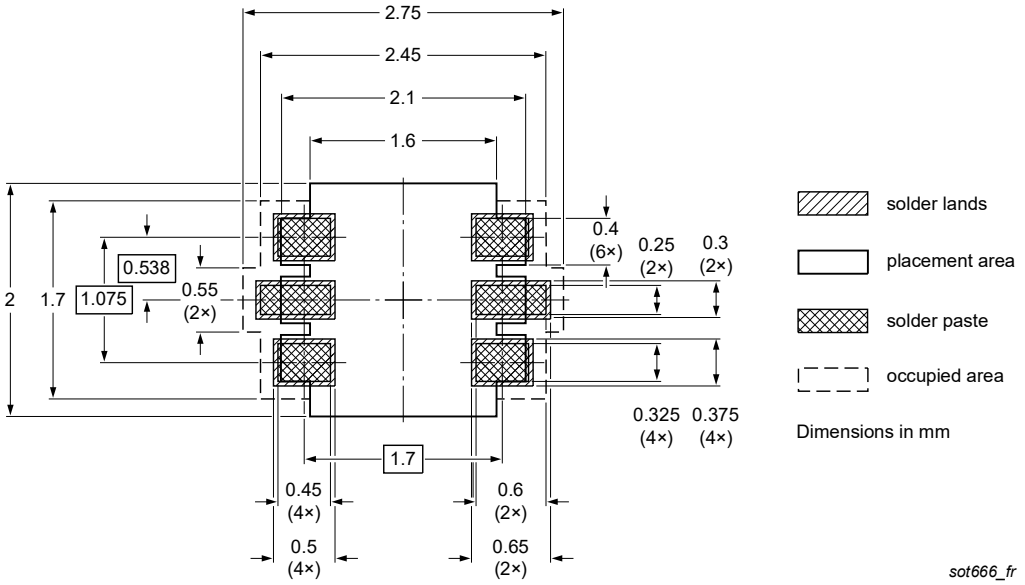


Fig. 26. Reflow soldering footprint SOT666

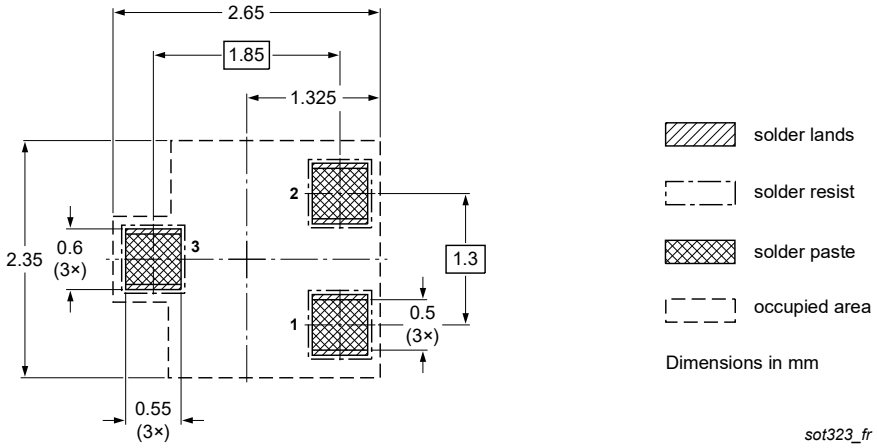


Fig. 27. Reflow soldering footprint SOT323 (SC-70)

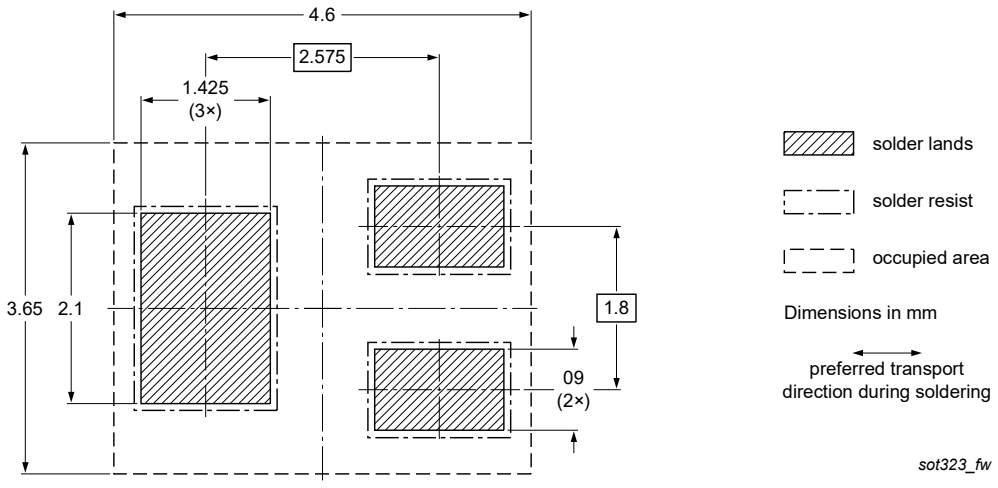


Fig. 28. Wave soldering footprint SOT323 (SC-70)

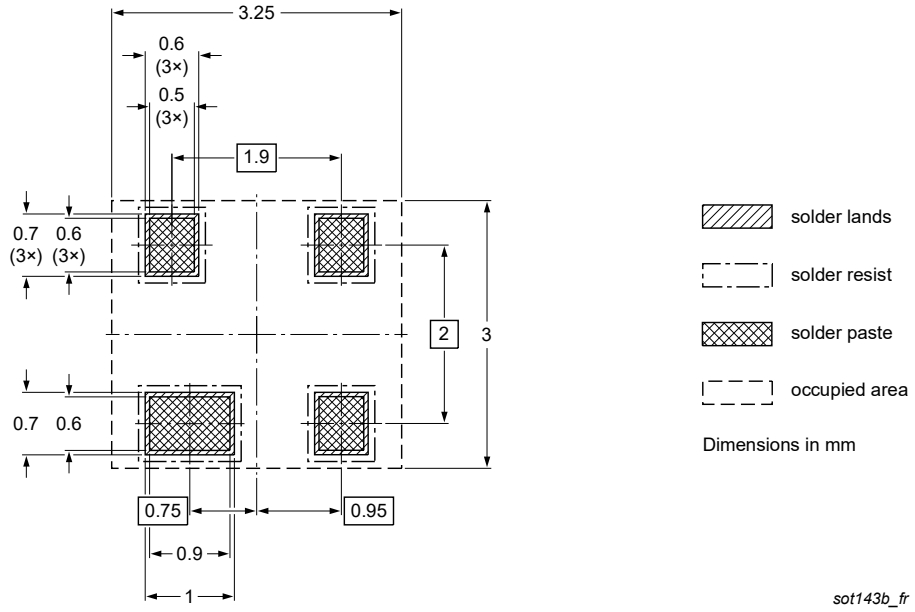


Fig. 29. Reflow soldering footprint SOT143B

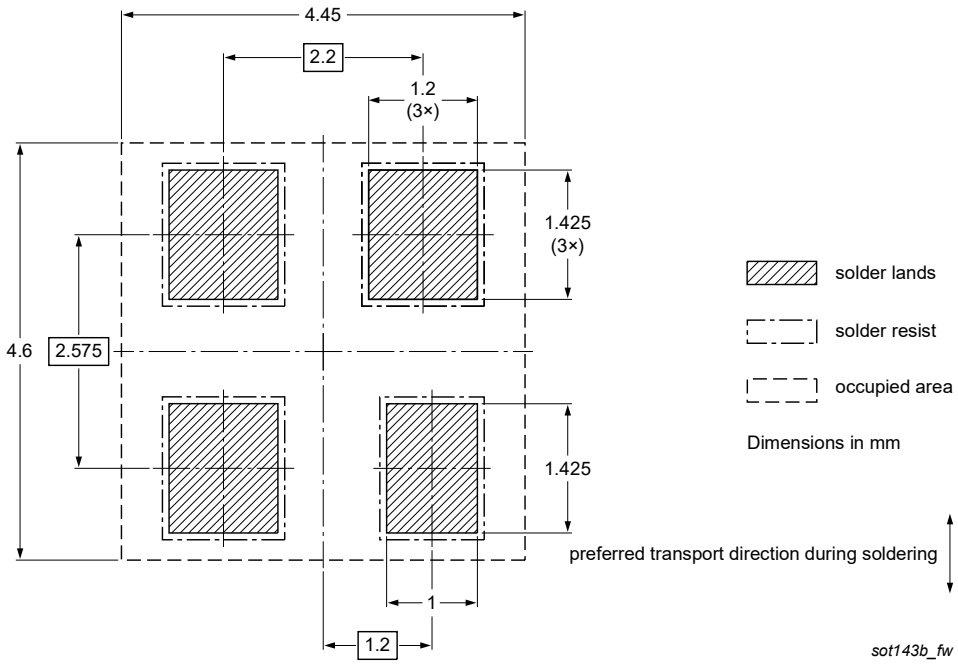


Fig. 30. Wave soldering footprint SOT143B

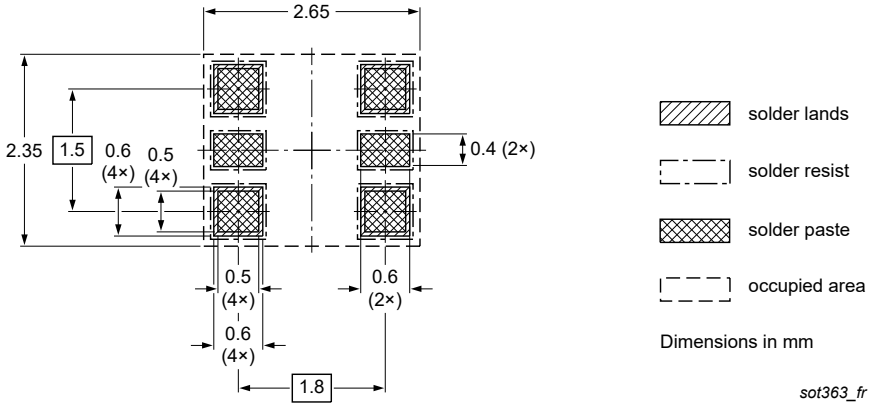


Fig. 31. Reflow soldering footprint SOT363 (SC-88)

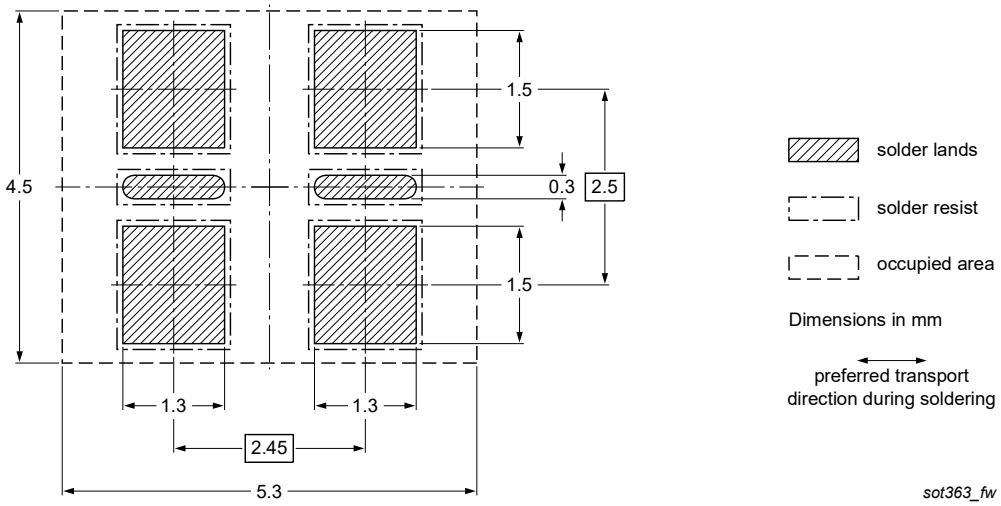


Fig. 32. Wave soldering footprint SOT363 (SC-88)

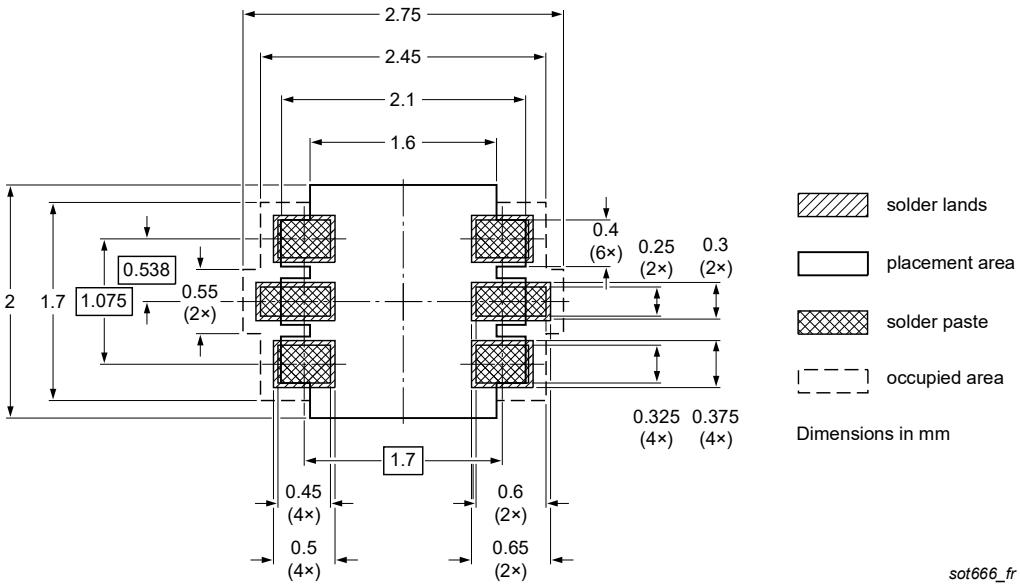


Fig. 33. Reflow soldering footprint SOT666

11. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BAS40_1PSXXSB4X_SER v.10	20210407	Product data sheet	-	BAS40_1PSXXSB4X_SER_9
Modifications:	• Soldering: Reflow soldering footprint SOD523 (SC-76) was updated. • 1PS75SB45 in obsolete SOT416 package removed. • The format of this data sheet has been redesigned to comply with the new identity guidelines of Nexperia. • Legal texts have been adapted to the new company name where appropriate.			
BAS40_1PSXXSB4X_SER_9	201560318	Product data sheet	-	BAS40_1PSXXSB4X_SER_8
BAS40_1PSXXSB4X_SER_8	20100113	Product data sheet	-	BAS40_1PSXXSB4X_SER_7
BAS40_1PSXXSB4X_SER_7	20060512	Product data sheet	-	BAS40_1PSXXSB4X_SER_6
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
1PS70SB40_3	19990426	Product specification	-	1PS70SB40_2
1PS75SB45_2	19990426	Product specification	-	1PS75SB45_1
1PS76SB40_3	20040126	Product specification	-	1PS76SB40_2
1PS79SB40_2	19990426	Product specification	-	1PS79SB40_1
1PS88SB48_3	20021107	Product specification	-	1PS88SB48_2
BAS40H_1	20050425	Product data sheet	-	-
BAS40L_1	20030520	Product specification	-	-
BAS40-05V_1	20021121	Product specification	-	-
BAS40-07V_1	20020327	Product specification	-	-
BAS40W_3	19990426	Product specification	-	BAS40W_2
BAS40_SERIES_5	20011010	Product specification	-	BAS40_4

12. 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".
[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 https://www.nexperia.com.

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