# 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 |

NXP founded by 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

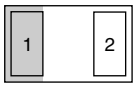
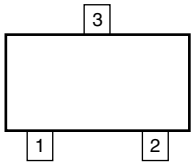
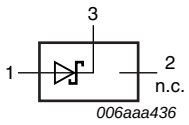
**Table 2. Quick reference data**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| **Per diode** | | | | | | | |
| $I_F$ | forward current | | | - | - | 120 | mA |
| $V_F$ | forward voltage | $I_F$ = 1 mA | [1] | - | - | 380 | mV |
| $V_R$ | reverse voltage | | | - | - | 40 | V |

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

## 2. Pinning information

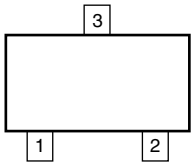
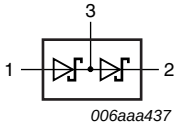
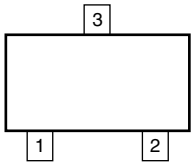
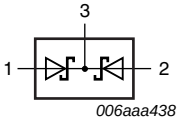
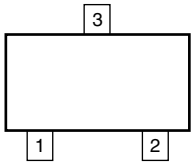
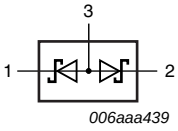
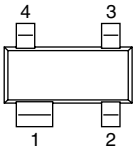
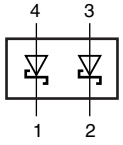
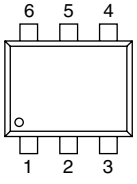
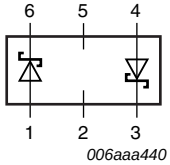
**Table 3. Pinning**

| Pin | Description | | Simplified outline | Symbol |
|---|---|---|---|---|
| **BAS40H; 1PS76SB40; 1PS79SB40** | | | | |
| 1 | cathode | [1] |  001aab540 |  sym001 |
| 2 | anode | | | |
| **BAS40L** | | | | |
| 1 | cathode | [1] |  Transparent top view |  sym001 |
| 2 | anode | | | |
| **BAS40; BAS40W; 1PS70SB40** | | | | |
| 1 | anode | |  006aaa144 |  006aaa436 |
| 2 | not connected | | | |
| 3 | cathode | | | |



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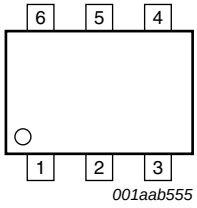
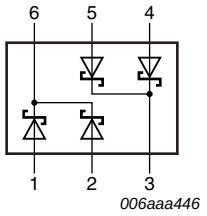
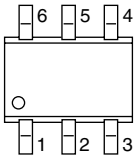
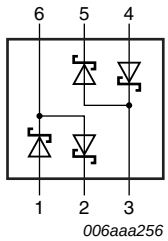
**Table 3. Pinning** *...continued*

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



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

| Pin | Description | Simplified outline | Symbol |
|---|---|---|---|
| **BAS40-05V; 1PS88SB48** | | | |
| 1 | anode (diode 1) | <br>001aab555 | <br>006aaa446 |
| 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) | | |
| **BAS40XY** | | | |
| 1 | anode (diode 1) |  | <br>006aaa256 |
| 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.



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## 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 |
| 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 |


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## 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 | 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 |
|---|---|---|---|---|---|---|
| **Per diode** | | | | | | |
| $V_R$ | 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.


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## 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 |
| | 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**

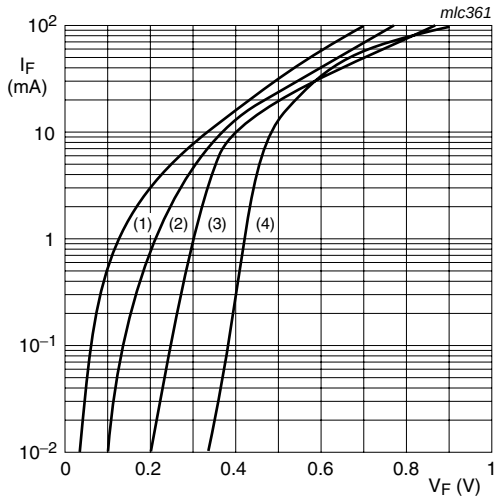
*$T_{amb}$ = 25 °C unless otherwise specified.*

| 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; $\delta \leq 0.02$.

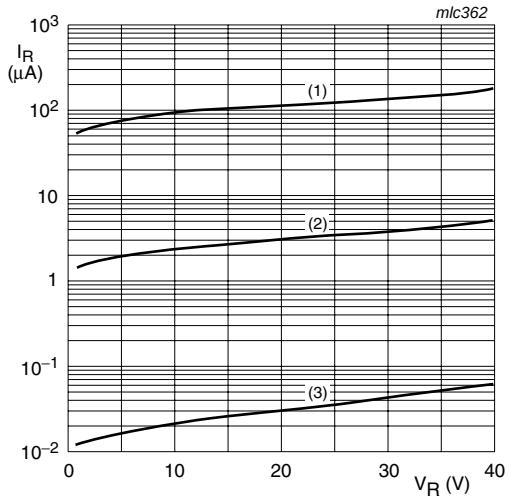


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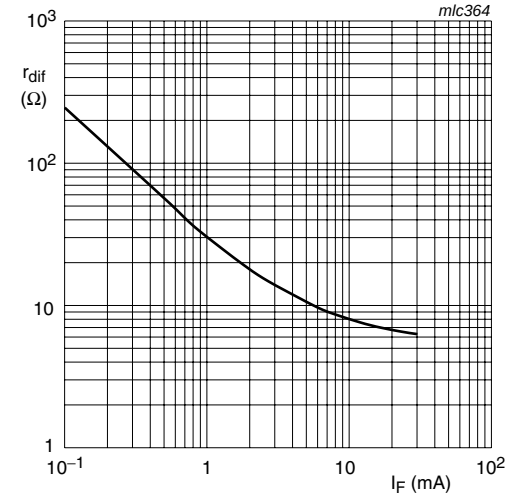

(1) $T_{amb}$ = 125 °C
(2) $T_{amb}$ = 85 °C
(3) $T_{amb}$ = 25 °C
(4) $T_{amb}$ = −40 °C

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



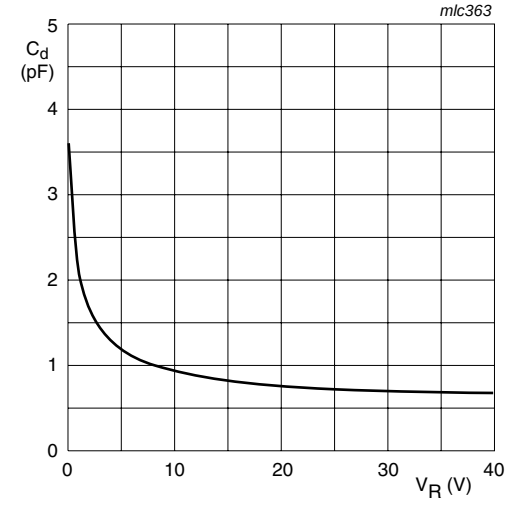

(1) $T_{amb}$ = 125 °C
(2) $T_{amb}$ = 85 °C
(3) $T_{amb}$ = 25 °C

**Fig 2. Reverse current as a function 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**


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## 8. Package outline

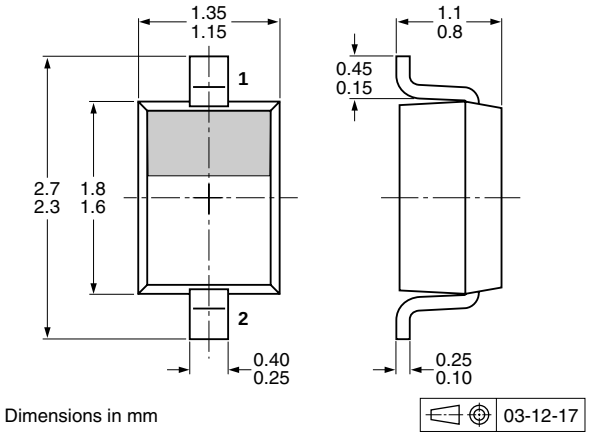



Fig 5. Package outline SOD323 (SC-76)

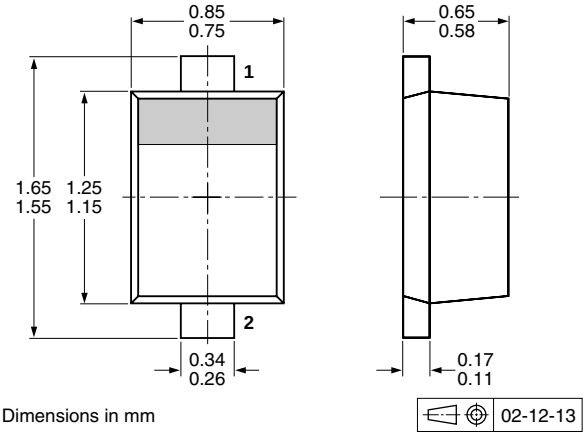



Fig 6. Package outline SOD523 (SC-79)

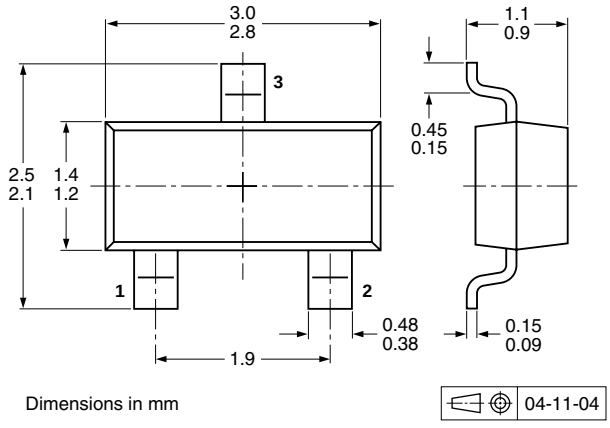



Fig 7. Package outline SOT23 (TO-236AB)

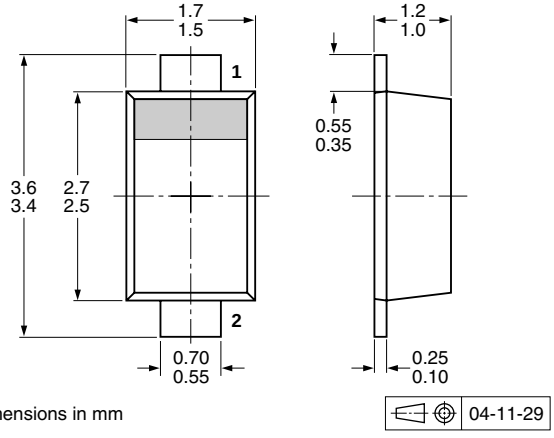



Fig 8. Package outline SOD123F

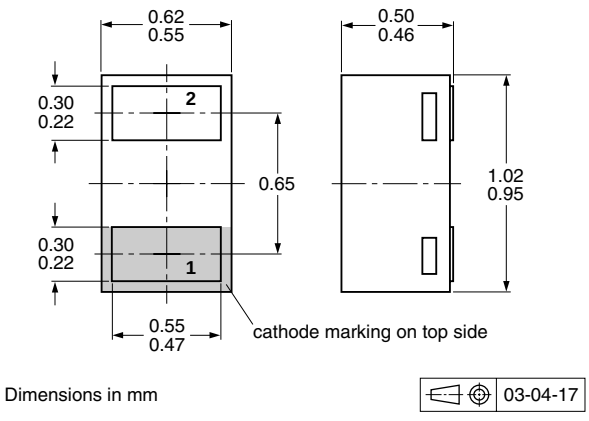



Fig 9. Package outline SOD882

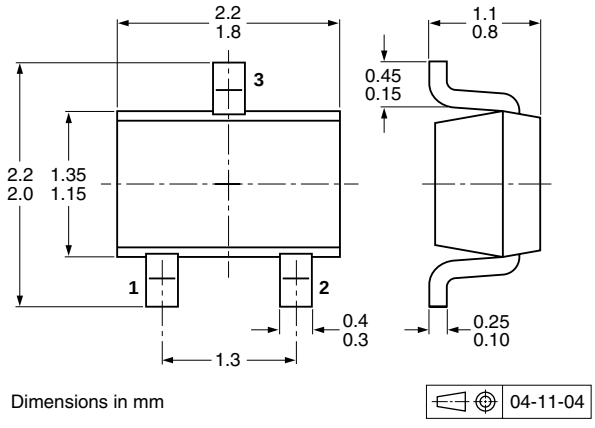



Fig 10. Package outline SOT323 (SC-70)



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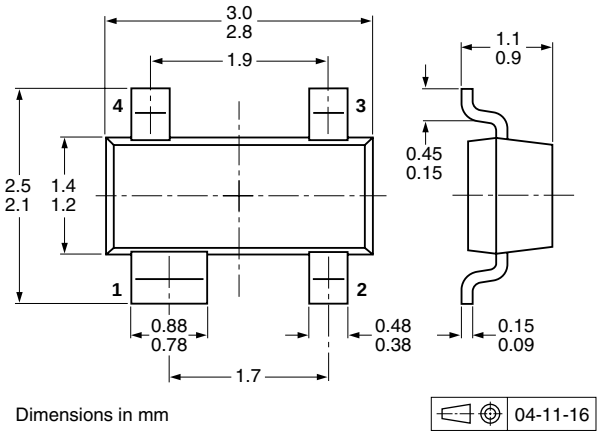



Fig 11. Package outline SOT143B

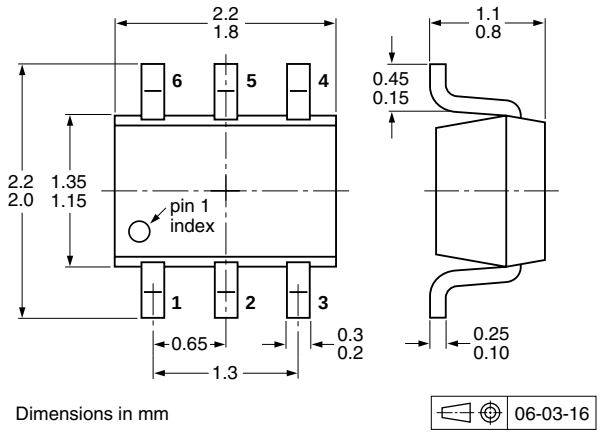



Fig 12. Package outline SOT363 (SC-88)

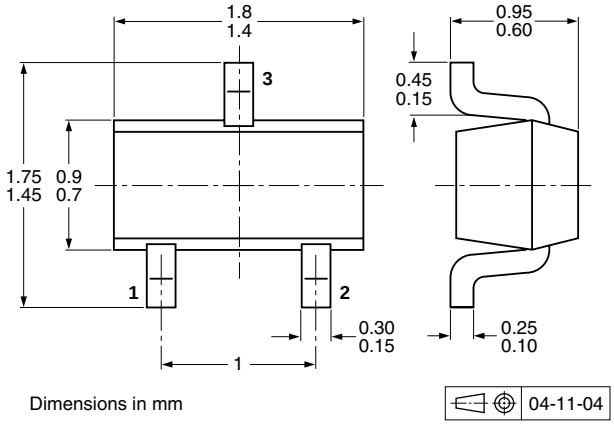



Fig 13. Package outline SOT416 (SC-75)

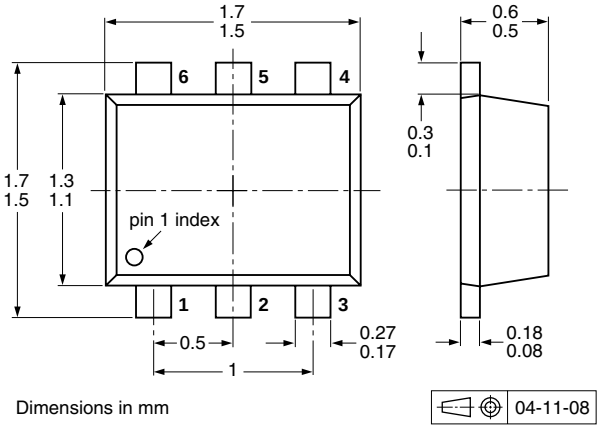



Fig 14. Package outline SOT666



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## 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 | 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 | [2] | -115 | - | - | -135 |
| | | 4 mm pitch, 8 mm tape and reel; T2 | [3] | -125 | - | - | -165 |
| BAS40XY | SOT363 | 4 mm pitch, 8 mm tape and reel; T1 | [2] | -115 | - | - | -135 |
| | | 4 mm pitch, 8 mm tape and reel; T2 | [3] | -125 | - | - | -165 |

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

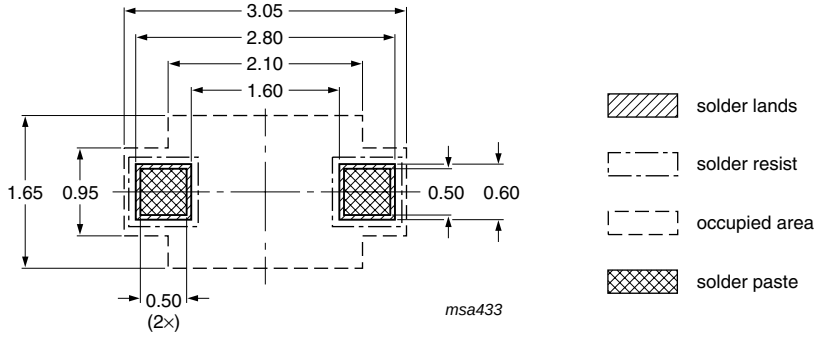
[2] T1: normal taping

[3] T2: reverse taping



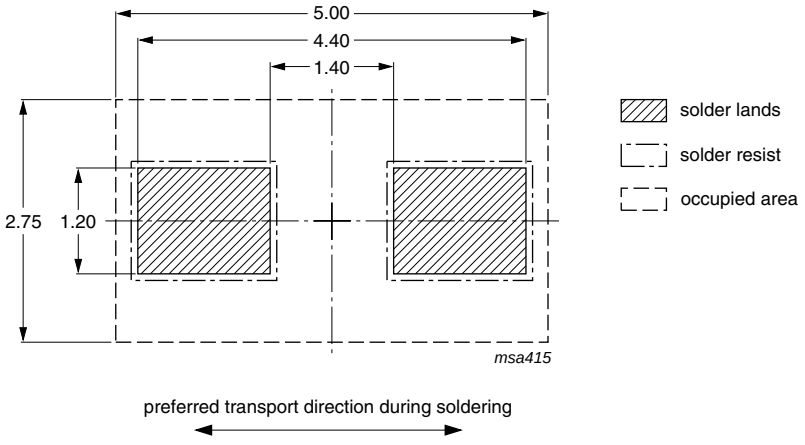
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## 10. Soldering



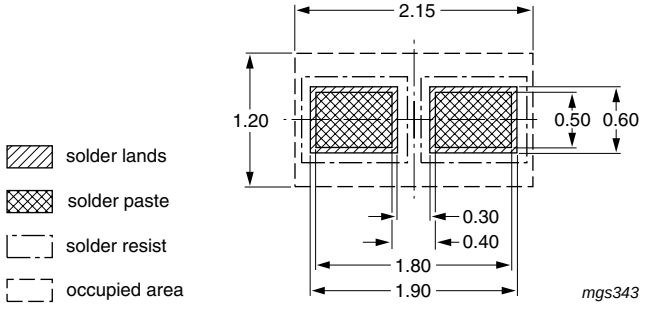

Dimensions in mm

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




Dimensions in mm

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



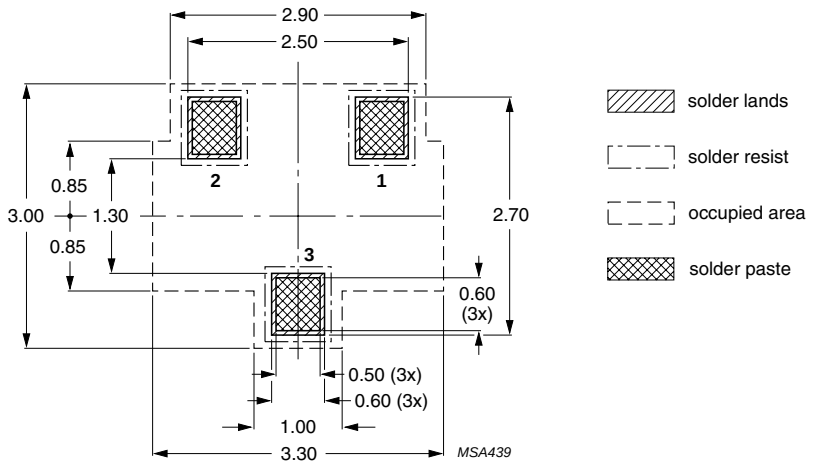

Reflow soldering is the only recommended soldering method.

Dimensions in mm

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

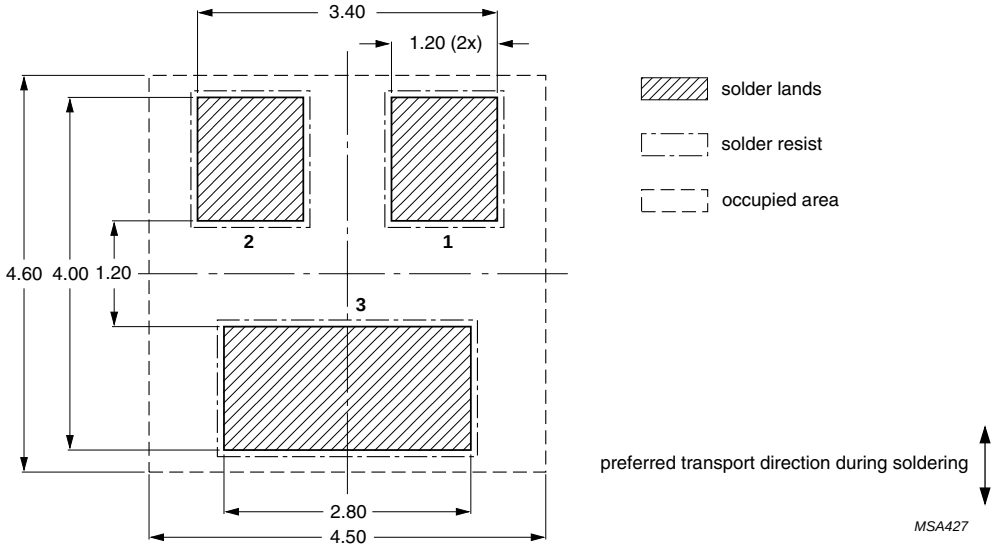


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Dimensions in mm

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

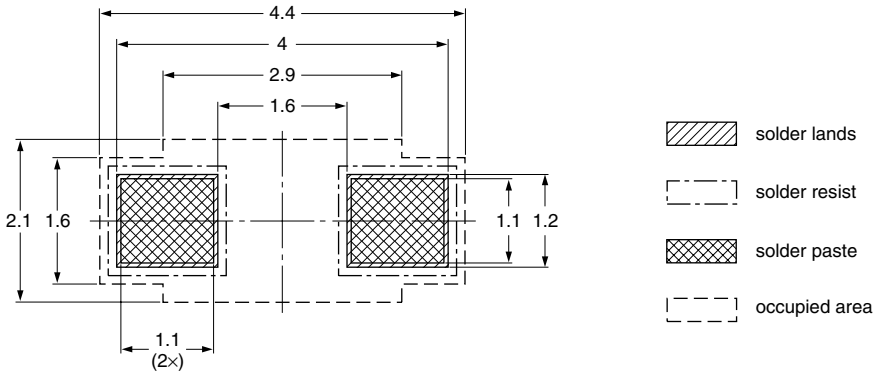



Dimensions in mm

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



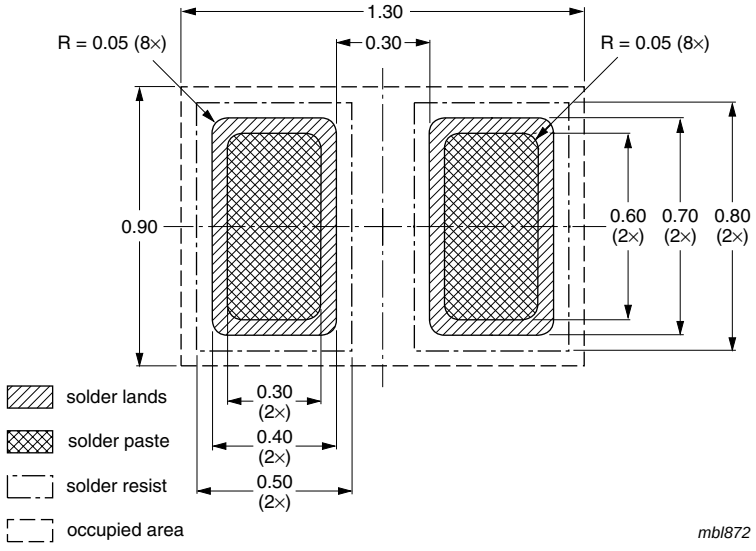
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Reflow soldering is the only recommended soldering method.

Dimensions in mm

**Fig 20. Reflow soldering footprint SOD123F**




Reflow soldering is the only recommended soldering method.

Dimensions in mm

**Fig 21. Reflow soldering footprint SOD882**



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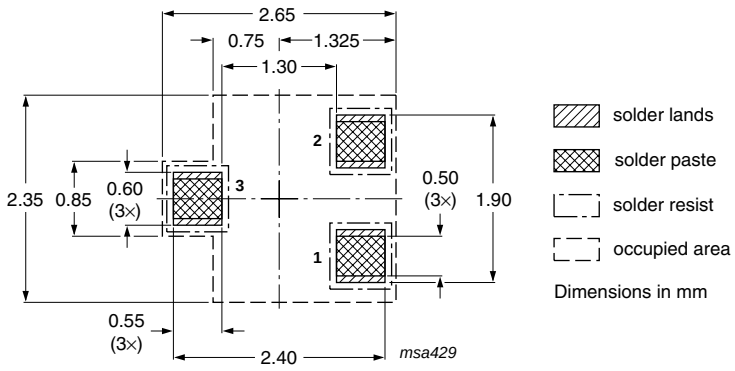



**Fig 22. Reflow soldering footprint SOT323 (SC-70)**

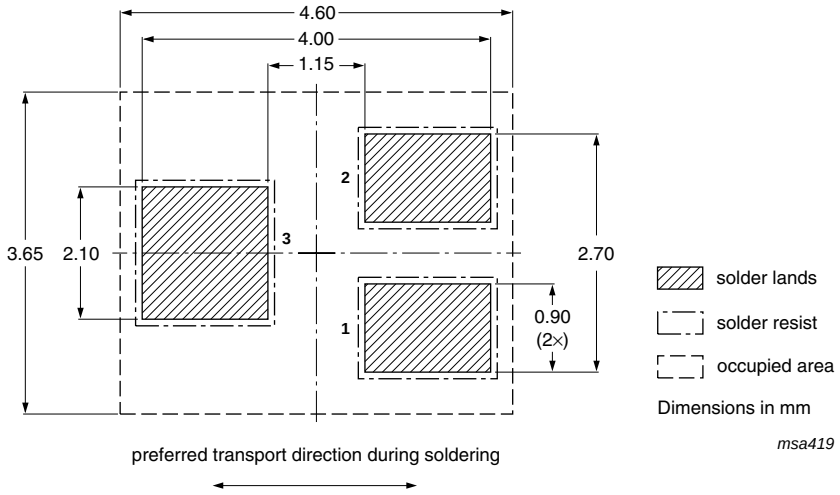
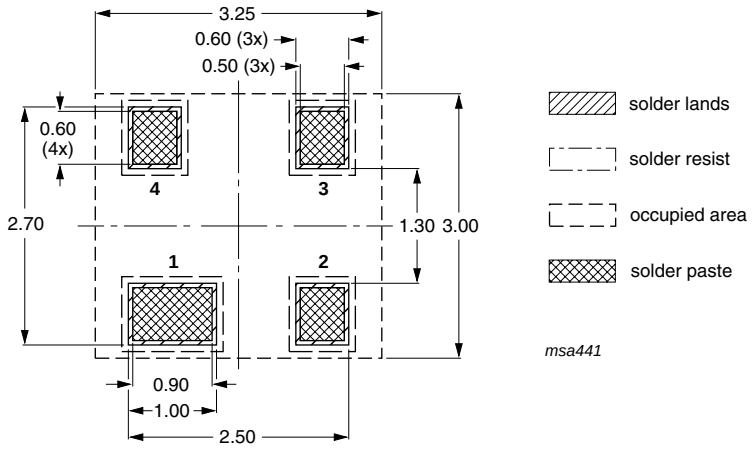



**Fig 23. Wave soldering footprint SOT323 (SC-70)**



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Dimensions in mm

**Fig 24. Reflow soldering footprint SOT143B**

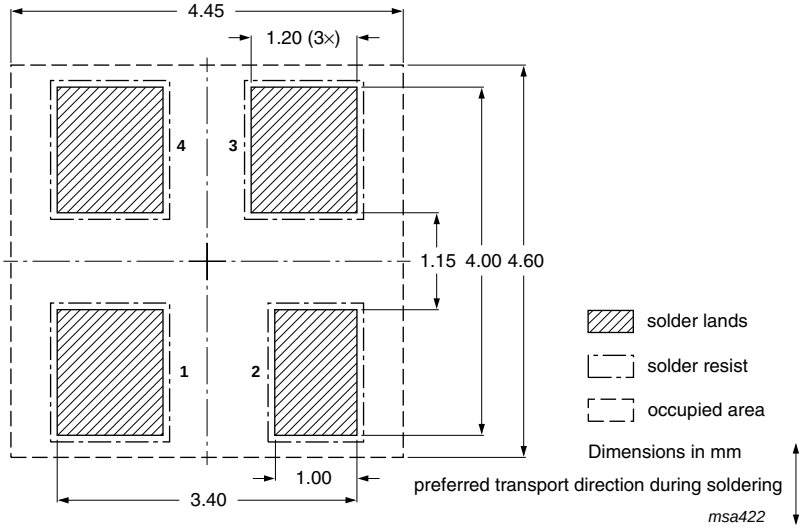



**Fig 25. Wave soldering footprint SOT143B**



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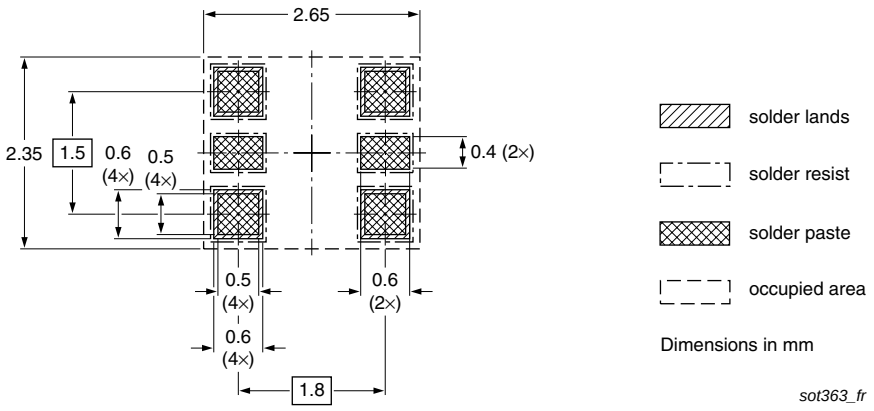



**Fig 26. Reflow soldering footprint SOT363 (SC-88)**

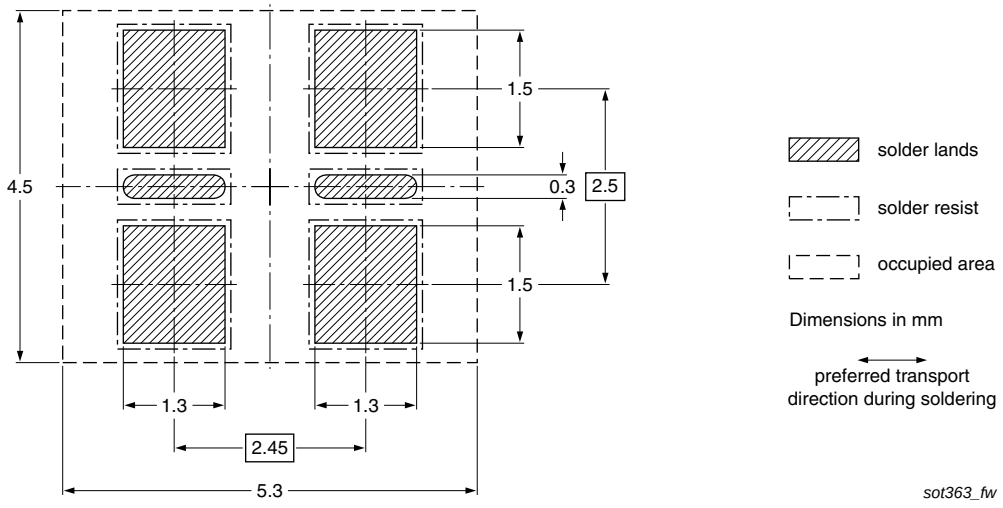



**Fig 27. Wave soldering footprint SOT363 (SC-88)**



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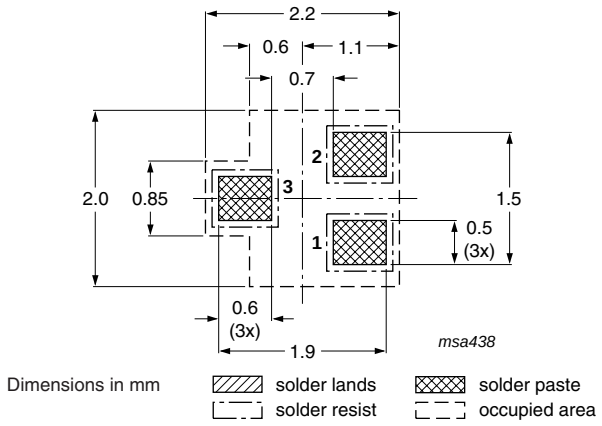
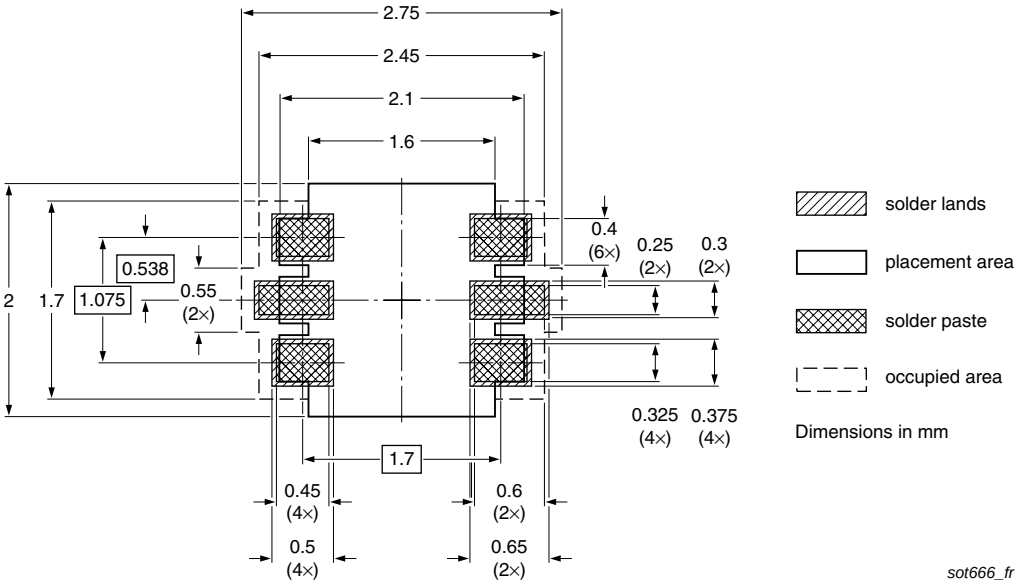



**Fig 28. Reflow soldering footprint SOT416**




Reflow soldering is the only recommended soldering method.

**Fig 29. Reflow soldering footprint SOT666**



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## 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: | • 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.<br>• Figure 12 “Package outline SOT363 (SC-88)”: updated<br>• Figure 16 “Wave soldering footprint SOD323 (SC-76)”: updated<br>• Figure 17 “Reflow soldering footprint SOD523 (SC-79)”: updated<br>• Figure 21 “Reflow soldering footprint SOD882”: updated<br>• Figure 22 “Reflow soldering footprint SOT323 (SC-70)”: updated<br>• Figure 23 “Wave soldering footprint SOT323 (SC-70)”: updated<br>• Figure 25 “Wave soldering footprint SOT143B”: updated<br>• Figure 26 “Reflow soldering footprint SOT363 (SC-88)”: updated<br>• Figure 27 “Wave soldering footprint SOT363 (SC-88)”: updated<br>• Figure 28 “Reflow soldering footprint SOT416”: updated<br>• Figure 29 “Reflow soldering footprint SOT666”: updated | | | |
| 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 |


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# 12. Legal information

## 12.1 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 URL http://www.nxp.com.

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**Date of release: 13 January 2010**

**Document identifier: BAS40_1PSXXSB4X_SER_8**

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