

BCP69

20 V, 1 A PNP medium power transistor

Rev. 06 — 2 December 2008

Product data sheet

1. Product profile

1.1 General description

PNP medium power transistor in a Surface-Mounted Device (SMD) plastic package.

Table 1. Product overview

Type number ^[1]	Package		Package configuration
	NXP	JEITA	
BCP69	SOT223	SC-73	medium power
BCP69-16			
BCP69-16/DG			
BCP69-16/IN			
BCP69-25			

[1] /DG: halogen-free

1.2 Features

- High current
- Three current gain selections
- 1.4 W total power dissipation
- Medium power SMD plastic package

1.3 Applications

- Linear voltage regulators
- High-side switches
- Supply line switches
- MOSFET drivers
- Audio preamplifier

1.4 Quick reference data

Table 2. Quick reference data

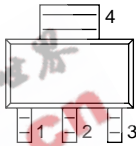
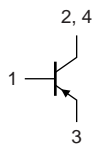
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base	-	-	-20	V
I_C	collector current		-	-	-1	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms	-	-	-2	A

Table 2. Quick reference data ...continued

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
h_{FE}	DC current gain	$V_{CE} = -1 \text{ V};$ $I_C = -500 \text{ mA}$				
	BCP69		85	-	375	
	BCP69-16 BCP69-16/DG		100	-	250	
	BCP69-16/IN		140	-	230	
	BCP69-25		160	-	375	

2. Pinning information

Table 3. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	base		
2	collector		
3	emitter		
4	collector		

sym028

3. Ordering information

Table 4. Ordering information

Type number ^[1]	Package		
	Name	Description	Version
BCP69	SC-73	plastic surface-mounted package with increased heatsink; 4 leads	SOT223
BCP69-16			
BCP69-16/DG			
BCP69-16/IN			
BCP69-25			

[1] /DG: halogen-free

4. Marking

Table 5. Marking codes

Type number ^[1]	Marking code
BCP69	BCP69
BCP69-16	BCP69/16
BCP69-16/DG	BCP69-16D
BCP69-16/IN	69-16N
BCP69-25	BCP69/25

[1] /DG: halogen-free

5. Limiting values

Table 6. Limiting values

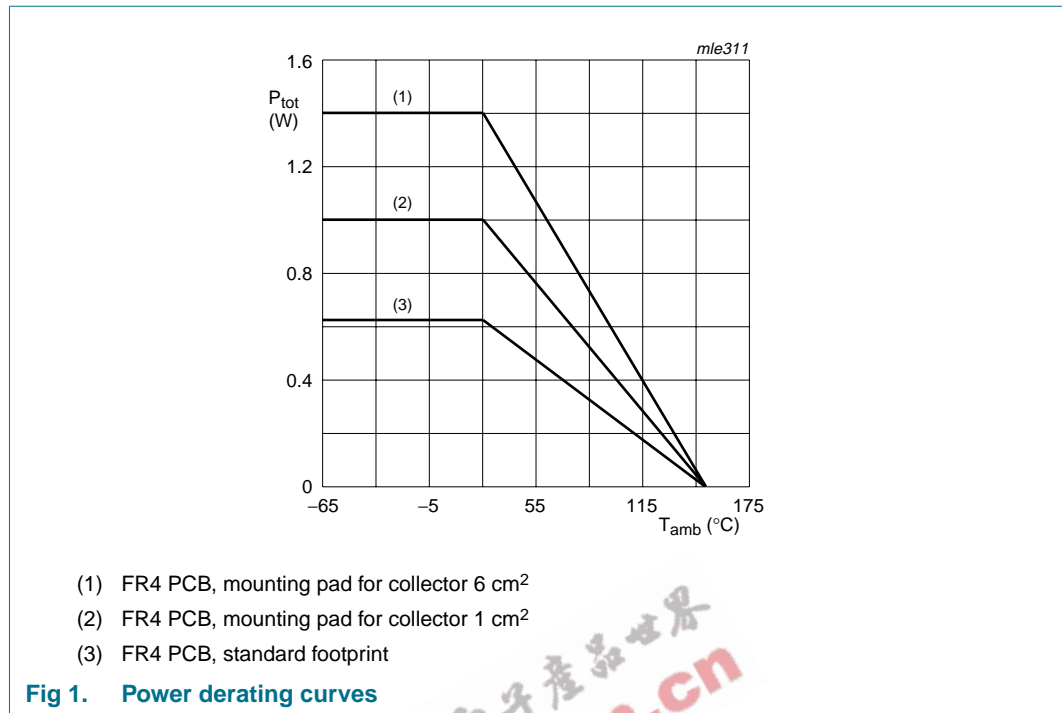
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit	
V_{CBO}	collector-base voltage	open emitter	-	-32	V	
V_{CEO}	collector-emitter voltage	open base	-	-20	V	
V_{EBO}	emitter-base voltage	open collector	-	-5	V	
I_C	collector current		-	-1	A	
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms	-	-2	A	
I_{BM}	peak base current	single pulse; $t_p \leq 1$ ms	-	-200	mA	
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	0.625	W
			[2]	-	1	W
			[3]	-	1.4	W
T_j	junction temperature		-	150	°C	
T_{amb}	ambient temperature		-65	+150	°C	
T_{stg}	storage temperature		-65	+150	°C	

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

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm².

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm².



6. Thermal characteristics

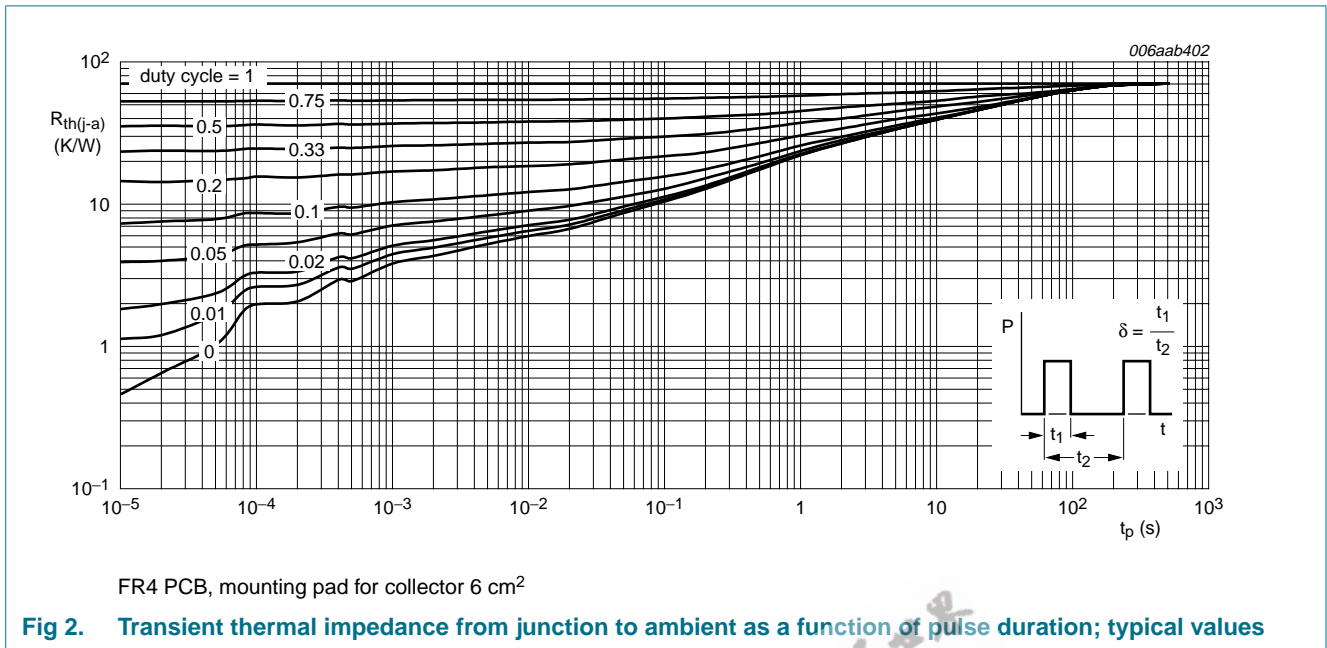
Table 7. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	200	K/W
			[2]	-	-	125	K/W
			[3]	-	-	89	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		-	-	15	K/W	

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

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm².

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm².



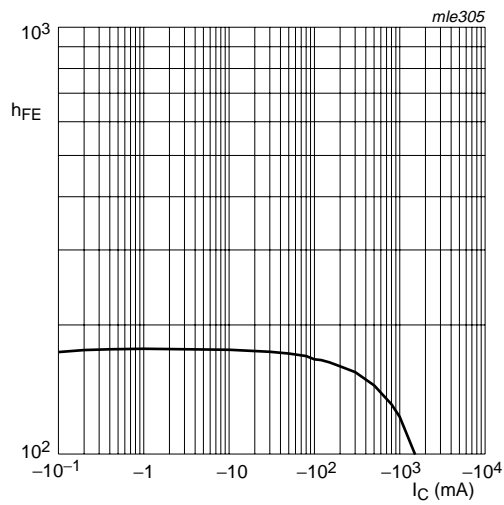
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7. Characteristics

Table 8. Characteristics

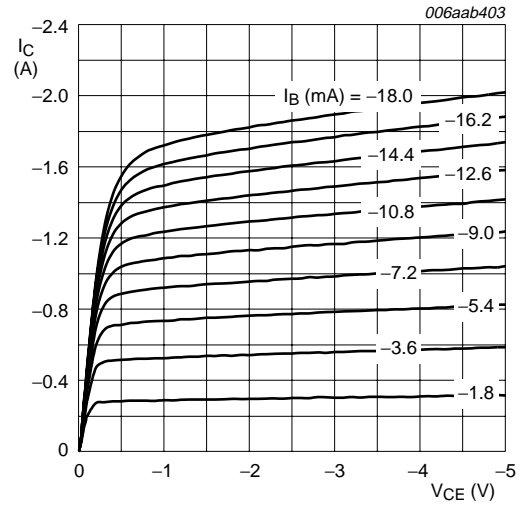
$T_{amb} = 25^{\circ}\text{C}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	$V_{CB} = -25\text{ V}; I_E = 0\text{ A}$	-	-	-100	nA
		$V_{CB} = -25\text{ V}; I_E = 0\text{ A}; T_j = 150^{\circ}\text{C}$	-	-	-10	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = -5\text{ V}; I_C = 0\text{ A}$	-	-	-100	nA
h_{FE}	DC current gain	BCP69 $V_{CE} = -10\text{ V}; I_C = -5\text{ mA}$	50	-	-	
		$V_{CE} = -1\text{ V}; I_C = -500\text{ mA}$	85	-	375	
		$V_{CE} = -1\text{ V}; I_C = -1\text{ A}$	60	-	-	
	BCP69-16 BCP69-16/DG	$V_{CE} = -1\text{ V}; I_C = -500\text{ mA}$	100	-	250	
	BCP69-16/IN	$V_{CE} = -1\text{ V}; I_C = -500\text{ mA}$	140	-	230	
	BCP69-25	$V_{CE} = -1\text{ V}; I_C = -500\text{ mA}$	160	-	375	
V_{CEsat}	collector-emitter saturation voltage	$I_C = -1\text{ A}; I_B = -100\text{ mA}$	-	-	-500	mV
V_{BE}	base-emitter voltage	$V_{CE} = -10\text{ V}; I_C = -5\text{ mA}$	-	-	-700	mV
		$V_{CE} = -1\text{ V}; I_C = -1\text{ A}$	-	-	-1	V
C_c	collector capacitance	$V_{CB} = -10\text{ V}; I_E = i_e = 0\text{ A}; f = 1\text{ MHz}$	-	28	-	pF
f_T	transition frequency	$V_{CE} = -5\text{ V}; I_C = -50\text{ mA}; f = 100\text{ MHz}$	40	140	-	MHz



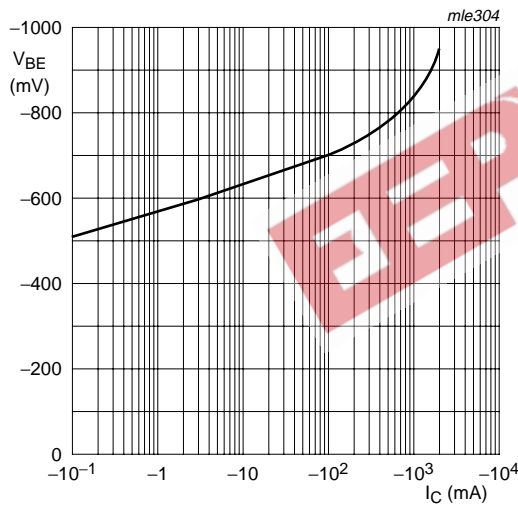
$V_{CE} = -1 \text{ V}$

Fig 3. BCP69-16: DC current gain as a function of collector current; typical values



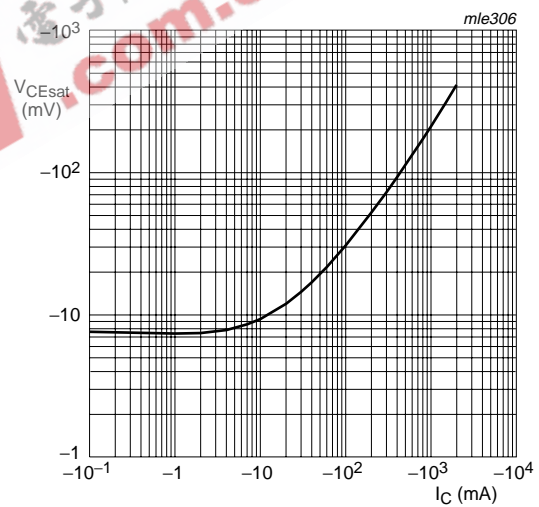
$T_{amb} = 25 \text{ }^\circ\text{C}$

Fig 4. BCP69-16: Collector current as a function of collector-emitter voltage; typical values



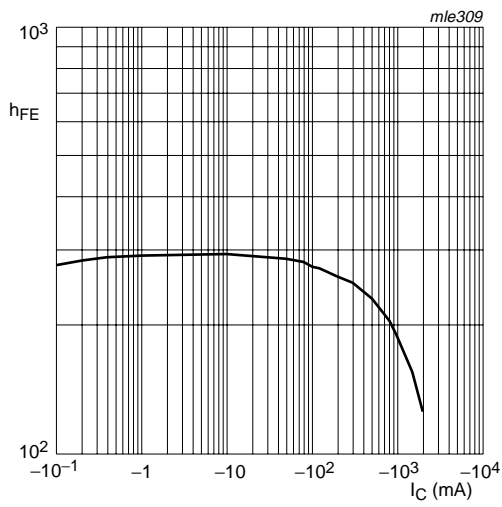
$V_{CE} = -1 \text{ V}$

Fig 5. BCP69-16: Base-emitter voltage as a function of collector current; typical values



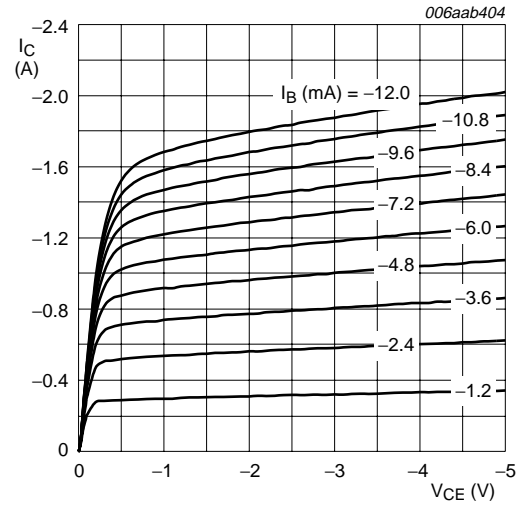
$I_C/I_B = 10$

Fig 6. BCP69-16: Collector-emitter saturation voltage as a function of collector current; typical values



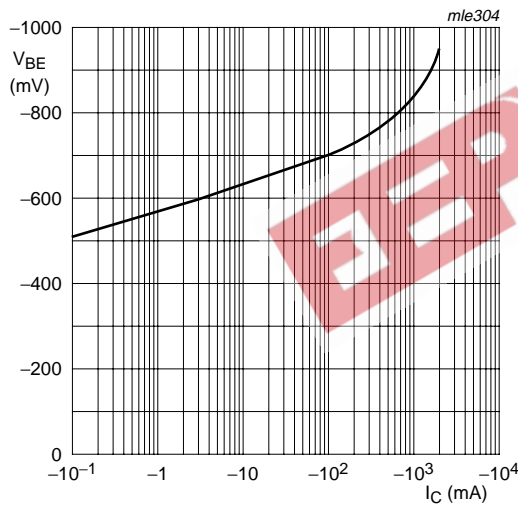
$V_{CE} = -1 \text{ V}$

Fig 7. BCP69-25: DC current gain as a function of collector current; typical values



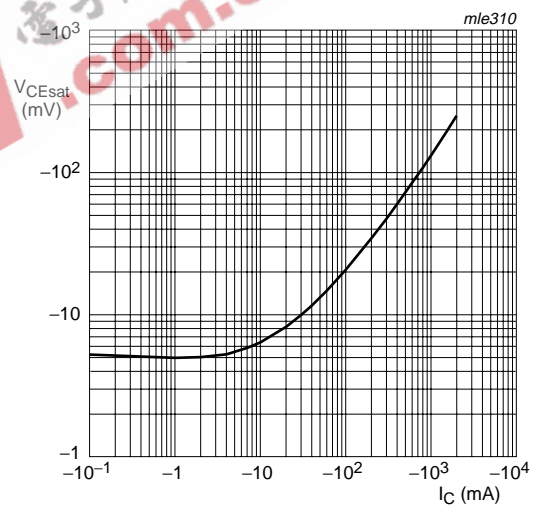
$T_{amb} = 25 \text{ }^\circ\text{C}$

Fig 8. BCP69-25: Collector current as a function of collector-emitter voltage; typical values



$V_{CE} = -1 \text{ V}$

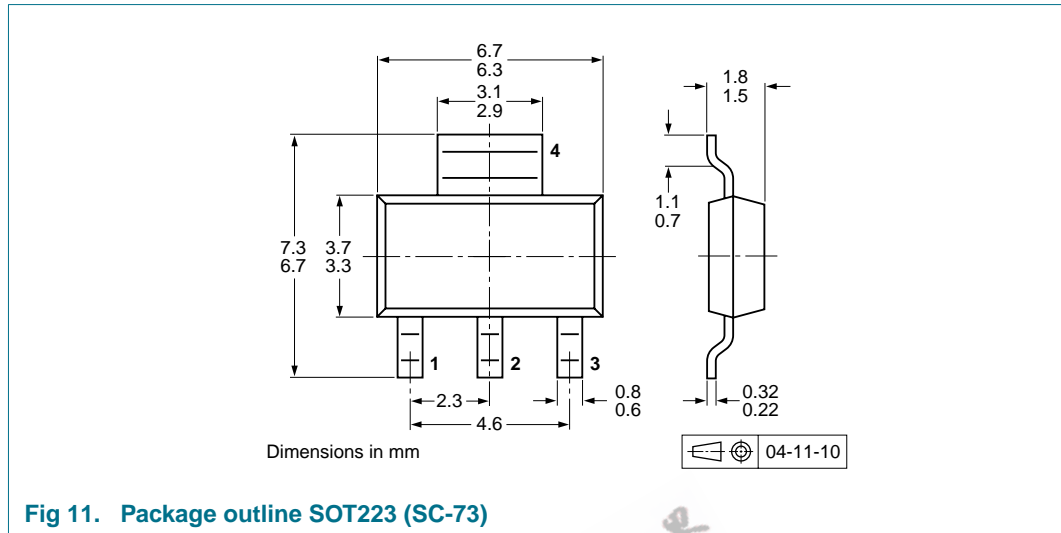
Fig 9. BCP69-25: Base-emitter voltage as a function of collector current; typical values



$I_C/I_B = 10$

Fig 10. BCP69-25: Collector-emitter saturation voltage as a function of collector current; typical values

8. Package outline



9. Packing information

Table 9. Packing methods

The indicated -xxx are the last three digits of the 12NC ordering code.^[1]

Type number ^[2]	Package	Description	Packing quantity	
			1000	4000
BCP69	SOT223	8 mm pitch, 12 mm tape and reel	-115	-135
BCP69-16				
BCP69-16/DG				
BCP69-16/IN				
BCP69-25				

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

[2] /DG: halogen-free

10. Soldering

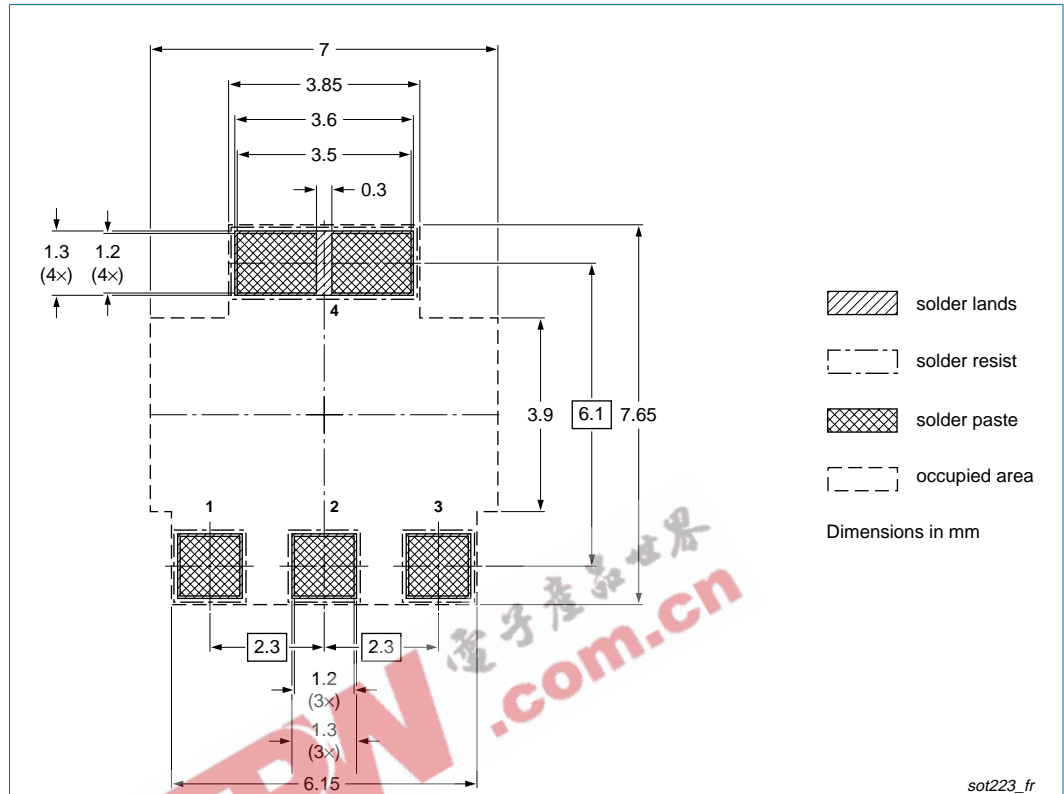


Fig 12. Reflow soldering footprint SOT223 (SC-73)

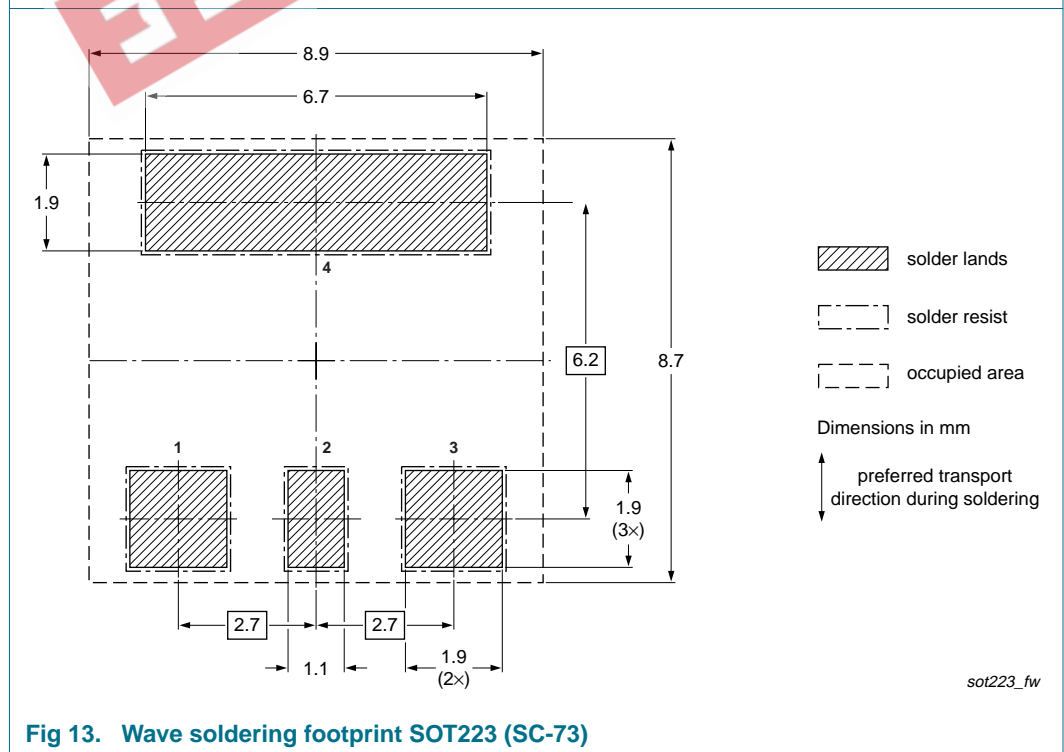


Fig 13. Wave soldering footprint SOT223 (SC-73)

11. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BCP69_6	20081202	Product data sheet	-	BCP69_5
Modifications:	<ul style="list-style-type: none"> • The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. • Legal texts have been adapted to the new company name where appropriate. • Table 1 "Product overview": enhanced • Table 4 "Ordering information": enhanced • Figure 2, 4 and 8: updated • Figure 11: superseded by minimized package outline drawing • Section 9 "Packing information": added • Section 10 "Soldering": enhanced • Section 12 "Legal information": updated 			
BCP69_5	20031125	Product specification	-	BCP69_4
BCP69_4	20021115	Product specification	-	BCP69_3
BCP69_3	19990408	Product specification	-	BCP69_CNV_2

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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.
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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".

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