

BCM61B

NPN/NPN matched double transistor

Rev. 02 — 28 August 2009

Product data sheet

1. Product profile

1.1 General description

NPN/NPN matched double transistor in a SOT143B small Surface-Mounted Device (SMD) plastic package. Matched version of BCV61.

PNP/PNP equivalent: BCM62B

1.2 Features

- Current gain matching

1.3 Applications

- Current mirror
- Differential amplifier

1.4 Quick reference data

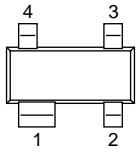
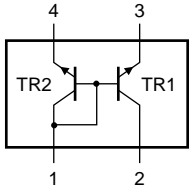
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor TR1						
V_{CEO}	collector-emitter voltage	open base	-	-	45	V
h_{FE}	DC current gain	$V_{CE} = 5\text{ V};$ $I_C = 2\text{ mA}$	200	290	450	
Per transistor						
I_C	collector current		-	-	100	mA
Per device						
I_{C1}/I_{E2}	current matching	$V_{CE1} = 5\text{ V};$ $I_{E2} = -0.5\text{ mA};$ $T_{amb} \leq 25\text{ °C}$	[1] 0.92	1.02	1.12	

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

2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Symbol
1	collector TR2, base TR1 and TR2		
2	collector TR1		
3	emitter TR1		
4	emitter TR2		

006aaa842

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BCM61B	-	plastic surface-mounted package; 4 leads	SOT143B

4. Marking

Table 4. Marking codes

Type number	Marking code ^[1]
BCM61B	*AC

- [1] * = -: made in Hong Kong
 * = p: made in Hong Kong
 * = t: made in Malaysia
 * = W: made in China

5. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions	Min	Max	Unit
Per transistor TR1					
V_{CBO}	collector-base voltage	open emitter	-	50	V
V_{CEO}	collector-emitter voltage	open base	-	45	V
Per transistor					
V_{EBS}	emitter-base voltage	$V_{CB} = 0\text{ V}$	-	6	V
I_C	collector current		-	100	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1\text{ ms}$	-	200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[1] -	220	mW
Per device					
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[1] -	390	mW
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 PCB, single-sided copper, tin-plated and standard footprint.

6. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor						
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] -	-	568	K/W
Per device						
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] -	-	321	K/W

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

7. Characteristics

Table 7. Characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor TR1						
I_{CBO}	collector-base cut-off current	$V_{CB} = 30\text{ V};$ $I_E = 0\text{ A}$	-	-	15	nA
		$V_{CB} = 30\text{ V};$ $I_E = 0\text{ A};$ $T_j = 150\text{ }^{\circ}\text{C}$	-	-	5	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	$V_{CE} = 5\text{ V};$ $I_C = 10\text{ }\mu\text{A}$	-	250	-	
		$V_{CE} = 5\text{ V};$ $I_C = 100\text{ }\mu\text{A}$	100	-	-	
		$V_{CE} = 5\text{ V};$ $I_C = 2\text{ mA}$	200	290	450	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 10\text{ mA};$ $I_B = 0.5\text{ mA}$	-	50	200	mV
		$I_C = 100\text{ mA};$ $I_B = 5\text{ mA}$	-	200	400	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = 10\text{ mA};$ $I_B = 0.5\text{ mA}$	[1] -	760	-	mV
		$I_C = 100\text{ mA};$ $I_B = 5\text{ mA}$	[1] -	910	-	mV
V_{BE}	base-emitter voltage	$V_{CE} = 5\text{ V};$ $I_C = 2\text{ mA}$	[2] 610	660	710	mV
		$V_{CE} = 5\text{ V};$ $I_C = 10\text{ mA}$	[2] -	-	770	mV
C_c	collector capacitance	$V_{CB} = 10\text{ V};$ $I_E = i_e = 0\text{ A};$ $f = 1\text{ MHz}$	-	-	1.5	pF
C_e	emitter capacitance	$V_{EB} = 0.5\text{ V};$ $I_C = i_c = 0\text{ A};$ $f = 1\text{ MHz}$	-	11	-	pF
f_T	transition frequency	$V_{CE} = 5\text{ V};$ $I_C = 10\text{ mA};$ $f = 100\text{ MHz}$	100	250	-	MHz
NF	noise figure	$V_{CE} = 5\text{ V};$ $I_C = 0.2\text{ mA};$ $R_S = 2\text{ k}\Omega;$ $f = 10\text{ Hz to}$ 15.7 kHz	-	2.8	-	dB
		$V_{CE} = 5\text{ V};$ $I_C = 0.2\text{ mA};$ $R_S = 2\text{ k}\Omega;$ $f = 1\text{ kHz};$ $B = 200\text{ Hz}$	-	3.3	-	dB

Table 7. Characteristics ...continued $T_{amb} = 25\text{ °C}$ unless otherwise specified

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor TR2						
V_{EBS}	emitter-base voltage	$V_{CB} = 0\text{ V};$ $I_E = -250\text{ mA}$	-	-	-1.8	V
		$V_{CB} = 0\text{ V};$ $I_E = -10\text{ }\mu\text{A}$	-400	-	-	mV
Per device						
I_{C1}/I_{E2}	current matching	$V_{CE1} = 5\text{ V};$ $I_{E2} = -0.5\text{ mA};$ $T_{amb} \leq 25\text{ °C}$	[3] 0.92	1.02	1.12	
		$V_{CE1} = 5\text{ V};$ $I_{E2} = -0.5\text{ mA};$ $T_{amb} \leq 150\text{ °C}$	[3] 0.93	-	1.13	
		$V_{CE1} = 3\text{ V};$ $I_{E2} = -0.5\text{ mA};$ $T_{amb} \leq 25\text{ °C}$	[3] 0.91	1.01	1.11	
		$V_{CE1} = 1\text{ V};$ $I_{E2} = -0.5\text{ mA};$ $T_{amb} \leq 25\text{ °C}$	[3] 0.9	1	1.1	

[1] V_{BEsat} decreases by about 1.7 mV/K with increasing temperature.

[2] V_{BE} decreases by about 2 mV/K with increasing temperature.

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

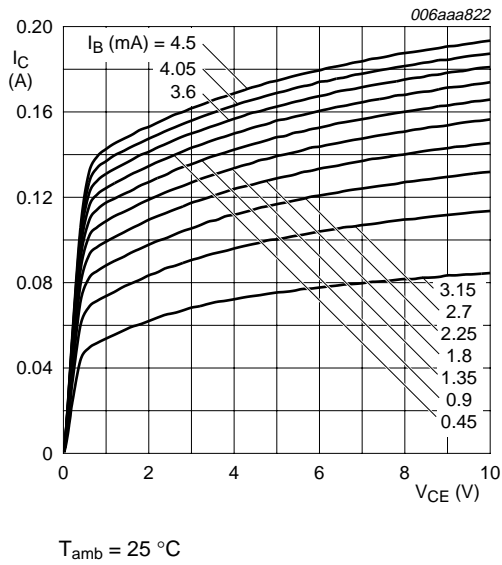


Fig 1. Collector current as a function of collector-emitter voltage; typical values

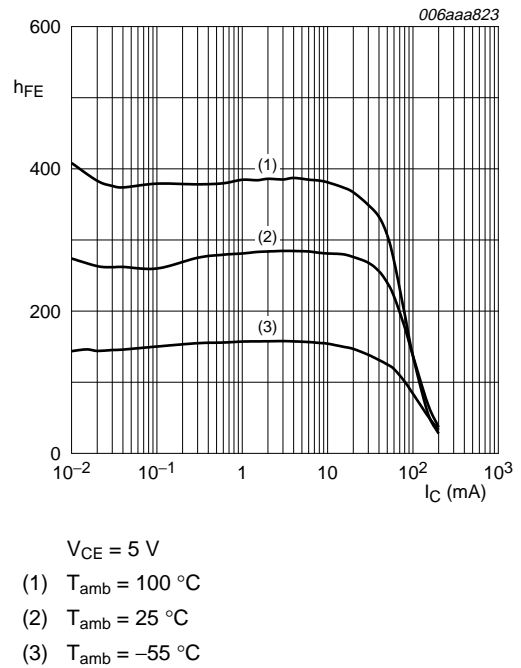


Fig 2. DC current gain as a function of collector current; typical values

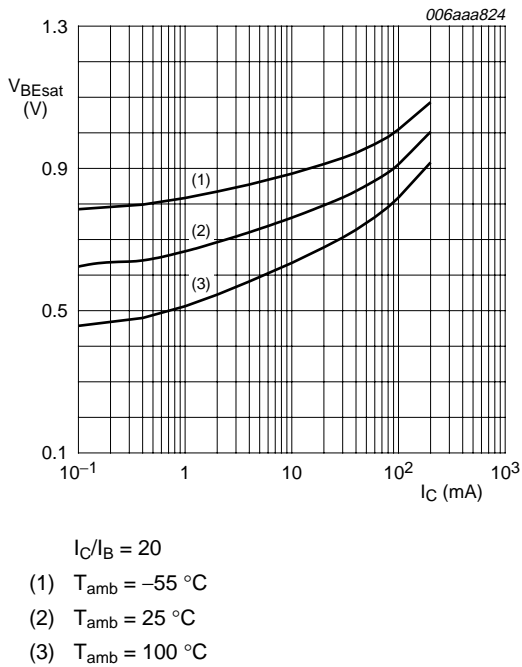


Fig 3. Base-emitter saturation voltage as a function of collector current; typical values

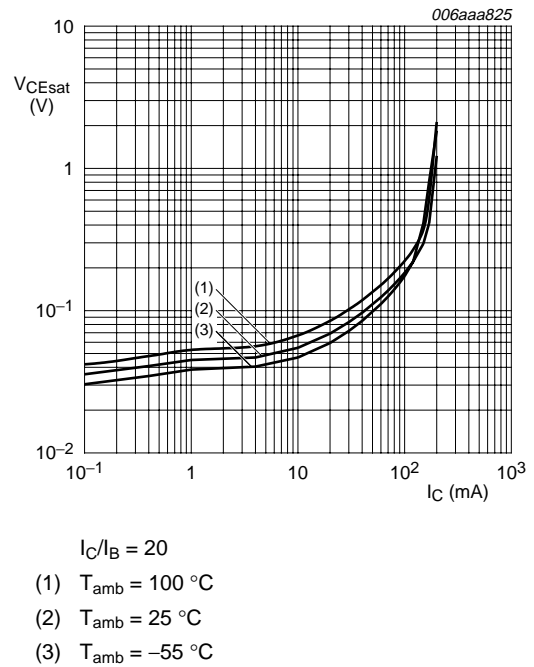
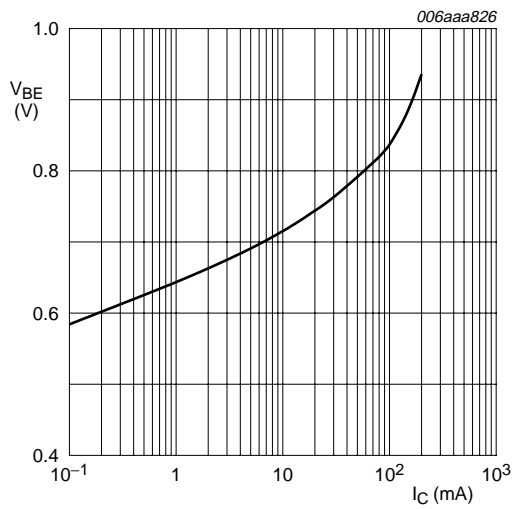
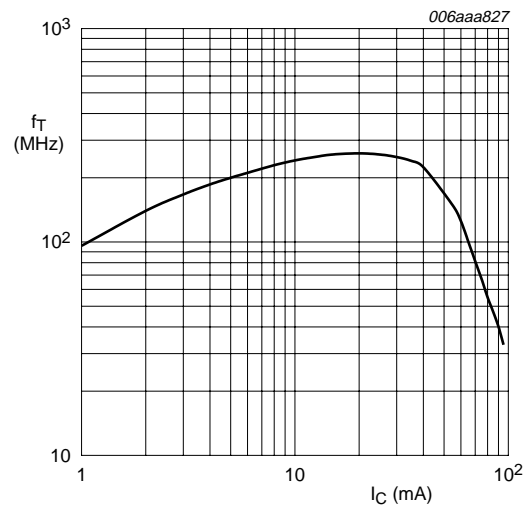


Fig 4. Collector-emitter saturation voltage as a function of collector current; typical values



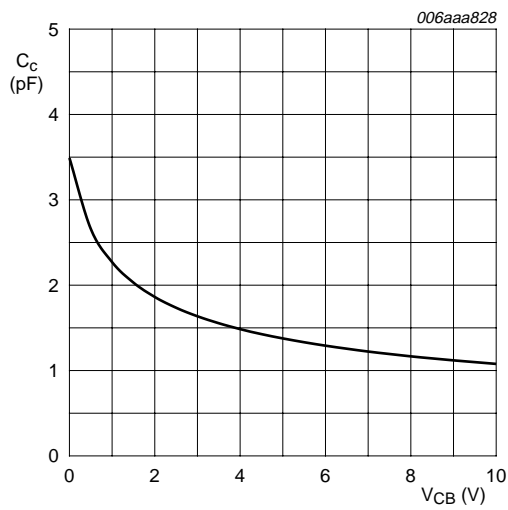
$V_{CE} = 5$ V; $T_{amb} = 25$ °C

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



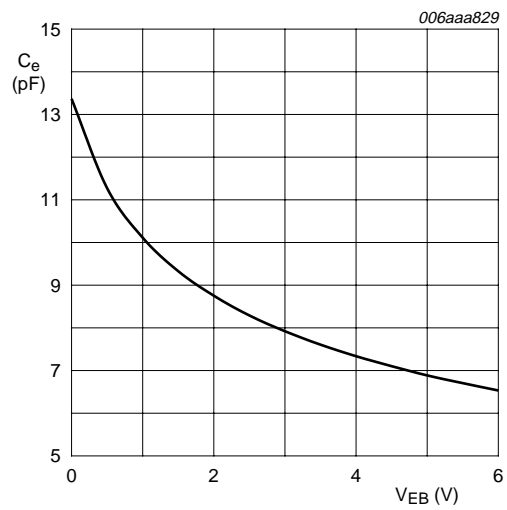
$V_{CE} = 5$ V; $T_{amb} = 25$ °C

Fig 6. Transition frequency as a function of collector current; typical values



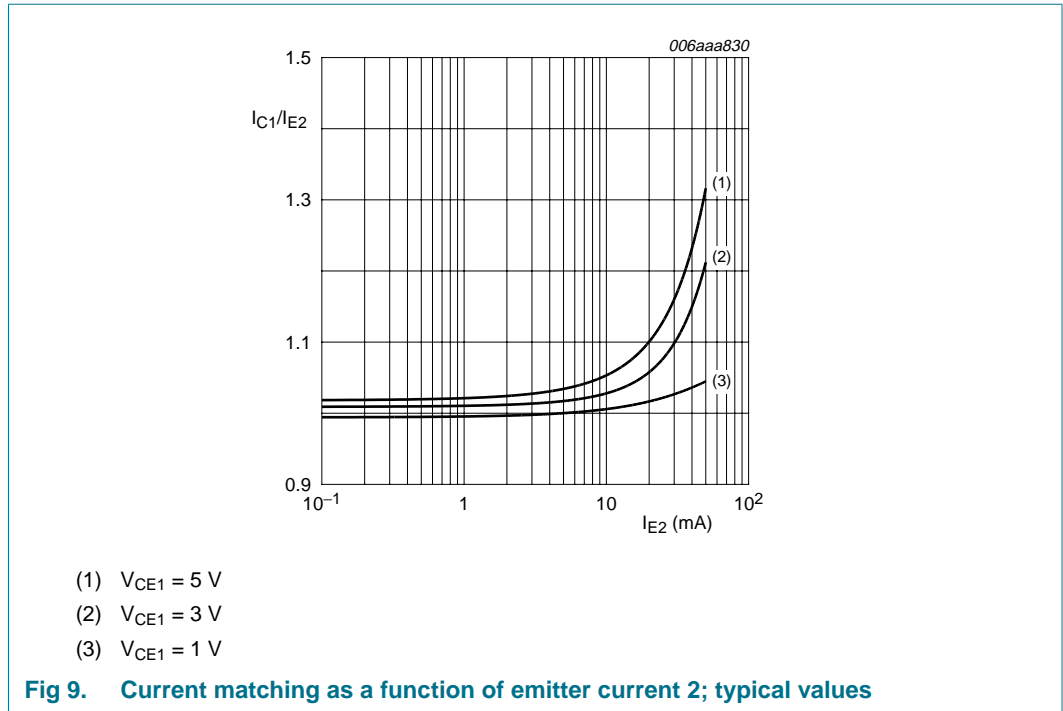
$f = 1$ MHz; $T_{amb} = 25$ °C

Fig 7. Collector capacitance as a function of collector-base voltage; typical values

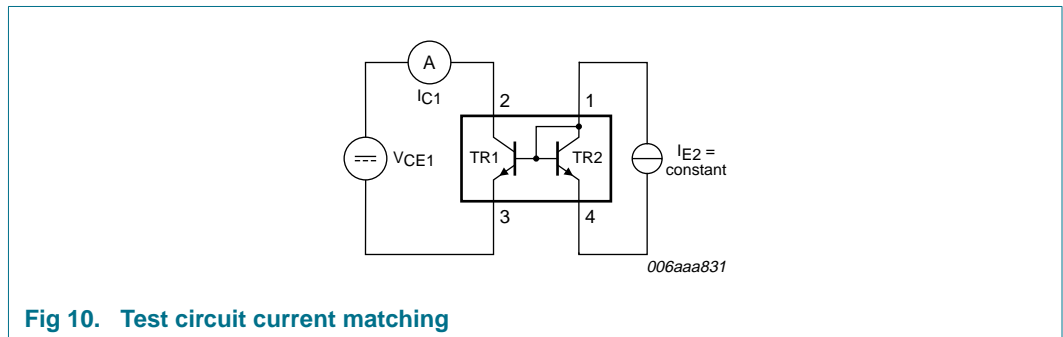


$f = 1$ MHz; $T_{amb} = 25$ °C

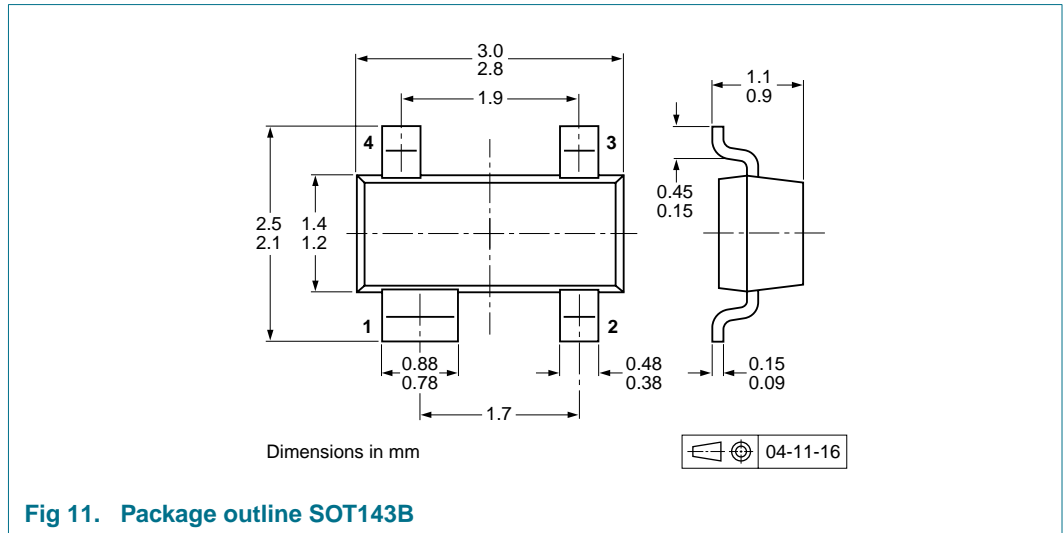
Fig 8. Emitter capacitance as a function of emitter-base voltage; typical values



8. Test information



9. Package outline



10. Packing information

Table 8. Packing methods

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

Type number	Package	Description	Packing quantity	
			3000	10000
BCM61B	SOT143B	4 mm pitch, 8 mm tape and reel	-215	-235

[1] For further information and the availability of packing methods, see [Section 14](#).

11. Soldering

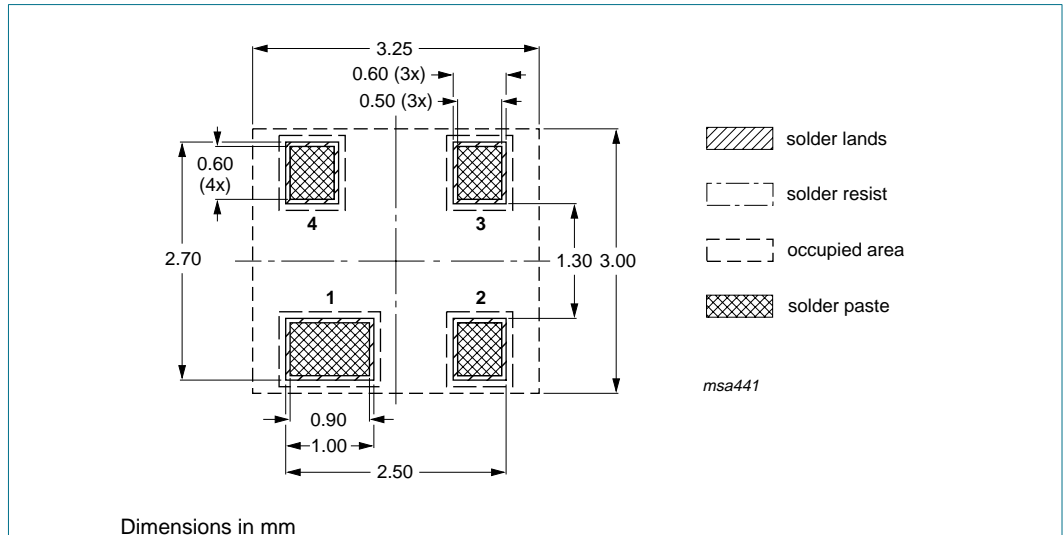


Fig 12. Reflow soldering footprint SOT143B

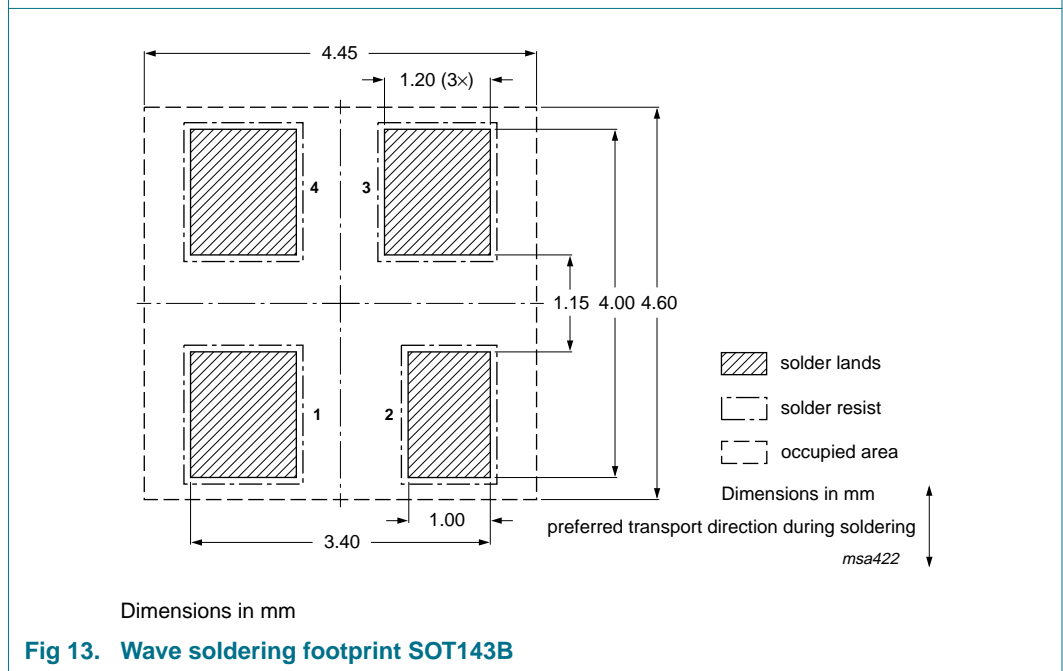


Fig 13. Wave soldering footprint SOT143B

12. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BCM61B_2	20090828	Product data sheet	-	BCM61B_1
Modifications:		<ul style="list-style-type: none">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.Figure 13 "Wave soldering footprint SOT143B": updated		
BCM61B_1	20060919	Product data sheet	-	-

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13.1 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.
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[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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