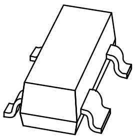


BCV61

NPN general-purpose double transistors

Rev. 04 — 18 December 2009 **Product data sheet**

1. Product profile

1.1 General description

NPN general-purpose double transistors in a small SOT143B Surface-Mounted Device (SMD) plastic package.

Table 1. Product overview

Type number	Package		PNP complement
	NXP	JEITA	
BCV61	SOT143B	-	BCV62
BCV61A			BCV62A
BCV61B			BCV62B
BCV61C			BCV62C

1.2 Features

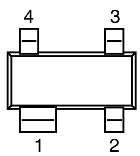
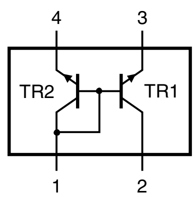
- Low current (max. 100 mA)
- Low voltage (max. 30 V)
- Matched pairs

1.3 Applications

- Applications with working point independent of temperature
- Current mirrors

2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	collector TR2; base TR1 and TR2		
2	collector TR1		
3	emitter TR1		
4	emitter TR2		

founded by Philips

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BCV61	-	plastic surface-mounted package; 4 leads	SOT143B
BCV61A			
BCV61B			
BCV61C			

4. Marking

Table 4. Marking codes

Type number	Marking code[1]
BCV61	1M*
BCV61A	1J*
BCV61B	1K*
BCV61C	1L*

[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						
V_{CBO}	collector-base voltage	open emitter		-	30	V
V_{CEO}	collector-emitter voltage	open base		-	30	V
V_{EBS}	emitter-base voltage	V_{CE} = 0 V		-	6	V
I_C	collector current			-	100	mA
I_{CM}	peak collector current			-	200	mA
I_{BM}	peak base current			-	200	mA
Per device						
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	250	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 Printed-Circuit Board (PCB).

6. Thermal characteristics

Table 6. Thermal characteristics

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

[1] Device mounted on an FR4 PCB.

7. Characteristics

Table 7. Characteristics

T_j = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Transistor TR1							
I_{CBO}	collector-base cut-off current	V_{CB} = 30 V; I_E = 0 A		-	-	15	nA
		V_{CB} = 30 V; I_E = 0 A; T_j = 150 °C		-	-	5	μA
I_{EBO}	emitter-base cut-off current	V_{EB} = 5 V; I_C = 0 A		-	-	100	nA
h_{FE}	DC current gain	V_{CE} = 5 V; I_C = 100 μA		100	-	-	
		V_{CE} = 5 V; I_C = 2 mA		110	-	800	
V_{CEsat}	collector-emitter saturation voltage	I_C = 10 mA; I_B = 0.5 mA		-	90	250	mV
		I_C = 100 mA; I_B = 5 mA		-	200	600	mV
V_{BEsat}	base-emitter saturation voltage	I_C = 10 mA; I_B = 0.5 mA	[1]	-	700	-	mV
		I_C = 100 mA; I_B = 5 mA	[1]	-	900	-	mV
V_{BE}	base-emitter voltage	I_C = 2 mA; V_{CE} = 5 V	[2]	580	660	700	mV
		I_C = 10 mA; V_{CE} = 5 V	[2]	-	-	770	mV
f_T	transition frequency	V_{CE} = 5 V; I_C = 10 mA; f = 100 MHz		100	-	-	MHz
C_c	collector capacitance	V_{CB} = 10 V; $I_E = i_e$ = 0 A; f = 1 MHz		-	2.5	-	pF
NF	noise figure	V_{CE} = 5 V; I_C = 200 μA; R_S = 2 kΩ; f = 1 kHz; B = 200 Hz		-	-	10	dB

Table 7. Characteristics *...continued*

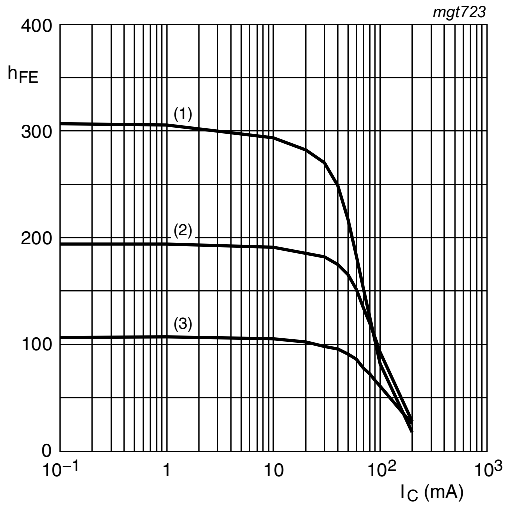
T_j = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Transistor TR2							
V_{EBS}	emitter-base voltage	V_{CB} = 0 V; I_E = −250 mA		-	-	−1.8	V
		V_{CB} = 0 V; I_E = −10 μA		−400	-	-	mV
h_{FE}	DC current gain	V_{CE} = 5 V; I_C = 2 mA					
	BCV61			110	-	800	
	BCV61A			110	-	220	
	BCV61B			200	-	450	
	BCV61C			420	-	800	
Transistors TR1 and TR2							
I_{C1}/I_{E2}	current matching	I_{E2} = −0.5 mA; V_{CE1} = 5 V					
		T_{amb} ≤ 25 °C		0.7	-	1.3	
		T_{amb} ≤ 150 °C		0.7	-	1.3	
I_{E2}	emitter current 2	V_{CE1} = 5 V	[3]	-	-	−5	mA

[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, without emitter resistors, mounted on an FR4 PCB.



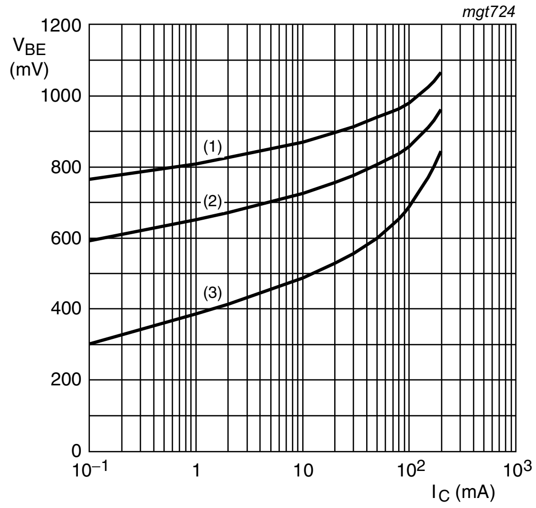
V_{CE} = 5 V

(1) T_{amb} = 150 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = −55 °C

Fig 1. BCV61A: DC current gain as a function of collector current; typical values



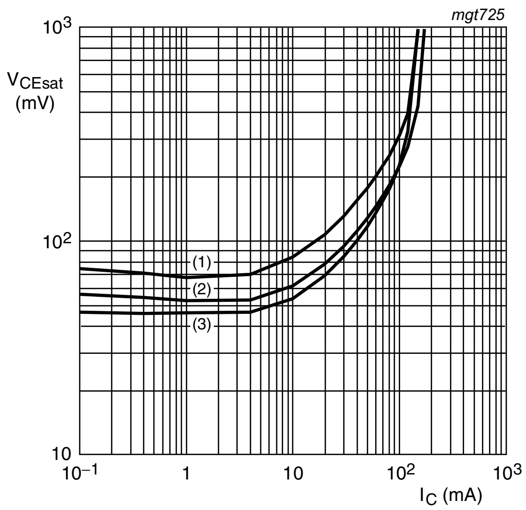
V_{CE} = 5 V

(1) T_{amb} = −55 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = 150 °C

Fig 2. BCV61A: Base-emitter voltage as a function of collector current; typical values



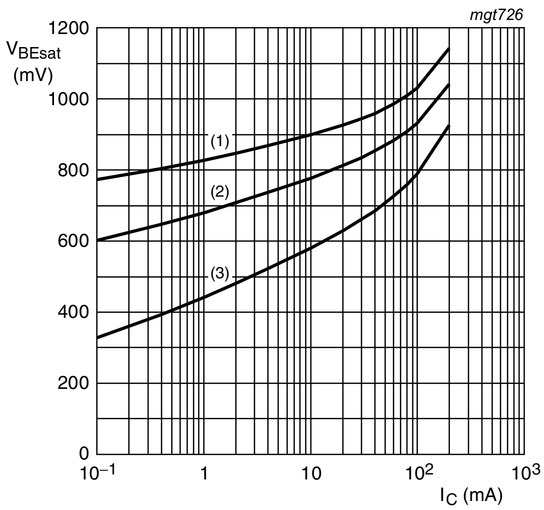
I_C/I_B = 20

(1) T_{amb} = 150 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = −55 °C

Fig 3. BCV61A: Collector-emitter saturation voltage as a function of collector current; typical values



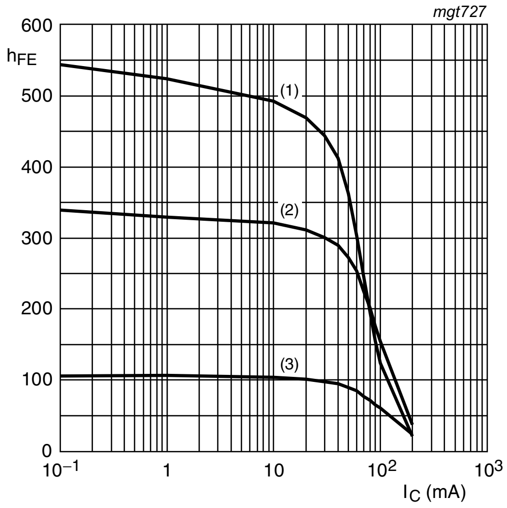
I_C/I_B = 10

(1) T_{amb} = −55 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = 150 °C

Fig 4. BCV61A: Base-emitter saturation voltage as a function of collector current; typical values



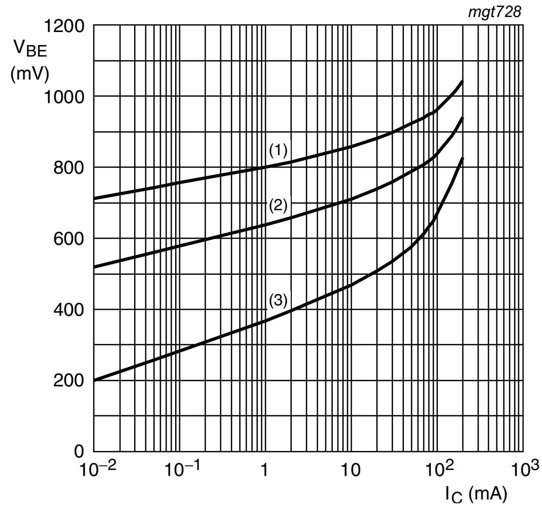
V_{CE} = 5 V

(1) T_{amb} = 150 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = −55 °C

Fig 5. BCV61B: DC current gain as a function of collector current; typical values



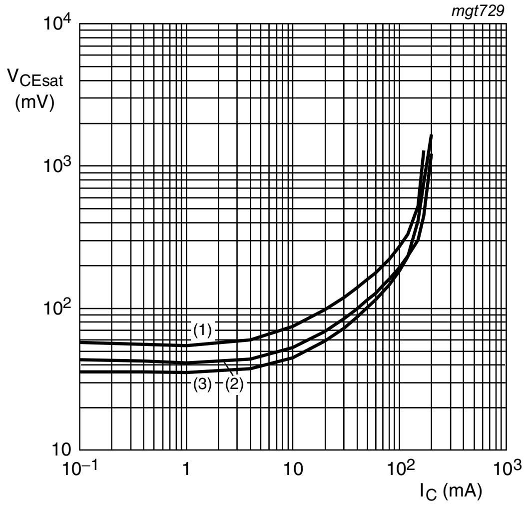
V_{CE} = 5 V

(1) T_{amb} = −55 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = 150 °C

Fig 6. BCV61B: Base-emitter voltage as a function of collector current; typical values



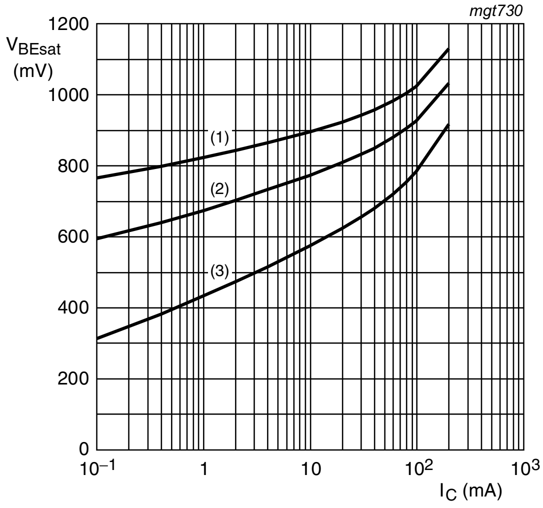
I_C/I_B = 20

(1) T_{amb} = 150 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = −55 °C

Fig 7. BCV61B: Collector-emitter saturation voltage as a function of collector current; typical values



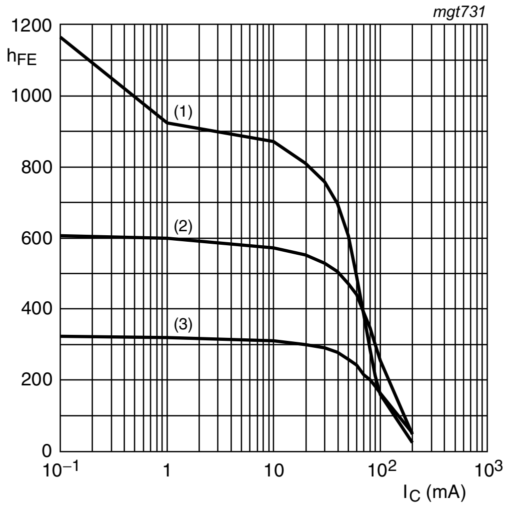
I_C/I_B = 10

(1) T_{amb} = −55 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = 150 °C

Fig 8. BCV61B: Base-emitter saturation voltage as a function of collector current; typical values



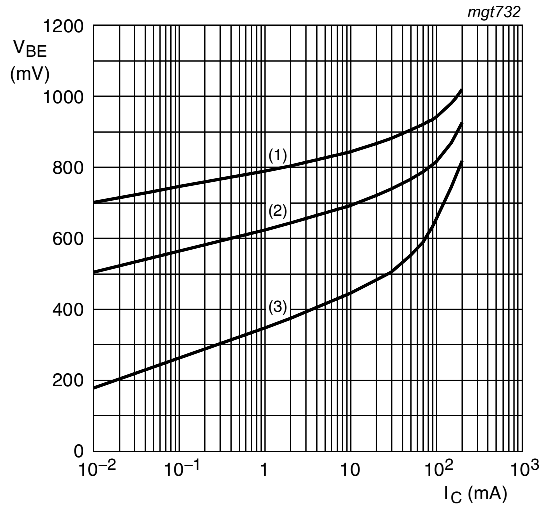
V_{CE} = 5 V

(1) T_{amb} = 150 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = −55 °C

Fig 9. BCV61C: DC current gain as a function of collector current; typical values



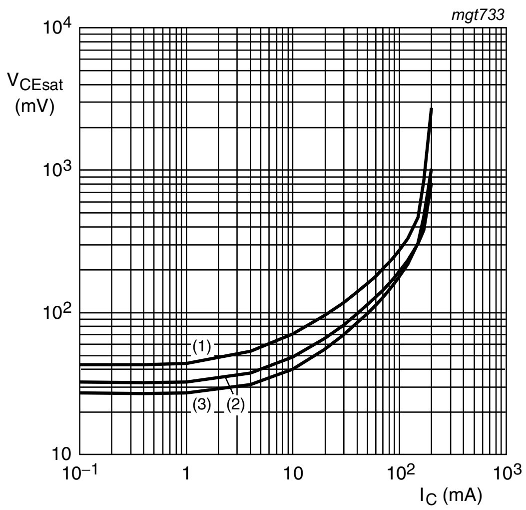
V_{CE} = 5 V

(1) T_{amb} = −55 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = 150 °C

Fig 10. BCV61C: Base-emitter voltage as a function of collector current; typical values



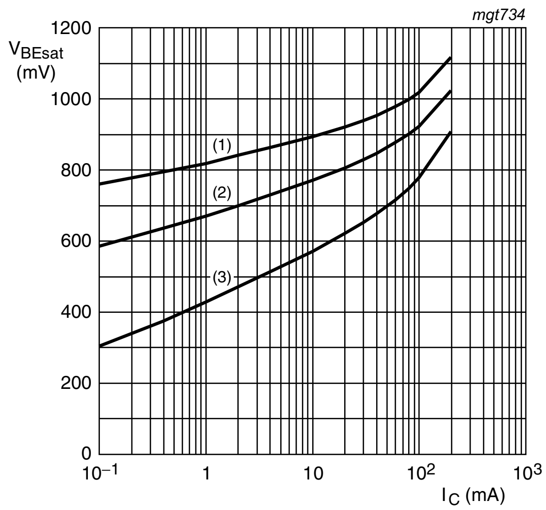
I_C/I_B = 20

(1) T_{amb} = 150 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = −55 °C

Fig 11. BCV61C: Collector-emitter saturation voltage as a function of collector current; typical values



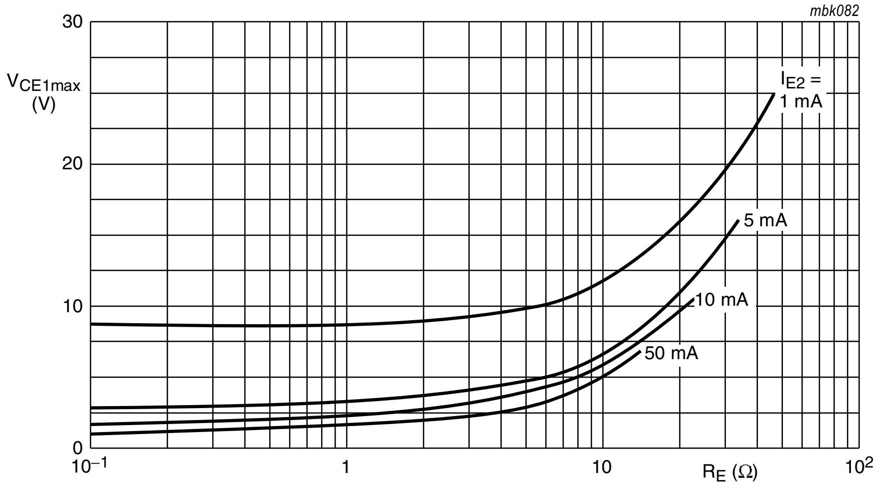
I_C/I_B = 10

(1) T_{amb} = −55 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = 150 °C

Fig 12. BCV61C: Base-emitter saturation voltage as a function of collector current; typical values



$I_{C1}/I_{E2} = 1.3$

Fig 13. Maximum collector-emitter voltage as a function of emitter resistance

8. Test information

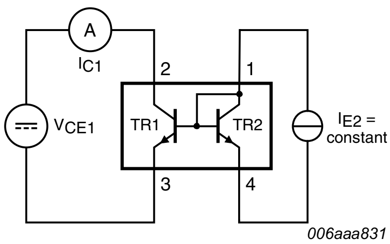


Fig 14. Test circuit current matching

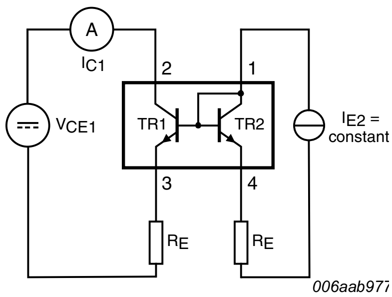


Fig 15. BCV61 with emitter resistors

9. Package outline

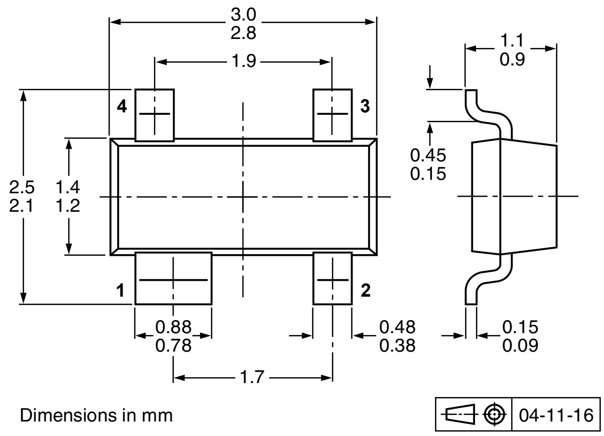


Fig 16. Package outline SOT143B

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**
BCV61	SOT143B	4 mm pitch, 8 mm tape and reel	-215	-235
BCV61A				
BCV61B				
BCV61C				

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

11. Soldering

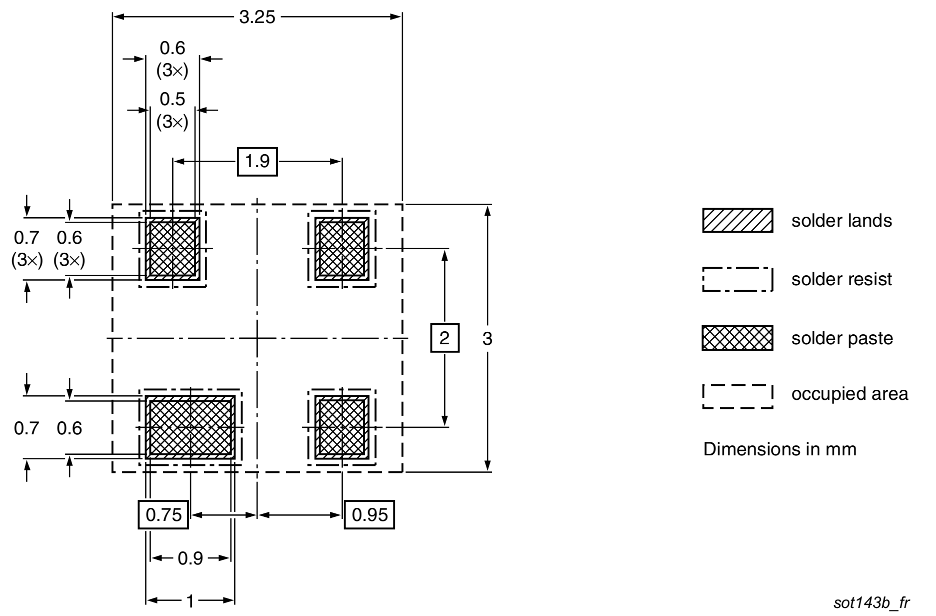


Fig 17. Reflow soldering footprint SOT143B

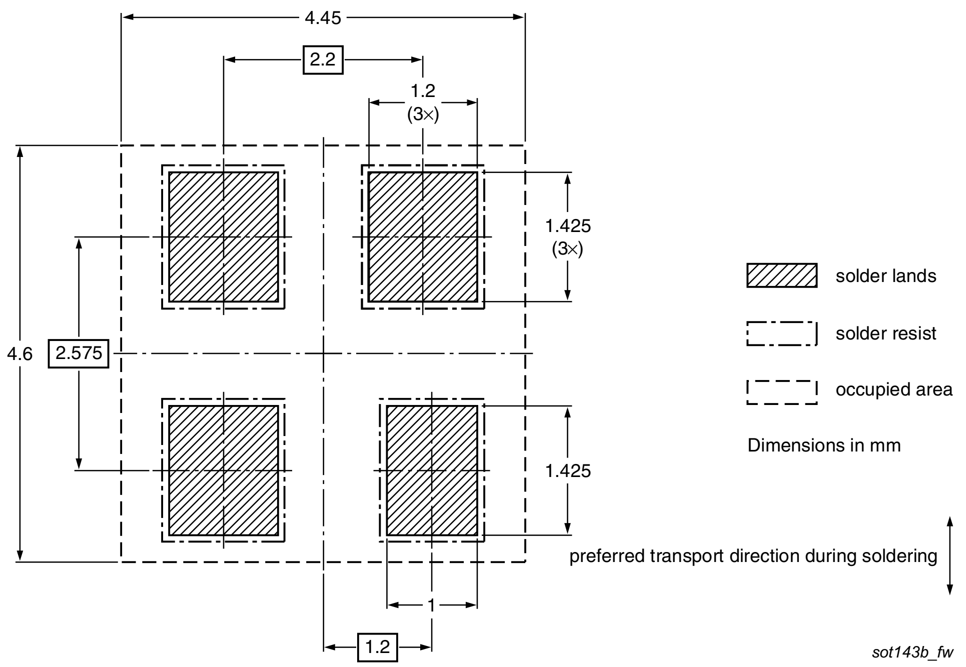


Fig 18. Wave soldering footprint SOT143B

12. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BCV61_4	20091218	Product data sheet	-	BCV61_3
Modifications:	• 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. • Section 3 “Ordering information”: added • Section 4 “Marking”: updated • Figure 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12: added • Section 8 “Test information”: added • Figure 16: superseded by minimized package outline drawing • Section 10 “Packing information”: added • Section 11 “Soldering”: added • Section 13 “Legal information”: updated			
BCV61_3	19990408	Product specification	-	BCV61_CNV_2
BCV61_CNV_2	19970616	Product specification	-	-

13. Legal information

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.
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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14. Contact information

For more information, please visit: **http://www.nxp.com**

For sales office addresses, please send an email to: **salesaddresses@nxp.com**

15. Contents

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