

# BCV62

## PNP general-purpose double transistors

Rev. 4 — 26 July 2010

Product data sheet

## 1. Product profile

### 1.1 General description

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

Table 1. Product overview

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

### 1.2 Features and benefits

- Low current (max. 100 mA)
- Low voltage (max. 30 V)
- Matched pairs
- AEC-Q101 qualified
- Small SMD plastic package

### 1.3 Applications

- Applications with working point independent of temperature
- Current mirrors

### 1.4 Quick reference data

Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per transistor</b>						
$V_{CE0}$	collector-emitter voltage	open base	-	-	-30	V
$I_C$	collector current		-	-	-100	mA
<b>Transistor TR1</b>						
$h_{FE}$	DC current gain	$V_{CE} = -5\text{ V}; I_C = -100\ \mu\text{A}$	100	-	-	
		$V_{CE} = -5\text{ V}; I_C = -2\text{ mA}$	100	-	800	

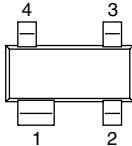
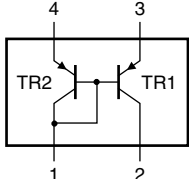


Table 2. Quick reference data ...continued

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Transistor TR2</b>						
$h_{FE}$	DC current gain	$V_{CE} = -5\text{ V}; I_C = -2\text{ mA}$				
	BCV62		100	-	800	
	BCV62A		100	-	250	
	BCV62B		220	-	475	
	BCV62C		420	-	800	

## 2. Pinning information

Table 3. Pinning

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

006aaa843

## 3. Ordering information

Table 4. Ordering information

Type number	Package		Version
	Name	Description	
BCV62	-	plastic surface-mounted package; 4 leads	SOT143B
BCV62A			
BCV62B			
BCV62C			

## 4. Marking

Table 5. Marking codes

Type number	Marking code <sup>[1]</sup>
BCV62	3M*
BCV62A	3J*
BCV62B	3K*
BCV62C	3L*

[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
<b>Per transistor</b>					
$V_{CBO}$	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
<b>Per device</b>					
$P_{tot}$	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 7. 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 8. Characteristics**

$T_j = 25$  °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Transistor TR1</b>						
$I_{CBO}$	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	100	-	800	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = -10$ mA; $I_B = -0.5$ mA	-	-75	-300	mV
		$I_C = -100$ mA; $I_B = -5$ mA	-	-250	-650	mV

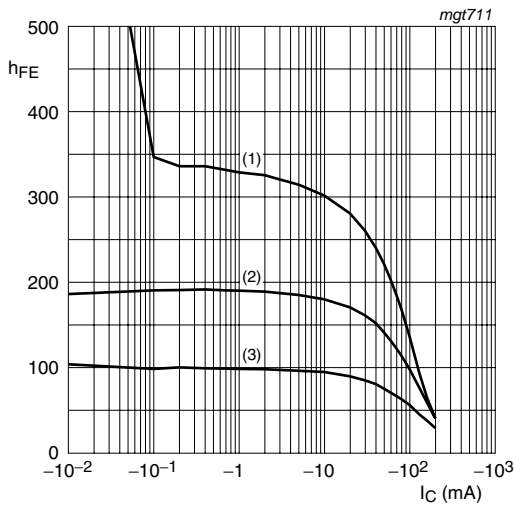
**Table 8. Characteristics ...continued**  
 $T_j = 25\text{ °C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit		
$V_{BEsat}$	base-emitter saturation voltage	$I_C = -10\text{ mA};$ $I_B = -0.5\text{ mA}$	[1]	-	-700	-	mV	
		$I_C = -100\text{ mA};$ $I_B = -5\text{ mA}$	[1]	-	-850	-	mV	
$V_{BE}$	base-emitter voltage	$I_C = -2\text{ mA}; V_{CE} = -5\text{ V}$	[2]	-600	-650	-750	mV	
		$I_C = -10\text{ mA}; V_{CE} = -5\text{ V}$	[2]	-	-	-820	mV	
$f_T$	transition frequency	$V_{CE} = -5\text{ V};$ $I_C = -10\text{ mA};$ $f = 100\text{ MHz}$		100	-	-	MHz	
$C_c$	collector capacitance	$V_{CB} = -10\text{ V};$ $I_E = i_e = 0\text{ A}$		-	4.5	-	pF	
NF	noise figure	$V_{CE} = -5\text{ V};$ $I_C = -200\text{ }\mu\text{A}; R_S = 2\text{ k}\Omega;$ $f = 1\text{ kHz}; B = 200\text{ Hz}$		-	-	10	dB	
<b>Transistor TR2</b>								
$V_{EBS}$	emitter-base voltage	$V_{CB} = 0\text{ V}; I_E = -250\text{ mA}$		-	-	-1.5	V	
		$V_{CB} = 0\text{ V}; I_E = -10\text{ }\mu\text{A}$		-400	-	-	mV	
$h_{FE}$	DC current gain	$V_{CE} = -5\text{ V}; I_C = -2\text{ mA}$						
			BCV62		100	-	800	
			BCV62A		100	-	250	
			BCV62B		220	-	475	
	BCV62C		420	-	800			
<b>Transistors TR1 and TR2</b>								
$I_{C1}/I_{E2}$	current matching	$I_{E2} = -0.5\text{ mA};$ $V_{CE1} = -5\text{ V};$						
			$T_{amb} \leq 25\text{ °C}$		0.7	-	1.3	
			$T_{amb} \leq 150\text{ °C}$		0.7	-	1.3	
$I_{E2}$	emitter current 2	$V_{CE1} = -5\text{ V}$	[3]	-	-	-5	mA	

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

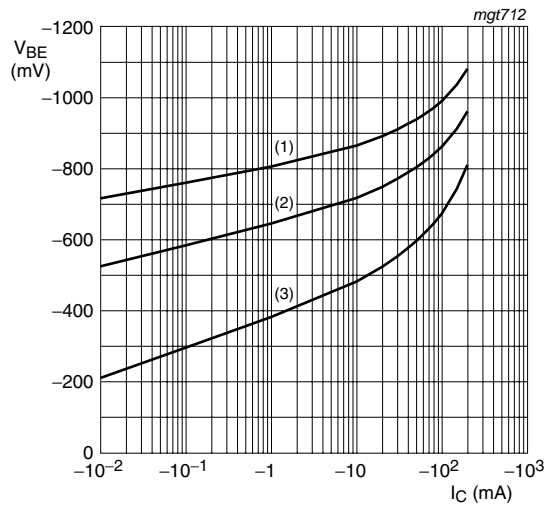
[2]  $V_{BE}$  decreases by about 2 mV/K with increasing temperature.

[3] Device, without emitter resistors, mounted on an FR4 PCB.



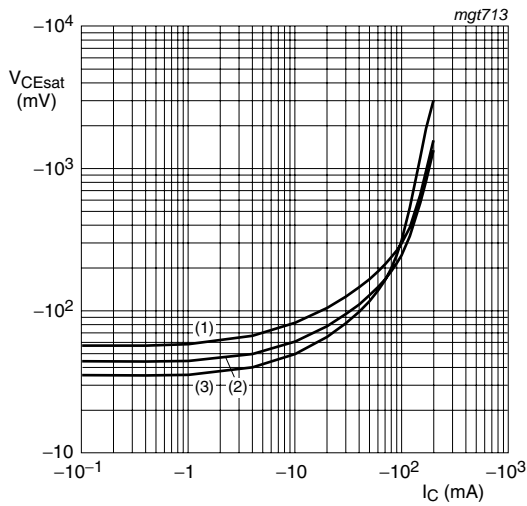
$V_{CE} = -5\text{ V}$   
 (1)  $T_{amb} = 150\text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = -55\text{ }^{\circ}\text{C}$

**Fig 1. BCV62A: DC current gain as a function of collector current; typical values**



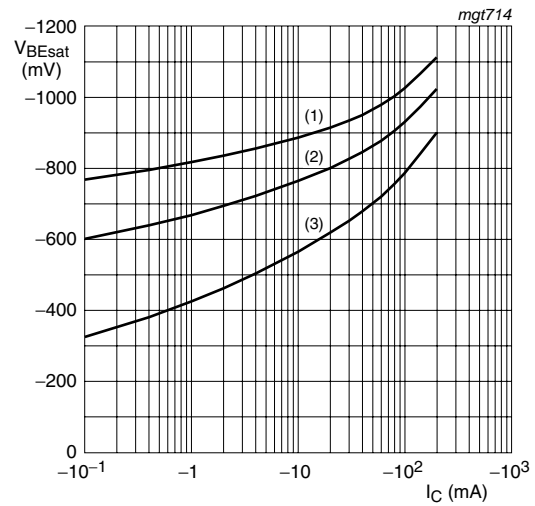
$V_{CE} = -5\text{ V}$   
 (1)  $T_{amb} = -55\text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = 150\text{ }^{\circ}\text{C}$

**Fig 2. BCV62A: Base-emitter voltage as a function of collector current; typical values**



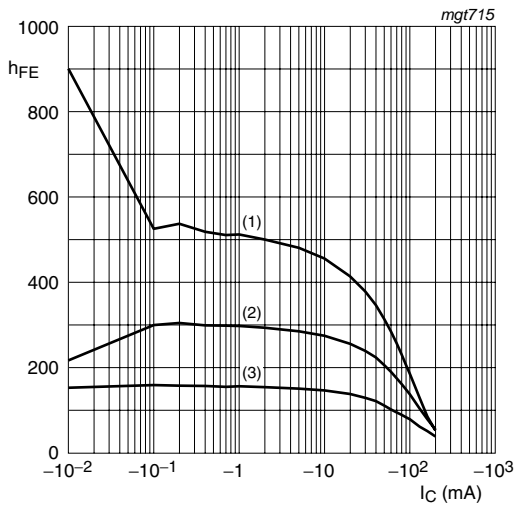
$I_C/I_B = 20$   
 (1)  $T_{amb} = 150\text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = -55\text{ }^{\circ}\text{C}$

**Fig 3. BCV62A: Collector-emitter saturation voltage as a function of collector current; typical values**



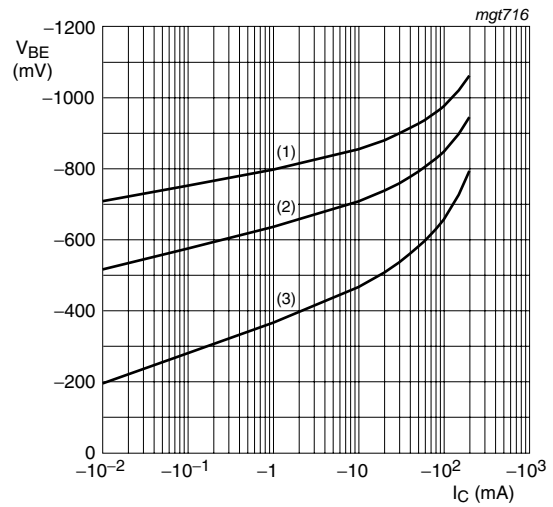
$I_C/I_B = 20$   
 (1)  $T_{amb} = -55\text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = 150\text{ }^{\circ}\text{C}$

**Fig 4. BCV62A: Base-emitter saturation voltage as a function of collector current; typical values**



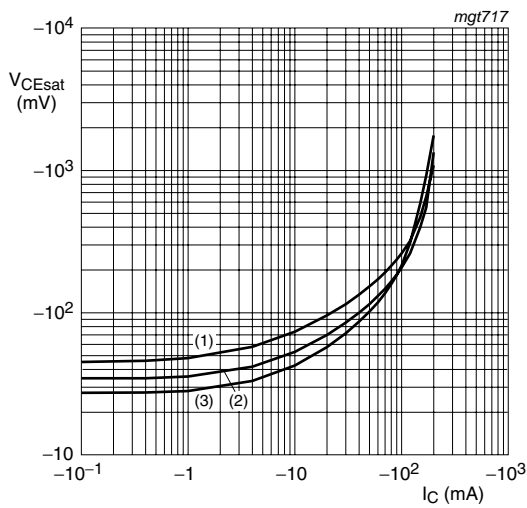
$V_{CE} = -5\text{ V}$   
 (1)  $T_{amb} = 150\text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = -55\text{ }^{\circ}\text{C}$

**Fig 5. BCV62B: DC current gain as a function of collector current; typical values**



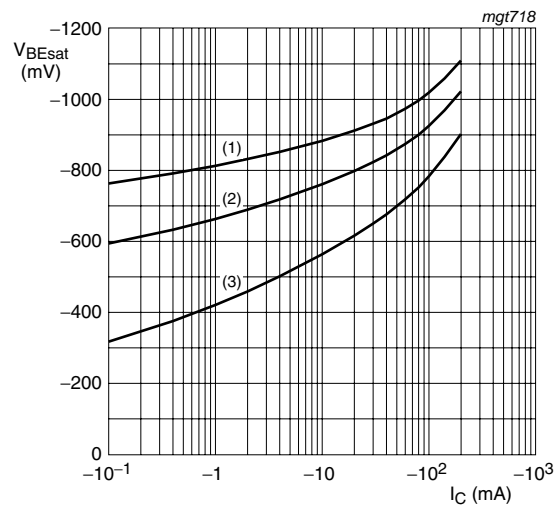
$V_{CE} = -5\text{ V}$   
 (1)  $T_{amb} = -55\text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = 150\text{ }^{\circ}\text{C}$

**Fig 6. BCV62B: Base-emitter voltage as a function of collector current; typical values**



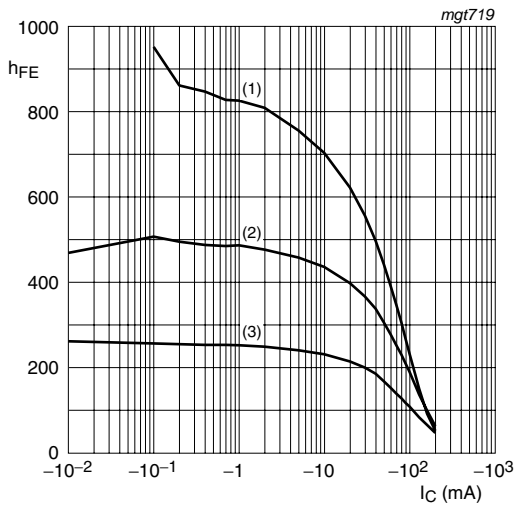
$I_C/I_B = 20$   
 (1)  $T_{amb} = 150\text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = -55\text{ }^{\circ}\text{C}$

**Fig 7. BCV62B: Collector-emitter saturation voltage as a function of collector current; typical values**



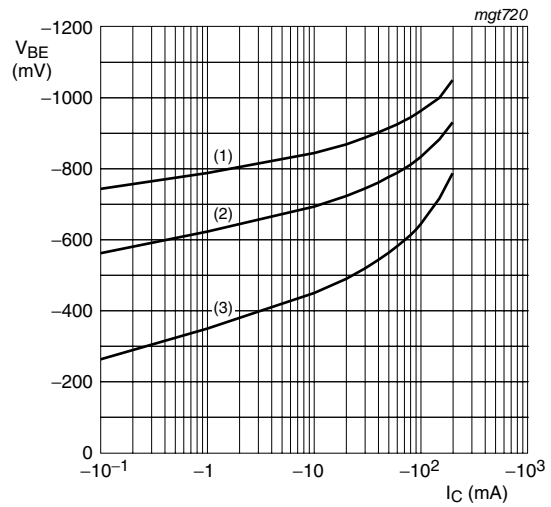
$I_C/I_B = 20$   
 (1)  $T_{amb} = -55\text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = 150\text{ }^{\circ}\text{C}$

**Fig 8. BCV62B: Base-emitter saturation voltage as a function of collector current; typical values**



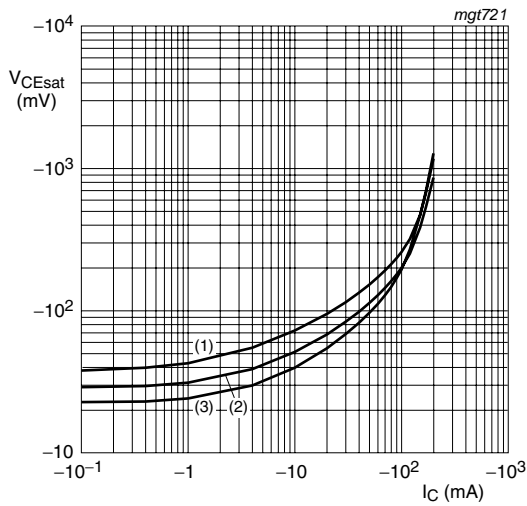
- $V_{CE} = -5\text{ V}$
- (1)  $T_{amb} = 150\text{ °C}$
  - (2)  $T_{amb} = 25\text{ °C}$
  - (3)  $T_{amb} = -55\text{ °C}$

Fig 9. BCV62C: DC current gain as a function of collector current; typical values



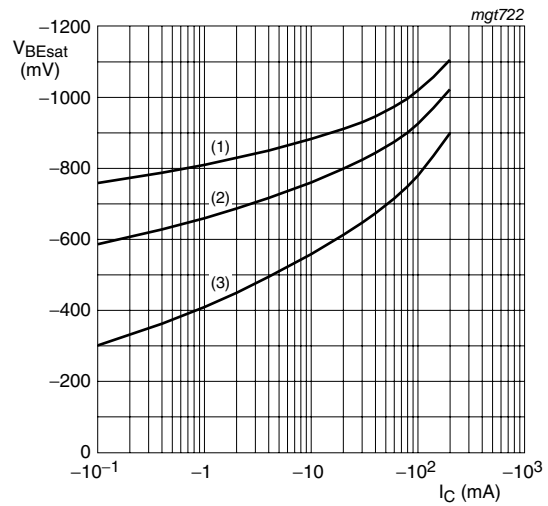
- $V_{CE} = -5\text{ V}$
- (1)  $T_{amb} = -55\text{ °C}$
  - (2)  $T_{amb} = 25\text{ °C}$
  - (3)  $T_{amb} = 150\text{ °C}$

Fig 10. BCV62C: Base-emitter voltage as a function of collector current; typical values



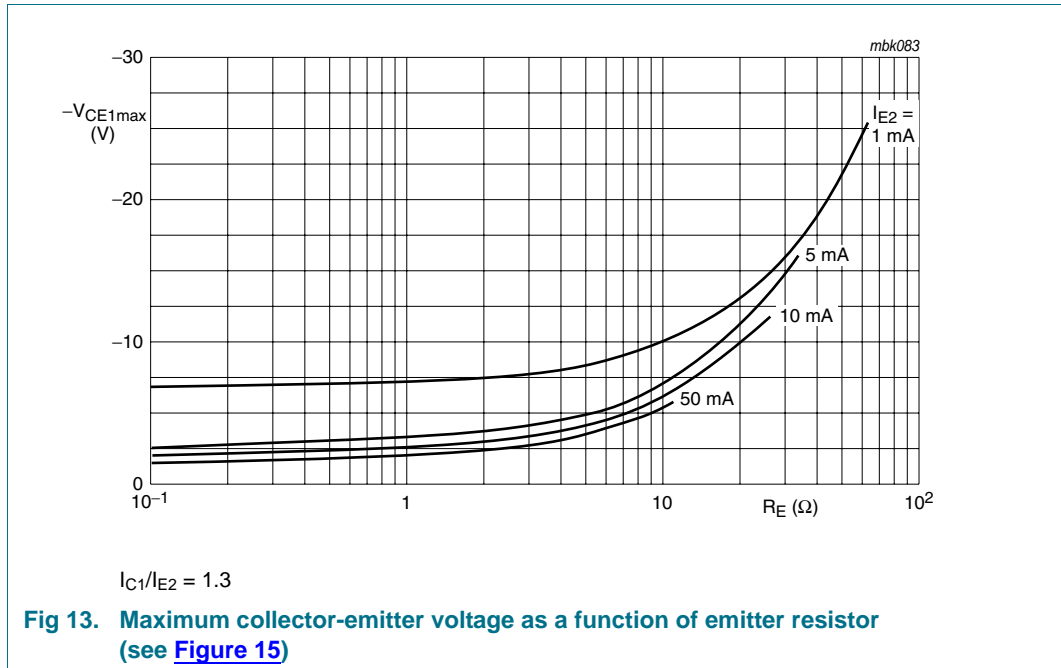
- $I_C/I_B = 20$
- (1)  $T_{amb} = 150\text{ °C}$
  - (2)  $T_{amb} = 25\text{ °C}$
  - (3)  $T_{amb} = -55\text{ °C}$

Fig 11. BCV62C: Collector-emitter saturation voltage as a function of collector current; typical values

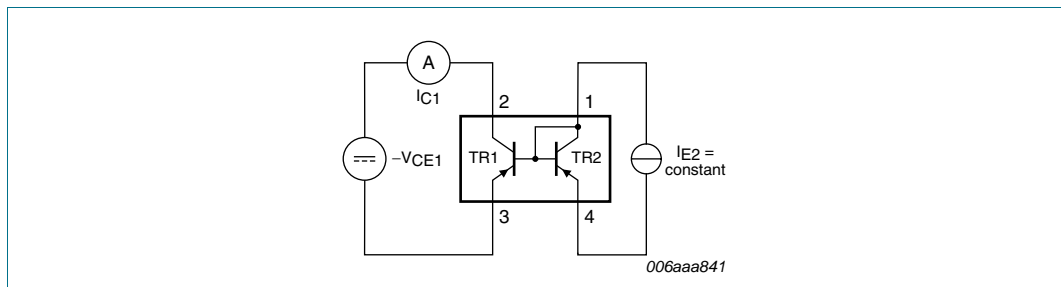


- $I_C/I_B = 20$
- (1)  $T_{amb} = -55\text{ °C}$
  - (2)  $T_{amb} = 25\text{ °C}$
  - (3)  $T_{amb} = 150\text{ °C}$

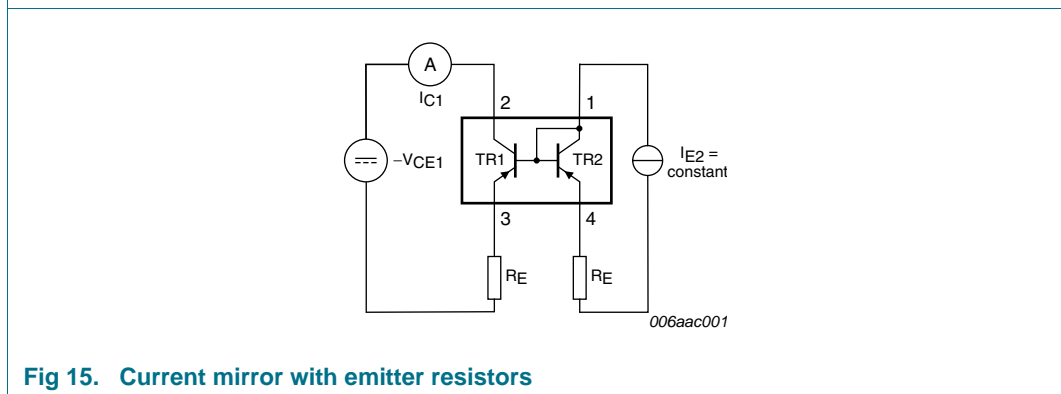
Fig 12. BCV62C: Base-emitter saturation voltage as a function of collector current; typical values



## 8. Test information



**Fig 14. Test circuit current matching**



**Fig 15. Current mirror with emitter resistors**



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

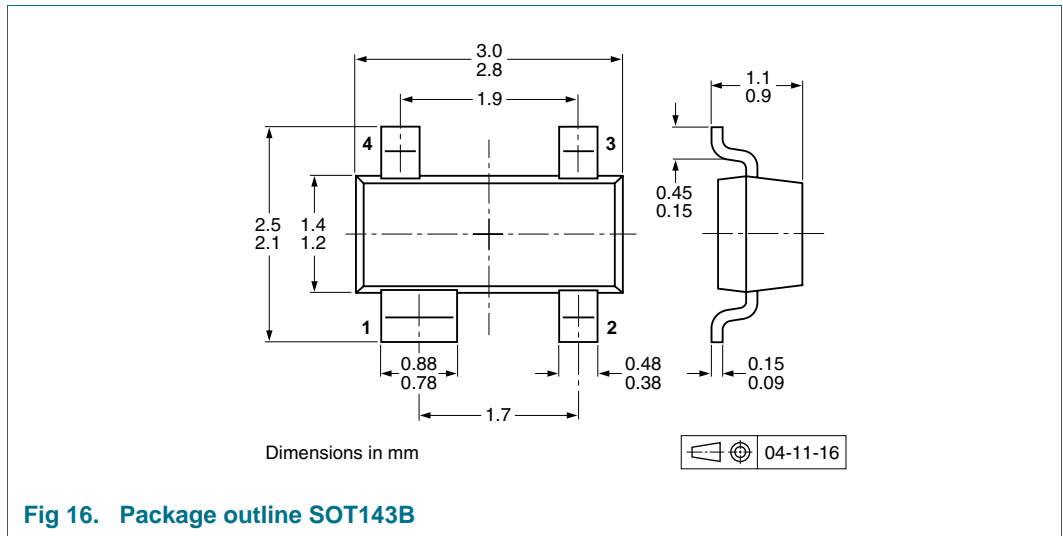


Fig 16. Package outline SOT143B

10. Packing information

Table 9. Packing methods

The indicated -xxx are the last three digits of the 12NC ordering code.<sup>[1]</sup>

Type number	Package	Description	Packing quantity	
			3000	10000
BCV62	SOT143B	4 mm pitch, 8 mm tape and reel	-215	-235
BCV62A				
BCV62B				
BCV62C				

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

11. Soldering

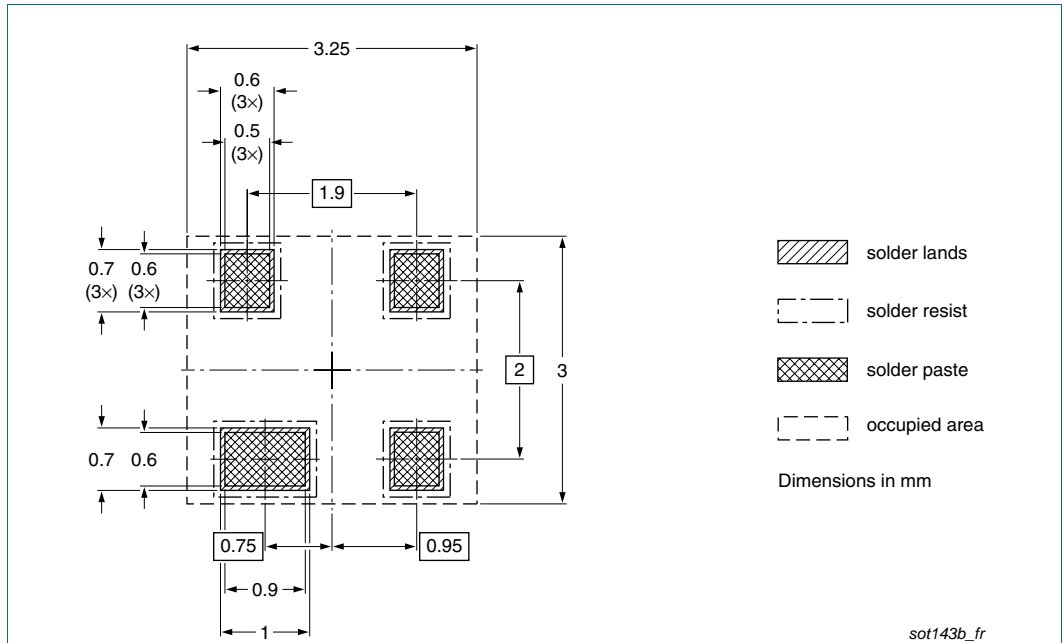


Fig 17. Reflow soldering footprint SOT143B

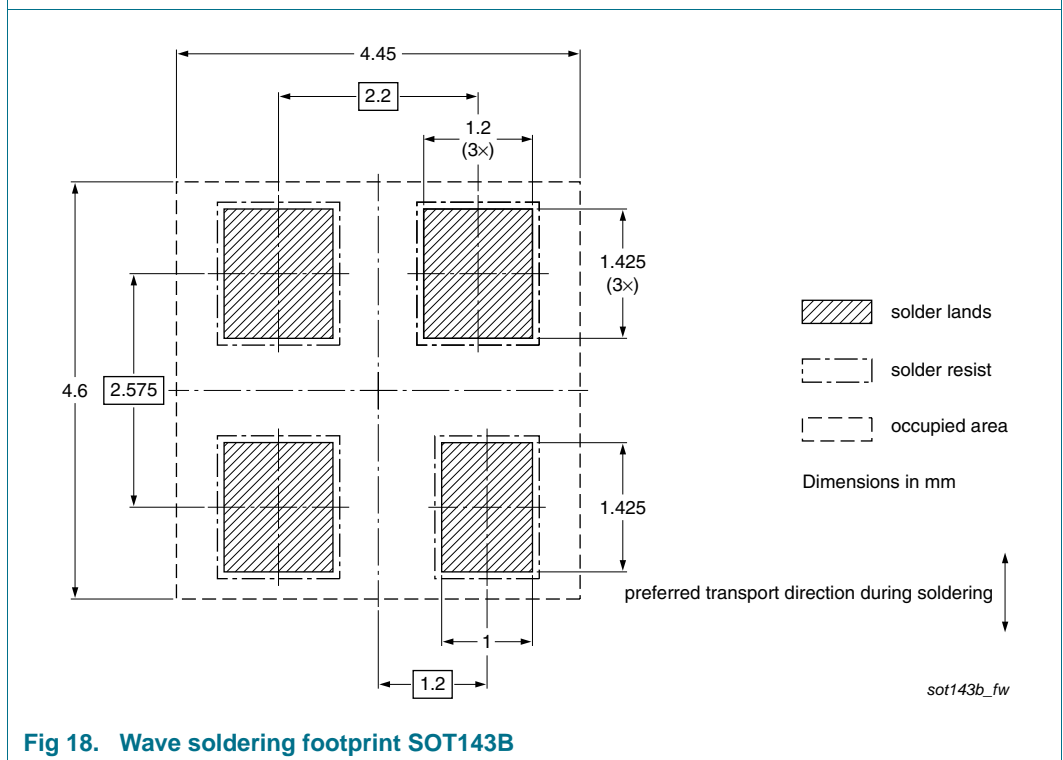


Fig 18. Wave soldering footprint SOT143B

## 12. Revision history

**Table 10. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
BCV62 v.4	20100726	Product data sheet	-	BCV62_3
Modifications:	<ul style="list-style-type: none"> <li>• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li> <li>• Legal texts have been adapted to the new company name where appropriate.</li> <li>• <a href="#">Section 1 "Product profile"</a>: amended</li> <li>• <a href="#">Section 3 "Ordering information"</a>: added</li> <li>• <a href="#">Section 4 "Marking"</a>: updated</li> <li>• <a href="#">Figure 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11</a> and <a href="#">12</a>: added</li> <li>• <a href="#">Section 8 "Test information"</a>: added</li> <li>• <a href="#">Figure 16</a>: superseded by minimized package outline drawing</li> <li>• <a href="#">Section 10 "Packing information"</a>: added</li> <li>• <a href="#">Section 11 "Soldering"</a>: added</li> <li>• <a href="#">Section 13 "Legal information"</a>: updated</li> </ul>			
BCV62_3	19990408	Product specification	-	BCV62_CNV_2
BCV62_CNV_2	19970618	Product specification	-	-

## 13. Legal information

### 13.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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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