



# BCV63; BCV63B

NPN general-purpose double transistors

Rev. 4 — 4 August 2010

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
	Nexperia	JEITA	
BCV63	SOT143B	-	-
BCV63B			BCV64B

### 1.2 Features and benefits

- Low current (max. 100 mA)
- Low voltage (max. 30 V and 6 V)
- AEC-Q101 qualified
- Small SMD plastic package

### 1.3 Applications

- General-purpose switching and amplification
- For use in Schmitt trigger applications

### 1.4 Quick reference data

Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per transistor</b>						
$I_C$	collector current		-	-	100	mA
<b>Transistor TR1</b>						
$V_{CE0}$	collector-emitter voltage	open base	-	-	30	V
$h_{FE}$	DC current gain	$V_{CE} = 5\text{ V}; I_C = 2\text{ mA}$				
	BCV63		110	-	800	
	BCV63B		200	-	450	

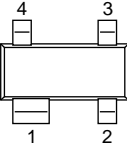
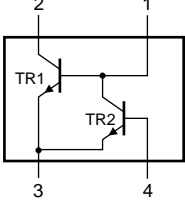
Table 2. Quick reference data ...continued

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Transistor TR2</b>						
$V_{CE0}$	collector-emitter voltage	open base	-	-	6	V
$h_{FE}$	DC current gain	$V_{CE} = 700 \text{ mV}; I_C = 2 \text{ mA}$ [1]				
	BCV63		110	-	800	
	BCV63B		200	-	450	

[1] Group selection will be done on TR1. Due to matched dies,  $h_{FE}$  values for TR2 are the same as for TR1.

## 2. Pinning information

Table 3. Pinning

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

006aab22t

## 3. Ordering information

Table 4. Ordering information

Type number	Package		Version
	Name	Description	
BCV63	-	plastic surface-mounted package; 4 leads	SOT143B
BCV63B			

## 4. Marking

Table 5. Marking codes

Type number	Marking code <sup>[1]</sup>
BCV63	*D5
BCV63B	*D6

[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>					
$V_{EBO}$	emitter-base voltage	open collector	-	6	V
$I_C$	collector current		-	100	mA
$I_{CM}$	peak collector current		-	200	mA
$I_B$	base current		-	100	mA
<b>Transistor TR1</b>					
$V_{CBO}$	collector-base voltage	open emitter	-	30	V
$V_{CEO}$	collector-emitter voltage	open base	-	30	V
<b>Transistor TR2</b>					
$V_{CBO}$	collector-base voltage	open emitter	-	6	V
$V_{CEO}$	collector-emitter voltage	open base	-	6	V
<b>Per device</b>					
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[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**

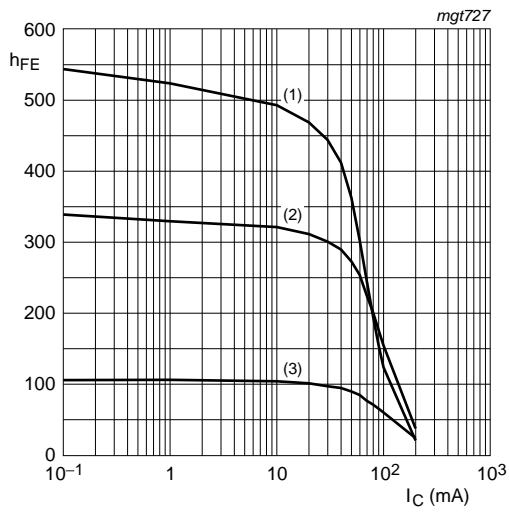
$T_j = 25\text{ °C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
<b>Per transistor</b>							
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 30\text{ V}; I_E = 0\text{ A}$	-	-	15	nA	
		$V_{CB} = 30\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ °C}$	-	-	5	$\mu\text{A}$	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 0.5\text{ mA}$	-	75	300	mV	
$V_{BEsat}$	base-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 0.5\text{ mA}$	[2]	700	-	mV	
<b>Transistor TR1</b>							
$h_{FE}$	DC current gain	$V_{CE} = 5\text{ V}; I_C = 2\text{ mA}$					
			BCV63	110	-	800	
			BCV63B	200	-	450	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 100\text{ mA}; I_B = 5\text{ mA}$	-	250	650	mV	
$V_{BEsat}$	base-emitter saturation voltage	$I_C = 100\text{ mA}; I_B = 5\text{ mA}$	[2]	850	-	mV	
$V_{BE}$	base-emitter voltage	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}$	[3]	600	650	750	mV
		$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}$	[3]	-	-	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	$V_{CB} = 10\text{ V}; I_E = i_e = 0\text{ A}; f = 1\text{ MHz}$	-	4	-	pF	
<b>Transistor TR2</b>							
$h_{FE}$	DC current gain	$V_{CE} = 700\text{ mV}; I_C = 2\text{ mA}$		[1]			
			BCV63	110	-	800	
			BCV63B	200	-	450	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 100\text{ mA}; I_B = 5\text{ mA}$	-	250	-	mV	
$V_{BE}$	base-emitter voltage	$I_C = 2\text{ mA}; V_{CE} = 700\text{ mV}$	[3]	700	-	mV	

[1] Group selection will be done on TR1. Due to matched dies,  $h_{FE}$  values for TR2 are the same as for TR1.

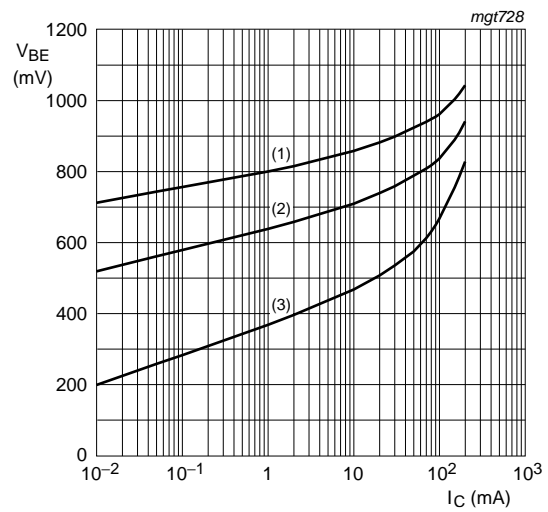
[2]  $V_{BEsat}$  decreases by about 1.7 mV/K with increasing temperature.

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



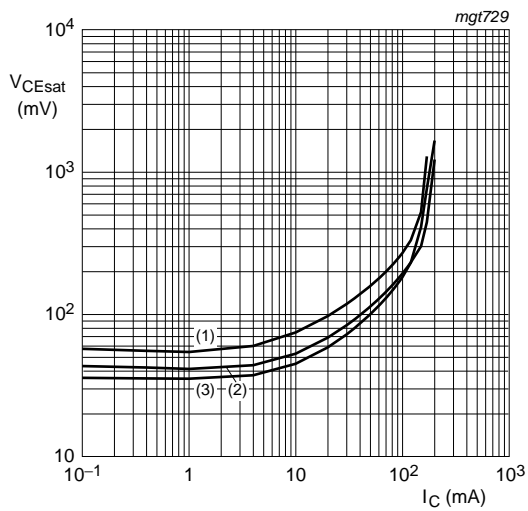
$V_{CE} = 5\text{ V}$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

**Fig 1. BCV63B: DC current gain as a function of collector current; typical values**



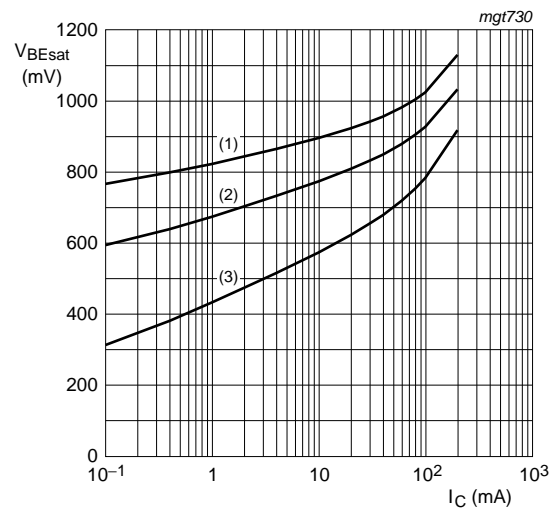
$V_{CE} = 5\text{ V}$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 150\text{ °C}$

**Fig 2. BCV63B: 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 3. BCV63B: Collector-emitter saturation voltage as a function of collector current; typical values**



$I_C/I_B = 10$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 150\text{ °C}$

**Fig 4. BCV63B: Base-emitter saturation voltage as a function of collector current; typical values**

## 8. Application information

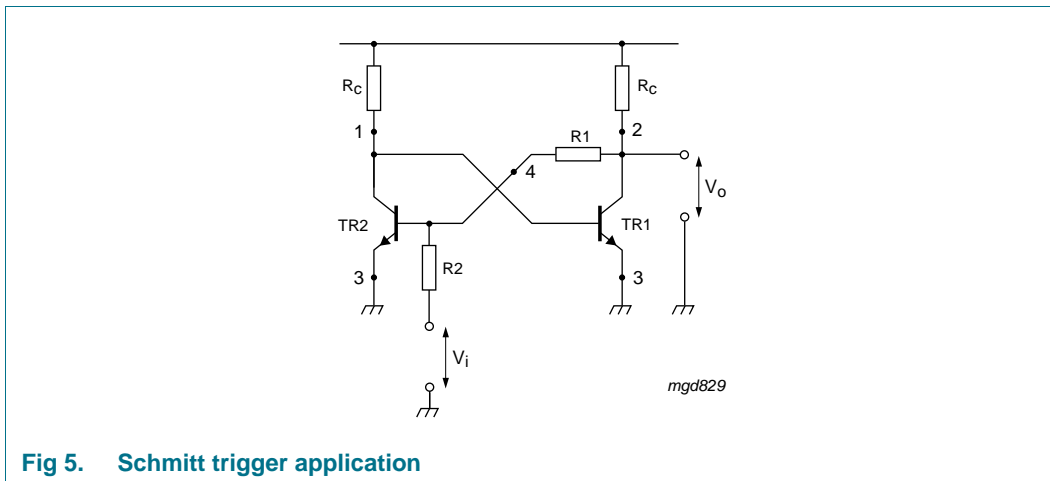


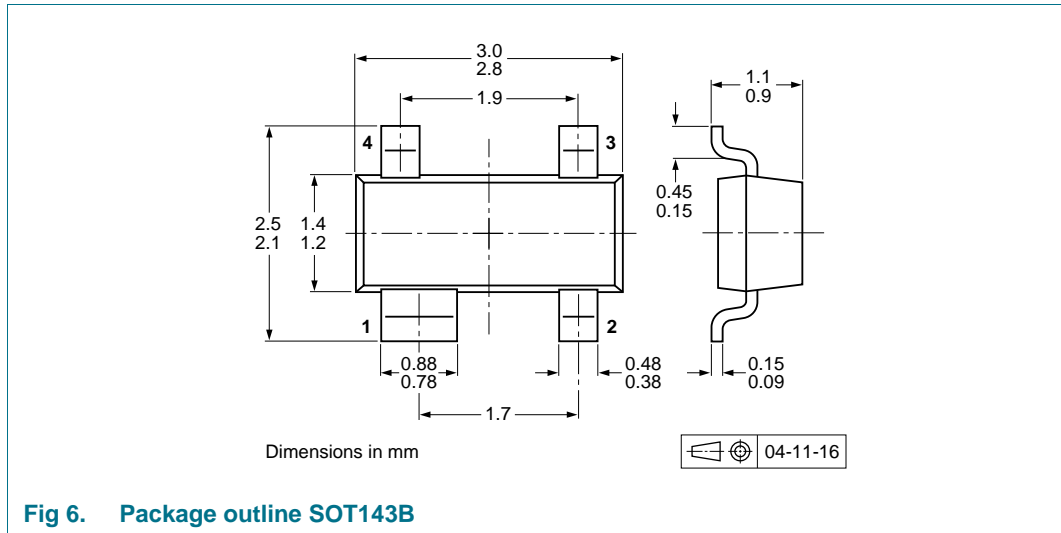
Fig 5. Schmitt trigger application

## 9. Test information

### 9.1 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.

## 10. Package outline



## 11. Packing information

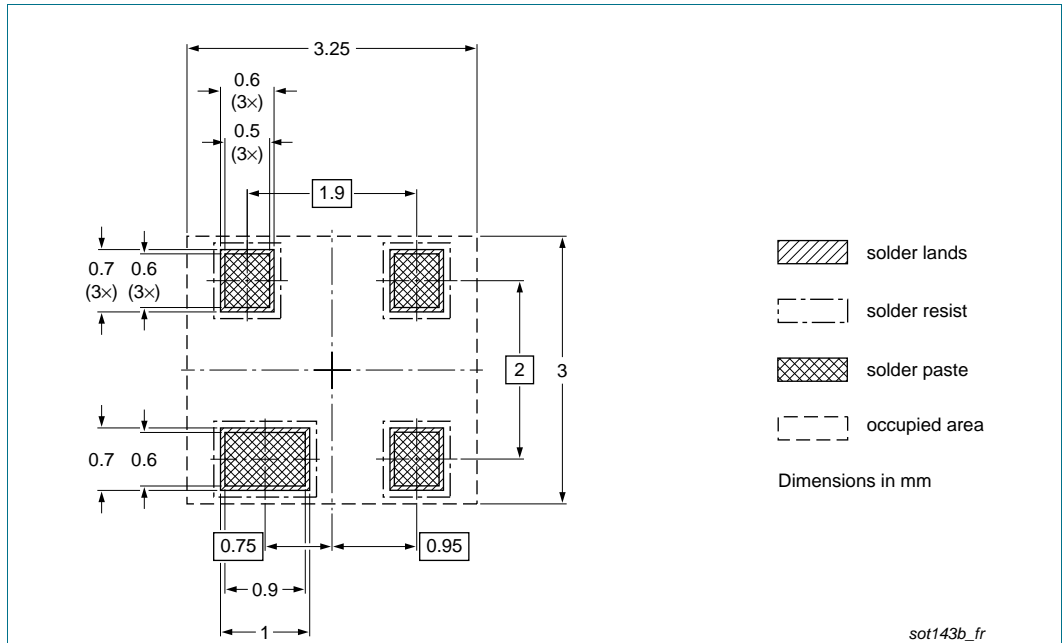
**Table 9. Packing methods**

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

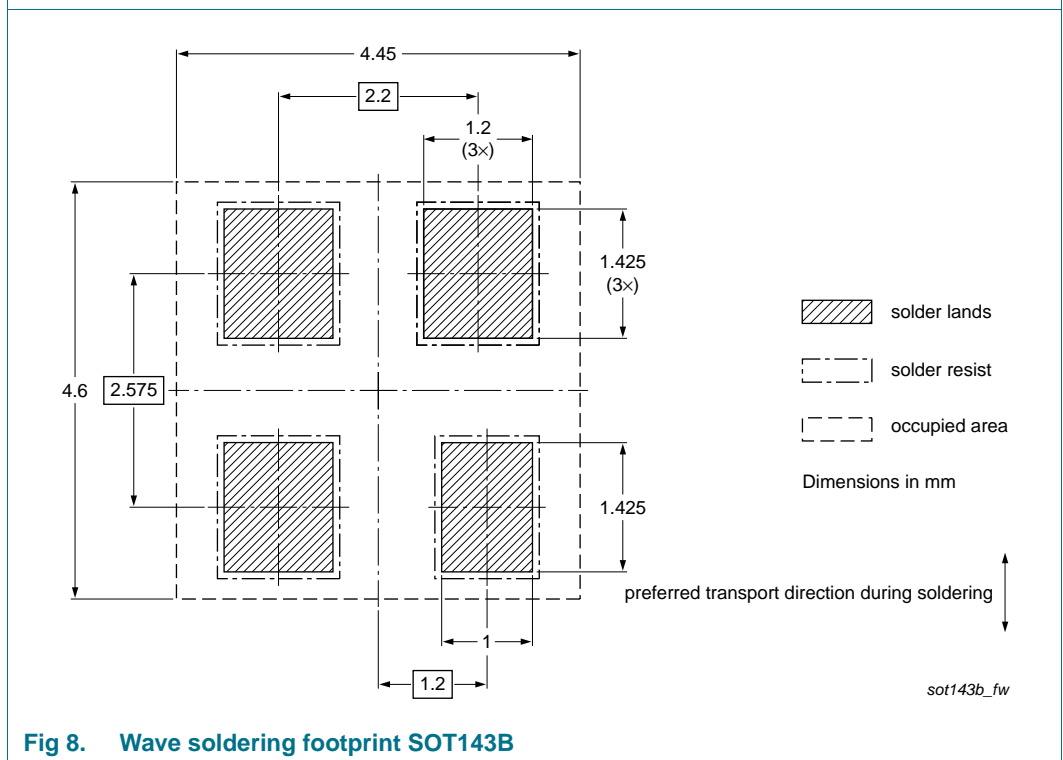
Type number	Package	Description	Packing quantity	
			3000	10000
BCV63	SOT143B	4 mm pitch, 8 mm tape and reel	-215	-235
BCV63B				

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

**12. Soldering**



**Fig 7. Reflow soldering footprint SOT143B**



**Fig 8. Wave soldering footprint SOT143B**



## 13. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BCV63_63B v.4	20100804	Product data sheet	-	BCV63_BCV63B_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 and 4</a>: added</li> <li>• <a href="#">Section 8 “Application information”</a>: added</li> <li>• <a href="#">Section 9 “Test information”</a>: added</li> <li>• <a href="#">Figure 6</a>: superseded by minimized package outline drawing</li> <li>• <a href="#">Section 11 “Packing information”</a>: added</li> <li>• <a href="#">Section 12 “Soldering”</a>: added</li> <li>• <a href="#">Section 14 “Legal information”</a>: updated</li> </ul>			
BCV63_BCV63B_3	19990521	Product specification	-	BCV63_CNV_2
BCV63_CNV_2	19970310	Product specification	-	-

## 14. Legal information

### 14.1 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.nexperia.com>.

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