

# 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
	NXP	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	



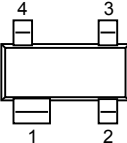
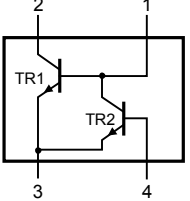
**Table 2. Quick reference data ...continued**

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		

006aab22ε

## 3. Ordering information

**Table 4. Ordering information**

Type number	Package		
	Name	Description	Version
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**

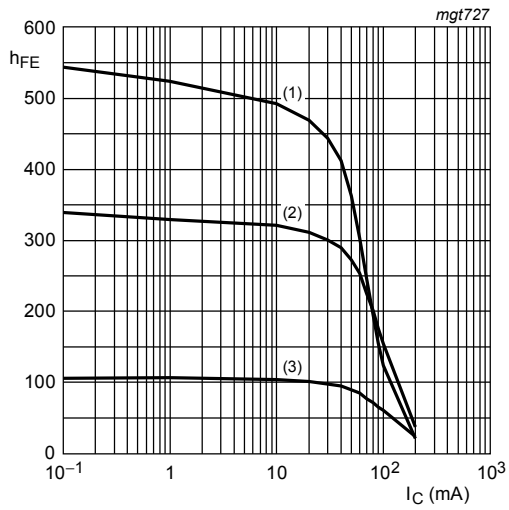
**Table 8. Characteristics**  
*T<sub>j</sub> = 25 °C unless otherwise specified.*

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
<b>Per transistor</b>							
I <sub>CBO</sub>	collector-base cut-off current	V <sub>CB</sub> = 30 V; I <sub>E</sub> = 0 A	-	-	15	nA	
		V <sub>CB</sub> = 30 V; I <sub>E</sub> = 0 A; T <sub>j</sub> = 150 °C	-	-	5	µA	
V <sub>CEsat</sub>	collector-emitter saturation voltage	I <sub>C</sub> = 10 mA; I <sub>B</sub> = 0.5 mA	-	75	300	mV	
V <sub>BEsat</sub>	base-emitter saturation voltage	I <sub>C</sub> = 10 mA; I <sub>B</sub> = 0.5 mA	[2]	700	-	mV	
<b>Transistor TR1</b>							
h <sub>FE</sub>	DC current gain	V <sub>CE</sub> = 5 V; I <sub>C</sub> = 2 mA					
			BCV63	110	-	800	
			BCV63B	200	-	450	
V <sub>CEsat</sub>	collector-emitter saturation voltage	I <sub>C</sub> = 100 mA; I <sub>B</sub> = 5 mA	-	250	650	mV	
V <sub>BEsat</sub>	base-emitter saturation voltage	I <sub>C</sub> = 100 mA; I <sub>B</sub> = 5 mA	[2]	850	-	mV	
V <sub>BE</sub>	base-emitter voltage	I <sub>C</sub> = 2 mA; V <sub>CE</sub> = 5 V	[3]	600	650	750	mV
		I <sub>C</sub> = 10 mA; V <sub>CE</sub> = 5 V	[3]	-	-	820	mV
f <sub>T</sub>	transition frequency	V <sub>CE</sub> = 5 V; I <sub>C</sub> = 10 mA; f = 100 MHz	100	-	-	MHz	
C <sub>C</sub>	collector capacitance	V <sub>CB</sub> = 10 V; I <sub>E</sub> = i <sub>e</sub> = 0 A; f = 1 MHz	-	4	-	pF	
<b>Transistor TR2</b>							
h <sub>FE</sub>	DC current gain	V <sub>CE</sub> = 700 mV; I <sub>C</sub> = 2 mA		[1]			
			BCV63	110	-	800	
			BCV63B	200	-	450	
V <sub>CEsat</sub>	collector-emitter saturation voltage	I <sub>C</sub> = 100 mA; I <sub>B</sub> = 5 mA	-	250	-	mV	
V <sub>BE</sub>	base-emitter voltage	I <sub>C</sub> = 2 mA; V <sub>CE</sub> = 700 mV	[3]	700	-	mV	

[1] Group selection will be done on TR1. Due to matched dies, h<sub>FE</sub> values for TR2 are the same as for TR1.

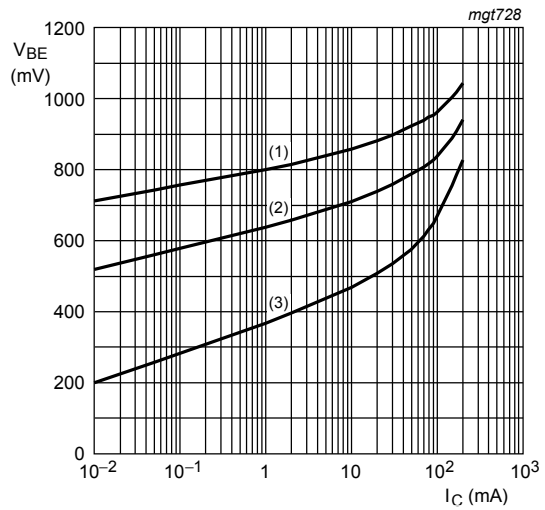
[2] V<sub>BEsat</sub> decreases by about 1.7 mV/K with increasing temperature.

[3] V<sub>BE</sub> decreases by about 2 mV/K with increasing temperature.



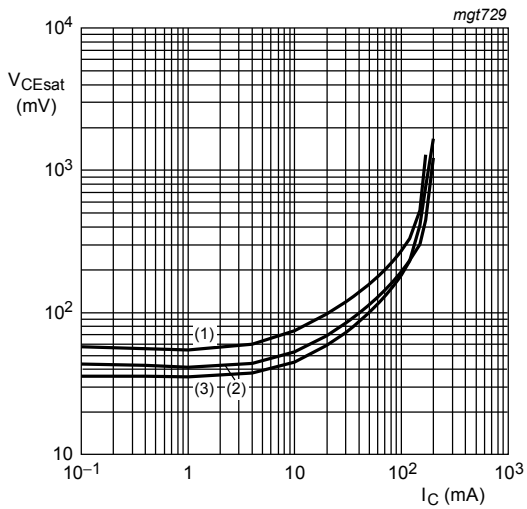
$V_{CE} = 5\text{ V}$   
 (1)  $T_{amb} = 150\text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = -55\text{ }^{\circ}\text{C}$

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



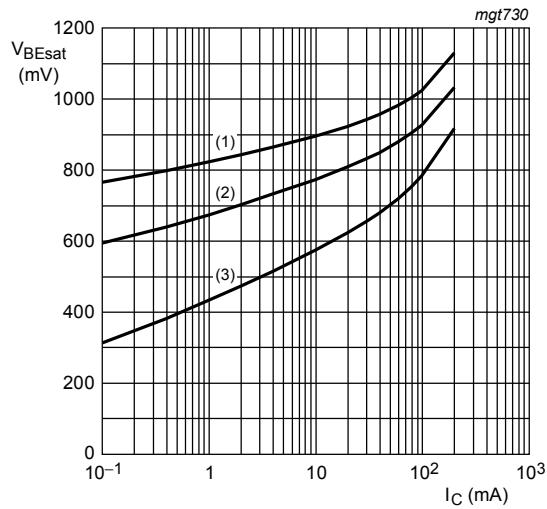
$V_{CE} = 5\text{ V}$   
 (1)  $T_{amb} = -55\text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = 150\text{ }^{\circ}\text{C}$

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



$I_C/I_B = 10$   
 (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. BCV63B: Base-emitter saturation voltage as a function of collector current; typical values**

## 8. Application information

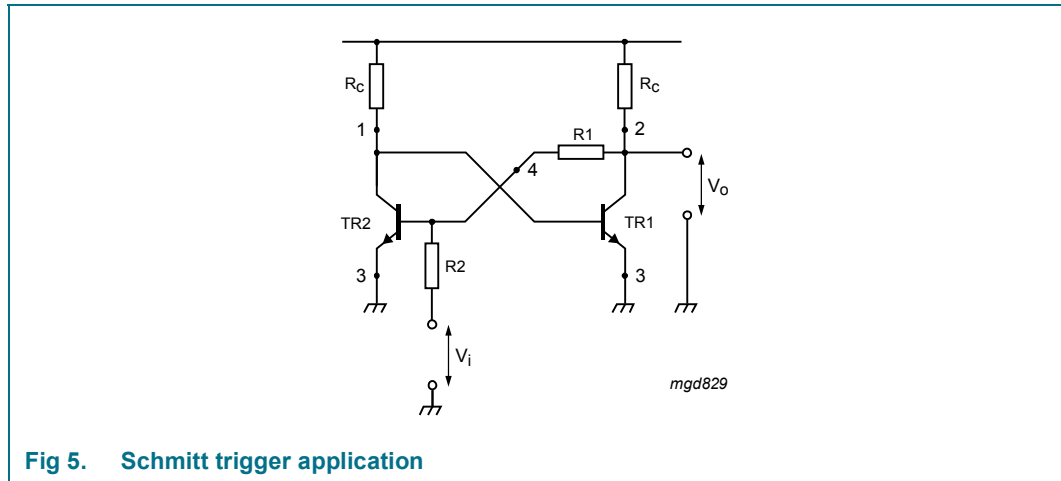


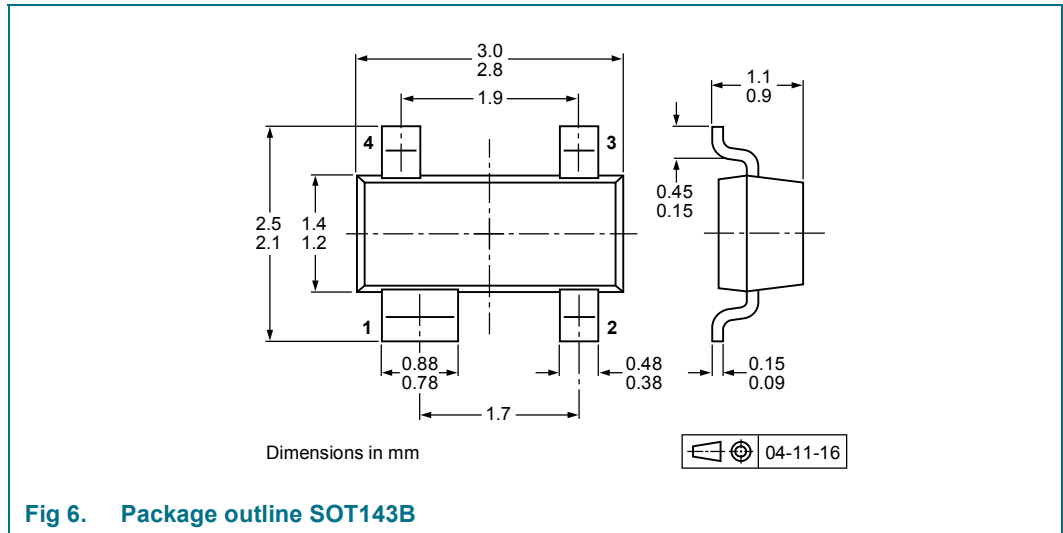
Fig 5. Schmitt trigger application

## 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

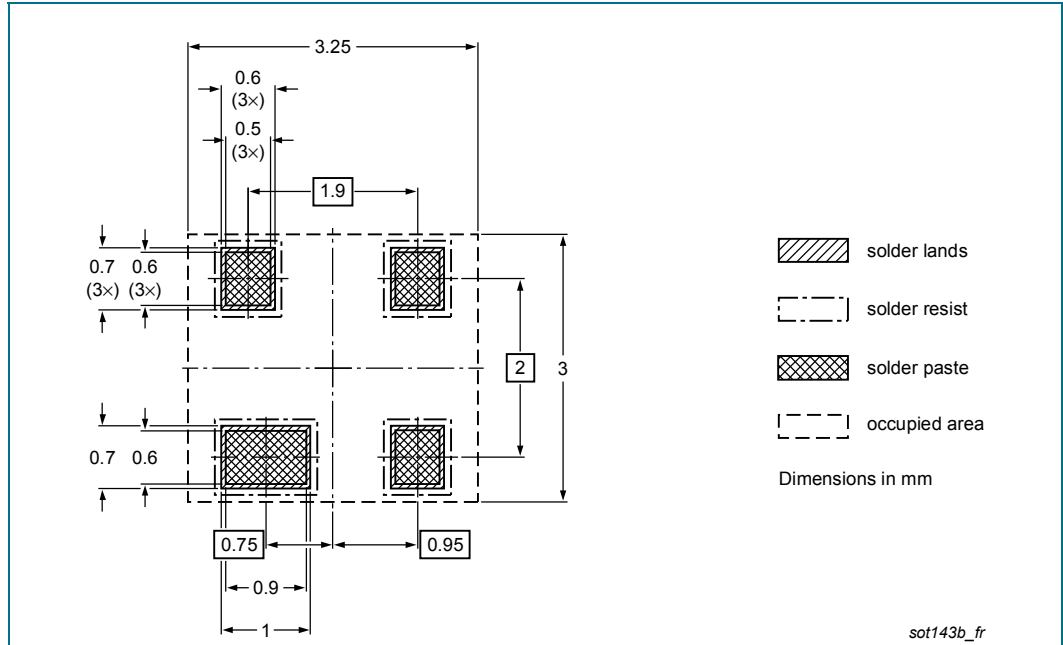
**Table 9. Packing methods**

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

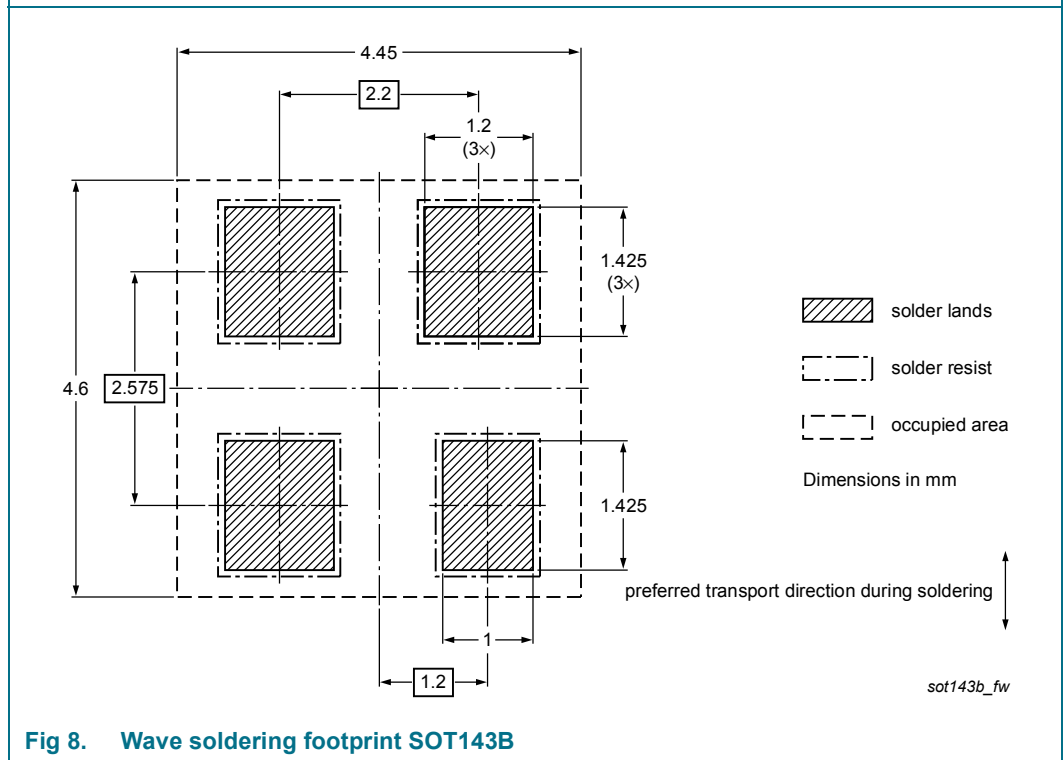
Type number	Package	Description	Packing quantity	
			3000	10000
BCV63	SOT143B	4 mm pitch, 8 mm tape and reel	-215	-235
BCV63B				

[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".

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