Important notice

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Kind regards,

Team Nexperia
1. Product profile

1.1 General description
NPN/PNP general-purpose transistor in a small SOT143B Surface-Mounted Device (SMD) plastic package.

1.2 Features and benefits
- Low current (max. 100 mA)
- Low voltage (max. 30 V)
- Matched pair
- AEC-Q101 qualified
- Small SMD plastic package

1.3 Applications
- General-purpose switching and amplification

1.4 Quick reference data

Table 1. Quick reference data

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Per transistor; for the PNP transistor with negative polarity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V_{CEO}</td>
<td>collector-emitter voltage</td>
<td>open base</td>
<td>-</td>
<td>-</td>
<td>30</td>
<td>V</td>
</tr>
<tr>
<td>I_C</td>
<td>collector current</td>
<td></td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>mA</td>
</tr>
<tr>
<td>h_{FE}</td>
<td>DC current gain</td>
<td>V_{CE} = 5 V; I_C = 2 mA</td>
<td>75</td>
<td>-</td>
<td>800</td>
<td></td>
</tr>
</tbody>
</table>

2. Pinning information

Table 2. Pinning

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Simplified outline</th>
<th>Graphic symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 3</td>
<td>collector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>common base</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>common emitter</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. Ordering information

Table 3. Ordering information

<table>
<thead>
<tr>
<th>Type number</th>
<th>Package Name</th>
<th>Description</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCV65</td>
<td></td>
<td>plastic surface-mounted package; 4 leads</td>
<td>SOT143B</td>
</tr>
</tbody>
</table>

4. Marking

Table 4. Marking codes

<table>
<thead>
<tr>
<th>Type number</th>
<th>Marking code[1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCV65</td>
<td>97*</td>
</tr>
</tbody>
</table>

[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).  

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Per transistor; for the PNP transistor with negative polarity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V_{CBG}</td>
<td>collector-base voltage</td>
<td>open emitter</td>
<td>-</td>
<td>30</td>
<td>V</td>
</tr>
<tr>
<td>V_{CEO}</td>
<td>collector-emitter voltage</td>
<td>open base</td>
<td>-</td>
<td>30</td>
<td>V</td>
</tr>
<tr>
<td>I_{C}</td>
<td>collector current</td>
<td>-</td>
<td>100</td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td>I_{CM}</td>
<td>peak collector current</td>
<td>-</td>
<td>200</td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td>I_{BM}</td>
<td>peak base current</td>
<td>-</td>
<td>200</td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Per device</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P_{tot}</td>
<td>total power dissipation</td>
<td>T_{amb} ≤ 25 °C</td>
<td>-</td>
<td>250</td>
<td>mW</td>
</tr>
<tr>
<td>T_{J}</td>
<td>junction temperature</td>
<td>-</td>
<td>150</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>T_{amb}</td>
<td>ambient temperature</td>
<td>-65</td>
<td>+150</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>T_{stg}</td>
<td>storage temperature</td>
<td>-65</td>
<td>+150</td>
<td>°C</td>
<td></td>
</tr>
</tbody>
</table>
6. Thermal characteristics

Table 6. Thermal characteristics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R_{th(j-a)}$</td>
<td>thermal resistance from junction to ambient</td>
<td>in free air</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>[1] -</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


7. Characteristics

Table 7. Characteristics

$T_j = 25 \degree C$ unless otherwise specified.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{CBO}$</td>
<td>collector-base cut-off current</td>
<td>$V_{CB} = 30 \text{ V}; I_E = 0 \text{ A}$</td>
<td>-</td>
<td>-</td>
<td>15</td>
<td>nA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{CB} = 30 \text{ V}; I_E = 0 \text{ A}; T_j = 150 \degree C$</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>$\mu$A</td>
</tr>
<tr>
<td>$h_{FE}$</td>
<td>DC current gain</td>
<td>$V_{CE} = 5 \text{ V}; I_C = 2 \text{ mA}$</td>
<td>75</td>
<td>-</td>
<td>800</td>
<td></td>
</tr>
<tr>
<td>$V_{CEsat}$</td>
<td>collector-emitter saturation voltage</td>
<td>$I_C = 10 \text{ mA}; I_B = 0.5 \text{ mA}$</td>
<td>-</td>
<td>90</td>
<td>300</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_C = 100 \text{ mA}; I_B = 5 \text{ mA}$</td>
<td>-</td>
<td>250</td>
<td>650</td>
<td>mV</td>
</tr>
<tr>
<td>$V_{BEsat}$</td>
<td>base-emitter saturation voltage</td>
<td>$I_C = 10 \text{ mA}; I_B = 0.5 \text{ mA}$</td>
<td>[1]</td>
<td>700</td>
<td>-</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_C = 100 \text{ mA}; I_B = 5 \text{ mA}$</td>
<td>[1]</td>
<td>900</td>
<td>-</td>
<td>mV</td>
</tr>
<tr>
<td>$V_{BE}$</td>
<td>base-emitter voltage</td>
<td>$I_C = 2 \text{ mA}; V_{CE} = 5 \text{ V}$</td>
<td>[2]</td>
<td>580</td>
<td>650</td>
<td>750</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_C = 10 \text{ mA}; V_{CE} = 5 \text{ V}$</td>
<td>[2]</td>
<td>-</td>
<td>820</td>
<td>mV</td>
</tr>
</tbody>
</table>

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

Fig 1. TR1 (NPN): DC current gain as a function of collector current; typical values

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

Fig 2. TR1 (NPN): Base-emitter voltage as a function of collector current; typical values

V_{CE\text{sat}} (mV) 
I_{C}/I_{B} = 20 
(1) \quad T_{\text{amb}} = 150 \, ^\circ\text{C} 
(2) \quad T_{\text{amb}} = 25 \, ^\circ\text{C} 
(3) \quad T_{\text{amb}} = -55 \, ^\circ\text{C} 

Fig 3. TR1 (NPN): Collector-emitter saturation voltage as a function of collector current; typical values

V_{BE\text{sat}} (mV) 
I_{C}/I_{B} = 10 
(1) \quad T_{\text{amb}} = -55 \, ^\circ\text{C} 
(2) \quad T_{\text{amb}} = 25 \, ^\circ\text{C} 
(3) \quad T_{\text{amb}} = 150 \, ^\circ\text{C} 

Fig 4. TR1 (NPN): Base-emitter saturation voltage as a function of collector current; typical values
NXP Semiconductors

BCV65

NPN/PNP general-purpose transistor

Fig 5. TR2 (PNP): DC current gain as a function of collector current; typical values

Fig 6. TR2 (PNP): Base-emitter voltage as a function of collector current; typical values

Fig 7. TR2 (PNP): Collector-emitter saturation voltage as a function of collector current; typical values

Fig 8. TR2 (PNP): Base-emitter saturation voltage as a function of collector current; typical values
8. Test information

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

![Package outline SOT143B](image)

Fig 9. Package outline SOT143B

10. Packing information

Table 8. Packing methods

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

<table>
<thead>
<tr>
<th>Type number</th>
<th>Package</th>
<th>Description</th>
<th>Packing quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCV65</td>
<td>SOT143B</td>
<td>4 mm pitch, 8 mm tape and reel</td>
<td>-215 -235</td>
</tr>
</tbody>
</table>

\[^{[1]}\] For further information and the availability of packing methods, see Section 14.
11. Soldering

Fig 10. Reflow soldering footprint SOT143B

Fig 11. Wave soldering footprint SOT143B
12. Revision history

Table 9. Revision history

<table>
<thead>
<tr>
<th>Document ID</th>
<th>Release date</th>
<th>Data sheet status</th>
<th>Change notice</th>
<th>Supersedes</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCV65 v.4</td>
<td>20100727</td>
<td>Product data sheet</td>
<td>-</td>
<td>BCV65_3</td>
</tr>
</tbody>
</table>

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 1 “Product profile”: amended
- Section 3 “Ordering information”: added
- Section 4 “Marking”: updated
- Figure 1, 2, 3, 4, 5, 6, 7 and 8: added
- Figure 9: superseded by minimized package outline drawing
- Section 8 “Test information”: added
- Section 10 “Packing information”: added
- Section 11 “Soldering”: added
- Section 13 “Legal information”: updated

<table>
<thead>
<tr>
<th>Document ID</th>
<th>Release date</th>
<th>Data sheet status</th>
<th>Change notice</th>
<th>Supersedes</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCV65_3</td>
<td>19990422</td>
<td>Product specification</td>
<td>-</td>
<td>BCV65_CNV_2</td>
</tr>
<tr>
<td>BCV65_CNV_2</td>
<td>19970422</td>
<td>Product specification</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
13. Legal information

13.1 Data sheet status

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective [short] data sheet</td>
<td>Development</td>
<td>This document contains data from the objective specification for product development.</td>
</tr>
<tr>
<td>Preliminary [short] data sheet</td>
<td>Qualification</td>
<td>This document contains data from the preliminary specification.</td>
</tr>
<tr>
<td>Product [short] data sheet</td>
<td>Production</td>
<td>This document contains the product specification.</td>
</tr>
</tbody>
</table>

[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
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