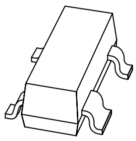


# BCV62

## 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**

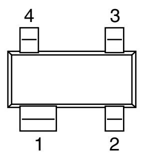
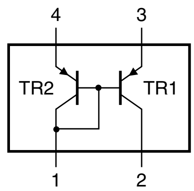
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Per transistor** | | | | | | |
| $V_{CEO}$ | collector-emitter voltage | open base | - | - | –30 | V |
| $I_C$ | collector current | | - | - | –100 | mA |
| **Transistor TR1** | | | | | | |
| $h_{FE}$ | DC current gain | $V_{CE}$ = –5 V; $I_C$ = –100 μA | 100 | - | - | |
| | | $V_{CE}$ = –5 V; $I_C$ = –2 mA | 100 | - | 800 | |

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Transistor TR2** | | | | | | |
| $h_{FE}$ | DC current gain | $V_{CE}$ = –5 V; $I_C$ = –2 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;<br>base TR1 and TR2 |   |   *006aaa843* |
| 2 | collector TR1 | | |
| 3 | emitter TR1 | | |
| 4 | emitter TR2 | | |

## 3. Ordering information

**Table 4. Ordering information**

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

## 4. Marking

**Table 5. Marking codes**

| Type number | Marking code[1] |
|---|---|
| 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 |
|---|---|---|---|---|---|---|
| **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 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 |
|---|---|---|---|---|---|---|
| **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 | 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*

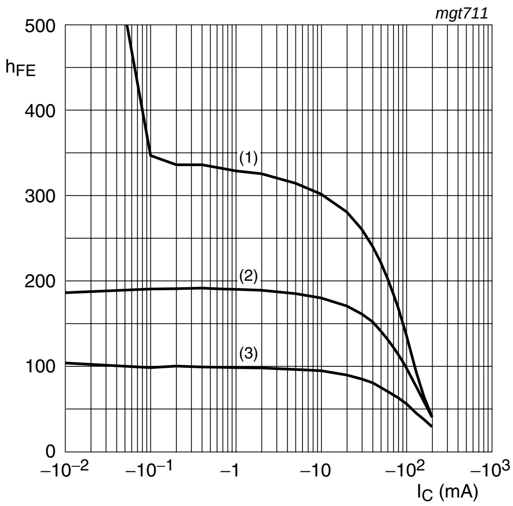
*$T_j$ = 25 °C unless otherwise specified.*

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{BEsat}$ | 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] | - | –850 | - | mV |
| $V_{BE}$ | base-emitter voltage | $I_C$ = –2 mA; $V_{CE}$ = –5 V | [2] | –600 | –650 | –750 | mV |
| | | $I_C$ = –10 mA; $V_{CE}$ = –5 V | [2] | - | - | –820 | 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 | | - | 4.5 | - | pF |
| NF | noise figure | $V_{CE}$ = –5 V; $I_C$ = –200 μA; $R_S$ = 2 kΩ; f = 1 kHz; B = 200 Hz | | - | - | 10 | dB |
| **Transistor TR2** | | | | | | | |
| $V_{EBS}$ | emitter-base voltage | $V_{CB}$ = 0 V; $I_E$ = –250 mA | | - | - | –1.5 | V |
| | | $V_{CB}$ = 0 V; $I_E$ = –10 μA | | –400 | - | - | mV |
| $h_{FE}$ | DC current gain | $V_{CE}$ = –5 V; $I_C$ = –2 mA | | | | | |
| | BCV62 | | | 100 | - | 800 | |
| | BCV62A | | | 100 | - | 250 | |
| | BCV62B | | | 220 | - | 475 | |
| | BCV62C | | | 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.



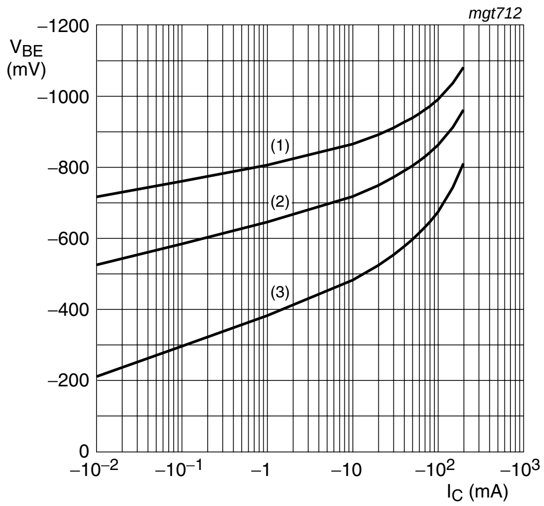

$V_{CE} = -5$ V

(1) $T_{amb} = 150$ °C

(2) $T_{amb} = 25$ °C

(3) $T_{amb} = -55$ °C

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



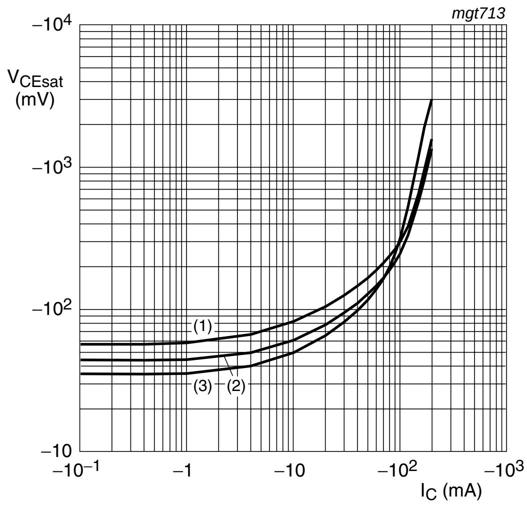

$V_{CE} = -5$ V

(1) $T_{amb} = -55$ °C

(2) $T_{amb} = 25$ °C

(3) $T_{amb} = 150$ °C

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



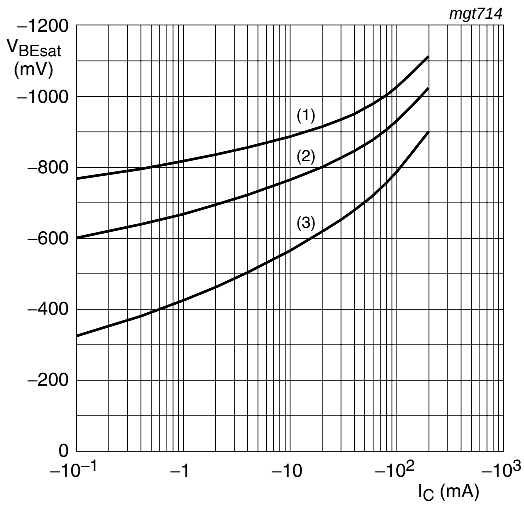

$I_C/I_B = 20$

(1) $T_{amb} = 150$ °C

(2) $T_{amb} = 25$ °C

(3) $T_{amb} = -55$ °C

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



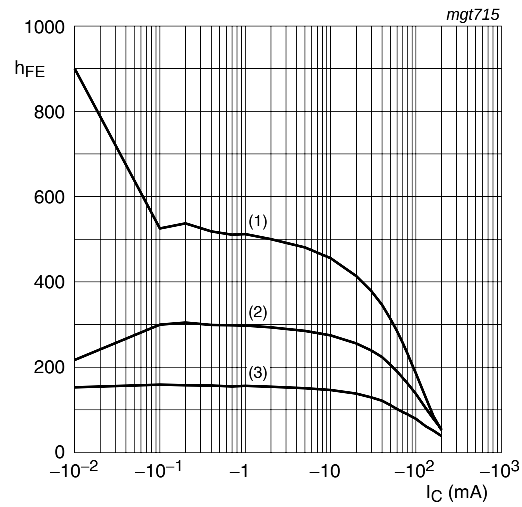

$I_C/I_B = 20$

(1) $T_{amb} = -55$ °C

(2) $T_{amb} = 25$ °C

(3) $T_{amb} = 150$ °C

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



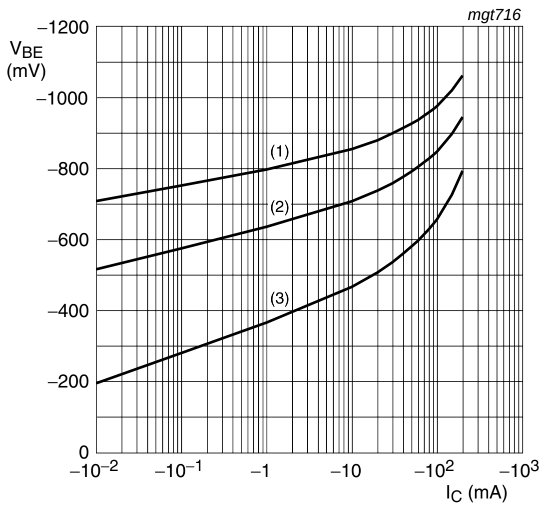

$V_{CE}$ = −5 V

(1) $T_{amb}$ = 150 °C

(2) $T_{amb}$ = 25 °C

(3) $T_{amb}$ = −55 °C

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



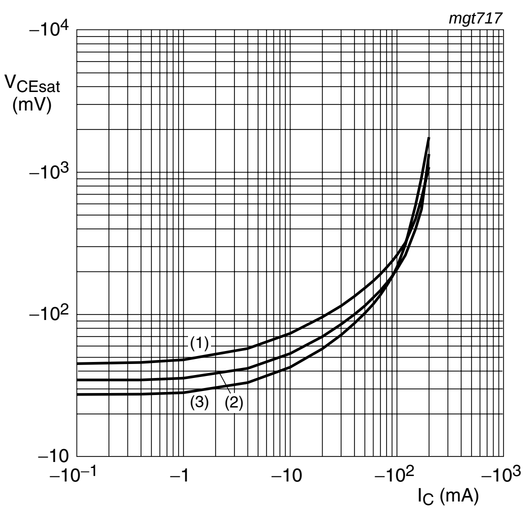

$V_{CE}$ = −5 V

(1) $T_{amb}$ = −55 °C

(2) $T_{amb}$ = 25 °C

(3) $T_{amb}$ = 150 °C

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



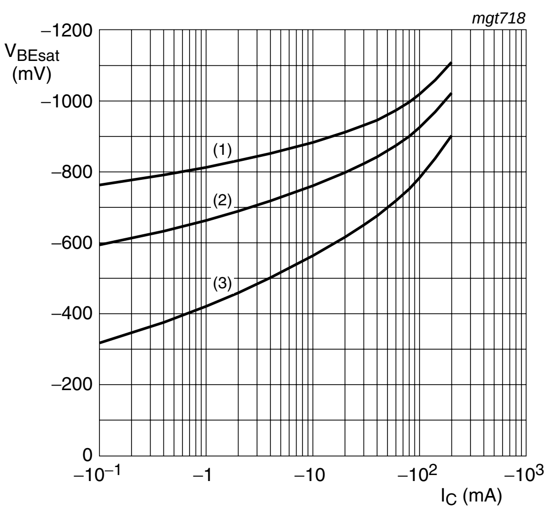

$I_C/I_B$ = 20

(1) $T_{amb}$ = 150 °C

(2) $T_{amb}$ = 25 °C

(3) $T_{amb}$ = −55 °C

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



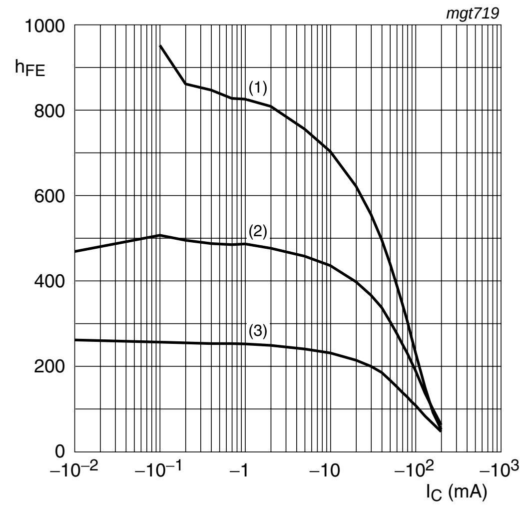

$I_C/I_B$ = 20

(1) $T_{amb}$ = −55 °C

(2) $T_{amb}$ = 25 °C

(3) $T_{amb}$ = 150 °C

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



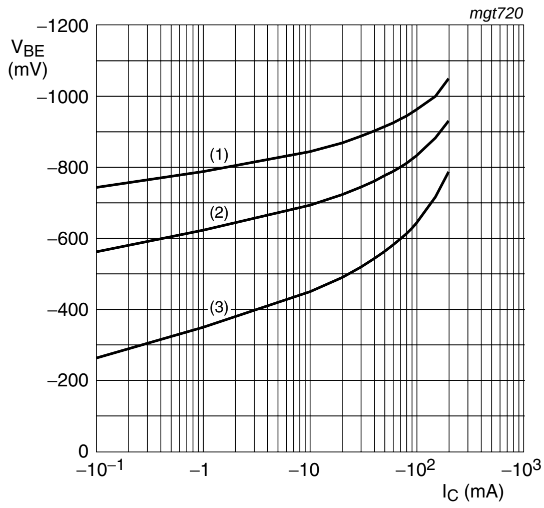

$V_{CE}$ = −5 V

(1) $T_{amb}$ = 150 °C

(2) $T_{amb}$ = 25 °C

(3) $T_{amb}$ = −55 °C

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



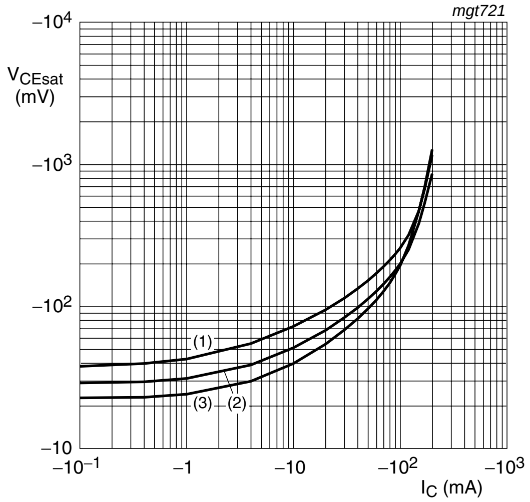

$V_{CE}$ = −5 V

(1) $T_{amb}$ = −55 °C

(2) $T_{amb}$ = 25 °C

(3) $T_{amb}$ = 150 °C

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



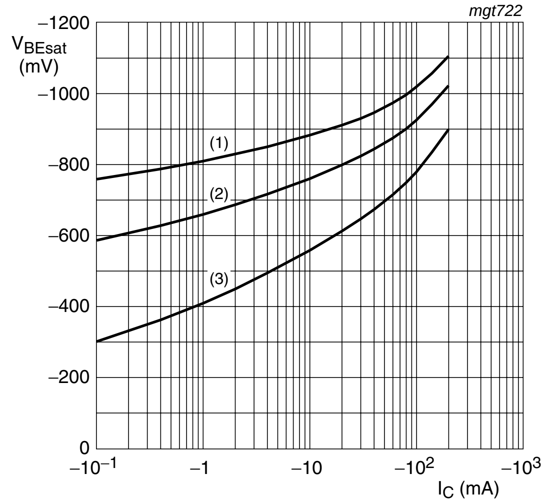

$I_C/I_B$ = 20

(1) $T_{amb}$ = 150 °C

(2) $T_{amb}$ = 25 °C

(3) $T_{amb}$ = −55 °C

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



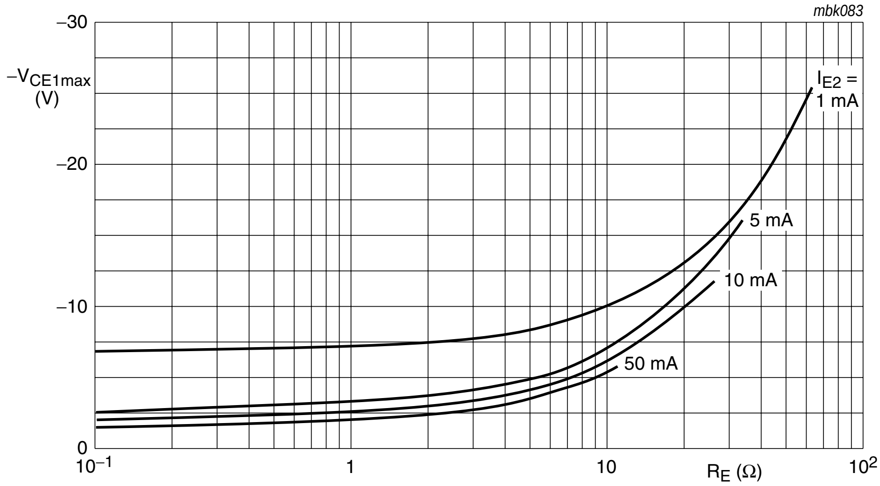

$I_C/I_B$ = 20

(1) $T_{amb}$ = −55 °C

(2) $T_{amb}$ = 25 °C

(3) $T_{amb}$ = 150 °C

**Fig 12. BCV62C: 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 resistor (see Figure 15)**

## 8. Test information

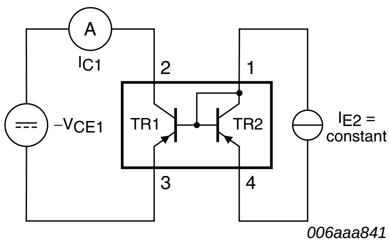



**Fig 14. Test circuit current matching**

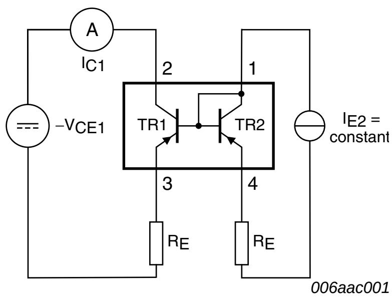



**Fig 15. Current mirror with emitter resistors**

### 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

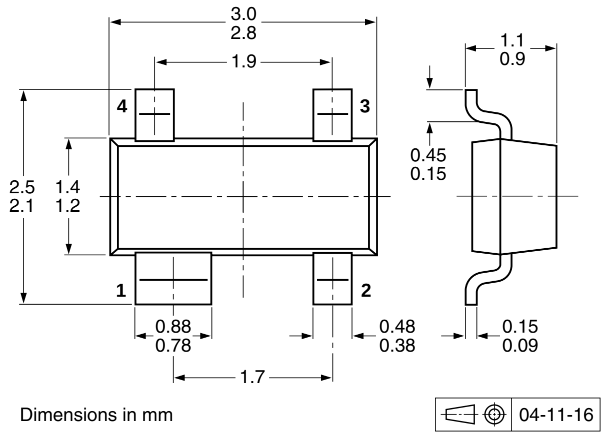



**Fig 16. Package outline SOT143B**

## 10. Packing information

**Table 9. Packing methods**

*The indicated -xxx are the last three digits of the 12NC ordering code.*[1]

| 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

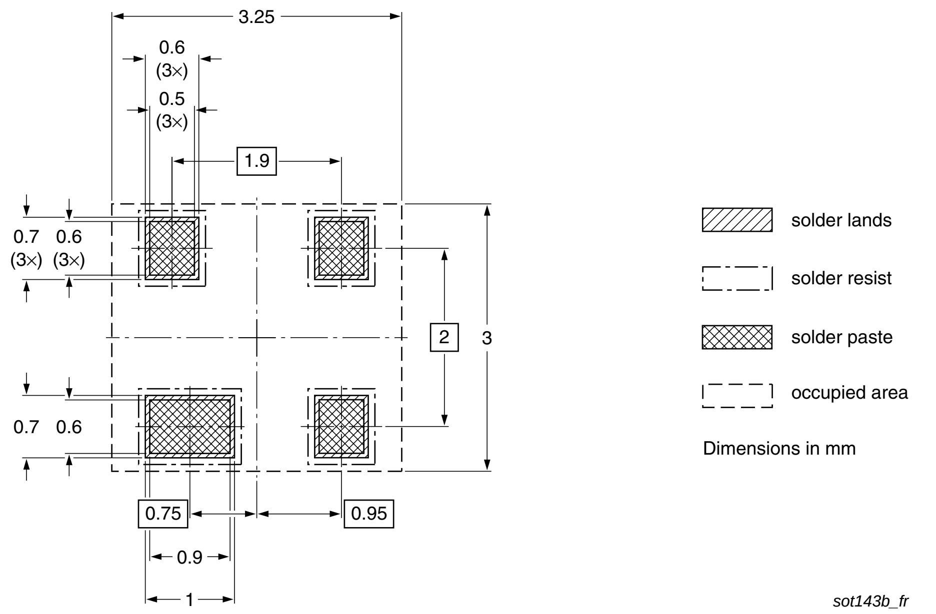



**Fig 17. Reflow soldering footprint SOT143B**

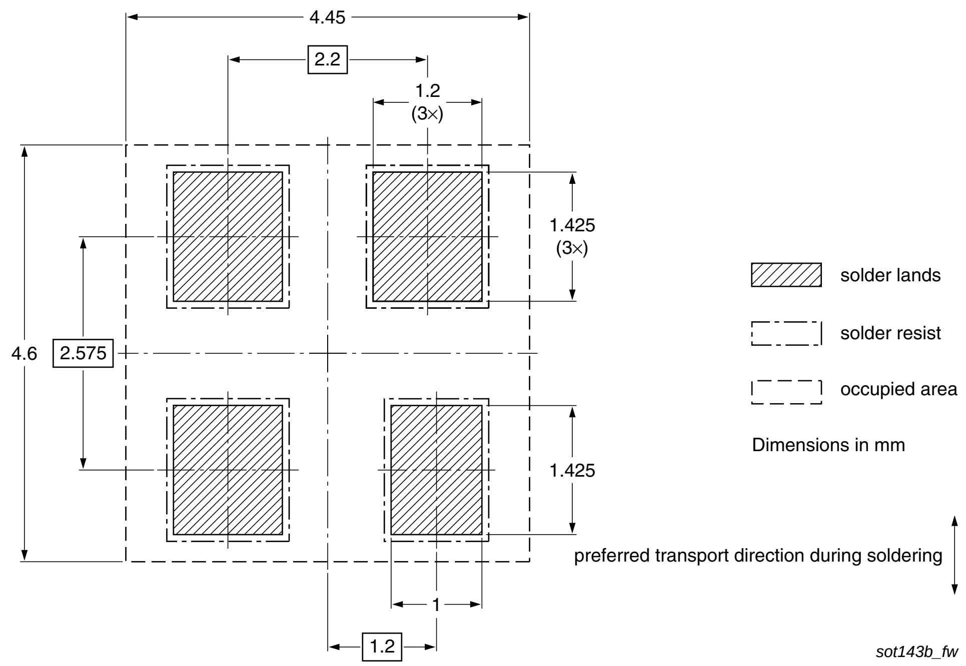



**Fig 18. Wave soldering footprint SOT143B**

## 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: | • The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.<br>• Legal texts have been adapted to the new company name where appropriate.<br>• Section 1 "Product profile": amended<br>• Section 3 "Ordering information": added<br>• Section 4 "Marking": updated<br>• Figure 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12: added<br>• Section 8 "Test information": added<br>• Figure 16: superseded by minimized package outline drawing<br>• Section 10 "Packing information": added<br>• Section 11 "Soldering": added<br>• Section 13 "Legal information": updated | | | |
| BCV62_3 | 19990408 | Product specification | - | BCV62_CNV_2 |
| BCV62_CNV_2 | 19970618 | 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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**Quick reference data —** The Quick reference data is an extract of the product data given in the Limiting values and Characteristics sections of this document, and as such is not complete, exhaustive or legally binding.

### 13.4 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

## 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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