

DATA SHEET



BCW31; BCW32; BCW33 NPN general purpose transistors

Product data sheet
Supersedes data of 2000 Jul 04

2004 Feb 06

NPN general purpose transistors

BCW31; BCW32; BCW33

FEATURES

- Low current (100 mA)
- Low voltage (32 V).

APPLICATIONS

- General purpose switching and amplification.

DESCRIPTION

NPN transistors in a plastic SOT23 package.
PNP complements: BCW29 and BCW30.

MARKING

| TYPE NUMBER | MARKING CODE ⁽¹⁾ |
|-------------|-----------------------------|
| BCW31 | D1* |
| BCW32 | D2* |
| BCW33 | D3* |

Note

- * = p : Made in Hong Kong.
* = t : Made in Malaysia.
* = W : Made in China.

PINNING

| PIN | DESCRIPTION |
|-----|-------------|
| 1 | base |
| 2 | emitter |
| 3 | collector |

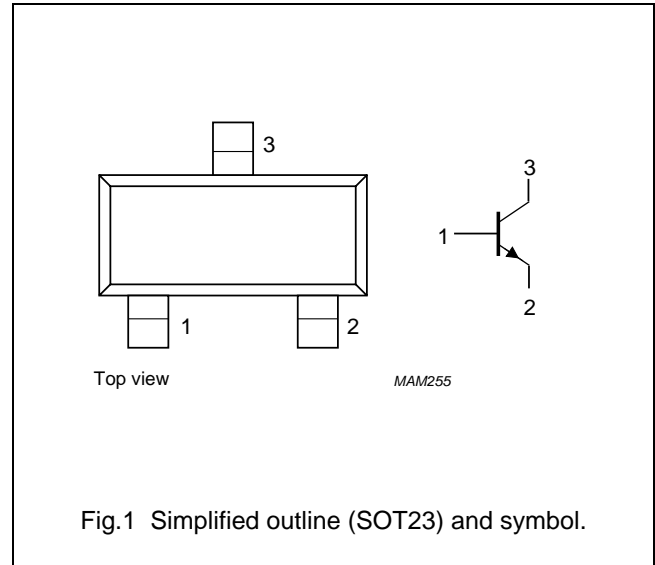


Fig.1 Simplified outline (SOT23) and symbol.

ORDERING INFORMATION

| TYPE NUMBER | PACKAGE | | |
|-------------|---------|--|---------|
| | NAME | DESCRIPTION | VERSION |
| BCW31 | - | plastic surface mounted package; 3 leads | SOT23 |
| BCW32 | | | |
| BCW33 | | | |

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|------------------|-------------------------------|----------------------------------|------|------|------|
| V _{CB0} | collector-base voltage | open emitter | - | 32 | V |
| V _{CEO} | collector-emitter voltage | open base; I _C = 2 mA | - | 32 | V |
| V _{EBO} | emitter-base voltage | open collector | - | 5 | V |
| I _C | collector current (DC) | | - | 100 | mA |
| I _{CM} | peak collector current | | - | 200 | mA |
| I _{BM} | peak base current | | - | 200 | mA |
| P _{tot} | total power dissipation | T _{amb} ≤ 25 °C | - | 250 | mW |
| T _{stg} | storage temperature | | -65 | +150 | °C |
| T _j | junction temperature | | - | 150 | °C |
| T _{amb} | operating ambient temperature | | -65 | +150 | °C |

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THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---------------|---|------------|-------|------|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | note 1 | 500 | K/W |

Note

1. Transistor mounted on an FR4 printed-circuit board.

CHARACTERISTICS

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|-------------|--|--|------|------|------|---------------|
| I_{CBO} | collector cut-off current | $I_E = 0; V_{CB} = 32\text{ V}$ | – | – | 100 | nA |
| | | $I_E = 0; V_{CB} = 32\text{ V}; T_j = 100\text{ °C}$ | – | – | 10 | μA |
| I_{EBO} | emitter cut-off current | $I_C = 0; V_{EB} = 5\text{ V}$ | – | – | 100 | nA |
| h_{FE} | DC current gain BCW31 BCW32 BCW33 | $I_C = 10\text{ }\mu\text{A}; V_{CE} = 5\text{ V}$ | – | 190 | – | |
| | | | – | 330 | – | |
| | | | – | 600 | – | |
| | DC current gain BCW31 BCW32 BCW33 | $I_C = 2\text{ mA}; V_{CE} = 5\text{ V}$ | 110 | – | 220 | |
| 200 | | | – | 450 | | |
| 420 | | | – | 800 | | |
| V_{CEsat} | collector-emitter saturation voltage | $I_C = 10\text{ mA}; I_B = 0.5\text{ mA}$ | – | 120 | 250 | mV |
| | | $I_C = 50\text{ mA}; I_B = 2.5\text{ mA}$ | – | 210 | – | mV |
| V_{BEsat} | base-emitter saturation voltage | $I_C = 10\text{ mA}; I_B = 0.5\text{ mA}$ | – | 750 | – | mV |
| | | $I_C = 50\text{ mA}; I_B = 2.5\text{ mA}$ | – | 850 | – | mV |
| V_{BE} | base-emitter voltage | $I_C = 2\text{ mA}; V_{CE} = 5\text{ V}$ | 550 | – | 700 | mV |
| C_c | collector capacitance | $I_E = I_e = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$ | – | 2.5 | – | pF |
| f_T | transition frequency | $I_C = 10\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}$ | 100 | – | – | MHz |
| F | noise figure | $I_C = 200\text{ }\mu\text{A}; V_{CE} = 5\text{ V}; R_S = 2\text{ k}\Omega; f = 1\text{ kHz}; B = 200\text{ Hz}$ | – | – | 10 | dB |

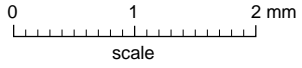
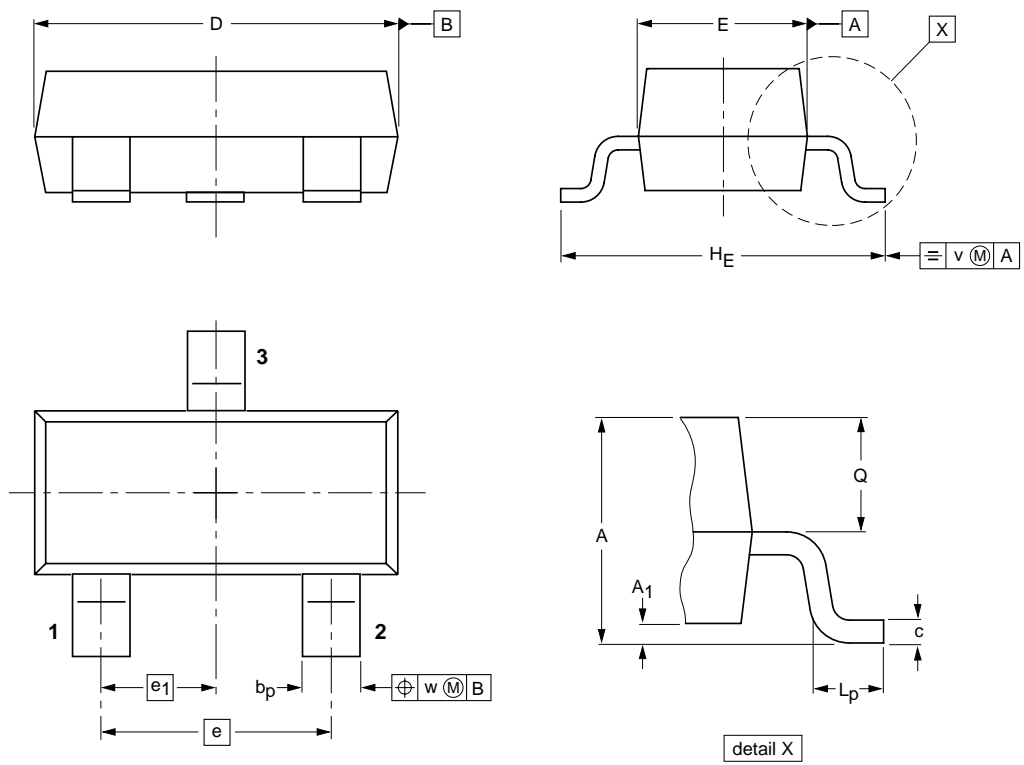
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PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads

SOT23



DIMENSIONS (mm are the original dimensions)

| UNIT | A | A ₁ max. | b _p | c | D | E | e | e ₁ | H _E | L _p | Q | v | w |
|------|------------|------------------------|----------------|--------------|------------|------------|-----|----------------|----------------|----------------|--------------|-----|-----|
| mm | 1.1 0.9 | 0.1 | 0.48 0.38 | 0.15 0.09 | 3.0 2.8 | 1.4 1.2 | 1.9 | 0.95 | 2.5 2.1 | 0.45 0.15 | 0.55 0.45 | 0.2 | 0.1 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|----------|-------|--|---------------------|----------------------|
| | IEC | JEDEC | JEITA | | | |
| SOT23 | | TO-236AB | | | | 04-11-04 06-03-16 |

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DATA SHEET STATUS

| DOCUMENT STATUS ⁽¹⁾ | PRODUCT STATUS ⁽²⁾ | DEFINITION |
|--------------------------------|-------------------------------|---|
| Objective data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary data sheet | Qualification | This document contains data from the preliminary specification. |
| Product data sheet | Production | This document contains the product specification. |

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NXP Semiconductors

Customer notification

This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content, except for package outline drawings which were updated to the latest version.

Contact information

For additional information please visit: <http://www.nxp.com>

For sales offices addresses send e-mail to: salesaddresses@nxp.com

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