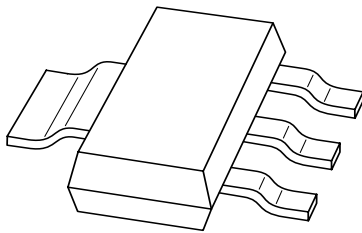


# DATA SHEET



**BCP68**

**NPN medium power transistor**

Product specification  
Supersedes data of 1997 Apr 09

1999 Apr 08

# NPN medium power transistor

# BCP68

### FEATURES

- High current (max. 1 A)
- Low voltage (max. 20 V).

### APPLICATIONS

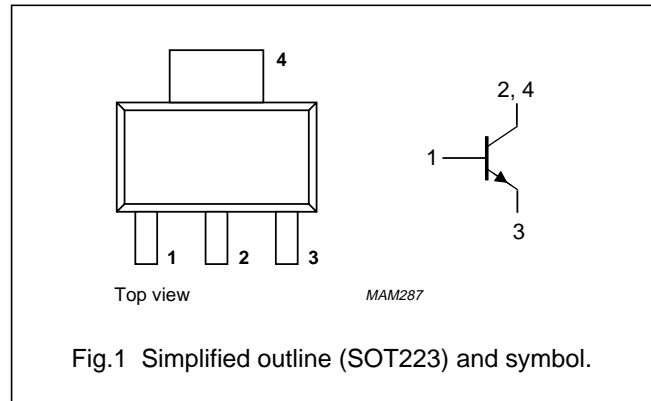
- General purpose switching and amplification under high current conditions.

### DESCRIPTION

NPN medium power transistor in a SOT223 plastic package. PNP complement: BCP69.

### PINNING

| PIN  | DESCRIPTION |
|------|-------------|
| 1    | base        |
| 2, 4 | collector   |
| 3    | emitter     |



### LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL    | PARAMETER                     | CONDITIONS                                       | MIN. | MAX. | UNIT             |
|-----------|-------------------------------|--|------|------|------------------|
| $V_{CBO}$ | collector-base voltage        | open emitter                                     | –    | 32   | V                |
| $V_{CEO}$ | collector-emitter voltage     | open base  | –    | 20   | V                |
| $V_{EBO}$ | emitter-base voltage          | open collector                                   | –    | 5    | V                |
| $I_C$     | collector current (DC)        |  | –    | 1    | A                |
| $I_{CM}$  | peak collector current        |  | –    | 2    | A                |
| $I_{BM}$  | peak base current             |  | –    | 200  | mA               |
| $P_{tot}$ | total power dissipation       | $T_{amb} \leq 25\text{ }^\circ\text{C}$ ; note 1 | –    | 1.37 | W                |
| $T_{stg}$ | storage temperature           |  | –65  | +150 | $^\circ\text{C}$ |
| $T_j$     | junction temperature          |  | –    | 150  | $^\circ\text{C}$ |
| $T_{amb}$ | operating ambient temperature |  | –65  | +150 | $^\circ\text{C}$ |

### Note

1. Device mounted on a printed-circuit board, single-sided copper, tinplated, mounting pad for collector 1 cm<sup>2</sup>. For other mounting conditions, see “*Thermal considerations for SOT223 in the General Part of associated Handbook*”.

## NPN medium power transistor

## BCP68

## THERMAL CHARACTERISTICS

| SYMBOL        | PARAMETER   | CONDITIONS | VALUE | UNIT |
|---------------|---|------------|-------|------|
| $R_{th\ j-a}$ | thermal resistance from junction to ambient         | note 1     | 91    | K/W  |
| $R_{th\ j-s}$ | thermal resistance from junction to soldering point |            | 10    | K/W  |

## Note

1. Device mounted on a printed-circuit board, single-sided copper, tinplated, mounting pad for collector 1 cm<sup>2</sup>. For other mounting conditions, see "Thermal considerations for SOT223 in the General Part of associated Handbook".

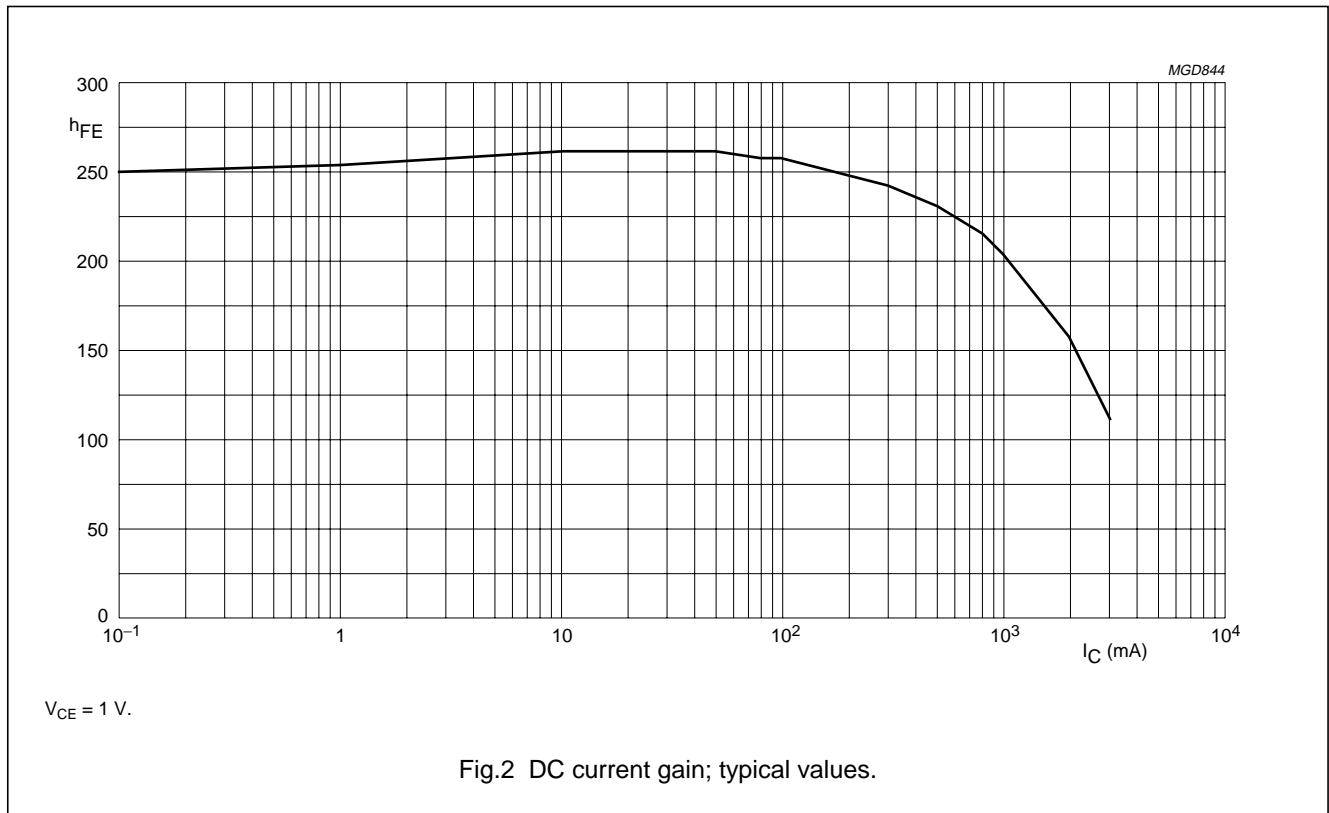
## CHARACTERISTICS

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

| SYMBOL                    | PARAMETER  | CONDITIONS  | MIN. | TYP. | MAX. | UNIT |
|---------------------------|--|---|------|------|------|------|
| $I_{CBO}$                 | collector cut-off current                        | $I_E = 0; V_{CB} = 25\text{ V}$                               | –    | –    | 100  | nA   |
|                           |  | $I_E = 0; V_{CB} = 25\text{ V}; T_j = 150\text{ °C}$          | –    | –    | 10   | μA   |
| $I_{EBO}$                 | emitter cut-off current                          | $I_C = 0; V_{EB} = 5\text{ V}$                                | –    | –    | 100  | nA   |
| $h_{FE}$                  | DC current gain                                  | $I_C = 5\text{ mA}; V_{CE} = 10\text{ V}$                     | 50   | –    | –    |      |
|                           |  | $I_C = 500\text{ mA}; V_{CE} = 1\text{ V};$ see Fig.2         | 85   | –    | 375  |      |
|                           |  | $I_C = 1\text{ A}; V_{CE} = 1\text{ V};$ see Fig.2            | 60   | –    | –    |      |
|                           | DC current gain<br>BCP68-25                      | $I_C = 500\text{ mA}; V_{CE} = 1\text{ V};$ see Fig.2         | 160  | –    | 375  |      |
| $V_{CEsat}$               | collector-emitter saturation voltage             | $I_C = 1\text{ A}; I_B = 100\text{ mA}$                       | –    | –    | 500  | mV   |
| $V_{BE}$                  | base-emitter voltage                             | $I_C = 5\text{ mA}; V_{CE} = 10\text{ V}$                     | –    | 620  | –    | mV   |
|                           |  | $I_C = 1\text{ A}; V_{CE} = 1\text{ V}$                       | –    | –    | 1    | V    |
| $C_c$                     | collector capacitance                            | $I_E = I_e = 0; V_{CB} = 5\text{ V}; f = 1\text{ MHz}$        | –    | 38   | –    | pF   |
| $f_T$                     | transition frequency                             | $I_C = 10\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}$ | 40   | –    | –    | MHz  |
| $\frac{h_{FE1}}{h_{FE2}}$ | DC current gain ratio of the complementary pairs | $ I_C  = 0.5\text{ A};  V_{CE}  = 1\text{ V}$                 | –    | –    | 1.6  |      |

NPN medium power transistor

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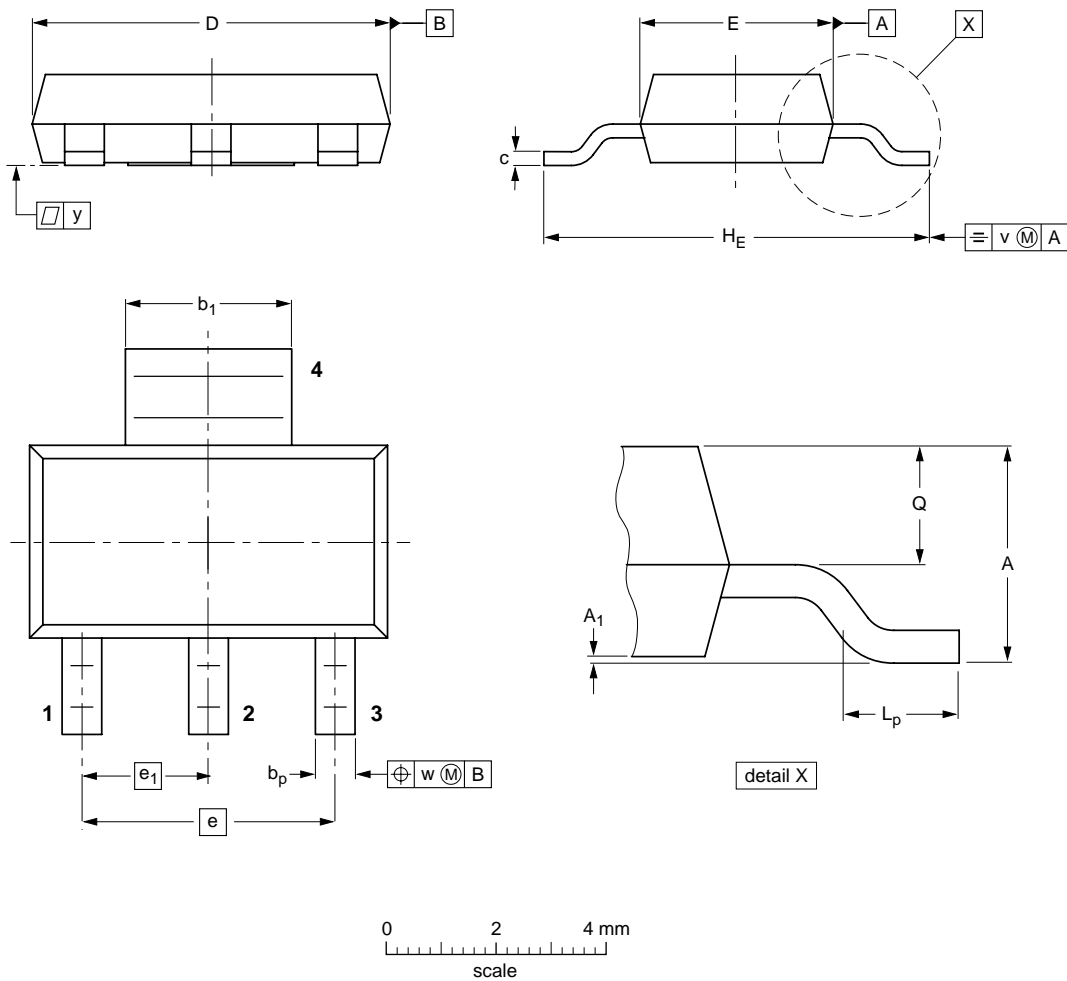
NPN medium power transistor

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PACKAGE OUTLINE

Plastic surface mounted package; collector pad for good heat transfer; 4 leads

SOT223



DIMENSIONS (mm are the original dimensions)

| UNIT | A          | A <sub>1</sub> | b <sub>p</sub> | b <sub>1</sub> | c            | D          | E          | e   | e <sub>1</sub> | H <sub>E</sub> | L <sub>p</sub> | Q            | v   | w   | y   |
|------|------------|----------------|----------------|----------------|--------------|------------|------------|-----|----------------|----------------|----------------|--------------|-----|-----|-----|
| mm   | 1.8<br>1.5 | 0.10<br>0.01   | 0.80<br>0.60   | 3.1<br>2.9     | 0.32<br>0.22 | 6.7<br>6.3 | 3.7<br>3.3 | 4.6 | 2.3            | 7.3<br>6.7     | 1.1<br>0.7     | 0.95<br>0.85 | 0.2 | 0.1 | 0.1 |

| OUTLINE VERSION | REFERENCES |       |      |  | EUROPEAN PROJECTION | ISSUE DATE           |
|-----------------|------------|-------|------|--|---------------------|----------------------|
|                 | IEC        | JEDEC | EIAJ |  |                     |                      |
| SOT223          |            |       |      |  |                     | 96-11-11<br>97-02-28 |

## NPN medium power transistor

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**DEFINITIONS**

| <b>Data Sheet Status</b>  |   |
|---|---|
| Objective specification   | This data sheet contains target or goal specifications for product development.       |
| Preliminary specification   | This data sheet contains preliminary data; supplementary data may be published later. |
| Product specification   | This data sheet contains final product specifications.                                |
| <b>Limiting values</b>  |   |
| Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability. |   |
| <b>Application information</b>  |   |
| Where application information is given, it is advisory and does not form part of the specification.   |   |

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Printed in The Netherlands

115002/00/03/pp8

Date of release: 1999 Apr 08

Document order number: 9397 750 05535

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