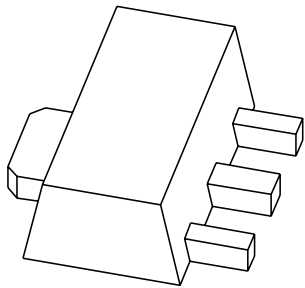


DATA SHEET



BSR30; BSR31; BSR32; BSR33 PNP medium power transistors

Product specification
Supersedes data of September 1994
File under Discrete Semiconductors, SC04

1997 Apr 01

PNP medium power transistors

BSR30; BSR31; BSR32; BSR33

FEATURES

- High current (max. 1 A)
- Low voltage (max. 80 V).

APPLICATIONS

- Telephony and general industrial applications
- Thick and thin-film circuits.

DESCRIPTION

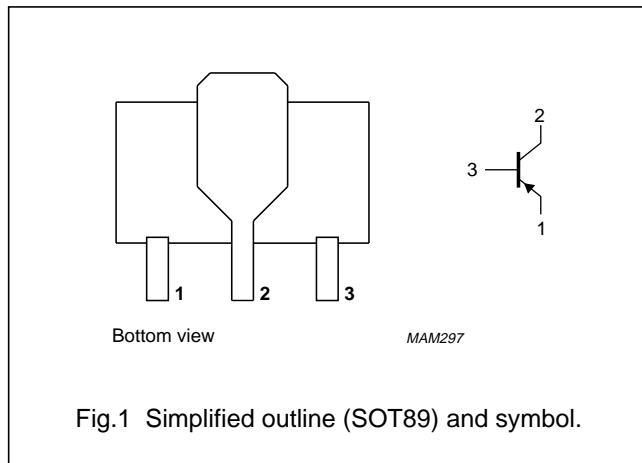
PNP medium power transistor in a SOT89 plastic package. NPN complements: BSR40; BSR41; BSR42 and BSR43.

MARKING

| TYPE NUMBER | MARKING CODE | TYPE NUMBER | MARKING CODE |
|-------------|--------------|-------------|--------------|
| BRS30 | BR1 | BRS32 | BR3 |
| BRS31 | BR2 | BRS33 | BR4 |

PINNING

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



QUICK REFERENCE DATA

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-----------|---|--|------|------|------|
| V_{CBO} | collector-base voltage BSR30; BSR31 BSR32; BSR33 | open emitter | - | -70 | V |
| | | | - | -90 | V |
| V_{CEO} | collector-emitter voltage BSR30; BSR31 BSR32; BSR33 | open base | - | -60 | V |
| | | | - | -80 | V |
| I_{CM} | peak collector current | | - | -2 | A |
| P_{tot} | total power dissipation | $T_{amb} \leq 25\text{ }^\circ\text{C}$ | - | 1.4 | W |
| h_{FE} | DC current gain BSR30; BSR32 BSR31; BSR33 | $I_C = -100\text{ mA}; V_{CE} = -5\text{ V}$ | 40 | 120 | |
| | | | 100 | 300 | |
| f_T | transition frequency | $I_C = -50\text{ mA}; V_{CE} = -10\text{ V}; f = 100\text{ MHz}$ | 100 | - | MHz |

PNP medium power transistors

BSR30; BSR31; BSR32; BSR33

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 | | | |
| | BSR30; BSR31 | | – | –70 | V |
| | BSR32; BSR33 | | – | –90 | V |
| V _{CEO} | collector-emitter voltage | open base | | | |
| | BSR30; BSR31 | | – | –60 | V |
| | BSR32; BSR33 | | – | –80 | 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} ≤ 25 °C; note 1 | – | 1.4 | W |
| T _{stg} | storage temperature | | –65 | +150 | °C |
| T _j | junction temperature | | – | 150 | °C |
| T _{amb} | operating ambient temperature | | –65 | +150 | °C |

Note

- Device mounted on a printed-circuit board, single sided copper, tinplated, mounting pad for collector 1 cm².
For other mounting conditions, see “*Thermal considerations for the SOT89 in the General part of handbook SC04*”.

THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---------------------|---|------------|-------|------|
| R _{th j-a} | thermal resistance from junction to ambient | note 1 | 89 | K/W |
| R _{th j-s} | thermal resistance from junction to soldering point | | 8 | K/W |

Note

- Device mounted on a printed-circuit board, single-sided copper, tinplated, mounting pad for collector 1 cm².
For other mounting conditions, see “*Thermal considerations for the SOT89 in the General part of handbook SC04*”.

PNP medium power transistors

BSR30; BSR31; BSR32; BSR33

CHARACTERISTICS

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-------------|---|--|------|-------|---------------|
| I_{CBO} | collector cut-off current | $I_E = 0; V_{CB} = -60\text{ V}$ | – | –100 | nA |
| | | $I_E = 0; V_{CB} = -60\text{ V}; T_j = 150\text{ °C}$ | – | –50 | μA |
| I_{EBO} | emitter cut-off current | $I_C = 0; V_{EB} = -5\text{ V}$ | – | –100 | nA |
| h_{FE} | DC current gain BSR30; BSR32 BSR31; BSR33 | $I_C = -100\text{ }\mu\text{A}; V_{CE} = -5\text{ V}; \text{note 1}$ | 10 | – | |
| | | | 30 | – | |
| h_{FE} | DC current gain BSR30; BSR32 BSR31; BSR33 | $I_C = -100\text{ mA}; V_{CE} = -5\text{ V}; \text{note 1}$ | 40 | 120 | |
| | | | 100 | 300 | |
| h_{FE} | DC current gain BSR30; BSR32 BSR31; BSR33 | $I_C = -500\text{ mA}; V_{CE} = -5\text{ V}; \text{note 1}$ | 30 | – | |
| | | | 50 | – | |
| V_{CEsat} | collector-emitter saturation voltage | $I_C = -150\text{ mA}; I_B = -15\text{ mA}; \text{note 1}$ | – | –0.25 | V |
| | | $I_C = -500\text{ mA}; I_B = -50\text{ mA}; \text{note 1}$ | – | –0.5 | V |
| V_{BEsat} | base-emitter saturation voltage | $I_C = -150\text{ mA}; I_B = -15\text{ mA}; \text{note 1}$ | – | –1 | V |
| | | $I_C = -500\text{ mA}; I_B = -50\text{ mA}; \text{note 1}$ | – | –1.2 | V |
| f_T | transition frequency | $I_C = -50\text{ mA}; V_{CE} = -10\text{ V}; f = 100\text{ MHz}$ | 100 | – | MHz |

Note

1. Pulse test: $t_p = 300\text{ }\mu\text{s}; \delta < 0.01$.

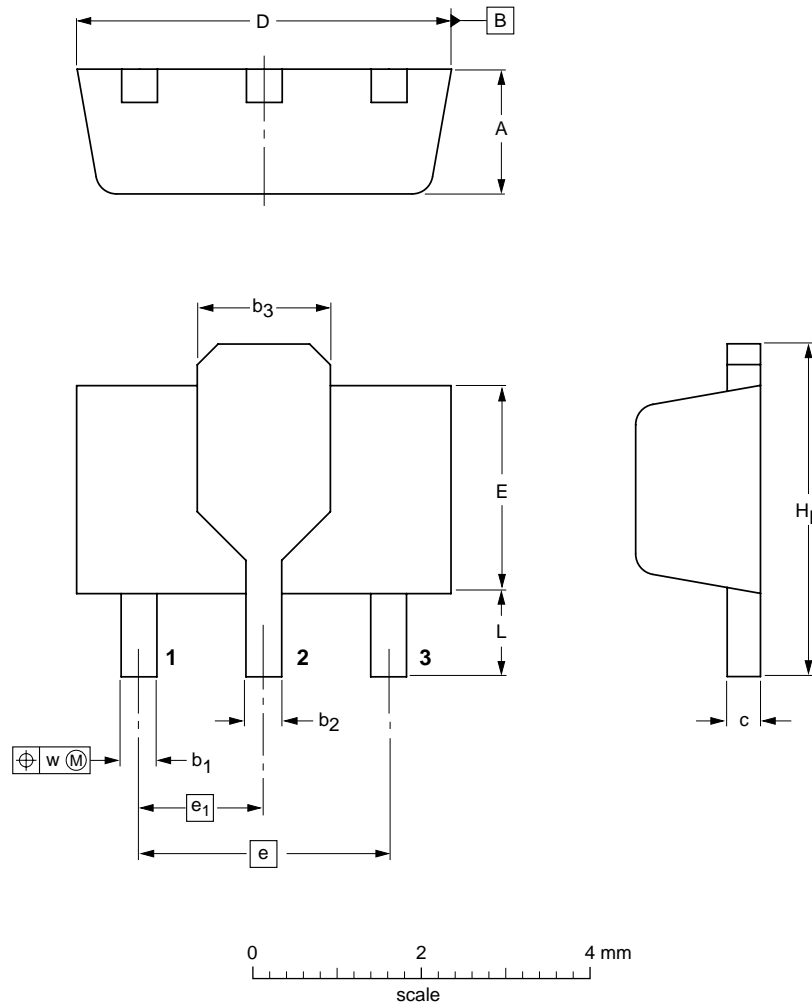
PNP medium power transistors

BSR30; BSR31; BSR32; BSR33

PACKAGE OUTLINE

Plastic surface mounted package; collector pad for good heat transfer; 3 leads

SOT89



DIMENSIONS (mm are the original dimensions)

| UNIT | A | b ₁ | b ₂ | b ₃ | c | D | E | e | e ₁ | H _E | L min. | w |
|------|------------|----------------|----------------|----------------|--------------|------------|------------|-----|----------------|----------------|--------|------|
| mm | 1.6 1.4 | 0.48 0.35 | 0.53 0.40 | 1.8 1.4 | 0.44 0.37 | 4.6 4.4 | 2.6 2.4 | 3.0 | 1.5 | 4.25 3.75 | 0.8 | 0.13 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|-------|------|--|---------------------|------------|
| | IEC | JEDEC | EIAJ | | | |
| SOT89 | | | | | | 97-02-28 |

PNP medium power transistors

BSR30; BSR31; BSR32; BSR33

DEFINITIONS

| Data Sheet Status | |
|---|---|
| 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. |
| Limiting values | |
| 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. | |
| Application information | |
| Where application information is given, it is advisory and does not form part of the specification. | |

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PNP medium power transistors

BSR30; BSR31; BSR32; BSR33

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