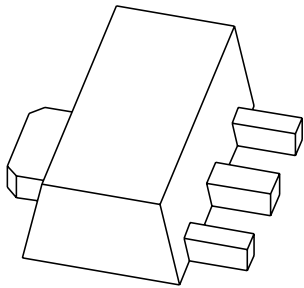


# DATA SHEET



## **BSR40; BSR41; BSR42; BSR43** NPN medium power transistors

Product data sheet  
Supersedes data of 1999 Apr 28

2004 Dec 13

# NPN medium power transistors

**BSR40; BSR41;  
BSR42; BSR43**

## FEATURES

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

## APPLICATIONS

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

## DESCRIPTION

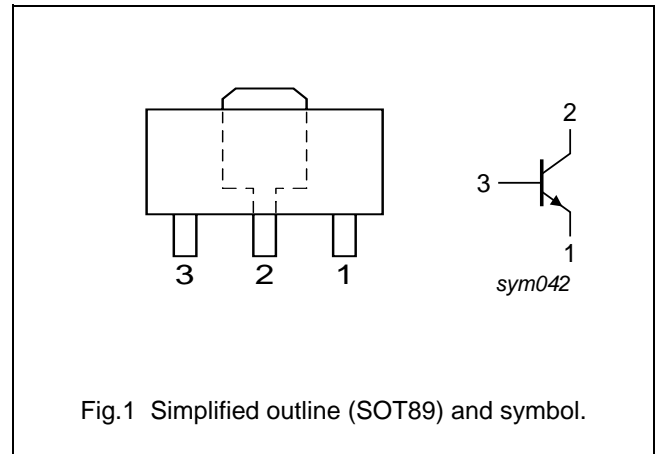
NPN medium power transistor in a SOT89 plastic package. PNP complements: BSR30; BSR31 and BSR33.

## MARKING

| TYPE NUMBER | MARKING CODE | TYPE NUMBER | MARKING CODE |
|-------------|--------------|-------------|--------------|
| BSR40       | AR1          | BSR42       | AR3          |
| BSR41       | AR2          | BSR43       | AR4          |

## PINNING

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



## ORDERING INFORMATION

| TYPE NUMBER | PACKAGE |  |         |
|-------------|---------|--|---------|
|             | NAME    | DESCRIPTION  | VERSION |
| BSR40       | SC-62   | plastic surface mounted package; collector pad for good heat transfer; 3 leads | SOT89   |
| BSR41       |         |  |         |
| BSR42       |         |  |         |
| BSR43       |         |  |         |

## NPN medium power transistors

BSR40; BSR41; BSR42;  
BSR43**LIMITING VALUES**

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

| SYMBOL           | PARAMETER                 | CONDITIONS                       | MIN. | MAX. | UNIT |
|------------------|---------------------------|----------------------------------|------|------|------|
| V <sub>CBO</sub> | collector-base voltage    | open emitter                     |      |      |      |
|                  | BSR40; BSR41              |                                  | –    | 70   | V    |
|                  | BSR42; BSR43              |                                  | –    | 90   | V    |
| V <sub>CEO</sub> | collector-emitter voltage | open base                        |      |      |      |
|                  | BSR40; BSR41              |                                  | –    | 60   | V    |
|                  | BSR42; BSR43              |                                  | –    | 80   | V    |
| V <sub>EBO</sub> | emitter-base voltage      | open collector                   | –    | 5    | V    |
| I <sub>C</sub>   | collector current (DC)    |                                  | –    | 1    | A    |
| I <sub>CM</sub>  | peak collector current    |                                  | –    | 2    | A    |
| I <sub>BM</sub>  | peak base current         |                                  | –    | 0.2  | A    |
| P <sub>tot</sub> | total power dissipation   | T <sub>amb</sub> ≤ 25 °C; note 1 | –    | 1.35 | W    |
| T <sub>stg</sub> | storage temperature       |                                  | –65  | +150 | °C   |
| T <sub>j</sub>   | junction temperature      |                                  | –    | 150  | °C   |
| T <sub>amb</sub> | ambient temperature       |                                  | –65  | +150 | °C   |

**Note**

- Device mounted on a printed-circuit board, single-sided copper, tin-plated, mounting pad for collector 6 cm<sup>2</sup>.  
For other mounting conditions, see *“Thermal considerations for SOT89 in the General Part of associated Handbook”*.

**THERMAL CHARACTERISTICS**

| SYMBOL               | PARAMETER   | CONDITIONS | VALUE | UNIT |
|----------------------|---|------------|-------|------|
| R <sub>th(j-a)</sub> | thermal resistance from junction to ambient         | note 1     | 93    | K/W  |
| R <sub>th(j-s)</sub> | thermal resistance from junction to soldering point |            | 13    | K/W  |

**Note**

- Device mounted on a printed-circuit board, single-sided copper, tin-plated, mounting pad for collector 6 cm<sup>2</sup>.  
For other mounting conditions, see *“Thermal considerations for SOT89 in the General Part of associated Handbook”*.

## NPN medium power transistors

BSR40; BSR41; BSR42;  
BSR43

## CHARACTERISTICS

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

| SYMBOL  | PARAMETER                                       | CONDITIONS   | MIN.      | MAX.       | UNIT          |
|---|---|--|-----------|------------|---------------|
| $I_{CBO}$   | collector-base cut-off current                  | $I_E = 0\text{ A}; V_{CB} = 60\text{ V}$                                       | –         | 100        | nA            |
|   |   | $I_E = 0\text{ A}; V_{CB} = 60\text{ V}; T_j = 150\text{ °C}$                  | –         | 50         | $\mu\text{A}$ |
| $I_{EBO}$   | emitter-base cut-off current                    | $I_C = 0\text{ A}; V_{EB} = 5\text{ V}$  | –         | 100        | nA            |
| $h_{FE}$  | DC current gain<br>BSR40; BSR42<br>BSR41; BSR43 | $I_C = 100\text{ }\mu\text{A}; V_{CE} = 5\text{ V}; \text{note 1}$             | 10<br>30  | –<br>–     |               |
|   | DC current gain<br>BSR40; BSR42<br>BSR41; BSR43 | $I_C = 100\text{ mA}; V_{CE} = 5\text{ V}; \text{note 1}$                      | 40<br>100 | 120<br>300 |               |
|   | DC current gain<br>BSR40; BSR42<br>BSR41; BSR43 | $I_C = 500\text{ mA}; V_{CE} = 5\text{ V}; \text{note 1}$                      | 30<br>50  | –<br>–     |               |
| $V_{CEsat}$   | collector-emitter saturation voltage            | $I_C = 150\text{ mA}; I_B = 15\text{ mA}; \text{note 1}$                       | –         | 250        | mV            |
|   |   | $I_C = 500\text{ mA}; I_B = 50\text{ mA}; \text{note 1}$                       | –         | 500        | mV            |
| $V_{BEsat}$   | 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             |
| $C_c$   | collector capacitance                           | $I_E = i_e = 0\text{ A}; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$               | –         | 12         | pF            |
| $C_e$   | emitter capacitance                             | $I_C = i_c = 0\text{ A}; V_{EB} = 0.5\text{ V}; f = 1\text{ MHz}$              | –         | 90         | pF            |
| $f_T$   | transition frequency                            | $I_C = 50\text{ mA}; V_{CE} = 10\text{ V}; f = 100\text{ MHz}$                 | 100       | –          | MHz           |
| <b>Switching times (between 10% and 90% levels)</b> |   |  |           |            |               |
| $t_{on}$  | turn-on time                                    | $I_{Con} = 100\text{ mA}; I_{Bon} = 5\text{ mA};$<br>$I_{Boff} = -5\text{ mA}$ | –         | 250        | ns            |
| $t_{off}$   | turn-off time                                   |  | –         | 1          | $\mu\text{s}$ |

## Note

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

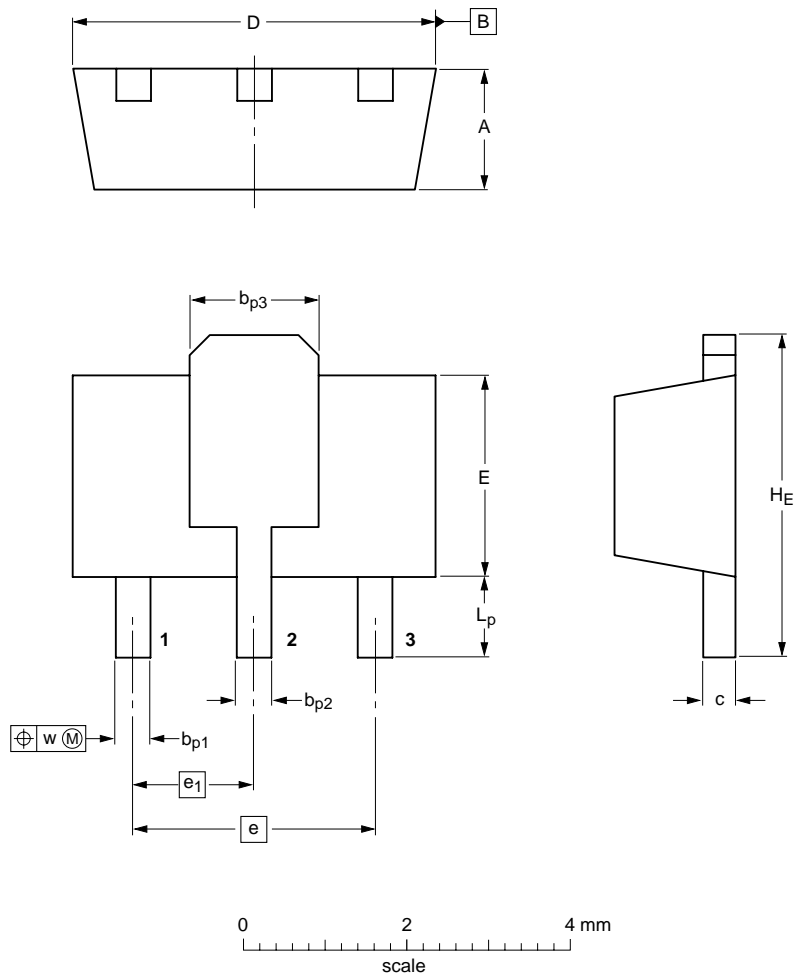
NPN medium power transistors

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BSR43

PACKAGE OUTLINE

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

SOT89



DIMENSIONS (mm are the original dimensions)

| UNIT | A          | b <sub>p1</sub> | b <sub>p2</sub> | b <sub>p3</sub> | c            | D          | E          | e   | e <sub>1</sub> | H <sub>E</sub> | L <sub>p</sub> | w    |
|------|------------|-----------------|-----------------|-----------------|--------------|------------|------------|-----|----------------|----------------|----------------|------|
| mm   | 1.6<br>1.4 | 0.48<br>0.35    | 0.53<br>0.40    | 1.8<br>1.4      | 0.44<br>0.23 | 4.6<br>4.4 | 2.6<br>2.4 | 3.0 | 1.5            | 4.25<br>3.75   | 1.2<br>0.8     | 0.13 |

| OUTLINE VERSION | REFERENCES |        |       | EUROPEAN PROJECTION | ISSUE DATE           |
|-----------------|------------|--------|-------|---------------------|----------------------|
|                 | IEC        | JEDEC  | JEITA |                     |                      |
| SOT89           |            | TO-243 | SC-62 |                     | 04-08-03<br>06-03-16 |

## NPN medium power transistors

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BSR43

## DATA SHEET STATUS

| DOCUMENT STATUS <sup>(1)</sup> | PRODUCT STATUS <sup>(2)</sup> | 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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## **Contact information**

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