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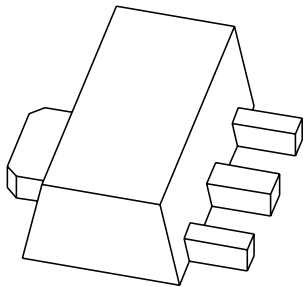
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Kind regards,

Team Nexperia

# DATA SHEET



## **BST60; BST61; BST62** PNP Darlington transistors

Product data sheet  
Supersedes data of 2001 Feb 20

2004 Dec 09

# PNP Darlington transistors

# BST60; BST61; BST62

### FEATURES

- High current (max. 0.5 A)
- Low voltage (max. 80 V)
- Integrated diode and resistor.

### APPLICATIONS

- Industrial switching applications such as:
  - Print hammer
  - Solenoid
  - Relay and lamp driving.

### DESCRIPTION

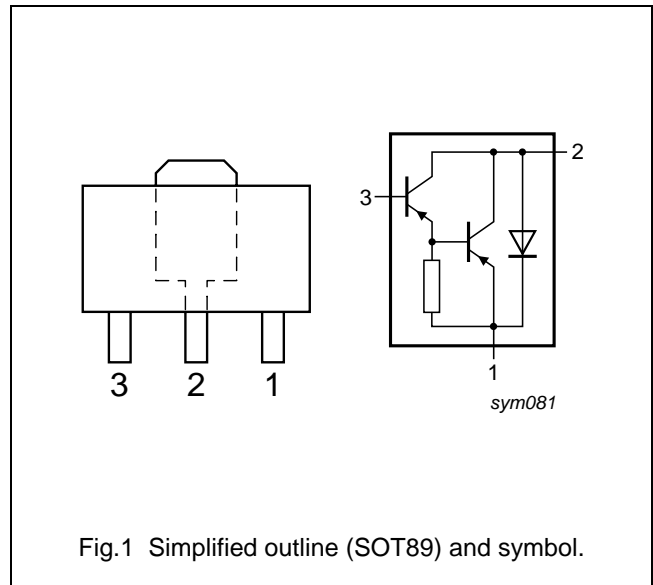
PNP Darlington transistor in a SOT89 plastic package.  
NPN complements: BST50, BST51 and BST52.

### MARKING

| TYPE NUMBER | MARKING CODE |
|-------------|--------------|
| BST60       | BS1          |
| BST61       | BS2          |
| BST62       | BS3          |

### PINNING

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



### ORDERING INFORMATION

| TYPE NUMBER | PACKAGE |  |         |
|-------------|---------|--|---------|
|             | NAME    | DESCRIPTION  | VERSION |
| BST60       | SC-62   | plastic surface mounted package; collector pad for good heat transfer; 3 leads | SOT89   |
| BST61       |         |  |         |
| BST62       |         |  |         |

## PNP Darlington transistors

## BST60; BST61; BST62

**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                     |      |      |      |
|                  | BST60                     |                                  | –    | –60  | V    |
|                  | BST61                     |                                  | –    | –80  | V    |
|                  | BST62                     |                                  | –    | –90  | V    |
| V <sub>CES</sub> | collector-emitter voltage | V <sub>BE</sub> = 0 V            |      |      |      |
|                  | BST60                     |                                  | –    | –45  | V    |
|                  | BST61                     |                                  | –    | –60  | V    |
|                  | BST62                     |                                  | –    | –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>B</sub>   | base current (DC)         |                                  | –    | –100 | mA   |
| P <sub>tot</sub> | total power dissipation   | T <sub>amb</sub> ≤ 25 °C; note 1 | –    | 1.3  | 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     | 96    | K/W  |
| R <sub>th(j-s)</sub> | thermal resistance from junction to soldering point |            | 16    | 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*”.

## PNP Darlington transistors

## BST60; BST61; BST62

**CHARACTERISTICS**

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

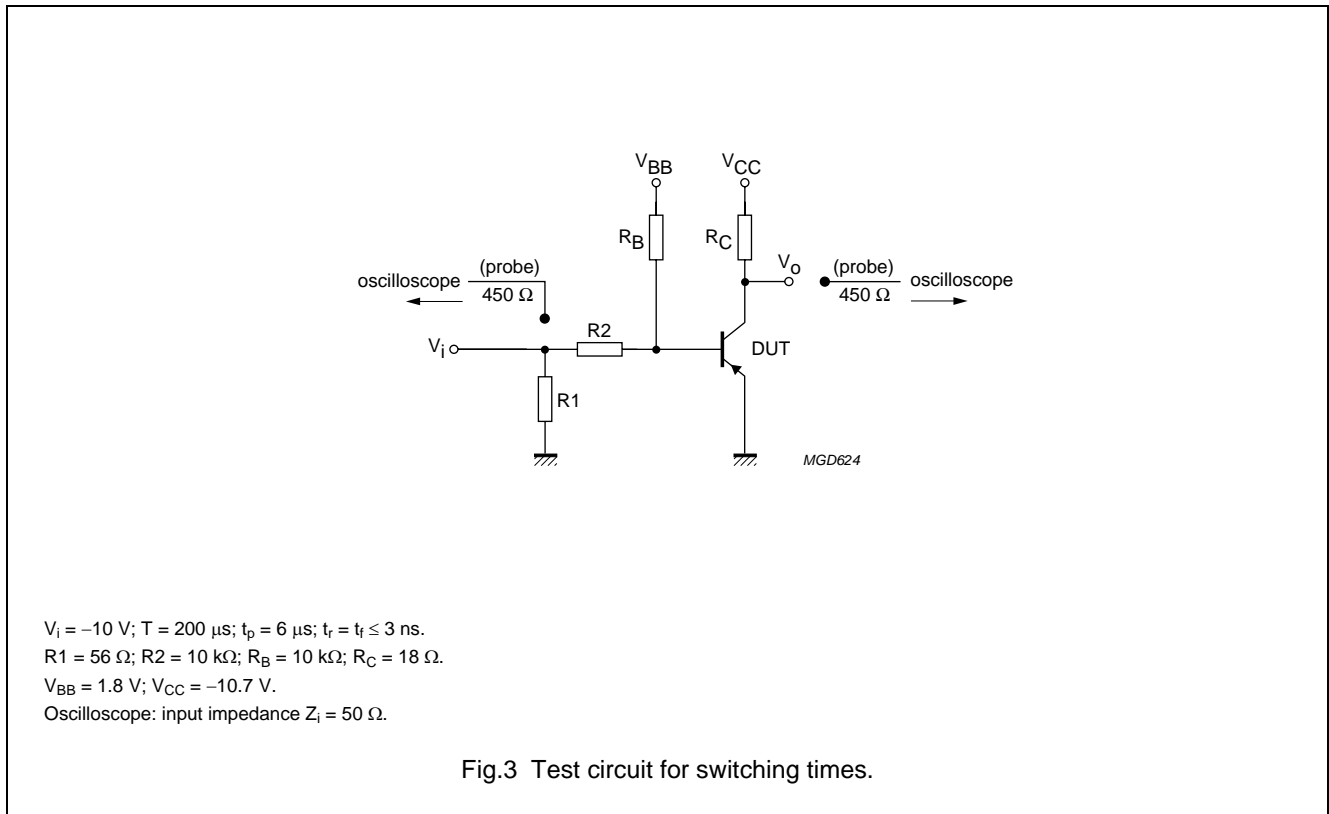
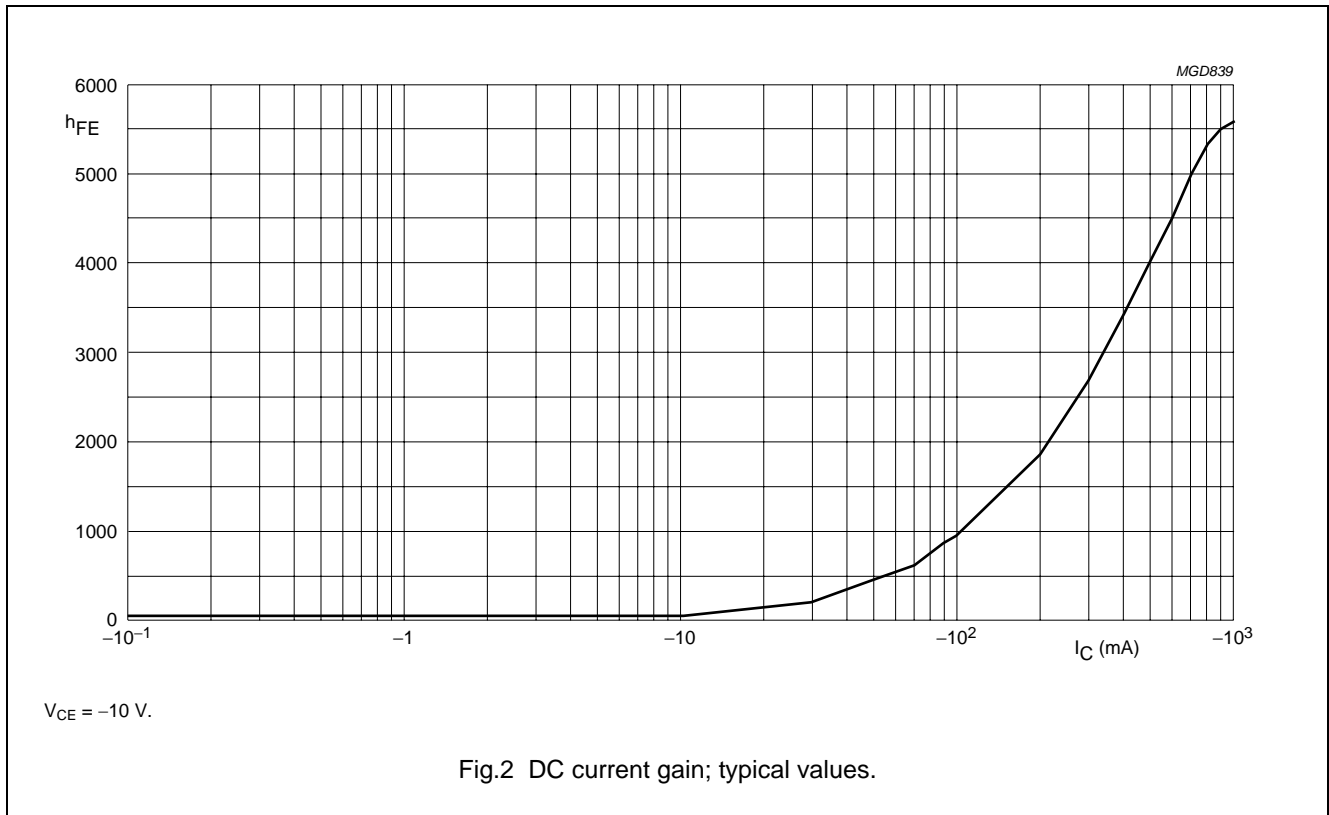
| SYMBOL   | PARAMETER                            | CONDITIONS   | MIN. | TYP. | MAX. | UNIT |
|--|--------------------------------------|--|------|------|------|------|
| $I_{CES}$  | collector-emitter cut-off current    |  |      |      |      |      |
|  | BST60                                | $V_{BE} = 0\text{ V}; V_{CE} = -45\text{ V}$                                   | –    | –    | –50  | nA   |
|  | BST61                                | $V_{BE} = 0\text{ V}; V_{CE} = -60\text{ V}$                                   | –    | –    | –50  | nA   |
|  | BST62                                | $V_{BE} = 0\text{ V}; V_{CE} = -80\text{ V}$                                   | –    | –    | –50  | nA   |
| $I_{EBO}$  | emitter-base cut-off current         | $I_C = 0\text{ A}; V_{EB} = -4\text{ V}$                                       | –    | –    | –50  | nA   |
| $h_{FE}$   | DC current gain                      | $V_{CE} = -10\text{ V}$ ; note 1; see Fig.2                                    |      |      |      |      |
|  |                                      | $I_C = -150\text{ mA}$   | 1000 | –    | –    |      |
|  |                                      | $I_C = -500\text{ mA}$   | 2000 | –    | –    |      |
| $V_{CEsat}$  | collector-emitter saturation voltage | $I_C = -500\text{ mA}; I_B = -0.5\text{ mA}$                                   | –    | –    | –1.3 | V    |
|  |                                      | $I_C = -500\text{ mA}; I_B = -0.5\text{ mA}; T_j = 150\text{ °C}$              | –    | –    | –1.3 | V    |
| $V_{BEsat}$  | base-emitter saturation voltage      | $I_C = -500\text{ mA}; I_B = -0.5\text{ mA}$                                   | –    | –    | –1.9 | V    |
| $f_T$  | transition frequency                 | $I_C = -500\text{ mA}; V_{CE} = -5\text{ V}; f = 100\text{ MHz}$               | –    | 200  | –    | MHz  |
| <b>Switching times (between 10% and 90% levels); (see Fig.3)</b> |                                      |  |      |      |      |      |
| $t_{on}$   | turn-on time                         | $I_{Con} = -500\text{ mA}; I_{Bon} = -0.5\text{ mA}; I_{Boff} = 0.5\text{ mA}$ | –    | 500  | –    | ns   |
| $t_{off}$  | turn-off time                        |  | –    | 700  | –    | ns   |

**Note**

1. Pulse test:  $t_p \leq 300\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$ .

PNP Darlington transistors

BST60; BST61; BST62



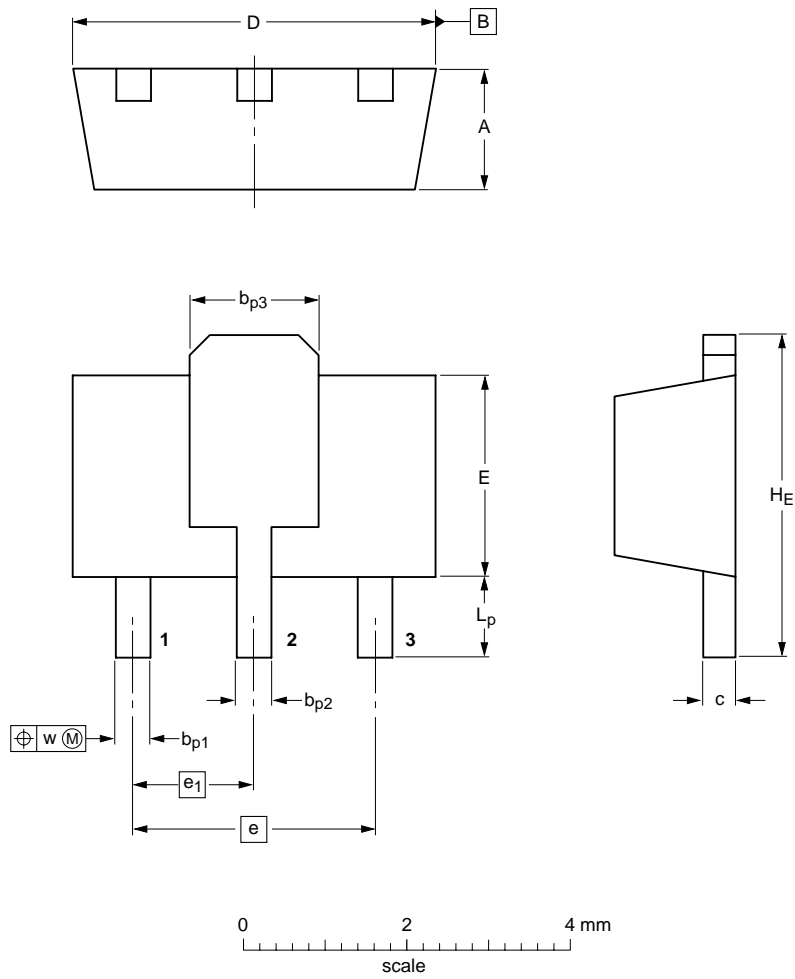
PNP Darlington transistors

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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 |

PNP Darlington transistors

BST60; BST61; BST62

**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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# ***NXP Semiconductors***

## **Customer notification**

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## **Contact information**

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

For sales offices addresses send e-mail to: [salesaddresses@nxp.com](mailto:salesaddresses@nxp.com)

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