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Kind regards,

Team Nexperia

DATA SHEET



BST50; BST51; BST52 NPN Darlington transistors

Product data sheet
Supersedes data of 2001 Feb 20

2004 Dec 09

NPN Darlington transistors

BST50; BST51; BST52

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

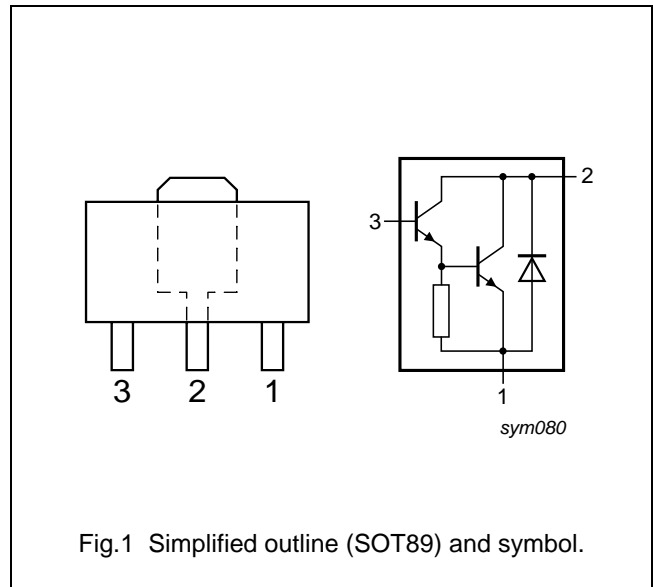
NPN Darlington transistor in a SOT89 plastic package.
PNP complements: BST60, BST61 and BST62.

MARKING

| TYPE NUMBER | MARKING CODE |
|-------------|--------------|
| BST50 | AS1 |
| BST51 | AS2 |
| BST52 | AS3 |

PINNING

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



ORDERING INFORMATION

| TYPE NUMBER | PACKAGE | | |
|-------------|---------|--|---------|
| | NAME | DESCRIPTION | VERSION |
| BST50 | SC-62 | plastic surface mounted package; collector pad for good heat transfer; 3 leads | SOT89 |
| BST51 | | | |
| BST52 | | | |

NPN Darlington transistors

BST50; BST51; BST52

LIMITING VALUES

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|------------------|---------------------------|----------------------------------|------|------|------|
| V _{CBO} | collector-base voltage | open emitter | | | |
| | BST50 | | – | 60 | V |
| | BST51 | | – | 80 | V |
| | BST52 | | – | 90 | V |
| V _{CES} | collector-emitter voltage | V _{BE} = 0 V | | | |
| | BST50 | | – | 45 | V |
| | BST51 | | – | 60 | V |
| | BST52 | | – | 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 _B | base current (DC) | | – | 100 | mA |
| P _{tot} | total power dissipation | T _{amb} ≤ 25 °C; note 1 | – | 1.3 | W |
| T _j | junction temperature | | – | 150 | °C |
| T _{amb} | ambient temperature | | –65 | +150 | °C |
| T _{stg} | storage temperature | | –65 | +150 | °C |

Note

- Device mounted on a printed-circuit board, single-sided copper, tin-plated, mounting pad for collector 6 cm².
For other mounting conditions, see *“Thermal considerations for SOT89 in the General Part of associated Handbook”*.

THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|----------------------|---|------------|-------|------|
| R _{th(j-a)} | thermal resistance from junction to ambient | note 1 | 96 | K/W |
| R _{th(j-s)} | 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 cm².
For other mounting conditions, see *“Thermal considerations for SOT89 in the General Part of associated Handbook”*.

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CHARACTERISTICS

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|--|--------------------------------------|---|------|------|------|------|
| I_{CES} | collector-emitter cut-off current | | | | | |
| | BST50 | $V_{BE} = 0\text{ V}; V_{CE} = 45\text{ V}$ | – | – | 50 | nA |
| | BST51 | $V_{BE} = 0\text{ V}; V_{CE} = 60\text{ V}$ | – | – | 50 | nA |
| | BST52 | $V_{BE} = 0\text{ V}; V_{CE} = 80\text{ V}$ | – | – | 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 |
| Switching times (between 10% and 90% levels); (see Fig.3) | | | | | | |
| t_{on} | turn-on time | $I_{Con} = 500\text{ mA}; I_{Bon} = 0.5\text{ mA}; I_{Boff} = -0.5\text{ mA}$ | – | 400 | – | ns |
| t_{off} | turn-off time | | – | 1500 | – | ns |

Note

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

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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_{p1} | b_{p2} | b_{p3} | c | D | E | e | e_1 | H_E | L_p | w |
|------|------------|--------------|--------------|------------|--------------|------------|------------|-----|-------|--------------|------------|------|
| mm | 1.6 1.4 | 0.48 0.35 | 0.53 0.40 | 1.8 1.4 | 0.44 0.23 | 4.6 4.4 | 2.6 2.4 | 3.0 | 1.5 | 4.25 3.75 | 1.2 0.8 | 0.13 |

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

NPN Darlington transistors

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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

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