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Kind regards,

Team Nexperia

# DATA SHEET



**BSV52**

**NPN switching transistor**

Product data sheet  
Supersedes data of 1999 Apr 15

2004 Jan 14

# NPN switching transistor

# BSV52

### FEATURES

- Low current (max. 100 mA)
- Low voltage (max. 12 V).

### APPLICATIONS

- High speed saturated switching applications, especially in portable equipment.

### DESCRIPTION

NPN switching transistor in a SOT23 plastic package.

### MARKING

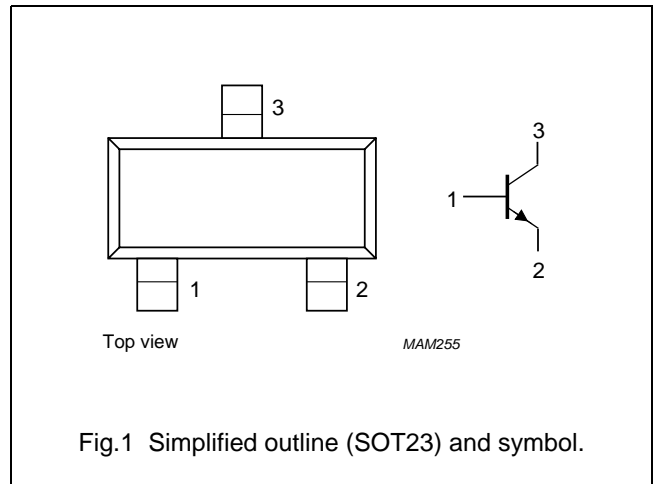
| TYPE NUMBER | MARKING CODE <sup>(1)</sup> |
|-------------|-----------------------------|
| BSV52       | B2*                         |

### Note

- \* = p : Made in Hong Kong.  
 \* = t : Made in Malaysia.  
 \* = W: Made in China.

### PINNING

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



### ORDERING INFORMATION

| TYPE NUMBER | PACKAGE |  |         |
|-------------|---------|--|---------|
|             | NAME    | DESCRIPTION                              | VERSION |
| BSV52       | -       | plastic surface mounted package; 3 leads | SOT23   |

### LIMITING VALUES

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

| SYMBOL           | PARAMETER                     | CONDITIONS               | MIN. | MAX. | UNIT |
|------------------|-------------------------------|--------------------------|------|------|------|
| V <sub>CB0</sub> | collector-base voltage        | open emitter             | -    | 20   | V    |
| V <sub>CEO</sub> | collector-emitter voltage     | open base                | -    | 12   | V    |
| V <sub>EBO</sub> | emitter-base voltage          | open collector           | -    | 5    | V    |
| I <sub>C</sub>   | collector current (DC)        |                          | -    | 100  | mA   |
| I <sub>CM</sub>  | peak collector current        |                          | -    | 200  | mA   |
| I <sub>BM</sub>  | peak base current             |                          | -    | 100  | mA   |
| P <sub>tot</sub> | total power dissipation       | T <sub>amb</sub> ≤ 25 °C | -    | 250  | mW   |
| T <sub>stg</sub> | storage temperature           |                          | -65  | +150 | °C   |
| T <sub>j</sub>   | junction temperature          |                          | -    | 150  | °C   |
| T <sub>amb</sub> | operating ambient temperature |                          | -65  | +150 | °C   |

## NPN switching transistor

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## THERMAL CHARACTERISTICS

| SYMBOL        | PARAMETER                                   | CONDITIONS | VALUE | UNIT |
|---------------|---|------------|-------|------|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | note 1     | 500   | K/W  |

## Note

1. Transistor mounted on an FR4 printed-circuit board.

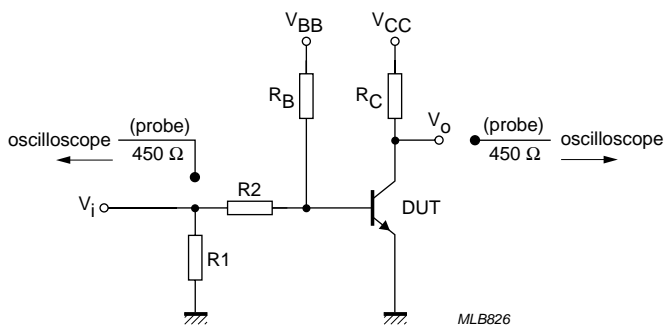
## CHARACTERISTICS

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

| SYMBOL   | PARAMETER                            | CONDITIONS  | MIN. | TYP. | MAX. | UNIT          |
|--|--------------------------------------|---|------|------|------|---------------|
| $I_{CBO}$  | collector cut-off current            | $I_E = 0; V_{CB} = 20\text{ V}$   | –    | –    | 400  | nA            |
|  |                                      | $I_E = 0; V_{CB} = 20\text{ V}; T_j = 125\text{ °C}$                            | –    | –    | 30   | $\mu\text{A}$ |
| $I_{EBO}$  | emitter cut-off current              | $I_C = 0; V_{EB} = 4\text{ V}$  | –    | –    | 100  | nA            |
| $h_{FE}$   | DC current gain                      | $V_{CE} = 1\text{ V}$   |      |      |      |               |
|  |                                      | $I_C = 1\text{ mA}$   | 25   | –    | –    |               |
|  |                                      | $I_C = 10\text{ mA}$  | 40   | –    | 120  |               |
|  |                                      | $I_C = 50\text{ mA}$  | 25   | –    | –    |               |
| $V_{CEsat}$  | collector-emitter saturation voltage | $I_C = 10\text{ mA}; I_B = 300\text{ }\mu\text{A}$                              | –    | –    | 300  | mV            |
|  |                                      | $I_C = 10\text{ mA}; I_B = 1\text{ mA}$   | –    | –    | 250  | mV            |
|  |                                      | $I_C = 50\text{ mA}; I_B = 5\text{ mA}$   | –    | –    | 400  | mV            |
| $V_{BEsat}$  | base-emitter saturation voltage      | $I_C = 10\text{ mA}; I_B = 1\text{ mA}$   | 700  | –    | 850  | mV            |
|  |                                      | $I_C = 50\text{ mA}; I_B = 5\text{ mA}$   | –    | –    | 1.2  | V             |
| $C_c$  | collector capacitance                | $I_E = i_e = 0; V_{CB} = 5\text{ V}; f = 1\text{ MHz}$                          | –    | –    | 4    | pF            |
| $C_e$  | emitter capacitance                  | $I_C = i_c = 0; V_{EB} = 1\text{ V}; f = 1\text{ MHz}$                          | –    | –    | 4.5  | pF            |
| $f_T$  | transition frequency                 | $I_C = 10\text{ mA}; V_{CE} = 10\text{ V}; f = 100\text{ MHz}$                  | 400  | 500  | –    | MHz           |
| <b>Switching times (between 10% and 90% levels); (see Fig.2)</b> |                                      |   |      |      |      |               |
| $t_{on}$   | turn-on time                         | $I_{Con} = 10\text{ mA}; I_{Bon} = 3\text{ mA};$<br>$I_{Boff} = -1.5\text{ mA}$ | –    | –    | 10   | ns            |
| $t_d$  | delay time                           |   | –    | –    | 4    | ns            |
| $t_r$  | rise time                            |   | –    | –    | 6    | ns            |
| $t_{off}$  | turn-off time                        |   | –    | –    | 20   | ns            |
| $t_s$  | storage time                         |   | –    | –    | 10   | ns            |
| $t_f$  | fall time                            |   | –    | –    | 10   | ns            |

NPN switching transistor

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$V_i = 0.5 \text{ V to } 4.2 \text{ V}$ ;  $T = 500 \mu\text{s}$ ;  $t_p = 10 \mu\text{s}$ ;  $t_r = t_s \leq 3 \text{ ns}$ .  
 $R1 = 56 \Omega$ ;  $R2 = 1 \text{ k}\Omega$ ;  $R_B = 1 \text{ k}\Omega$ ;  $R_C = 270 \Omega$ .  
 $V_{BB} = 0.2 \text{ V}$ ;  $V_{CC} = 2.7 \text{ V}$ .  
 Oscilloscope: input impedance  $Z_i = 50 \Omega$ .

Fig.2 Test circuit for switching times.

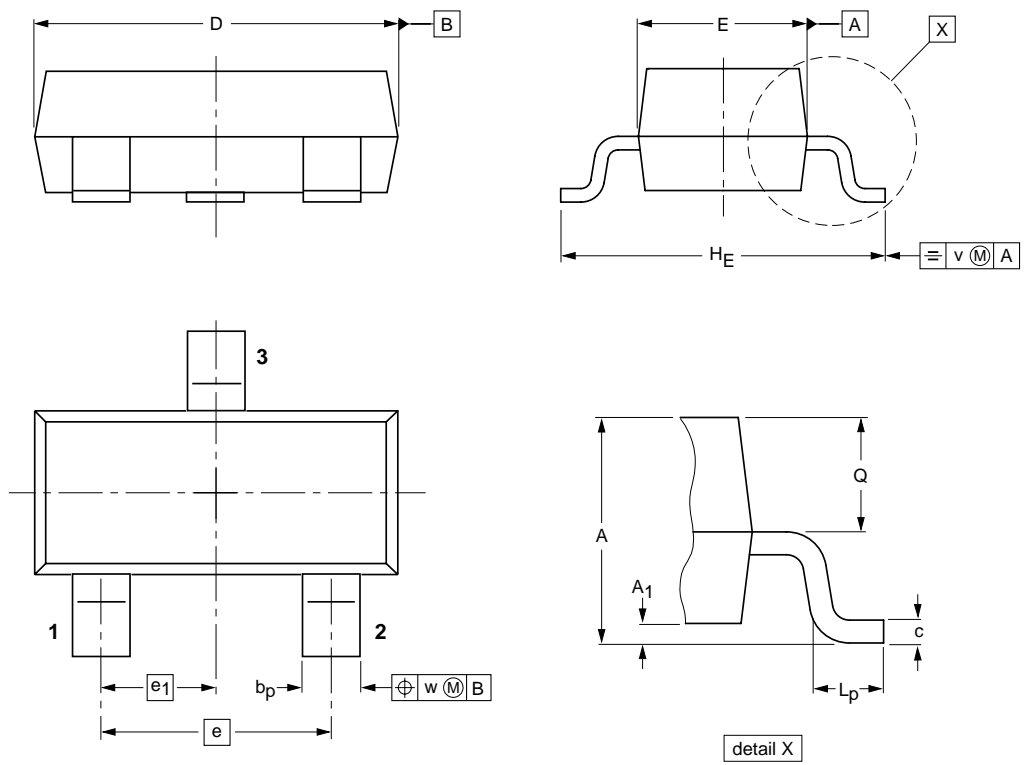
NPN switching transistor

BSV52

PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads

SOT23



DIMENSIONS (mm are the original dimensions)

| UNIT | A          | A <sub>1</sub> max. | b <sub>p</sub> | c            | D          | E          | e   | e <sub>1</sub> | H <sub>E</sub> | L <sub>p</sub> | Q            | v   | w   |
|------|------------|---------------------|----------------|--------------|------------|------------|-----|----------------|----------------|----------------|--------------|-----|-----|
| mm   | 1.1<br>0.9 | 0.1                 | 0.48<br>0.38   | 0.15<br>0.09 | 3.0<br>2.8 | 1.4<br>1.2 | 1.9 | 0.95           | 2.5<br>2.1     | 0.45<br>0.15   | 0.55<br>0.45 | 0.2 | 0.1 |

| OUTLINE VERSION | REFERENCES |          |       |  | EUROPEAN PROJECTION | ISSUE DATE           |
|-----------------|------------|----------|-------|--|---------------------|----------------------|
|                 | IEC        | JEDEC    | JEITA |  |                     |                      |
| SOT23           |            | TO-236AB |       |  |                     | 04-11-04<br>06-03-16 |

## NPN switching transistor

BSV52

## 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**

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