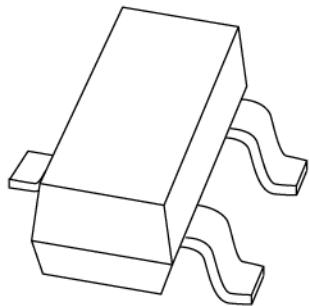


DATA SHEET



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 ⁽¹⁾ |
|-------------|-----------------------------|
| 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 |

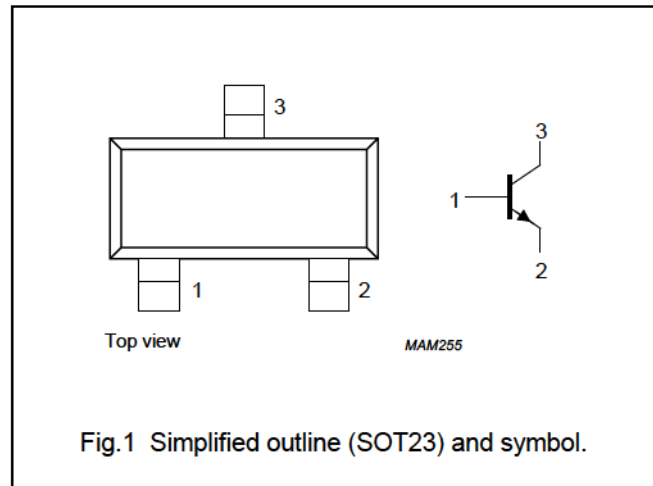


Fig.1 Simplified outline (SOT23) and symbol.

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_{CBO} | collector-base voltage | open emitter | - | 20 | V |
| V_{CEO} | collector-emitter voltage | open base | - | 12 | V |
| V_{EBO} | emitter-base voltage | open collector | - | 5 | V |
| I_C | collector current (DC) | | - | 100 | mA |
| I_{CM} | peak collector current | | - | 200 | mA |
| I_{BM} | peak base current | | - | 100 | mA |
| P_{tot} | total power dissipation | $T_{amb} \leq 25\text{ }^\circ\text{C}$ | - | 250 | mW |
| T_{stg} | storage temperature | | -65 | +150 | $^\circ\text{C}$ |
| T_j | junction temperature | | - | 150 | $^\circ\text{C}$ |
| T_{amb} | operating ambient temperature | | -65 | +150 | $^\circ\text{C}$ |

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.

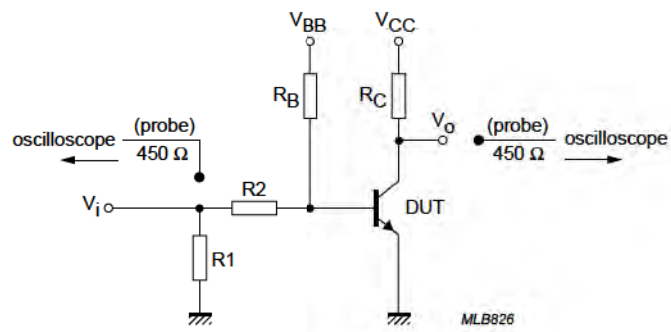
CHARACTERISTICS

$T_j = 25\text{ }^\circ\text{C}$ 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 |
| | | $I_E = 0; V_{CB} = 20\text{ V}; T_j = 125\text{ }^\circ\text{C}$ | – | – | 30 | μA |
| 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 |
| Switching times (between 10% and 90% levels); (see Fig.2) | | | | | | |
| t_{on} | turn-on time | $I_{Con} = 10\text{ mA}; I_{Bon} = 3\text{ mA};$ $I_{Boff} = -1.5\text{ mA}$ | – | – | 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

BSV52



$V_i = 0.5 \text{ V to } 4.2 \text{ V}$; $T = 500 \mu\text{s}$; $t_p = 10 \mu\text{s}$; $t_r = t_s \leq 3 \text{ ns}$.
 $R_1 = 56 \Omega$; $R_2 = 1 \text{ k}\Omega$; $R_B = 1 \text{ k}\Omega$; $R_C = 270 \Omega$.
 $V_{BB} = 0.2 \text{ V}$; $V_{CC} = 2.7 \text{ V}$.
Oscilloscope: input impedance $Z_i = 50 \Omega$.

Fig.2 Test circuit for switching times.

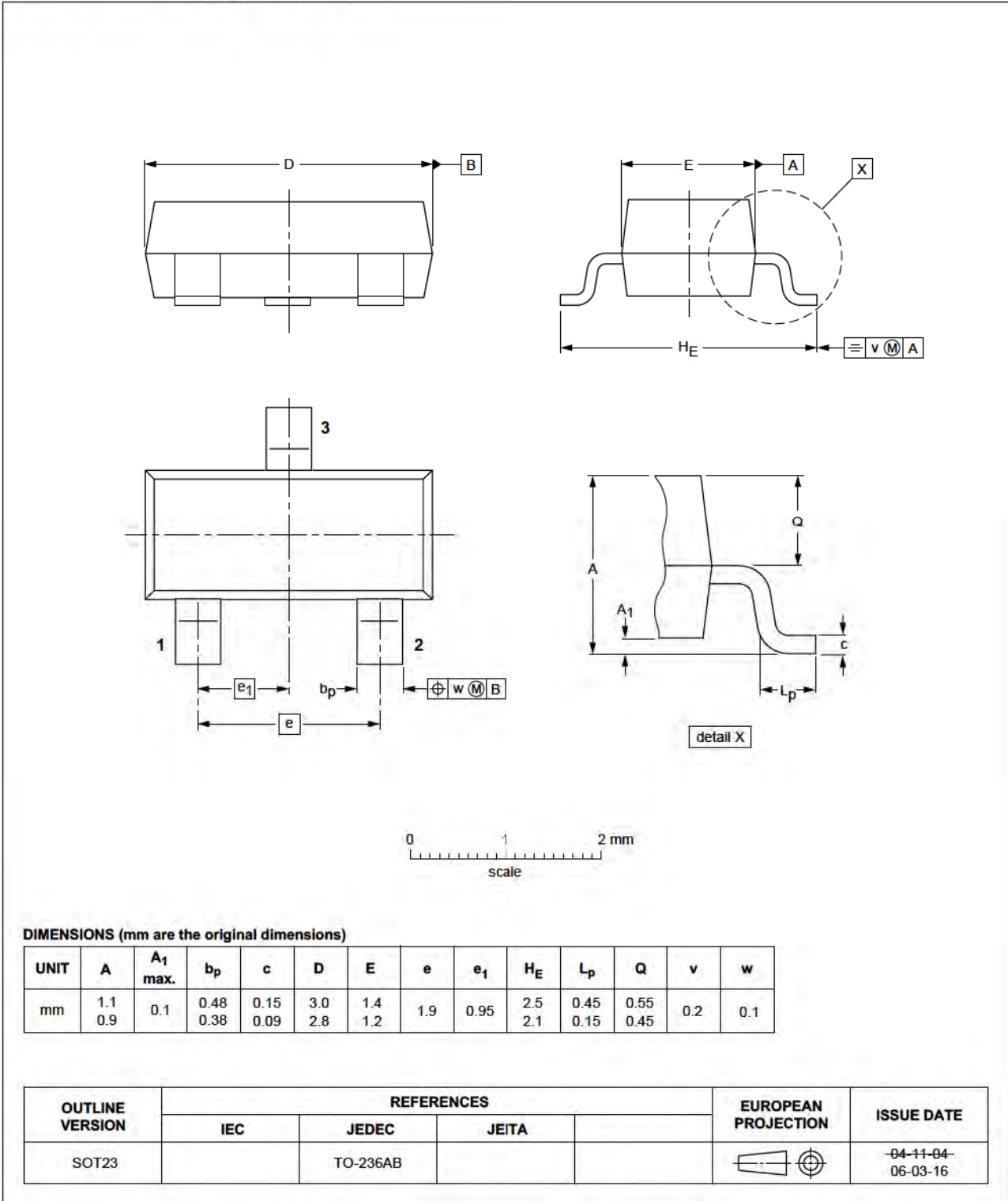
NPN switching transistor

BSV52

PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads

SOT23



NPN switching transistor

BSV52

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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Customer notification

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Contact information

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