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Kind regards,

Team Nexperia

# DATA SHEET



## **PMBT2369** NPN switching transistor

Product data sheet  
Supersedes data of 1999 Apr 27

2004 Jan 22

# NPN switching transistor

# PMBT2369

### FEATURES

- Low current (max. 200 mA)
- Low voltage (max. 15 V).

### APPLICATIONS

- High-speed switching, especially in portable equipment.

### DESCRIPTION

NPN switching transistor in a SOT23 plastic package.

### MARKING

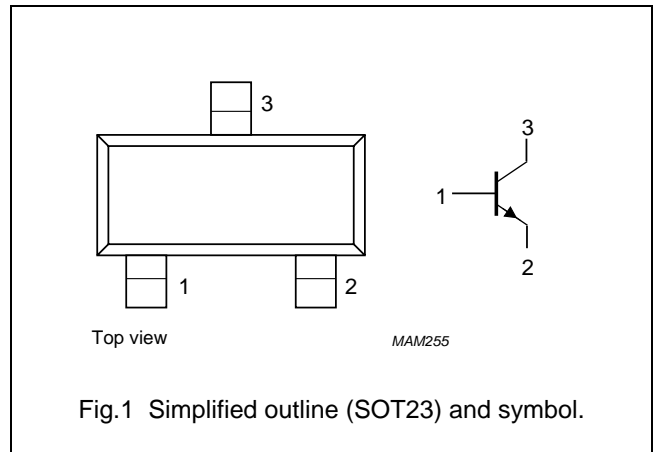
| TYPE NUMBER | MARKING CODE <sup>(1)</sup> |
|-------------|-----------------------------|
| PMBT2369    | *1J                         |

### 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 |
| PMBT2369    | –       | 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>CBO</sub> | collector-base voltage        | open emitter                     | –    | 40   | V    |
| V <sub>CEO</sub> | collector-emitter voltage     | open base                        | –    | 15   | V    |
| V <sub>EBO</sub> | emitter-base voltage          | open collector                   | –    | 5    | V    |
| I <sub>C</sub>   | collector current (DC)        |                                  | –    | 200  | mA   |
| I <sub>CM</sub>  | peak collector current        |                                  | –    | 300  | mA   |
| I <sub>BM</sub>  | peak base current             |                                  | –    | 100  | mA   |
| P <sub>tot</sub> | total power dissipation       | T <sub>amb</sub> ≤ 25 °C; note 1 | –    | 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   |

### Note

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

## NPN switching transistor

## PMBT2369

## 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.

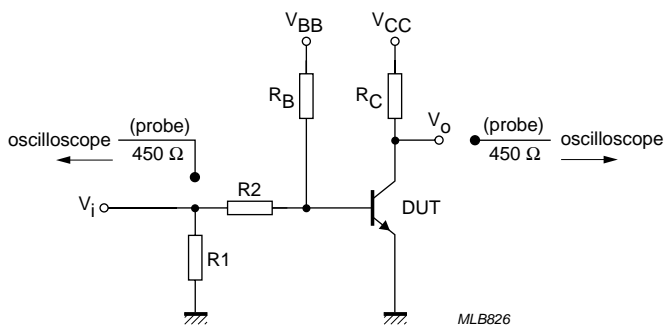
## CHARACTERISTICS

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

| SYMBOL   | PARAMETER                            | CONDITIONS  | MIN. | 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                      | $I_C = 10\text{ mA}; V_{CE} = 1\text{ V}$                                       | 40   | 120  |               |
|  |                                      | $I_C = 10\text{ mA}; V_{CE} = 1\text{ V}; T_{amb} = -55\text{ °C}$              | 20   | –    |               |
|  |                                      | $I_C = 100\text{ mA}; V_{CE} = 2\text{ V}$                                      | 20   | –    |               |
| $V_{CEsat}$  | collector-emitter saturation voltage | $I_C = 10\text{ mA}; I_B = 1\text{ mA}$   | –    | 250  | mV            |
| $V_{BEsat}$  | base-emitter saturation voltage      | $I_C = 10\text{ mA}; I_B = 1\text{ mA}$   | 700  | 850  | mV            |
| $C_c$  | collector capacitance                | $I_E = I_e = 0; V_{CB} = 5\text{ V}; f = 1\text{ MHz}$                          | –    | 4    | pF            |
| $f_T$  | transition frequency                 | $I_C = 10\text{ mA}; V_{CE} = 10\text{ V}; f = 100\text{ MHz}$                  | 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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$V_i = 0.5$  to  $4.2$  V;  $T = 500$   $\mu$ s;  $t_p = 10$   $\mu$ s;  $t_r = t_f \leq 3$  ns.  
 $R_1 = 56$   $\Omega$ ;  $R_2 = 1$  k $\Omega$ ;  $R_B = 1$  k $\Omega$ ;  $R_C = 270$   $\Omega$ .  
 $V_{BB} = 0.2$  V;  $V_{CC} = 2.7$  V.  
 Oscilloscope input impedance  $Z_i = 50$   $\Omega$ .

Fig.2 Test circuit for switching times.

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PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads

SOT23



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## 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**

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**

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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