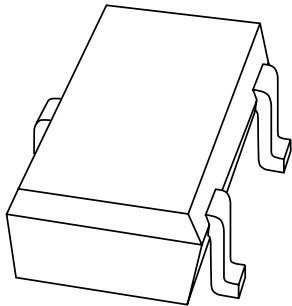


# DATA SHEET



## **PMST2222; PMST2222A** NPN switching transistors

Product data sheet  
Supersedes data of 1997 Jul 14

1999 Apr 22

# NPN switching transistors

## PMST2222; PMST2222A

### FEATURES

- High current (max. 600 mA)
- Low voltage (max. 40 V).

### APPLICATIONS

- High-speed switching and linear amplification.

### DESCRIPTION

NPN switching transistor in a SOT323 plastic package.  
PNP complement: PMST2907A.

### MARKING

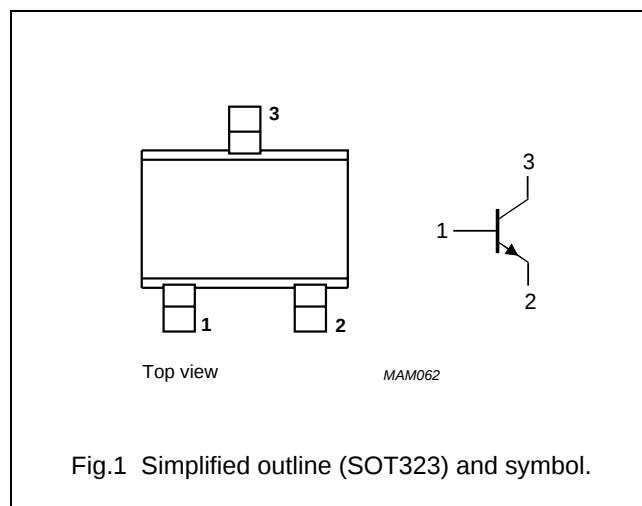
| TYPE NUMBER | MARKING CODE <sup>(1)</sup> |
|-------------|-----------------------------|
| PMST2222    | *1B                         |
| PMST2222A   | *1P                         |

### Note

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

### PINNING

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



### LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL    | PARAMETER                     | CONDITIONS                           | MIN. | MAX. | UNIT |
|-----------|-------------------------------|--------------------------------------|------|------|------|
| $V_{CBO}$ | collector-base voltage        | open emitter                         |      |      |      |
|           | PMST2222                      |                                      | –    | 60   | V    |
|           | PMST2222A                     |                                      | –    | 75   | V    |
| $V_{CEO}$ | collector-emitter voltage     | open base                            |      |      |      |
|           | PMST2222                      |                                      | –    | 30   | V    |
|           | PMST2222A                     |                                      | –    | 40   | V    |
| $V_{EBO}$ | emitter-base voltage          | open collector                       |      |      |      |
|           | PMST2222                      |                                      | –    | 5    | V    |
|           | PMST2222A                     |                                      | –    | 6    | V    |
| $I_C$     | collector current (DC)        |                                      | –    | 600  | mA   |
| $I_{CM}$  | peak collector current        |                                      | –    | 800  | mA   |
| $I_{BM}$  | peak base current             |                                      | –    | 200  | mA   |
| $P_{tot}$ | total power dissipation       | $T_{amb} \leq 25\text{ °C}$ ; note 1 | –    | 200  | mW   |
| $T_{stg}$ | storage temperature           |                                      | –65  | +150 | °C   |
| $T_j$     | junction temperature          |                                      | –    | 150  | °C   |
| $T_{amb}$ | operating ambient temperature |                                      | –65  | +150 | °C   |

### Note

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

## NPN switching transistors

## PMST2222; PMST2222A

## THERMAL CHARACTERISTICS

| SYMBOL        | PARAMETER                                   | CONDITIONS | VALUE | UNIT |
|---------------|---------------------------------------------|------------|-------|------|
| $R_{th\ j-a}$ | thermal resistance from junction to ambient | note 1     | 625   | K/W  |

## Note

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

## CHARACTERISTICS

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

| SYMBOL      | PARAMETER                                         | CONDITIONS                                                          | MIN. | MAX. | UNIT          |
|-------------|---------------------------------------------------|---------------------------------------------------------------------|------|------|---------------|
| $I_{CBO}$   | collector cut-off current<br>PMST2222             | $I_E = 0; V_{CB} = 50\text{ V}$                                     | –    | 10   | nA            |
|             |                                                   | $I_E = 0; V_{CB} = 50\text{ V}; T_j = 125\text{ °C}$                | –    | 10   | $\mu\text{A}$ |
|             | collector cut-off current<br>PMST2222A            | $I_E = 0; V_{CB} = 60\text{ V}$                                     | –    | 10   | nA            |
|             |                                                   | $I_E = 0; V_{CB} = 60\text{ V}; T_j = 125\text{ °C}$                | –    | 10   | $\mu\text{A}$ |
| $I_{EBO}$   | collector cut-off current                         | $I_C = 0; V_{EB} = 3\text{ V}$                                      | –    | 10   | nA            |
| $h_{FE}$    | DC current gain                                   | $I_C = 0.1\text{ mA}; V_{CE} = 10\text{ V}$                         | 35   | –    |               |
|             |                                                   | $I_C = 1\text{ mA}; V_{CE} = 10\text{ V}$                           | 50   | –    |               |
|             |                                                   | $I_C = 10\text{ mA}; V_{CE} = 10\text{ V}$                          | 75   | –    |               |
|             |                                                   | $I_C = 10\text{ mA}; V_{CE} = 10\text{ V}; T_{amb} = -55\text{ °C}$ | 35   | –    |               |
|             |                                                   | $I_C = 150\text{ mA}; V_{CE} = 1\text{ V}; \text{note 1}$           | 50   | –    |               |
|             |                                                   | $I_C = 150\text{ mA}; V_{CE} = 10\text{ V}; \text{note 1}$          | 100  | 300  |               |
|             | DC current gain<br>PMST2222<br>PMST2222A          | $I_C = 500\text{ mA}; V_{CE} = 10\text{ V}; \text{note 1}$          | 30   | –    |               |
|             |                                                   |                                                                     | 40   | –    |               |
| $V_{CEsat}$ | collector-emitter saturation voltage<br>PMST2222  | $I_C = 150\text{ mA}; I_B = 15\text{ mA}; \text{note 1}$            | –    | 400  | mV            |
|             |                                                   | $I_C = 500\text{ mA}; I_B = 50\text{ mA}; \text{note 1}$            | –    | 1.6  | V             |
|             | collector-emitter saturation voltage<br>PMST2222A | $I_C = 150\text{ mA}; I_B = 15\text{ mA}; \text{note 1}$            | –    | 300  | mV            |
|             |                                                   | $I_C = 500\text{ mA}; I_B = 50\text{ mA}; \text{note 1}$            | –    | 1    | V             |
| $V_{BEsat}$ | base-emitter saturation voltage<br>PMST2222       | $I_C = 150\text{ mA}; I_B = 15\text{ mA}; \text{note 1}$            | –    | 1.3  | V             |
|             |                                                   | $I_C = 500\text{ mA}; I_B = 50\text{ mA}; \text{note 1}$            | –    | 2.6  | V             |
|             | base-emitter saturation voltage<br>PMST2222A      | $I_C = 150\text{ mA}; I_B = 15\text{ mA}; \text{note 1}$            | 0.6  | 1.2  | V             |
|             |                                                   | $I_C = 500\text{ mA}; I_B = 50\text{ mA}; \text{note 1}$            | –    | 2    | V             |
| $C_c$       | collector capacitance                             | $I_E = i_e = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$             | –    | 8    | pF            |
| $C_e$       | emitter capacitance<br>PMST2222<br>PMST2222A      | $I_C = i_c = 0; V_{EB} = 0.5\text{ V}; f = 1\text{ MHz}$            | –    | 30   | pF            |
|             |                                                   |                                                                     | –    | 25   | pF            |
| $f_T$       | transition frequency<br>PMST2222<br>PMST2222A     | $I_C = 20\text{ mA}; V_{CE} = 20\text{ V}; f = 100\text{ MHz}$      | 250  | –    | MHz           |
|             |                                                   |                                                                     | 300  | –    | MHz           |

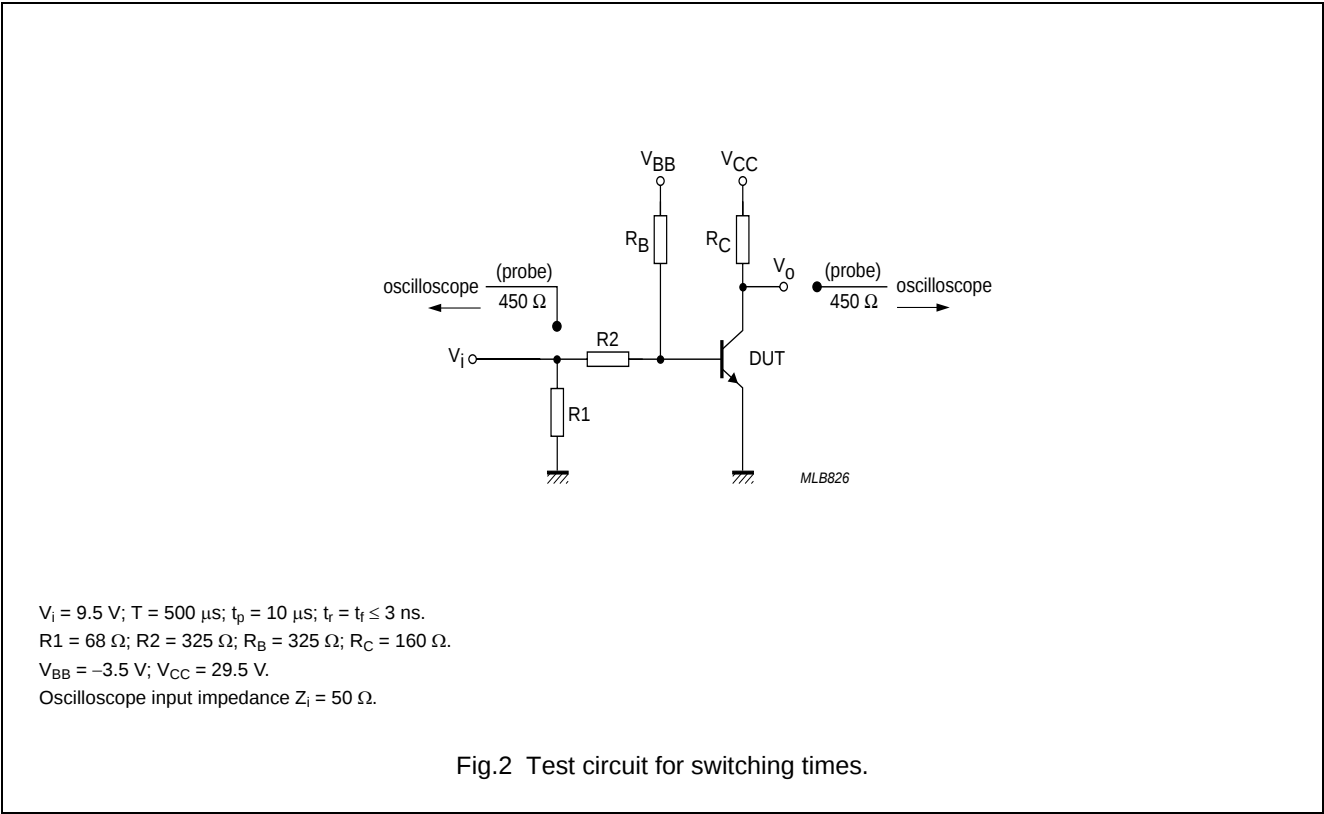
NPN switching transistors

PMST2222; PMST2222A

| SYMBOL                                                    | PARAMETER     | CONDITIONS                                                                                                                      | MIN. | MAX. | UNIT |
|-----------------------------------------------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------|------|------|------|
| F                                                         | noise figure  | $I_C = 200\text{ }\mu\text{A}$ ; $V_{CE} = 5\text{ V}$ ; $R_S = 2\text{ k}\Omega$ ;<br>$f = 1\text{ kHz}$ ; $B = 200\text{ Hz}$ | –    | 4    | dB   |
| Switching times (between 10% and 90% levels); (see Fig.2) |               |                                                                                                                                 |      |      |      |
| $t_{on}$                                                  | turn-on time  | $I_{Con} = 150\text{ mA}$ ; $I_{Bon} = 15\text{ mA}$ ;<br>$I_{Boff} = -15\text{ mA}$                                            | –    | 35   | ns   |
| $t_d$                                                     | delay time    |                                                                                                                                 | –    | 15   | ns   |
| $t_r$                                                     | rise time     |                                                                                                                                 | –    | 20   | ns   |
| $t_{off}$                                                 | turn-off time |                                                                                                                                 | –    | 250  | ns   |
| $t_s$                                                     | storage time  |                                                                                                                                 | –    | 200  | ns   |
| $t_f$                                                     | fall time     |                                                                                                                                 | –    | 60   | ns   |

Note

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



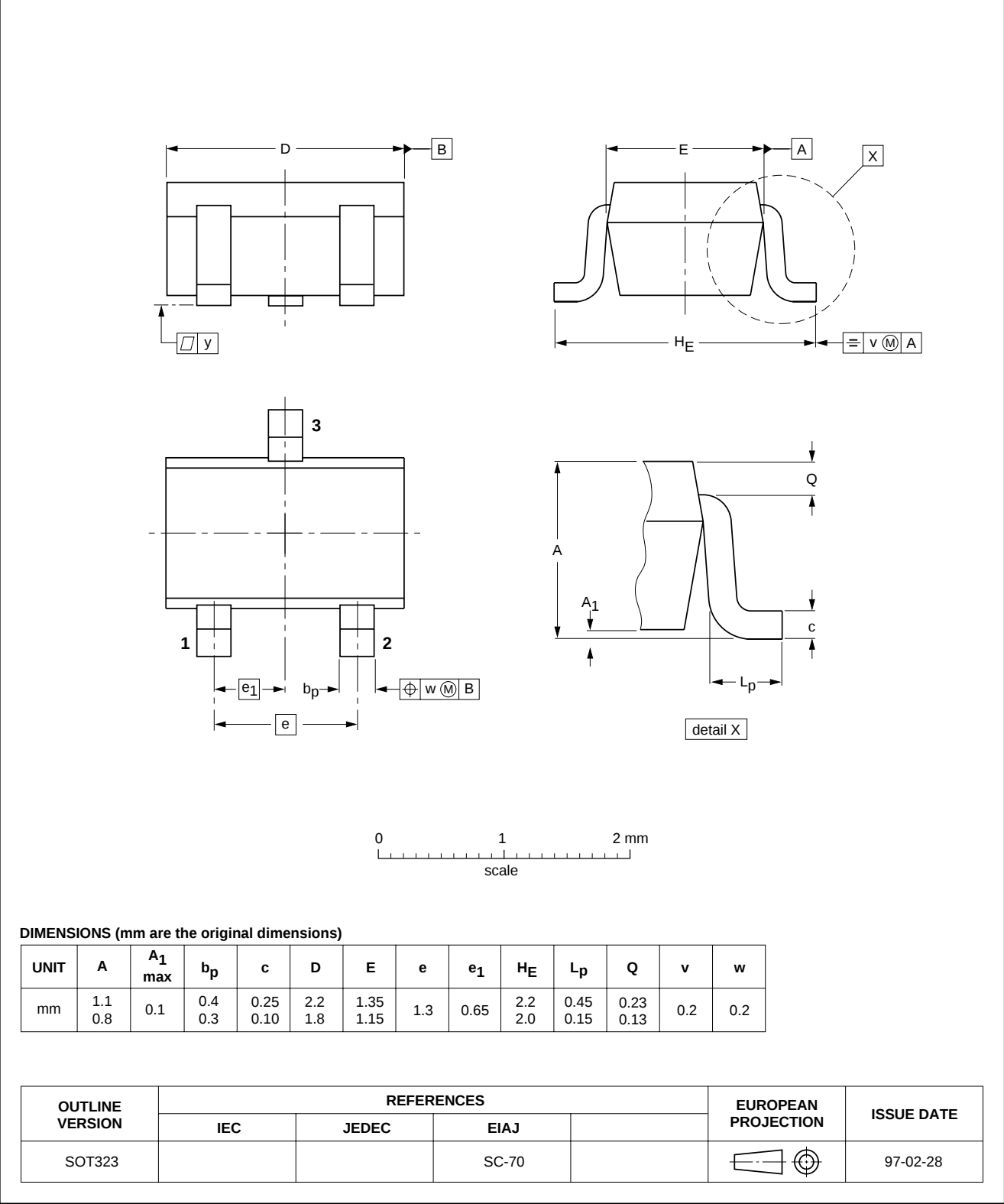
NPN switching transistors

PMST2222; PMST2222A

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT323



## NPN switching transistors

PMST2222;  
PMST2222A

## 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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