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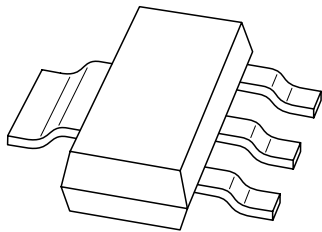
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Kind regards,

Team Nexperia

# DATA SHEET



## **PZT2222A** NPN switching transistor

Product data sheet  
Supersedes data of 1997 Jun 02

1999 Apr 14

## NPN switching transistor

## PZT2222A

## FEATURES

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

## APPLICATIONS

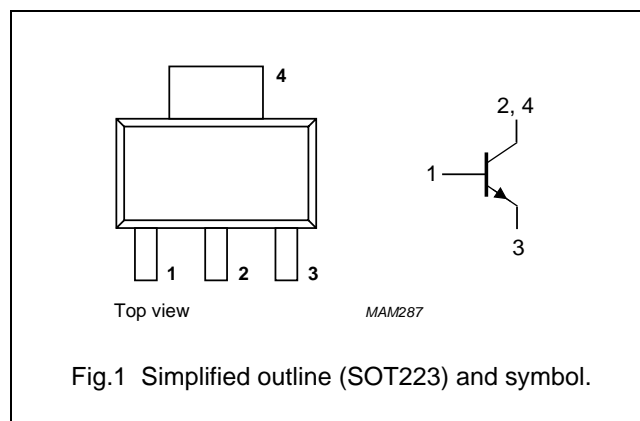
- Switching and linear amplification.

## DESCRIPTION

NPN switching transistor in a SOT223 plastic package.  
PNP complement: PZT2907A.

## PINNING

| PIN  | DESCRIPTION |
|------|-------------|
| 1    | base        |
| 2, 4 | collector   |
| 3    | emitter     |



## 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                         | —    | 75   | V    |
| $V_{CEO}$ | collector-emitter voltage     | open base                            | —    | 40   | V    |
| $V_{EBO}$ | emitter-base voltage          | open collector                       | —    | 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 | —    | 1.15 | W    |
| $T_{stg}$ | storage temperature           |                                      | −65  | +150 | °C   |
| $T_j$     | junction temperature          |                                      | —    | 150  | °C   |
| $T_{amb}$ | operating ambient temperature |                                      | −65  | +150 | °C   |

## Note

1. Device mounted on a printed-circuit board, single-sided copper, tinplated, mounting pad for collector 1 cm<sup>2</sup>. For other mounting conditions, see “*Thermal considerations for SOT223 in the General Part of associated Handbook*”.

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## THERMAL CHARACTERISTICS

| SYMBOL        | PARAMETER   | CONDITIONS | VALUE | UNIT |
|---------------|---|------------|-------|------|
| $R_{th\ j-a}$ | thermal resistance from junction to ambient         | note 1     | 109   | K/W  |
| $R_{th\ j-s}$ | thermal resistance from junction to soldering point |            | 28    | K/W  |

## Note

1. Device mounted on a printed-circuit board, single-sided copper, tinplated, mounting pad for collector 1 cm<sup>2</sup>.  
For other mounting conditions, see "Thermal considerations for SOT223 in the General Part of associated Handbook".

## CHARACTERISTICS

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

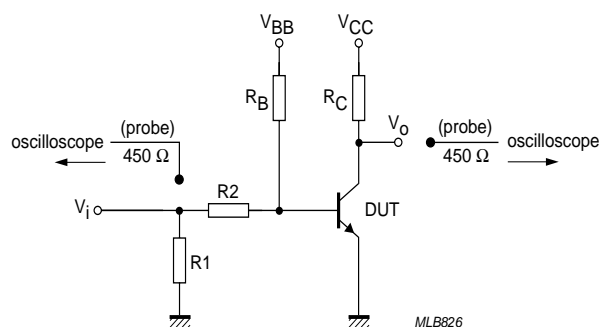
| SYMBOL   | PARAMETER                            | CONDITIONS  | MIN. | MAX. | UNIT |
|--|--------------------------------------|---|------|------|------|
| $I_{CBO}$  | collector cut-off current            | $I_E = 0$ ; $V_{CB} = 60\text{ V}$  | –    | 10   | nA   |
|  |                                      | $I_E = 0$ ; $V_{CB} = 60\text{ V}$ ; $T_{amb} = 125\text{ °C}$  | –    | 10   | μA   |
| $I_{EBO}$  | emitter cut-off current              | $I_C = 0$ ; $V_{EB} = 5\text{ V}$   | –    | 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   | –    |      |
|  |                                      | $I_C = 10\text{ mA}$ ; $V_{CE} = 10\text{ V}$ ;<br>$T_{amb} = -55\text{ °C}$                                    | 35   | –    |      |
|  |                                      | $I_C = 150\text{ mA}$ ; $V_{CE} = 1\text{ V}$ ; note 1  | 50   | –    |      |
|  |                                      | $I_C = 150\text{ mA}$ ; $V_{CE} = 10\text{ V}$ ; note 1   | 100  | 300  |      |
|  |                                      | $I_C = 500\text{ mA}$ ; $V_{CE} = 10\text{ V}$ ; note 1   | 40   | –    |      |
| $V_{CEsat}$  | collector-emitter saturation voltage | $I_C = 150\text{ mA}$ ; $I_B = 15\text{ mA}$  | –    | 300  | mV   |
|  |                                      | $I_C = 500\text{ mA}$ ; $I_B = 50\text{ mA}$  | –    | 1    | V    |
| $V_{BEsat}$  | base-emitter saturation voltage      | $I_C = 150\text{ mA}$ ; $I_B = 15\text{ mA}$  | 0.6  | 1.2  | V    |
|  |                                      | $I_C = 500\text{ mA}$ ; $I_B = 50\text{ mA}$  | –    | 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                  | $I_C = i_c = 0$ ; $V_{EB} = 500\text{ mV}$ ; $f = 1\text{ MHz}$   | –    | 25   | pF   |
| $f_T$  | transition frequency                 | $I_C = 20\text{ mA}$ ; $V_{CE} = 20\text{ V}$ ; $f = 100\text{ MHz}$  | 300  | –    | MHz  |
| <b>Switching times (between 10% and 90% levels); (see Fig.2)</b> |                                      |   |      |      |      |
| $t_{on}$   | turn-on time                         | $I_{Con} = 150\text{ mA}$ ; $I_{Bon} = 15\text{ mA}$ ;<br>$I_{Boff} = -15\text{ mA}$ ; $T_{amb} = 25\text{ °C}$ | –    | 35   | ns   |
| $t_d$  | delay time                           |   | –    | 10   | ns   |
| $t_r$  | rise time                            |   | –    | 25   | ns   |
| $t_{off}$  | turn-off time                        |   | –    | 250  | ns   |
| $t_s$  | storage time                         |   | –    | 200  | ns   |
| $t_f$  | fall time                            |   | –    | 60   | ns   |

## Note

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

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$V_i = 9.5 \text{ V}$ ;  $T = 500 \text{ } \mu\text{s}$ ;  $t_p = 10 \text{ } \mu\text{s}$ ;  $t_r = t_f \leq 3 \text{ ns}$ .  
 $R_1 = 68 \text{ } \Omega$ ;  $R_2 = 325 \text{ } \Omega$ ;  $R_B = 325 \text{ } \Omega$ ;  $R_C = 160 \text{ } \Omega$ .  
 $V_{BB} = -3.5 \text{ V}$ ;  $V_{CC} = 29.5 \text{ V}$ .  
 Oscilloscope input impedance  $Z_i = 50 \text{ } \Omega$ .

Fig.2 Test circuit for switching times.

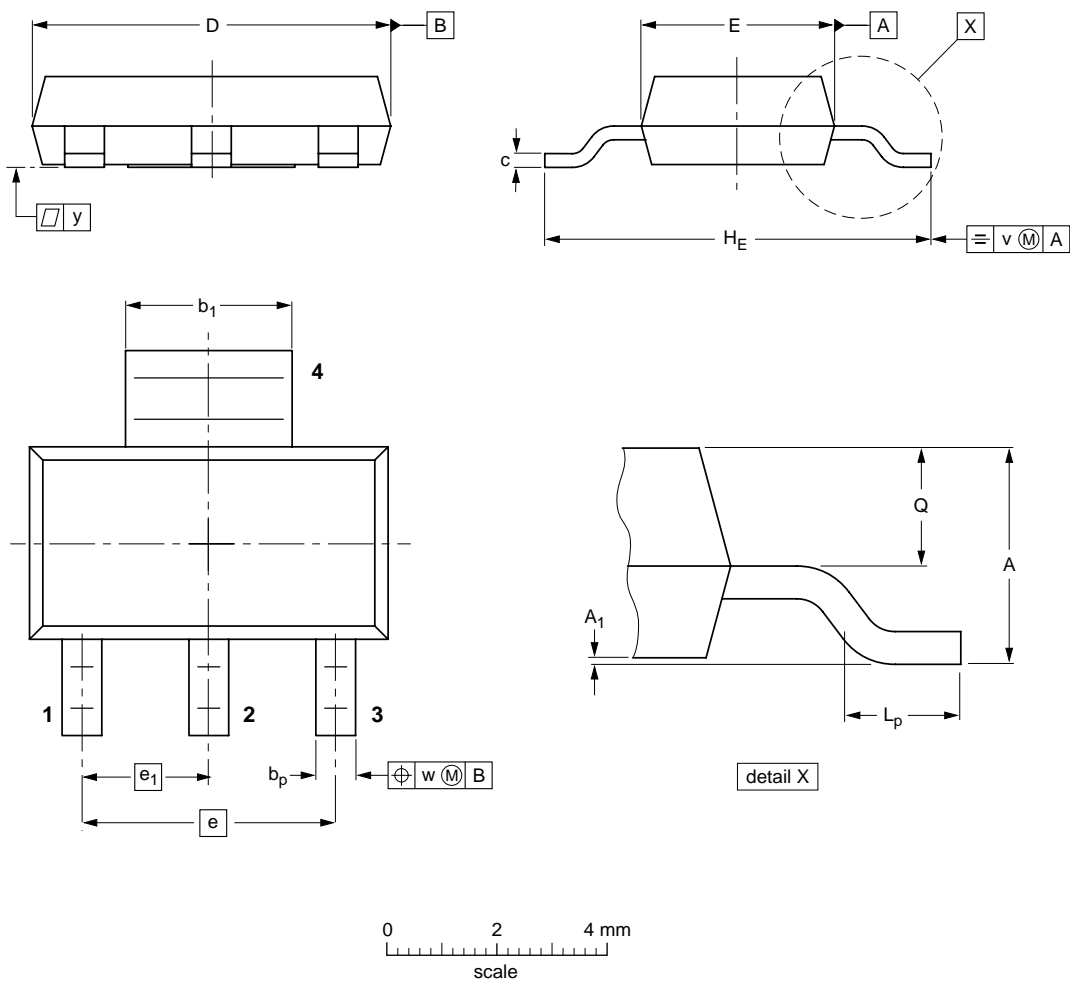
NPN switching transistor

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PACKAGE OUTLINE


Plastic surface mounted package; collector pad for good heat transfer; 4 leads

SOT223



DIMENSIONS (mm are the original dimensions)

| UNIT | A          | A <sub>1</sub> | b <sub>p</sub> | b <sub>1</sub> | c            | D          | E          | e   | e <sub>1</sub> | H <sub>E</sub> | L <sub>p</sub> | Q            | v   | w   | y   |
|------|------------|----------------|----------------|----------------|--------------|------------|------------|-----|----------------|----------------|----------------|--------------|-----|-----|-----|
| mm   | 1.8<br>1.5 | 0.10<br>0.01   | 0.80<br>0.60   | 3.1<br>2.9     | 0.32<br>0.22 | 6.7<br>6.3 | 3.7<br>3.3 | 4.6 | 2.3            | 7.3<br>6.7     | 1.1<br>0.7     | 0.95<br>0.85 | 0.2 | 0.1 | 0.1 |

| OUTLINE<br>VERSION | REFERENCES |       |       |  | EUROPEAN<br>PROJECTION  | ISSUE DATE           |
|--------------------|------------|-------|-------|--|---|----------------------|
|                    | IEC        | JEDEC | EIAJ  |  |   |                      |
| SOT223             |            |       | SC-73 |  |  | 97-02-28<br>99-09-13 |

## NPN switching transistor

PZT2222A

## 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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## **Contact information**

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