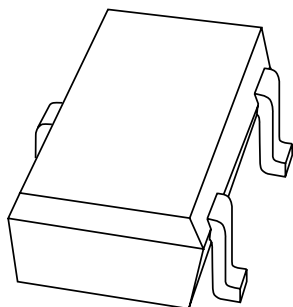


DATA SHEET



PMST2222; PMST2222A NPN switching transistors

Product specification
File under Discrete Semiconductors, SC04

1997 Jul 14

NPN switching transistors

PMST2222; PMST2222A

FEATURES

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

APPLICATIONS

- High-speed switching and linear amplification.

DESCRIPTION

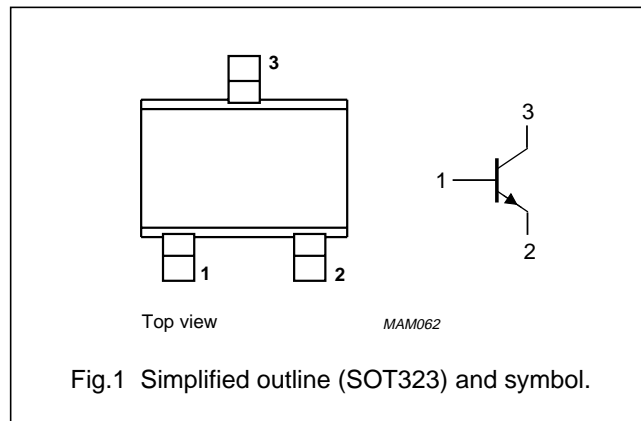
NPN switching transistor in a SOT323 plastic package.
PNP complement: PMST2907A.

MARKING

| TYPE NUMBER | MARKING CODE |
|-------------|--------------|
| PMST2222 | t1B |
| PMST2222A | t1P |

PINNING

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



QUICK REFERENCE DATA

| 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 |
| I_C | collector current (DC) | | – | 600 | mA |
| P_{tot} | total power dissipation | $T_{amb} \leq 25\text{ }^\circ\text{C}$ | – | 200 | mW |
| h_{FE} | DC current gain | $I_C = 150\text{ mA}; V_{CE} = 10\text{ V}$ | 100 | 300 | |
| f_T | transition frequency | $I_C = 20\text{ mA}; V_{CE} = 20\text{ V}; f = 100\text{ MHz}$ | | | |
| | PMST2222 | | 250 | – | MHz |
| | PMST2222A | | 300 | – | MHz |
| t_{off} | turn-off time | $I_{Con} = 150\text{ mA}; I_{Bon} = 15\text{ mA}; I_{Boff} = -15\text{ mA}$ | – | 250 | ns |

NPN switching transistors

PMST2222; PMST2222A

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} ≤ 25 °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.

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.

NPN switching transistors

PMST2222; PMST2222A

CHARACTERISTICS

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-------------|---|---|------------|--------|---------------|
| I_{CBO} | collector cut-off current PMST2222 | $I_E = 0; V_{CB} = 50\text{ V}$ | – | 10 | nA |
| | | $I_E = 0; V_{CB} = 50\text{ V}; T_j = 125\text{ }^{\circ}\text{C}$ | – | 10 | μA |
| I_{CBO} | collector cut-off current PMST2222A | $I_E = 0; V_{CB} = 60\text{ V}$ | – | 10 | nA |
| | | $I_E = 0; V_{CB} = 60\text{ V}; T_j = 125\text{ }^{\circ}\text{C}$ | – | 10 | μA |
| 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 | – | |
| | | $I_C = 10\text{ mA}; V_{CE} = 10\text{ V}; T_{amb} = -55\text{ }^{\circ}\text{C}$ | 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 | |
| h_{FE} | DC current gain PMST2222 PMST2222A | $I_C = 500\text{ mA}; V_{CE} = 10\text{ V}; \text{note 1}$ | 30 40 | – – | |
| | | | | | |
| V_{CEsat} | collector-emitter saturation voltage 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 |
| V_{CEsat} | collector-emitter saturation voltage 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 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 |
| V_{BEsat} | base-emitter saturation voltage 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 PMST2222 PMST2222A | $I_C = i_c = 0; V_{EB} = 0.5\text{ V}; f = 1\text{ MHz}$ | – | 30 | pF |
| | | | – | 25 | pF |
| f_T | transition frequency PMST2222 PMST2222A | $I_C = 20\text{ mA}; V_{CE} = 20\text{ V}; f = 100\text{ MHz}$ | 250 300 | – – | MHz MHz |
| | | | | | |
| F | noise figure | $I_C = 200\text{ }\mu\text{A}; V_{CE} = 5\text{ V}; R_S = 2\text{ k}\Omega;$ $f = 1\text{ kHz}; B = 200\text{ Hz}$ | – | 4 | dB |

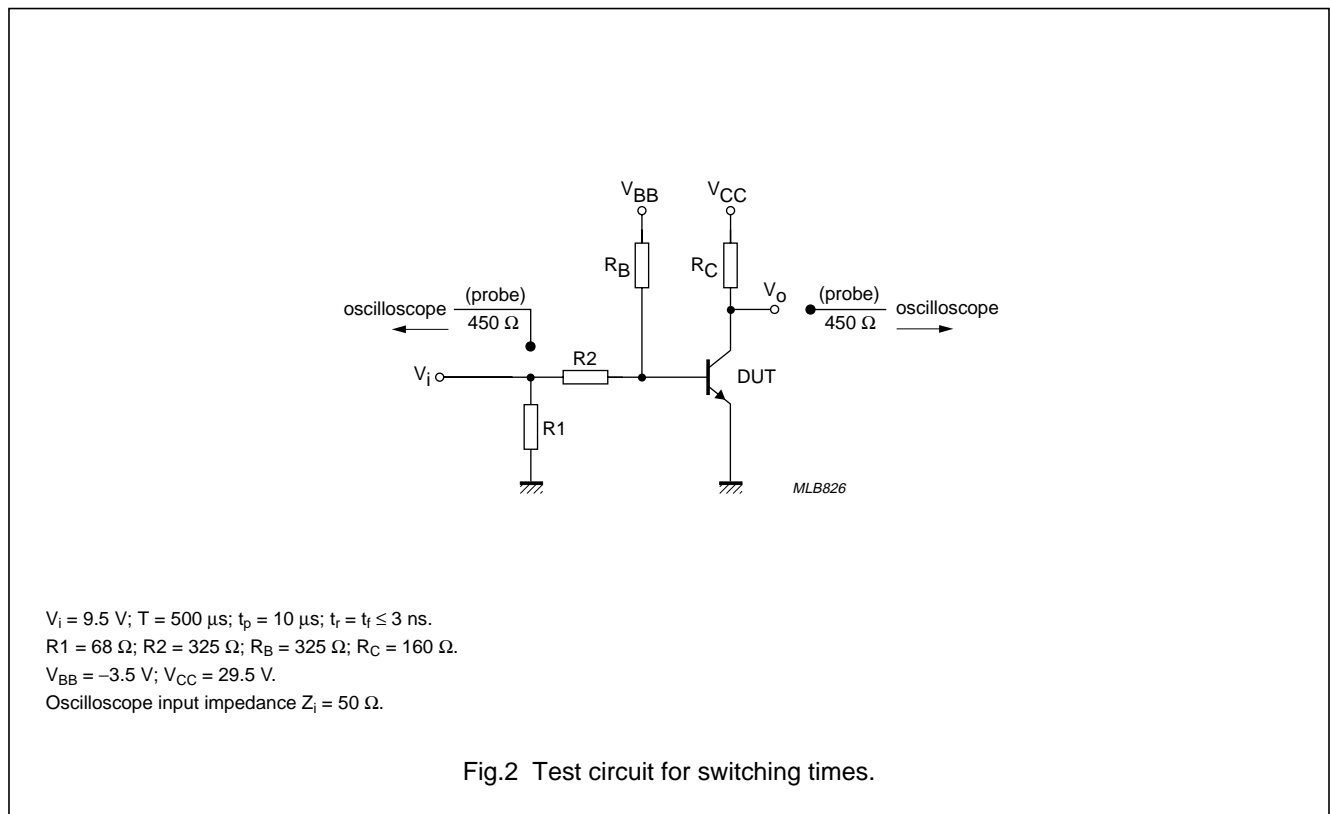
NPN switching transistors

PMST2222; PMST2222A

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|--|---------------|--|------|------|------|
| Switching times (between 10% and 90% levels); see Fig.2 | | | | | |
| t_{on} | turn-on time | $I_{Con} = 150 \text{ mA}; I_{Bon} = 15 \text{ mA}; I_{Boff} = -15 \text{ mA}$ | – | 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: $t_p \leq 300 \mu\text{s}; \delta \leq 0.02$.



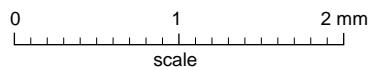
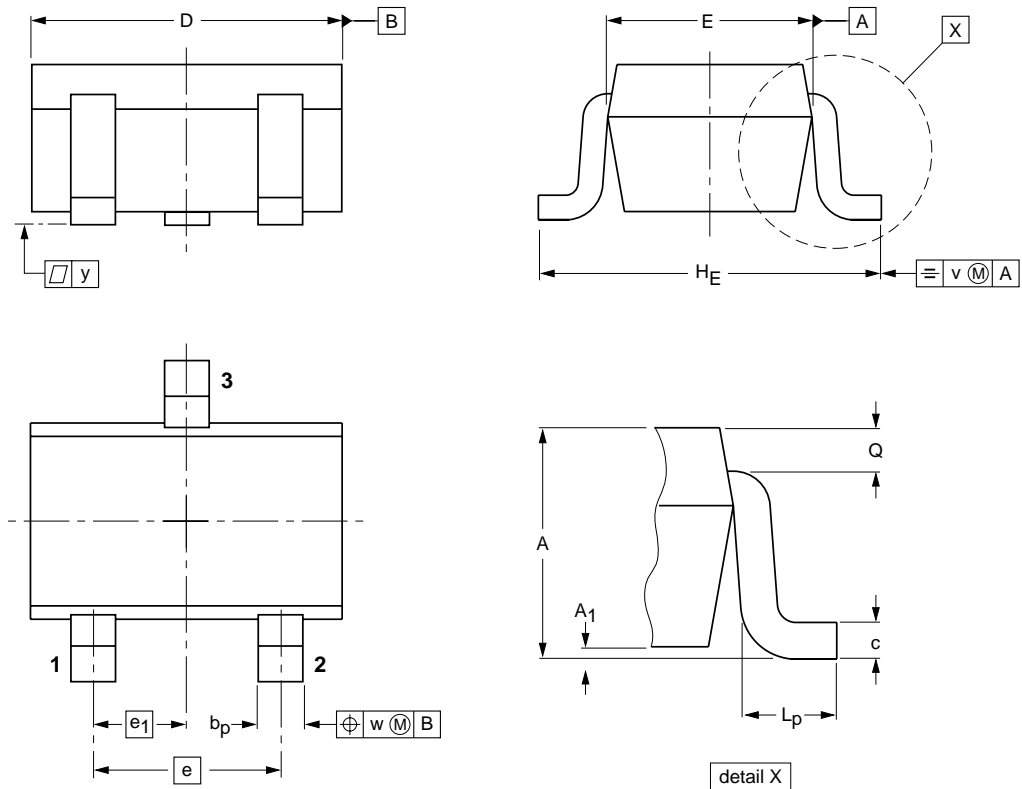
NPN switching transistors

PMST2222; PMST2222A

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT323



DIMENSIONS (mm are the original dimensions)

| UNIT | A | A ₁ max | b _p | c | D | E | e | e ₁ | H _E | L _p | Q | v | w |
|------|------------|-----------------------|----------------|--------------|------------|--------------|-----|----------------|----------------|----------------|--------------|-----|-----|
| mm | 1.1 0.8 | 0.1 | 0.4 0.3 | 0.25 0.10 | 2.2 1.8 | 1.35 1.15 | 1.3 | 0.65 | 2.2 2.0 | 0.45 0.15 | 0.23 0.13 | 0.2 | 0.2 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|-------|-------|--|---------------------|------------|
| | IEC | JEDEC | EIAJ | | | |
| SOT323 | | | SC-70 | | | 97-02-28 |

NPN switching transistors

PMST2222; PMST2222A

DEFINITIONS

| Data sheet status | |
|---|---|
| Objective specification | This data sheet contains target or goal specifications for product development. |
| Preliminary specification | This data sheet contains preliminary data; supplementary data may be published later. |
| Product specification | This data sheet contains final product specifications. |
| Limiting values | |
| Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability. | |
| Application information | |
| Where application information is given, it is advisory and does not form part of the specification. | |

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