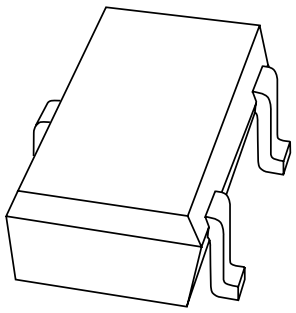
# DATA SHEET



# PMSS3906
## PNP switching transistor

Product data sheet
Supersedes data of 1999 Apr 22

2004 Jan 09

NXP founded by Philips

# PNP switching transistor PMSS3906

## FEATURES

- Low current (max. 100 mA)
- Low voltage (max. 40 V).

## APPLICATIONS

- Switching, e.g. telephony and professional communication equipment.

## DESCRIPTION

PNP switching transistor in an SOT323 (SC-70) plastic package. NPN complement: PMSS3904.

## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | TYP. | MAX. | UNIT |
|---|---|---|---|---|
| $V_{CEO}$ | collector-emitter voltage | – | –40 | V |
| $I_C$ | collector current | – | –100 | mA |
| $h_{FE}$ | DC current gain | 100 | 300 | |

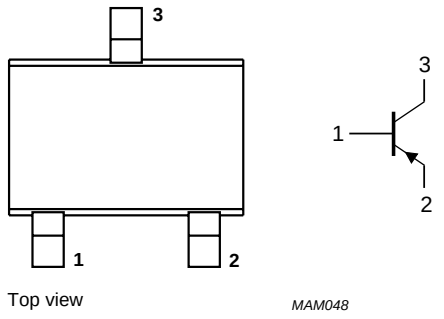
## PRODUCT OVERVIEW

| TYPE NUMBER | PACKAGE | | MARKING CODE(1) | NPN COMPLEMENT |
|---|---|---|---|---|
| | PHILIPS | EIAJ | | |
| PMSS3906 | SOT323 | SC-70 | 06* | PMSS3904 |

**Note**

1. * = p: Made in Hong Kong.
   * = t: Made in Malaysia.
   * = W: Made in China.

## SIMPLIFIED OUTLINE, SYMBOL AND PINNING

| TYPE NUMBER | SIMPLIFIED OUTLINE AND SYMBOL | PINNING | |
|---|---|---|---|
| | | PIN | DESCRIPTION |
| PMSS3906 |  | 1 | base |
| | | 2 | emitter |
| | | 3 | collector |

## ORDERING INFORMATION

| TYPE NUMBER | PACKAGE | | |
|---|---|---|---|
| | NAME | DESCRIPTION | VERSION |
| PMSS3906 | – | plastic surface mounted package; 3 leads | SOT323 |

## 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 | – | −40 | V |
| $V_{CEO}$ | collector-emitter voltage | open base | – | −40 | 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 | $T_{amb} \leq 25$ °C; notes 1 and 2 | – | 200 | mW |
| $T_{stg}$ | storage temperature | | −65 | +150 | °C |
| $T_j$ | junction temperature | | – | 150 | °C |
| $T_{amb}$ | operating ambient temperature | | −65 | +150 | °C |

**Notes**

1. Refer to standard mounting conditions.
2. Transistor mounted on an FR4 printed-circuit board, single-sided copper, tinplated, standard footprint.

## THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---|---|---|---|---|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | notes 1 and 2 | 625 | K/W |

**Notes**

1. Refer to standard mounting conditions.
2. Transistor mounted on an FR4 printed-circuit board, single-sided copper, tinplated, standard footprint.

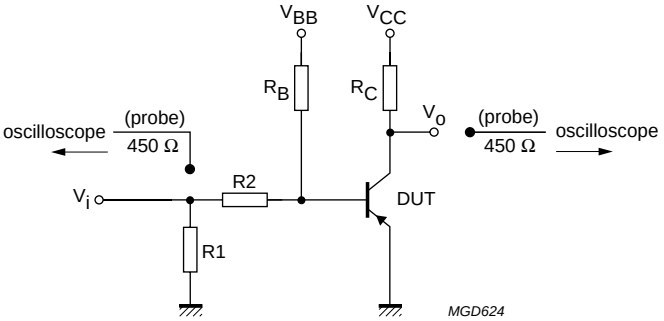
## CHARACTERISTICS

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| $I_{CBO}$ | collector-base cut-off current | $I_E$ = 0; $V_{CB}$ = −30 V | − | −50 | nA |
| | | $I_E$ = 0; $V_{CB}$ = −30 V; $T_j$ = 150 °C | − | −10 | μA |
| $I_{EBO}$ | emitter-base cut-off current | $I_C$ = 0; $V_{EB}$ = −5 V | − | −50 | nA |
| $h_{FE}$ | DC current gain | $V_{CE}$ = −1 V | | | |
| | | $I_C$ = −0.1 mA | 60 | − | |
| | | $I_C$ = −1 mA | 80 | − | |
| | | $I_C$ = −10 mA | 100 | 300 | |
| | | $I_C$ = −50 mA; note 1 | 60 | − | |
| | | $I_C$ = −100 mA; note 1 | 30 | − | |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C$ = −10 mA; $I_B$ = −1 mA | − | −250 | mV |
| | | $I_C$ = −50 mA; $I_B$ = −5 mA; note 1 | − | −400 | mV |
| $V_{BEsat}$ | base-emitter saturation voltage | $I_C$ = −10 mA; $I_B$ = −1 mA | − | −850 | mV |
| | | $I_C$ = −50 mA; $I_B$ = −5 mA; note 1 | − | −950 | mV |
| $C_c$ | collector capacitance | $I_E$ = $i_e$ = 0; $V_{CB}$ = −5 V; f = 1 MHz | − | 4.5 | pF |
| $C_e$ | emitter capacitance | $I_C$ = $i_c$ = 0; $V_{EB}$ = −0.5 V; f = 1 MHz | − | 14 | pF |
| $f_T$ | transition frequency | $I_E$ = −10 mA; $V_{CB}$ = −20 V; f = 100 MHz | 150 | − | MHz |
| F | noise figure | $I_C$ = −100 μA; $V_{CE}$ = −5 V; $R_S$ = 1 kΩ; f = 10 Hz to 15.7 kHz | − | 4 | dB |
| **Switching times (between 10% and 90% levels)**; see Fig.1 | | | | | |
| $t_{on}$ | turn-on time | $I_{Con}$ = −10 mA; $I_{Bon}$ = −1 mA; $I_{Boff}$ = 1 mA | − | 100 | ns |
| $t_d$ | delay time | | − | 50 | ns |
| $t_r$ | rise time | | − | 50 | ns |
| $t_{off}$ | turn-off time | | − | 700 | ns |
| $t_s$ | storage time | | − | 600 | ns |
| $t_f$ | fall time | | − | 100 | ns |

**Note**

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

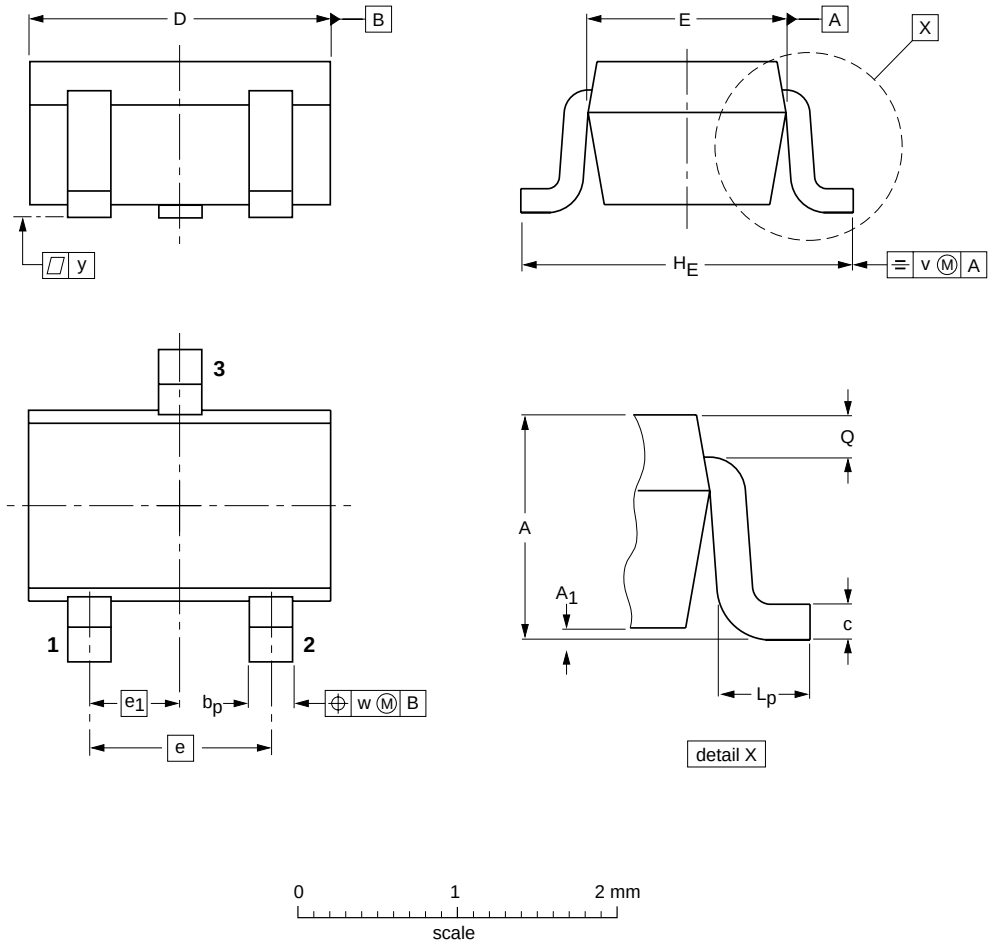



$V_i$ = −5 V; T = 500 μs; $t_p$ = 10 μs; $t_r = t_f \leq 3$ ns.
R1 = 56 Ω; R2 = 2.5 kΩ; $R_B$ = 3.9 kΩ; $R_C$ = 270 Ω.
$V_{BB}$ = 1.9 V; $V_{CC}$ = 3 V.
Oscilloscope input impedance $Z_i$ = 50 Ω.

Fig.1 Test circuit for switching times.

## 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<br>0.8 | 0.1 | 0.4<br>0.3 | 0.25<br>0.10 | 2.2<br>1.8 | 1.35<br>1.15 | 1.3 | 0.65 | 2.2<br>2.0 | 0.45<br>0.15 | 0.23<br>0.13 | 0.2 | 0.2 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT323 | | | SC-70 | | | ~~04-11-04~~<br>06-03-16 |

**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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