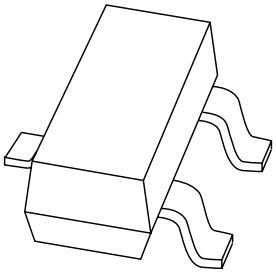
# DATA SHEET



# PMBS3906
## PNP general purpose transistor

Product data sheet
Supersedes data of 1999 Apr 22

2004 Feb 02

NXP founded by Philips

# PNP general purpose transistor PMBS3906

## FEATURES

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

## APPLICATIONS

- General purpose switching and amplification, e.g. telephony and professional communication equipment.

## DESCRIPTION

PNP transistor in a SOT23 plastic package.
NPN complement: PMBS3904.

## MARKING

| TYPE NUMBER | MARKING CODE(1) |
|---|---|
| PMBS3906 | *O6 |

**Note**

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

## PINNING

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

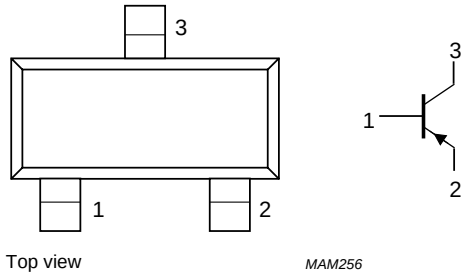



Fig.1 Simplified outline (SOT23) and symbol.

## ORDERING INFORMATION

| TYPE NUMBER | PACKAGE | | |
|---|---|---|---|
| | NAME | DESCRIPTION | VERSION |
| PMBS3906 | – | 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 |
|---|---|---|---|---|---|
| $V_{CBO}$ | 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 capability | | – | −100 | mA |
| $I_{CM}$ | peak collector current | | – | −200 | mA |
| $I_{BM}$ | peak base current | | – | −200 | mA |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq 25$ °C | – | 250 | mW |
| $T_{stg}$ | storage temperature | | −65 | +150 | °C |
| $T_j$ | junction temperature | | – | 150 | °C |
| $T_{amb}$ | operating ambient temperature | | −65 | +150 | °C |

## 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

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| $I_{CBO}$ | collector cut-off current | $I_E$ = 0; $V_{CB}$ = –30 V | – | –50 | nA |
| $I_{EBO}$ | emitter cut-off current | $I_C$ = 0; $V_{EB}$ = –5 V | – | –50 | nA |
| $h_{FE}$ | DC current gain | $V_{CE}$ = –1 V; (see Fig.2) | | | |
| | | $I_C$ = –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 = 100 MHz | – | 4.5 | pF |
| $C_e$ | emitter capacitance | $I_C = i_c$ = 0; $VE_B$ = –0.5 V; f = 100 MHz | – | 12 | pF |
| $f_T$ | transition frequency | $I_C$ = –10 mA; $V_{CE}$ = –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.3) | | | | | |
| $t_{on}$ | 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; $\delta \leq 0.02$.

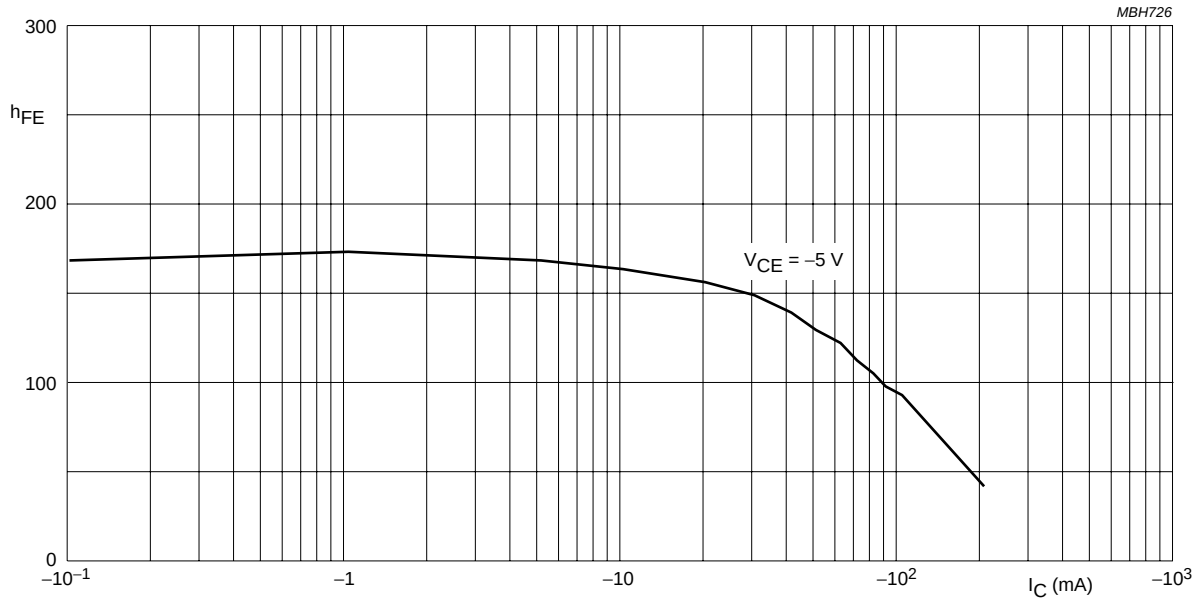
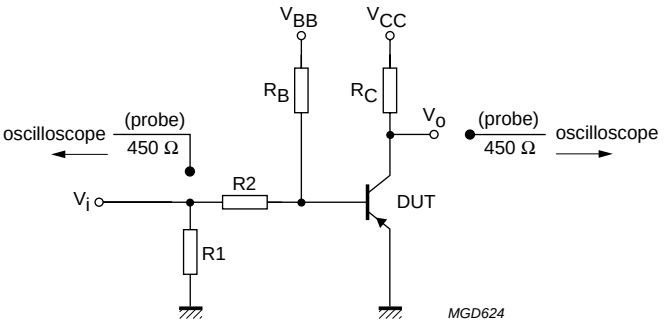



Fig.2 DC current gain; typical values.

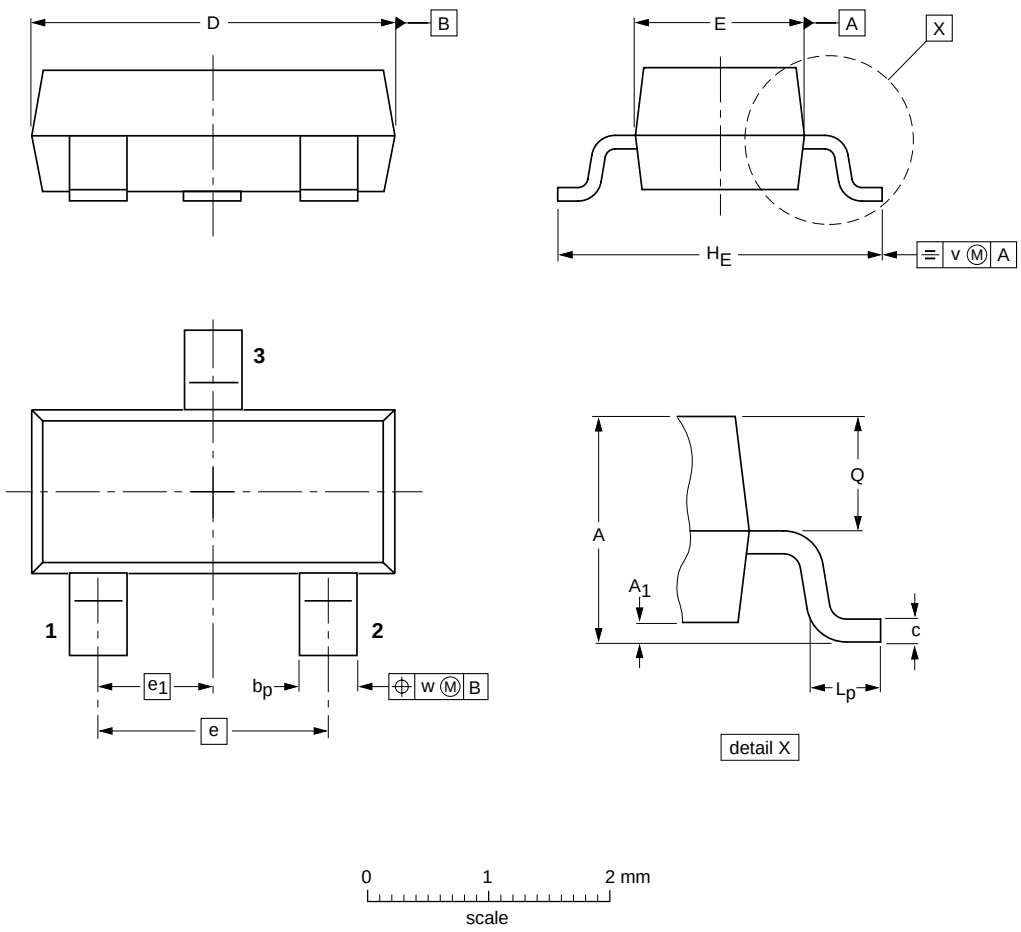



$V_i$ = –5 V; T = 500 μs; $t_p$ = 10 μs; $t_r$ = $t_f$ ≤ 3 ns.
R1 = 56 Ω; R2 = 2.5 kΩ; $R_B$ = 3.9 kΩ; $R_C$ = 270 Ω.
$V_{BB}$ = 1.9 V; $V_{CC}$ = 3 V.
Oscilloscope input impedance $Z_i$ = 50 Ω.

Fig.3 Test circuit for switching times.

## PACKAGE OUTLINE

**Plastic surface-mounted package; 3 leads** **SOT23**




**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>0.9 | 0.1 | 0.48<br>0.38 | 0.15<br>0.09 | 3.0<br>2.8 | 1.4<br>1.2 | 1.9 | 0.95 | 2.5<br>2.1 | 0.45<br>0.15 | 0.55<br>0.45 | 0.2 | 0.1 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT23 | | TO-236AB | | | | ~~04-11-04~~<br>06-03-16 |

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| 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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