

# DATA SHEET



**PMBS3906**

**PNP general purpose transistor**

Product data sheet  
Supersedes data of 1999 Apr 22

2004 Feb 02

# 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

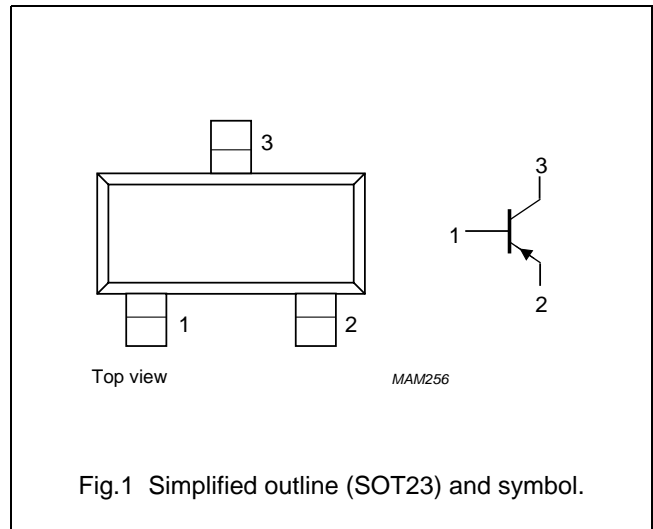
TYPE NUMBER	MARKING CODE <sup>(1)</sup>
PMBS3906	*O6

### Note

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

### PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector



### 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 <sub>CB0</sub>	collector-base voltage	open emitter	–	–40	V
V <sub>CEO</sub>	collector-emitter voltage	open base	–	–40	V
V <sub>EBO</sub>	emitter-base voltage	open collector	–	–5	V
I <sub>C</sub>	collector current capability		–	–100	mA
I <sub>CM</sub>	peak collector current		–	–200	mA
I <sub>BM</sub>	peak base current		–	–200	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	–	250	mW
T <sub>stg</sub>	storage temperature		–65	+150	°C
T <sub>j</sub>	junction temperature		–	150	°C
T <sub>amb</sub>	operating ambient temperature		–65	+150	°C

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## 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

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{CBO}$	collector cut-off current	$I_E = 0$ ; $V_{CB} = -30\text{ V}$	–	–50	nA
$I_{EBO}$	emitter cut-off current	$I_C = 0$ ; $V_{EB} = -5\text{ V}$	–	–50	nA
$h_{FE}$	DC current gain	$V_{CE} = -1\text{ V}$ ; (see Fig.2) $I_C = -0.1\text{ mA}$ $I_C = -1\text{ mA}$ $I_C = -10\text{ mA}$ $I_C = -50\text{ mA}$ ; note 1 $I_C = -100\text{ mA}$ ; note 1	60 80 100 60 30	– – 300 – –	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = -10\text{ mA}$ ; $I_B = -1\text{ mA}$ $I_C = -50\text{ mA}$ ; $I_B = -5\text{ mA}$ ; note 1	– –	–250 –400	mV mV
$V_{BEsat}$	base-emitter saturation voltage	$I_C = -10\text{ mA}$ ; $I_B = -1\text{ mA}$ $I_C = -50\text{ mA}$ ; $I_B = -5\text{ mA}$ ; note 1	– –	–850 –950	mV mV
$C_c$	collector capacitance	$I_E = i_e = 0$ ; $V_{CB} = -5\text{ V}$ ; $f = 100\text{ MHz}$	–	4.5	pF
$C_e$	emitter capacitance	$I_C = i_c = 0$ ; $V_{EB} = -0.5\text{ V}$ ; $f = 100\text{ MHz}$	–	12	pF
$f_T$	transition frequency	$I_C = -10\text{ mA}$ ; $V_{CE} = -20\text{ V}$ ; $f = 100\text{ MHz}$	150	–	MHz
F	noise figure	$I_C = -100\text{ }\mu\text{A}$ ; $V_{CE} = -5\text{ V}$ ; $R_S = 1\text{ k}\Omega$ ; $f = 10\text{ Hz to }15.7\text{ kHz}$	–	4	dB

## Switching times (between 10% and 90% levels); (see Fig.3)

$t_{on}$	turn-on time	$I_{Con} = -10\text{ mA}$ ; $I_{Bon} = -1\text{ mA}$ ; $I_{Boff} = 1\text{ mA}$	–	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:  $t_p \leq 300\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$ .

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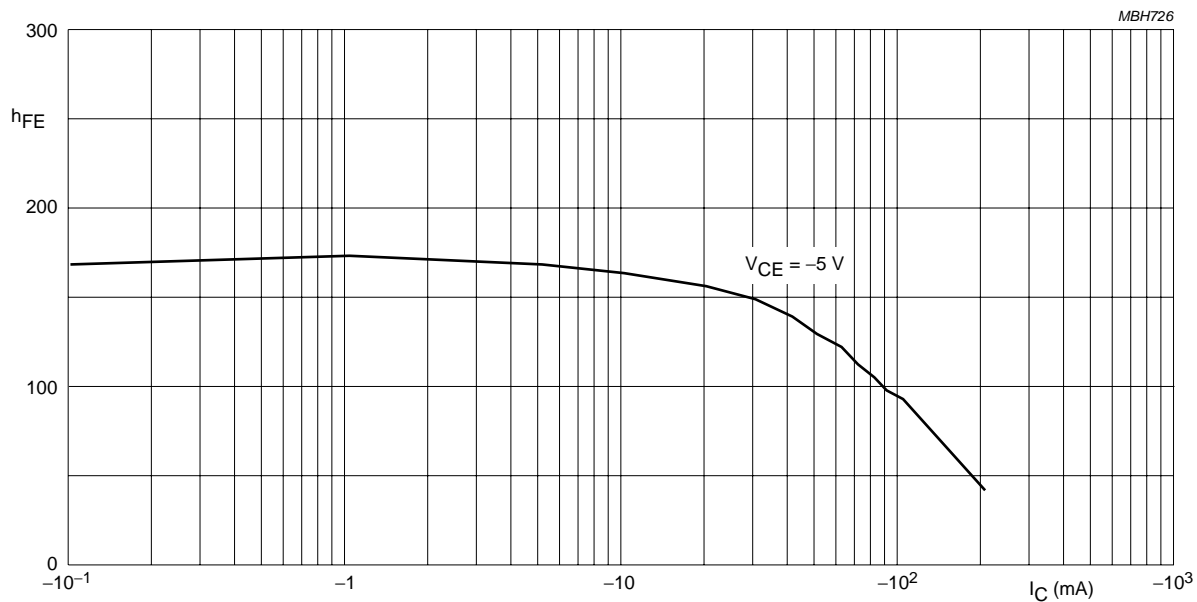
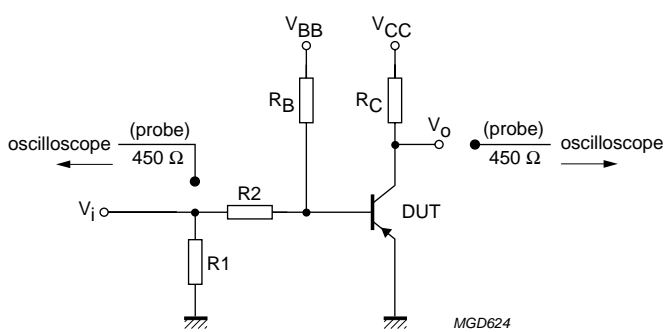


Fig.2 DC current gain; typical values.



$V_i = -5 \text{ V}$ ;  $T = 500 \text{ } \mu\text{s}$ ;  $t_p = 10 \text{ } \mu\text{s}$ ;  $t_r = t_f \leq 3 \text{ ns}$ .  
 $R_1 = 56 \text{ } \Omega$ ;  $R_2 = 2.5 \text{ k}\Omega$ ;  $R_B = 3.9 \text{ k}\Omega$ ;  $R_C = 270 \text{ } \Omega$ .  
 $V_{BB} = 1.9 \text{ V}$ ;  $V_{CC} = 3 \text{ V}$ .  
 Oscilloscope input impedance  $Z_i = 50 \text{ } \Omega$ .

Fig.3 Test circuit for switching times.

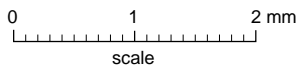
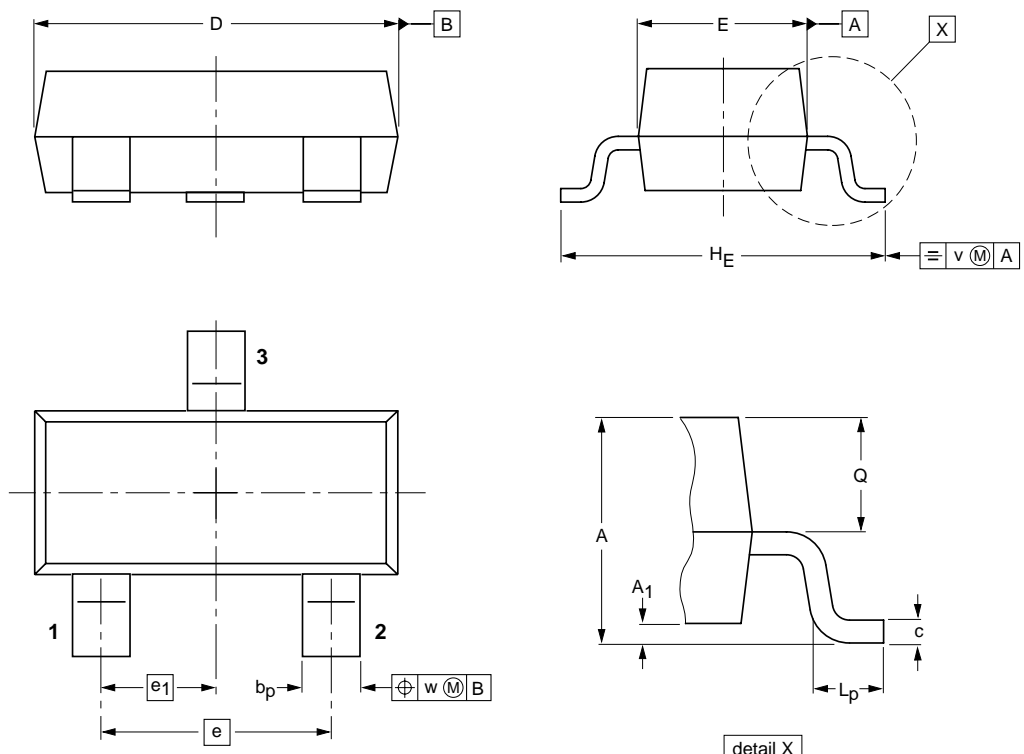
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PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads

SOT23



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub> max.	b <sub>p</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	Q	v	w
mm	1.1 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1

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

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## 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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# ***NXP Semiconductors***

## **Customer notification**

This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content, except for package outline drawings which were updated to the latest version.

## **Contact information**

For additional information please visit: <http://www.nxp.com>

For sales offices addresses send e-mail to: [salesaddresses@nxp.com](mailto:salesaddresses@nxp.com)

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