



# PMBS3906

40 V, 100 mA PNP general-purpose transistor

5 June 2018

Product data sheet

## 1. General description

PNP general-purpose transistor in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

NPN complement: PMBS3904

## 2. Features and benefits

- 100 mA collector current capability

## 3. Applications

- General-purpose switching and amplification

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CEO}$	collector-emitter voltage	open base	-	-	-40	V
$I_C$	collector current		-	-	-100	mA
$h_{FE}$	DC current gain	$V_{CE} = -1\text{ V}; I_C = -10\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	100	-	300	

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	<p>TO-236AB (SOT23)</p>	<p>006aab259</p>
2	E	emitter		
3	C	collector		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMBS3906	TO-236AB	plastic surface-mounted package; 3 leads	SOT23

## 7. Marking

Table 4. Marking codes

Type number	Marking code <sup>[1]</sup>
PMBS3906	%O6

[1] % = placeholder for manufacturing site code

## 8. Limiting values

Table 5. 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		-	-100	mA
$I_{CM}$	peak collector current		-	-200	mA
$I_{BM}$	peak base current		-	-200	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	-	250	mW
$T_j$	junction temperature		-	150	°C
$T_{amb}$	ambient temperature		-65	150	°C
$T_{stg}$	storage temperature		-65	150	°C

## 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	500	K/W

[1] Device mounted on an FR4 Printed-Circuit Board (PCB).

## 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{CBO}$	collector-base cut-off current	$V_{CB} = -30\text{ V}$ ; $I_E = 0\text{ A}$ ; $T_{amb} = 25\text{ °C}$	-	-	-50	nA
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = -5\text{ V}$ ; $I_C = 0\text{ A}$ ; $T_{amb} = 25\text{ °C}$	-	-	-50	nA
$h_{FE}$	DC current gain	$V_{CE} = -1\text{ V}$ ; $I_C = -0.1\text{ mA}$ ; $T_{amb} = 25\text{ °C}$	60	-	-	
		$V_{CE} = -1\text{ V}$ ; $I_C = -1\text{ mA}$ ; $T_{amb} = 25\text{ °C}$	80	-	-	
		$V_{CE} = -1\text{ V}$ ; $I_C = -10\text{ mA}$ ; $T_{amb} = 25\text{ °C}$	100	-	300	
		$V_{CE} = -1\text{ V}$ ; $I_C = -50\text{ mA}$ ; pulsed; $t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25\text{ °C}$	60	-	-	
		$V_{CE} = -1\text{ V}$ ; $I_C = -100\text{ mA}$ ; pulsed; $t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25\text{ °C}$	30	-	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = -10\text{ mA}$ ; $I_B = -1\text{ mA}$ ; $T_{amb} = 25\text{ °C}$	-	-	-250	mV
		$I_C = -50\text{ mA}$ ; $I_B = -5\text{ mA}$ ; pulsed; $t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25\text{ °C}$	-	-	-400	mV
$V_{BEsat}$	base-emitter saturation voltage	$I_C = -10\text{ mA}$ ; $I_B = -1\text{ mA}$ ; $T_{amb} = 25\text{ °C}$	-	-	-850	mV
		$I_C = -50\text{ mA}$ ; $I_B = -5\text{ mA}$ ; pulsed; $t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25\text{ °C}$	-	-	-950	mV
$t_d$	delay time	$I_C = -10\text{ mA}$ ; $I_{Bon} = -1\text{ mA}$ ; $I_{Boff} = 1\text{ mA}$ ; $T_{amb} = 25\text{ °C}$	-	-	50	ns
$t_r$	rise time		-	-	50	ns
$t_{on}$	turn-on time		-	-	100	ns
$t_s$	storage time		-	-	600	ns
$t_f$	fall time		-	-	100	ns
$t_{off}$	turn-off time		-	-	700	ns
$C_c$	collector capacitance		$V_{CB} = -5\text{ V}$ ; $I_E = 0\text{ A}$ ; $i_e = 0\text{ A}$ ; $f = 100\text{ MHz}$ ; $T_{amb} = 25\text{ °C}$	-	-	4.5
$C_e$	emitter capacitance	$V_{EB} = -0.5\text{ V}$ ; $I_C = 0\text{ A}$ ; $i_c = 0\text{ A}$ ; $f = 100\text{ MHz}$ ; $T_{amb} = 25\text{ °C}$	-	-	12	pF
$f_T$	transition frequency	$V_{CE} = -20\text{ V}$ ; $I_C = -10\text{ mA}$ ; $f = 100\text{ MHz}$ ; $T_{amb} = 25\text{ °C}$	150	-	-	MHz
NF	noise figure	$V_{CE} = -5\text{ V}$ ; $I_C = -100\text{ }\mu\text{A}$ ; $R_S = 1\text{ k}\Omega$ ; $10\text{ Hz} < f < 15700\text{ Hz}$ ; $T_{amb} = 25\text{ °C}$	-	-	4	dB

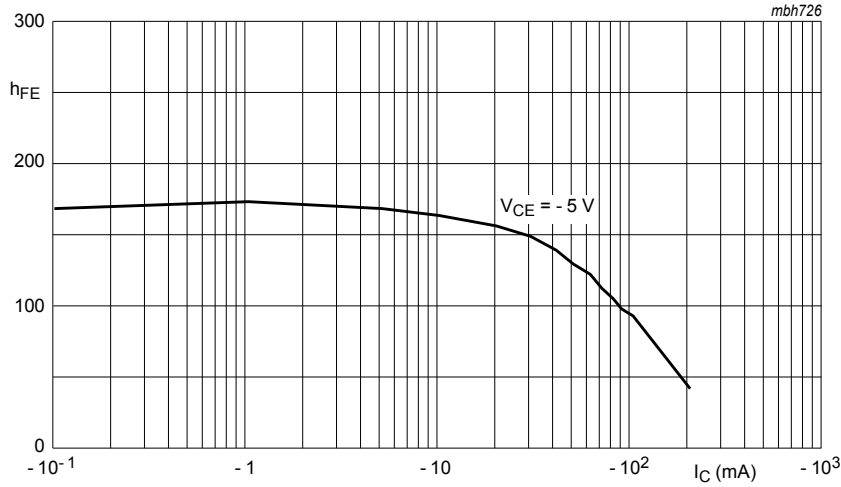
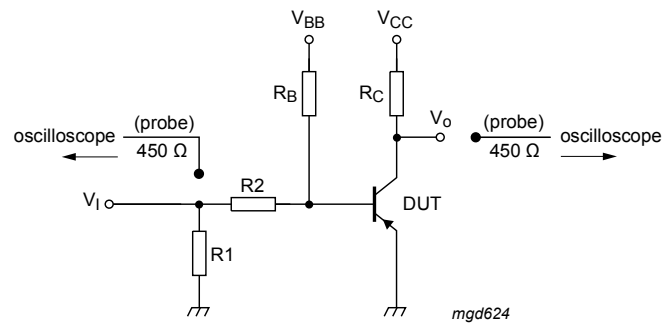


Fig. 1. DC current gain as a function of collector current; typical values

### 11. Test information



$V_1 = -5\text{ V}$ ;  $T = 500\ \mu\text{s}$ ;  $t_p = 10\ \mu\text{s}$ ;  $t_r = t_f \leq 3\ \text{ns}$ .  
 $R_1 = 56\ \Omega$ ;  $R_2 = 2.5\ \text{k}\Omega$ ;  $R_B = 3.9\ \text{k}\Omega$ ;  $R_C = 270\ \Omega$ .  
 $V_{BB} = 1.9\ \text{V}$ ;  $V_{CC} = 3\ \text{V}$ .  
 Oscilloscope: input impedance  $Z_i = 50\ \Omega$ .

Fig. 2. Test circuit or switching times

## 12. Package outline

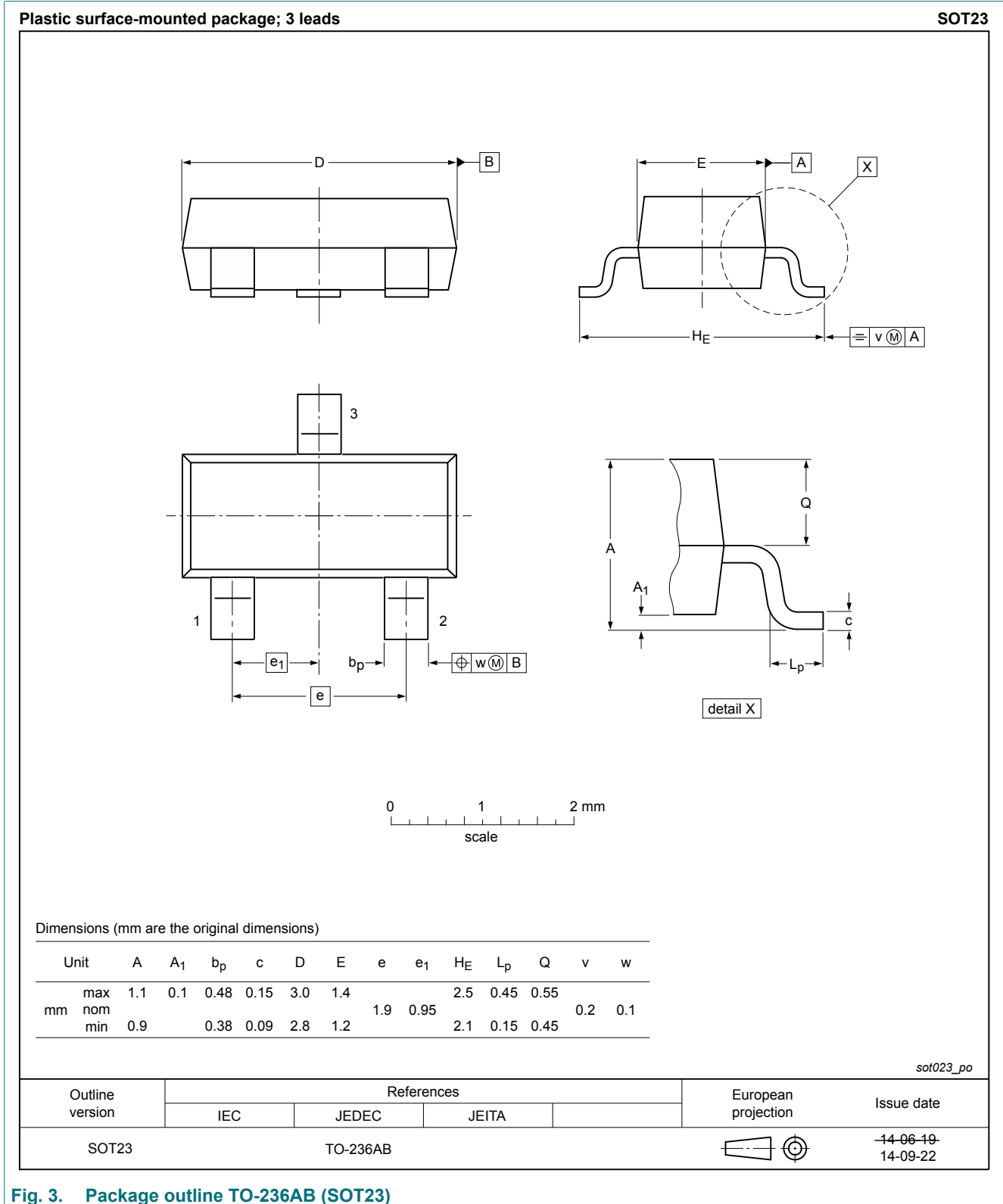


Fig. 3. Package outline TO-236AB (SOT23)

### 13. Soldering

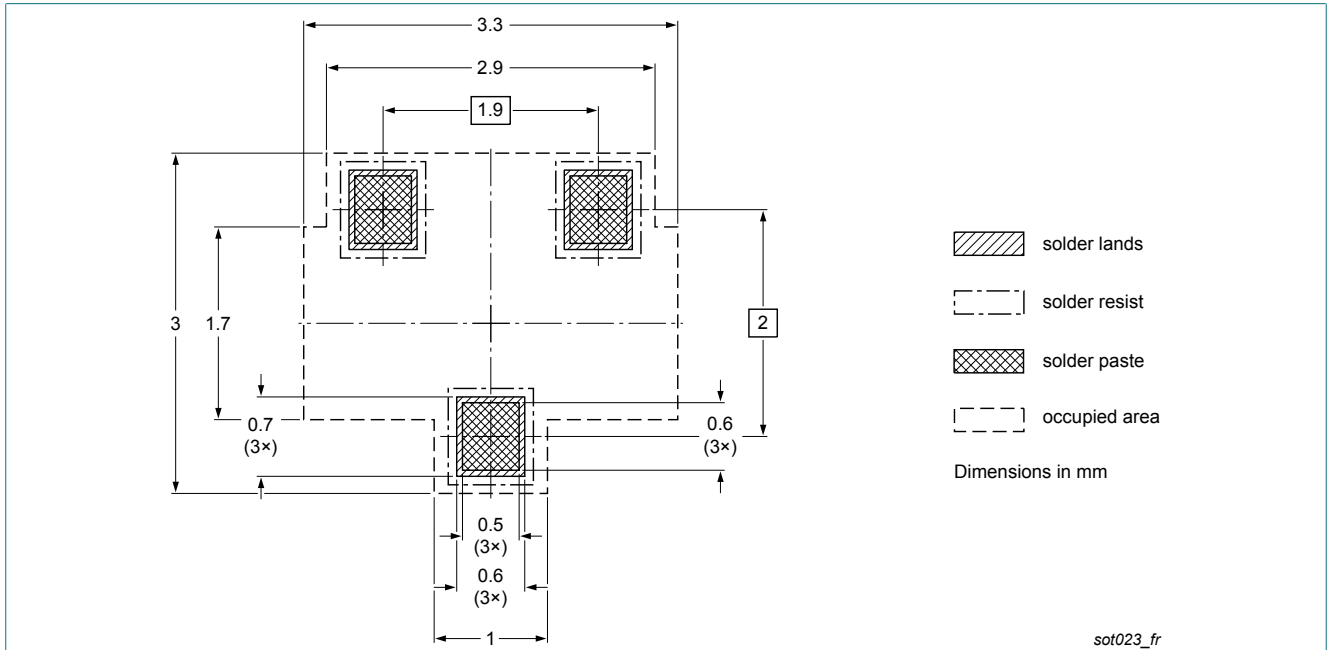


Fig. 4. Reflow soldering footprint for TO-236AB (SOT23)

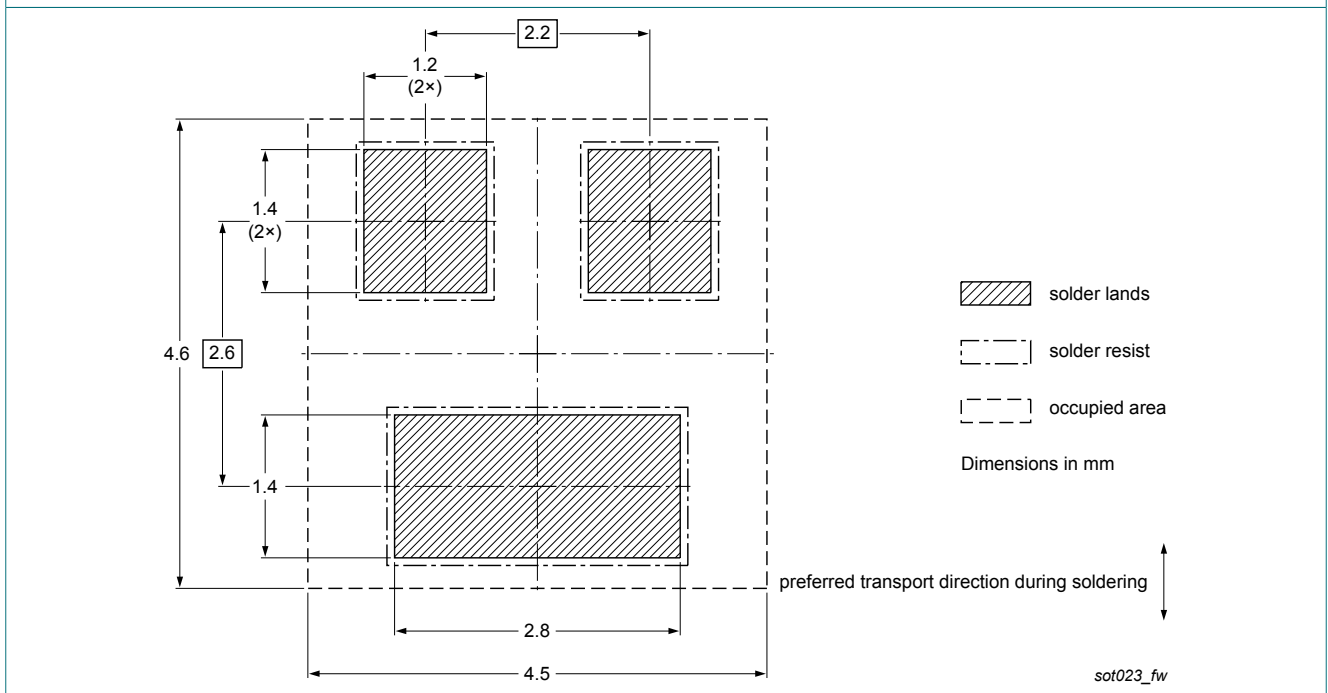


Fig. 5. Wave soldering footprint for TO-236AB (SOT23)

## 14. Revision history

**Table 8. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMBS3906 v.3	20180605	Product data sheet	-	PMBS3906 v.2
Modifications:	<ul style="list-style-type: none"><li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li><li>Legal texts have been adapted to the new company name where appropriate.</li></ul>			
PMBS3906 v.2	20040202	Product data sheet	-	PMBS3906 v.1
PMBS3906 v.1	19990422	Product data sheet	-	-

## 15. Legal information

### Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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