



# PMBT4401

## NPN switching transistor

1 October 2025

Product data sheet

## 1. General description

NPN switching transistor in a small SOT23 Surface-Mounted Device (SMD) plastic package.

PNP complement: PMBT4403

## 2. Features and benefits

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

## 3. Applications

- Industrial and consumer switching applications

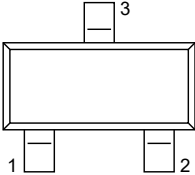
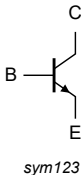
## 4. Quick reference data

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		-	-	600	mA
$h_{FE}$	DC current gain	$V_{CE} = 1\text{ V}$ ; $I_C = 150\text{ mA}$ ; pulsed; $t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25\text{ }^\circ\text{C}$	100	-	300	

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 SOT23	 sym123
2	E	emitter		
3	C	collector		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMBT4401	SOT23	plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body	SOT23

## 7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PMBT4401	% 2X

[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 <sub>CBO</sub>	collector-base voltage	open emitter		-	60	V
V <sub>CEO</sub>	collector-emitter voltage	open base		-	40	V
V <sub>EBO</sub>	emitter-base voltage	open collector		-	6	V
I <sub>C</sub>	collector current			-	600	mA
I <sub>CM</sub>	peak collector current			-	800	mA
I <sub>BM</sub>	peak base current			-	200	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	[1]	-	250	mW
T <sub>j</sub>	junction temperature			-	150	°C
T <sub>amb</sub>	ambient temperature			-65	150	°C
T <sub>stg</sub>	storage temperature			-65	150	°C

[1] Transistor mounted on an FR4 printed-circuit board, single-sided copper, tin-plated and standard footprint.

## 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient	in free air	[1]	-	-	500	K/W

[1] Transistor mounted on an FR4 printed-circuit board, single-sided copper, tin-plated and standard footprint.

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = 100\text{ }\mu\text{A}$ ; $T_{amb} = 25\text{ }^{\circ}\text{C}$	60	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = 1\text{ mA}$ ; $T_{amb} = 25\text{ }^{\circ}\text{C}$	40	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	$I_C = 100\text{ }\mu\text{A}$ ; $T_{amb} = 25\text{ }^{\circ}\text{C}$	6	-	-	V
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 60\text{ V}$ ; $I_E = 0\text{ A}$ ; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	50	nA
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 6\text{ V}$ ; $I_C = 0\text{ A}$ ; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	50	nA
$h_{FE}$	DC current gain	$V_{CE} = 1\text{ V}$ ; $I_C = 0.1\text{ mA}$ ; $T_{amb} = 25\text{ }^{\circ}\text{C}$	20	-	-	
		$V_{CE} = 1\text{ V}$ ; $I_C = 1\text{ mA}$ ; $T_{amb} = 25\text{ }^{\circ}\text{C}$	40	-	-	
		$V_{CE} = 1\text{ V}$ ; $I_C = 10\text{ mA}$ ; $T_{amb} = 25\text{ }^{\circ}\text{C}$	80	-	-	
		$V_{CE} = 1\text{ V}$ ; $I_C = 150\text{ mA}$ ; pulsed; $t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25\text{ }^{\circ}\text{C}$	100	-	300	
		$V_{CE} = 2\text{ V}$ ; $I_C = 500\text{ mA}$ ; pulsed; $t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25\text{ }^{\circ}\text{C}$	40	-	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 150\text{ mA}$ ; $I_B = 15\text{ mA}$ ; pulsed; $t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	400	mV
		$I_C = 500\text{ mA}$ ; $I_B = 50\text{ mA}$ ; pulsed; $t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	750	mV
$V_{BEsat}$	base-emitter saturation voltage	$I_C = 150\text{ mA}$ ; $I_B = 15\text{ mA}$ ; pulsed; $t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	950	mV
		$I_C = 500\text{ mA}$ ; $I_B = 50\text{ mA}$ ; pulsed; $t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	1.2	V
$C_C$	collector capacitance	$V_{CB} = 5\text{ V}$ ; $I_E = 0\text{ A}$ ; $i_e = 0\text{ A}$ ; $f = 1\text{ MHz}$ ; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	8	pF
$C_e$	emitter capacitance	$V_{EB} = 500\text{ mV}$ ; $I_C = 0\text{ A}$ ; $i_c = 0\text{ A}$ ; $f = 1\text{ MHz}$ ; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	30	pF
$f_T$	transition frequency	$V_{CE} = 10\text{ V}$ ; $I_C = 20\text{ mA}$ ; $f = 100\text{ MHz}$ ; $T_{amb} = 25\text{ }^{\circ}\text{C}$	250	-	-	MHz
Switching times (between 10 % and 90 % levels)						
$t_d$	delay time	$I_C = 150\text{ mA}$ ; $I_{Bon} = 15\text{ mA}$ ; $I_{Boff} = -15\text{ mA}$ ; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	15	ns
$t_r$	rise time		-	-	20	ns
$t_{on}$	turn-on time		-	-	35	ns
$t_s$	storage time		-	-	200	ns
$t_f$	fall time		-	-	60	ns
$t_{off}$	turn-off time		-	-	250	ns

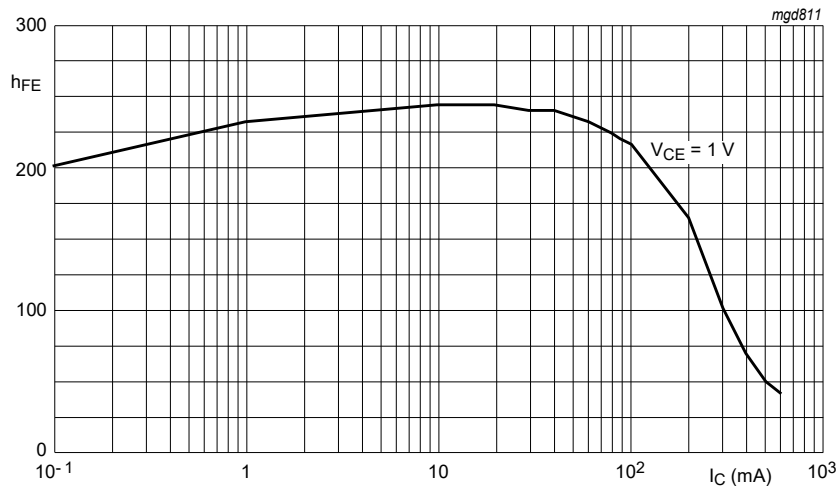


Fig. 1. DC current gain; typical value

11. Test information

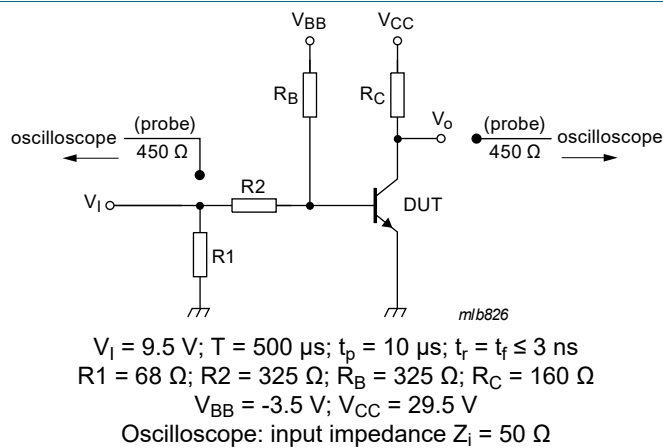


Fig. 2. Test circuit for switching times

12. Package outline

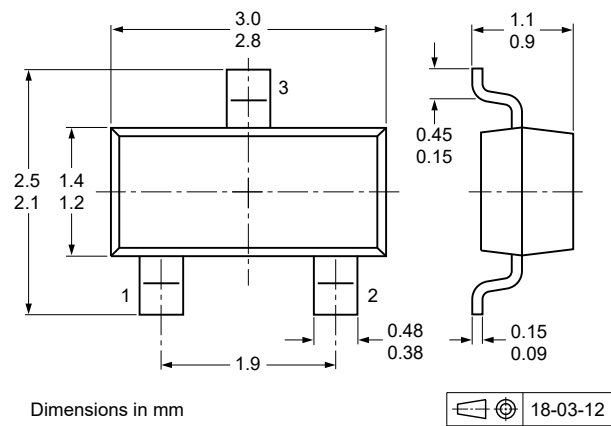


Fig. 3. Package outline SOT23

13. Soldering

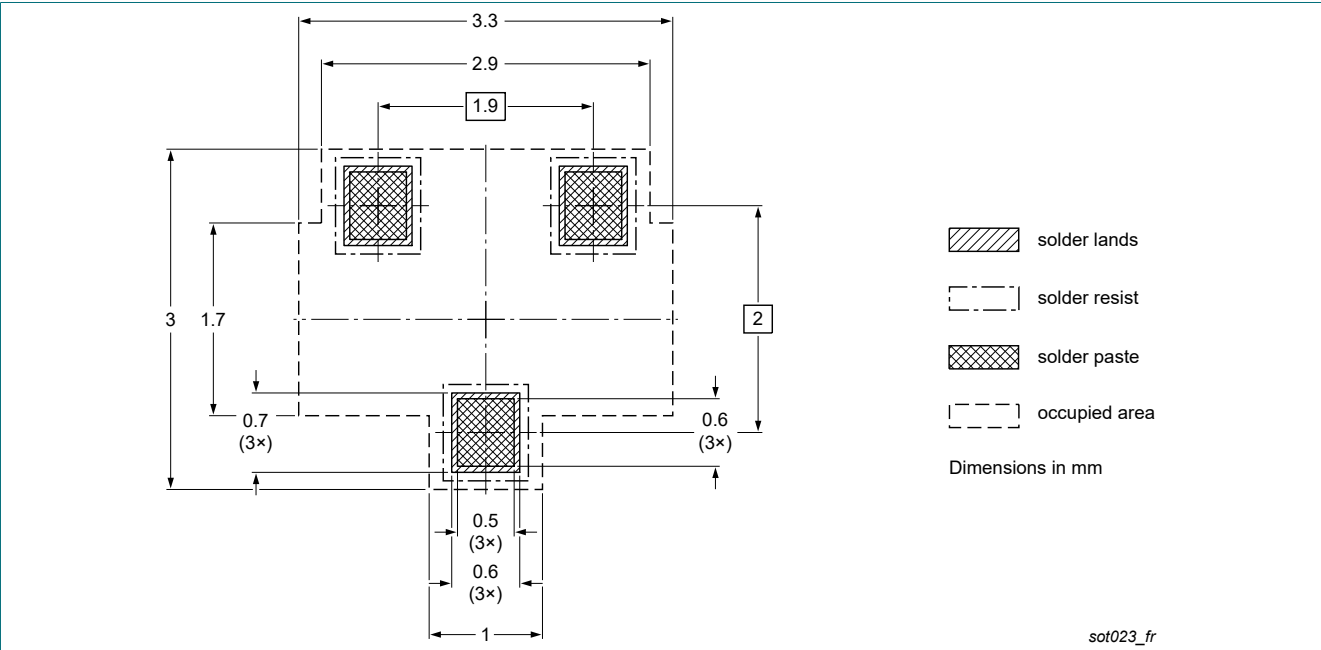


Fig. 4. Reflow soldering footprint for SOT23

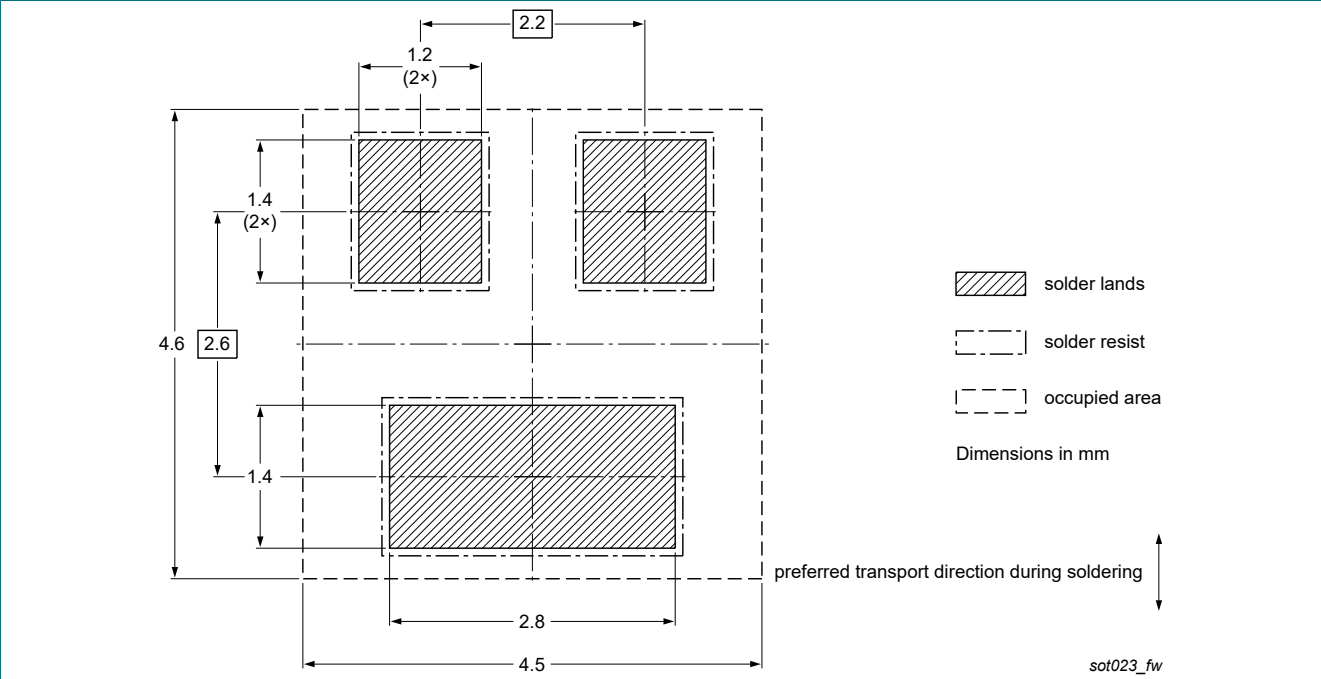


Fig. 5. Wave soldering footprint for SOT23

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMBT4401 v.5	20251001	Product data sheet	-	PMBT4401 v.4
Modifications:	<ul style="list-style-type: none"><li>Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).</li></ul>			
PMBT4401 v.4	20231207	Product data sheet	-	PMBT4401 v.3
PMBT4401 v.3	20231117	Product data sheet	-	PMBT4401 v.2
PMBT4401 v.2	20040121	Product data sheet	-	PMBT4401 v.1
PMBT4401 v.1	19990415	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.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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Date of release: 1 October 2025