



# PMBT5551

NPN high-voltage transistor

31 August 2020

Product data sheet

## 1. General description

NPN high-voltage transistor in a SOT23 plastic package.

## 2. Features and benefits

- Low current (max. 300 mA)
- High voltage (max. 160 V)
- AEC-Q101 qualified

## 3. Applications

- General purpose

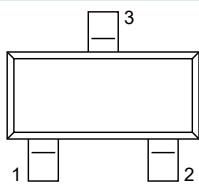
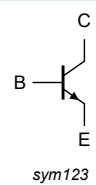
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CEO}$	collector-emitter voltage	open base	-	-	160	V
$I_C$	collector current		-	-	300	mA

## 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
PMBT5551	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 <sup>[1]</sup>
PMBT5551	%G1

[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	-	180	V
$V_{CEO}$	collector-emitter voltage	open base	-	160	V
$V_{EBO}$	emitter-base voltage	open collector	-	6	V
$I_C$	collector current		-	300	mA
$I_{CM}$	peak collector current	single pulse; $t_p \leq 1$ ms	-	600	mA
$I_{BM}$	peak base current		-	100	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25$ °C	[1]	250	mW
$T_j$	junction temperature		-	150	°C
$T_{amb}$	ambient temperature		-65	150	°C
$T_{stg}$	storage temperature		-65	150	°C

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

## 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

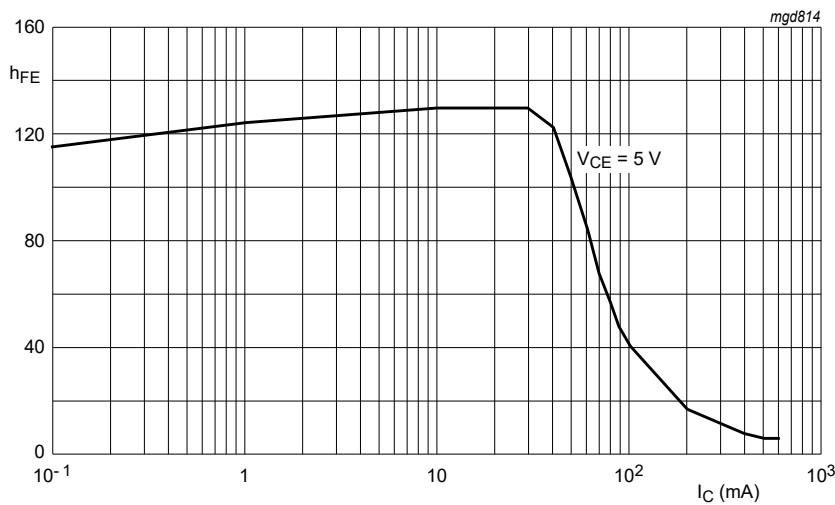
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

## 10. Characteristics

**Table 7. Characteristics**

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 120\text{ V}; I_E = 0\text{ A}; T_j = 25\text{ °C}$	-	-	50	nA
		$V_{CB} = 120\text{ V}; T_{amb} = 100\text{ °C}$	-	-	50	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 4\text{ V}; I_C = 0\text{ A}$	-	-	50	nA
$h_{FE}$	DC current gain	$V_{CE} = 5\text{ V}; I_C = 1\text{ mA}$	80	-	-	
		$V_{CE} = 5\text{ V}; I_C = 10\text{ mA}; T_j = 25\text{ °C}$	80	250	-	
		$V_{CE} = 5\text{ V}; I_C = 50\text{ mA}; T_j = 25\text{ °C}$	30	-	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 1\text{ mA}$	-	-	150	mV
		$I_C = 50\text{ mA}; I_B = 5\text{ mA}$	-	-	200	mV
$V_{BEsat}$	base-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 1\text{ mA}$	-	-	1	V
		$I_C = 50\text{ mA}; I_B = 5\text{ mA}$	-	-	1	V
$C_c$	collector capacitance	$V_{CB} = 10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}$	-	-	6	pF
$C_e$	emitter capacitance	$V_{EB} = 0.5\text{ V}; I_C = 0\text{ A}; i_c = 0\text{ A}; f = 1\text{ MHz}$	-	-	30	pF
$f_T$	transition frequency	$V_{CE} = 10\text{ V}; I_C = 10\text{ mA}; f = 100\text{ MHz}$	100	300	-	MHz
NF	noise figure	$V_{CE} = 5\text{ V}; I_C = 200\text{ }\mu\text{A}; R_S = 2\text{ k}\Omega;$ $10\text{ Hz} \leq f \leq 15700\text{ Hz}$	-	-	8	dB



$V_{CE} = 5\text{ V}$

**Fig. 1. DC current gain; typical values**

## 11. Test information

### Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - *Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

## 12. Package outline

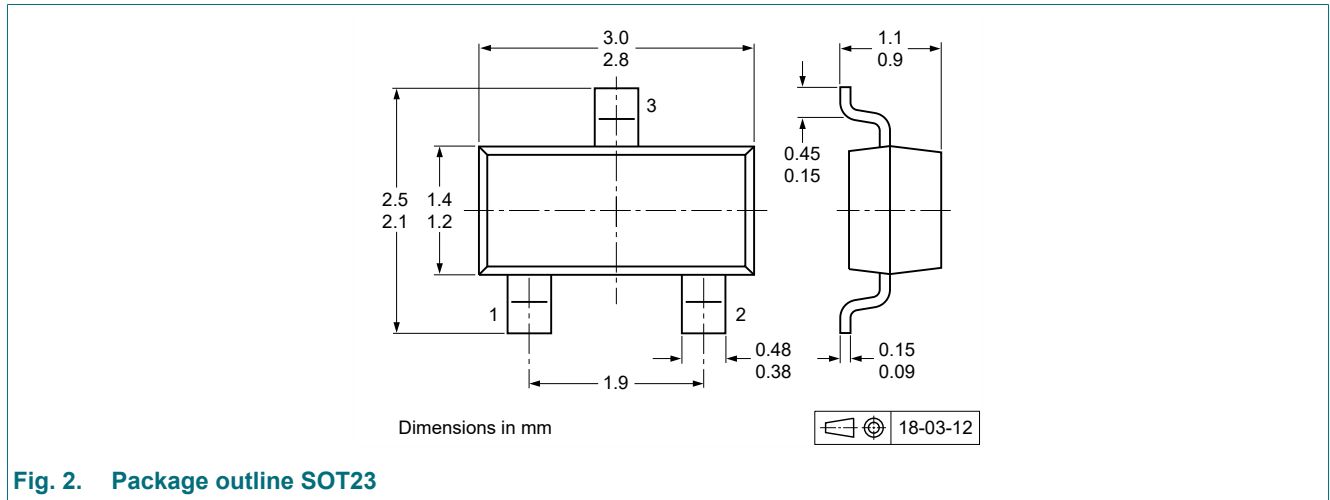


Fig. 2. Package outline SOT23

## 13. Soldering

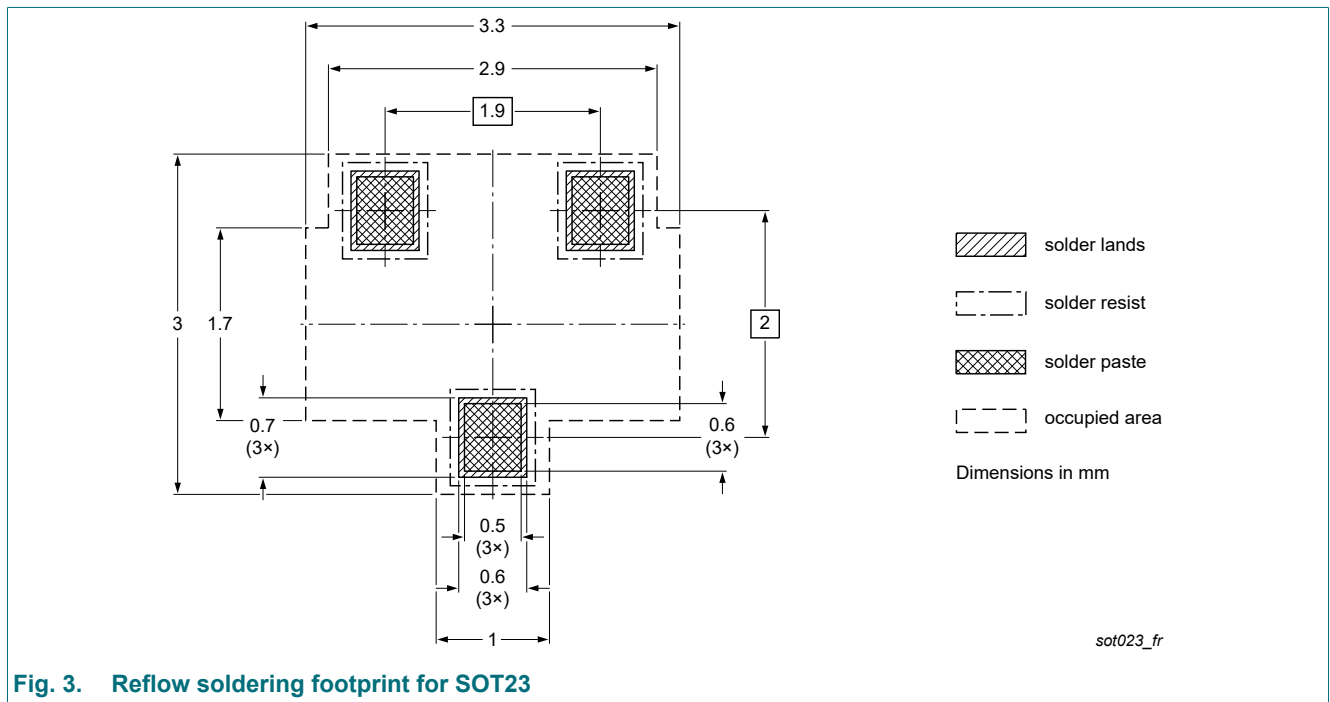


Fig. 3. Reflow soldering footprint for SOT23

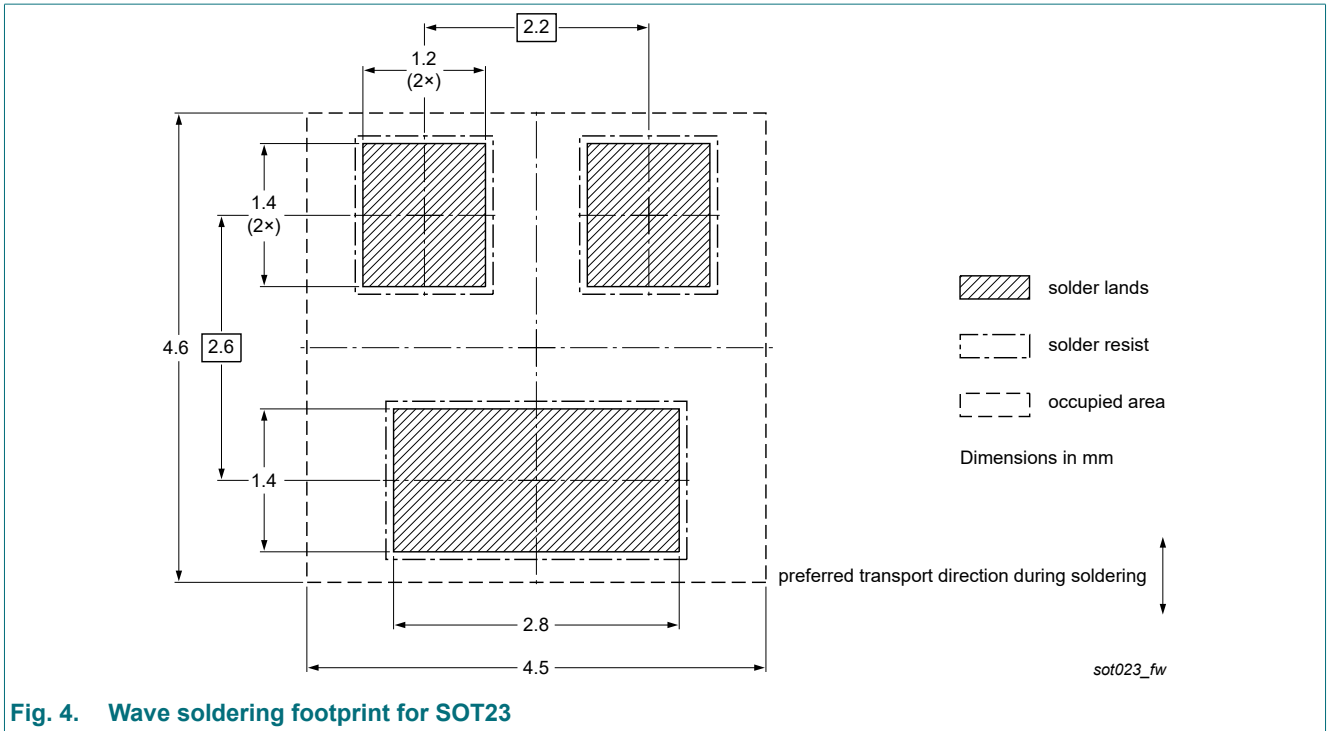


Fig. 4. Wave soldering footprint for SOT23

## 14. Revision history

**Table 8. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMBT5551 v.3	20200831	Product data sheet	-	PMBT5551 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>			
PMBT5551 v.2	20040121	Product data sheet	-	PMBT5551 v.1
PMBT5551 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.

- [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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