PMBT5551

NPN high-voltage transistor

12 October 2023 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)

3. Applications

- General purpose

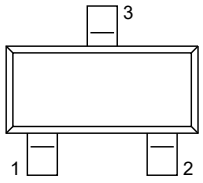
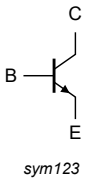
4. Quick reference data

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[1]
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

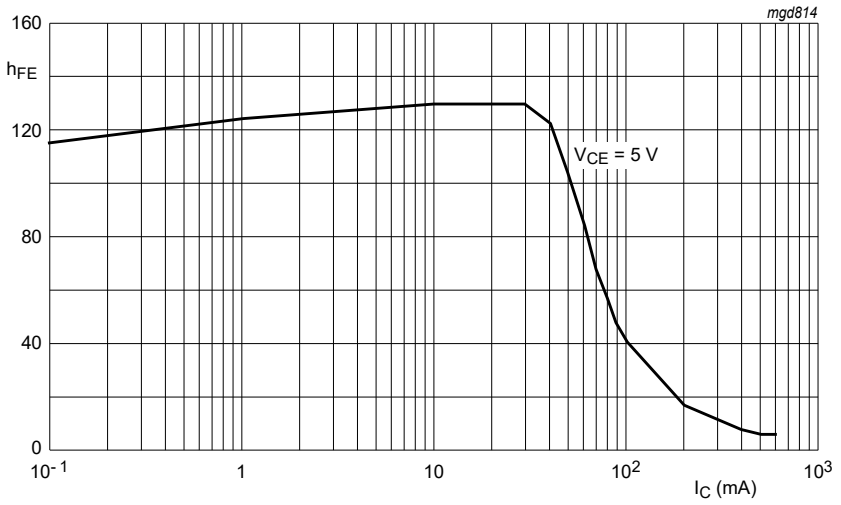
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

10. Characteristics

Table 7. Characteristics

T_{amb} = 25 °C unless otherwise specified

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



V_{CE} = 5 V

Fig. 1. DC current gain; typical values

11. Package outline

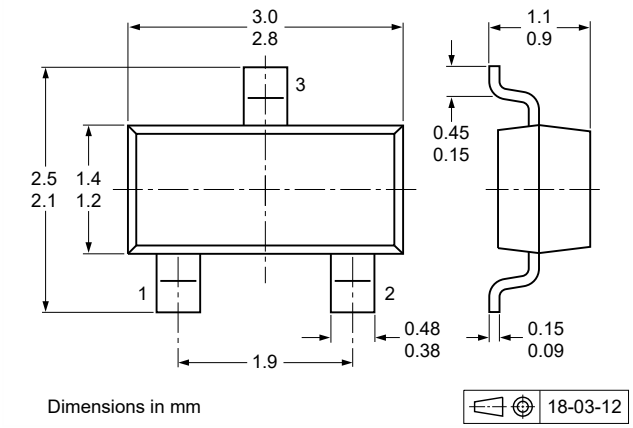


Fig. 2. Package outline SOT23

12. Soldering

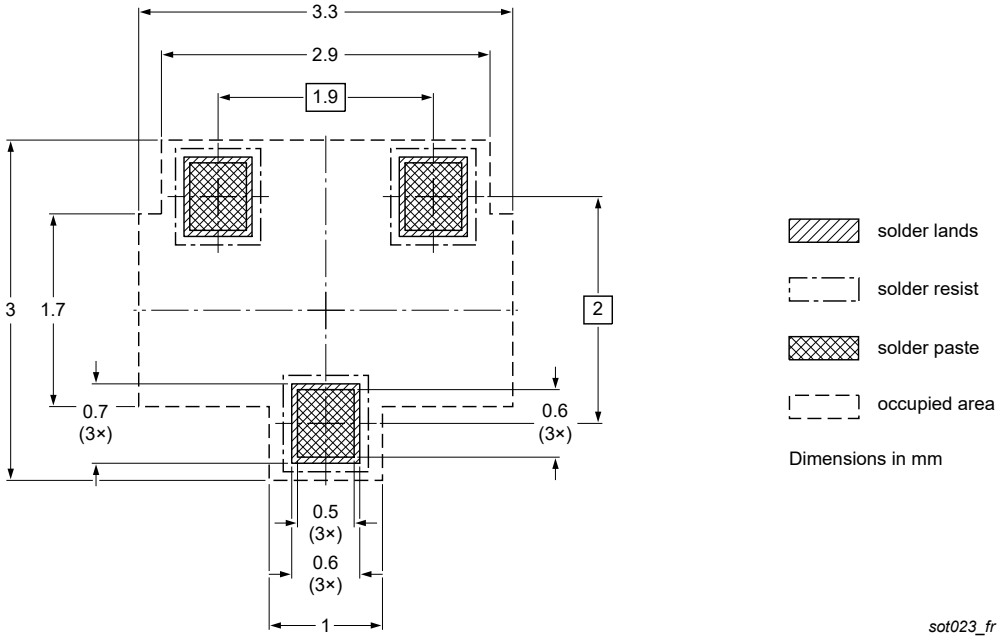


Fig. 3. Reflow soldering footprint for SOT23

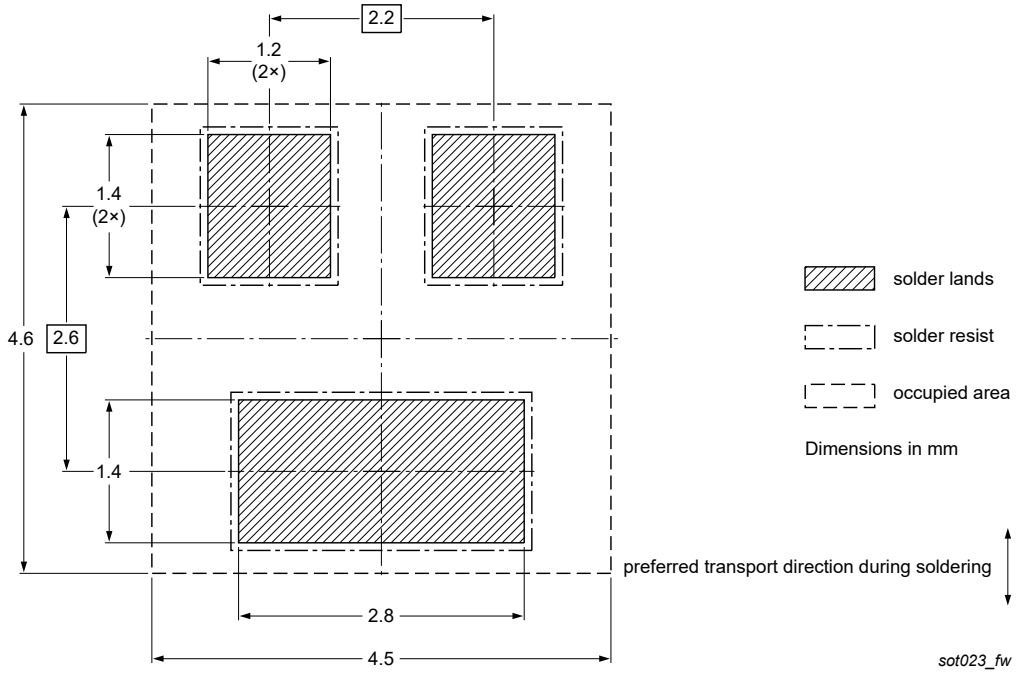


Fig. 4. Wave soldering footprint for SOT23

13. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMBT5551 v.4	20231012	Product data sheet	-	PMBT5551 v.3
Modifications:	• Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).			
PMBT5551 v.3	20200831	Product data sheet	-	PMBT5551 v.2
PMBT5551 v.2	20040121	Product data sheet	-	PMBT5551 v.1
PMBT5551 v.1	19990415	Product data sheet	-	-

14. 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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