



PMBT5550-Q

NPN high-voltage transistor

20 July 2023

Product data sheet

1. General description

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

2. Features and benefits

- Low current (max. 300 mA)
- High voltage (max. 140 V)
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- General purpose applications

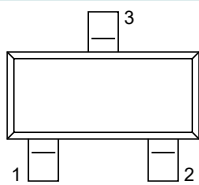
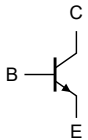
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CE0}	collector-emitter voltage	open base	-	-	140	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		Version
	Name	Description	
PMBT5550-Q	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]
PMBT5550-Q	%1F

[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	-	160	V
V_{CEO}	collector-emitter voltage	open base	-	140	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	$V_{CB} = 100\text{ V}; I_E = 0\text{ A}; T_j = 25\text{ °C}$	-	-	50	nA
		$V_{CB} = 100\text{ V}; T_{amb} = 100\text{ °C}$	-	-	50	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 4\text{ V}; I_C = 0\text{ A}$	-	-	50	nA
h_{FE}	DC current gain	$V_{CE} = 5\text{ V}; I_C = 1\text{ mA}$	60	-	-	
		$V_{CE} = 5\text{ V}; I_C = 10\text{ mA}; T_j = 25\text{ °C}$	60	250	-	
		$V_{CE} = 5\text{ V}; I_C = 50\text{ mA}; T_j = 25\text{ °C}$	20	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 1\text{ mA}$	-	-	150	mV
		$I_C = 50\text{ mA}; I_B = 5\text{ mA}$	-	-	250	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 1\text{ mA}$	-	-	1	V
		$I_C = 50\text{ mA}; I_B = 5\text{ mA}$	-	-	1.2	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	$V_{CE} = 5\text{ V}; I_C = 200\text{ }\mu\text{A}; R_S = 2\text{ k}\Omega;$ $10\text{ Hz} \leq f \leq 15700\text{ Hz}$	-	-	10	dB

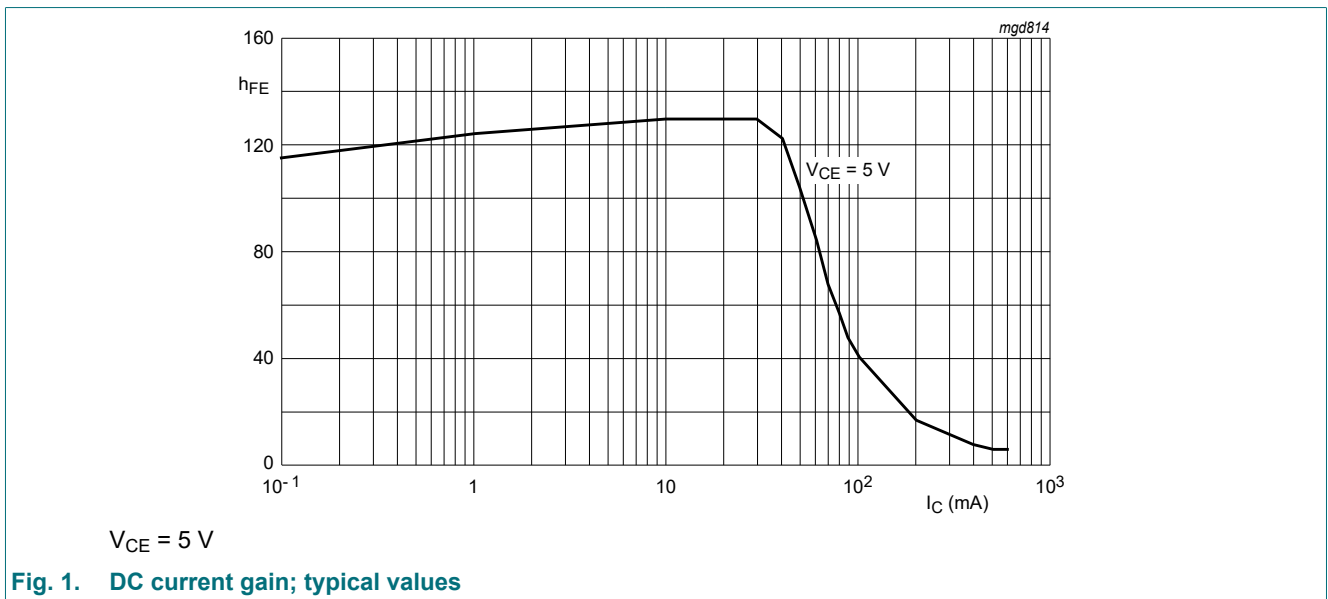


Fig. 1. DC current gain; typical values

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

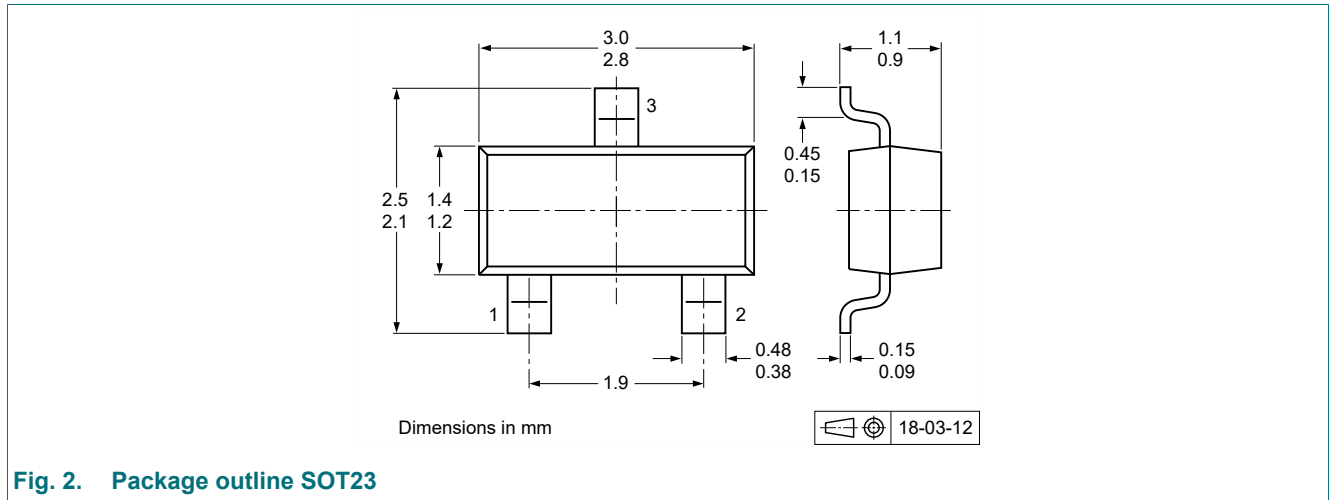


Fig. 2. Package outline SOT23

13. Soldering

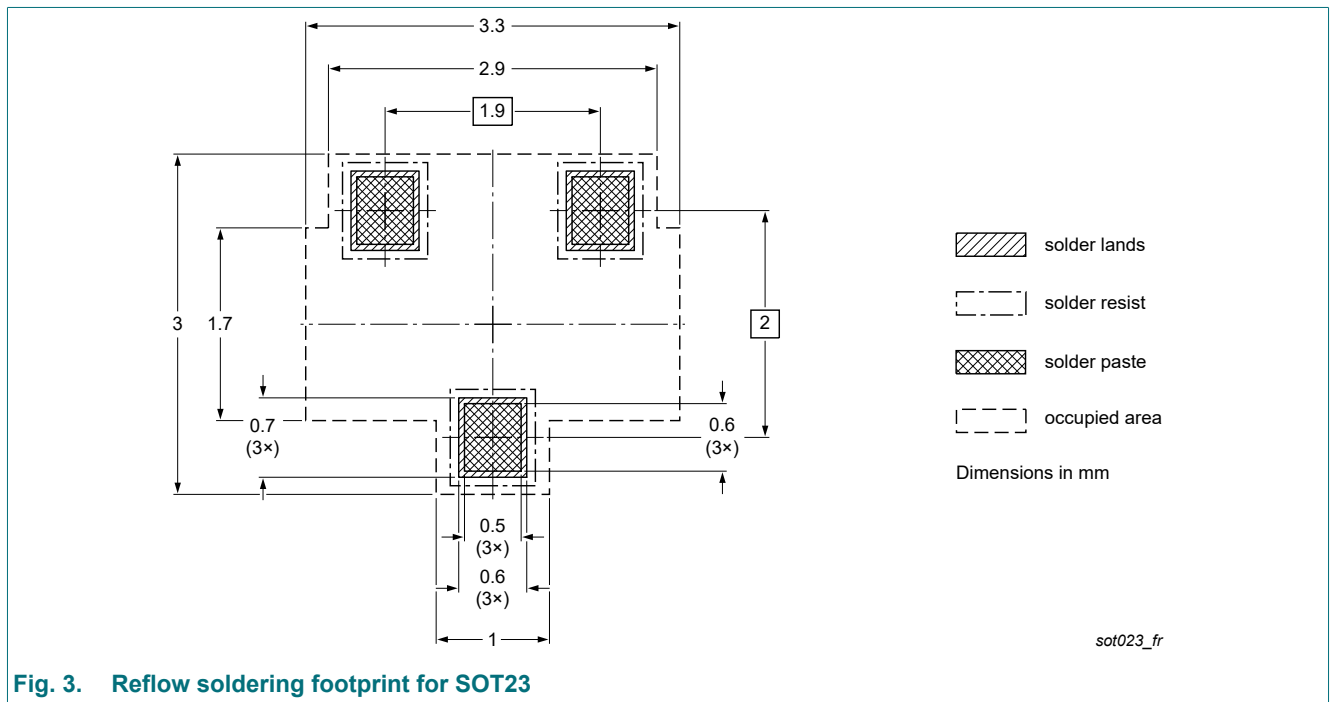


Fig. 3. Reflow soldering footprint for SOT23

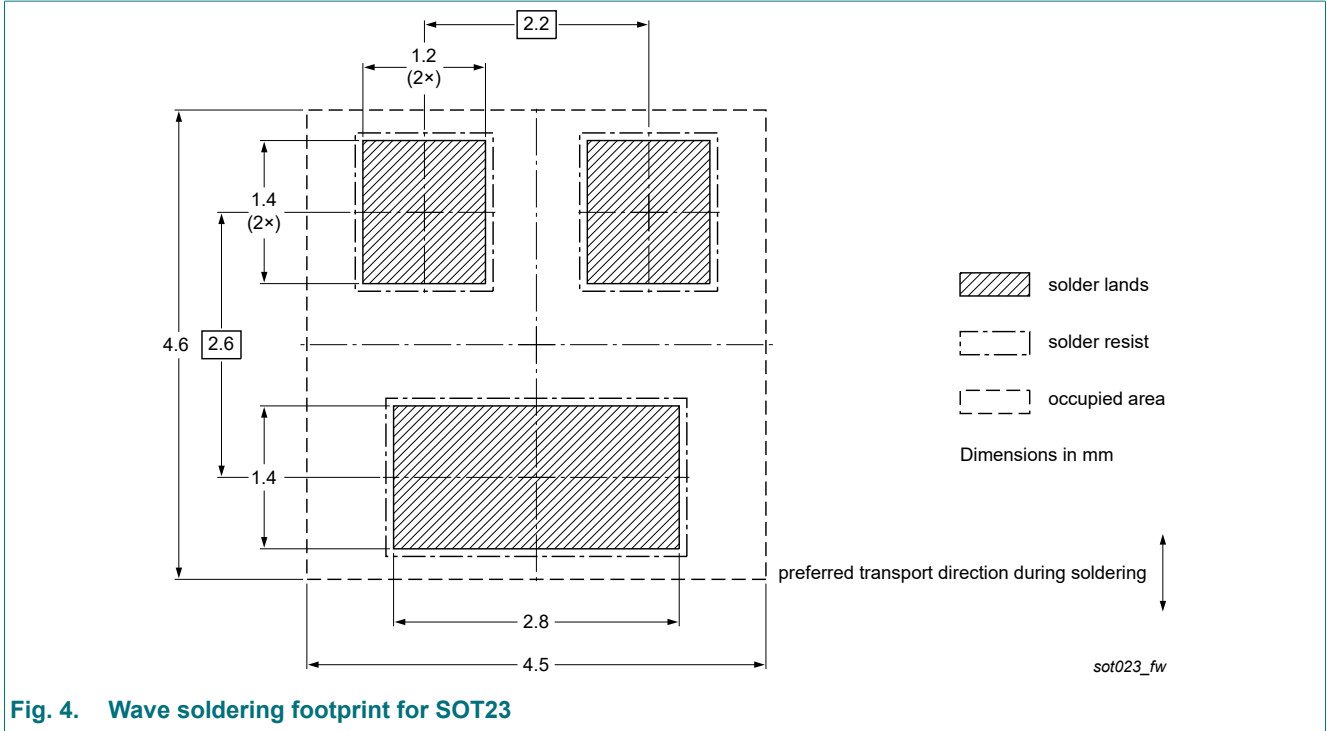


Fig. 4. Wave soldering footprint for SOT23

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMBT5550-Q v.1	20230720	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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