



# PBSS4120T-Q

20 V; 1 A NPN low  $V_{CEsat}$  transistor

15 September 2025

Product data sheet

## 1. General description

NPN transistor in a small SOT23 Surface-Mounted Device (SMD) plastic package providing ultra low  $V_{CEsat}$  and  $R_{CEsat}$  parameters.

PNP complement: PBSS5120T-Q

## 2. Features and benefits

- Low collector-emitter saturation voltage  $V_{CEsat}$
- High collector current capability  $I_C$  and  $I_{CM}$
- High efficiency leading to less heat generation
- Reduced printed-circuit board requirements
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

- Power management
  - DC/DC conversion
  - Supply line switching
  - Battery charger
  - LCD backlighting.
- Peripheral driver
  - Driver in low supply voltage applications (e.g. lamps and LEDs)
  - Inductive load drivers (e.g. relays, buzzers and motors).

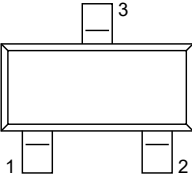
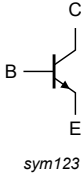
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CEO}$	collector-emitter voltage	open base	-	-	20	V
$I_C$	collector current		-	-	1	A
$I_{CM}$	peak collector current	single pulse; $t_p \leq 1$ ms	-	-	3	A
$R_{CEsat}$	collector-emitter saturation resistance	$I_C = 500$ mA; $I_B = 50$ mA; pulsed; $t_p \leq 300$ $\mu$ s; $\delta \leq 0.02$ ; $T_{amb} = 25$ °C	-	-	220	m $\Omega$

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
<a href="#">PBSS4120T-Q</a>	SOT23	plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body	<a href="#">SOT23</a>

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PBSS4120T-Q	%3B

[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		-	30	V
V <sub>CEO</sub>	collector-emitter voltage	open base		-	20	V
V <sub>EBO</sub>	emitter-base voltage	open collector		-	5	V
I <sub>C</sub>	collector current	single pulse; t <sub>p</sub> ≤ 1 ms		-	1	A
I <sub>CM</sub>	peak collector current			-	3	A
I <sub>BM</sub>	peak base current			-	300	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	[1]	-	300	mW
			[2]	-	480	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] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm<sup>2</sup>.

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]	-	-	417	K/W
			[2]	-	-	260	K/W

- [1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.  
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm<sup>2</sup>.

10. Characteristics

Table 7. Characteristics

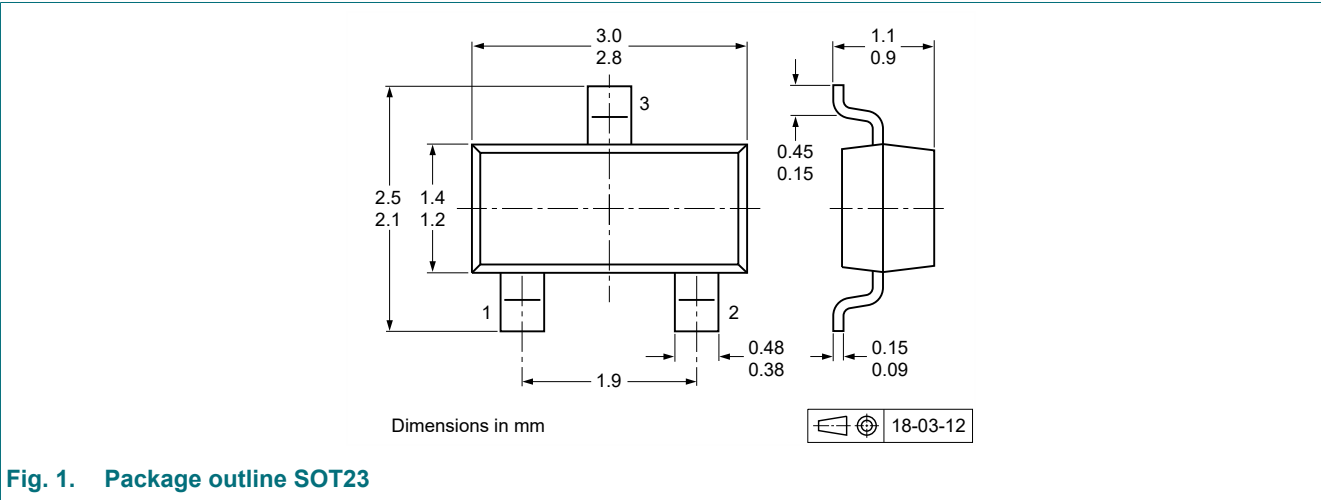
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I <sub>CBO</sub>	collector-base cut-off current	V <sub>CB</sub> = 30 V; I <sub>E</sub> = 0 A; T <sub>amb</sub> = 25 °C		-	-	100	nA
		V <sub>CB</sub> = 30 V; I <sub>E</sub> = 0 A; T <sub>j</sub> = 150 °C		-	-	50	µA
I <sub>EBO</sub>	emitter-base cut-off current	V <sub>EB</sub> = 4 V; I <sub>C</sub> = 0 A; T <sub>amb</sub> = 25 °C		-	-	100	nA
h <sub>FE</sub>	DC current gain	V <sub>CE</sub> = 2 V; I <sub>C</sub> = 100 mA; T <sub>amb</sub> = 25 °C		350	470	-	
		V <sub>CE</sub> = 2 V; I <sub>C</sub> = 500 mA; T <sub>amb</sub> = 25 °C		300	450	-	
		V <sub>CE</sub> = 2 V; I <sub>C</sub> = 1 A; T <sub>amb</sub> = 25 °C		280	420	-	
V <sub>CEsat</sub>	collector-emitter saturation voltage	I <sub>C</sub> = 100 mA; I <sub>B</sub> = 1 mA; T <sub>amb</sub> = 25 °C		-	-	80	mV
		I <sub>C</sub> = 500 mA; I <sub>B</sub> = 50 mA; T <sub>amb</sub> = 25 °C		-	-	110	mV
		I <sub>C</sub> = 750 mA; I <sub>B</sub> = 15 mA; T <sub>amb</sub> = 25 °C		-	-	200	mV
		I <sub>C</sub> = 1 A; I <sub>B</sub> = 50 mA; pulsed; t <sub>p</sub> ≤ 300 µs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C		-	-	250	mV
R <sub>CEsat</sub>	collector-emitter saturation resistance	I <sub>C</sub> = 500 mA; I <sub>B</sub> = 50 mA; pulsed; t <sub>p</sub> ≤ 300 µs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C		-	-	220	mΩ
V <sub>BEsat</sub>	base-emitter saturation voltage	I <sub>C</sub> = 1 A; I <sub>B</sub> = 100 mA; pulsed; t <sub>p</sub> ≤ 300 µs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C		-	-	1.1	V
V <sub>BEon</sub>	base-emitter turn-on voltage	V <sub>CE</sub> = 2 V; I <sub>C</sub> = 100 mA; T <sub>amb</sub> = 25 °C		-	-	0.75	V
f <sub>T</sub>	transition frequency	V <sub>CE</sub> = 10 V; I <sub>C</sub> = 100 mA; f = 100 MHz; T <sub>amb</sub> = 25 °C		100	-	-	MHz
C <sub>c</sub>	collector capacitance	V <sub>CB</sub> = 10 V; I <sub>E</sub> = 0 A; i <sub>e</sub> = 0 A; f = 1 MHz; T <sub>amb</sub> = 25 °C		-	-	20	pF

11. Test information

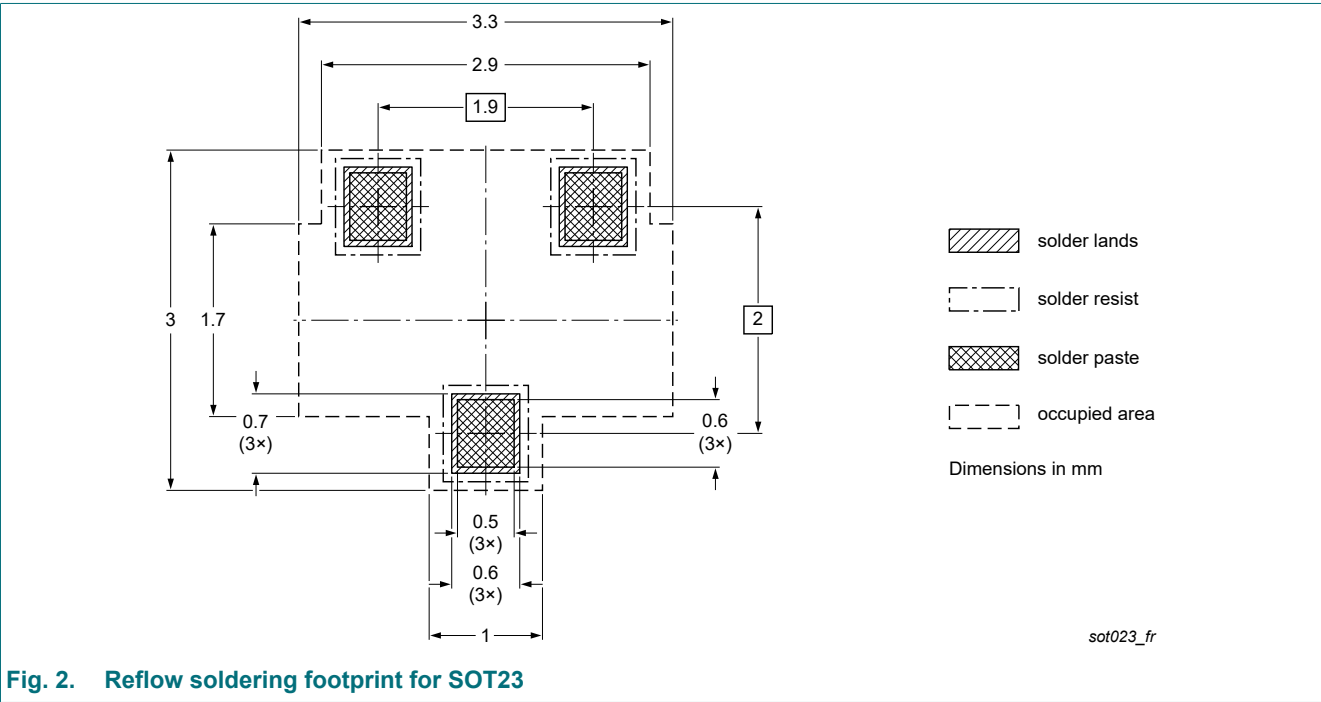
Quality information

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



13. Soldering



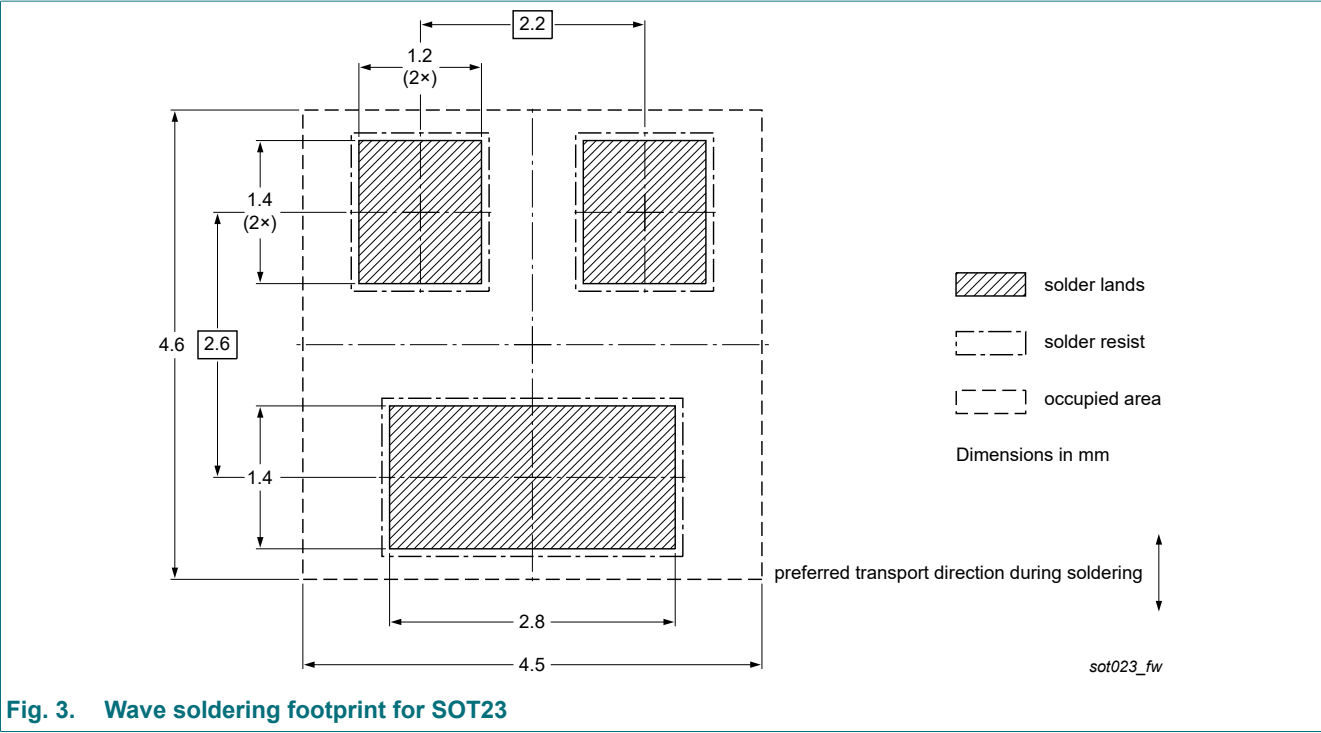


Fig. 3. Wave soldering footprint for SOT23

## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS4120T-Q v.1	20250915	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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