



PBSS4120T

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

21 July 2025

Product data sheet

1. General description

NPN transistor in a SOT23 plastic package providing ultra low V_{CEsat} and R_{CEsat} parameters.

PNP complement: PBSS5120T

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 AEC-Q101

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).

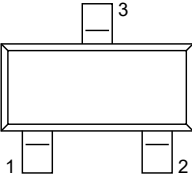
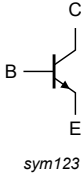
4. Quick reference data

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 ≤ 1 ms	-	-	3	A
R _{CEsat}	collector-emitter saturation resistance	I _C = 500 mA; I _B = 50 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C	-	-	220	mΩ

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
PBSS4120T	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]
PBSS4120T	% 3 B

[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		-	30	V
V _{CEO}	collector-emitter voltage	open base		-	20	V
V _{EBO}	emitter-base voltage	open collector		-	5	V
I _C	collector current	single pulse; t _p ≤ 1 ms		-	1	A
I _{CM}	peak collector current			-	3	A
I _{BM}	peak base current			-	300	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	300	mW
			[2]	-	480	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 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 cm².

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]	-	-	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 cm².

10. Characteristics

Table 7. Characteristics

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

11. Package outline

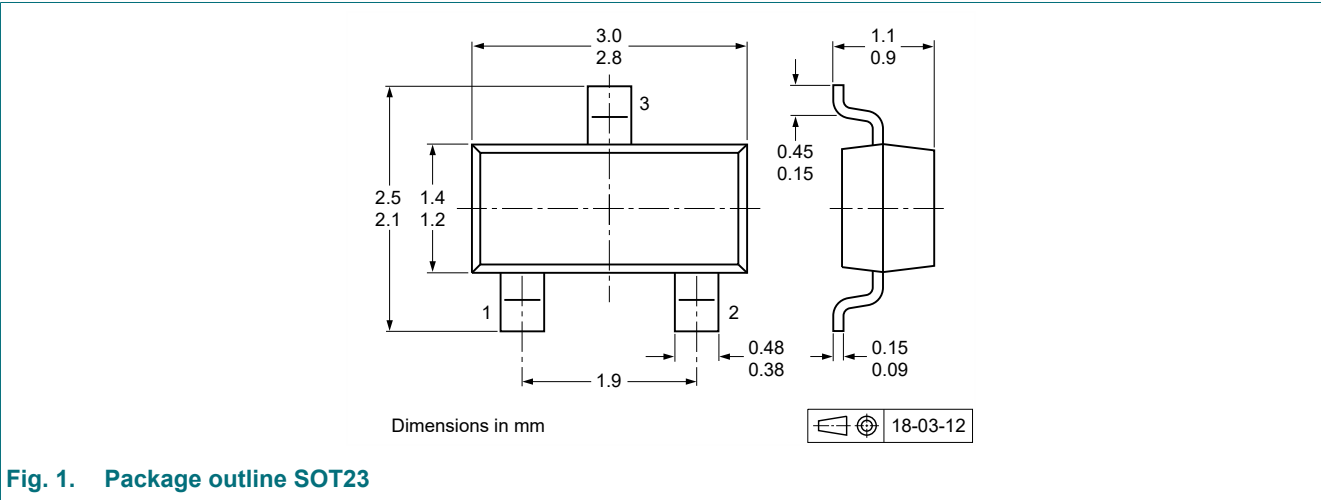


Fig. 1. Package outline SOT23

12. Soldering

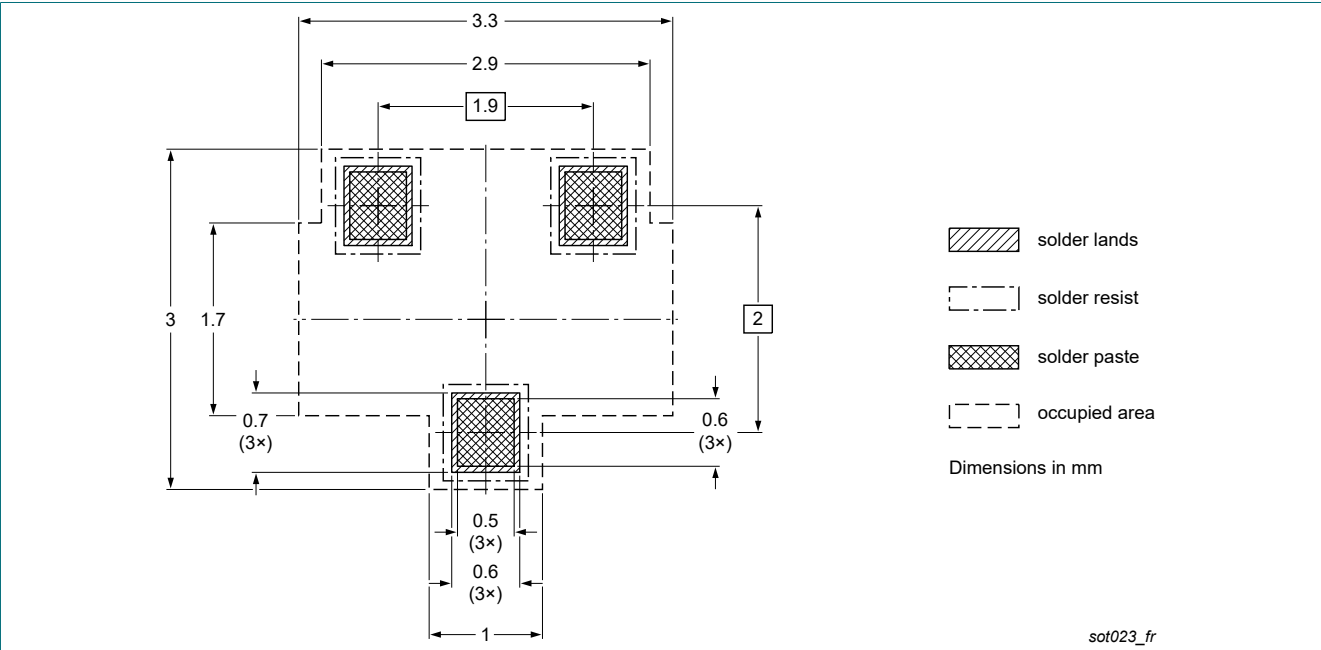


Fig. 2. Reflow soldering footprint for SOT23

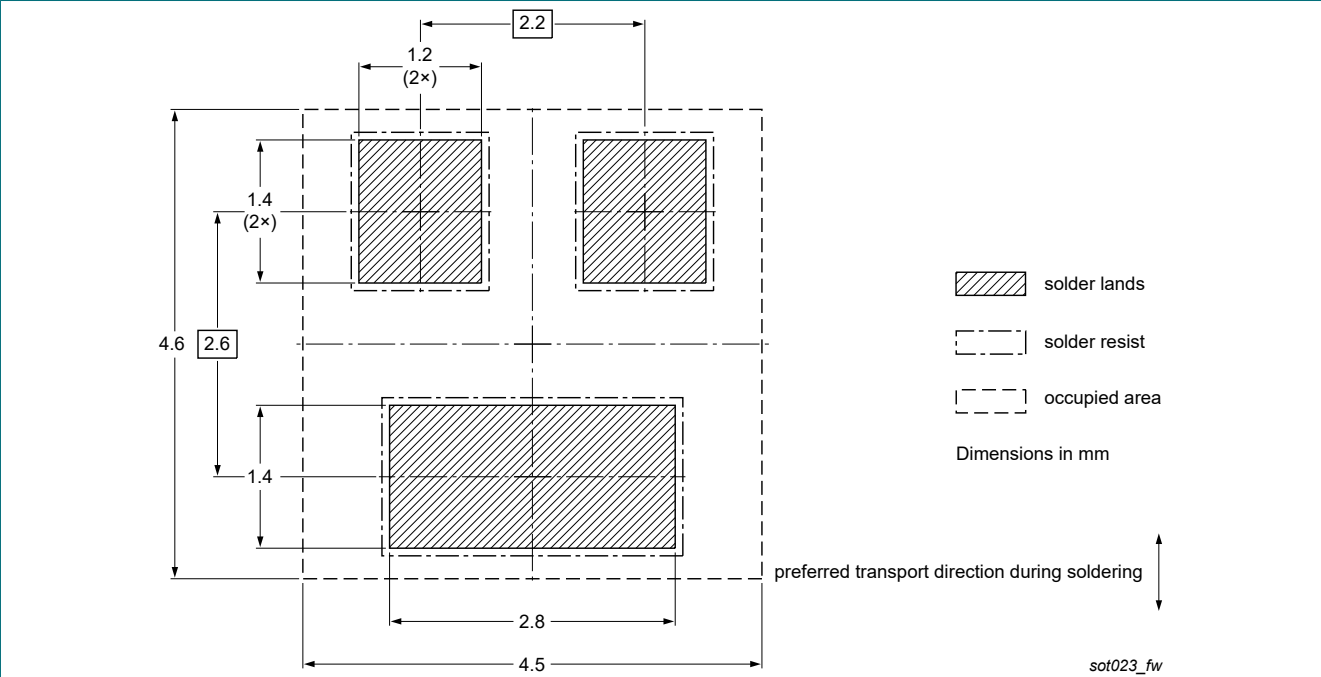


Fig. 3. Wave soldering footprint for SOT23

13. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS4120T v.2	20250721	Product data sheet	-	PBSS4120T v.1
Modifications	<ul style="list-style-type: none">The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.Legal texts have been adapted to the new company name where appropriate.			
PBSS4120T v.1	20030929	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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