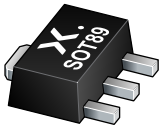

PBSS5250X

50 V, 2 A PNP low VCEsat transistor

24 April 2023 Product data sheet

1. General description

PNP low V_{CEsat} transistor in a SOT89 (SC-62) flat lead Surface-Mounted Device (SMD) plastic package.

NPN complement: PBSS4250X

2. Features and benefits

- Low collector-emitter saturation voltage V_{CEsat}
- High collector current capability: I_C and I_{CM}
- Higher efficiency leading to less heat generation
- Reduced printed-circuit board requirements
- AEC-Q101 qualified

3. Applications

- Power management
  - DC/DC converters
  - Supply line switching
  - Battery charger
  - LCD backlighting
- Peripheral drivers
  - Driver in low supply voltage applications (e.g. lamps and LEDs).
  - Inductive load driver (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		-	-	-50	V
I_C	collector current			-	-	-2	A
h_{FE}	DC current gain	V_{CE} = -2 V; I_C = -0.1 A; T_{amb} = 25 °C		200	-	-	

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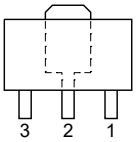
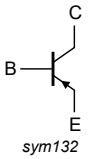
5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	E	emitter	 SOT89	 sym132
2	C	collector		
3	B	base		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBSS5250X	SOT89	plastic, surface-mounted package; 3 leads; 1.5 mm pitch; 4.5 mm x 2.5 mm x 1.5 mm body	SOT89

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PBSS5250X	%1L

[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		-	-50	V
V_{CEO}	collector-emitter voltage	open base		-	-50	V
V_{EBO}	emitter-base voltage	open collector		-	-5	V
I_C	collector current			-	-2	A
I_{CM}	peak collector current	limited by $T_{j(max)}$		-	-5	A
I_B	base current			-	-0.5	A
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	550	mW
			[2]	-	1	W
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-65	150	°C
T_{stg}	storage temperature			-65	150	°C

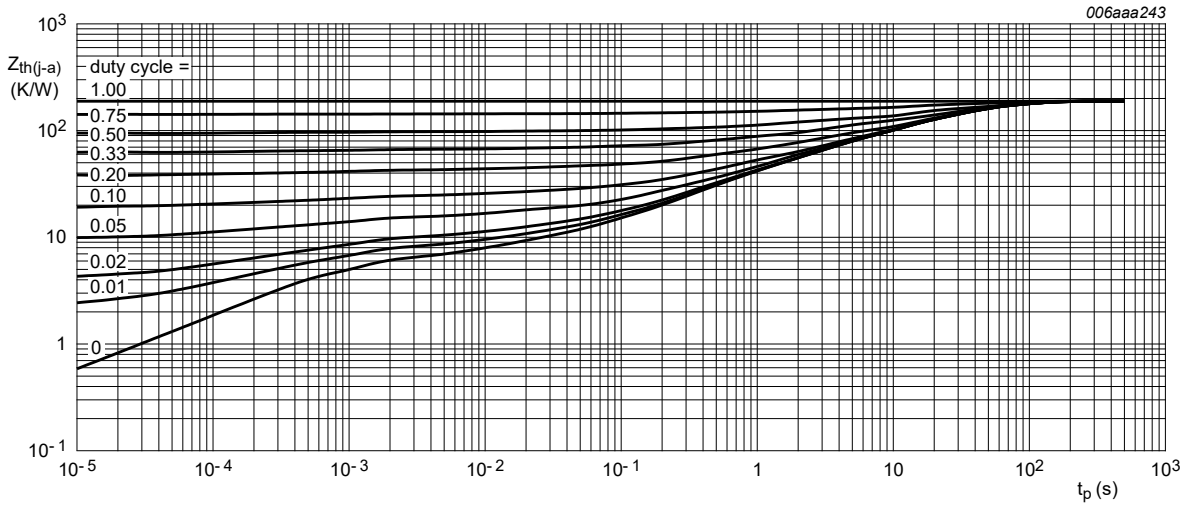
[1] Device mounted on an FR4 PCB, single-sided, 35 µm copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, single-sided, 35 µm copper, tin-plated, mounting pad for collector 1 cm^2.

9. Thermal characteristics

Table 6. Thermal characteristics

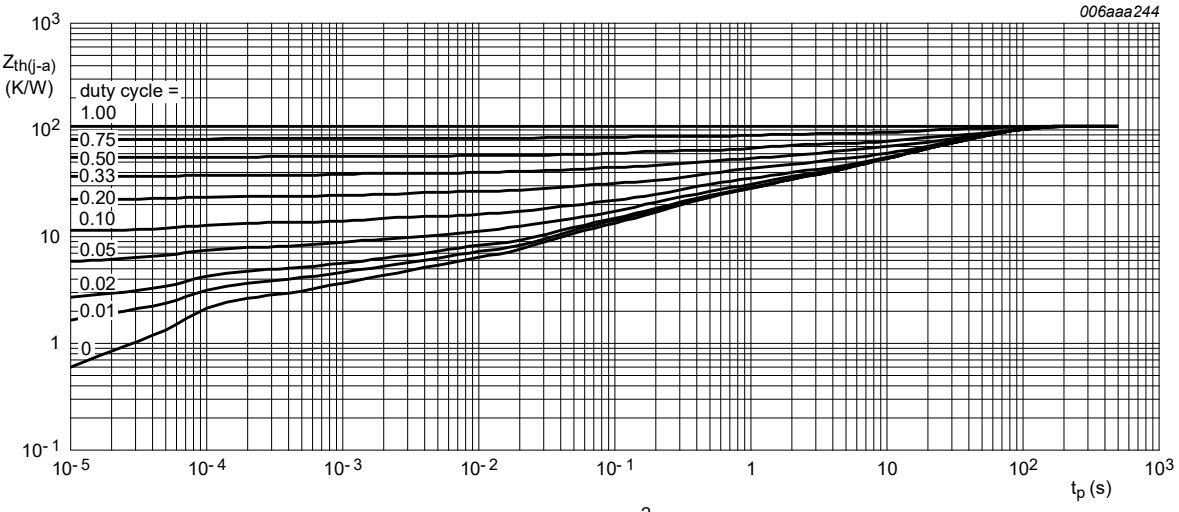
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	225	K/W
			[2]	-	-	125	K/W
			[3]	-	-	90	K/W
			[4]	-	-	80	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	16	K/W

[1] Device mounted on an FR4 PCB, single-sided, 35 µm copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, single-sided, 35 µm copper, tin-plated, mounting pad for collector 1 cm^2.
[3] Device mounted on an FR4 PCB, single-sided, 35 µm copper, tin-plated, mounting pad for collector 6 cm^2.
[4] Device mounted on a ceramic PCB, 7 cm^2, single-sided, 35 µm copper, tin-plated; standard footprint.



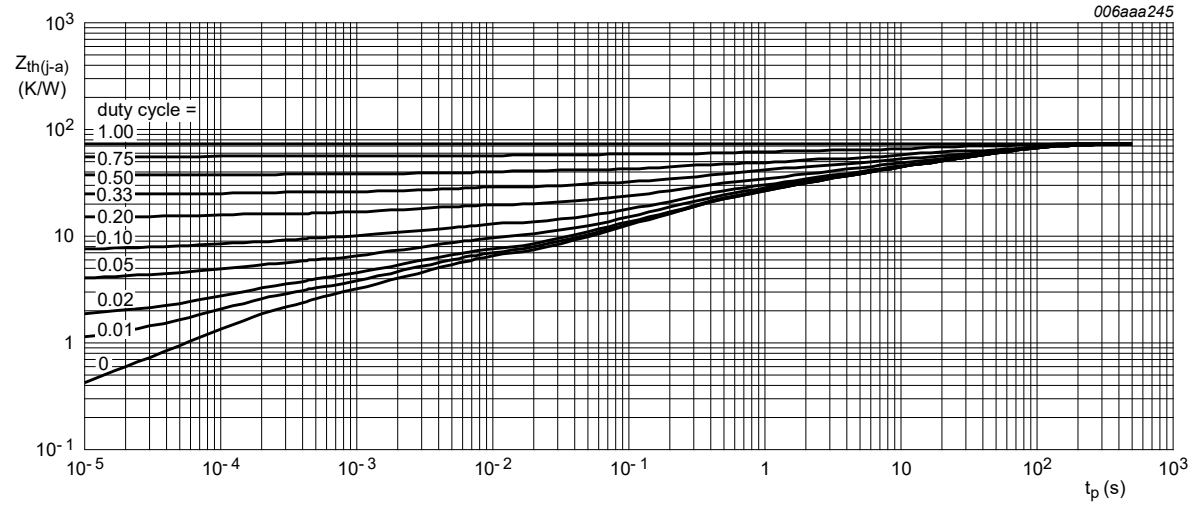
Mounted on FR4 PCB; standard footprint.

Fig. 1. Transient thermal impedance as a function of pulse duration; typical values



Mounted on FR4 PCB; mounting pad for collector 1 cm^2

Fig. 2. Transient thermal impedance as a function of pulse duration; typical values



Mounted on FR4 PCB; mounting pad for collector 6 cm^2

Fig. 3. Transient thermal impedance as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage	I_C = -100 µA; I_E = 0 A; T_{amb} = 25 °C		-50	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	I_C = -2 mA; I_B = 0 A; T_{amb} = 25 °C		-50	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage (collector open)	I_E = -100 µA; I_C = 0 A; T_{amb} = 25 °C		-5	-	-	V
I_{CBO}	collector-base cut-off current	V_{CB} = -50 V; I_E = 0 A; T_{amb} = 25 °C		-	-	-100	nA
		V_{CB} = -50 V; I_E = 0 A; T_j = 150 °C		-	-	-50	µA
I_{EBO}	emitter-base cut-off current	V_{EB} = -5 V; I_C = 0 A; T_{amb} = 25 °C		-	-	-100	nA
I_{CES}	collector-emitter cut-off current	V_{CE} = -50 V; V_{BE} = 0 V; T_{amb} = 25 °C		-	-	-100	nA
h_{FE}	DC current gain	V_{CE} = -2 V; I_C = -0.1 A; T_{amb} = 25 °C		200	-	-	
		V_{CE} = -2 V; I_C = -0.5 A; T_{amb} = 25 °C		200	-	-	
		V_{CE} = -2 V; I_C = -1 A; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		200	-	-	
		V_{CE} = -2 V; I_C = -2 A; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		100	-	-	
V_{CEsat}	collector-emitter saturation voltage	I_C = -0.5 A; I_B = -50 mA; T_{amb} = 25 °C		-	-	-90	mV
		I_C = -1 A; I_B = -50 mA; T_{amb} = 25 °C		-	-	-250	mV
		I_C = -2 A; I_B = -100 mA; T_{amb} = 25 °C		-	-	-380	mV
		I_C = -2 A; I_B = -200 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		-	-	-320	mV
R_{CEsat}	collector-emitter saturation resistance			-	-	160	mΩ
V_{BEsat}	base-emitter saturation voltage	I_C = -2 A; I_B = -100 mA; T_{amb} = 25 °C		-	-	-1.1	V

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{BEon}	base-emitter turn-on voltage	V_{CE} = -2 V; I_C = -1 A; T_{amb} = 25 °C		-1.1	-	-	V
f_T	transition frequency	V_{CE} = -5 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		-	-	35	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

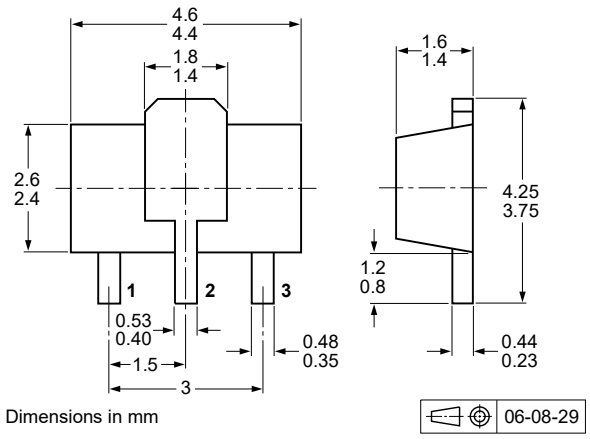


Fig. 4. Package outline SOT89

13. Soldering

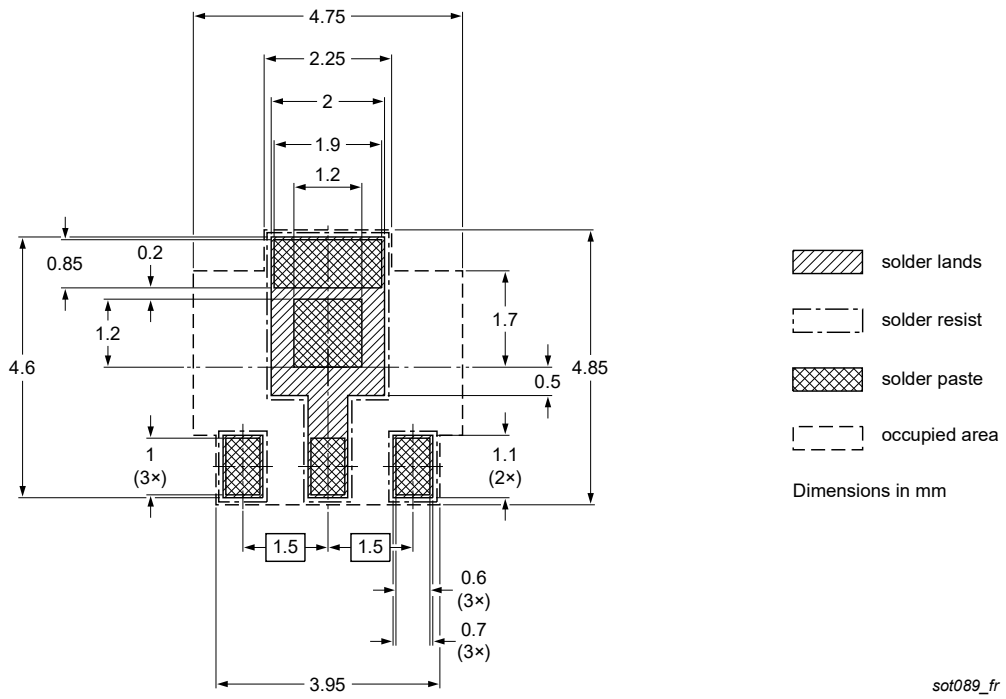


Fig. 5. Reflow soldering footprint for SOT89

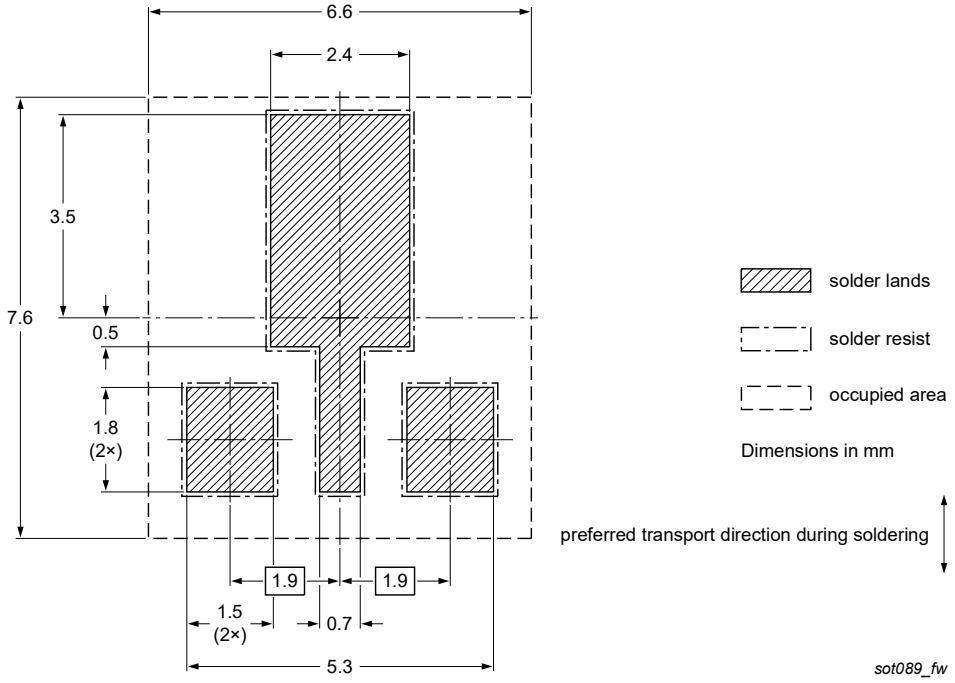


Fig. 6. Wave soldering footprint for SOT89

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS5250X v.3	20230424	Product data sheet	-	PBSS5250X v.2
Modifications:	• 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.			
PBSS5250X v.2	20041104	Product data sheet	-	PBSS5250X v.1
PBSS5250X v.1	20030617	Product specification	-	-

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".
[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at https://www.nexperia.com.

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Date of release: 24 April 2023

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