



PBSS8110X

100 V, 1 A NPN low V_{CEsat} transistor

3 July 2025

Product data sheet

1. General description

NPN low V_{CEsat} transistor in a SOT89 (SC-62/ TO-243) small Surface-Mounted Device (SMD) plastic package.

PNP complement: PBSS9110X.

2. Features and benefits

- SOT89 package
- Low collector-emitter saturation voltage V_{CEsat}
- High collector current capability: I_C and I_{CM}
- High efficiency leading to less heat generation
- AEC-Q101 qualified

3. Applications

- Major application segments:
 - Automotive 42 V power
 - Telecom infrastructure
 - Industrial
- Peripheral driver:
 - Driver in low supply voltage applications (e.g. lamps and LEDs)
 - Inductive load driver (e.g. relays, buzzers and motors)
- DC-to-DC converter

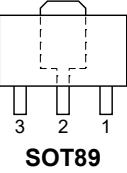
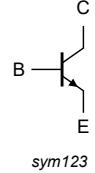
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V _{CEO}	collector-emitter voltage	open base		-	-	100	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 = 1 A; I _B = 100 mA; pulsed; t _p ≤ 300 µs; δ ≤ 0.02; T _{amb} = 25 °C		-	165	200	mΩ

5. Pinning information

Table 2. Pinning information

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

6. Ordering information

Table 3. Ordering information

Type number	Package			Version
	Name	Description		
PBSS8110X	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]
PBSS8110X	%4B

[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		-	120	V
V_{CEO}	collector-emitter voltage	open base		-	100	V
V_{EBO}	emitter-base voltage	open collector		-	5	V
I_C	collector current			-	1	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms		-	3	A
I_B	base current			-	300	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	0.55	W
			[2]	-	1.4	W
			[3]	-	2	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 copper, tin-plated and standard footprint.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm².

[3] Device mounted on a ceramic PCB, Al₂O₃, standard footprint.

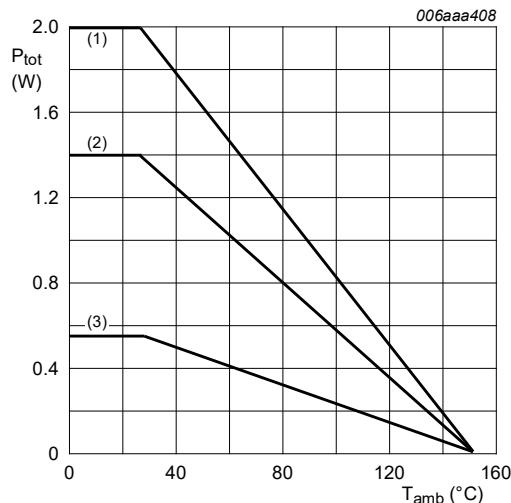


Fig. 1. Power derating curves

9. Thermal characteristics

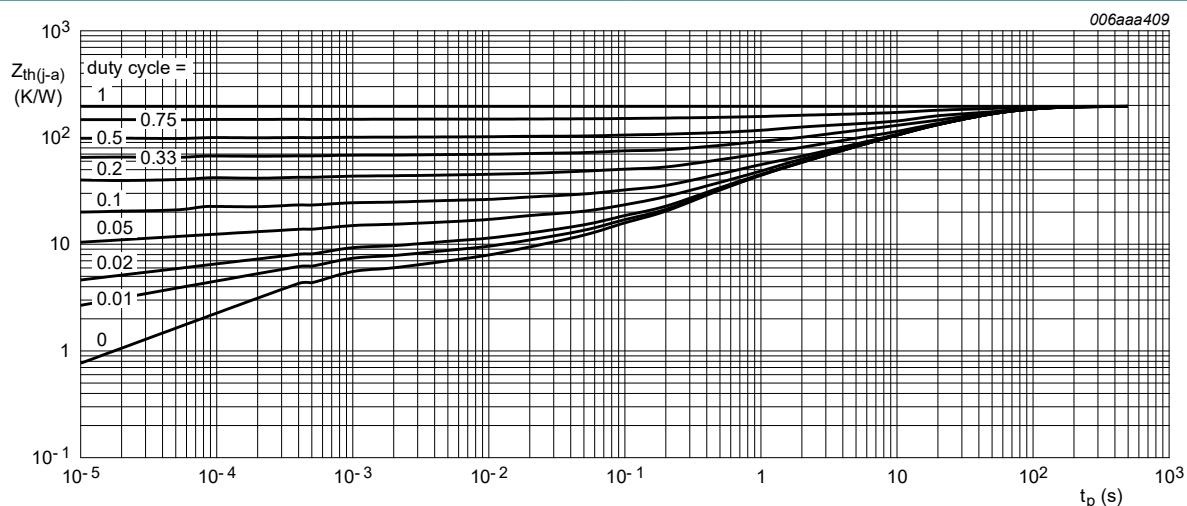
Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	227	K/W
			[2]	-	-	89	K/W
			[3]	-	-	63	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 copper, tin-plated and standard footprint.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm^2 .

[3] Device mounted on a ceramic PCB, Al_2O_3 , standard footprint.



FR4 PCB; standard footprint

Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse time; typical values

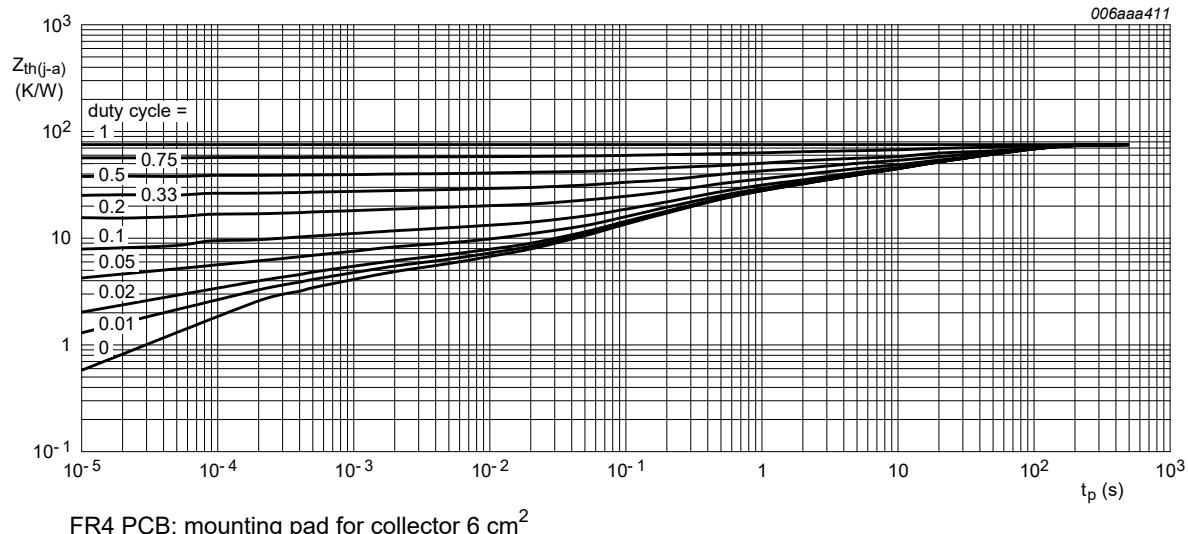


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse time; typical values

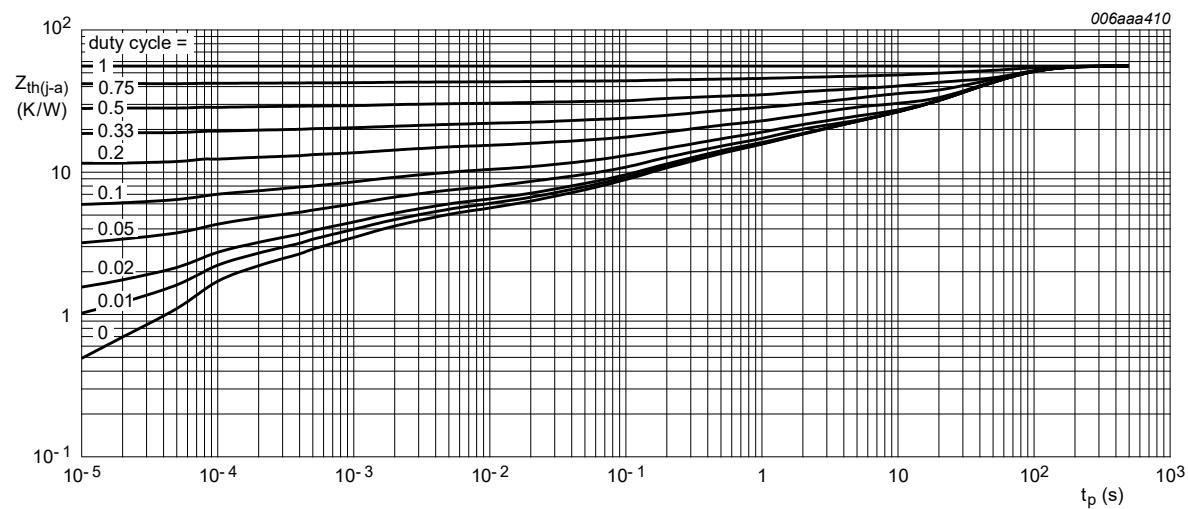


Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse time; typical values

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I _{CBO}	collector-base cut-off current	V _{CB} = 80 V; I _E = 0 A; T _{amb} = 25 °C	-	-	100	nA
		V _{CB} = 80 V; I _E = 0 A; T _j = 150 °C	-	-	50	μA
I _{CES}	collector-emitter cut-off current	V _{CE} = 80 V; V _{BE} = 0 V; T _{amb} = 25 °C	-	-	100	nA
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} = 10 V; I _C = 1 mA; T _{amb} = 25 °C	150	-	-	
		V _{CE} = 10 V; I _C = 250 mA; T _{amb} = 25 °C	150	-	500	
		V _{CE} = 10 V; I _C = 500 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C	100	-	-	
		V _{CE} = 10 V; I _C = 1 A; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C	80	-	-	

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEsat}	collector-emitter saturation voltage	$I_C = 100 \text{ mA}; I_B = 10 \text{ mA}; T_{amb} = 25 \text{ }^\circ\text{C}$	-	-	40	mV
		$I_C = 500 \text{ mA}; I_B = 50 \text{ mA}; T_{amb} = 25 \text{ }^\circ\text{C}$	-	-	120	mV
		$I_C = 1 \text{ A}; I_B = 100 \text{ mA}; \text{pulsed}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02; T_{amb} = 25 \text{ }^\circ\text{C}$	-	-	200	mV
R_{CEsat}	collector-emitter saturation resistance		-	165	200	$\text{m}\Omega$
V_{BEsat}	base-emitter saturation voltage	$I_C = 1 \text{ A}; I_B = 100 \text{ mA}; T_{amb} = 25 \text{ }^\circ\text{C}$	-	-	1.05	V
V_{BEon}	base-emitter turn-on voltage	$V_{CE} = 10 \text{ V}; I_C = 1 \text{ A}; T_{amb} = 25 \text{ }^\circ\text{C}$	-	-	0.9	V
t_d	delay time	$V_{CC} = 10 \text{ V}; I_C = 0.5 \text{ A}; I_{Bon} = 0.025 \text{ A}; I_{Boff} = -0.025 \text{ A}; T_{amb} = 25 \text{ }^\circ\text{C}$	-	25	-	ns
t_r	rise time		-	220	-	ns
t_{on}	turn-on time		-	245	-	ns
t_s	storage time		-	365	-	ns
t_f	fall time		-	185	-	ns
t_{off}	turn-off time		-	550	-	ns
f_T	transition frequency	$V_{CE} = 10 \text{ V}; I_C = 50 \text{ mA}; f = 100 \text{ MHz}; T_{amb} = 25 \text{ }^\circ\text{C}$	100	-	-	MHz
C_c	collector capacitance	$V_{CB} = 10 \text{ V}; I_E = 0 \text{ A}; i_e = 0 \text{ A}; f = 1 \text{ MHz}; T_{amb} = 25 \text{ }^\circ\text{C}$	-	-	7.5	pF

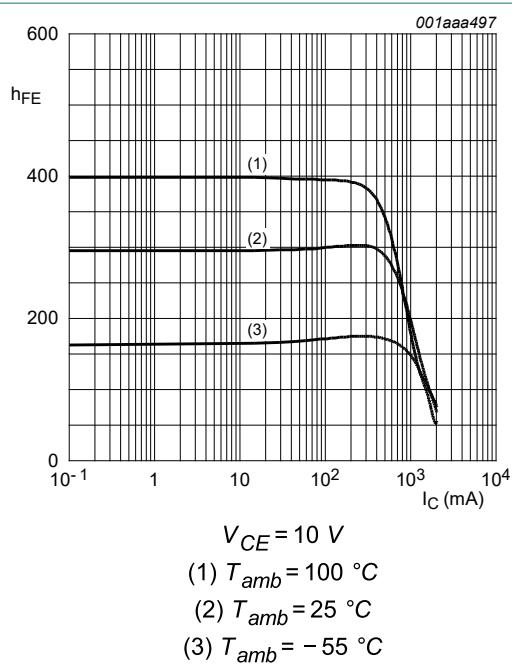


Fig. 5. DC current gain as a function of collector current; typical values

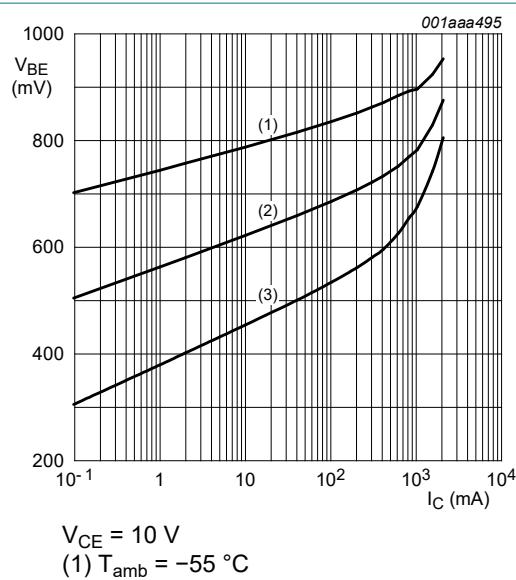
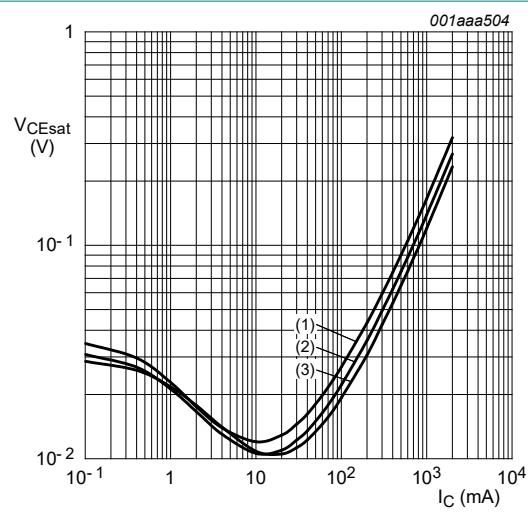
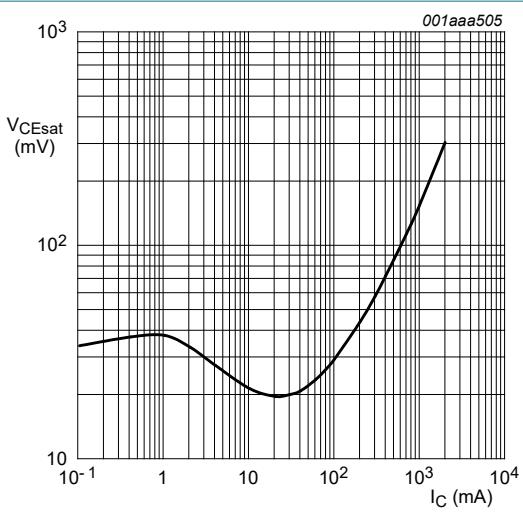


Fig. 6. Base-emitter voltage as a function of collector current; typical values



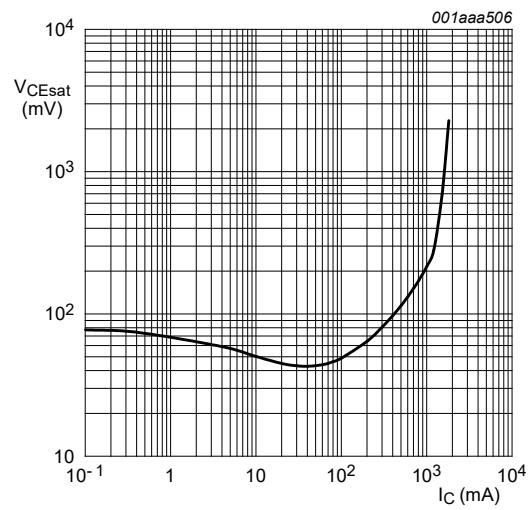
$I_C/I_B = 10$
 (1) $T_{amb} = 100 \text{ }^{\circ}\text{C}$
 (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$
 (3) $T_{amb} = -55 \text{ }^{\circ}\text{C}$

Fig. 7. Collector-emitter saturation voltage as a function of collector current; typical values



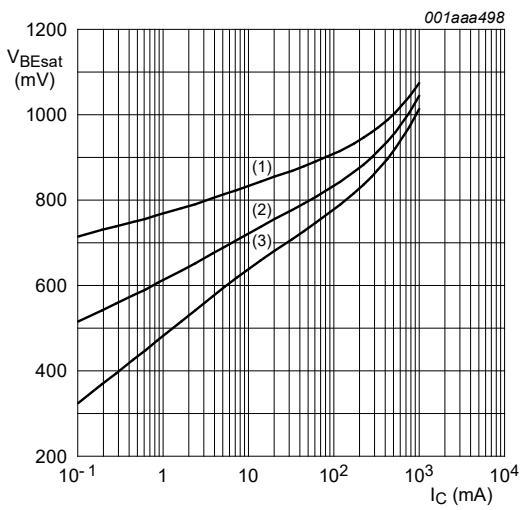
$I_C/I_B = 20; T_{amb} = 25 \text{ }^{\circ}\text{C}$

Fig. 8. Collector-emitter saturation voltage as a function of collector current; typical values



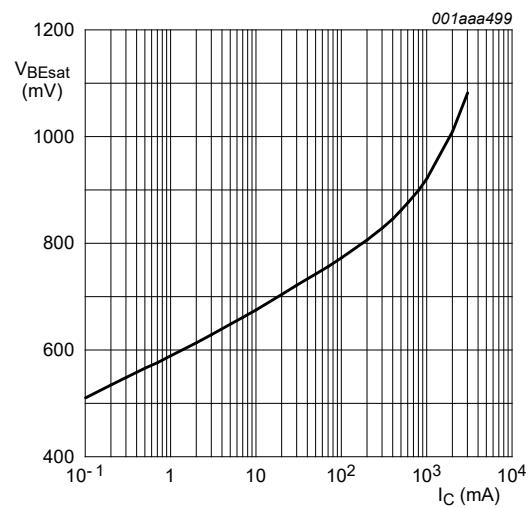
$I_C/I_B = 50; T_{amb} = 25 \text{ }^{\circ}\text{C}$

Fig. 9. Collector-emitter saturation voltage as a function of collector current; typical values



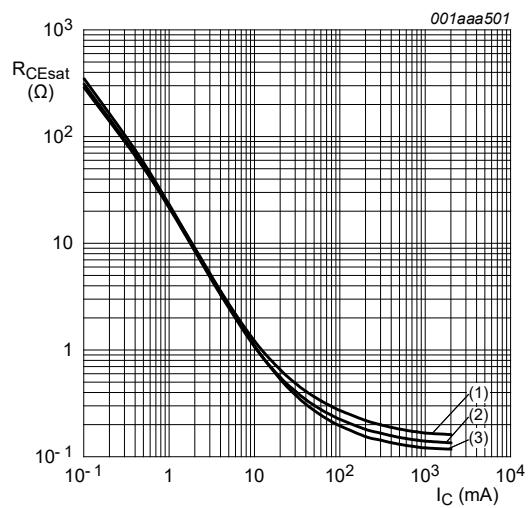
$I_C/I_B = 10$
 (1) $T_{amb} = -55 \text{ }^{\circ}\text{C}$
 (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$
 (3) $T_{amb} = 100 \text{ }^{\circ}\text{C}$

Fig. 10. Base-emitter saturation voltage as a function of collector current; typical values



$I_C/I_B = 20$; $T_{amb} = 25^\circ\text{C}$

Fig. 11. Base-emitter saturation voltage as a function of collector current; typical values



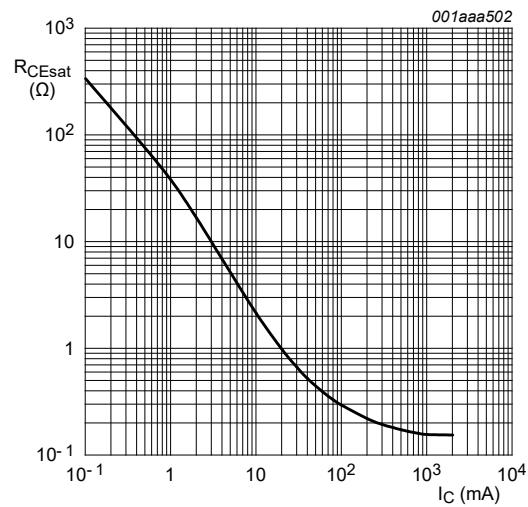
$I_C/I_B = 10$

(1) $T_{amb} = 100^\circ\text{C}$

(2) $T_{amb} = 25^\circ\text{C}$

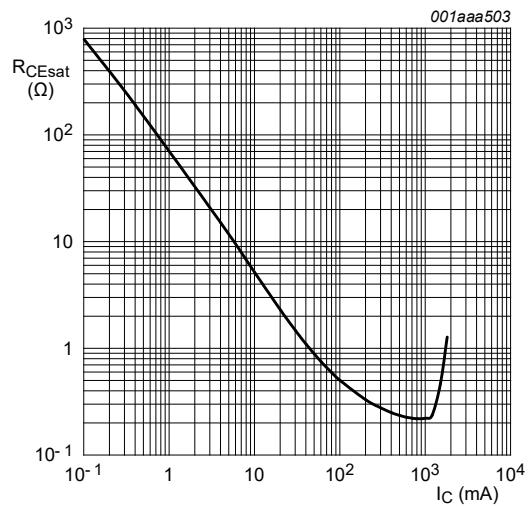
(3) $T_{amb} = -55^\circ\text{C}$

Fig. 12. Collector-emitter saturation resistance as a function of collector current; typical values



$I_C/I_B = 20$; $T_{amb} = 25^\circ\text{C}$

Fig. 13. Equivalent on-resistance as a function of collector current; typical values



$I_C/I_B = 50$; $T_{amb} = 25^\circ\text{C}$

Fig. 14. Equivalent on-resistance as a function of collector current; typical values

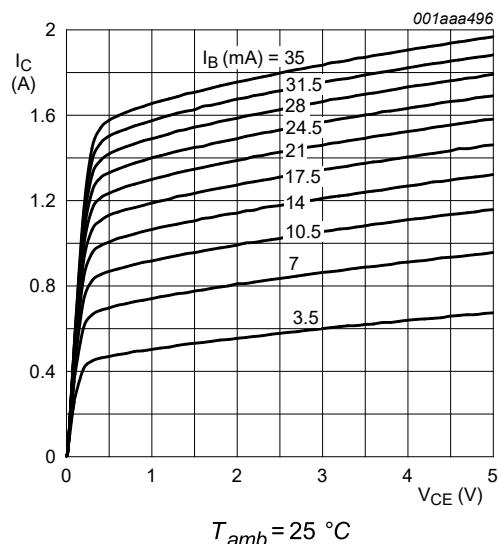


Fig. 15. Collector current as a function of collector-emitter voltage; typical values

11. Package outline

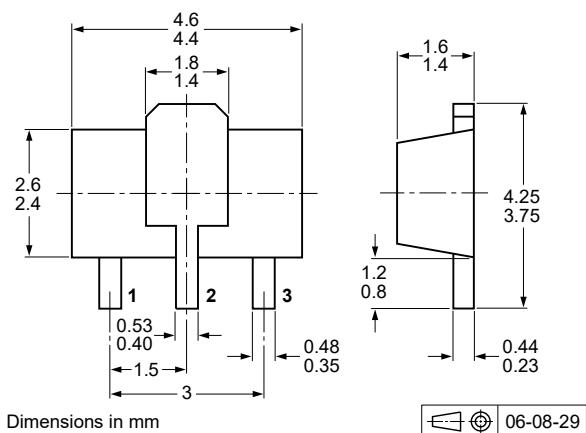


Fig. 16. Package outline SOT89

12. Soldering

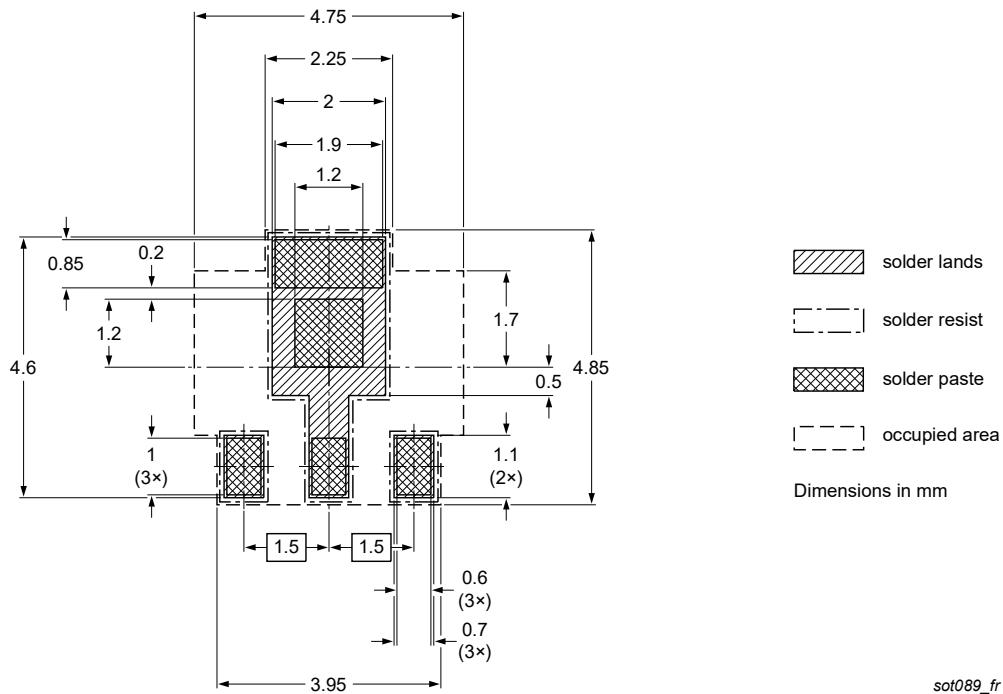


Fig. 17. Reflow soldering footprint for SOT89

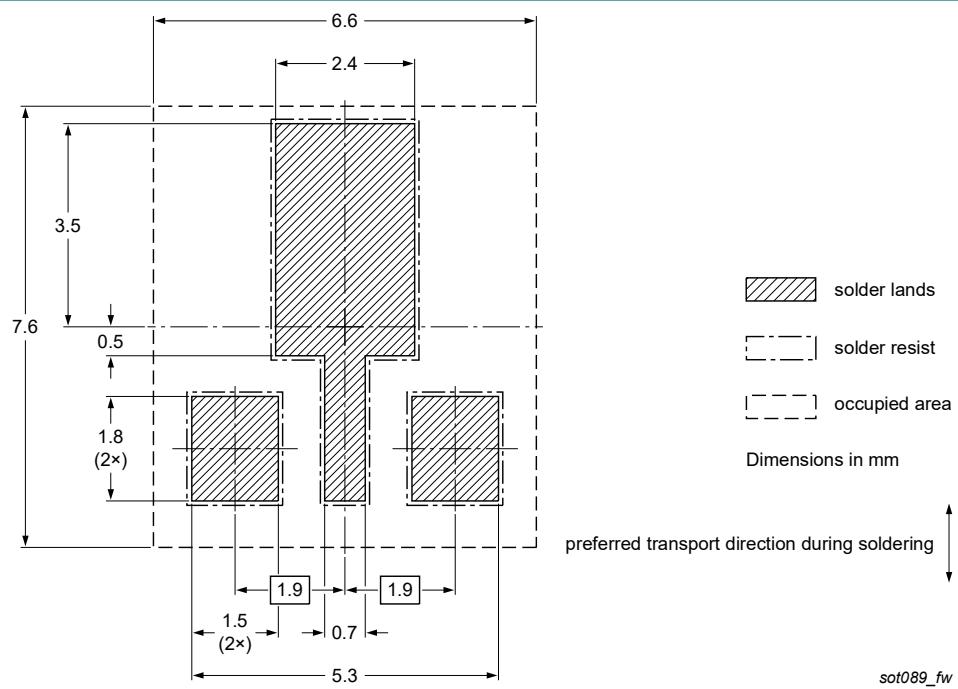


Fig. 18. Wave soldering footprint for SOT89

13. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS8110X v.3	20250703	Product data sheet	-	PBSS8110X_2
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.			
PBSS8110X_2	20091211	Product data sheet	-	PBSS8110X_1
PBSS8110X_1	20050511	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.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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