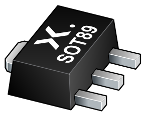

PBSS4350X-Q

50 V, 3 A NPN low VCEsat transistor

31 July 2025 **Product data sheet**

1. General description

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

PNP complement: PBSS5350X-Q

2. Features and benefits

- SOT89 (SC-62) package
- 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
- Qualified according to AEC-Q101 and recommended for use in automotive applications

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			-	-	3	A
I_{CM}	peak collector current	limited by $T_{j(max)}$		-	-	5	A
R_{CEsat}	collector-emitter saturation resistance	I_C = 2 A; I_B = 200 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		-	100	130	mΩ

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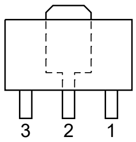
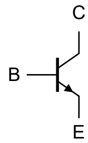
5. Pinning information

Table 2. Pinning information

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

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBSS4350X-Q	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
PBSS4350X-Q	S43

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			-	3	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
			[3]	-	1.4	W
			[4]	-	1.6	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 1 cm^2.
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm^2.
[4] Device mounted on a ceramic PCB 7 cm^2, single-sided copper, tin-plated.

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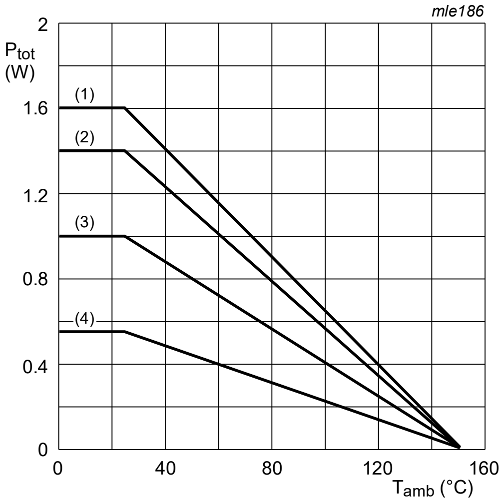

(1) Ceramic PCB; 7 cm^2 mounting pad for collector
(2) FR4 PCB; 6 cm^2 copper mounting pad for collector
(3) FR4 PCB; 1 cm^2 copper mounting pad for collector
(4) Standard footprint

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

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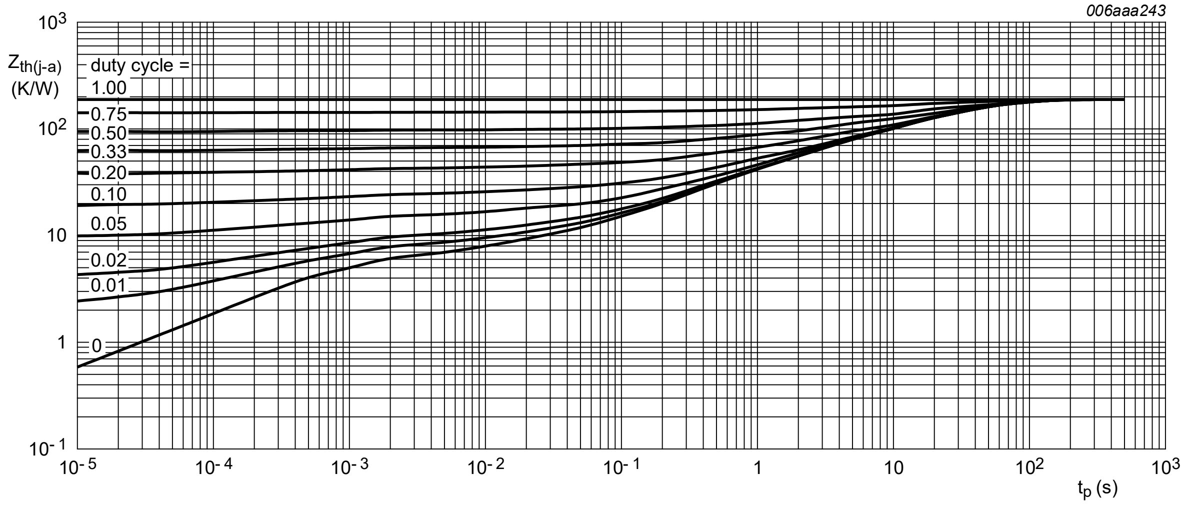
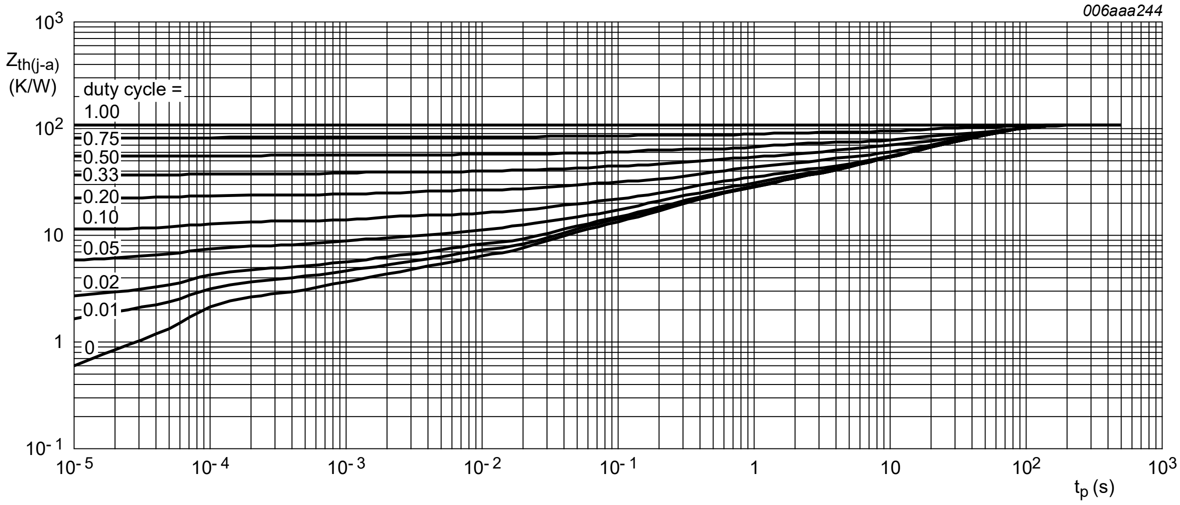


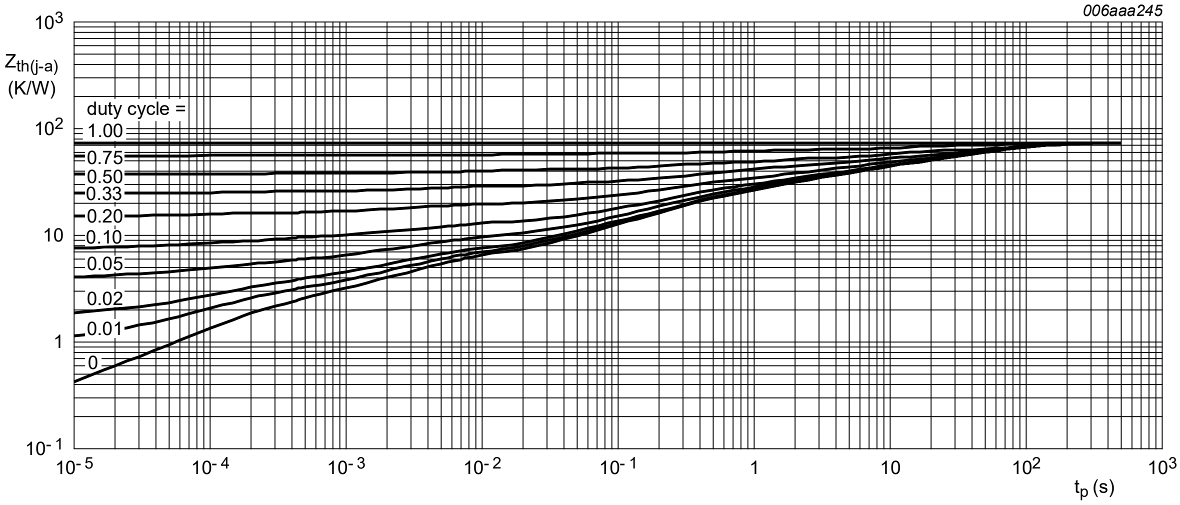
Mounted on FR4 PCB; standard footprint.

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



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

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



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

Fig. 4. Transient thermal impedance as a function of pulse duration; typical values

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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 = 10 mA; I_B = 0 A; T_{amb} = 25 °C	50	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	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_{CES}	collector-emitter cut-off current	V_{CE} = 50 V; V_{BE} = 0 V; T_{amb} = 25 °C	-	-	100	nA
I_{EBO}	emitter-base cut-off current	V_{EB} = 5 V; I_C = 0 A; T_{amb} = 25 °C	-	-	100	nA
h_{FE}	DC current gain	V_{CE} = 2 V; I_C = 0.1 A; pulsed; t_p ≤ 300 µs; δ ≤ 2; T_{amb} = 25 °C	300	-	-	
		V_{CE} = 2 V; I_C = 0.5 A; pulsed; t_p ≤ 300 µs; δ ≤ 0.02; T_{amb} = 25 °C	300	-	-	
		V_{CE} = 2 V; I_C = 1 A; pulsed; t_p ≤ 300 µs; δ ≤ 0.02; T_{amb} = 25 °C	300	-	700	
		V_{CE} = 2 V; I_C = 2 A; pulsed; t_p ≤ 300 µs; δ ≤ 0.02; T_{amb} = 25 °C	200	-	-	
		V_{CE} = 2 V; I_C = 3 A; pulsed; t_p ≤ 300 µs; δ ≤ 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	-	-	80	mV
		I_C = 1 A; I_B = 50 mA; T_{amb} = 25 °C	-	-	160	mV
		I_C = 2 A; I_B = 100 mA; pulsed; t_p ≤ 300 µs; δ ≤ 0.02; T_{amb} = 25 °C	-	-	280	mV
		I_C = 2 A; I_B = 200 mA; pulsed; t_p ≤ 300 µs; δ ≤ 0.02; T_{amb} = 25 °C	-	-	260	mV
		I_C = 3 A; I_B = 300 mA; pulsed; t_p ≤ 300 µs; δ ≤ 0.02; T_{amb} = 25 °C	-	-	370	mV
R_{CEsat}	collector-emitter saturation resistance	I_C = 2 A; I_B = 200 mA; pulsed; t_p ≤ 300 µs; δ ≤ 0.02; T_{amb} = 25 °C	-	100	130	mΩ
V_{BEsat}	base-emitter saturation voltage	I_C = 2 A; I_B = 100 mA; T_{amb} = 25 °C	-	-	1.1	V
		I_C = 3 A; I_B = 300 mA; pulsed; t_p ≤ 300 µs; δ ≤ 0.02; T_{amb} = 25 °C	-	-	1.2	V
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	-	-	25	pF

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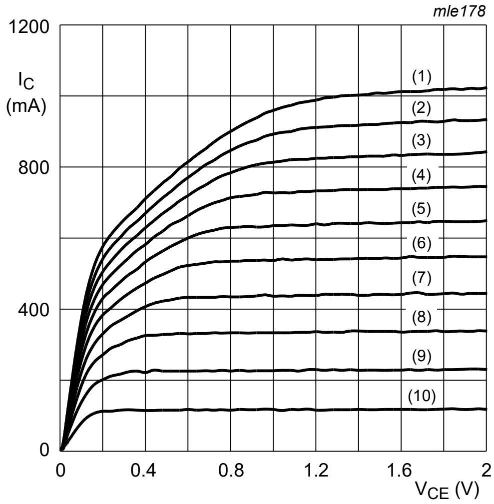
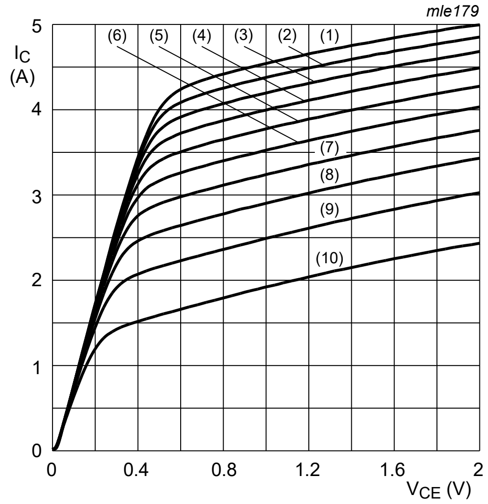


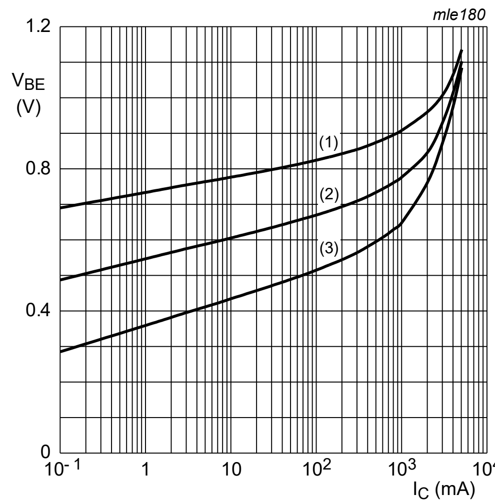
T_{amb} = 25 °C
(1) I_B = 2600 μA
(2) I_B = 2340 μA
(3) I_B = 2080 μA
(4) I_B = 1820 μA
(5) I_B = 1560 μA
(6) I_B = 1300 μA
(7) I_B = 1040 μA
(8) I_B = 780 μA
(9) I_B = 520 μA
(10) I_B = 260 μA

Fig. 5. Collector current as a function of collector-emitter voltage; typical values



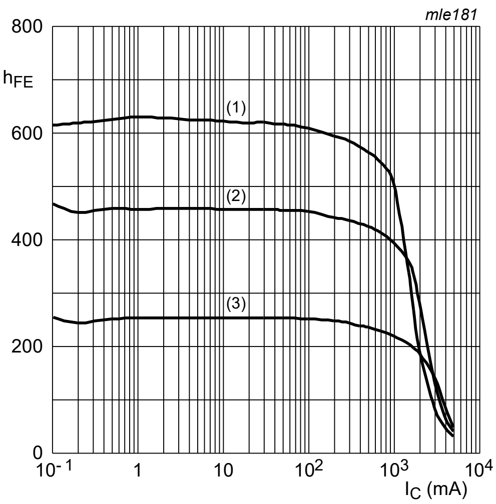
T_{amb} = 25 °C
(1) I_B = 120 mA
(2) I_B = 108 mA
(3) I_B = 96 mA
(4) I_B = 84 mA
(5) I_B = 72 mA
(6) I_B = 60 mA
(7) I_B = 48 mA
(8) I_B = 36 mA
(9) I_B = 24 mA
(10) I_B = 12 mA

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



V_{CE} = 2 V
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 100 °C

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



V_{CE} = 2 V
(1) T_{amb} = 100 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

Fig. 8. DC current gain as a function of collector current; typical values

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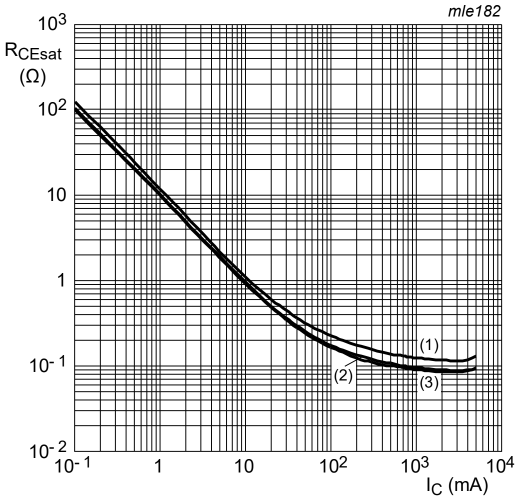
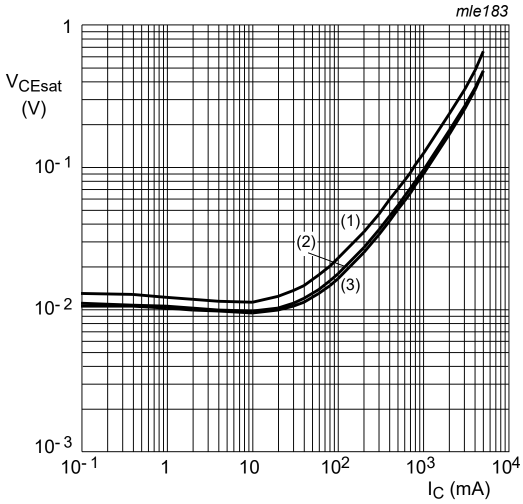


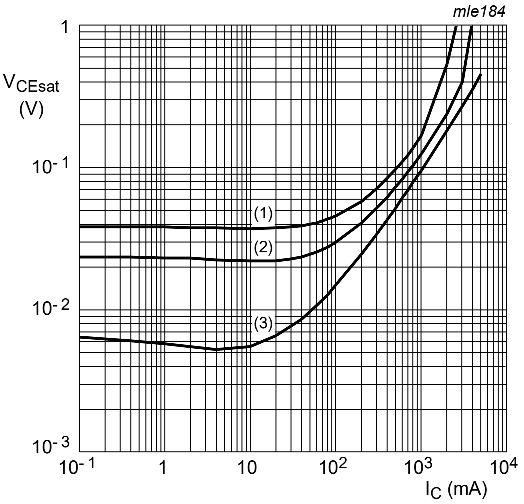
$I_C/I_B = 20$
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

Fig. 9. Equivalent on-resistance as a function of collector current; typical values



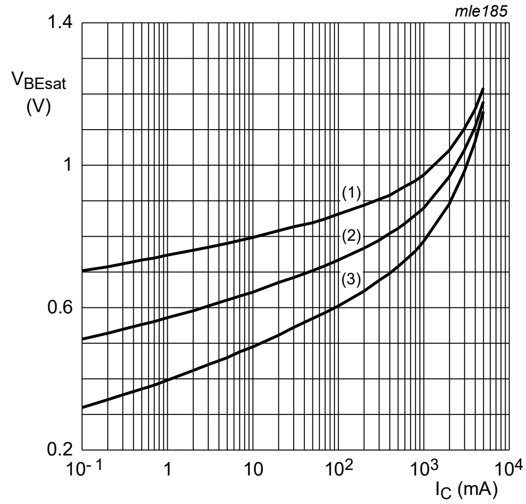
$I_C/I_B = 20$
(1) T_{amb} = 100 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

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



T_{amb} = 25 °C
(1) $I_C/I_B = 100$
(2) $I_C/I_B = 50$
(3) $I_C/I_B = 10$

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



$I_C/I_B = 20$
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 100 °C

Fig. 12. Base-emitter saturation voltage as a function of collector current; typical values

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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

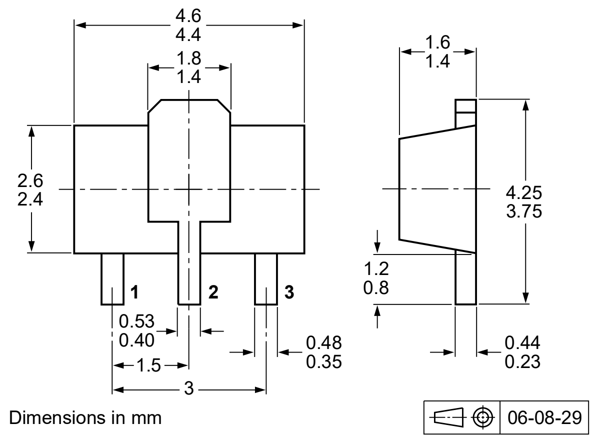

Fig. 13. Package outline SOT89

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13. Soldering

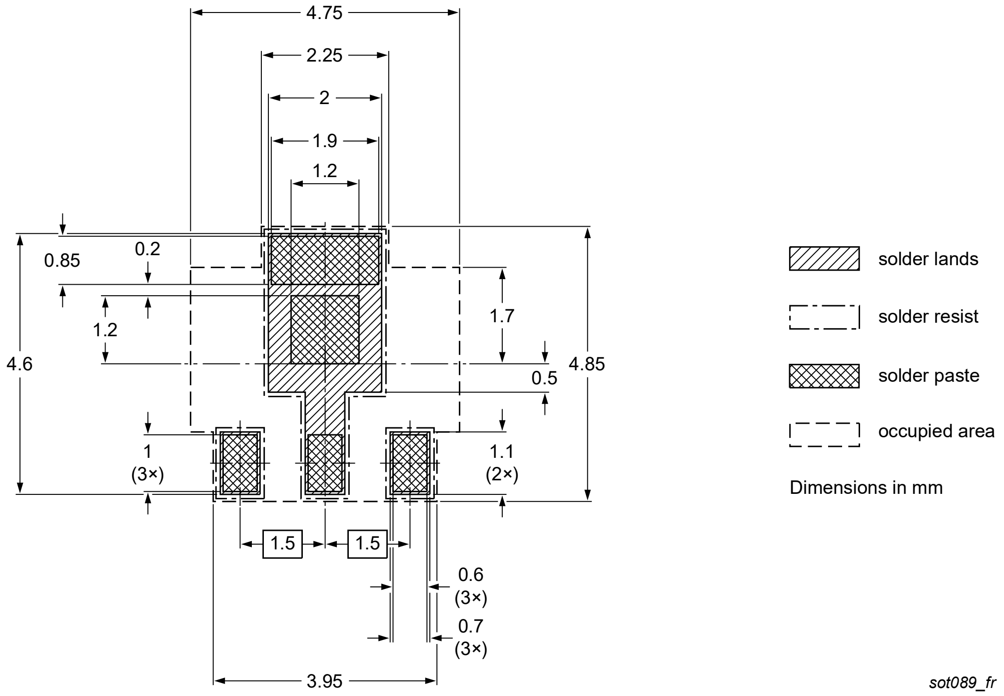

Fig. 14. Reflow soldering footprint for SOT89

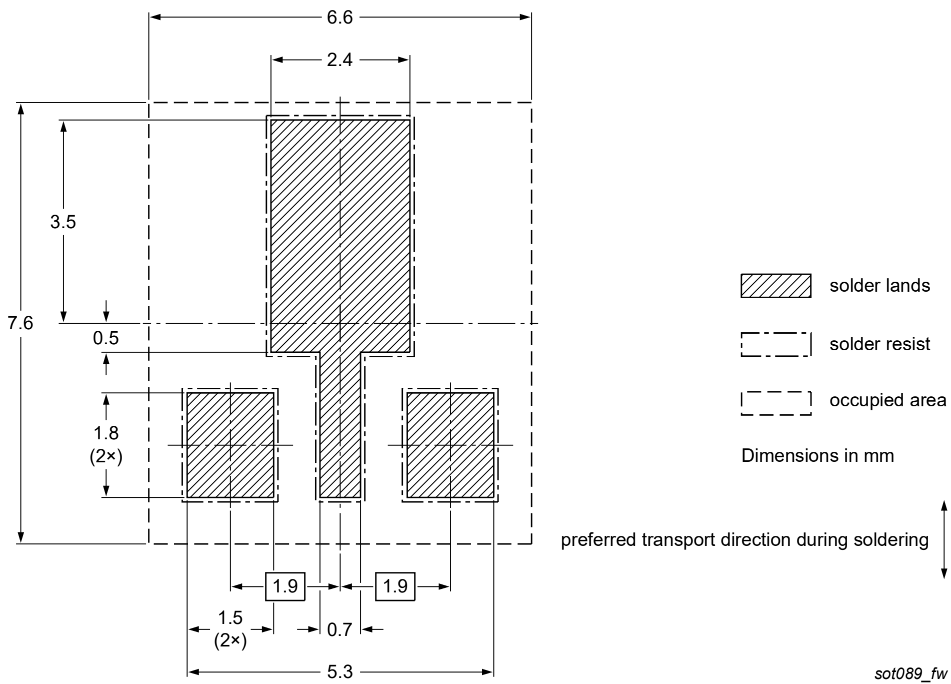

Fig. 15. Wave soldering footprint for SOT89

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14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS4350X-Q v.1	20250731	Product data sheet	-	-

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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".
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