



PBSS5240X-Q

40 V, 2 A PNP low V_{CEsat} transistor

10 July 2025

Product data sheet

1. General description

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

NPN complement: PBSS4240X-Q

2. Features and benefits

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

3. Applications

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

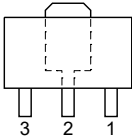
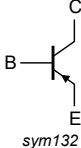
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{CEO}	collector-emitter voltage	open base	-	-	-40	V
I _C	collector current		-	-	-2	A
I _{CM}	peak collector current		-	-	-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	-	-	310	mΩ
I _{CRM}	repetitive peak collector current	δ ≤ 0.33; pulsed; t _p ≤ 20 ms	-	-	-2.5	A

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
PBSS5240X-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
PBSS5240X-Q	S48

8. Limiting values

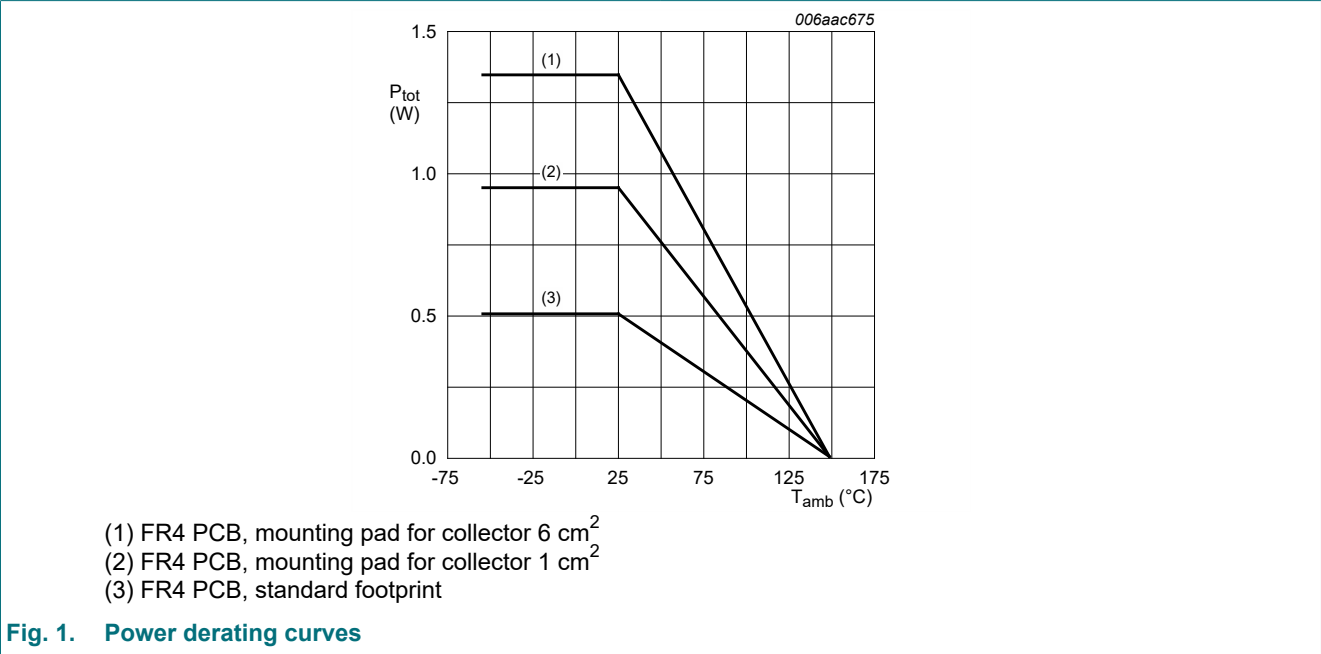
Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
V _{CBO}	collector-base voltage	open emitter		-	-40	V
V _{CEO}	collector-emitter voltage	open base		-	-40	V
V _{EBO}	emitter-base voltage	open collector		-	-5	V
I _C	collector current			-	-2	A
I _{CRM}	repetitive peak collector current	δ ≤ 0.33; pulsed; t _p ≤ 20 ms		-	-2.5	A
I _{CM}	peak collector current			-	-3	A
I _B	base current			-	-300	mA
I _{BM}	peak base current			-	-1	A
P _{tot}	total power dissipation		[1]	-	0.5	W
			[2]	-	0.95	W
			[3]	-	1.35	W
T _j	junction temperature			-	150	°C
T _{amb}	ambient temperature			-65	150	°C

Symbol	Parameter	Conditions		Min	Max	Unit
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.
- [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm².

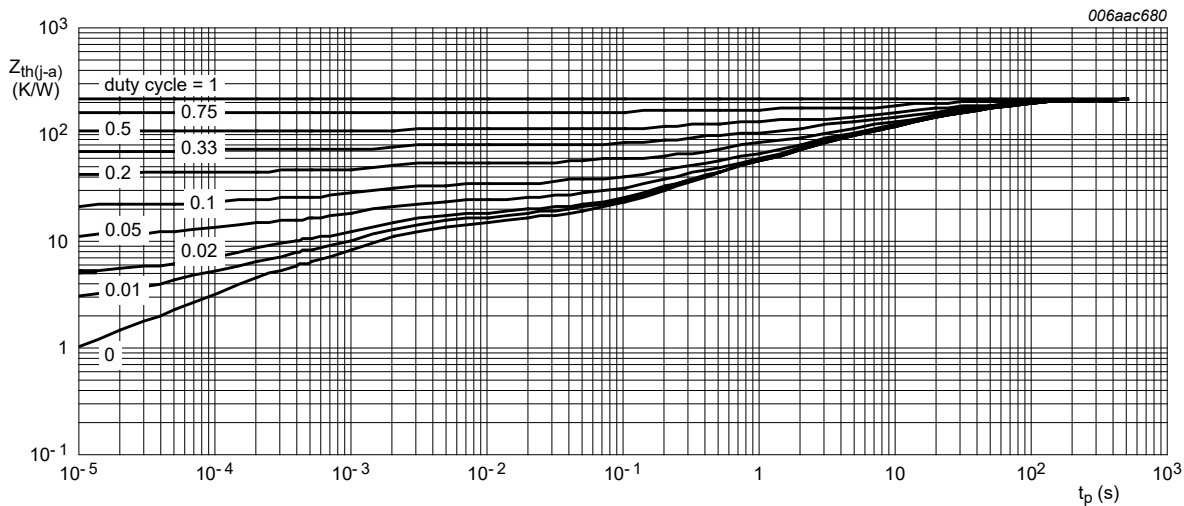


9. Thermal characteristics

Table 6. Thermal characteristics

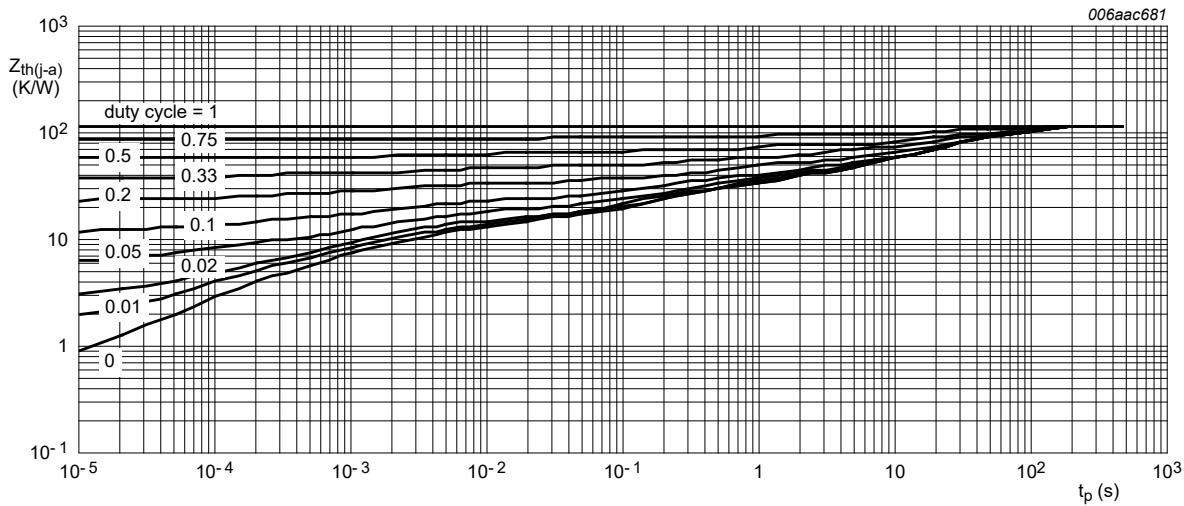
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
R _{th(j-a)}	thermal resistance from junction to ambient	in free air	[1]	-	-	250	K/W
			[2]	-	-	132	K/W
			[3]	-	-	93	K/W
R _{th(j-sp)}	thermal resistance from junction to solder point			-	-	16	K/W

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



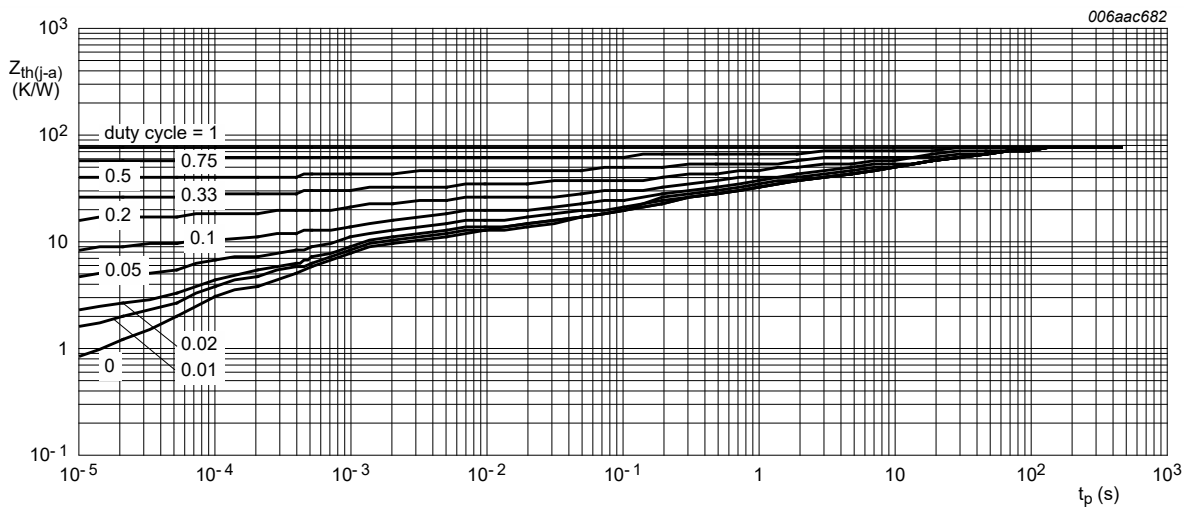
FR4 PCB, standard footprint

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



FR4 PCB, mounting pad for collector 1 cm²

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



FR4 PCB, mounting pad for collector 6 cm²

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

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I _{CBO}	collector-base cut-off current	V _{CB} = -40 V; I _E = 0 A; T _{amb} = 25 °C		-	-	-100	nA
		V _{CB} = -40 V; I _E = 0 A; T _j = 150 °C		-	-	-50	µA
I _{CEO}	collector-emitter cut-off current (base open)	I _B = 0 A; V _{CE} = -30 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} = -5 V; I _C = -1 mA; T _{amb} = 25 °C		300	-	-	
		V _{CE} = -5 V; I _C = -500 mA; T _{amb} = 25 °C		215	-	-	
		V _{CE} = -5 V; I _C = -1 A; T _{amb} = 25 °C		145	-	-	
		V _{CE} = -5 V; I _C = -2 A; pulsed; t _p ≤ 300 µs; δ ≤ 0.02; T _{amb} = 25 °C		55	-	-	
V _{CEsat}	collector-emitter saturation voltage	I _C = -100 mA; I _B = -5 mA; T _{amb} = 25 °C		-	-	-140	mV
		I _C = -500 mA; I _B = -50 mA; T _{amb} = 25 °C		-	-	-170	mV
		I _C = -1 A; I _B = -100 mA; pulsed; t _p ≤ 300 µs; δ ≤ 0.02; T _{amb} = 25 °C		-	-	-310	mV
		I _C = -2 A; I _B = -200 mA; pulsed; t _p ≤ 300 µs; δ ≤ 0.02; T _{amb} = 25 °C		-	-	-630	mV
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		-	-	310	mΩ
V _{BEsat}	base-emitter saturation voltage			-	-	-1.2	V
V _{BEon}	base-emitter turn-on voltage	V _{CE} = -5 V; I _C = -1 A; pulsed; t _p ≤ 300 µs; δ ≤ 0.02; T _{amb} = 25 °C		-	-	-1.1	V
f _T	transition frequency	V _{CE} = -10 V; I _C = -50 mA; f = 100 MHz; T _{amb} = 25 °C		150	-	-	MHz
C _c	collector capacitance	V _{CB} = -10 V; I _E = 0 A; i _e = 0 A; f = 1 MHz; T _{amb} = 25 °C		-	-	12	pF

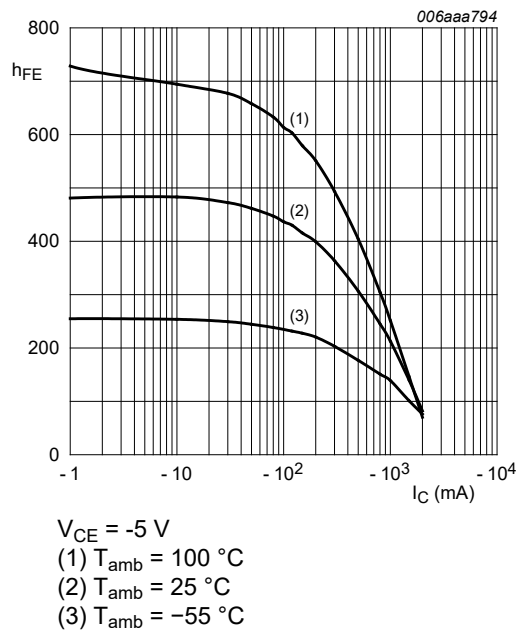


Fig. 5. DC current gain as a function of collector current; typical values

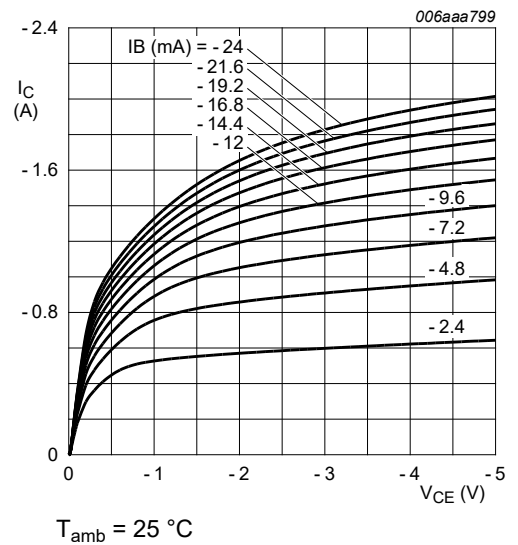


Fig. 6. Collector current as a function of collector-emitter voltage; typical values

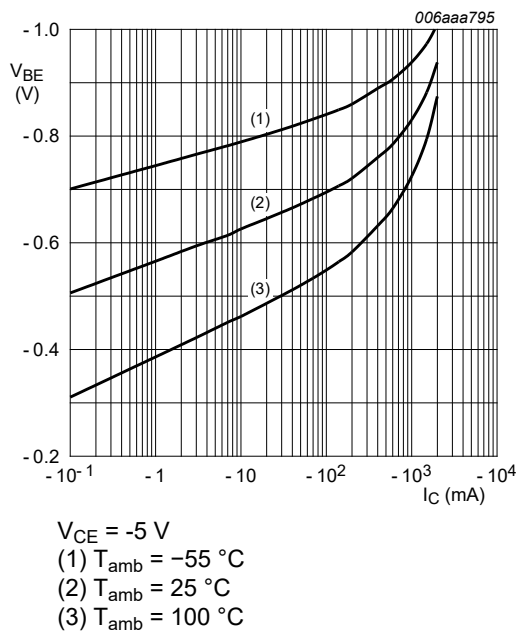


Fig. 7. Base-emitter voltage as a function of collector current; typical values

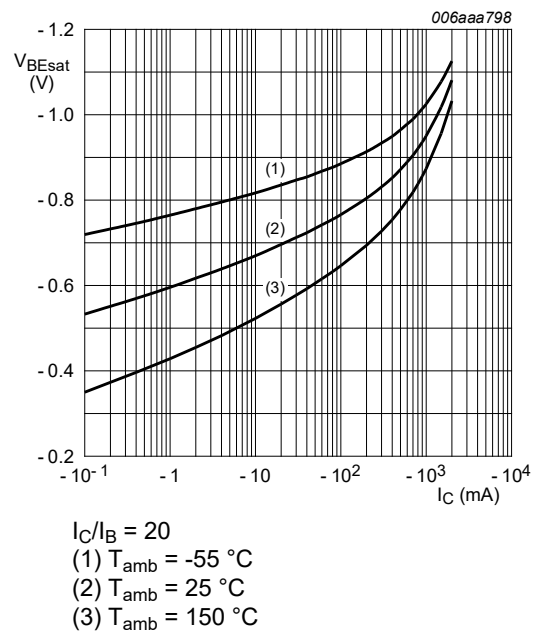
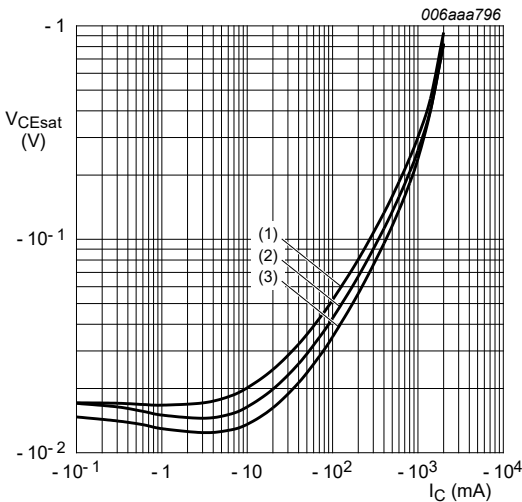


Fig. 8. Base-emitter saturation voltage as a function of collector current; typical values



$I_C/I_B = 20$
(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. 9. Collector-emitter saturation voltage as a function of collector current; typical values

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

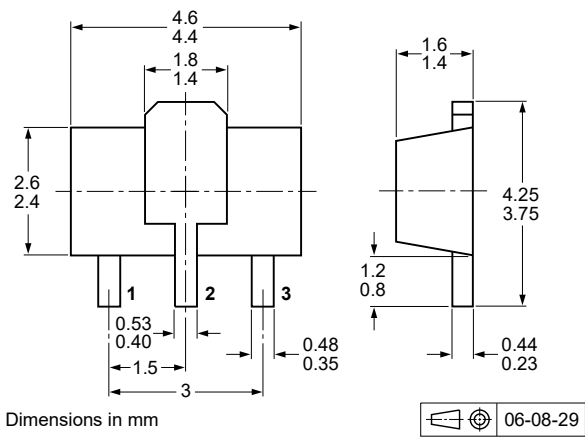


Fig. 10. Package outline SOT89

13. Soldering

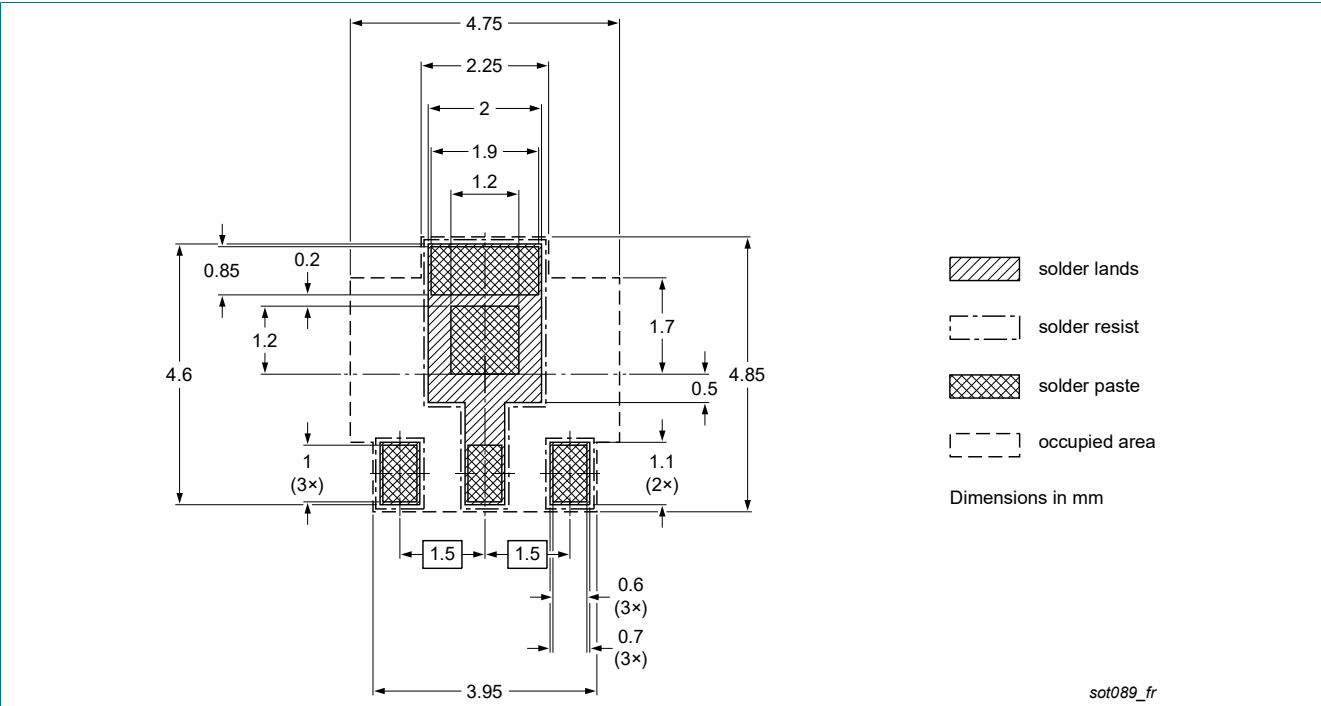


Fig. 11. Reflow soldering footprint for SOT89

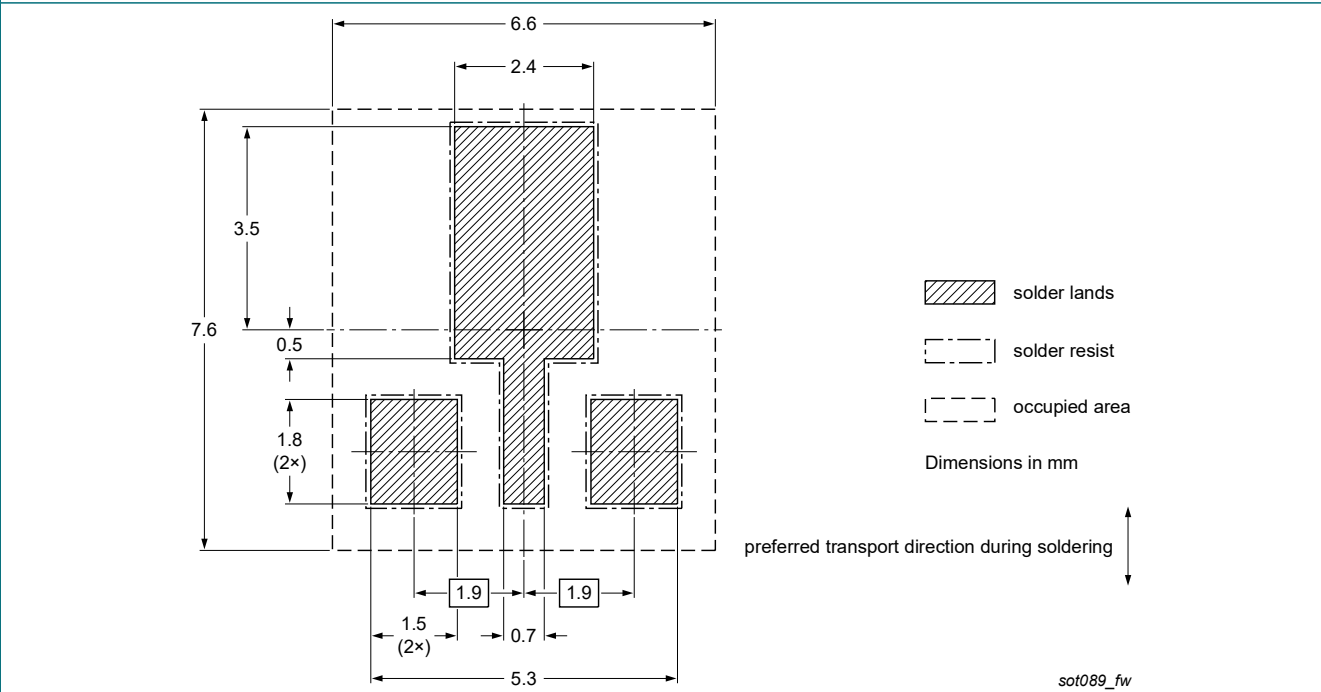


Fig. 12. Wave soldering footprint for SOT89

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS5240X-Q v.1	20250710	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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