
# PBSS5250X-Q

## 50 V, 2 A PNP low VCEsat transistor

31 July 2025 Product data sheet

## 1. General description

PNP general-purpose low $V_{CEsat}$ transistor in a medium power SOT89 (SC-62) Surface-Mounted Device (SMD) plastic package.

NPN complement: PBSS4250X-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)

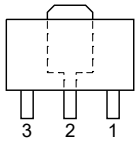
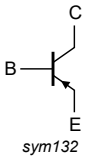
## 4. Quick reference data

**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 | | | - | - | -2 | A |
| $h_{FE}$ | DC current gain | $V_{CE}$ = -2 V; $I_C$ = -0.1 A; $T_{amb}$ = 25 °C | | 200 | - | - | |

# 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-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[1] |
|---|---|
| PBSS5250X-Q | %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 |

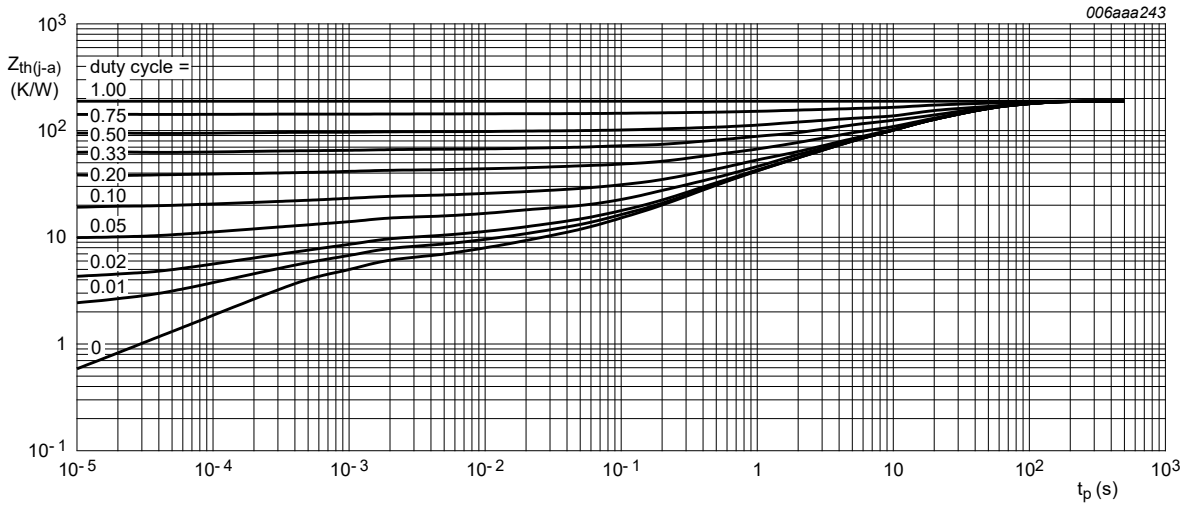
[1] Device mounted on an FR4 PCB, single-sided, 35 µm copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, single-sided, 35 µm copper, tin-plated, mounting pad for collector 1 $cm^2$.

# 9. Thermal characteristics

**Table 6. Thermal characteristics**

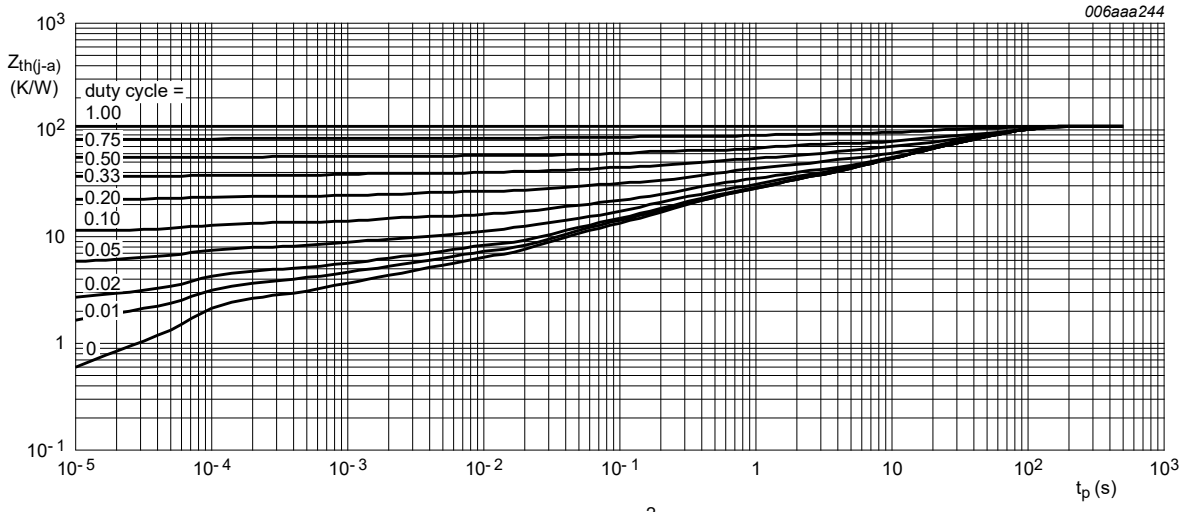
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] | - | - | 225 | K/W |
| | | | [2] | - | - | 125 | K/W |
| | | | [3] | - | - | 90 | K/W |
| | | | [4] | - | - | 80 | K/W |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



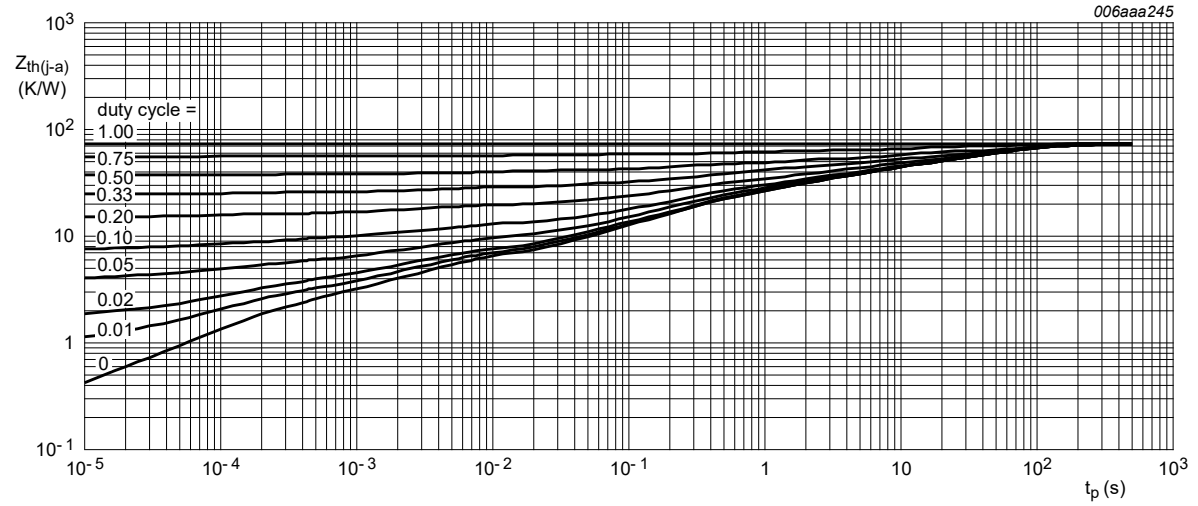

Mounted on FR4 PCB; standard footprint.

**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 | $I_E$ = -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; $T_{amb}$ = 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 |
| $V_{BEon}$ | base-emitter turn-on voltage | $V_{CE}$ = -2 V; $I_C$ = -1 A; $T_{amb}$ = 25 °C | | -1.1 | - | - | V |

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $f_T$ | 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

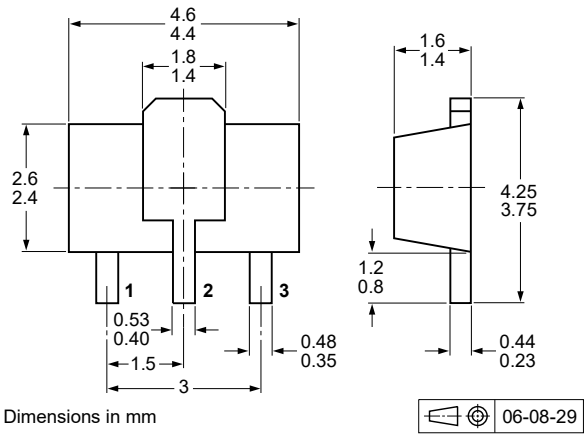



**Fig. 4. Package outline SOT89**

## 13. Soldering

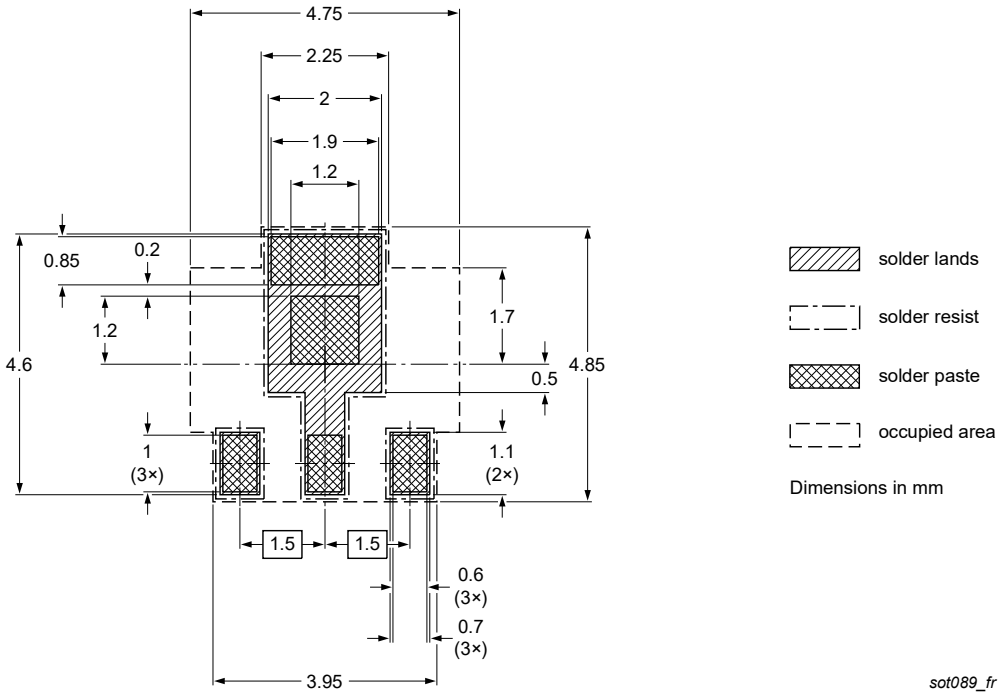



**Fig. 5. Reflow soldering footprint for SOT89**

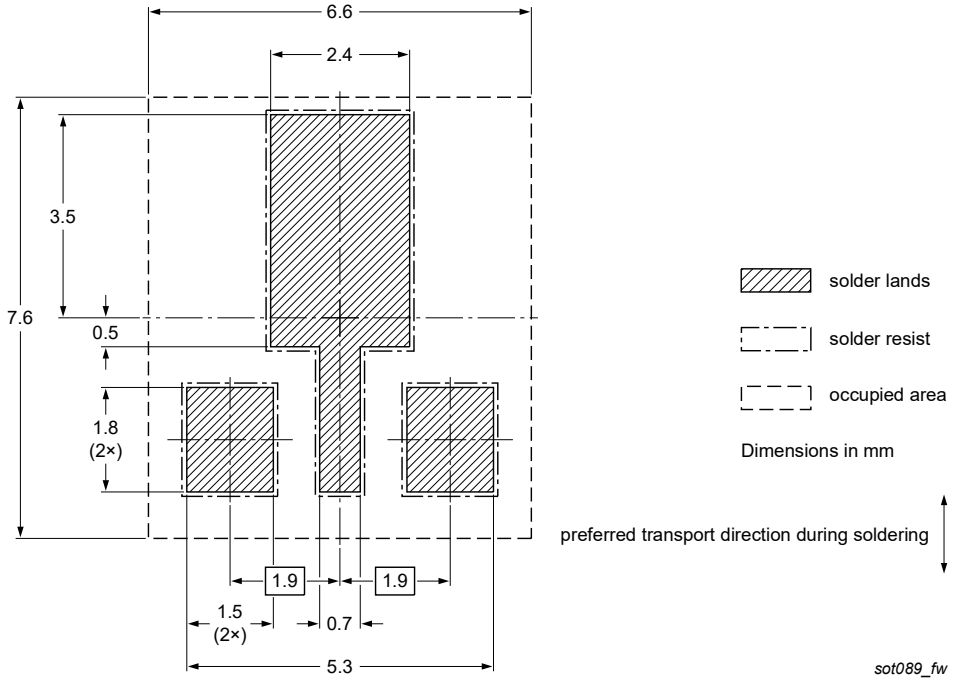



**Fig. 6. Wave soldering footprint for SOT89**

# 14. Revision history

**Table 8. Revision history**

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| PBSS5250X-Q v.1 | 20250731 | 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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