



PBSS5230T-Q

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

26 September 2023

Product data sheet

1. General description

PNP low V_{CEsat} transistor in a SOT23 small Surface-Mounted Device (SMD) plastic package.

NPN complement: PBSS4230T

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
- 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)

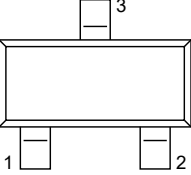
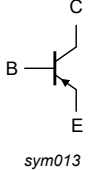
4. Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------|---|--|-----|-----|-----|------|
| V _{CEO} | collector-emitter voltage | open base | - | - | -30 | V |
| I _C | collector current | | - | - | -2 | A |
| I _{CM} | peak collector current | single pulse; t _p ≤ 1 ms | - | - | -3 | A |
| R _{CEsat} | collector-emitter saturation resistance | I _C = -500 mA; I _B = -50 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C | - | 160 | 220 | mΩ |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------|--|---|
| 1 | B | base |  <p style="text-align: center;">SOT23</p> |  <p style="text-align: center;">sym013</p> |
| 2 | E | emitter | | |
| 3 | C | collector | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-----------------------------|---------|--|-----------------------|
| | Name | Description | Version |
| PBSS5230T-Q | SOT23 | plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body | SOT23 |

7. Marking

Table 4. Marking codes

| Type number | Marking code ^[1] |
|-------------|-----------------------------|
| PBSS5230T-Q | %3G |

[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 | | - | -30 | V |
| V_{CEO} | collector-emitter voltage | open base | | - | -30 | V |
| V_{EBO} | emitter-base voltage | open collector | | - | -5 | V |
| I_C | collector current | | | - | -2 | 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] | - | 300 | mW |
| | | | [2] | - | 480 | mW |
| 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 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] | - | - | 417 | K/W |
| | | | [2] | - | - | 260 | K/W |

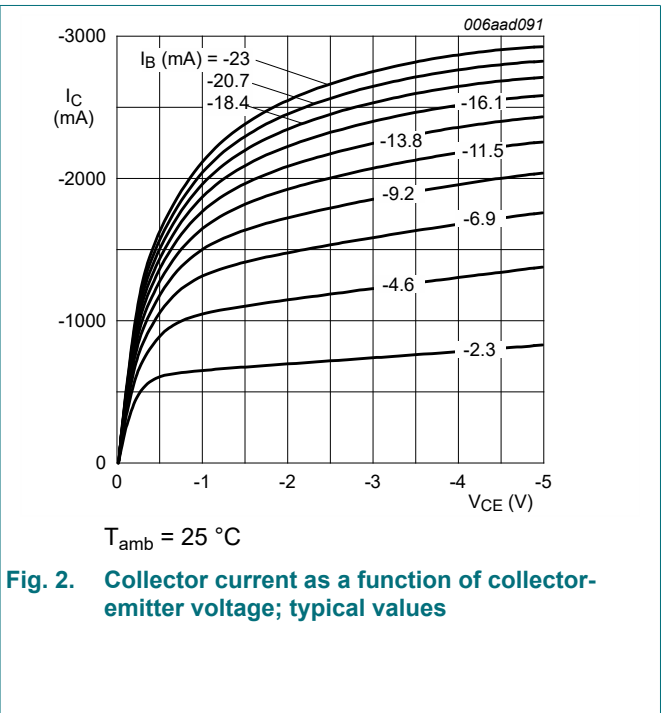
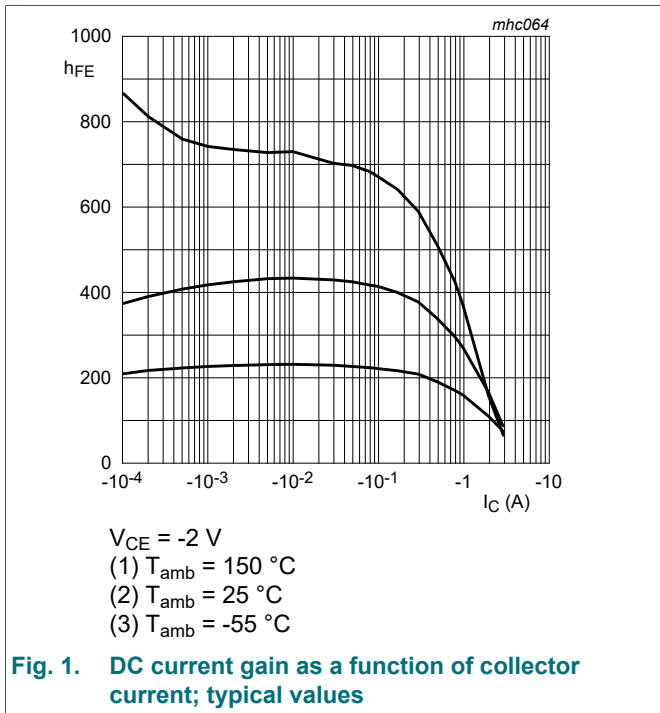
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

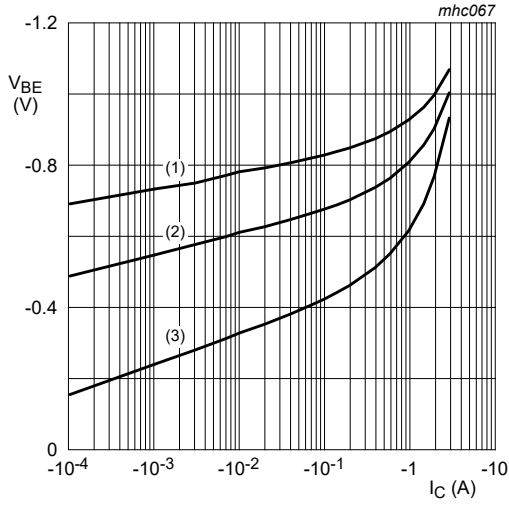
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm².

10. Characteristics

Table 7. Characteristics

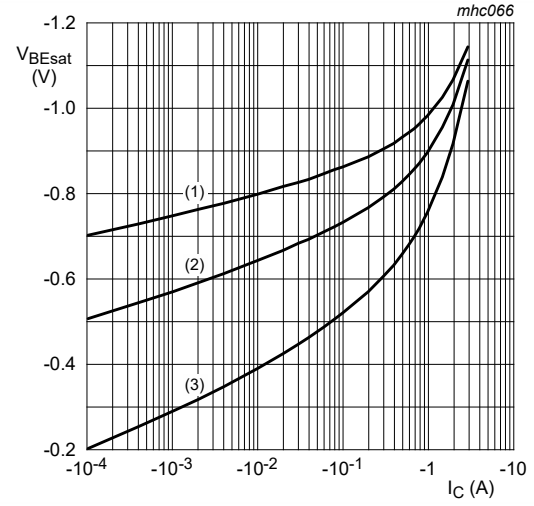
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------|---|--|-----|------|-------|------|
| I _{CBO} | collector-base cut-off current | V _{CB} = -30 V; I _E = 0 A; T _{amb} = 25 °C | - | - | -100 | nA |
| | | V _{CB} = -30 V; I _E = 0 A; T _j = 150 °C | - | - | -50 | μA |
| 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} = -2 V; I _C = -100 mA; T _{amb} = 25 °C | 300 | 450 | - | |
| | | V _{CE} = -2 V; I _C = -1 A; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C | 200 | 290 | - | |
| | | V _{CE} = -2 V; I _C = -2 A; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C | 100 | 180 | - | |
| V _{CEsat} | collector-emitter saturation voltage | I _C = -500 mA; I _B = -50 mA; T _{amb} = 25 °C | - | -70 | -110 | mV |
| | | I _C = -1 A; I _B = -50 mA; T _{amb} = 25 °C | - | -140 | -225 | mV |
| | | I _C = -2 A; I _B = -200 mA; T _{amb} = 25 °C | - | -240 | -350 | mV |
| R _{CEsat} | collector-emitter saturation resistance | I _C = -500 mA; I _B = -50 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C | - | 160 | 220 | mΩ |
| V _{BEsat} | base-emitter saturation voltage | I _C = -2 A; I _B = -50 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C | - | - | -1.1 | V |
| V _{BEon} | base-emitter turn-on voltage | V _{CE} = -2 V; I _C = -100 mA; T _{amb} = 25 °C | - | - | -0.75 | V |
| f _T | transition frequency | V _{CE} = -10 V; I _C = -100 mA; f = 100 MHz; T _{amb} = 25 °C | 100 | 200 | - | MHz |
| C _c | collector capacitance | V _{CB} = -10 V; I _E = 0 A; i _e = 0 A; f = 1 MHz; T _{amb} = 25 °C | - | 23 | 28 | pF |





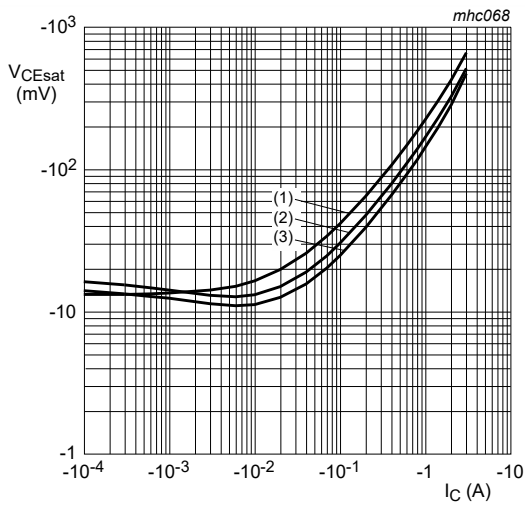
$V_{CE} = -2 \text{ V}$
 (1) $T_{amb} = -55 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = 150 \text{ }^\circ\text{C}$

Fig. 3. Base-emitter voltage as a function of collector current; typical values



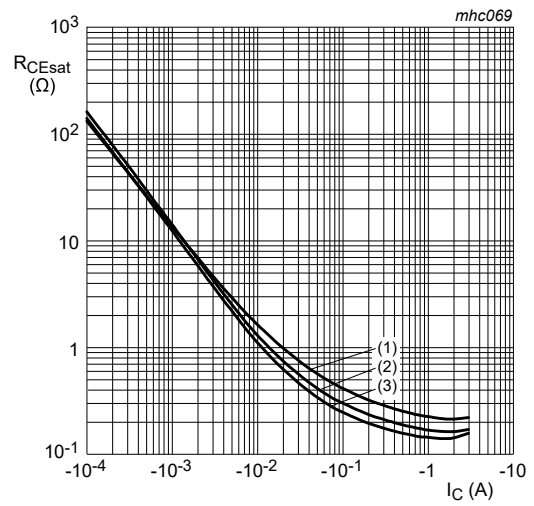
$I_C/I_B = 20$
 (1) $T_{amb} = -55 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = 150 \text{ }^\circ\text{C}$

Fig. 4. Base-emitter saturation voltage as a function of collector current; typical values



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

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



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

Fig. 6. Collector-emitter saturation resistance 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

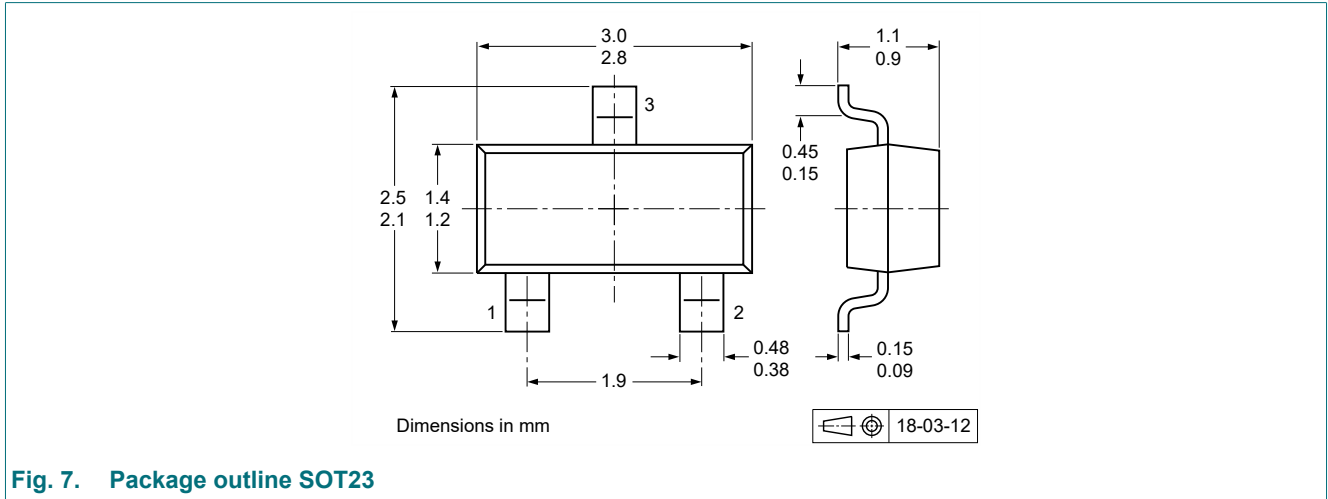


Fig. 7. Package outline SOT23

13. Soldering

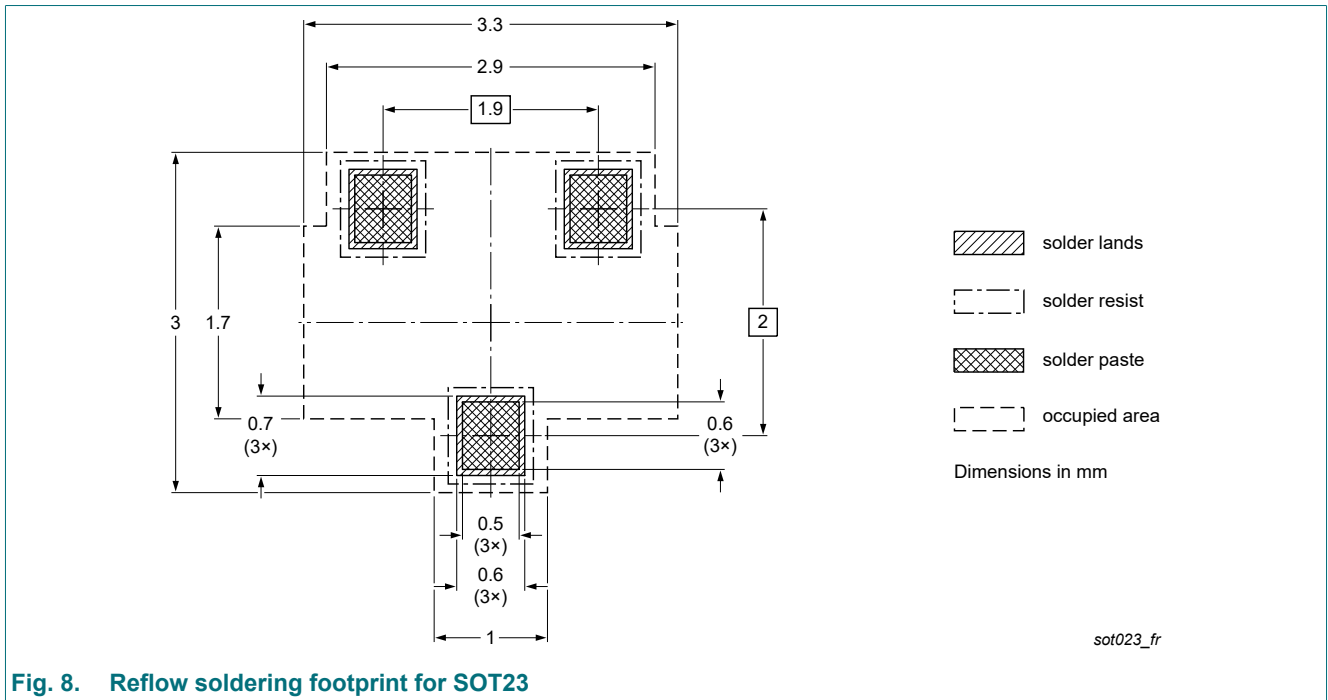


Fig. 8. Reflow soldering footprint for SOT23

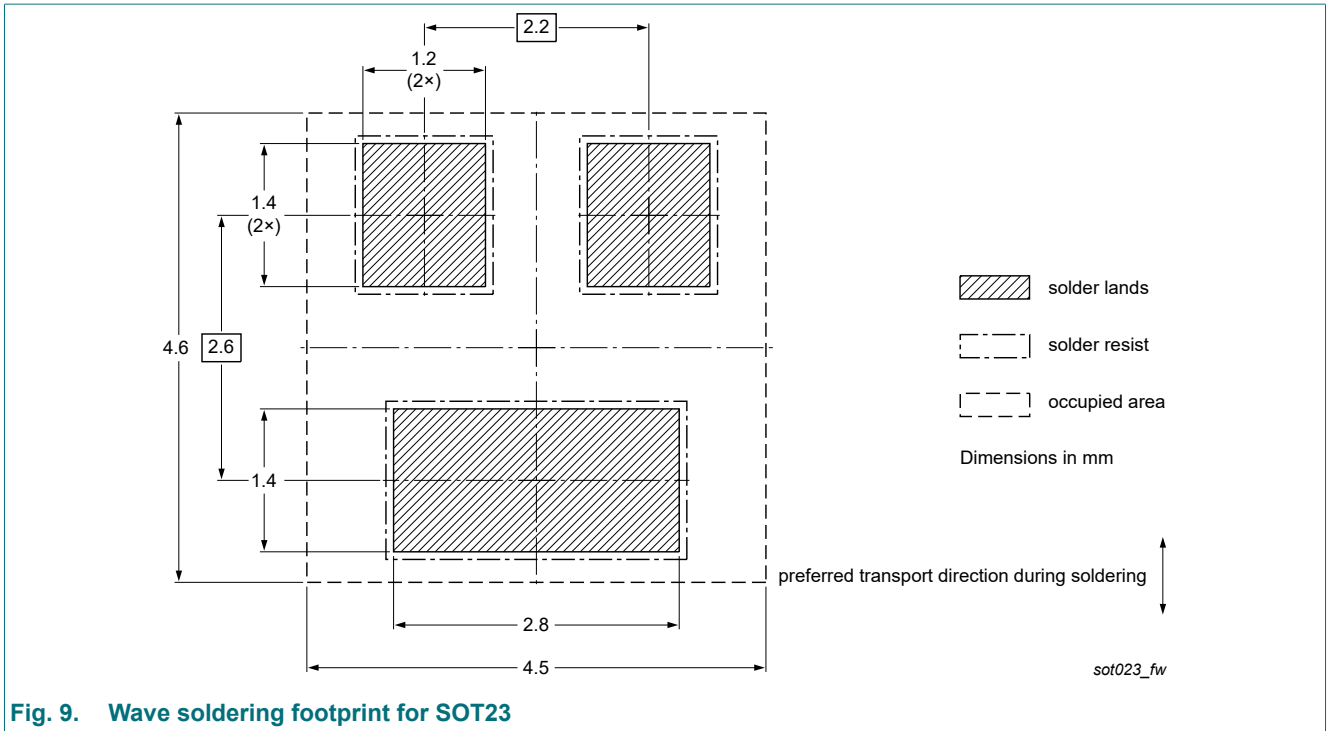


Fig. 9. Wave soldering footprint for SOT23

14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|-----------------|--------------|--------------------|---------------|------------|
| PBSS5230T-Q v.1 | 20230926 | 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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Date of release: 26 September 2023
