


# BSR30

## 60 V, 1 A PNP medium power transistor

8 October 2024 **Product data sheet**

## 1. General description

PNP medium power transistor in a SOT89 Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

- High current
- High power dissipation capability
- Exposed heatsink for excellent thermal and electrical conductivity

## 3. Applications

- Linear voltage regulators
- High-side switches
- Battery-driven devices
- MOSFET drivers
- Amplifiers

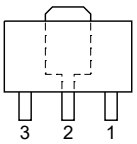
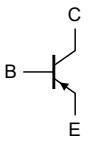
## 4. Quick reference data

**Table 1. Quick reference data**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{CEO}$ | collector-emitter voltage | open base | | - | - | -60 | V |
| $I_C$ | collector current | | | - | - | -1 | A |
| $I_{CM}$ | peak collector current | single pulse; $t_p \leq$ 1 ms | | - | - | -2 | A |
| $h_{FE}$ | DC current gain | $V_{CE}$ = -5 V; $I_C$ = -100 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.01; $T_{amb}$ = 25 °C | | 40 | - | 120 | |

## 5. Pinning information

**Table 2. Pinning information**

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|---|---|---|---|---|
| 1 | E | emitter |   SOT89 |   006aaa231 |
| 2 | C | collector | | |
| 3 | B | base | | |

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# 6. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| BSR30 | 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. Limiting values

**Table 4. 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 | | - | -70 | V |
| $V_{CEO}$ | collector-emitter voltage | open base | | - | -60 | 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 | | - | -2 | A |
| $I_{BM}$ | peak base current | | | - | -200 | mA |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq 25$ °C | [1] | - | 1.35 | 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, mounting pad for collector 6 $cm^2$.

# 8. Thermal characteristics

**Table 5. Thermal characteristics**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] | - | - | 93 | K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | | - | - | 13 | K/W |

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


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# 9. Characteristics

**Table 6. Characteristics**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $I_{CBO}$ | collector-base cut-off current (emitter open) | $V_{CB}$ = -60 V; $I_E$ = 0 A; $T_{amb}$ = 25 °C | | - | - | -100 | nA |
| | | $V_{CB}$ = -60 V; $I_E$ = 0 A; $T_j$ = 150 °C | | - | - | -50 | µA |
| $I_{EBO}$ | emitter-base cut-off current (collector open) | $V_{EB}$ = -5 V; $I_C$ = 0 A; $T_{amb}$ = 25 °C | | - | - | -100 | nA |
| $h_{FE}$ | DC current gain | $V_{CE}$ = -5 V; $I_C$ = -100 µA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.01; $T_{amb}$ = 25 °C | | 10 | - | - | |
| | | $V_{CE}$ = -5 V; $I_C$ = -100 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.01; $T_{amb}$ = 25 °C | | 40 | - | 120 | |
| | | $V_{CE}$ = -5 V; $I_C$ = -500 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.01; $T_{amb}$ = 25 °C | | 30 | - | - | |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C$ = -150 mA; $I_B$ = -15 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.01; $T_{amb}$ = 25 °C | | - | - | -0.25 | V |
| | | $I_C$ = -500 mA; $I_B$ = -50 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.01; $T_{amb}$ = 25 °C | | - | - | -0.5 | V |
| $V_{BEsat}$ | base-emitter saturation voltage | $I_C$ = -150 mA; $I_B$ = -15 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.01; $T_{amb}$ = 25 °C | | - | - | -1 | V |
| | | $I_C$ = -500 mA; $I_B$ = -50 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.01; $T_{amb}$ = 25 °C | | - | - | -1.2 | V |
| $f_T$ | transition frequency | $V_{CE}$ = -10 V; $I_C$ = -50 mA; f = 100 MHz; $T_{amb}$ = 25 °C | | 100 | - | - | MHz |

# 10. Package outline

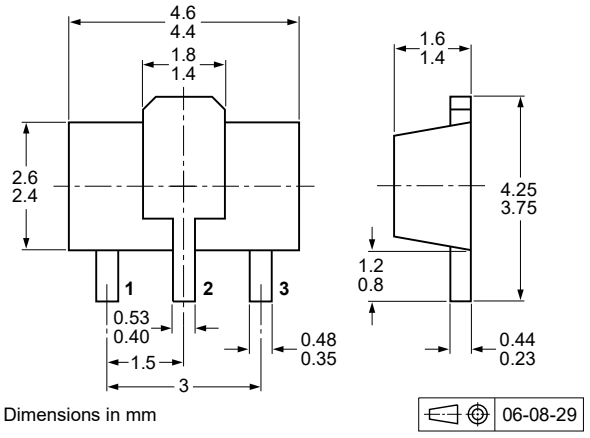



**Fig. 1. Package outline SOT89**


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## 11. Soldering

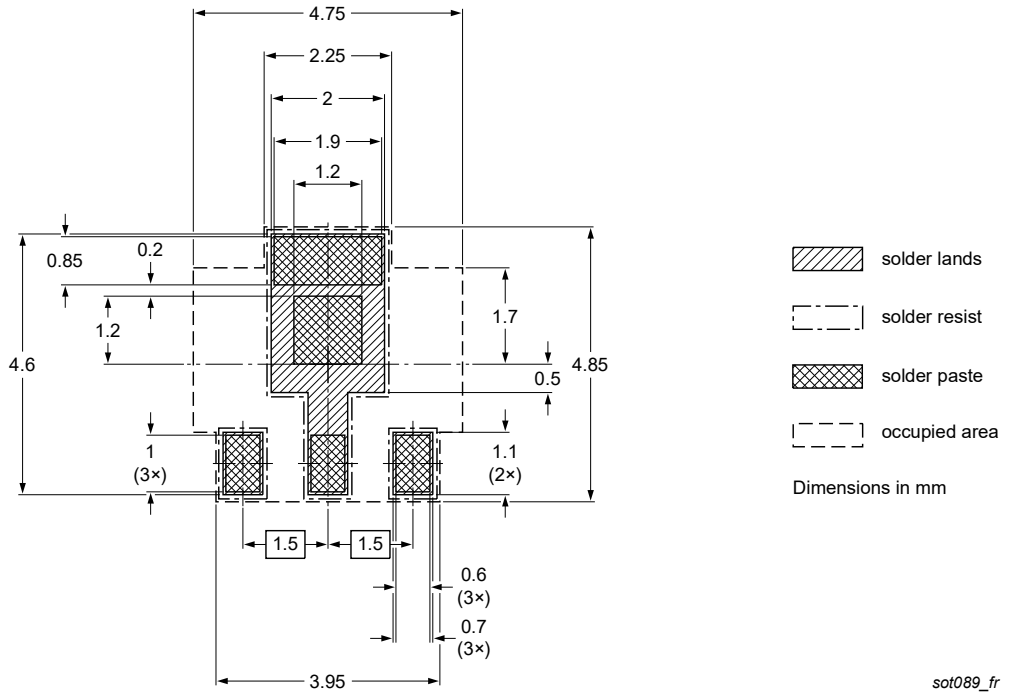



**Fig. 2. Reflow soldering footprint for SOT89**

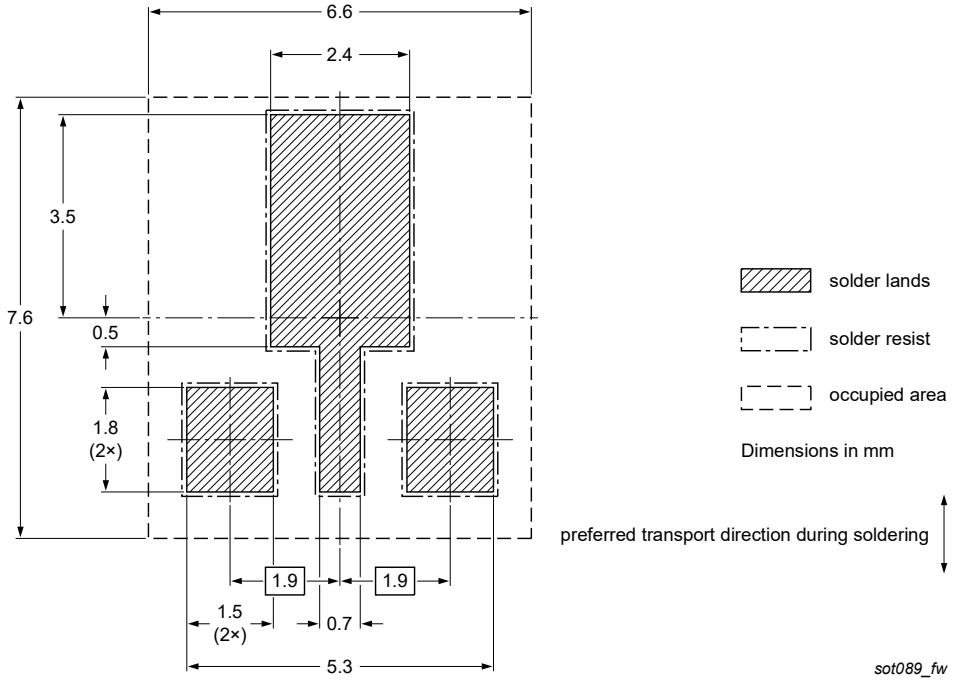



**Fig. 3. Wave soldering footprint for SOT89**


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## 12. Revision history

**Table 7. Revision history**

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| BSR30 v.4 | 20241008 | Product data sheet | - | BSR30_31_33 v.2 |
| Modifications: | • Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s). | | | |
| BSR30 v.3 | 20230310 | Product data sheet | - | BSR30_31_33 v.2 |
| BSR30_31_33 v.2 | 20041213 | Product data sheet | - | BSR30_31_33 v.1 |
| BSR30_31_33 v.1 | 19990426 | Product data sheet | - | - |


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## 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".
[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at https://www.nexperia.com.

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**Date of release: 8 October 2024**



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