



# PBSS5360Z

60 V, 3 A PNP low V<sub>CEsat</sub> transistor

1 July 2023

Product data sheet

## 1. General description

PNP low V<sub>CEsat</sub> transistor in a medium power SOT223 (SC-73) Surface-Mounted Device (SMD) plastic package.

NPN complement: PBSS4360Z

## 2. Features and benefits

- Low collector-emitter saturation voltage V<sub>CEsat</sub>
- High collector current capability I<sub>C</sub> and I<sub>CM</sub>
- High energy efficiency due to less heat generation

## 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 <sub>CEO</sub>   | collector-emitter voltage               | open base  | -   | -   | -60 | V    |
| I <sub>C</sub>     | collector current                       |  | -   | -   | -3  | A    |
| I <sub>CM</sub>    | peak collector current                  | single pulse; t <sub>p</sub> ≤ 1 ms  | -   | -   | -6  | A    |
| R <sub>CEsat</sub> | collector-emitter saturation resistance | I <sub>C</sub> = -2 A; I <sub>B</sub> = -200 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C | -   | -   | 225 | mΩ   |

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline    | Graphic symbol |
|-----|--------|-------------|-----------------------|----------------|
| 1   | B      | base        | <p>SC-73 (SOT223)</p> | <p>sym028</p>  |
| 2   | C      | collector   |                       |                |
| 3   | E      | emitter     |                       |                |
| 4   | C      | collector   |                       |                |

## 6. Ordering information

Table 3. Ordering information

| Type number               | Package |   |                        |
|---------------------------|---------|---|------------------------|
|                           | Name    | Description   | Version                |
| <a href="#">PBSS5360Z</a> | SC-73   | plastic, surface-mounted package with increased heatsink; 4 leads; 2.3 mm pitch; 6.5 mm x 3.5 mm x 1.65 mm body | <a href="#">SOT223</a> |

## 7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| PBSS5360Z   | P5360Z       |

## 8. Limiting values

Table 5. Limiting values

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

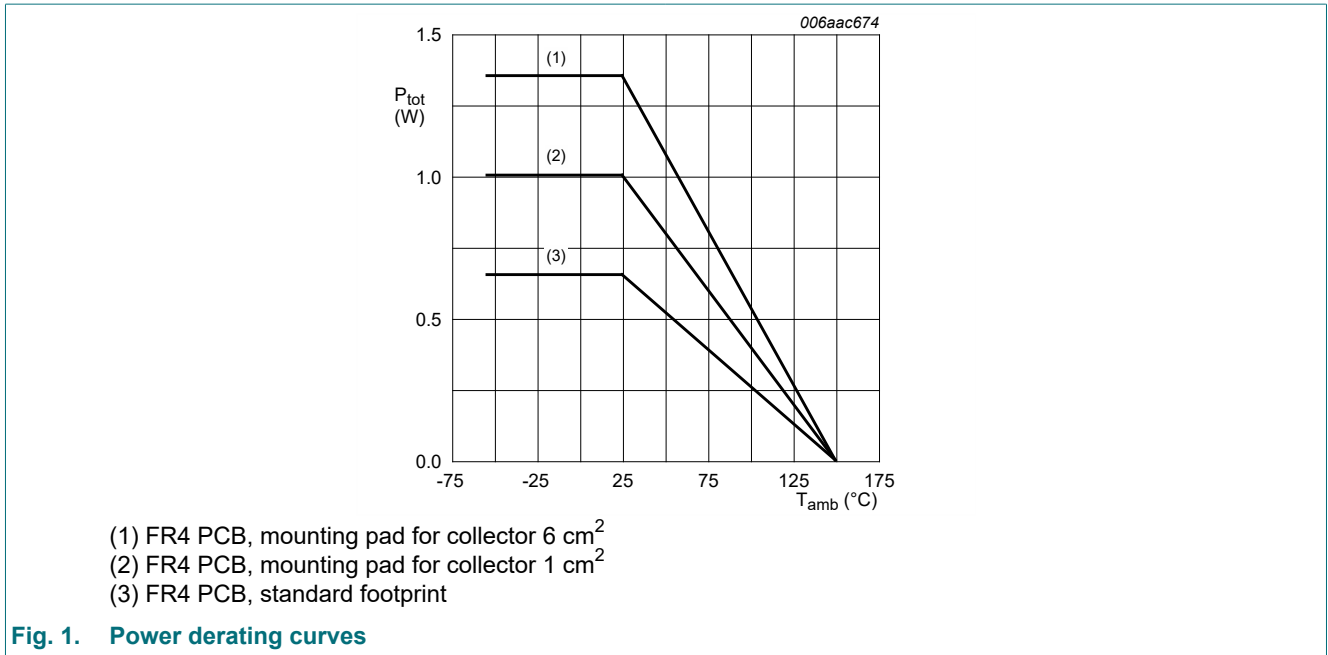
| Symbol    | Parameter                 | Conditions                    | Min | Max  | Unit |
|-----------|---------------------------|-------------------------------|-----|------|------|
| $V_{CBO}$ | collector-base voltage    | open emitter                  | -   | -80  | V    |
| $V_{CEO}$ | collector-emitter voltage | open base                     | -   | -60  | V    |
| $V_{EBO}$ | emitter-base voltage      | open collector                | -   | -7   | V    |
| $I_C$     | collector current         |                               | -   | -3   | A    |
| $I_{CM}$  | peak collector current    | single pulse; $t_p \leq 1$ ms | -   | -6   | A    |
| $I_B$     | base current              |                               | -   | -500 | mA   |
| $I_{BM}$  | peak base current         | single pulse; $t_p \leq 1$ ms | -   | -1   | A    |
| $P_{tot}$ | total power dissipation   | [1]                           | -   | 0.65 | W    |
|           |                           | [2]                           | -   | 1    | W    |
|           |                           | [3]                           | -   | 1.35 | W    |
|           |                           | [4]                           | -   | 2    | W    |
| $T_j$     | junction temperature      |                               | -   | 150  | °C   |
| $T_{amb}$ | ambient temperature       |                               | -55 | 150  | °C   |
| $T_{stg}$ | storage temperature       |                               | -65 | 150  | °C   |

[1] Device mounted on an FR4 Printed-Circuit Board (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<sup>2</sup>.

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm<sup>2</sup>.

[4] Device mounted on an FR4 PCB, 70 μm single-sided copper, tin-plated, mounting pad for collector 6 cm<sup>2</sup>.

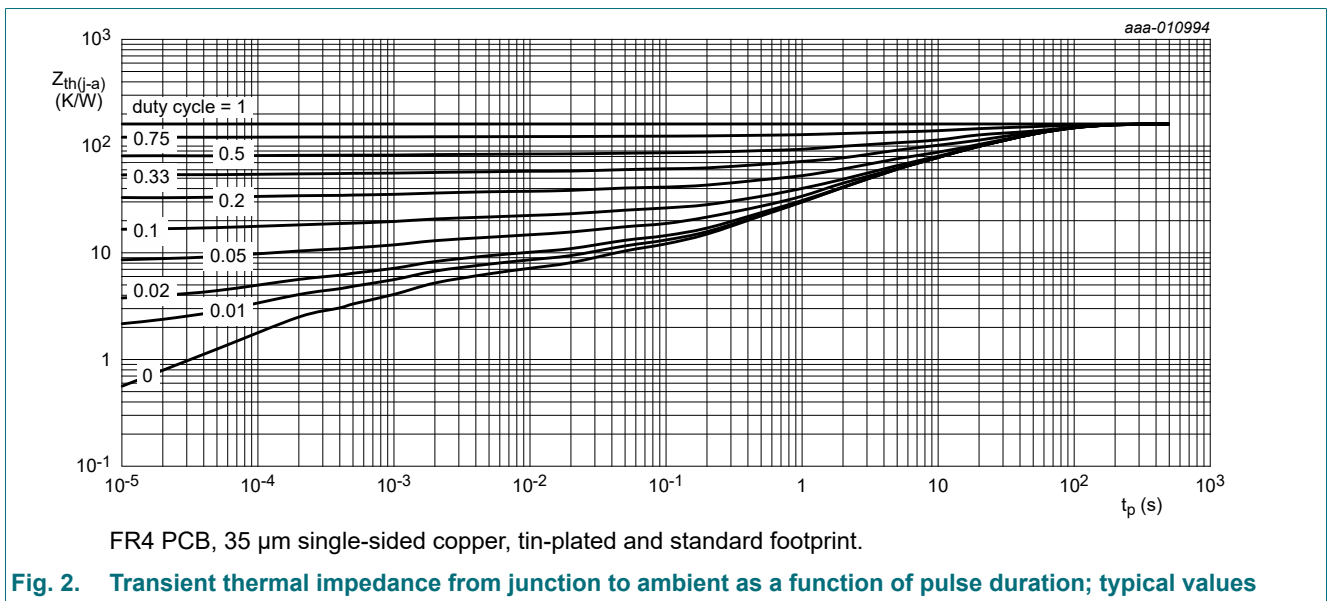


## 9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol                | Parameter  | Conditions  |     | Min | Typ | Max | Unit |
|-----------------------|--|-------------|-----|-----|-----|-----|------|
| R <sub>th(j-a)</sub>  | thermal resistance from junction to ambient      | in free air | [1] | -   | -   | 192 | K/W  |
|                       |  |             | [2] | -   | -   | 125 | K/W  |
|                       |  |             | [3] | -   | -   | 93  | K/W  |
| R <sub>th(j-sp)</sub> | 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<sup>2</sup>.
- [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm<sup>2</sup>.



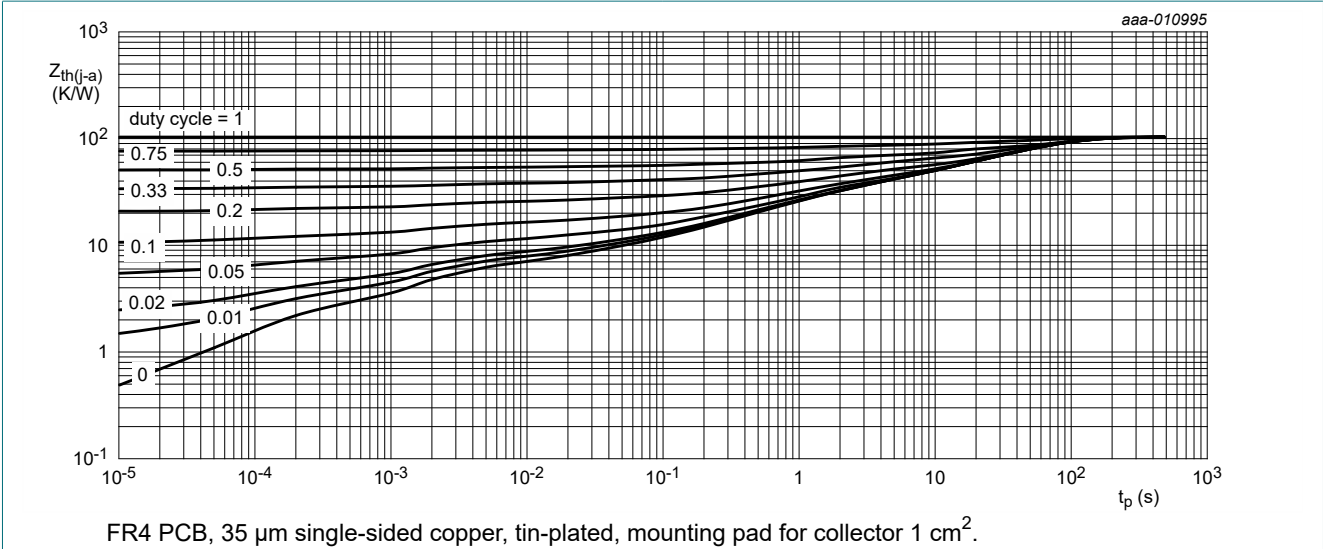


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

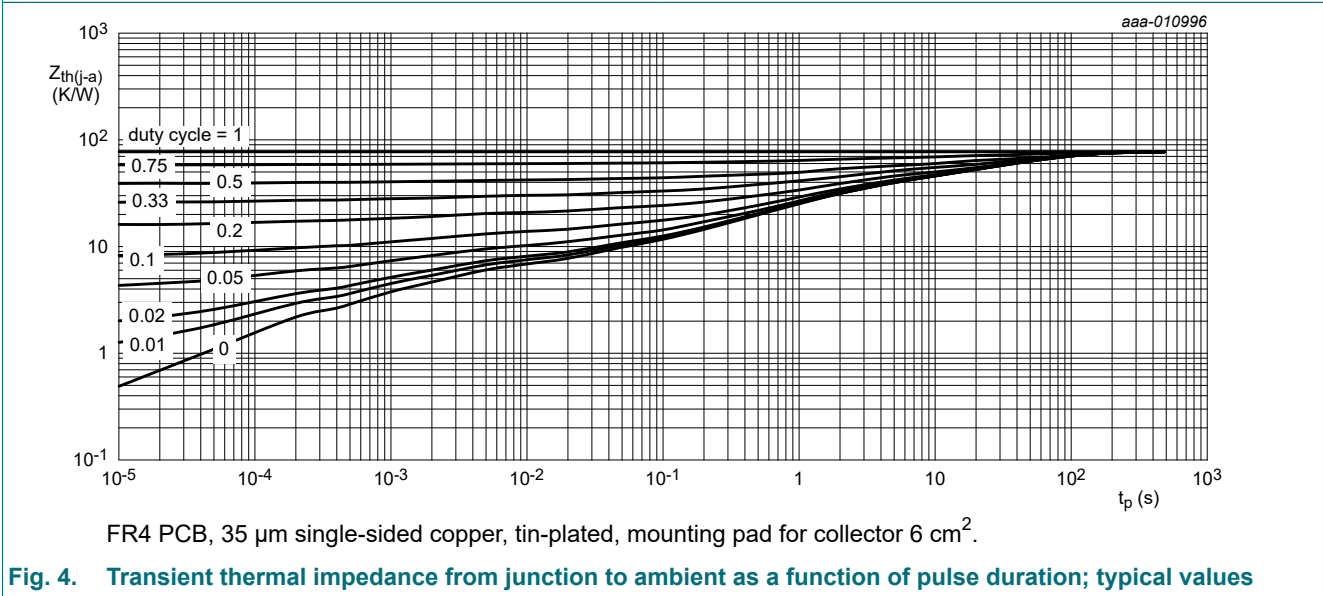
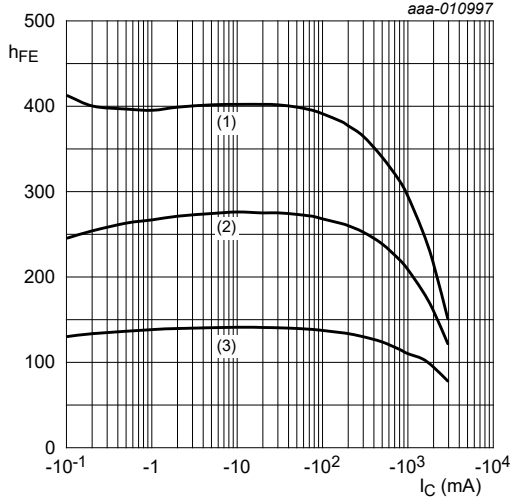


Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

## 10. Characteristics

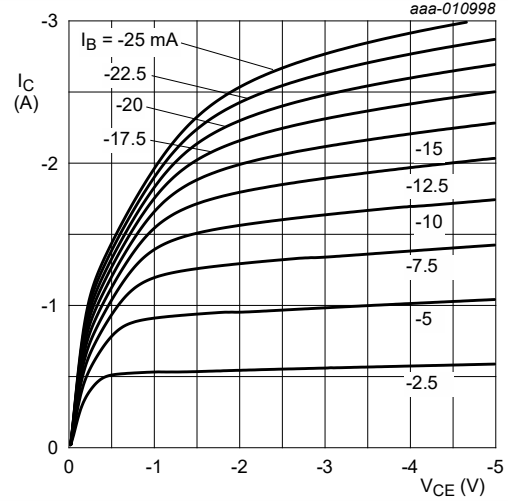
Table 7. Characteristics

| Symbol             | Parameter                               | Conditions   | Min | Typ | Max  | Unit |
|--------------------|---|--|-----|-----|------|------|
| I <sub>CBO</sub>   | collector-base cut-off current          | V <sub>CB</sub> = -48 V; I <sub>E</sub> = 0 A; T <sub>amb</sub> = 25 °C  | -   | -   | -100 | nA   |
|                    |   | V <sub>CB</sub> = -48 V; I <sub>E</sub> = 0 A; T <sub>j</sub> = 150 °C   | -   | -   | -50  | μA   |
| I <sub>EBO</sub>   | emitter-base cut-off current            | V <sub>EB</sub> = -5 V; I <sub>C</sub> = 0 A; T <sub>amb</sub> = 25 °C   | -   | -   | -100 | nA   |
| I <sub>CES</sub>   | collector-emitter cut-off current       | V <sub>CE</sub> = -48 V; V <sub>BE</sub> = 0 V; T <sub>amb</sub> = 25 °C   | -   | -   | -100 | nA   |
| h <sub>FE</sub>    | DC current gain                         | V <sub>CE</sub> = -5 V; I <sub>C</sub> = -50 mA; T <sub>amb</sub> = 25 °C  | 150 | -   | -    |      |
|                    |   | V <sub>CE</sub> = -5 V; I <sub>C</sub> = -500 mA; T <sub>amb</sub> = 25 °C   | 130 | -   | -    |      |
|                    |   | V <sub>CE</sub> = -5 V; I <sub>C</sub> = -1 A; T <sub>amb</sub> = 25 °C  | 120 | -   | -    |      |
|                    |   | V <sub>CE</sub> = -5 V; I <sub>C</sub> = -2 A; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C; pulsed   | 100 | -   | -    |      |
|                    |   | V <sub>CE</sub> = -5 V; I <sub>C</sub> = -3 A; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C; pulsed   | 80  | -   | -    |      |
| V <sub>CEsat</sub> | collector-emitter saturation voltage    | I <sub>C</sub> = -500 mA; I <sub>B</sub> = -50 mA; T <sub>amb</sub> = 25 °C  | -   | -   | -150 | mV   |
|                    |   | I <sub>C</sub> = -1 A; I <sub>B</sub> = -100 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C; pulsed | -   | -   | -200 | mV   |
|                    |   | I <sub>C</sub> = -2 A; I <sub>B</sub> = -200 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C | -   | -   | -450 | mV   |
|                    |   | I <sub>C</sub> = -3 A; I <sub>B</sub> = -300 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C | -   | -   | -550 | mV   |
| R <sub>CEsat</sub> | collector-emitter saturation resistance | I <sub>C</sub> = -2 A; I <sub>B</sub> = -200 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C | -   | -   | 225  | mΩ   |
| V <sub>BEsat</sub> | base-emitter saturation voltage         | I <sub>C</sub> = -1 A; I <sub>B</sub> = -100 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C | -   | -   | -1.2 | V    |
| V <sub>BEon</sub>  | base-emitter turn-on voltage            | V <sub>CE</sub> = -5 V; I <sub>C</sub> = -1 A; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C   | -   | -   | -1.1 | V    |
| f <sub>T</sub>     | transition frequency                    | V <sub>CE</sub> = -10 V; I <sub>C</sub> = -50 mA; f = 100 MHz; T <sub>amb</sub> = 25 °C                              | 65  | 130 | -    | MHz  |
| C <sub>c</sub>     | collector capacitance                   | V <sub>CB</sub> = -10 V; I <sub>E</sub> = 0 A; i <sub>e</sub> = 0 A; f = 1 MHz; T <sub>amb</sub> = 25 °C             | -   | 28  | 32   | pF   |



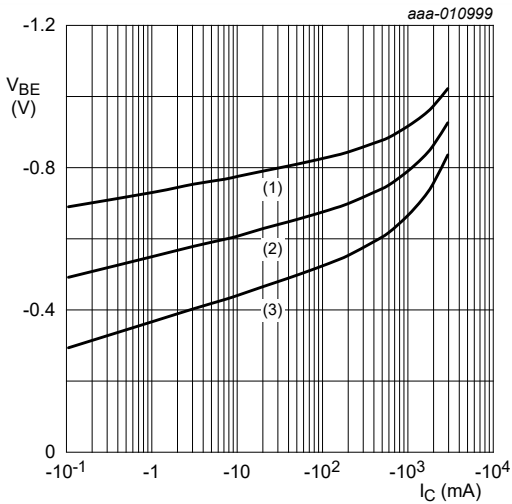
$V_{CE} = -5\text{ V}$   
 (1)  $T_{amb} = 100^\circ\text{C}$   
 (2)  $T_{amb} = 25^\circ\text{C}$   
 (3)  $T_{amb} = -55^\circ\text{C}$

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



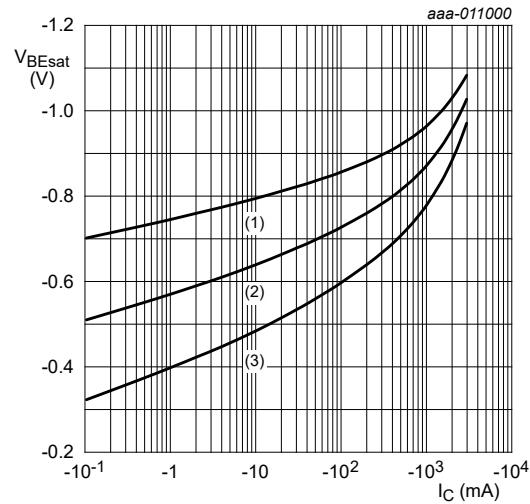
$T_{amb} = 25^\circ\text{C}$

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



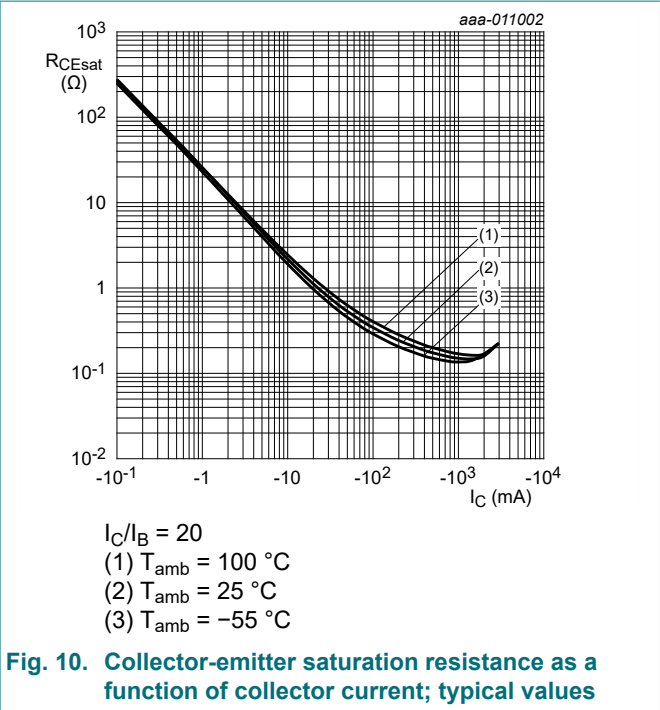
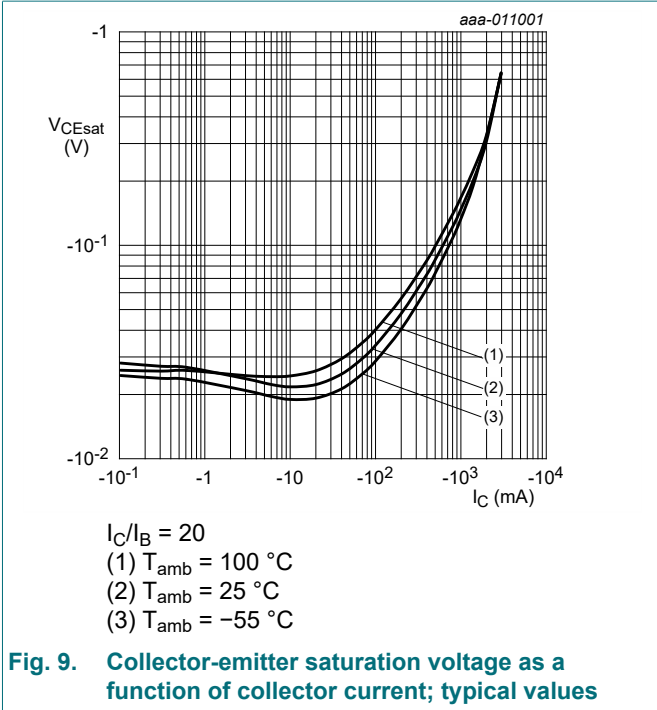
$V_{CE} = -5\text{ V}$   
 (1)  $T_{amb} = -55^\circ\text{C}$   
 (2)  $T_{amb} = 25^\circ\text{C}$   
 (3)  $T_{amb} = 100^\circ\text{C}$

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

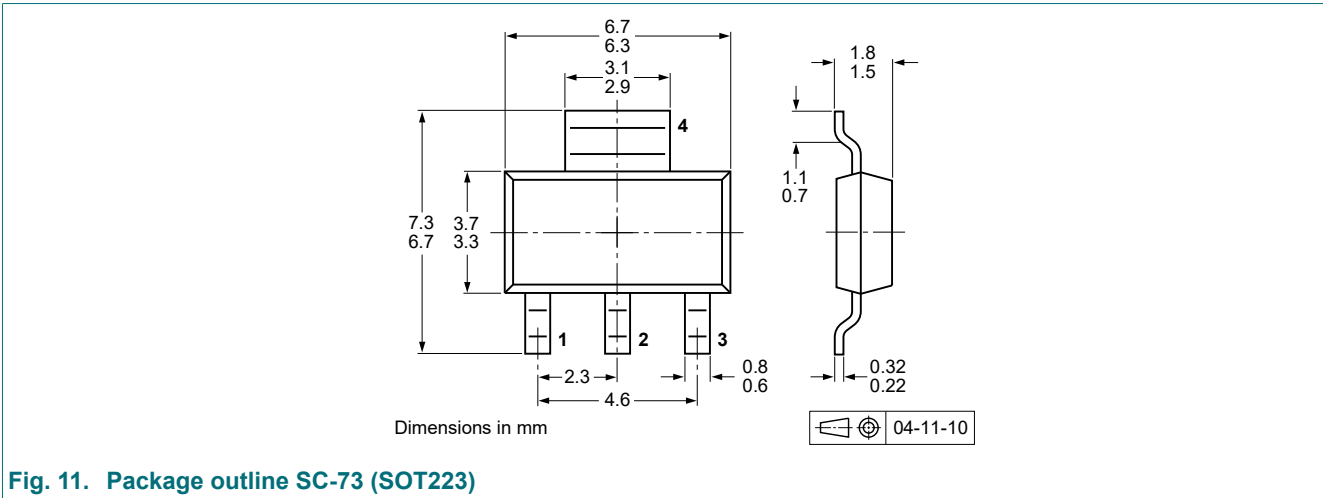


$I_C/I_B = 20$   
 (1)  $T_{amb} = -55^\circ\text{C}$   
 (2)  $T_{amb} = 25^\circ\text{C}$   
 (3)  $T_{amb} = 100^\circ\text{C}$

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



## 11. Package outline



## 12. Soldering

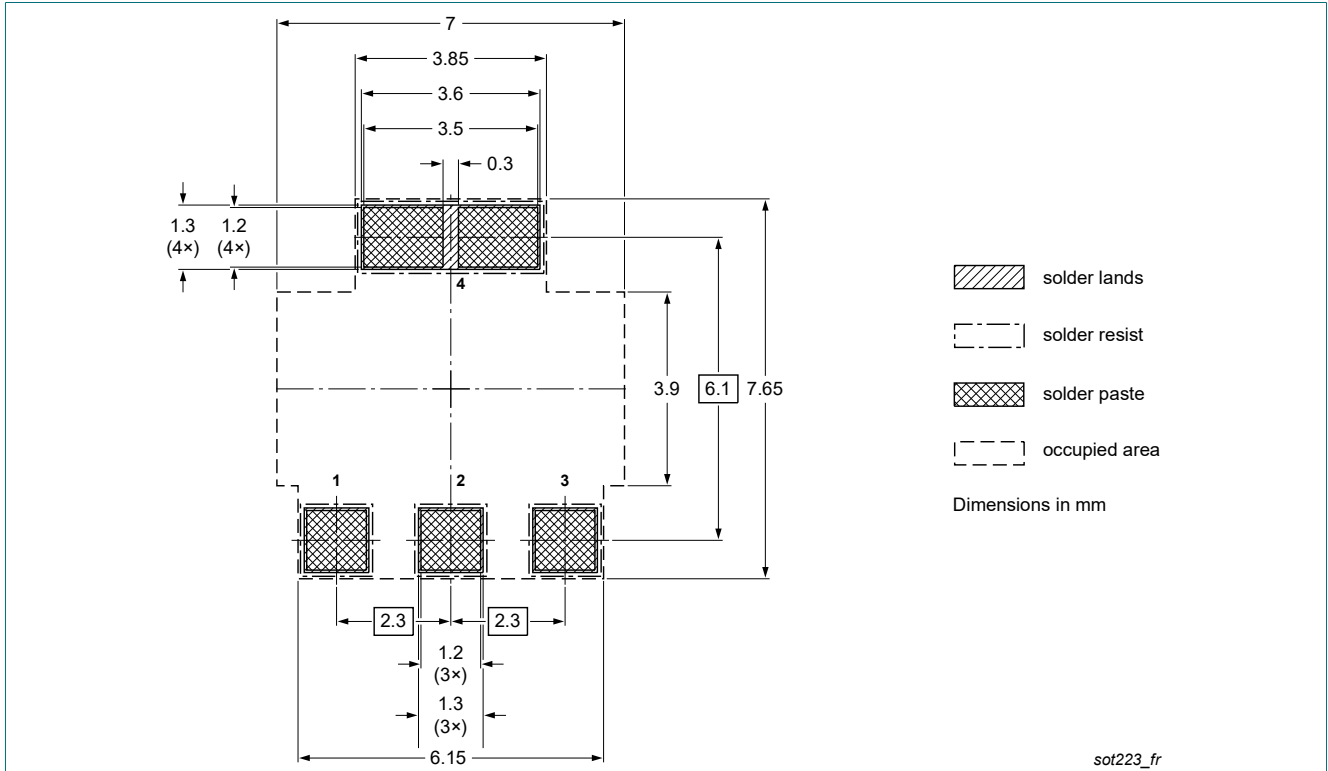


Fig. 12. Reflow soldering footprint for SC-73 (SOT223)

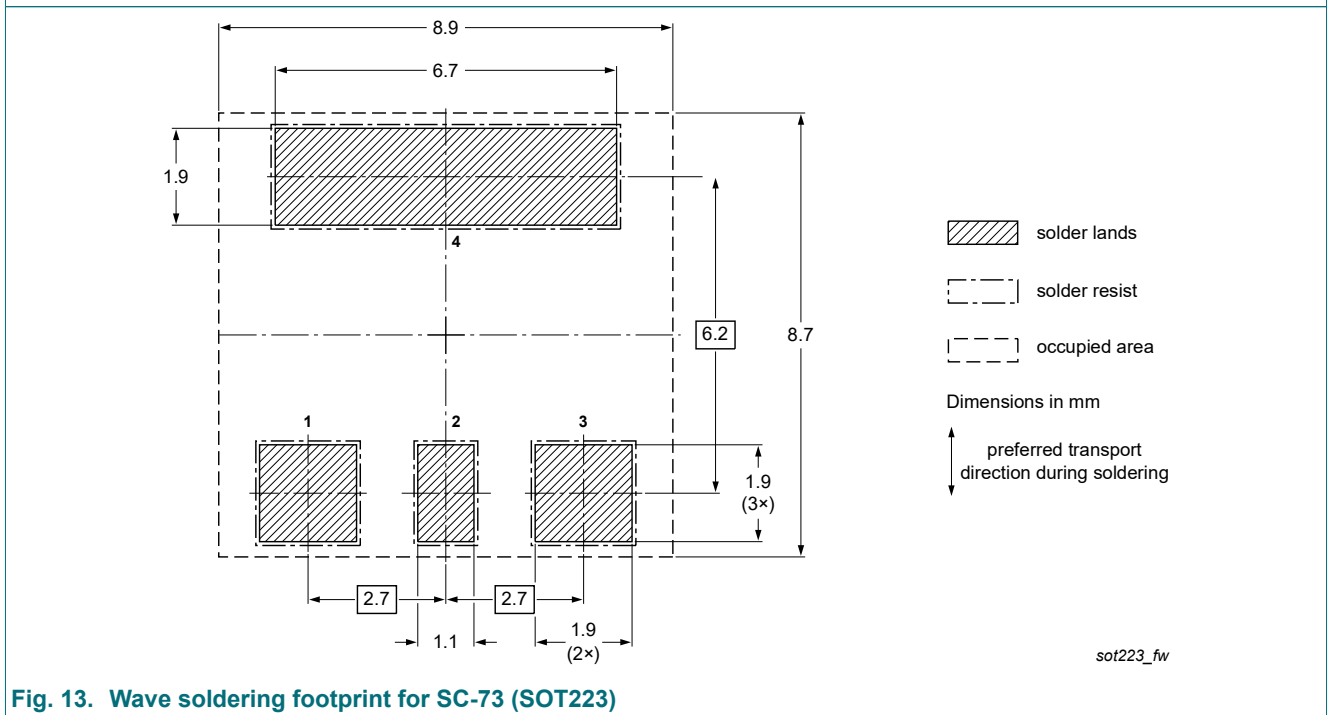


Fig. 13. Wave soldering footprint for SC-73 (SOT223)



## 13. Revision history

Table 8. Revision history

| Data sheet ID  | Release date   | Data sheet status  | Change notice | Supersedes    |
|----------------|--|--------------------|---------------|---------------|
| PBSS5360Z v.2  | 20230701   | Product data sheet | -             | PBSS5360Z v.1 |
| Modifications: | <ul style="list-style-type: none"><li>Product changed to non-automotive qualification. Please refer to <a href="https://www.nexperia.com">nexperia.com</a> for automotive (-Q) product alternative(s).</li></ul> |                    |               |               |
| PBSS5360Z v.1  | 20140219   | Product data sheet | -             | -             |

## 14. 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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