



PBVH8560Z

600 V, 0.5 A NPN high-voltage low V_{CEsat} transistor

8 October 2024

Product data sheet

1. General description

NPN high-voltage low V_{CEsat} transistor in a SOT223 (SC-73) medium power Surface-Mounted Device (SMD) plastic package.

PNP complement: PBHV9560Z

2. Features and benefits

- Low collector-emitter saturation voltage V_{CEsat}
- High collector current capability
- High collector current gain h_{FE} at high I_C

3. Applications

- Electronic ballast for fluorescent lighting
- LED driver for LED chain module
- LCD backlighting
- High Intensity Discharge (HID) front lighting
- Hook switch for wired telecom
- Switch Mode Power Supply (SMPS)

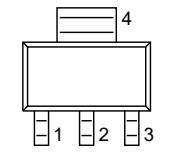
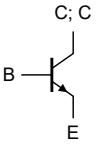
4. Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------|--------------------------------|---|-----|-----|-----|------|
| V_{CESM} | collector-emitter peak voltage | $V_{BE} = 0$ V | - | - | 600 | V |
| V_{CEO} | collector-emitter voltage | open base | - | - | 600 | V |
| I_C | collector current | | - | - | 0.5 | A |
| h_{FE} | DC current gain | $V_{CE} = 10$ V; $I_C = 50$ mA; $T_{amb} = 25$ °C | 70 | 135 | - | |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------|---|---|
| 1 | B | base |  SC-73 (SOT223) |  sym016 |
| 2 | C | collector | | |
| 3 | E | emitter | | |
| 4 | C | collector | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|---------|--|------------------------|
| | Name | Description | Version |
| PBHV8560Z | 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 | SOT223 |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| PBHV8560Z | HV856Z |

8. Limiting values

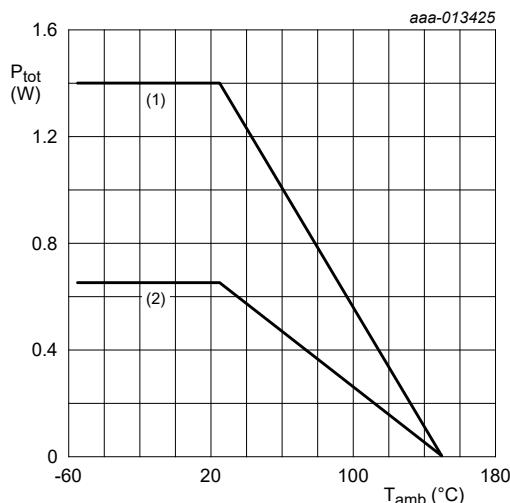
Table 5. Limiting values

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

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|------------|--------------------------------|----------------------|-----|-----|------|------|
| V_{CBO} | collector-base voltage | open emitter | | - | 600 | V |
| V_{CEO} | collector-emitter voltage | open base | | - | 600 | V |
| V_{CESM} | collector-emitter peak voltage | $V_{BE} = 0$ V | | - | 600 | V |
| V_{EBO} | emitter-base voltage | open collector | | - | 6 | V |
| I_c | collector current | | | - | 0.5 | A |
| P_{tot} | total power dissipation | $T_{amb} \leq 25$ °C | [1] | - | 0.65 | W |
| | | | [2] | - | 1.4 | 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 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 6 cm².



(1) FR4 PCB, mounting pad for collector 6 cm²
 (2) FR4 PCB, standard footprint

Fig. 1. Power derating curves

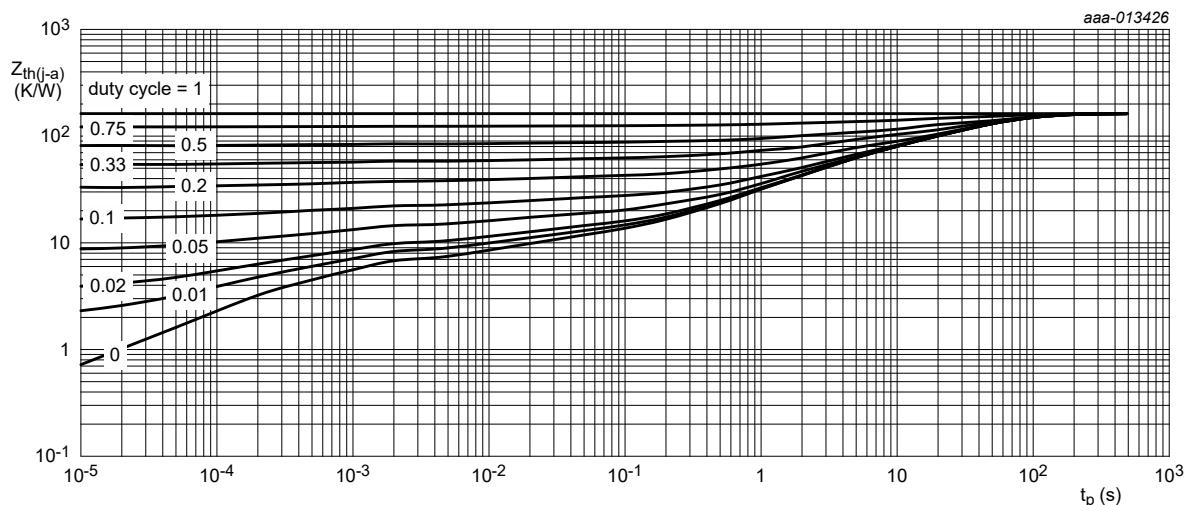
9. Thermal characteristics

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] | - | - | 190 | K/W |
| | | | [2] | - | - | 89 | K/W |
| R _{th(j-sp)} | thermal resistance from junction to solder point | | | - | - | 20 | K/W |

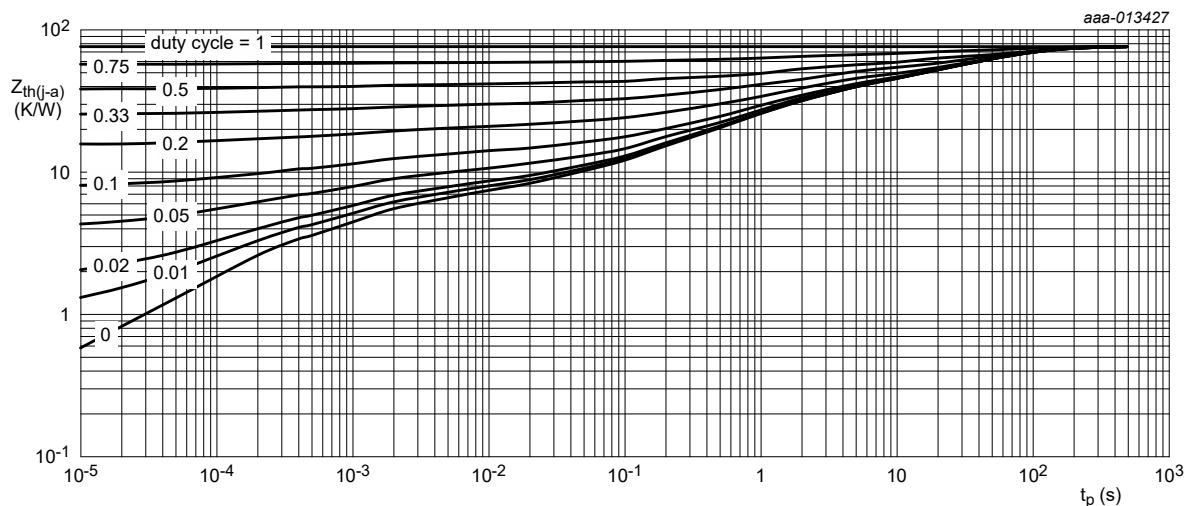
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

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



FR4 PCB, single-sided copper, tin-plated and standard footprint.

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



FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm².

Fig. 3. 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} = 400 V; I _E = 0 A; T _{amb} = 25 °C | - | - | 100 | nA |
| | | V _{CB} = 400 V; I _E = 0 A; T _j = 150 °C | - | - | 10 | µA |
| I _{CES} | collector-emitter cut-off current | V _{CE} = 400 V; V _{BE} = 0 V; T _{amb} = 25 °C | - | - | 100 | nA |
| 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} = 10 V; I _C = 50 mA; T _{amb} = 25 °C | 70 | 135 | - | |
| | | V _{CE} = 10 V; I _C = 100 mA; t _p ≤ 300 µs; δ ≤ 0.02; T _{amb} = 25 °C; pulsed | 70 | 135 | - | |
| V _{CEsat} | collector-emitter saturation voltage | I _C = 50 mA; I _B = 5 mA; T _{amb} = 25 °C | - | 50 | 100 | mV |
| | | I _C = 100 mA; I _B = 20 mA; t _p ≤ 300 µs; δ ≤ 0.02; T _{amb} = 25 °C; pulsed | - | 50 | 100 | mV |
| V _{BEsat} | base-emitter saturation voltage | I _C = 50 mA; I _B = 5 mA; pulsed; t _p ≤ 300 µs; δ ≤ 0.02; T _{amb} = 25 °C | - | - | 950 | mV |
| C _c | collector capacitance | V _{CB} = 20 V; I _E = 0 A; i _e = 0 A; f = 1 MHz; T _{amb} = 25 °C | - | 7.5 | - | pF |
| C _e | emitter capacitance | V _{EB} = 0.5 V; I _C = 0 A; i _c = 0 A; f = 1 MHz; T _{amb} = 25 °C | - | 710 | - | pF |

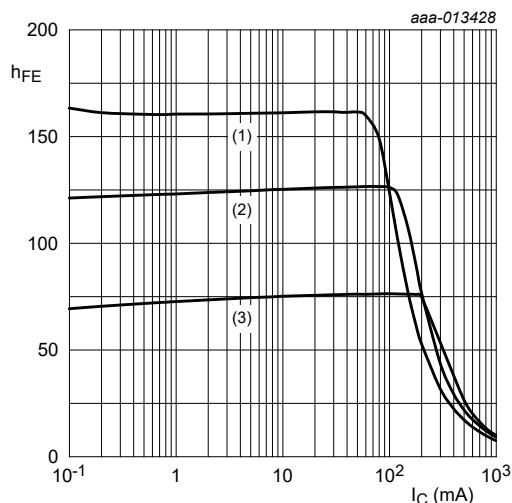


Fig. 4. DC current gain as a function of collector current; typical values

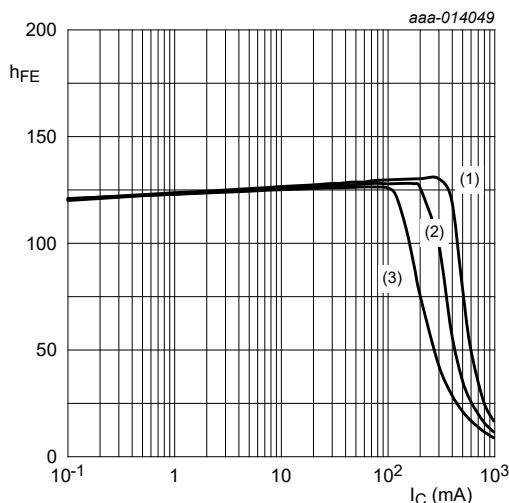


Fig. 5. DC current gain as a function of collector current; typical values

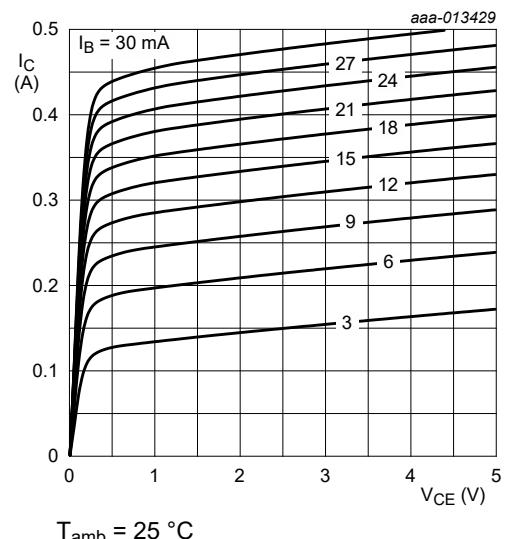


Fig. 6. Collector current as a function of collector-emitter voltage; typical values

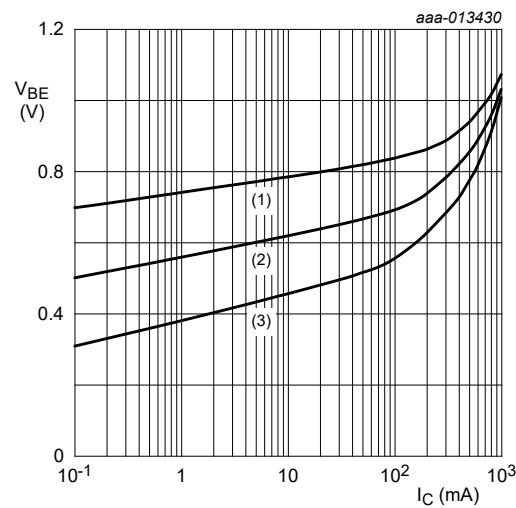
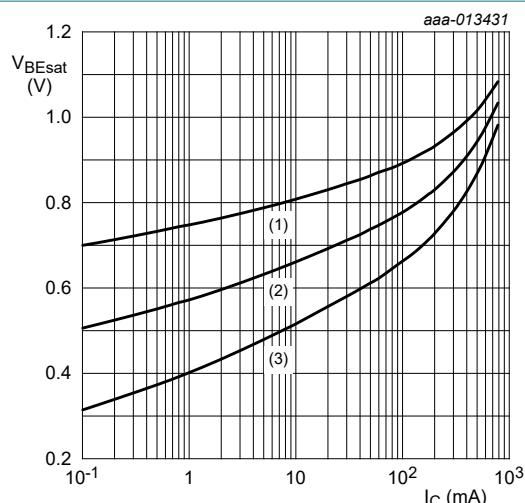
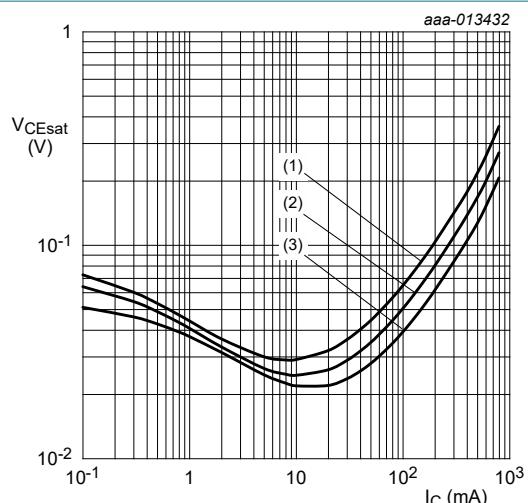


Fig. 7. Base-emitter voltage as a function of collector current; typical values



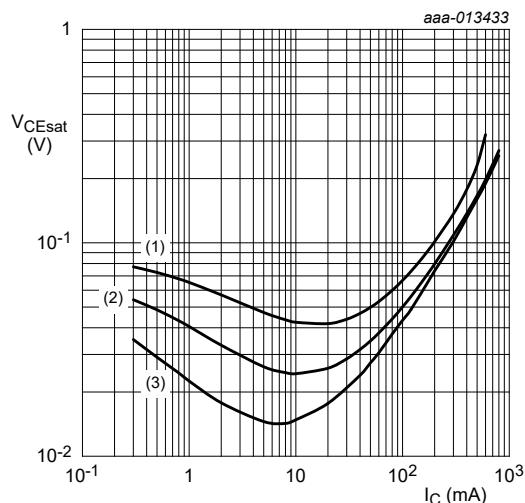
$I_C/I_B = 5$
 (1) $T_{amb} = -55^\circ C$
 (2) $T_{amb} = 25^\circ C$
 (3) $T_{amb} = 100^\circ C$

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



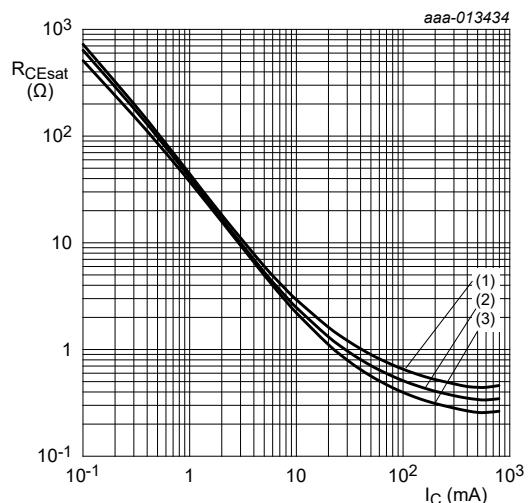
$I_C/I_B = 5$
 (1) $T_{amb} = 100^\circ C$
 (2) $T_{amb} = 25^\circ C$
 (3) $T_{amb} = -55^\circ C$

Fig. 9. Collector-emitter saturation voltage as a function of collector current; typical values



$T_{amb} = 25^\circ C$
 (1) $I_C/I_B = 10$
 (2) $I_C/I_B = 5$
 (3) $I_C/I_B = 2.5$

Fig. 10. Collector-emitter saturation voltage as a function of collector current; typical values



$I_C/I_B = 5$
 (1) $T_{amb} = 100^\circ C$
 (2) $T_{amb} = 25^\circ C$
 (3) $T_{amb} = -55^\circ C$

Fig. 11. Collector-emitter saturation resistance as a function of collector current; typical values

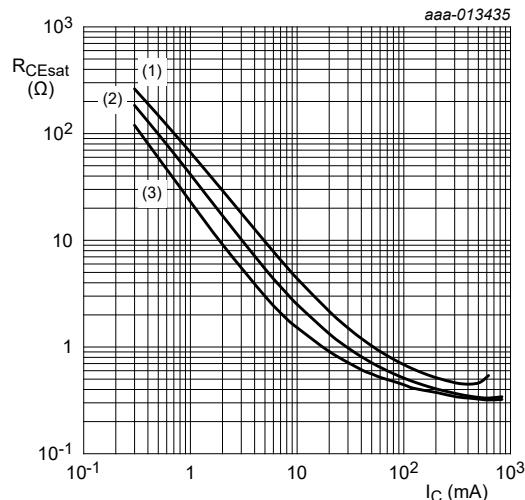


Fig. 12. Collector-emitter saturation resistance as a function of collector current; typical values

11. Package outline

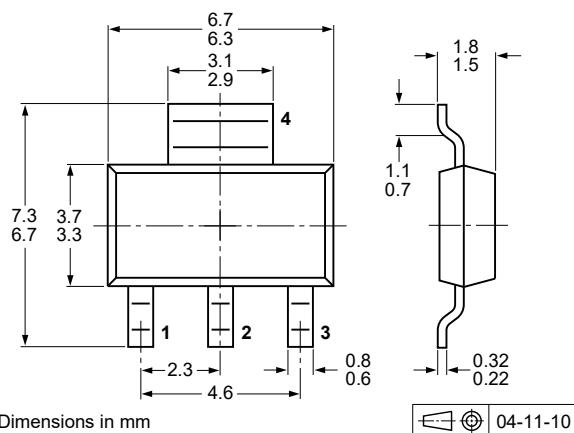


Fig. 13. Package outline SC-73 (SOT223)

12. Soldering

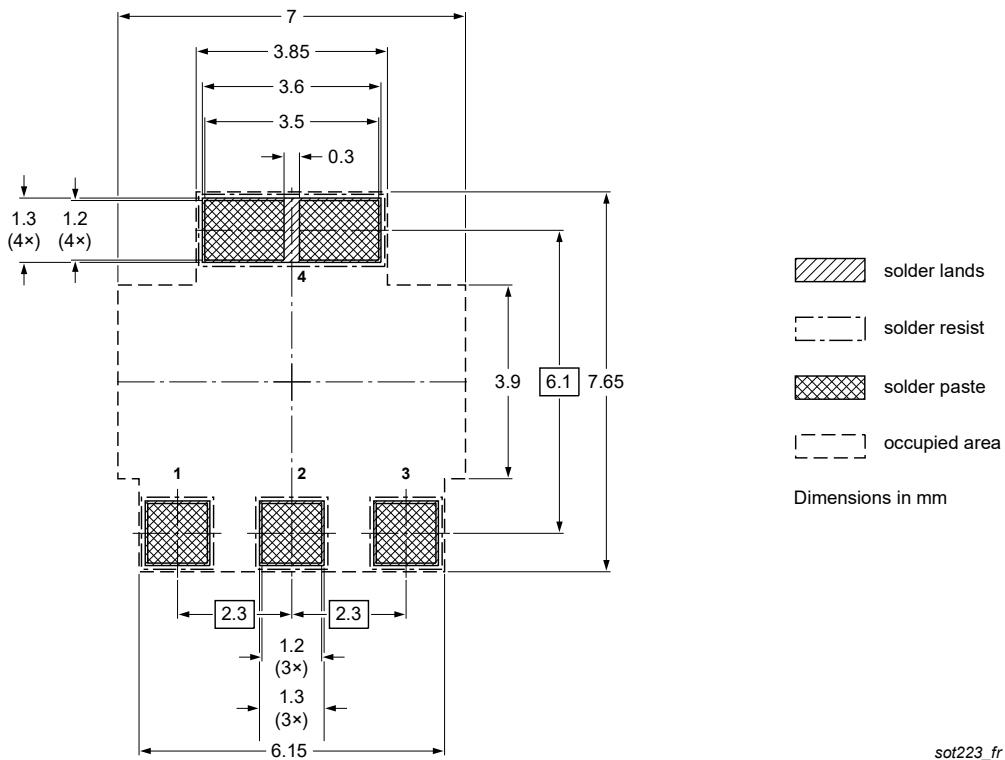


Fig. 14. Reflow soldering footprint for SC-73 (SOT223)

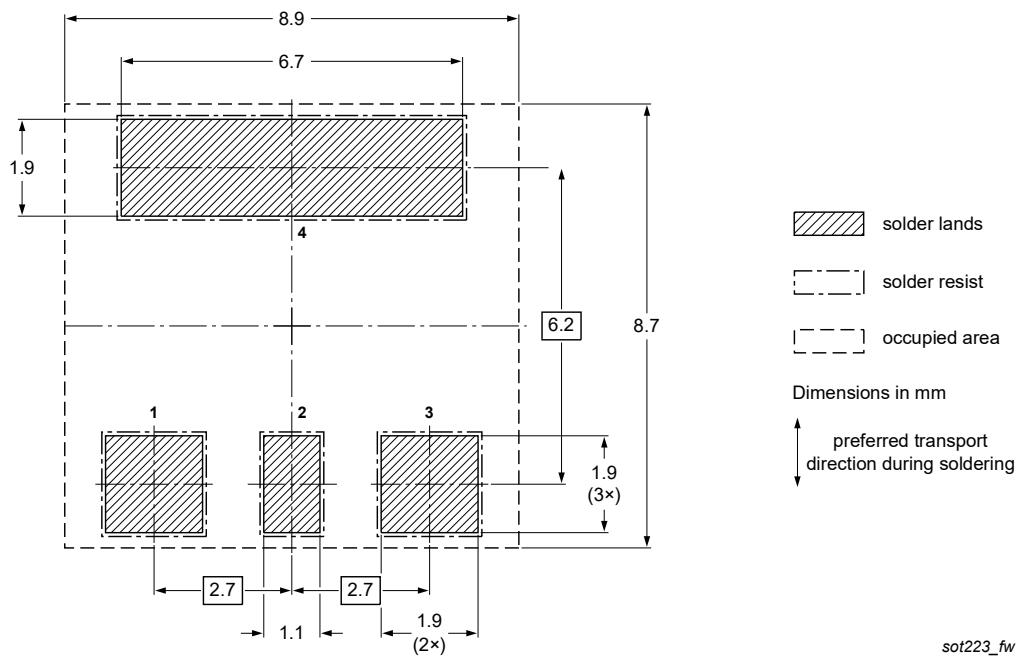


Fig. 15. Wave soldering footprint for SC-73 (SOT223)

13. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|--|--------------------|---------------|---------------|
| PBHV8560Z v.3 | 20241008 | Product data sheet | - | PBHV8560Z v.2 |
| Modifications: | <ul style="list-style-type: none">Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s). | | | |
| PBHV8560Z v.2 | 20200907 | Product data sheet | - | PBHV8560Z v.1 |
| PBHV8560Z v.1 | 20150313 | 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. |

- [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".
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Date of release: 8 October 2024