



PBHV2160Z

600 V, 0.1 A NPN high-voltage low V_{CEsat} (BISS) transistor

24 June 2015

Product data sheet

1. General description

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

PNP complement: PBHV3160Z

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
- HID front lighting
- Hook switch for wired telecom
- Switch Mode Power Supply (SMPS)

4. Quick reference data

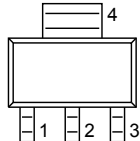
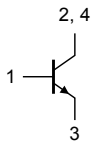
Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|---------------------------|------------|-----|-----|-----|------|
| V_{CEO} | collector-emitter voltage | open base | - | - | 600 | V |
| I_C | collector current | | - | - | 0.1 | A |



5. Pinning information

Table 2. Pinning information

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

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|---------|--|---------|
| | Name | Description | Version |
| PBHV2160Z | SC-73 | plastic surface-mounted package with increased heatsink; 4 leads | SOT223 |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| PBHV2160Z | HV216Z |

8. Limiting values

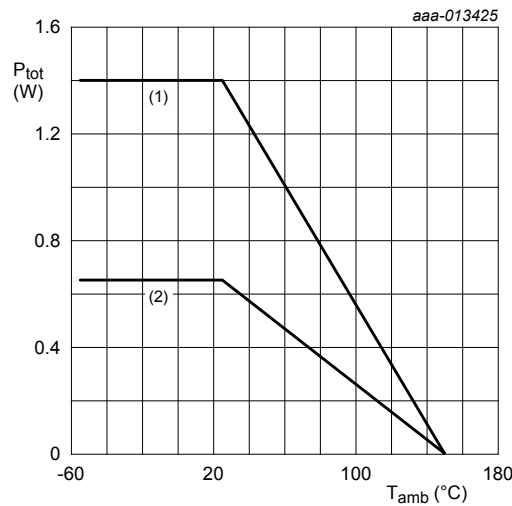
Table 5. Limiting values

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 | | | - | 0.1 | A |
| P _{tot} | total power dissipation | T _{amb} ≤ 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.

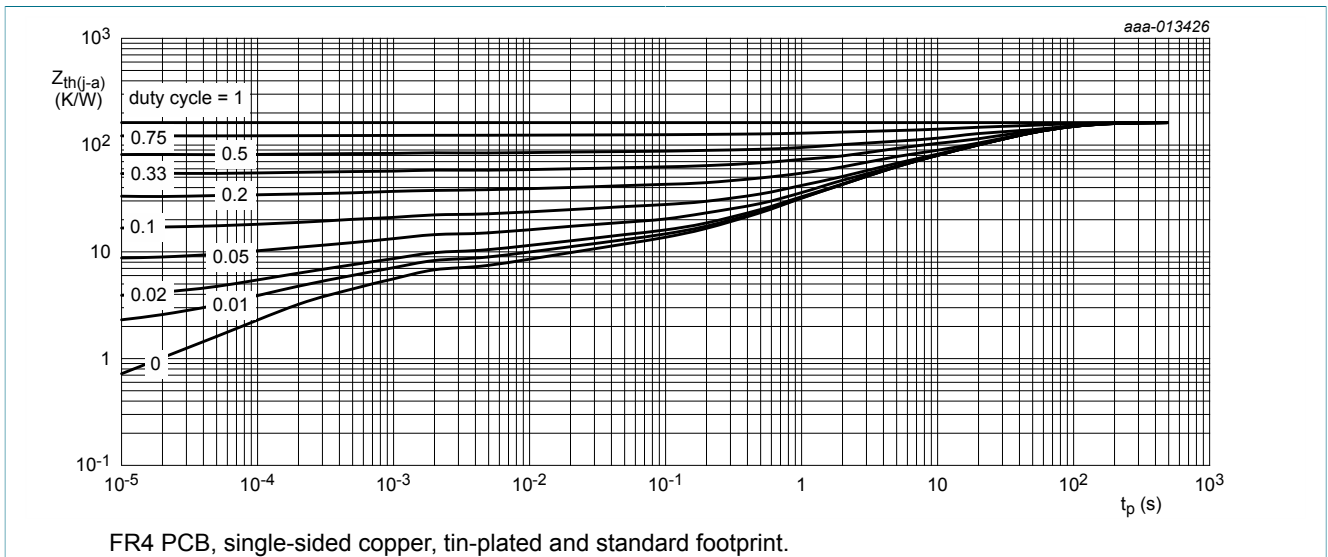


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

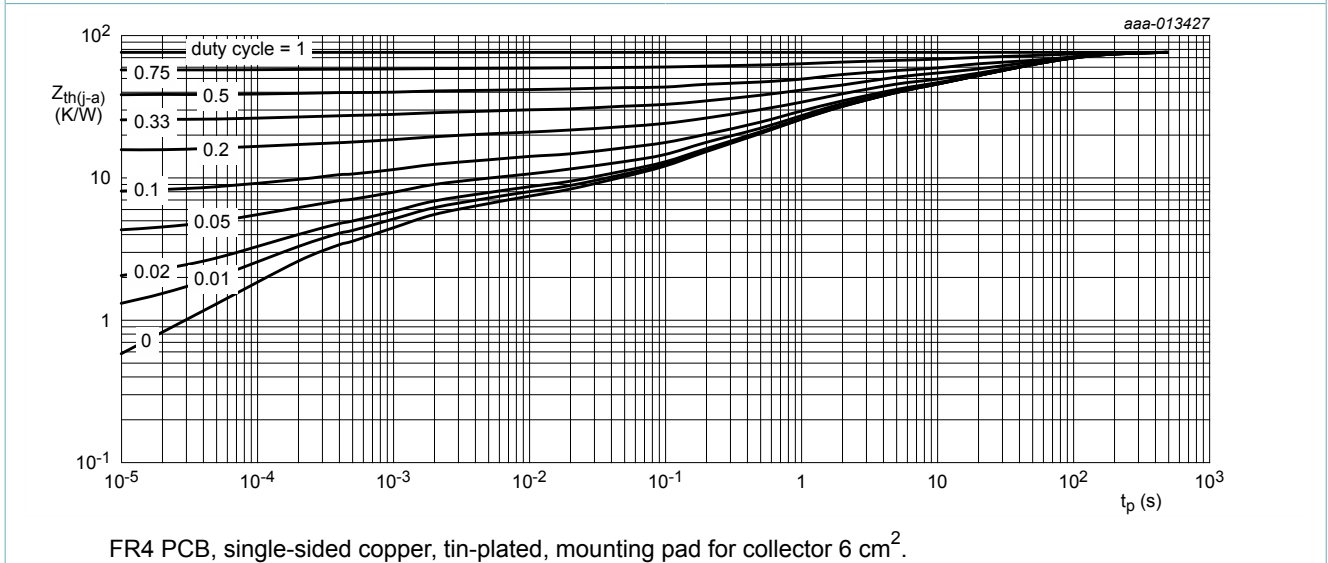


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

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} = 4.8 V; I _C = 0 A; T _{amb} = 25 °C | - | - | 100 | nA |
| h _{FE} | DC current gain | V _{CE} = 10 V; I _C = 10 mA; T _{amb} = 25 °C | 70 | 125 | - | |
| V _{CEsat} | collector-emitter saturation voltage | I _C = 30 mA; I _B = 6 mA; T _{amb} = 25 °C | - | 65 | 125 | 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 | - | 1.7 | - | 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 | - | 81 | - | pF |

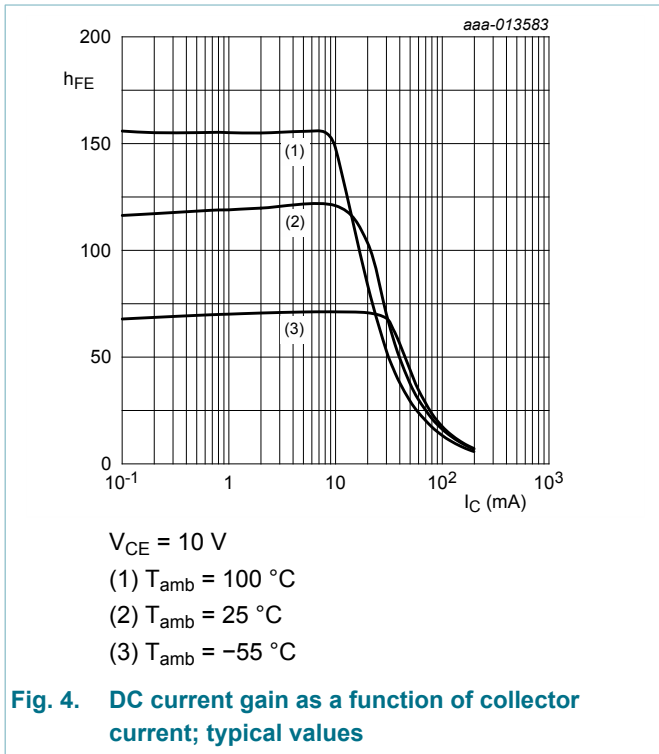


Fig. 4. DC current gain as a function of collector current; typical values

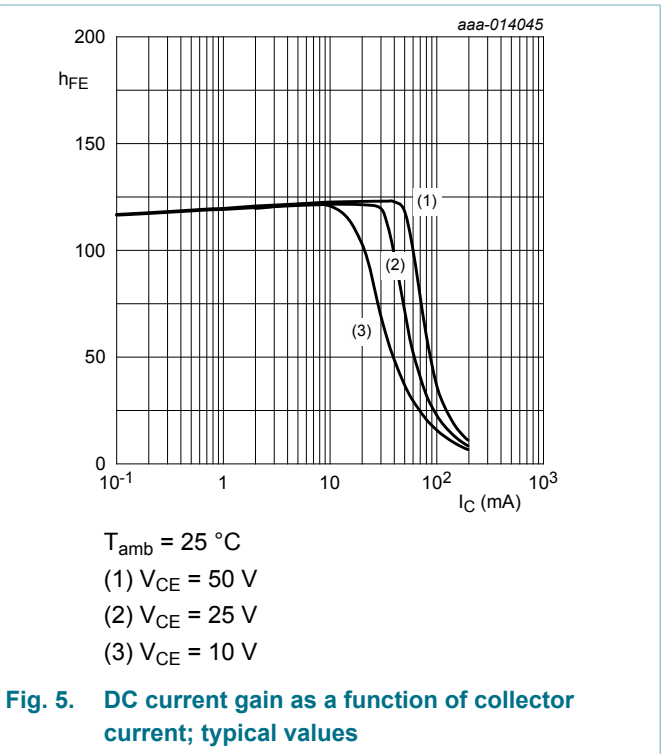


Fig. 5. DC current gain as a function of collector current; typical values

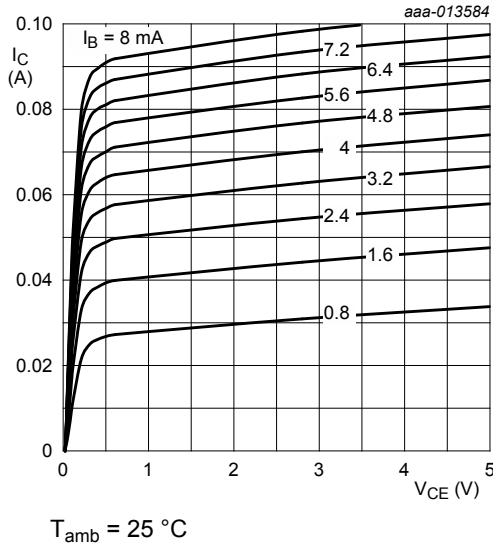


Fig. 6. Collector current as a function of collector-emitter voltage; typical values

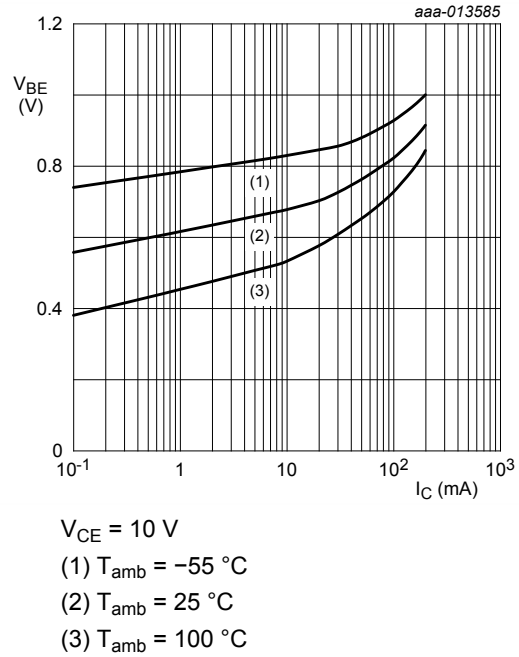


Fig. 7. Base-emitter voltage as a function of collector current; typical values

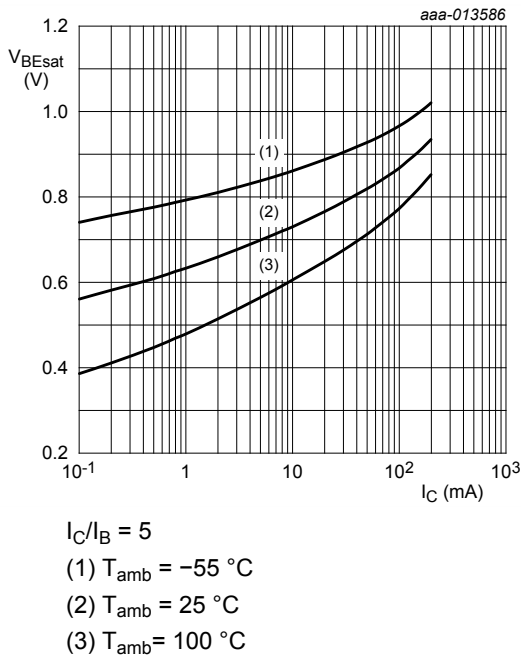


Fig. 8. Base-emitter saturation voltage as a function of collector current; typical values

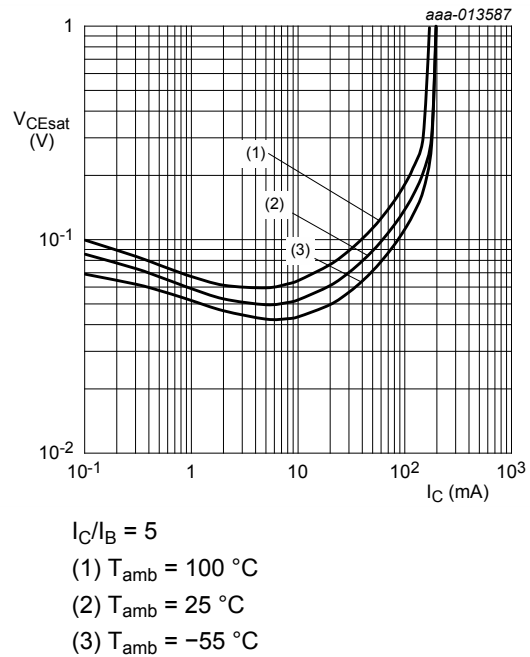
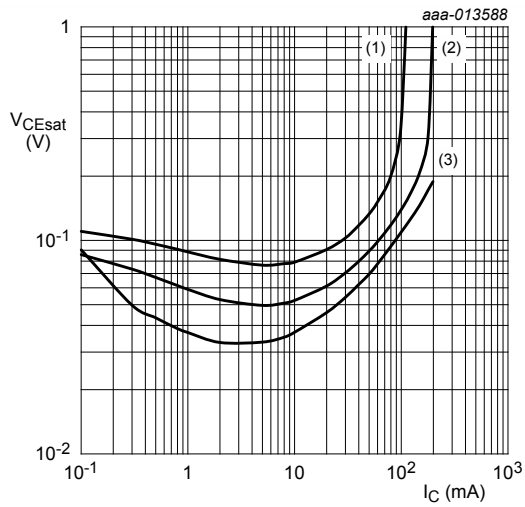


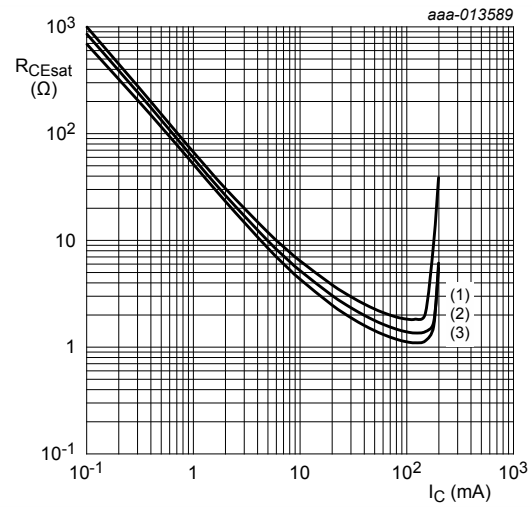
Fig. 9. Collector-emitter saturation voltage as a function of collector current; typical values

600 V, 0.1 A NPN high-voltage low VCEsat (BISS) transistor



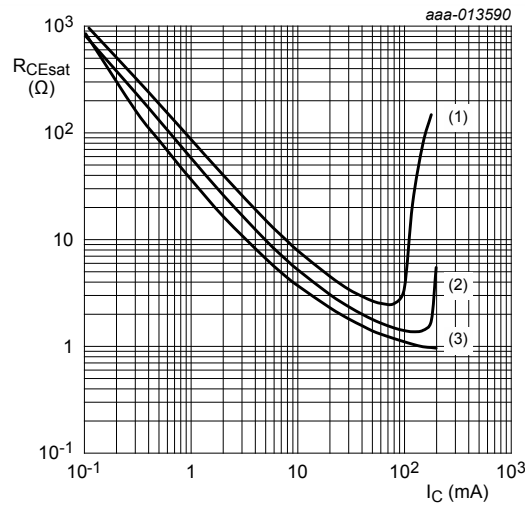
$T_{amb} = 25\text{ °C}$
 (1) $I_C/I_B = 10$
 (2) $I_C/I_B = 5$
 (3) $I_C/I_B = 2.5$

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



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

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



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

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

11. Package outline

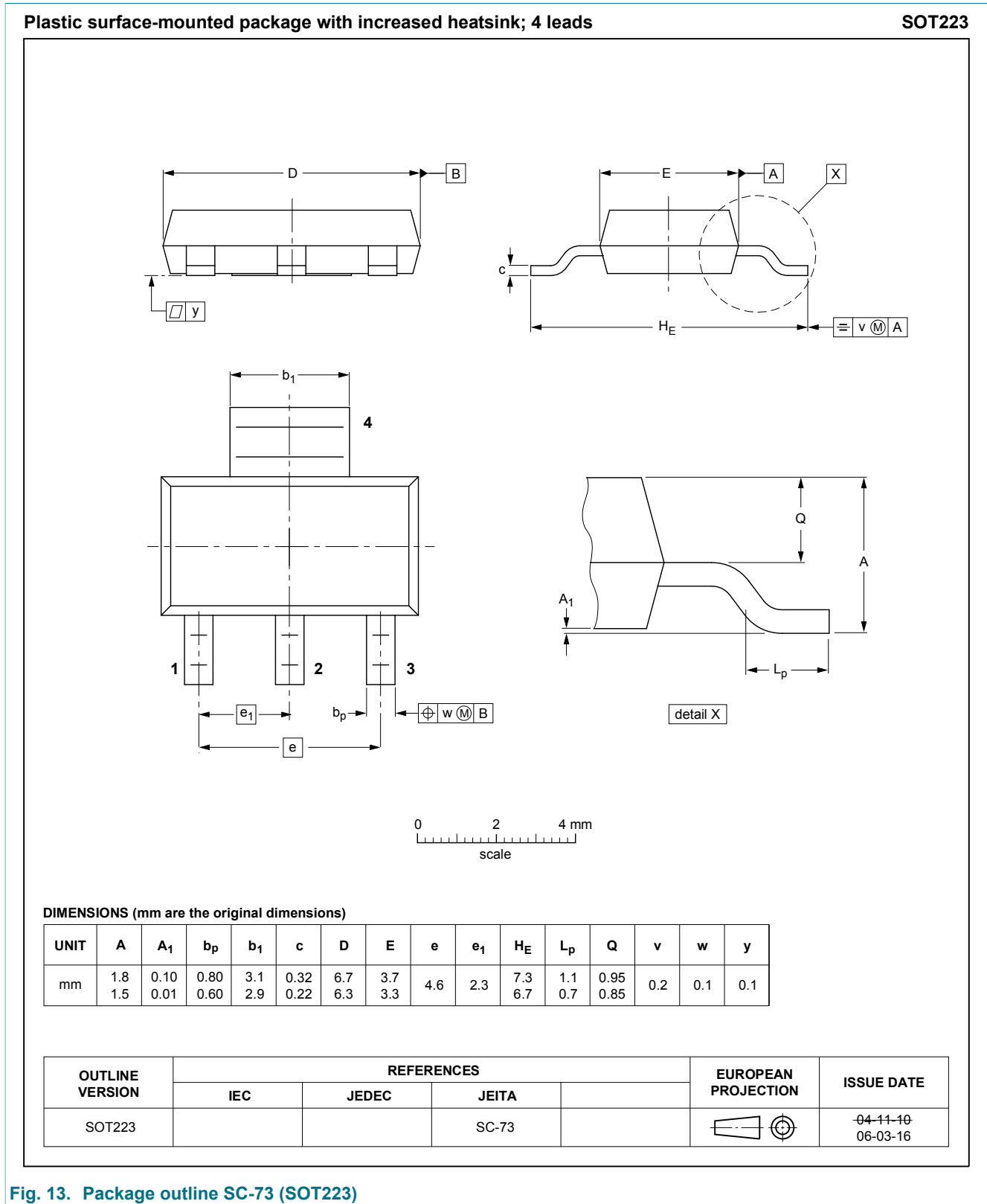


Fig. 13. Package outline SC-73 (SOT223)

12. Soldering

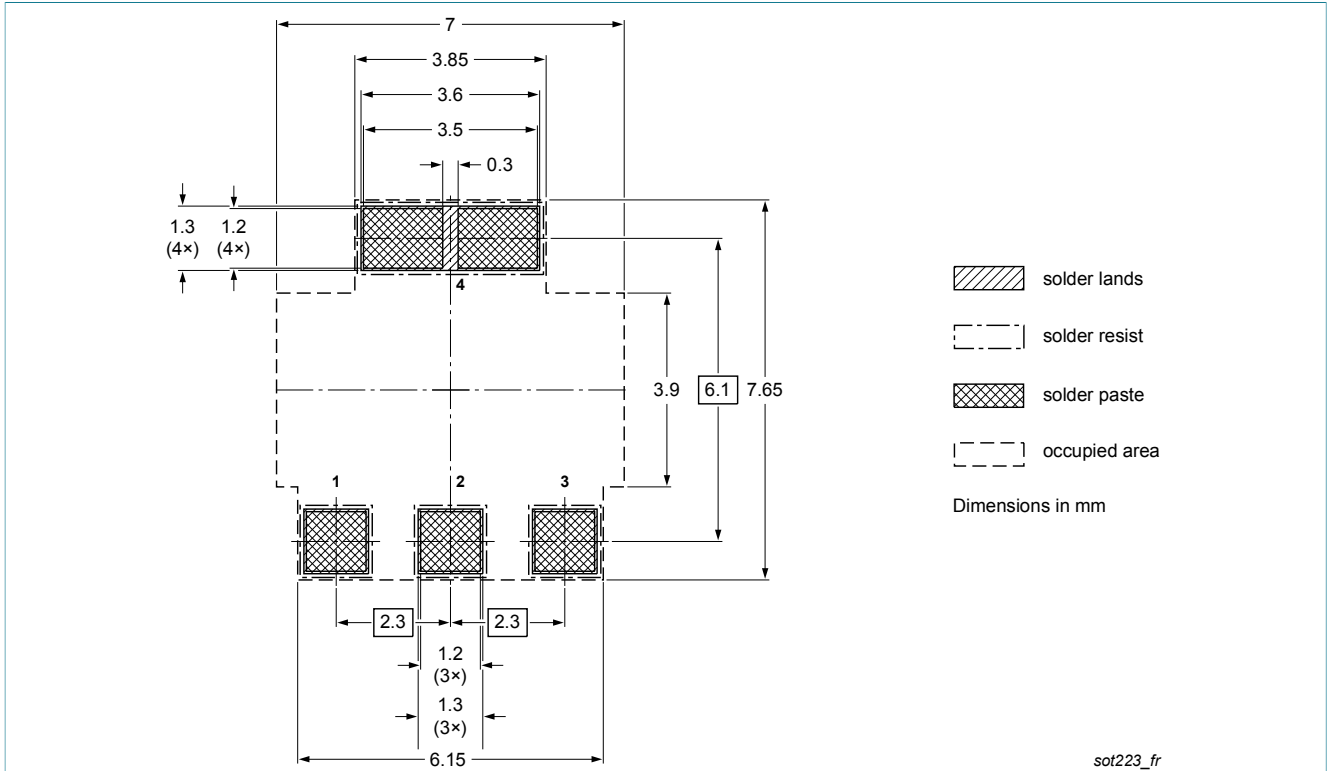


Fig. 14. Reflow soldering footprint for SC-73 (SOT223)

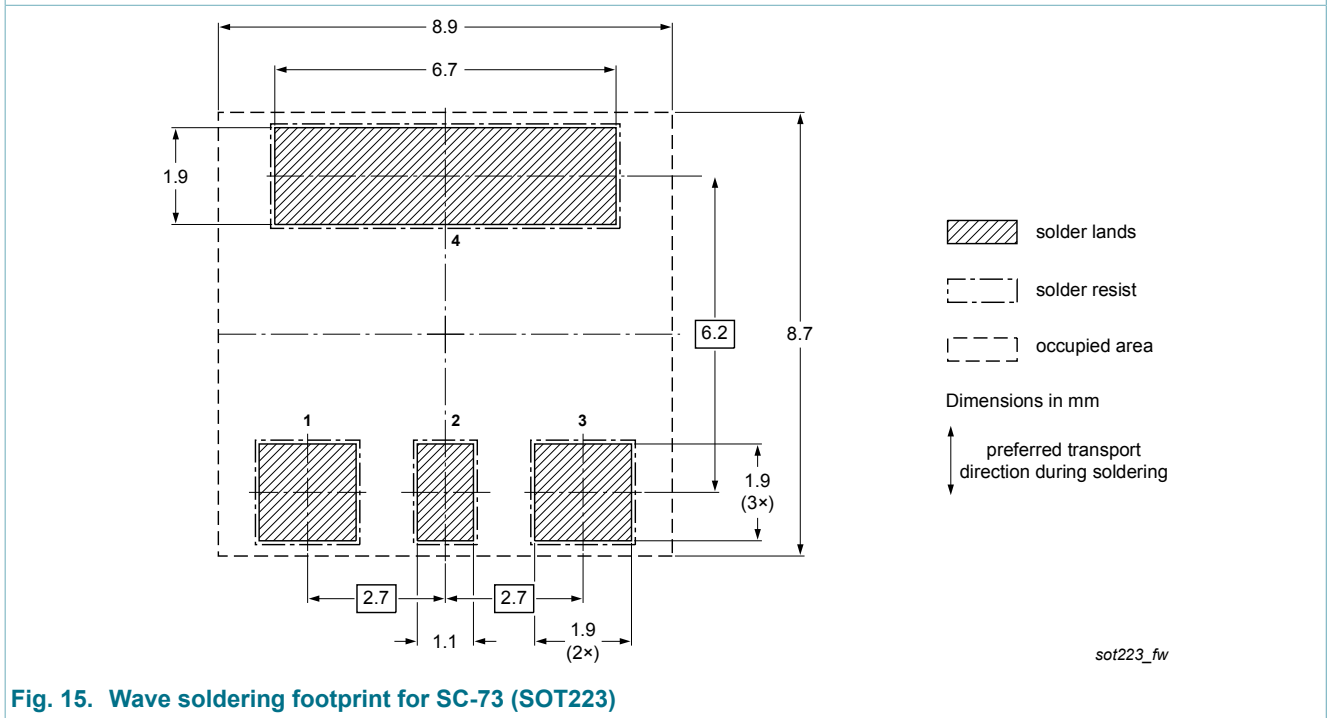


Fig. 15. Wave soldering footprint for SC-73 (SOT223)

13. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---------------|--------------|--------------------|---------------|------------|
| PBHV2160Z v.1 | 20150624 | Product data sheet | - | - |

14. Legal information

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|--------------------------------|--------------------|---|
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15. Contents

| | | |
|------|-------------------------------|----|
| 1 | General description | 1 |
| 2 | Features and benefits | 1 |
| 3 | Applications | 1 |
| 4 | Quick reference data | 1 |
| 5 | Pinning information | 2 |
| 6 | Ordering information | 2 |
| 7 | Marking | 2 |
| 8 | Limiting values | 3 |
| 9 | Thermal characteristics | 4 |
| 10 | Characteristics | 5 |
| 11 | Package outline | 8 |
| 12 | Soldering | 9 |
| 13 | Revision history | 10 |
| 14 | Legal information | 11 |
| 14.1 | Data sheet status | 11 |
| 14.2 | Definitions | 11 |
| 14.3 | Disclaimers | 11 |
| 14.4 | Trademarks | 12 |

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