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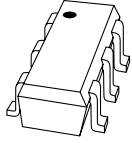
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Kind regards,

Team Nexperia



PBSS8110Y

100 V, 1 A NPN low V_{CEsat} (BISS) transistor

Rev. 02 — 21 November 2009

Product data sheet

1. Product profile

1.1 General description

NPN low V_{CEsat} transistor in a SOT363 (SC-88) plastic package.

1.2 Features

- SOT363 package
- Low collector-emitter saturation voltage V_{CEsat}
- High collector current capability I_C and I_{CM}
- High efficiency reduces heat generation

1.3 Applications

- Major application segments:
 - ◆ Automotive 42 V power
 - ◆ Telecom infrastructure
 - ◆ Industrial
- Peripheral driver:
 - ◆ Driver in low supply voltage applications (e.g. lamps and LEDs)
 - ◆ Inductive load driver (e.g. relays, buzzers and motors)
- DC-to-DC converter

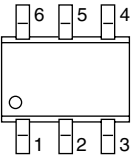
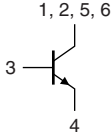
1.4 Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-------------|---------------------------|------------|-----|-----|-----|------------|
| V_{CEO} | collector-emitter voltage | | - | - | 100 | V |
| I_C | collector current (DC) | | - | - | 1 | A |
| I_{CM} | peak collector current | | - | - | 3 | A |
| R_{CEsat} | equivalent on-resistance | | - | - | 200 | m Ω |

2. Pinning information

Table 2. Discrete pinning

| Pin | Description | Simplified outline | Symbol |
|------------|-------------|---|---|
| 1, 2, 5, 6 | collector |  |  |
| 3 | base | | |
| 4 | emitter | | |

3. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|---------|--|---------|
| | Name | Description | Version |
| PBSS8110Y | - | plastic surface mounted package; 6 leads | SOT363 |

4. Marking

Table 4. Marking

| Type number | Marking code ^[1] |
|-------------|-----------------------------|
| PPBSS8110Y | 81* |

- [1] * = p: made in Hong Kong
 * = t: made in Malaysia
 * = W: made in China

5. Limiting values

Table 5. Limiting values

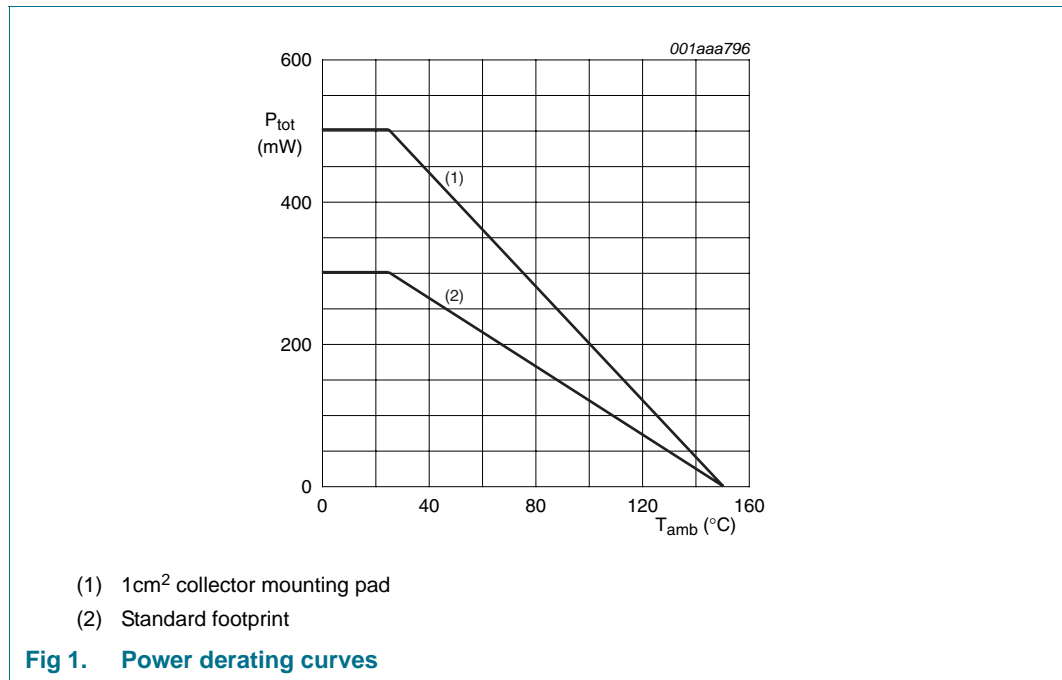
In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-----------|------------------------------|-----------------------------|-------|-----|------|
| V_{CBO} | collector-base voltage | open emitter | - | 120 | V |
| V_{CEO} | collector-emitter voltage | open base | - | 100 | V |
| V_{EBO} | emitter-base voltage | open collector | - | 5 | V |
| I_{CM} | peak collector current | $T_{j(max)}$ | - | 3 | A |
| I_C | continuous collector current | | - | 1 | A |
| I_B | continuous base current | | - | 0.3 | A |
| P_{tot} | total power dissipation | $T_{amb} \leq 25\text{ °C}$ | [1] - | 290 | mW |
| | | | [2] - | 480 | mW |
| | | | [3] - | 625 | mW |

Table 5. Limiting values ...continued
In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-----------|-------------------------------|------------|-----|------|------|
| T_j | junction temperature | | - | 150 | °C |
| T_{amb} | operating ambient temperature | | -65 | +150 | °C |
| T_{stg} | storage temperature | | | +150 | °C |

- [1] Device mounted on a FR4 printed-circuit board, single-sided copper, tin-plated, standard footprint.
- [2] Device mounted on a FR4 printed-circuit board, single-sided copper, tin-plated, 1cm² collector mounting pad.
- [3] Device mounted on a FR4 printed-circuit board, single-sided copper, tin-plated, 6cm² collector mounting pad.

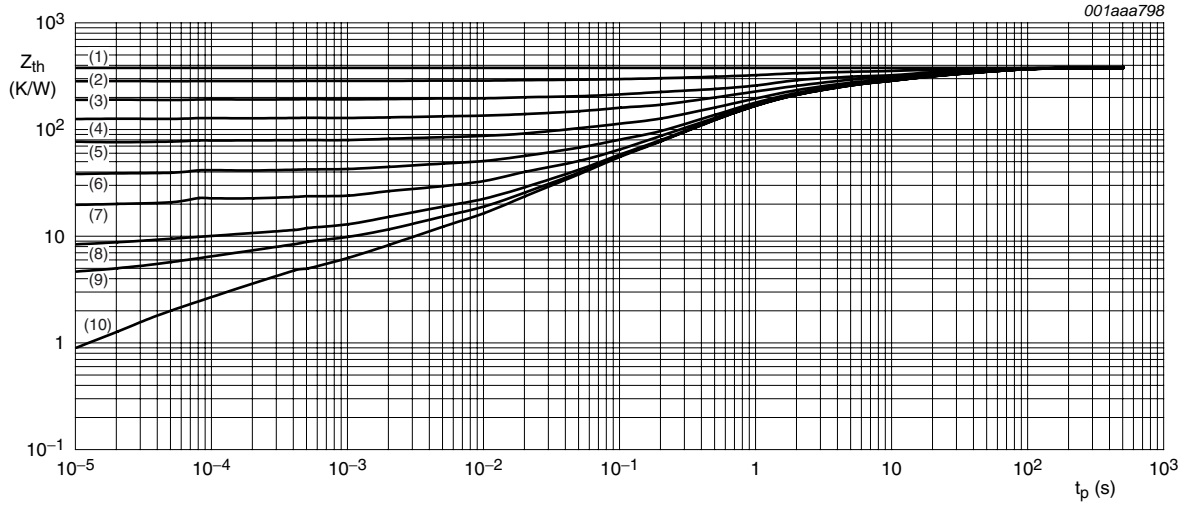


6. Thermal characteristics

Table 6. Thermal characteristics

| Symbol | Parameter | Conditions | Typ | Unit |
|---------------|---|-------------|---------|------|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] 431 | K/W |
| | | | [2] 260 | K/W |
| | | | [3] 200 | K/W |
| $R_{th(j-s)}$ | thermal resistance from junction to soldering point | in free air | [1] 85 | K/W |

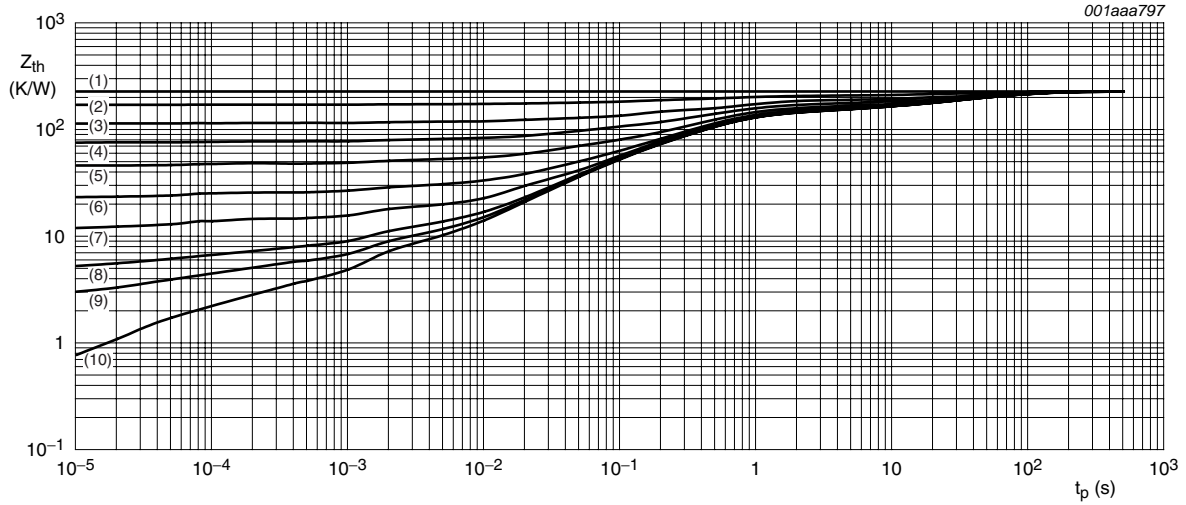
- [1] Device mounted on a FR4 printed-circuit board, single-sided copper, tin-plated, standard footprint.
- [2] Device mounted on a FR4 printed-circuit board, single-sided copper, tin-plated, 1cm² collector mounting pad.
- [3] Device mounted on a FR4 printed-circuit board, single-sided copper, tin-plated, 6cm² collector mounting pad.



Mounted on FR4 PCB; standard footprint

- (1) $\delta = 1$
- (2) $\delta = 0.75$
- (3) $\delta = 0.5$
- (4) $\delta = 0.33$
- (5) $\delta = 0.2$
- (6) $\delta = 0.1$
- (7) $\delta = 0.05$
- (8) $\delta = 0.02$
- (9) $\delta = 0.01$
- (10) $\delta = 0$

Fig 2. Transient thermal impedance as a function of pulse time; typical values



Mounted on FR4 PCB; mounting pad for collector = 1cm²

- (1) $\delta = 1$
- (2) $\delta = 0.75$
- (3) $\delta = 0.5$
- (4) $\delta = 0.33$
- (5) $\delta = 0.2$
- (6) $\delta = 0.1$
- (7) $\delta = 0.05$
- (8) $\delta = 0.02$
- (9) $\delta = 0.01$
- (10) $\delta = 0$

Fig 3. Transient thermal impedance as a function of pulse time; typical values

7. Characteristics

Table 7. Characteristics

$T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified.

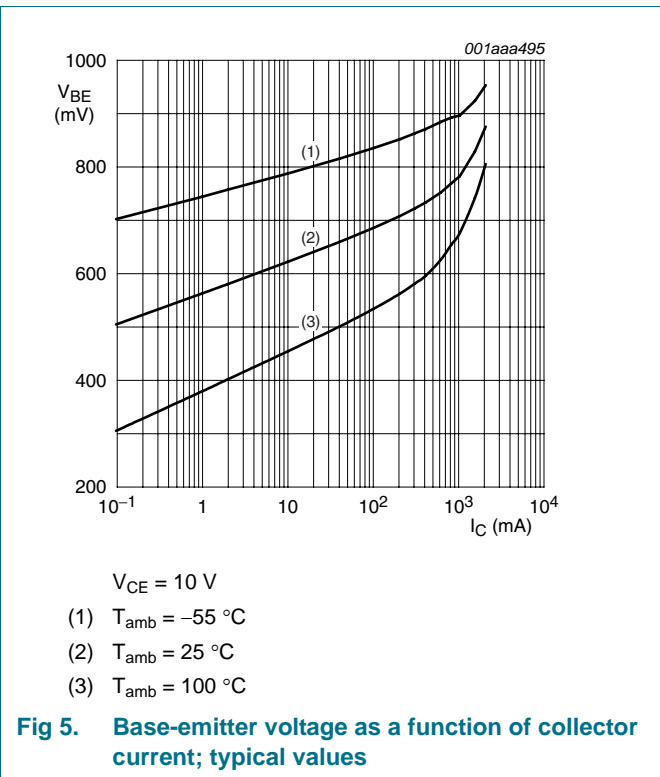
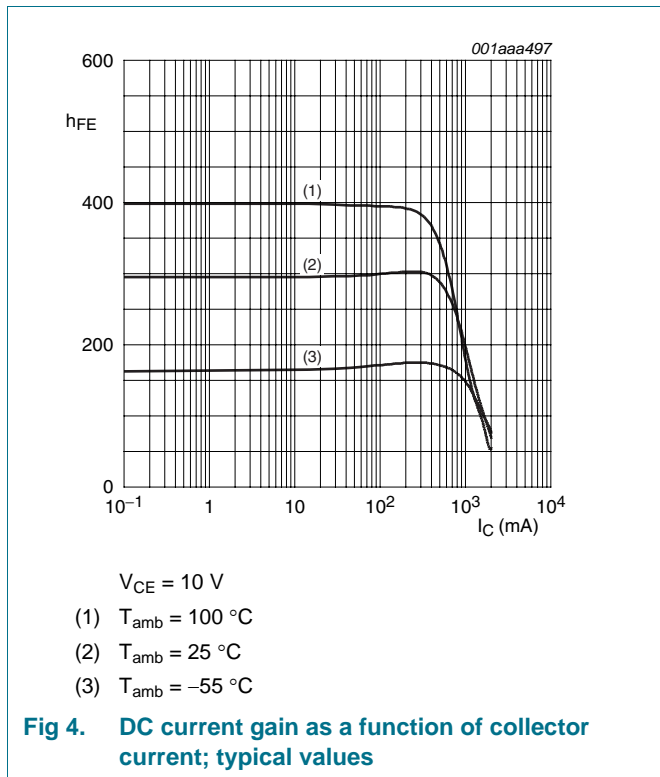
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|-----------------------------------|---|---------|-----|-----|---------------|
| I_{CBO} | collector-base cut-off current | $V_{CB} = 80\text{ V}; I_E = 0\text{ A}$ | - | - | 100 | nA |
| | | $V_{CB} = 80\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ }^\circ\text{C}$ | - | - | 50 | μA |
| I_{CES} | collector-emitter cut-off current | $V_{CE} = 80\text{ V}; V_{BE} = 0\text{ V}$ | - | - | 100 | nA |
| I_{EBO} | emitter-base cut-off current | $V_{EB} = 4\text{ V}; I_C = 0\text{ A}$ | - | - | 100 | nA |
| h_{FE} | DC current gain | $V_{CE} = 10\text{ V}; I_C = 1\text{ mA}$ | 150 | - | - | |
| | | $V_{CE} = 10\text{ V}; I_C = 250\text{ mA}$ | 150 | - | 500 | |
| | | $V_{CE} = 10\text{ V}; I_C = 0.5\text{ A}$ | [1] 100 | - | - | |
| | | $V_{CE} = 10\text{ V}; I_C = 1\text{ A}$ | [1] 80 | - | - | |

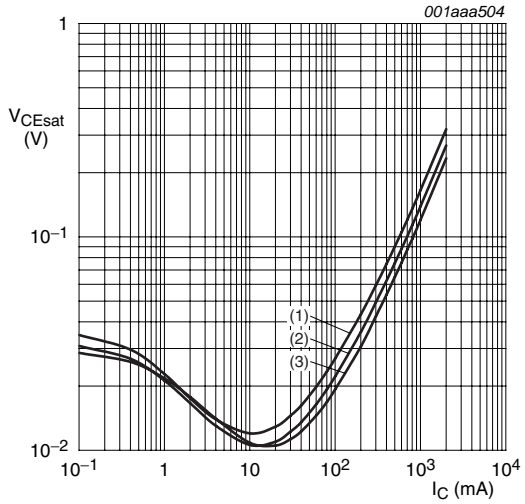
Table 7. Characteristics ...continued

$T_j = 25\text{ °C}$ unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-------------|--------------------------------------|--|-----|-----|------|-----------|
| V_{CEsat} | collector-emitter saturation voltage | $I_C = 100\text{ mA}; I_B = 10\text{ mA}$ | - | - | 40 | mV |
| | | $I_C = 500\text{ mA}; I_B = 50\text{ mA}$ | - | - | 120 | mV |
| | | $I_C = 1\text{ A}; I_B = 100\text{ mA}$ | - | - | 200 | mV |
| R_{CEsat} | equivalent on-resistance | $I_C = 1\text{ A}; I_B = 100\text{ mA}$ | [1] | 160 | 200 | $m\Omega$ |
| V_{BEsat} | base-emitter saturation voltage | $I_C = 1\text{ A}; I_B = 100\text{ mA}$ | - | - | 1.05 | V |
| V_{BEon} | base-emitter turn-on voltage | $V_{CE} = 10\text{ V}; I_C = 1\text{ A}$ | - | - | 0.9 | V |
| f_T | transition frequency | $V_{CE} = 10\text{ V}; I_C = 50\text{ mA}; f = 100\text{ MHz}$ | 100 | - | - | MHz |
| C_c | collector capacitance | $V_{CB} = 10\text{ V}; I_E = I_e = 0\text{ A}; f = 1\text{ MHz}$ | - | - | 7.5 | pF |

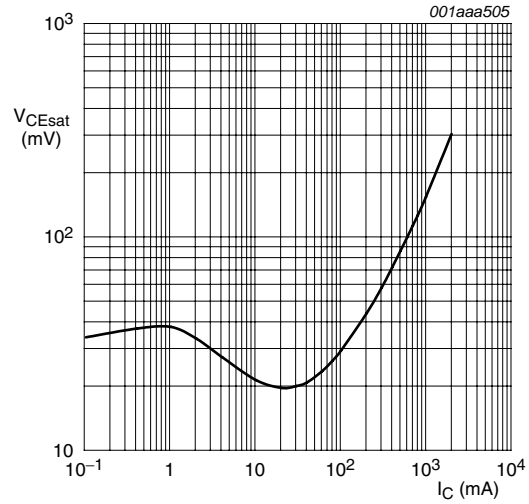
[1] Pulse test: $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02$.





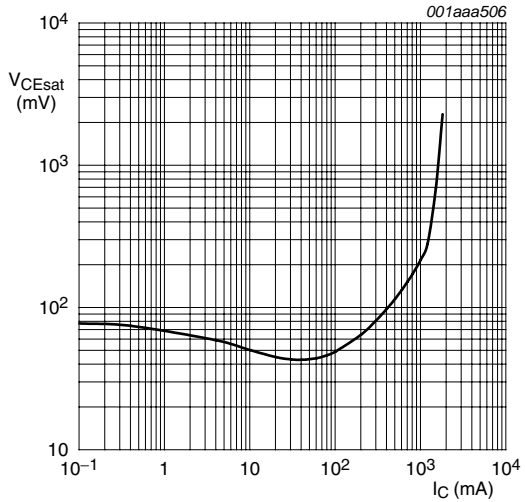
$I_C/I_B = 10$
 (1) $T_{amb} = 100\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = -55\text{ °C}$

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



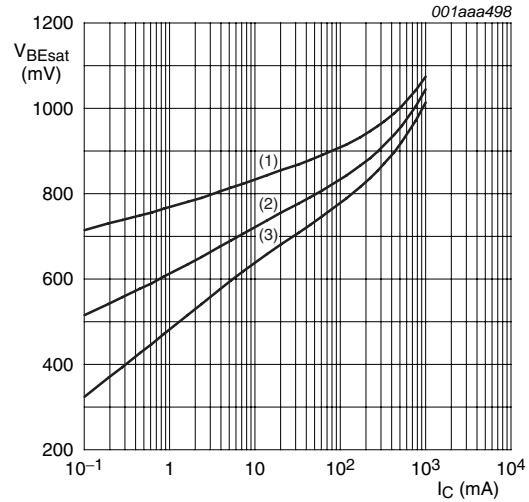
$I_C/I_B = 20; T_{amb} = 25\text{ °C}$

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



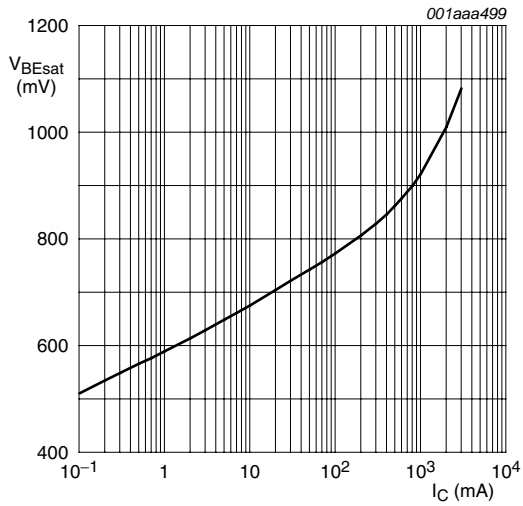
$I_C/I_B = 50; T_{amb} = 25\text{ °C}$

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



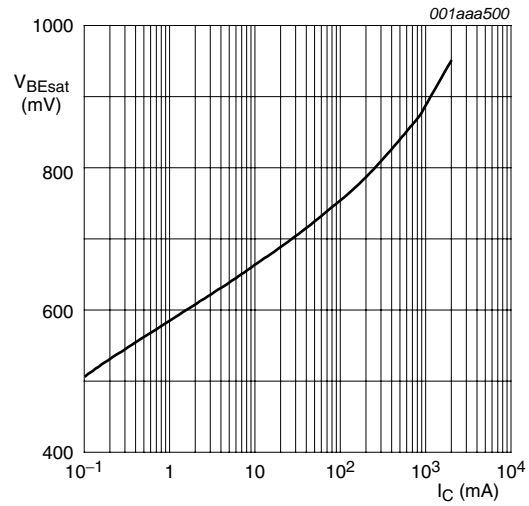
$I_C/I_B = 10$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 100\text{ °C}$

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



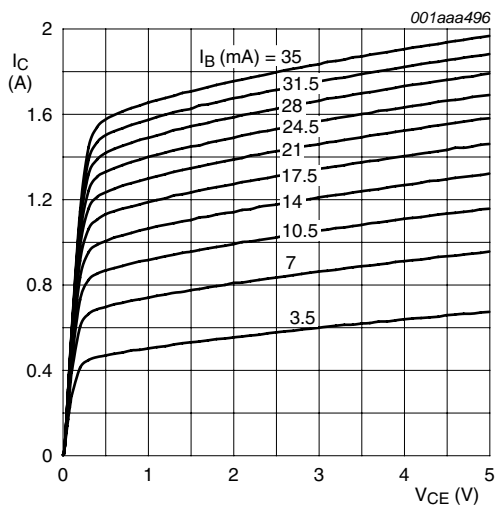
$I_C/I_B = 20$; $T_{amb} = 25\text{ }^\circ\text{C}$

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



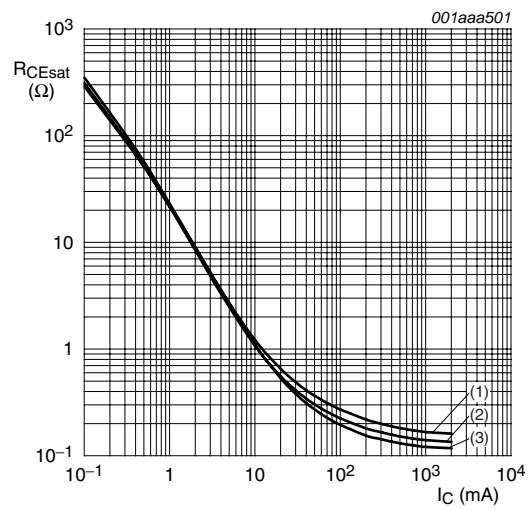
$I_C/I_B = 50$; $T_{amb} = 25\text{ }^\circ\text{C}$

Fig 11. Base-emitter saturation voltage as a function of collector current; typical values



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

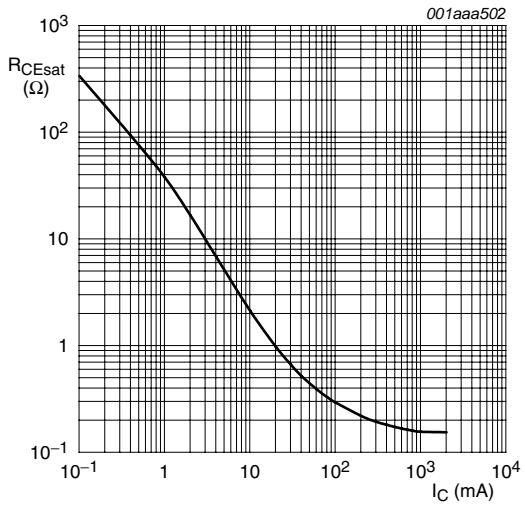
Fig 12. Collector current as a function of collector-emitter voltage; typical values



$I_C/I_B = 10$

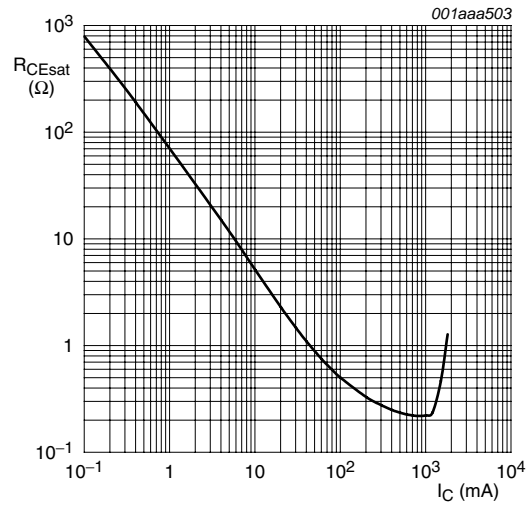
- (1) $T_{amb} = 100\text{ }^\circ\text{C}$
- (2) $T_{amb} = 25\text{ }^\circ\text{C}$
- (3) $T_{amb} = -55\text{ }^\circ\text{C}$

Fig 13. Equivalent on-resistance as a function of collector current; typical values



$I_C/I_B = 20$; $T_{amb} = 25 \text{ }^\circ\text{C}$

Fig 14. Equivalent on-resistance as a function of collector current; typical values



$I_C/I_B = 50$; $T_{amb} = 25 \text{ }^\circ\text{C}$

Fig 15. Equivalent on-resistance as a function of collector current; typical values

8. Package outline

Plastic surface-mounted package; 6 leads

SOT363

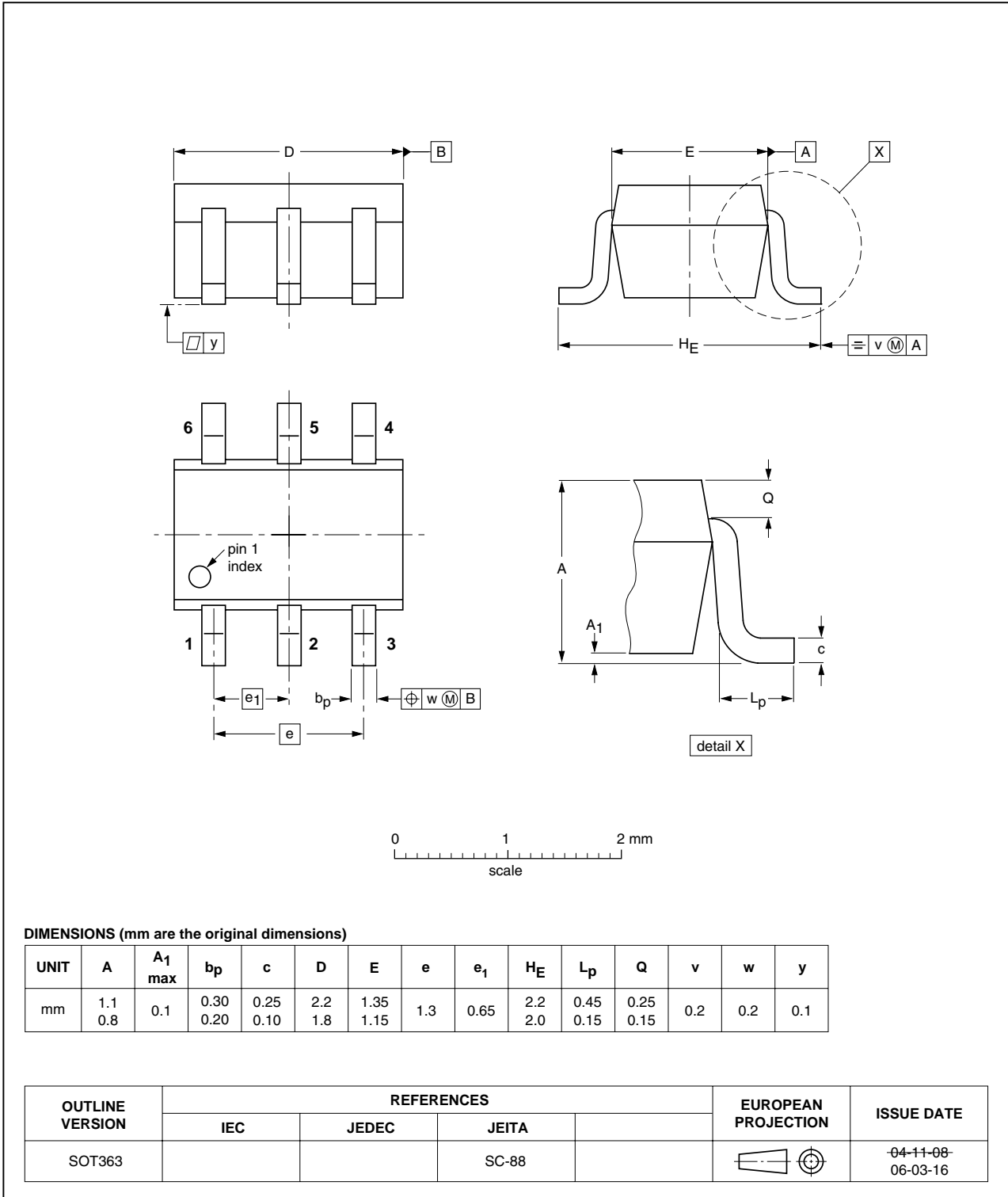


Fig 16. Package outline

9. Revision history

Table 8. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|---|-------------------|---------------|-------------|
| PBSS8110Y_2 | 20091121 | Product data | - | PBSS8110Y_1 |
| Modifications: | <ul style="list-style-type: none"> • This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content. • Table 2 “Discrete pinning”: amended • Figure 4 “DC current gain as a function of collector current; typical values”: updated • Figure 6 “Collector-emitter saturation voltage as a function of collector current; typical values”: V_{CEsat} unit amended from mV to V • Figure 12 “Collector current as a function of collector-emitter voltage; typical values”: updated • Figure 16 “Package outline”: updated | | | |
| PBSS8110Y_1 | 20040602 | Product data | - | - |

10. Legal information

10.1 Data sheet status

| Document status ^{[1][2]} | Product status ^[3] | Definition |
|-----------------------------------|-------------------------------|---|
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| Preliminary [short] data sheet | Qualification | This document contains data from the preliminary specification. |
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[1] Please consult the most recently issued document before initiating or completing a design.

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Date of release: 21 November 2009

Document identifier: PBSS8110Y_2



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