Important notice

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If you have any questions related to the data sheet, please contact our nearest sales office via e-mail or telephone (details via salesaddresses@nexperia.com). Thank you for your cooperation and understanding,

Kind regards,

Team Nexperia
1. Product profile

1.1 General description
PNP 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 leading to less 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>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{CEO}$</td>
<td>collector-emitter voltage</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-100</td>
<td>V</td>
</tr>
<tr>
<td>$I_C$</td>
<td>collector current (DC)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-1</td>
<td>A</td>
</tr>
<tr>
<td>$I_{CM}$</td>
<td>peak collector current</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-3</td>
<td>A</td>
</tr>
<tr>
<td>$R_{CEsat}$</td>
<td>equivalent on-resistance</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>320</td>
<td>mΩ</td>
</tr>
</tbody>
</table>
2. Pinning information

Table 2. Discrete pinning

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Simplified outline</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 5, 6</td>
<td>collector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>base</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>emitter</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Ordering information

Table 3. Ordering information

<table>
<thead>
<tr>
<th>Type number</th>
<th>Package</th>
<th>Name</th>
<th>Description</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBSS9110Y</td>
<td>plastic surface mounted package; 6 leads</td>
<td></td>
<td>SOT363</td>
<td></td>
</tr>
</tbody>
</table>

4. Marking

Table 4. Marking

<table>
<thead>
<tr>
<th>Type number</th>
<th>Marking code</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBSS9110Y</td>
<td>91*[^1]</td>
</tr>
</tbody>
</table>

[^1] * = p: made in Hong Kong  
* = t: made in Malaysia  
* = W: made in China
5. Limiting values

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

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{CBO}$</td>
<td>collector-base voltage</td>
<td>open emitter</td>
<td>-</td>
<td>−120</td>
<td>V</td>
</tr>
<tr>
<td>$V_{CEO}$</td>
<td>collector-emitter voltage</td>
<td>open base</td>
<td>-</td>
<td>−100</td>
<td>V</td>
</tr>
<tr>
<td>$V_{EBO}$</td>
<td>emitter-base voltage</td>
<td>open collector</td>
<td>-</td>
<td>−5</td>
<td>V</td>
</tr>
<tr>
<td>$I_{CM}$</td>
<td>peak collector current</td>
<td>$T_j(\text{max})$</td>
<td>-</td>
<td>−3</td>
<td>A</td>
</tr>
<tr>
<td>$I_C$</td>
<td>collector current (DC)</td>
<td></td>
<td>-</td>
<td>−1</td>
<td>A</td>
</tr>
<tr>
<td>$I_B$</td>
<td>base current (DC)</td>
<td></td>
<td>-</td>
<td>−0.3</td>
<td>A</td>
</tr>
<tr>
<td>$P_{tot}$</td>
<td>total power dissipation</td>
<td>$T_{\text{amb}} \leq 25 , ^\circ\text{C}$</td>
<td>[1]</td>
<td>290</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[2]</td>
<td>480</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[3]</td>
<td>625</td>
<td>mW</td>
</tr>
</tbody>
</table>

$T_j$ junction temperature - 150 °C

$T_{\text{amb}}$ operating ambient temperature −65 +150 °C

$T_{\text{stg}}$ storage temperature −65 +150 °C


![Fig 1. Power derating curves](image_url)

(1) 1cm² collector mounting pad
(2) Standard footprint

Fig 1. Power derating curves
6. Thermal characteristics

Table 6. Thermal characteristics

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


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

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) $\delta = 0$
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

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{CBO}$</td>
<td>collector-base cut-off current</td>
<td>$V_{CB} = -80,V; I_E = 0,A$</td>
<td>-</td>
<td>-</td>
<td>$-100$</td>
<td>nA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{CB} = -80,V; I_E = 0,A; T_j = 150,^\circ C$</td>
<td>-</td>
<td>-</td>
<td>$-50$</td>
<td>$\mu A$</td>
</tr>
<tr>
<td>$I_{CES}$</td>
<td>collector-emitter cut-off current</td>
<td>$V_{CE} = -80,V; V_{BE} = 0,V$</td>
<td>-</td>
<td>-</td>
<td>$-100$</td>
<td>nA</td>
</tr>
<tr>
<td>$I_{EBO}$</td>
<td>emitter-base cut-off current</td>
<td>$V_{EB} = -4,V; I_C = 0,A$</td>
<td>-</td>
<td>-</td>
<td>$-100$</td>
<td>nA</td>
</tr>
<tr>
<td>$h_{FE}$</td>
<td>DC current gain</td>
<td>$V_{CE} = -5,V; I_C = -1,mA$</td>
<td>150</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{CE} = -5,V; I_C = -250,mA$</td>
<td>150</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{CE} = -5,V; I_C = -0.5,A$</td>
<td>[1]</td>
<td>150</td>
<td>-</td>
<td>450</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{CE} = -5,V; I_C = -1,A$</td>
<td>[1]</td>
<td>125</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>$V_{CESat}$</td>
<td>collector-emitter saturation voltage</td>
<td>$I_C = -250,mA; I_B = -25,mA$</td>
<td>-</td>
<td>-</td>
<td>$-120$</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_C = -500,mA; I_B = -50,mA$</td>
<td>-</td>
<td>-</td>
<td>$-180$</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_C = -1,A; I_B = -100,mA$</td>
<td>-</td>
<td>-</td>
<td>$-320$</td>
<td>mV</td>
</tr>
<tr>
<td>$R_{CESat}$</td>
<td>equivalent on-resistance</td>
<td>$I_C = -1,A; I_B = -100,mA$</td>
<td>[1]</td>
<td>-</td>
<td>170</td>
<td>320</td>
</tr>
<tr>
<td>$V_{BEsat}$</td>
<td>base-emitter saturation voltage</td>
<td>$I_C = -1,A; I_B = -100,mA$</td>
<td>-</td>
<td>-</td>
<td>$-1.1$</td>
<td>V</td>
</tr>
<tr>
<td>$V_{BEon}$</td>
<td>base-emitter turn-on voltage</td>
<td>$I_C = -1,A; V_{CE} = -5,V$</td>
<td>-</td>
<td>-</td>
<td>$-1.0$</td>
<td>V</td>
</tr>
<tr>
<td>$f_T$</td>
<td>transition frequency</td>
<td>$I_C = -50,mA; V_{CE} = -10,V; f = 100,MHz$</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>MHz</td>
</tr>
<tr>
<td>$C_C$</td>
<td>collector capacitance</td>
<td>$I_E = I_e = 0,A; V_{CB} = -10,V; f = 1,MHz$</td>
<td>-</td>
<td>-</td>
<td>17</td>
<td>pF</td>
</tr>
</tbody>
</table>

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

_Tamb = 25 °C unless otherwise specified._
100 V, 1 A PNP low $V_{CEsat}$ (BISS) transistor

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

- $V_{CE} = -10$ V
  - (1) $T_{amb} = 100$ °C
  - (2) $T_{amb} = 25$ °C
  - (3) $T_{amb} = -55$ °C

**Fig 5.** Base-emitter voltage as a function of collector current; typical values

- $V_{CE} = -10$ V
  - (1) $T_{amb} = -55$ °C
  - (2) $T_{amb} = 25$ °C
  - (3) $T_{amb} = 100$ °C

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

- $I_{C}/I_{B} = 10$
  - (1) $T_{amb} = 100$ °C
  - (2) $T_{amb} = 25$ °C
  - (3) $T_{amb} = -55$ °C

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

- $I_{C}/I_{B} = 50$
  - (1) $I_{C}/I_{B} = 50$
  - (2) $I_{C}/I_{B} = 20$
**Base-emitter saturation voltage as a function of collector current; typical values**

- **Fig 8.**
  - $I_C/I_B = 10$
  - (1) $T_{amb} = -55 \, ^\circ C$
  - (2) $T_{amb} = 25 \, ^\circ C$
  - (3) $T_{amb} = 100 \, ^\circ C$

- **Fig 9.**
  - $I_C/I_B = 20$
  - $T_{amb} = 25 \, ^\circ C$

**Equivalent on-resistance as a function of collector current; typical values**

- **Fig 10.**
  - $I_C/I_B = 10$
  - (1) $T_{amb} = -55 \, ^\circ C$
  - (2) $T_{amb} = 25 \, ^\circ C$
  - (3) $T_{amb} = 100 \, ^\circ C$

- **Fig 11.**
  - $T_{amb} = 25 \, ^\circ C$
  - (1) $I_C/I_B = 50$
  - (2) $I_C/I_B = 20$
Fig 12. Collector current as a function of collector-emitter voltage; typical values
8. Package outline

Plastic surface-mounted package; 6 leads

SOT363

DIMENSIONS (mm are the original dimensions)

<table>
<thead>
<tr>
<th>UNIT</th>
<th>A</th>
<th>A₁ max</th>
<th>bₚ</th>
<th>c</th>
<th>D</th>
<th>E</th>
<th>e</th>
<th>e₁</th>
<th>Hₑ</th>
<th>Lₚ</th>
<th>Q</th>
<th>v</th>
<th>w</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>1.1</td>
<td>0.1</td>
<td>0.30</td>
<td>0.25</td>
<td>2.2</td>
<td>1.35</td>
<td>1.3</td>
<td>0.65</td>
<td>2.2</td>
<td>0.45</td>
<td>0.25</td>
<td>0.2</td>
<td>0.2</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Fig 13. Package outline
9. Revision history

<table>
<thead>
<tr>
<th>Document ID</th>
<th>Release date</th>
<th>Data sheet status</th>
<th>Change notice</th>
<th>Supersedes</th>
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</thead>
<tbody>
<tr>
<td>PBSS9110Y_2</td>
<td>20091122</td>
<td>Product data</td>
<td>-</td>
<td>PBSS9110Y_1</td>
</tr>
</tbody>
</table>

Modifications:
- 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 10 “Equivalent on-resistance as a function of collector current; typical values”**: updated
- **Figure 11 “Equivalent on-resistance as a function of collector current; typical values”**: updated
- **Figure 12 “Collector current as a function of collector-emitter voltage; typical values”**: updated
- **Figure 13 “Package outline”**: updated

| PBSS9110Y_1     | 20040609     | Product data      | -             | -             |
10. Legal information

10.1 Data sheet status

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Objective [short] data sheet</td>
<td>Development</td>
<td>This document contains data from the objective specification for product development.</td>
</tr>
<tr>
<td>Preliminary [short] data sheet</td>
<td>Qualification</td>
<td>This document contains data from the preliminary specification.</td>
</tr>
<tr>
<td>Product [short] data sheet</td>
<td>Production</td>
<td>This document contains the product specification.</td>
</tr>
</tbody>
</table>

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[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 URL http://www.nxp.com.

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11. Contact information

For more information, please visit: http://www.nxp.com

For sales office addresses, please send an email to: salesaddresses@nxp.com
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