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Kind regards,

Team Nexperia
1. General description

PNP low $V_{CE\text{sat}}$ Breakthrough In Small Signal (BISS) transistor in a small SOT23 Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Small SMD plastic package
- Low collector-emitter saturation voltage $V_{CE\text{sat}}$
- High collector current capability: $I_C$ and $I_{CM}$
- Higher efficiency due to less heat generation
- AEC-Q101 qualified

3. Applications

- DC-to-DC conversion
- Supply line switching
- Battery charger
- LCD backlighting
- Driver in low supply voltage applications (e.g. lamps and LEDs)

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>open base</td>
<td>-</td>
<td>-</td>
<td>-30</td>
<td>V</td>
</tr>
<tr>
<td>$I_C$</td>
<td>collector current</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>single pulse; $T_p \leq 1$ ms</td>
<td>-</td>
<td>-</td>
<td>-3</td>
<td>A</td>
</tr>
<tr>
<td>$R_{CE\text{sat}}$</td>
<td>collector-emitter saturation resistance</td>
<td>$I_C = -500$ mA; $I_B = -50$ mA; pulsed; $T_p \leq 300$ µs; $\delta \leq 0.02$; $T_{amb} = 25$ °C</td>
<td>-</td>
<td>-</td>
<td>220</td>
<td>mΩ</td>
</tr>
</tbody>
</table>
5. Pinning information

Table 2. Pinning information

<table>
<thead>
<tr>
<th>Pin</th>
<th>Symbol</th>
<th>Description</th>
<th>Simplified outline</th>
<th>Graphic symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>B</td>
<td>base</td>
<td>TO-236AB (SOT23)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>E</td>
<td>emitter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>C</td>
<td>collector</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. 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>PBSS5130T</td>
<td>TO-236AB</td>
<td>plastic surface-mounted package; 3 leads</td>
<td>SOT23</td>
<td></td>
</tr>
</tbody>
</table>

7. Marking

Table 4. Marking codes

<table>
<thead>
<tr>
<th>Type number</th>
<th>Marking code</th>
<th>[1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBSS5130T</td>
<td>%3E</td>
<td></td>
</tr>
</tbody>
</table>

[1] % = placeholder for manufacturing site code
8. Limiting values

Table 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>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>V&lt;sub&gt;CBO&lt;/sub&gt;</td>
<td>collector-base voltage</td>
<td>open emitter</td>
<td>-</td>
<td>-30</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>V&lt;sub&gt;CEO&lt;/sub&gt;</td>
<td>collector-emitter voltage</td>
<td>open base</td>
<td>-</td>
<td>-30</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>V&lt;sub&gt;EBO&lt;/sub&gt;</td>
<td>emitter-base voltage</td>
<td>open collector</td>
<td>-</td>
<td>-5</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>I&lt;sub&gt;C&lt;/sub&gt;</td>
<td>collector current</td>
<td></td>
<td>-</td>
<td>-1</td>
<td>-</td>
<td>A</td>
</tr>
<tr>
<td>I&lt;sub&gt;CM&lt;/sub&gt;</td>
<td>peak collector current</td>
<td>single pulse; t&lt;sub&gt;p&lt;/sub&gt; ≤ 1 ms</td>
<td>-</td>
<td>-3</td>
<td>-</td>
<td>A</td>
</tr>
<tr>
<td>I&lt;sub&gt;BM&lt;/sub&gt;</td>
<td>peak base current</td>
<td></td>
<td>-</td>
<td>-300</td>
<td>-</td>
<td>mA</td>
</tr>
<tr>
<td>P&lt;sub&gt;tot&lt;/sub&gt;</td>
<td>total power dissipation</td>
<td>T&lt;sub&gt;amb&lt;/sub&gt; ≤ 25 °C</td>
<td>[1]</td>
<td>300</td>
<td>480</td>
<td>mW</td>
</tr>
<tr>
<td>T&lt;sub&gt;j&lt;/sub&gt;</td>
<td>junction temperature</td>
<td></td>
<td>-</td>
<td>150</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>T&lt;sub&gt;amb&lt;/sub&gt;</td>
<td>ambient temperature</td>
<td></td>
<td>-55</td>
<td>150</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>T&lt;sub&gt;stg&lt;/sub&gt;</td>
<td>storage temperature</td>
<td></td>
<td>-65</td>
<td>150</td>
<td>150</td>
<td>°C</td>
</tr>
</tbody>
</table>

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm<sup>2</sup>.

9. Thermal characteristics

Table 6. Thermal 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>R&lt;sub&gt;th(j-a)&lt;/sub&gt;</td>
<td>thermal resistance from junction to ambient</td>
<td>in free air</td>
<td>[1]</td>
<td>-</td>
<td>417</td>
<td>K/W</td>
</tr>
</tbody>
</table>

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm<sup>2</sup>.
## 10. 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(_{CEO})</td>
<td>collector-base cut-off current</td>
<td>$V_{CB} = -30 \text{ V}; I_E = 0 \text{ A}; T_{amb} = 25 \text{ °C}$</td>
<td>-</td>
<td>-</td>
<td>-100</td>
<td>nA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{CB} = -30 \text{ V}; I_E = 0 \text{ A}; T_J = 150 \text{ °C}$</td>
<td>-</td>
<td>-</td>
<td>-50</td>
<td>µA</td>
</tr>
<tr>
<td>I(_{EBO})</td>
<td>emitter-base cut-off current</td>
<td>$V_{EB} = -4 \text{ V}; I_C = 0 \text{ A}; T_{amb} = 25 \text{ °C}$</td>
<td>-</td>
<td>-</td>
<td>-100</td>
<td>nA</td>
</tr>
<tr>
<td>h(_{FE})</td>
<td>DC current gain</td>
<td>$V_{CE} = -2 \text{ V}; I_C = -100 \text{ mA}; \text{ pulsed}$; $t_p \leq 300 \mu\text{s}; \delta \leq 0.02$; $T_{amb} = 25 \text{ °C}$</td>
<td>300</td>
<td>450</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{CE} = -2 \text{ V}; I_C = -500 \text{ mA}; \text{ pulsed}$; $t_p \leq 300 \mu\text{s}; \delta \leq 0.02$; $T_{amb} = 25 \text{ °C}$</td>
<td>260</td>
<td>350</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{CE} = -2 \text{ V}; I_C = -1 \text{ A}; \text{ pulsed}$; $t_p \leq 300 \mu\text{s}; \delta \leq 0.02$; $T_{amb} = 25 \text{ °C}$</td>
<td>210</td>
<td>290</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>V(_{CEsat})</td>
<td>collector-emitter saturation voltage</td>
<td>$I_C = -100 \text{ mA}; I_B = -1 \text{ mA}; \text{ pulsed}$; $t_p \leq 300 \mu\text{s}; \delta \leq 0.02$; $T_{amb} = 25 \text{ °C}$</td>
<td>-</td>
<td>-</td>
<td>-100</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_C = -1 \text{ A}; I_B = -50 \text{ mA}; \text{ pulsed}$; $t_p \leq 300 \mu\text{s}; \delta \leq 0.02$; $T_{amb} = 25 \text{ °C}$</td>
<td>-</td>
<td>-</td>
<td>-225</td>
<td>mV</td>
</tr>
<tr>
<td>R(_{CEsat})</td>
<td>collector-emitter saturation resistance</td>
<td>$I_C = -500 \text{ mA}; I_B = -50 \text{ mA}; \text{ pulsed}$; $t_p \leq 300 \mu\text{s}; \delta \leq 0.02$; $T_{amb} = 25 \text{ °C}$</td>
<td>-</td>
<td>-</td>
<td>220</td>
<td>mΩ</td>
</tr>
<tr>
<td>V(_{BEsat})</td>
<td>base-emitter saturation voltage</td>
<td>$I_C = -2 \text{ A}; I_B = -200 \text{ mA}; \text{ pulsed}$; $t_p \leq 300 \mu\text{s}; \delta \leq 0.02$; $T_{amb} = 25 \text{ °C}$</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>$V_{CE} = -2 \text{ V}; I_C = -100 \text{ mA}; \text{ pulsed}$; $t_p \leq 300 \mu\text{s}; \delta \leq 0.02$; $T_{amb} = 25 \text{ °C}$</td>
<td>-</td>
<td>-</td>
<td>-0.75</td>
<td>V</td>
</tr>
<tr>
<td>f(_T)</td>
<td>transition frequency</td>
<td>$V_{CE} = -10 \text{ V}; I_C = -100 \text{ mA}$; $f = 100 \text{ MHz}$; $T_{amb} = 25 \text{ °C}$</td>
<td>100</td>
<td>200</td>
<td>-</td>
<td>MHz</td>
</tr>
<tr>
<td>C(_C)</td>
<td>collector capacitance</td>
<td>$V_{CB} = -10 \text{ V}; I_E = 0 \text{ A}; I_B = 0 \text{ A}$; $f = 1 \text{ MHz}$; $T_{amb} = 25 \text{ °C}$</td>
<td>-</td>
<td>-</td>
<td>28</td>
<td>pF</td>
</tr>
</tbody>
</table>
NXP Semiconductors

PBSS5130T
30 V; 1 A PNP low VCEsat (BISS) transistor

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Fig. 1. DC current gain as a function of collector current; typical values

\( V_{CE} = -2 \) V
(1) \( T_{amb} = 150 \) °C
(2) \( T_{amb} = 25 \) °C
(3) \( T_{amb} = -55 \) °C

Fig. 2. Collector current as a function of collector-emitter voltage; typical values

Fig. 3. Base-emitter voltage as a function of collector current; typical values

\( V_{CE} = -2 \) V
(1) \( T_{amb} = 150 \) °C
(2) \( T_{amb} = 25 \) °C
(3) \( T_{amb} = -55 \) °C

Fig. 4. Base-emitter saturation voltage as a function of collector current; typical values

\( I_{C}/I_B = 20 \)
(1) \( T_{amb} = -55 \) °C
(2) \( T_{amb} = 25 \) °C
(3) \( T_{amb} = 150 \) °C
11. Test information

11.1 Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - Stress test qualification for discrete semiconductors, and is suitable for use in automotive applications.

12. Package outline

Fig. 7. Package outline TO-236AB (SOT23)
13. Soldering

Fig. 8. Reflow soldering footprint for TO-236AB (SOT23)

Fig. 9. Wave soldering footprint for TO-236AB (SOT23)
14. Revision history

Table 8. Revision history

<table>
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<tr>
<th>Data sheet ID</th>
<th>Release date</th>
<th>Data sheet status</th>
<th>Change notice</th>
<th>Supersedes</th>
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<tr>
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<td>20130709</td>
<td>Product data sheet</td>
<td>-</td>
<td>PBSS5130T v.1</td>
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</table>

Modifications:
- The format of this document has been redesigned to comply with the new identity guidelines of NXP Semiconductors.
- Legal texts have been adapted to the new company name where appropriate.
- Sections "General description", "Features and benefits" and "Applications": updated
- Section "Marking": updated
- Table "Limiting values": ambient temperature $T_{amb}$ updated
- Table "Characteristics": base-emitter saturation voltage $V_{BE_{sat}}$ added
- Figures 1 to 6: added
- Section "Test information": added
- Figure "Package outline TO-236AB (SOT23)”: replaced by minimized outline drawing
- Section "Soldering": added
- Section "Legal information": updated

| PBSS5130T v.1     | 20031212     | Product data sheet| -             | -               |
15. Legal information

15.1 Data sheet status

<table>
<thead>
<tr>
<th>Document status</th>
<th>Product status</th>
<th>Definition</th>
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<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>

[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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