1. General description

NPN/PNP low V_{CEsat} Breakthrough In Small Signal (BISS) transistor in a leadless medium power DFN2020-6 (SOT1118) Surface-Mounted Device (SMD) plastic package.

NPN/NPN complement: PBSS4130PAN. PNP/PNP complement: PBSS5130PAP.

2. Features and benefits

- Very low collector-emitter saturation voltage V_{CEsat}
- High collector current capability I_C and I_{CM}
- High collector current gain h_{FE} at high I_C
- Reduced Printed-Circuit Board (PCB) requirements
- High efficiency due to less heat generation
- AEC-Q101 qualified

3. Applications

- Load switch
- Battery-driven devices
- Power management
- Charging circuits
- Power switches (e.g. motors, fans)

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>2</td>
<td>A</td>
</tr>
<tr>
<td>R_{CESat}</td>
<td>collector-emitter saturation resistance</td>
<td>I_C = 1 A; I_B = 0.1 A; pulsed; t_p \leq 300 \mu s; \delta \leq 0.02 ; T_{amb} = 25 ^\circ C</td>
<td>-</td>
<td>-</td>
<td>190</td>
<td>m\Omega</td>
</tr>
</tbody>
</table>

Table 1. Quick reference data
5. Pinning information

Table 2. Pinning information

<table>
<thead>
<tr>
<th>Pin</th>
<th>Symbol</th>
<th>Description</th>
<th>Simplified outline</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>E1</td>
<td>emitter TR1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>B1</td>
<td>base TR1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>C2</td>
<td>collector TR2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>E2</td>
<td>emitter TR2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>B2</td>
<td>base TR2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>C1</td>
<td>collector TR1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>C1</td>
<td>collector TR1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>C2</td>
<td>collector TR2</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>PBSS4130PANP</td>
<td>DFN2020-6</td>
<td>plastic thermal enhanced ultra thin small outline package; no leads; 6 terminals; body 2 x 2 x 0.65 mm</td>
<td>SOT1118</td>
<td></td>
</tr>
</tbody>
</table>

7. Marking

Table 4. Marking codes

<table>
<thead>
<tr>
<th>Type number</th>
<th>Marking code</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBSS4130PANP</td>
<td>2F</td>
</tr>
</tbody>
</table>

8. Limiting values

Table 5. Limiting values

<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>30</td>
<td>V</td>
</tr>
<tr>
<td>V_{CEO}</td>
<td>collector-emitter voltage</td>
<td>open base</td>
<td>-</td>
<td>30</td>
<td>V</td>
</tr>
</tbody>
</table>
### Symbol | Parameter | Conditions | Min | Max | Unit
--- | --- | --- | --- | --- | ---
$V_{EBO}$ | emitter-base voltage | open collector | - | 7 | V
$I_C$ | collector current | - | 1 | A
$I_{CM}$ | peak collector current | single pulse; $t_p \leq 1$ ms | - | 2 | A
$I_B$ | base current | - | 0.3 | A
$I_{BM}$ | peak base current | single pulse; $t_p \leq 1$ ms | - | 1 | A
$P_{tot}$ | total power dissipation | $T_{amb} \leq 25$ °C | [1] | - | 370 mW
 |  |  | [2] | - | 570 mW
 |  |  | [3] | - | 530 mW
 |  |  | [4] | - | 700 mW
 |  |  | [5] | - | 450 mW
 |  |  | [6] | - | 760 mW
 |  |  | [7] | - | 700 mW
 |  |  | [8] | - | 1450 mW

### Per device

| $P_{tot}$ | total power dissipation | $T_{amb} \leq 25$ °C | [1] | - | 510 mW
 |  |  | [2] | - | 780 mW
 |  |  | [3] | - | 730 mW
 |  |  | [4] | - | 960 mW
 |  |  | [5] | - | 620 mW
 |  |  | [6] | - | 1040 mW
 |  |  | [7] | - | 960 mW
 |  |  | [8] | - | 2000 mW

$T_j$ | junction temperature | - | 150 | °C
$T_{amb}$ | ambient temperature | -55 | 150 | °C
$T_{stg}$ | storage temperature | -65 | 150 | °C

[3] Device mounted on 4-layer PCB 35 µm copper strip line, tin-plated and standard footprint.
[4] Device mounted on 4-layer PCB 35 µm copper strip line, tin-plated, mounting pad for collector 1 cm$^2$.
[7] Device mounted on 4-layer PCB 70 µm copper strip line, tin-plated and standard footprint.
[8] Device mounted on 4-layer PCB 70 µm copper strip line, tin-plated, mounting pad for collector 1 cm$^2$. 
(1) 4-layer PCB 70 µm, mounting pad for collector 1 cm²
(2) FR4 PCB 70 µm, mounting pad for collector 1 cm²
(3) 4-layer PCB 70 µm, standard footprint
(4) 4-layer PCB 35 µm, mounting pad for collector 1 cm²
(5) FR4 PCB 35 µm, mounting pad for collector 1 cm²
(6) 4-layer PCB 35 µm, standard footprint
(7) FR4 PCB 70 µm, standard footprint
(8) FR4 PCB 35 µm, standard footprint

Fig. 1. Per transistor: power derating curves

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>$R_{th(j-a)}$</td>
<td>thermal resistance from junction to ambient</td>
<td>in free air</td>
<td>[1]</td>
<td>-</td>
<td>-</td>
<td>338 K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[2]</td>
<td>-</td>
<td>-</td>
<td>219 K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[3]</td>
<td>-</td>
<td>-</td>
<td>236 K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[4]</td>
<td>-</td>
<td>-</td>
<td>179 K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[5]</td>
<td>-</td>
<td>-</td>
<td>278 K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[6]</td>
<td>-</td>
<td>-</td>
<td>164 K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[7]</td>
<td>-</td>
<td>-</td>
<td>179 K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[8]</td>
<td>-</td>
<td>-</td>
<td>86 K/W</td>
</tr>
<tr>
<td>$R_{th(j-sp)}$</td>
<td>thermal resistance from junction to solder point</td>
<td>-</td>
<td>-</td>
<td>30 K/W</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Symbol | Parameter | Conditions | Min | Typ | Max | Unit
--- | --- | --- | --- | --- | --- | ---
| | \( R_{\text{th(j-a)}} \) | thermal resistance from junction to ambient | in free air | | | |
| | \( R_{\text{th(j-a)}} \) | thermal resistance from junction to ambient | | | | |

[2] Device mounted on an FR4 PCB, single-sided 35 µm copper strip line, tin-plated, mounting pad for collector 1 cm².
[3] Device mounted on 4-layer PCB 35 µm copper strip line, tin-plated and standard footprint.
[4] Device mounted on 4-layer PCB 35 µm copper strip line, tin-plated, mounting pad for collector 1 cm².
[5] Device mounted on an FR4 PCB, single-sided 70 µm copper strip line, tin-plated, mounting pad for collector 1 cm².
[6] Device mounted on an FR4 PCB, single-sided 70 µm copper strip line, tin-plated, mounting pad for collector 1 cm².
[7] Device mounted on 4-layer PCB 70 µm copper strip line, tin-plated and standard footprint.
[8] Device mounted on 4-layer PCB 70 µm copper strip line, tin-plated, mounting pad for collector 1 cm².

![Fig. 2. Per transistor: transient thermal impedance from junction to ambient as a function of pulse duration; typical values](image-url)
Fig. 3. Per transistor: transient thermal impedance from junction to ambient as a function of pulse duration; typical values

FR4 PCB 35 µm, mounting pad for collector 1 cm²

Fig. 4. Per transistor: transient thermal impedance from junction to ambient as a function of pulse duration; typical values

4-layer PCB 35 µm, standard footprint
4-layer PCB 35 µm, mounting pad for collector 1 cm²

**Fig. 5.** Per transistor: transient thermal impedance from junction to ambient as a function of pulse duration; typical values

FR4 PCB 70 µm, standard footprint

**Fig. 6.** Per transistor: transient thermal impedance from junction to ambient as a function of pulse duration; typical values
Fig. 7. Per transistor: transient thermal impedance from junction to ambient as a function of pulse duration; typical values

FR4 PCB 70 µm, mounting pad for collector 1 cm²

Fig. 8. Per transistor: transient thermal impedance from junction to ambient as a function of pulse duration; typical values

4-layer PCB 70 µm, standard footprint
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>ICBO</td>
<td>collector-base cut-off</td>
<td>V_{CB} = 24 V; I_E = 0 A; T_{amb} = 25 °C</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>nA</td>
</tr>
<tr>
<td></td>
<td>current</td>
<td>V_{CB} = 24 V; I_E = 0 A; T_{j} = 150 °C</td>
<td>-</td>
<td>-</td>
<td>50</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V_{EB} = 5 V; I_C = 0 A; T_{amb} = 25 °C</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>nA</td>
</tr>
<tr>
<td>I_{EBO}</td>
<td>emitter-base cut-off</td>
<td>V_{CE} = 2 V; I_C = 100 mA; pulsed; t_p ≤ 300 µs; δ ≤ 0.02 ; T_{amb} = 25 °C</td>
<td>240</td>
<td>370</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>current</td>
<td>V_{CE} = 2 V; I_C = 500 mA; pulsed; t_p ≤ 300 µs; δ ≤ 0.02 ; T_{amb} = 25 °C</td>
<td>210</td>
<td>320</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>V_{CE} = 2 V; I_C = 1 A; pulsed; t_p ≤ 300 µs; δ ≤ 0.02 ; T_{amb} = 25 °C</td>
<td>180</td>
<td>270</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>hFE</td>
<td>DC current gain</td>
<td>V_{CE} = 2 V; I_C = 500 mA; I_B = 50 mA; T_{amb} = 25 °C</td>
<td>-</td>
<td>75</td>
<td>100</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I_C = 1 A; I_B = 50 mA; pulsed; t_p ≤ 300 µs; δ ≤ 0.02 ; T_{amb} = 25 °C</td>
<td>-</td>
<td>155</td>
<td>200</td>
<td>mV</td>
</tr>
<tr>
<td>V_{CEsat}</td>
<td>collector-emitter</td>
<td>I_C = 1 A; I_B = 100 mA; pulsed; t_p ≤ 300 µs; δ ≤ 0.02 ; T_{amb} = 25 °C</td>
<td>-</td>
<td>150</td>
<td>190</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td>saturation voltage</td>
<td>I_C = 1 A; I_B = 0.1 A; pulsed; t_p ≤ 300 µs; δ ≤ 0.02 ; T_{amb} = 25 °C</td>
<td>-</td>
<td>-</td>
<td>190</td>
<td>mΩ</td>
</tr>
<tr>
<td>R_{CEsat}</td>
<td>collector-emitter</td>
<td>I_C = 1 A; I_B = 0.1 A; pulsed; t_p ≤ 300 µs; δ ≤ 0.02 ; T_{amb} = 25 °C</td>
<td>-</td>
<td>-</td>
<td>190</td>
<td>mΩ</td>
</tr>
</tbody>
</table>

4-layer PCB 70 µm, mounting pad for collector 1 cm²

Fig. 9. Per transistor: transient thermal impedance from junction to ambient as a function of pulse duration; typical values
<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>$V_{BE_{sat}}$</td>
<td>base-emitter saturation voltage</td>
<td>$I_C = 500 \text{ mA}; \ I_B = 50 \text{ mA}; \ T_{amb} = 25 \degree \text{C}$</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_C = 1 \text{ A}; \ I_B = 50 \text{ mA}; \ T_{amb} = 25 \degree \text{C}$</td>
<td>-</td>
<td>-</td>
<td>1.1</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_C = 1 \text{ A}; \ I_B = 100 \text{ mA}; \ T_{amb} = 25 \degree \text{C}$</td>
<td>-</td>
<td>-</td>
<td>1.1</td>
<td>V</td>
</tr>
<tr>
<td>$V_{BE_{on}}$</td>
<td>base-emitter turn-on voltage</td>
<td>$V_{CE} = 2 \text{ V}; \ I_C = 0.5 \text{ A}; \ T_{amb} = 25 \degree \text{C}$</td>
<td>-</td>
<td>-</td>
<td>0.9</td>
<td>V</td>
</tr>
<tr>
<td>$t_d$</td>
<td>delay time</td>
<td>$V_{CC} = 10 \text{ V}; \ I_C = 0.5 \text{ A}; \ T_{on} = 25 \text{ mA}$</td>
<td>-</td>
<td>15</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>$t_r$</td>
<td>rise time</td>
<td>$I_{B_{off}} = -25 \text{ mA}; \ T_{amb} = 25 \degree \text{C}$</td>
<td>-</td>
<td>30</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>$t_{on}$</td>
<td>turn-on time</td>
<td></td>
<td>-</td>
<td>45</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>$t_s$</td>
<td>storage time</td>
<td></td>
<td>-</td>
<td>310</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>$t_f$</td>
<td>fall time</td>
<td></td>
<td>-</td>
<td>55</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>$t_{off}$</td>
<td>turn-off time</td>
<td></td>
<td>-</td>
<td>365</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>$f_T$</td>
<td>transition frequency</td>
<td>$V_{CE} = 10 \text{ V}; \ I_C = 50 \text{ mA}; \ f = 100 \text{ MHz}$</td>
<td>90</td>
<td>165</td>
<td>-</td>
<td>MHz</td>
</tr>
<tr>
<td>$C_C$</td>
<td>collector capacitance</td>
<td>$V_{CB} = 10 \text{ V}; \ I_C = 0 \text{ A}; \ I_E = 0 \text{ A}; \ f = 1 \text{ MHz}; \ T_{amb} = 25 \degree \text{C}$</td>
<td>-</td>
<td>7.5</td>
<td>10</td>
<td>pF</td>
</tr>
</tbody>
</table>

**TR2 (PNP)**

<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>$V_{CB} = -24 \text{ V}; \ I_E = 0 \text{ A}$</td>
<td>-</td>
<td>-</td>
<td>-100</td>
<td>nA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{CB} = -24 \text{ V}; \ I_E = 0 \text{ A}; \ T_J = 150 \degree \text{C}$</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>$V_{EB} = -5 \text{ V}; \ I_C = 0 \text{ A}$</td>
<td>-</td>
<td>-</td>
<td>-100</td>
<td>nA</td>
</tr>
<tr>
<td>$h_{FE}$</td>
<td>DC current gain</td>
<td>$V_{CE} = -2 \text{ V}; \ I_C = -100 \text{ mA}; \ T_{amb} = 25 \degree \text{C}$</td>
<td>250</td>
<td>350</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{CE} = -2 \text{ V}; \ I_C = -500 \text{ mA}; \ T_{amb} = 25 \degree \text{C}$</td>
<td>170</td>
<td>250</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{CE} = -2 \text{ V}; \ I_C = -1 \text{ A}; \ T_{amb} = 25 \degree \text{C}$</td>
<td>120</td>
<td>175</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>$V_{CE_{sat}}$</td>
<td>collector-emitter saturation voltage</td>
<td>$I_C = -500 \text{ mA}; \ I_B = -50 \text{ mA}; \ T_{amb} = 25 \degree \text{C}$</td>
<td>-</td>
<td>-85</td>
<td>-140</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_C = -1 \text{ A}; \ I_B = -50 \text{ mA}; \ T_{amb} = 25 \degree \text{C}$</td>
<td>-</td>
<td>-175</td>
<td>-280</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_C = -1 \text{ A}; \ I_B = -100 \text{ mA}; \ T_{amb} = 25 \degree \text{C}$</td>
<td>-</td>
<td>-160</td>
<td>-250</td>
<td>mV</td>
</tr>
<tr>
<td>$R_{CE_{sat}}$</td>
<td>collector-emitter saturation resistance</td>
<td>$I_C = -1 \text{ A}; \ I_B = -0.1 \text{ A}; \ T_{amb} = 25 \degree \text{C}$</td>
<td>-</td>
<td>-</td>
<td>250</td>
<td>mΩ</td>
</tr>
<tr>
<td>$V_{BE_{sat}}$</td>
<td>base-emitter saturation voltage</td>
<td>$I_C = -500 \text{ mA}; \ I_B = -50 \text{ mA}; \ T_{amb} = 25 \degree \text{C}$</td>
<td>-</td>
<td>-</td>
<td>-1</td>
<td>V</td>
</tr>
</tbody>
</table>
## Symbol | Parameter | Conditions | Min | Typ | Max | Unit
--- | --- | --- | --- | --- | --- | ---
I<sub>C</sub> = -1 A; I<sub>B</sub> = -50 mA; pulsed; t<sub>p</sub> ≤ 300 µs; δ ≤ 0.02 ; T<sub>amb</sub> = 25 °C | - | - | -1 | V
I<sub>C</sub> = -1 A; I<sub>B</sub> = -100 mA; pulsed; t<sub>p</sub> ≤ 300 µs; δ ≤ 0.02 ; T<sub>amb</sub> = 25 °C | - | - | -1.1 | V
V<sub>BEon</sub> base-emitter turn-on voltage | V<sub>CE</sub> = -2 V; I<sub>C</sub> = -0.5 A; pulsed; t<sub>p</sub> ≤ 300 µs; δ ≤ 0.02 ; T<sub>amb</sub> = 25 °C | - | - | -0.9 | V
V<sub>CC</sub> = -10 V; I<sub>C</sub> = -0.5 A; I<sub>Bon</sub> = -25 mA; I<sub>Boff</sub> = 25 mA; T<sub>amb</sub> = 25 °C | - | 15 | - | ns
f<sub>T</sub> transition frequency | V<sub>CE</sub> = -10 V; I<sub>C</sub> = -50 mA; f = 100 MHz; T<sub>amb</sub> = 25 °C | 65 | 125 | - | MHz
C<sub>C</sub> collector capacitance | V<sub>CB</sub> = -10 V; I<sub>E</sub> = 0 A; I<sub>B</sub> = 0 A; f = 1 MHz; T<sub>amb</sub> = 25 °C | - | 13 | 17 | pF

### Fig. 10. TR1 (NPN): DC current gain as a function of collector current; typical values

### Fig. 11. TR1 (NPN): Collector current as a function of collector-emitter voltage; typical values
**Fig. 12.** TR1 (NPN): Base-emitter voltage as a function of collector current; typical values

\[ V_{CE} = 2 \text{ V} \]

(1) \( T_{amb} = -55 \degree C \)

(2) \( T_{amb} = 25 \degree C \)

(3) \( T_{amb} = 100 \degree C \)

**Fig. 13.** TR1 (NPN): Base-emitter saturation voltage as a function of collector current; typical values

\[ I_{C}/I_B = 20 \]

(1) \( T_{amb} = -55 \degree C \)

(2) \( T_{amb} = 25 \degree C \)

(3) \( T_{amb} = 100 \degree C \)

**Fig. 14.** TR1 (NPN): Collector-emitter saturation voltage as a function of collector current; typical values

\[ I_{C}/I_B = 20 \]

(1) \( T_{amb} = 100 \degree C \)

(2) \( T_{amb} = 25 \degree C \)

(3) \( T_{amb} = -55 \degree C \)

**Fig. 15.** TR1 (NPN): Collector-emitter saturation voltage as a function of collector current; typical values

\[ T_{amb} = 25 \degree C \]

(1) \( I_{C}/I_B = 100 \)

(2) \( I_{C}/I_B = 50 \)

(3) \( I_{C}/I_B = 10 \)
Fig. 16. TR1 (NPN): Collector-emitter saturation resistance as a function of collector current; typical values

\[ I_C/I_B = 20 \]
(1) \( T_{amb} = 100 \, ^\circ C \)
(2) \( T_{amb} = 25 \, ^\circ C \)
(3) \( T_{amb} = -55 \, ^\circ C \)

Fig. 17. TR1 (NPN): Collector-emitter saturation resistance as a function of collector current; typical values

\[ T_{amb} = 25 \, ^\circ C \]
(1) \( I_C/I_B = 100 \)
(2) \( I_C/I_B = 50 \)
(3) \( I_C/I_B = 10 \)

Fig. 18. TR2 (PNP): DC current gain as a function of collector current; typical values

\[ V_{CE} = -2 \, V \]
(1) \( T_{amb} = 100 \, ^\circ C \)
(2) \( T_{amb} = 25 \, ^\circ C \)
(3) \( T_{amb} = -55 \, ^\circ C \)

Fig. 19. TR2 (PNP): Collector current as a function of collector-emitter voltage; typical values

\[ I_B = -20 \, mA \]
\[ T_{amb} = 25 \, ^\circ C \]
Fig. 20. TR2 (PNP): Base-emitter voltage as a function of collector current; typical values

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

Fig. 21. TR2 (PNP): 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} = 100 °C

Fig. 22. TR2 (PNP): Collector-emitter saturation voltage as a function of collector current; typical values

I_{C}/I_{B} = 20
(1) T_{amb} = 100 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = −55 °C

Fig. 23. TR2 (PNP): Collector-emitter saturation voltage as a function of collector current; typical values

T_{amb} = 25 °C
(1) I_{C}/I_{B} = 100
(2) I_{C}/I_{B} = 50
(3) I_{C}/I_{B} = 10
PBSS4130PANP
30 V, 1 A NPN/PNP low VCEsat (BISS) transistor

Fig. 24. TR2 (PNP): Collector-emitter saturation resistance as a function of collector current; typical values

Fig. 25. TR2 (PNP): Collector-emitter saturation resistance as a function of collector current; typical values

$I_C/I_B = 20$
(1) $T_{amb} = 100 \, ^\circ C$
(2) $T_{amb} = 25 \, ^\circ C$
(3) $T_{amb} = -55 \, ^\circ C$

$T_{amb} = 25 \, ^\circ C$
(1) $I_C/I_B = 100$
(2) $I_C/I_B = 50$
(3) $I_C/I_B = 10$
11. Test information

Fig. 26. TR1 (NPN): BISS transistor switching time definition

Fig. 27. TR1 (NPN): Test circuit for switching times
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. 30. Package outline DFN2020-6 (SOT1118)

13. Soldering

Fig. 31. Reflow soldering footprint for DFN2020-6 (SOT1118)

14. Revision history

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15. Legal information

15.1 Data sheet status

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[2] The term "short data sheet" is explained in section "Definitions".

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