# TIP32 Series (TIP32/32A/32B/32C)

## Medium Power Linear Switching Applications
- Complement to TIP31/31A/31B/31C

## PNP Epitaxial Silicon Transistor

### Absolute Maximum Ratings \( T_C=25^\circ C \) unless otherwise noted

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Value</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_{CBO} )</td>
<td>Collector-Base Voltage</td>
<td>( -40 )</td>
<td>V</td>
</tr>
<tr>
<td>( v_{CBO} )</td>
<td>Collector-Base Voltage</td>
<td>( -60 )</td>
<td>V</td>
</tr>
<tr>
<td>( v_{CBO} )</td>
<td>Collector-Base Voltage</td>
<td>( -80 )</td>
<td>V</td>
</tr>
<tr>
<td>( v_{CBO} )</td>
<td>Collector-Base Voltage</td>
<td>( -100 )</td>
<td>V</td>
</tr>
<tr>
<td>( V_{CEO} )</td>
<td>Collector-Emitter Voltage</td>
<td>( -40 )</td>
<td>V</td>
</tr>
<tr>
<td>( v_{CEO} )</td>
<td>Collector-Emitter Voltage</td>
<td>( -60 )</td>
<td>V</td>
</tr>
<tr>
<td>( v_{CEO} )</td>
<td>Collector-Emitter Voltage</td>
<td>( -80 )</td>
<td>V</td>
</tr>
<tr>
<td>( v_{CEO} )</td>
<td>Collector-Emitter Voltage</td>
<td>( -100 )</td>
<td>V</td>
</tr>
<tr>
<td>( V_{EBO} )</td>
<td>Emitter-Base Voltage</td>
<td>( -5 )</td>
<td>V</td>
</tr>
<tr>
<td>( I_C )</td>
<td>Collector Current (DC)</td>
<td>( -3 )</td>
<td>A</td>
</tr>
<tr>
<td>( I_CP )</td>
<td>Collector Current (Pulse)</td>
<td>( -5 )</td>
<td>A</td>
</tr>
<tr>
<td>( I_B )</td>
<td>Base Current</td>
<td>( -3 )</td>
<td>A</td>
</tr>
<tr>
<td>( P_C )</td>
<td>Collector Dissipation ( (T_C=25^\circ C) )</td>
<td>( 40 )</td>
<td>W</td>
</tr>
<tr>
<td>( P_C )</td>
<td>Collector Dissipation ( (T_a=25^\circ C) )</td>
<td>( 2 )</td>
<td>W</td>
</tr>
<tr>
<td>( T_J )</td>
<td>Junction Temperature</td>
<td>( 150 )</td>
<td>°C</td>
</tr>
<tr>
<td>( T_{STG} )</td>
<td>Storage Temperature</td>
<td>( -65 ~ 150 )</td>
<td>°C</td>
</tr>
</tbody>
</table>

### Electrical Characteristics \( T_C=25^\circ C \) unless otherwise noted

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Test Condition</th>
<th>Min.</th>
<th>Max.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_{CE(sus)} )</td>
<td>* Collector-Emitter Sustaining Voltage</td>
<td>( I_C = -30mA, I_B = 0 )</td>
<td>( -40 )</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>( V_{CE(sus)} )</td>
<td>* Collector-Emitter Sustaining Voltage</td>
<td>( I_C = -60mA, I_B = 0 )</td>
<td>( -60 )</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>( V_{CE(sus)} )</td>
<td>* Collector-Emitter Sustaining Voltage</td>
<td>( I_C = -80mA, I_B = 0 )</td>
<td>( -80 )</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>( V_{CE(sus)} )</td>
<td>* Collector-Emitter Sustaining Voltage</td>
<td>( I_C = -100mA, I_B = 0 )</td>
<td>( -100 )</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>( I_{CEO} )</td>
<td>Collector Cut-off Current</td>
<td>( V_{CE} = -30V, I_B = 0 )</td>
<td>( -0.3 )</td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td>( I_{CEO} )</td>
<td>Collector Cut-off Current</td>
<td>( V_{CE} = -60V, I_B = 0 )</td>
<td>( -0.3 )</td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td>( I_{CES} )</td>
<td>Collector Cut-off Current</td>
<td>( V_{CE} = -40V, V_{EB} = 0 )</td>
<td>( -200 )</td>
<td>µA</td>
<td></td>
</tr>
<tr>
<td>( I_{CES} )</td>
<td>Collector Cut-off Current</td>
<td>( V_{CE} = -60V, V_{EB} = 0 )</td>
<td>( -200 )</td>
<td>µA</td>
<td></td>
</tr>
<tr>
<td>( I_{CES} )</td>
<td>Collector Cut-off Current</td>
<td>( V_{CE} = -80V, V_{EB} = 0 )</td>
<td>( -200 )</td>
<td>µA</td>
<td></td>
</tr>
<tr>
<td>( I_{CES} )</td>
<td>Collector Cut-off Current</td>
<td>( V_{CE} = -100V, V_{CE} = 0 )</td>
<td>( -200 )</td>
<td>µA</td>
<td></td>
</tr>
<tr>
<td>( I_{EBO} )</td>
<td>Emitter Cut-off Current</td>
<td>( V_{EB} = -5V, I_C = 0 )</td>
<td>-1</td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td>( h_{FE} )</td>
<td>* DC Current Gain</td>
<td>( V_{CE} = -4V, I_C = -1A )</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( h_{FE} )</td>
<td>* DC Current Gain</td>
<td>( V_{CE} = -4V, I_C = -3A )</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( V_{CE(sat)} )</td>
<td>* Collector-Emitter Saturation Voltage</td>
<td>( I_C = -3A, I_B = -375mA )</td>
<td>1.2</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>( V_{BE(sat)} )</td>
<td>* Base-Emitter Saturation Voltage</td>
<td>( V_{CE} = -4V, I_C = -3A )</td>
<td>1.8</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>( f_T )</td>
<td>Current Gain Bandwidth Product</td>
<td>( V_{CE} = -10V, I_C = -500mA )</td>
<td>3.0</td>
<td>MHz</td>
<td></td>
</tr>
</tbody>
</table>

* Pulse Test: \( PW=300\mu s, \text{Duty Cycle}=2\% \)
Typical Characteristics

Figure 1. DC current Gain

Figure 2. Base-Emitter Saturation Voltage

Figure 3. Safe Operating Area

Figure 4. Power Derating
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