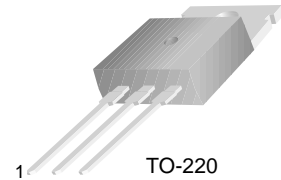


TIP120/121/122

Medium Power Linear Switching Applications

- Complementary to TIP125/126/127



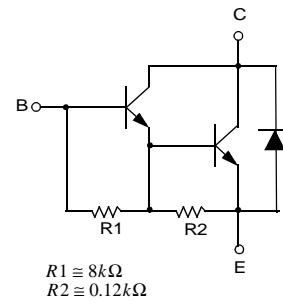
TO-220
1.Base 2.Collector 3.Emmitter

NPN Epitaxial Darlington Transistor

Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Value | Units |
|-----------|--|------------|------------------|
| V_{CBO} | Collector-Base Voltage : TIP120 | 60 | V |
| | : TIP121 | 80 | V |
| | : TIP122 | 100 | V |
| V_{CEO} | Collector-Emitter Voltage : TIP120 | 60 | V |
| | : TIP121 | 80 | V |
| | : TIP122 | 100 | V |
| V_{EBO} | Emitter-Base Voltage | 5 | V |
| I_C | Collector Current (DC) | 5 | A |
| I_{CP} | Collector Current (Pulse) | 8 | A |
| I_B | Base Current (DC) | 120 | mA |
| P_C | Collector Dissipation ($T_a=25^\circ\text{C}$) | 2 | W |
| P_C | Collector Dissipation ($T_C=25^\circ\text{C}$) | 65 | W |
| T_J | Junction Temperature | 150 | $^\circ\text{C}$ |
| T_{STG} | Storage Temperature | - 65 ~ 150 | $^\circ\text{C}$ |

Equivalent Circuit



Electrical Characteristics $T_C=25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Test Condition | Min. | Max. | Units |
|----------------|--|---|------|------|-------|
| $V_{CEO(sus)}$ | Collector-Emitter Sustaining Voltage | $I_C = 100\text{mA}, I_B = 0$ | 60 | | V |
| | : TIP120 | | | | |
| | : TIP121 | | | | |
| I_{CEO} | Collector Cut-off Current | $V_{CE} = 30\text{V}, I_B = 0$ $V_{CE} = 40\text{V}, I_B = 0$ $V_{CE} = 50\text{V}, I_B = 0$ | | 0.5 | mA |
| | : TIP120 | | | | |
| | : TIP121 | | | | |
| I_{CBO} | Collector Cut-off Current | $V_{CB} = 60\text{V}, I_E = 0$ $V_{CB} = 80\text{V}, I_E = 0$ $V_{CB} = 100\text{V}, I_E = 0$ | | 0.2 | mA |
| | : TIP120 | | | | |
| | : TIP121 | | | | |
| I_{EBO} | Emitter Cut-off Current | $V_{BE} = 5\text{V}, I_C = 0$ | | 2 | mA |
| h_{FE} | * DC Current Gain | $V_{CE} = 3\text{V}, I_C = 0.5\text{A}$ $V_{CE} = 3\text{V}, I_C = 3\text{A}$ | 1000 | | |
| $V_{CE(sat)}$ | * Collector-Emitter Saturation Voltage | $I_C = 3\text{A}, I_B = 12\text{mA}$ | | 2.0 | V |
| | | $I_C = 5\text{A}, I_B = 20\text{mA}$ | | 4.0 | V |
| $V_{BE(on)}$ | * Base-Emitter ON Voltage | $V_{CE} = 3\text{V}, I_C = 3\text{A}$ | | 2.5 | V |
| C_{ob} | Output Capacitance | $V_{CB} = 10\text{V}, I_E = 0, f = 0.1\text{MHz}$ | | 200 | pF |

* Pulse Test : $PW \leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

Typical characteristics

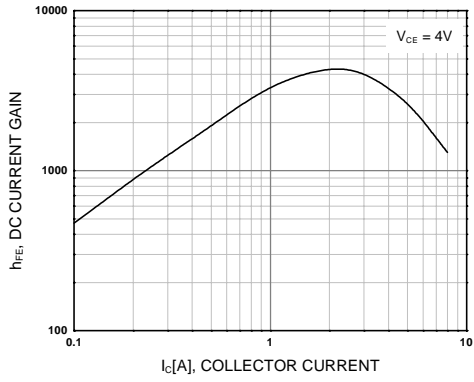


Figure 1. DC current Gain

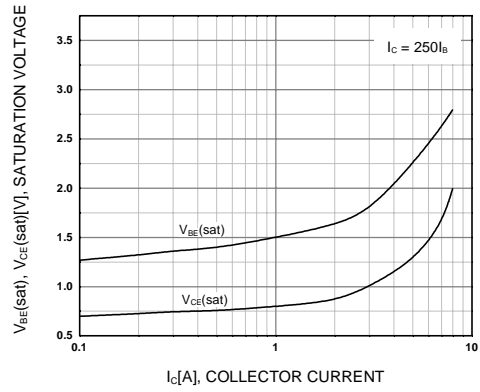


Figure 2. Base-Emitter Saturation Voltage
Collector-Emitter Saturation Voltage

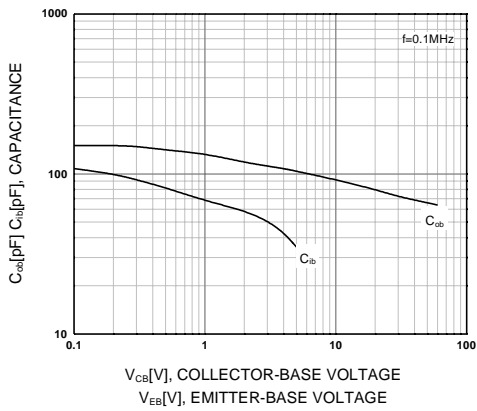


Figure 3. Output and Input Capacitance
vs. Reverse Voltage

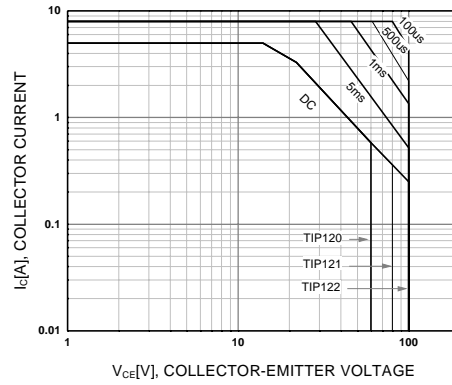


Figure 4. Safe Operating Area

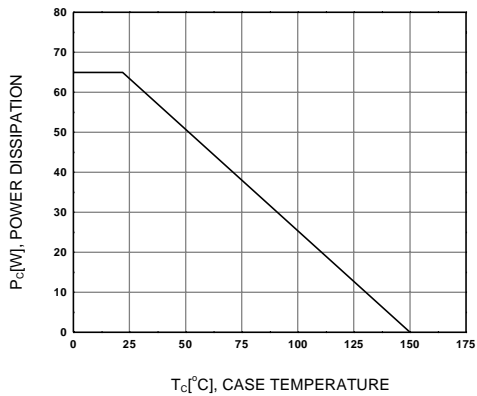


Figure 5. Power Derating

Package Dimensions

TO-220

TIP120/121/122



Dimensions in Millimeters

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