

Features

- Collector-Emitter Sustaining Voltage - $V_{CE(sus)} = 30V$ (Minimum)
- Collector-Emitter Saturation Voltage $V_{CE(sat)} = 2V$ (Maximum) at $I_C = 5A$
- Reverse-Base SOA - 300V to 400V at 7A

NPN

TIP150

7 Amperes

Darlington

Power Transistor

300V to 400V

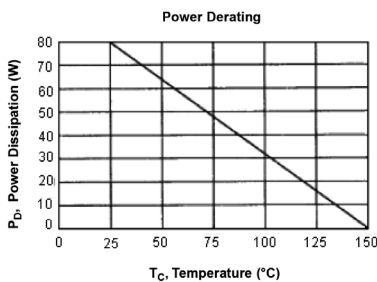
80W

Maximum Ratings

| Characteristic | Symbol | Ratings | Unit |
|--|----------------|-------------|----------------|
| Collector - Emitter Voltage | V_{CEO} | 300 | V |
| Collector - Base Voltage | V_{CBO} | | |
| Emitter - Base Voltage | V_{EBO} | | |
| Collector Current - Continuous | I_C | 7 | A |
| - Peak | I_{CM} | 10 | |
| Base Current | I_B | 1.5 | |
| Total Power Dissipation at $T_C = 25^\circ C$ | P_D | 80 | W |
| Derate above $25^\circ C$ | | 0.64 | W / $^\circ C$ |
| Operating and Storage Junction Temperature Range | T_J, T_{STG} | -65 to +150 | $^\circ C$ |

Thermal Characteristics

| Characteristic | Symbol | Maximum | Unit |
|-------------------------------------|-----------------|---------|----------------|
| Thermal Resistance Junction to case | $R_{\theta JC}$ | 1.56 | $^\circ C / W$ |

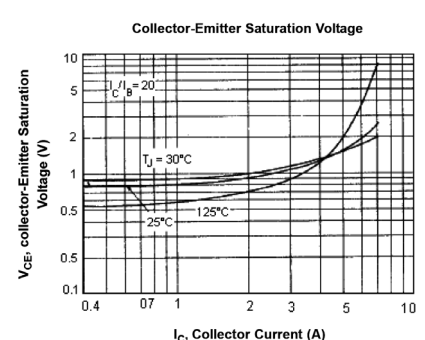
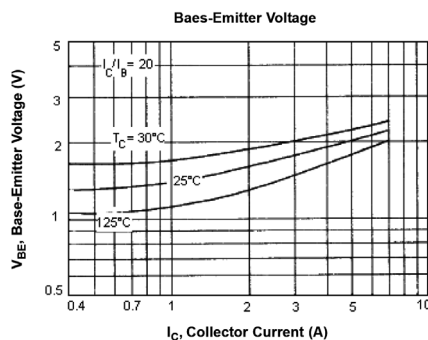
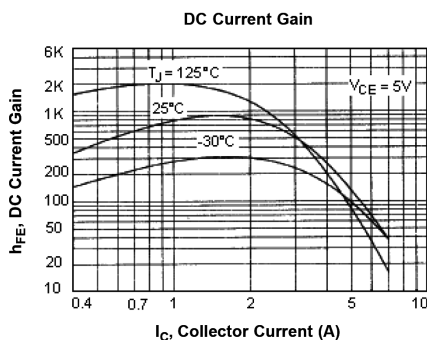


Electrical Characteristics ($T_C = 25^\circ C$ unless otherwise specified)

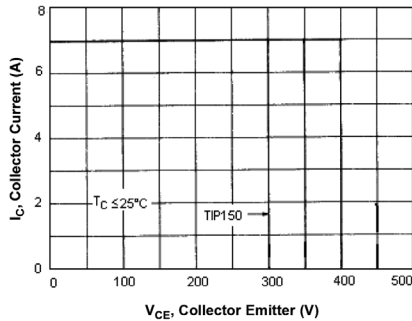
| Characteristic | Symbol | Minimum | Maximum | Unit |
|--|---------------|---------|---------|---------|
| OFF Characteristics | | | | |
| Collector - Emitter Breakdown Voltage (1) ($I_C = 10mA, I_B = 0$) | $V_{(BR)CEO}$ | 300 | - | V |
| Collector - Base Breakdown Voltage (1) ($I_C = 1mA, I_B = 0$) | $V_{(BR)CBO}$ | | | |
| Collector Cutoff Current ($V_{CE} = 300V, I_B = 0$) | I_{CEO} | - | 250 | μA |

| Characteristic | Symbol | Minimum | Maximum | Unit |
|--|--|-----------------|-----------------|------|
| Emitter Cut off Current ($V_{EB} = 5V, I_C = 0$) | I_{EBO} | - | 15 | mA |
| ON Characteristics (1) | | | | |
| DC Current Gain ($I_C = 2.5A, V_{CE} = 5V$) ($I_C = 5A, V_{CE} = 5V$) ($I_C = 7A, V_{CE} = 5V$) | h_{FE} | 150 50 15 | - | - |
| Collector-Emitter Saturation Voltage ($I_C = 1A, I_B = 10mA$) ($I_C = 2A, I_B = 100mA$) ($I_C = 5A, I_B = 250mA$) | $V_{CE(sat)}$ | - | 1.5 1.5 2 | V |
| Base-Emitter Saturation Voltage ($I_C = 2A, I_B = 100mA$) ($I_C = 5A, I_B = 250mA$) | $V_{BE(sat)}$ | - | 2.2 2.3 | |
| Diode Forward Voltage ($I_F = 7A$) | V_F | - | 3.5 | |
| Dynamic Characteristics | | | | |
| Small-Signal Current Gain ($I_C = 0.5A, V_{CE} = 5V, f = 1kHz$) | H_{fe} | 200 | - | - |
| Output Capacitance ($V_{CB} = 10V, I_E = 0, f = 1MHz$) | C_{ob} | - | 150 | pF |
| Switching Characteristics | | | | |
| Delay Time | $V_{CC} = 33V, I_C = 6.5A$ | t_d | 30 (Typical) | μs |
| Rise Time | $I_{B1} = -I_{B2} = 250mA$ $t_p = 20\mu s$, Duty cycle $\leq 2\%$ | t_r | 180 (Typical) | |
| Storage Time | | t_s | 3.5 (Typical) | |
| Fall Time | | t_f | 1.6 (Typical) | |

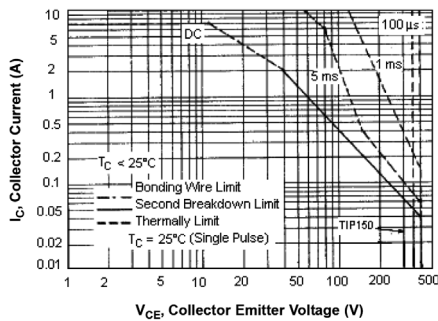
1. Pulse Test : Pulse width = 30μs, Duty cycle = 2%



Reverse Biase Safe Operating Area

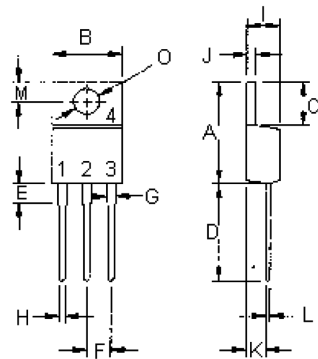


Active Region Sage Operating Area



There are two limitations on the power handling ability of a transistor average junction temperature and second breakdown safe operating area curves indicate I_C - V_{CE} : limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation than the curves indicate. The data of figure - 6 curve is based on $T_{J(PK)} = 150^\circ\text{C}$; T_C is variable depending on power level. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(PK)} < 150^\circ\text{C}$. At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown

Diagram



| Dimensions | Minimum | Maximum |
|------------|---------|---------|
| A | 14.68 | 15.31 |
| B | 9.78 | 10.42 |
| C | 5.01 | 8.52 |
| D | 13.06 | 14.62 |
| E | 3.57 | 4.07 |
| F | 2.42 | 3.66 |
| G | 1.12 | 1.36 |

| Dimensions | Minimum | Maximum |
|------------|---------|---------|
| H | 0.72 | 0.96 |
| I | 4.22 | 4.98 |
| J | 1.14 | 1.38 |
| K | 2.2 | 2.97 |
| L | 0.33 | 0.55 |
| M | 2.48 | 2.98 |
| O | 3.7 | 3.9 |

Dimensions : Millimetres

- Pin 1. Base
- 2. Collector
- 3. Emitter
- 4. Collector (Case)

Part Number Table

| Description | Part Number |
|-------------------------------|-------------|
| Darlington Transistor, TO-220 | TIP150 |

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