

# TIP145T/146T/147T

**SemiHow**  
Know-How for Semiconductor

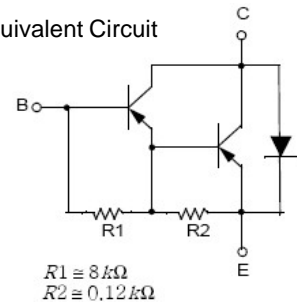
# TIP145T/146T/147T

## Monolithic Construction With Built In Base-Emitter Shunt Resistors

- High DC Current Gain :  $h_{FE}=1000$  @  $V_{CE}=-4V$ ,  $I_C=-3A$  (Min.)
- Collector-Emitter Sustaining Voltage
- Low Collector-Emitter Saturation Voltage
- Industrial Use
- Complementary to TIP140/141/142

## PNP Epitaxial Silicon Darlington Transistor

Equivalent Circuit



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

| CHARACTERISTICS   | SYMBOL    | RATING             | UNIT             |
|---|-----------|--------------------|------------------|
| Collector-Base Voltage : TIP145T<br>: TIP146T<br>: TIP147T    | $V_{CBO}$ | -60<br>-80<br>-100 | V<br>V<br>V      |
| Collector-Emitter Voltage : TIP145T<br>: TIP146T<br>: TIP147T | $V_{CEO}$ | -60<br>-80<br>-100 | V<br>V<br>V      |
| Emitter-Base Voltage  | $V_{EBO}$ | -5                 | V                |
| Collector Current(DC)   | $I_C$     | -10                | A                |
| Collector Current(Pulse)                                      | $I_{CP}$  | -15                | A                |
| Base Current  | $I_B$     | -0.5               | A                |
| Collector Dissipation( $T_a=25^\circ\text{C}$ )               | $P_C$     | 2                  | W                |
| Collector Dissipation( $T_c=25^\circ\text{C}$ )               | $P_C$     | 80                 | W                |
| Junction Temperature  | $T_J$     | 150                | $^\circ\text{C}$ |
| Storage Temperature   | $T_{STG}$ | -65~150            | $^\circ\text{C}$ |

TO-220

1. Base
2. Collector
3. Emitter



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

| CHARACTERISTICS  | SYMBOL         | Test Condition  | Min                | Max            | Unit           |
|--|----------------|---|--------------------|----------------|----------------|
| Collector-Emitter Sustaining Voltage : TIP145T<br>: TIP146T<br>: TIP147T | $V_{CEO(SUS)}$ | $I_C=-30\text{mA}$ , $I_B=0$  | -60<br>-80<br>-100 |                | V<br>V<br>V    |
| Collector Cut-off Current : TIP145T<br>: TIP146T<br>: TIP147T            | $I_{CEO}$      | $V_{CE}=-30\text{V}$ , $I_B=0$<br>$V_{CE}=-40\text{V}$ , $I_B=0$<br>$V_{CE}=-50\text{V}$ , $I_B=0$  |                    | -2<br>-2<br>-2 | mA<br>mA<br>mA |
| Collector Cut-off Current : TIP145T<br>: TIP146T<br>: TIP147T            | $I_{CBO}$      | $V_{CE}=-60\text{V}$ , $I_E=0$<br>$V_{CE}=-80\text{V}$ , $I_E=0$<br>$V_{CE}=-100\text{V}$ , $I_E=0$ |                    | -1<br>-1<br>-1 | mA<br>mA<br>mA |
| Emitter Cut-off Current  | $I_{EBO}$      | $V_{EB}=-5\text{V}$ , $I_C=0$   |                    | -2             | mA             |
| DC Current Gain  | $h_{FE}$       | $V_{CE}=-4\text{V}$ , $I_C=-5\text{A}$<br>$V_{CE}=-4\text{V}$ , $I_C=-10\text{A}$                   | 1000<br>500        |                |                |
| Collector-Emitter Saturation Voltage                                     | $V_{CE(sat)}$  | $I_C=-5\text{A}$ , $I_B=-10\text{mA}$<br>$I_C=-10\text{A}$ , $I_B=-40\text{mA}$                     |                    | -2<br>-3       | V<br>V         |
| Base-Emitter ON Voltage  | $V_{BE(on)}$   | $V_{CE}=-4\text{V}$ , $I_C=-10\text{A}$   |                    | -3             | V              |
| Output Capacitance   | $C_{ob}$       | $V_{CB}=10\text{V}$ , $I_E=0$ , $f=0.1\text{MHz}$   |                    | 200            | pF             |

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

# Typical Characteristics

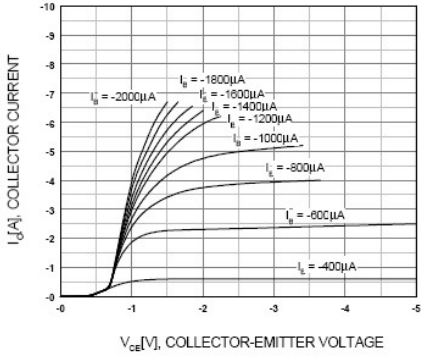


Figure 1. Static Characteristic

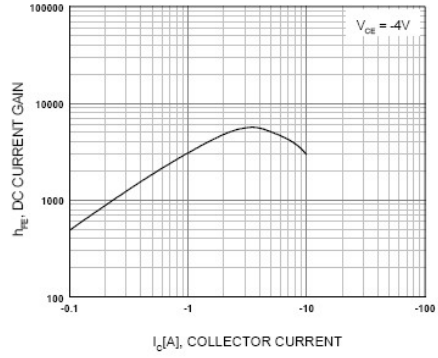


Figure 2. DC current Gain

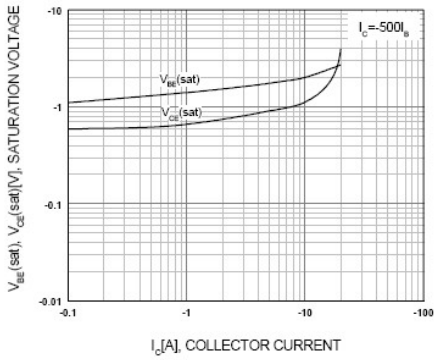


Figure 3. Collector-Emitter Saturation Voltage  
Base-Emitter Saturation Voltage

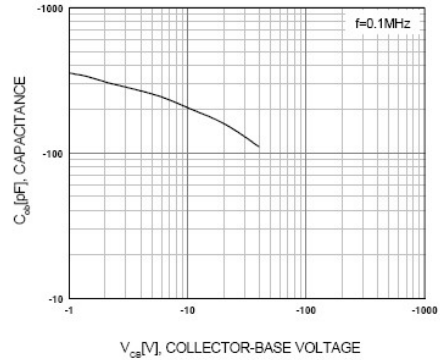


Figure 4. Collector Output Capacitance

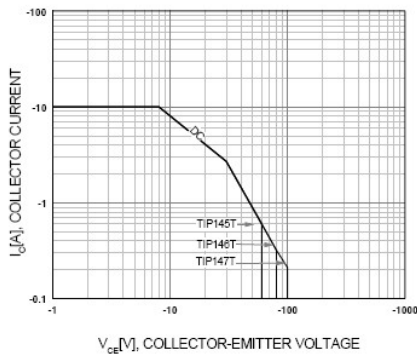


Figure 5. Safe Operating Area

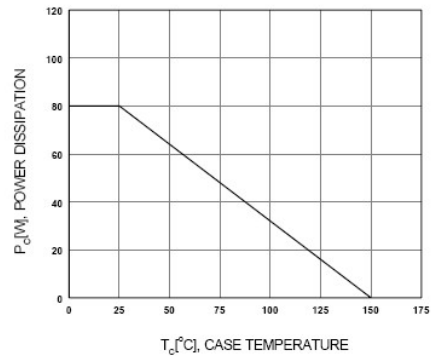
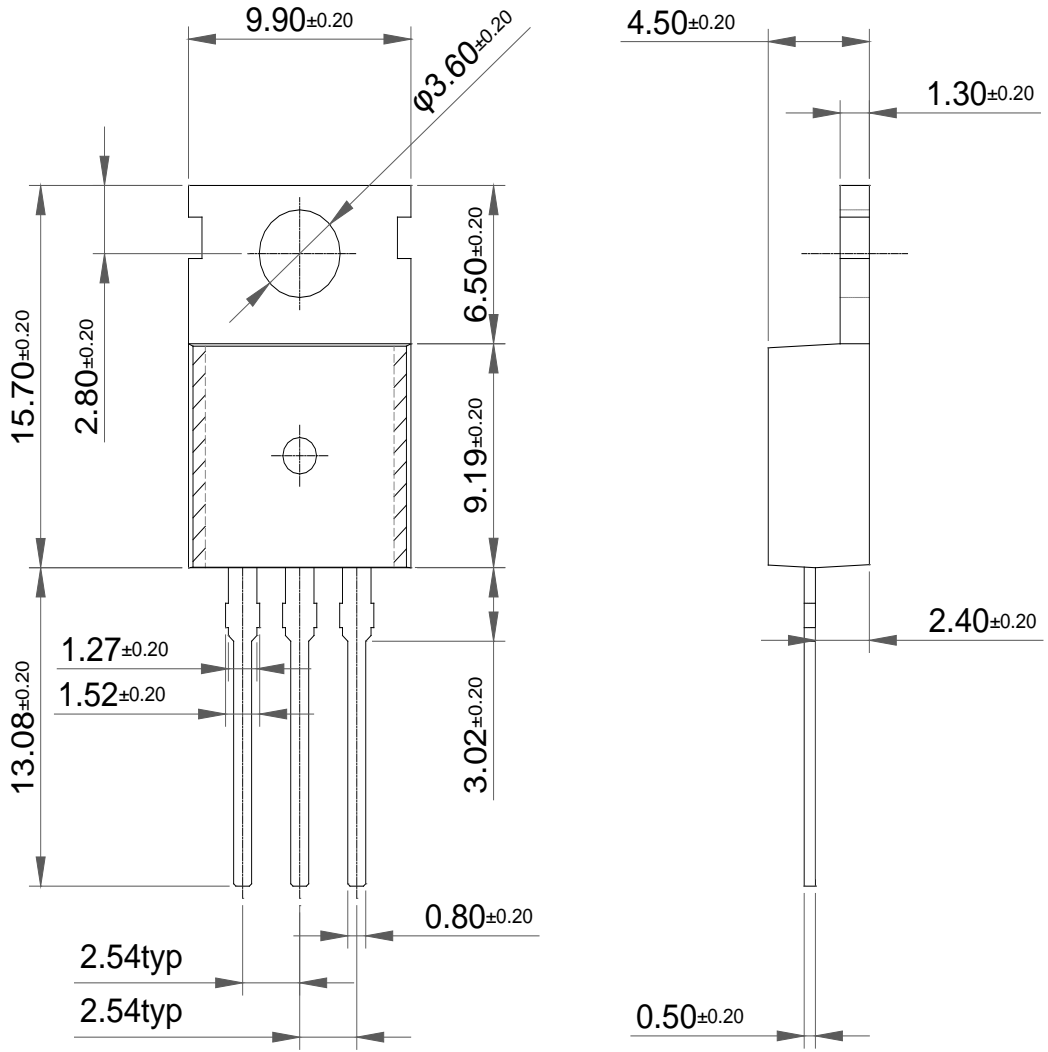


Figure 6. Power Derating

Package Dimension

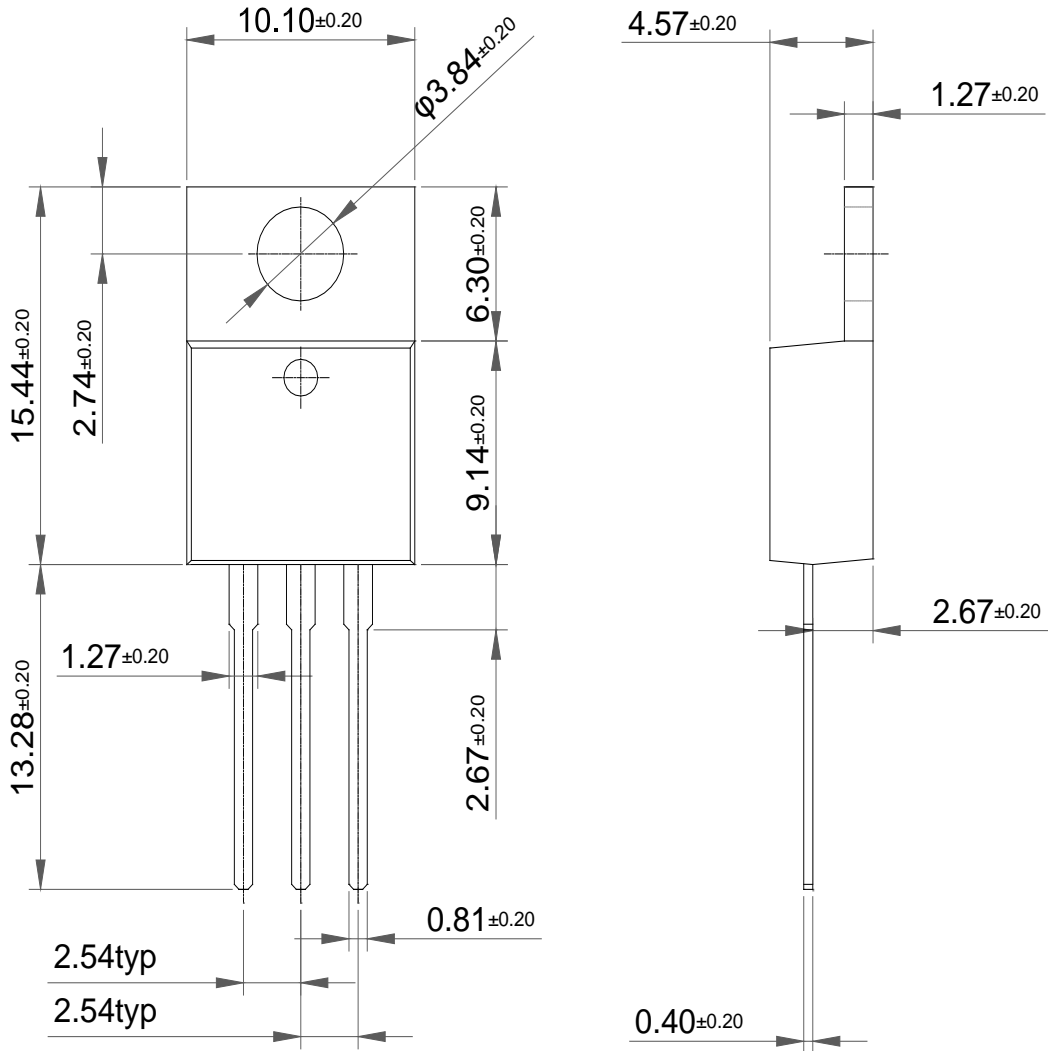
# TO-220 (A)



Dimensions in Millimeters

Package Dimension

TO-220 (B)



Dimensions in Millimeters