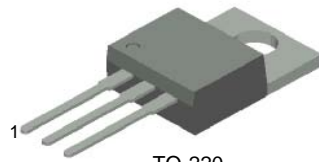


TIP145T/146T/147T

PNP Epitaxial Silicon Darlington Transistor

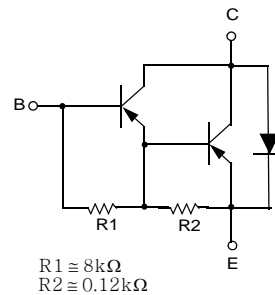
Monolithic Construction With Built In Base-Emitter Shunt Resistors

- High DC Current Gain : $h_{FE} = 1000 @ V_{CE} = -4V, I_C = -5A$ (Min.)
- Industrial Use
- Complement to TIP140T/141T/142T



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

Equivalent Circuit



Absolute Maximum Ratings * $T_C=25^\circ C$ unless otherwise noted

| Symbol | Parameter | Value | Units |
|------------|--|------------|------------|
| BV_{CBO} | Collector-Base Voltage : TIP145T | - 60 | V |
| | : TIP146T | - 80 | V |
| | : TIP147T | - 100 | V |
| BV_{CEO} | Collector-Emitter Voltage : TIP145T | - 60 | V |
| | : TIP146T | - 80 | V |
| | : TIP147T | - 100 | V |
| BV_{EBO} | Emitter-Base Voltage | - 5 | V |
| I_C | Collector Current (DC) | - 10 | A |
| I_{CP} | Collector Current (Pulse) | - 15 | A |
| I_B | Base Current (DC) | - 0.5 | A |
| P_C | Collector Dissipation ($T_C=25^\circ C$) | 80 | W |
| T_J | Junction Temperature | 150 | $^\circ C$ |
| T_{STG} | Storage Junction Temperature Range | - 65 ~ 150 | $^\circ C$ |

* These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

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

| Symbol | Parameter | Conditions | Min. | Typ. | Max | Units |
|----------------|---|--|-----------------------|------|-------------------|----------------|
| $V_{CE0(sus)}$ | Collector-Emitter Sustaining Voltage : TIP145T : TIP146T : TIP147T | $I_C = -30\text{mA}, I_B = 0$ | - 60 - 80 - 100 | | | V V V |
| I_{CEO} | Collector Cut-off Current : TIP145T : TIP146T : TIP147T | $V_{CE} = -30\text{V}, I_B = 0$ $V_{CE} = -40\text{V}, I_B = 0$ $V_{CE} = -50\text{V}, I_B = 0$ | | | - 2 - 2 - 2 | mA mA mA |
| I_{CBO} | Collector Cut-off Current : TIP145T : TIP146T : TIP147T | $V_{CB} = -60\text{V}, I_E = 0$ $V_{CB} = -80\text{V}, I_E = 0$ $V_{CB} = -100\text{V}, I_E = 0$ | | | - 1 - 1 - 1 | mA mA mA |
| I_{EBO} | Emitter Cut-off Current | $V_{BE} = -5\text{V}, I_C = 0$ | | | - 2 | mA |
| h_{FE} | DC Current Gain | $V_{CE} = -4\text{V}, I_C = -5\text{A}$ $V_{CE} = -4\text{V}, I_C = -10\text{A}$ | 1000 500 | | | |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C = -5\text{A}, I_B = -10\text{mA}$ $I_C = -10\text{A}, I_B = -40\text{mA}$ | | | - 2 - 3 | V V |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage | $I_C = -10\text{A}, I_B = -40\text{mA}$ | | | - 3.5 | V |
| $V_{BE(on)}$ | Base-Emitter On Voltage | $V_{CE} = -4\text{V}, I_C = -10\text{A}$ | | | - 3 | V |
| t_d | Delay Time | $V_{CC} = -30\text{V}, I_C = -5\text{A}$ $I_{B1} = -20\text{mA}, I_{B2} = 20\text{mA}$ $R_L = 6\Omega$ | | 0.15 | | μs |
| t_r | Rise Time | | | 0.55 | | μs |
| t_{stg} | Storage Time | | | 2.5 | | μs |
| t_f | Fall Time | | | 2.5 | | μs |

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

Typical Characteristics

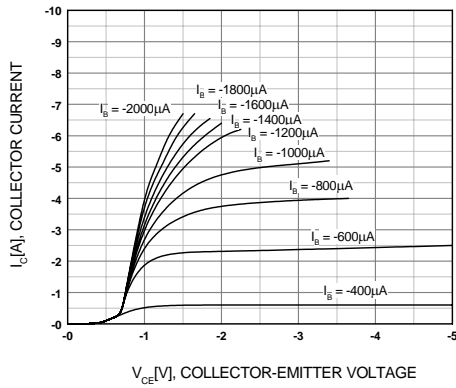


Figure 1. Static Characteristic

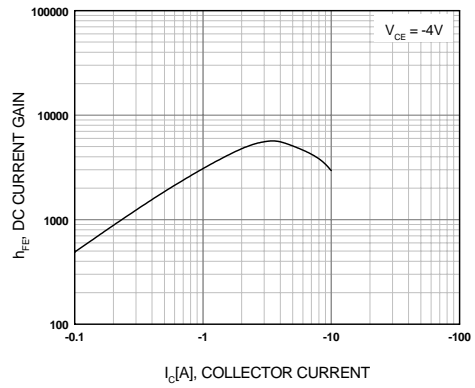


Figure 2. DC current Gain

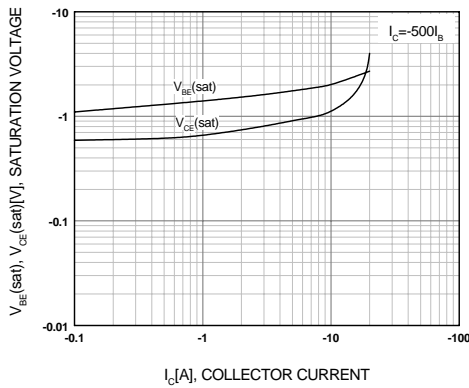


Figure 3. Collector-Emitter Saturation Voltage
Base-Emitter Saturation Voltage

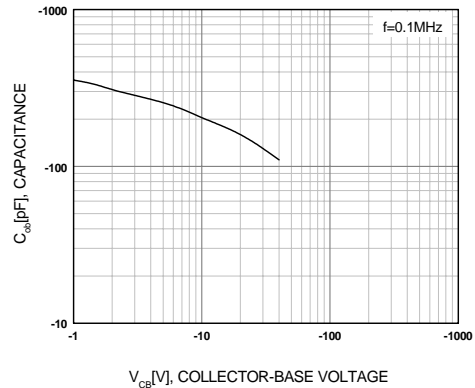


Figure 4. Collector Output Capacitance

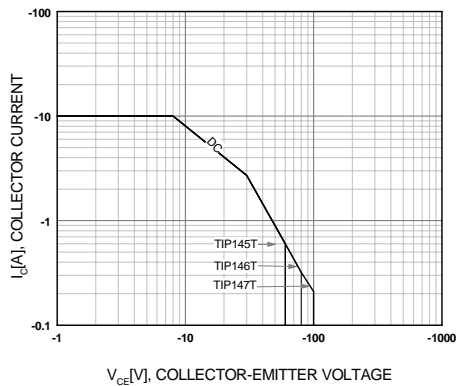


Figure 5. Safe Operating Area

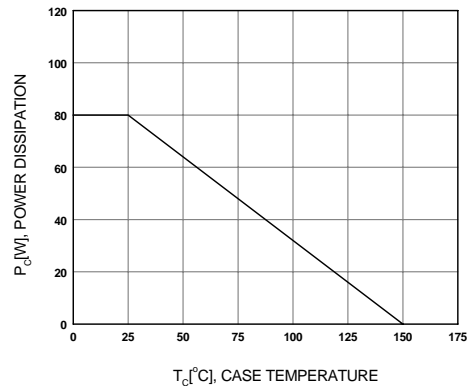
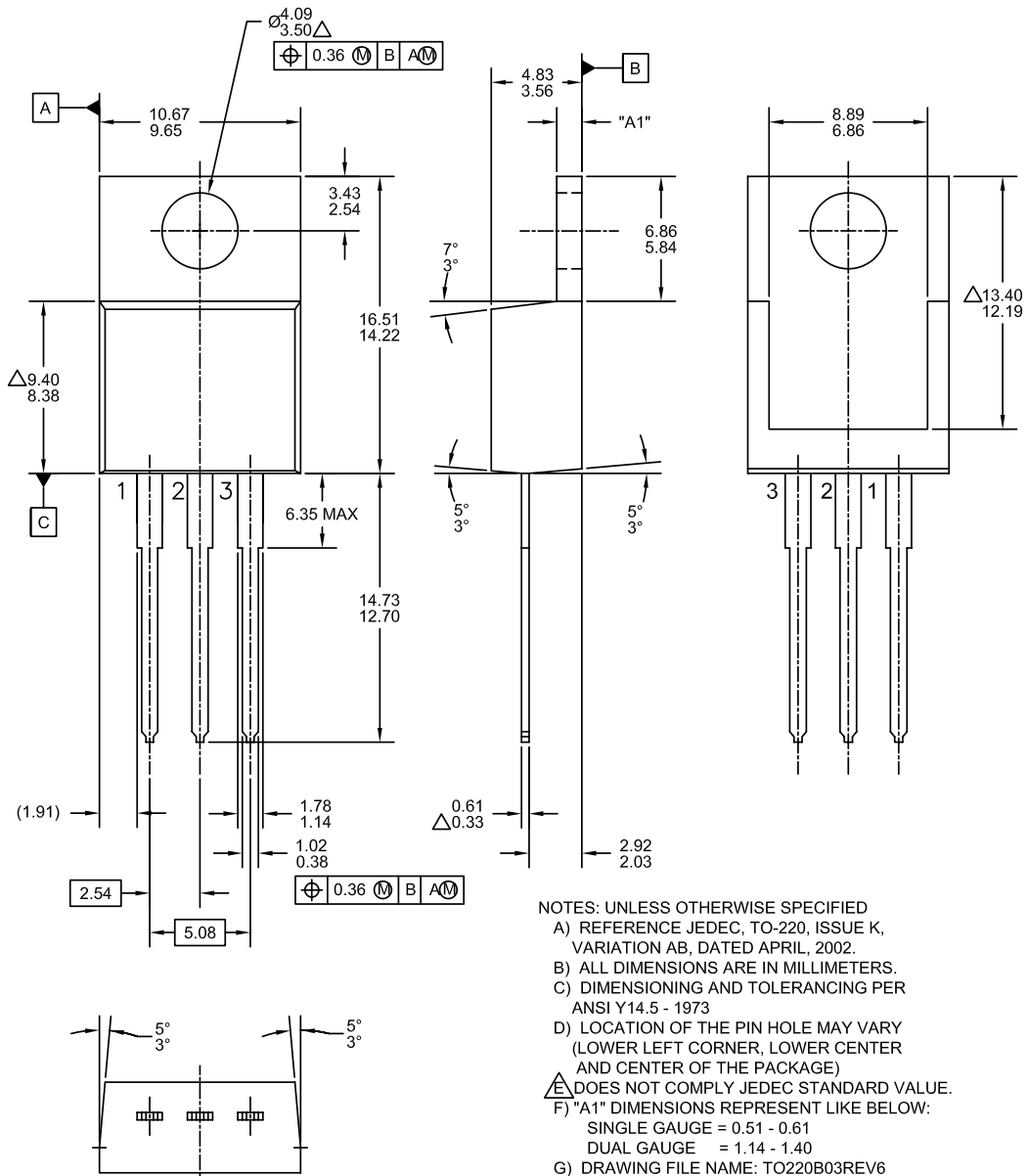


Figure 6. Power Derating

Mechanical Dimensions

TO220





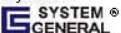


- NOTES: UNLESS OTHERWISE SPECIFIED
 A) REFERENCE JEDEC, TO-220, ISSUE K, VARIATION AB, DATED APRIL, 2002.
 B) ALL DIMENSIONS ARE IN MILLIMETERS.
 C) DIMENSIONING AND TOLERANCING PER ANSI Y14.5 - 1973
 D) LOCATION OF THE PIN HOLE MAY VARY (LOWER LEFT CORNER, LOWER CENTER AND CENTER OF THE PACKAGE)
 E) DOES NOT COMPLY JEDEC STANDARD VALUE.
 F) "A1" DIMENSIONS REPRESENT LIKE BELOW:
 SINGLE GAUGE = 0.51 - 0.61
 DUAL GAUGE = 1.14 - 1.40
 G) DRAWING FILE NAME: TO220B03REV6



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