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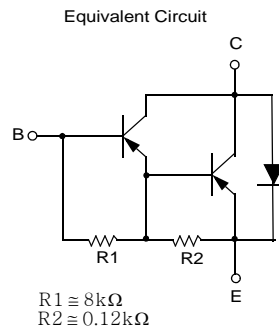
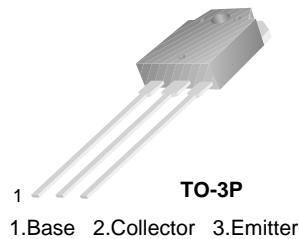


# TIP145 / TIP146 / TIP147

## PNP Epitaxial Silicon Darlington Transistor

### Features

- 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 TIP140/141/142



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

| Symbol    | Parameter                                  | Value        | Units      |
|-----------|--|--------------|------------|
| $V_{CBO}$ | Collector-Base Voltage : TIP145            | - 60         | V          |
|           | : TIP146                                   | - 80         | V          |
|           | : TIP147                                   | - 100        | V          |
| $V_{CEO}$ | Collector-Emitter Voltage : TIP145         | - 60         | V          |
|           | : TIP146                                   | - 80         | V          |
|           | : TIP147                                   | - 100        | V          |
| $V_{EBO}$ | 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 ( $T_C=25^\circ C$ ) | 125          | W          |
| $T_J$     | Junction Temperature                       | 150          | $^\circ C$ |
| $T_{STG}$ | Storage Temperature                        | - 65 to +150 | $^\circ C$ |

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

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

| Symbol         | Parameter  | Test Condition   | Min.               | Typ. | Max.           | Units          |
|----------------|--|--|--------------------|------|----------------|----------------|
| $V_{CEO(sus)}$ | Collector-Emitter Sustaining Voltage<br>: TIP145<br>: TIP146<br>: TIP147 | $I_C = -30\text{mA}, I_B = 0$  | -60<br>-80<br>-100 |      |                | V<br>V<br>V    |
| $I_{CEO}$      | Collector Cut-off Current<br>: TIP145<br>: TIP146<br>: TIP147            | $V_{CE} = -30\text{V}, I_B = 0$<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 |
| $I_{CBO}$      | Collector Cut-off Current<br>: TIP145<br>: TIP146<br>: TIP147            | $V_{CB} = -60\text{V}, I_E = 0$<br>$V_{CB} = -80\text{V}, I_E = 0$<br>$V_{CB} = -100\text{V}, I_E = 0$       |                    |      | -1<br>-1<br>-1 | mA<br>mA<br>mA |
| $I_{EBO}$      | Emitter Cut-off Current  | $V_{BE} = -5\text{V}, I_C = 0$   |                    |      | -2             | mA             |
| $h_{FE}$       | DC Current Gain  | $V_{CE} = -4\text{V}, I_C = -5\text{A}$<br>$V_{CE} = -4\text{V}, I_C = -10\text{A}$                          | 1000<br>500        |      |                |                |
| $V_{CE(sat)}$  | Collector-Emitter Saturation Voltage                                     | $I_C = -5\text{A}, I_B = -10\text{mA}$<br>$I_C = -10\text{A}, I_B = -40\text{mA}$                            |                    |      | -2<br>-3       | V<br>V         |
| $V_{BE(sat)}$  | 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   | $V_{CC} = -30\text{V}, I_C = -5\text{A}$<br>$I_{B1} = -20\text{mA}, I_{B2} = 20\text{mA}$<br>$R_L = 6\Omega$ |                    | 0.15 |                | $\mu\text{s}$  |
| $t_R$          | Rise Time  |  |                    | 0.55 |                | $\mu\text{s}$  |
| $t_{STG}$      | Storage Time   |  |                    | 2.5  |                | $\mu\text{s}$  |
| $t_F$          | Fall Time  |  |                    | 2.5  |                | $\mu\text{s}$  |

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

## Typical Performance Characteristics

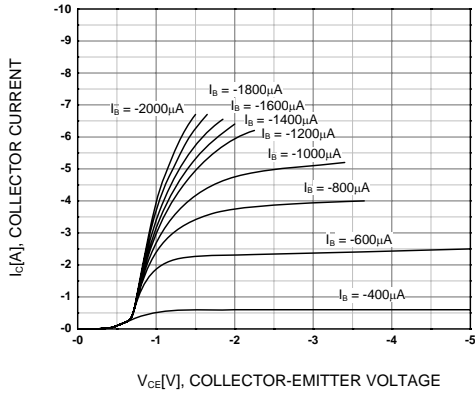


Figure 1. Static Characteristic

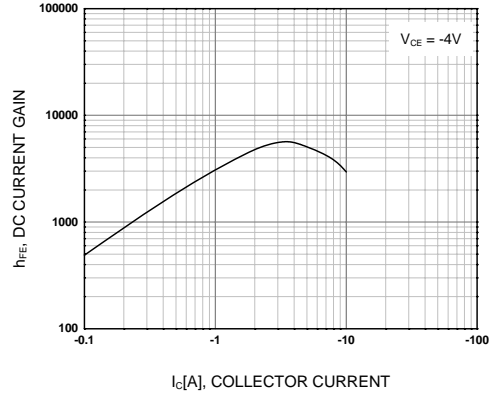


Figure 2. DC current Gain

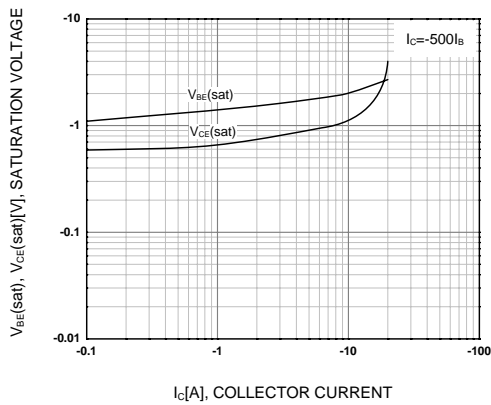


Figure 3. Collector-Emitter Saturation Voltage  
Base-Emitter Saturation Voltage

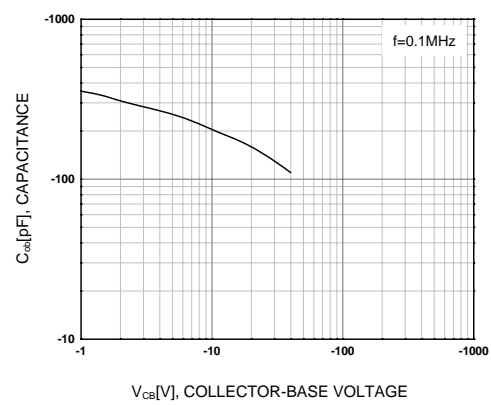


Figure 4. Collector Output Capacitance

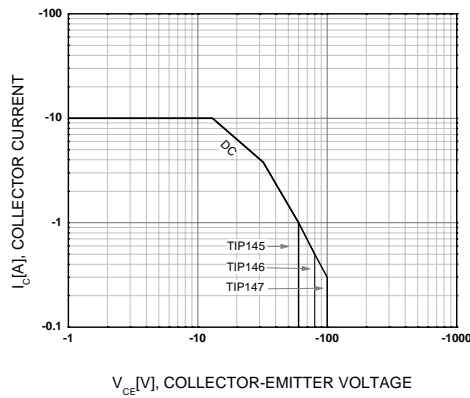


Figure 5. Safe Operating Area

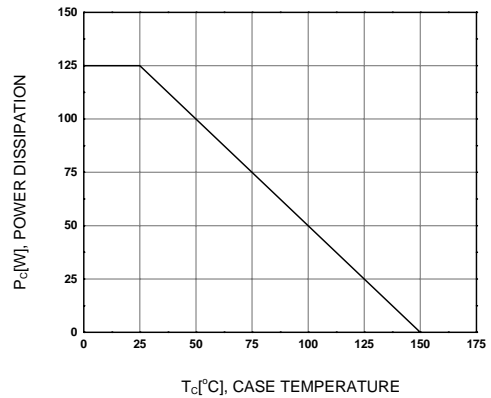
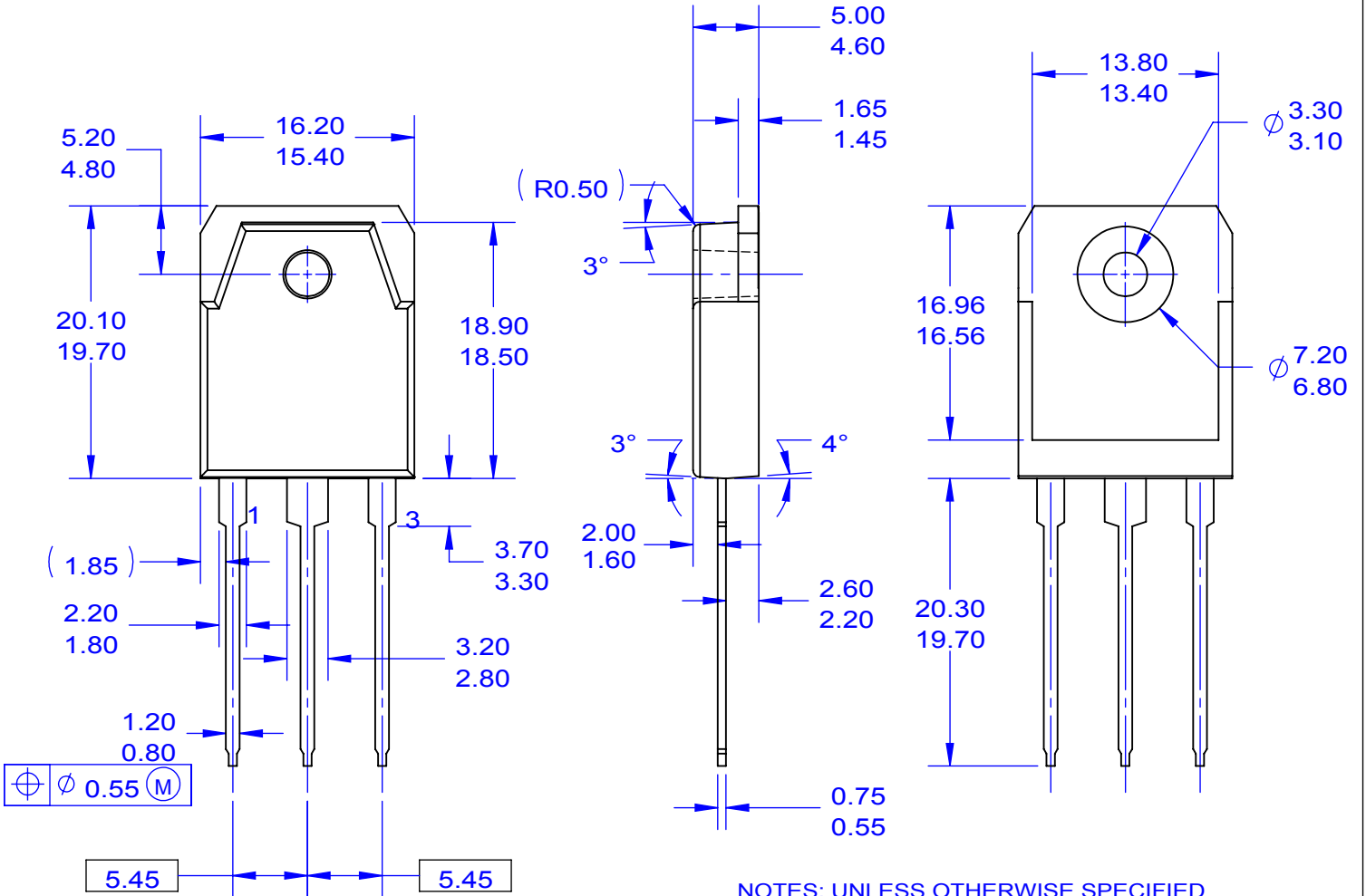


Figure 6. Power Derating



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**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.