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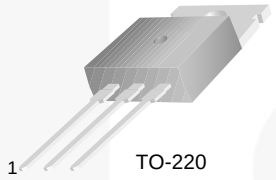
December 2014

# TIP105 / TIP107
# PNP Epitaxial Silicon Darlington Transistor

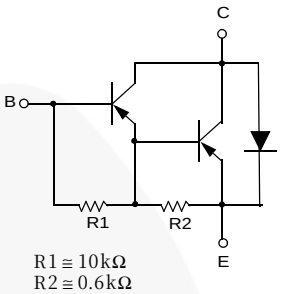
## Features

- Monolithic Construction with Built-in Base-Emitter Shunt Resistors
- High DC Current Gain:
  $h_{FE}$ = 1000 @ $V_{CE}$ = -4 V, $I_C$ = -3 A (Minimum)
- Collector-Emitter Sustaining Voltage
- Low Collector-Emitter Saturation Voltage
- Industrial Use
- Complementary to TIP102




1.Base 2.Collector 3.Emitter

Equivalent Circuit




$R1 \cong 10k\Omega$
$R2 \cong 0.6k\Omega$

## Ordering Information

| Part Number | Top Mark | Package | Packing Method |
|---|---|---|---|
| TIP105 | TIP105 | TO-220 3L (Single Gauge) | Bulk |
| TIP105TU | TIP105 | TO-220 3L (Single Gauge) | Rail |
| TIP107 | TIP107 | TO-220 3L (Single Gauge) | Bulk |
| TIP107TU | TIP107 | TO-220 3L (Single Gauge) | Rail |

## Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at $T_C$ = 25°C unless otherwise noted.

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | TIP105 | -60 | V |
| | | TIP107 | -100 | |
| $V_{CEO}$ | Collector-Emitter Voltage | TIP105 | -60 | V |
| | | TIP107 | -100 | |
| $V_{EBO}$ | Emitter-Base Voltage | | -5 | V |
| $I_C$ | Collector Current (DC) | | -8 | A |
| $I_{CP}$ | Collector Current (Pulse) | | -15 | A |
| $I_B$ | Base Current (DC) | | -1 | A |
| $T_J$ | Junction Temperature | | 150 | °C |
| $T_{STG}$ | Storage Temperature Range | | -65 to 150 | °C |

## Thermal Characteristics

Values are at $T_C$ = 25°C unless otherwise noted.

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_C$ | Collector Dissipation ($T_A$ = 25°C) | 2 | W |
| | Collector Dissipation ($T_C$ = 25°C) | 80 | |

## Electrical Characteristics(1)

Values are at $T_C$ = 25°C unless otherwise noted.

| Symbol | Parameter | | Conditions | Min. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_{CEO}$(sus) | Collector-Emitter Sustaining Voltage | TIP105 | $I_C$ = -30 mA, $I_B$ = 0 | -60 | | V |
| | | TIP107 | | -100 | | |
| $I_{CEO}$ | Collector Cut-Off Current | TIP105 | $V_{CE}$ = -30 V, $I_B$ = 0 | | -50 | µA |
| | | TIP107 | $V_{CE}$ = -50 V, $I_B$ = 0 | | -50 | |
| $I_{CBO}$ | Collector Cut-Off Current | TIP105 | $V_{CB}$ = -60 V, $I_E$ = 0 | | -50 | µA |
| | | TIP107 | $V_{CB}$ = -100 V, $I_E$ = 0 | | -50 | |
| $I_{EBO}$ | Emitter Cut-Off Current | | $V_{EB}$ = -5 V, $I_C$ = 0 | | -2 | mA |
| $h_{FE}$ | DC Current Gain | | $V_{CE}$ = -4 V, $I_C$ = -3 A | 1000 | 20000 | |
| | | | $V_{CE}$ = -4 V, $I_C$ = -8 A | 200 | | |
| $V_{CE}$(sat) | Collector-Emitter Saturation Voltage | | $I_C$ = -3 A, $I_B$ = -6 mA | | -2.0 | V |
| | | | $I_C$ = -8 A, $I_B$ = -80 mA | | -2.5 | |
| $V_{BE}$(on) | Base-Emitter On Voltage | | $V_{CE}$ = -4 V, $I_C$ = -8 A | | -2.8 | V |
| $C_{ob}$ | Output Capacitance | | $V_{CB}$ = -10 V, $I_E$ = 0, f = 0.1 MHz | | 300 | pF |

**Note:**

1. Pulse test: pw ≤ 300 µs, duty cycle ≤ 2%.

## Typical Performance Characteristics

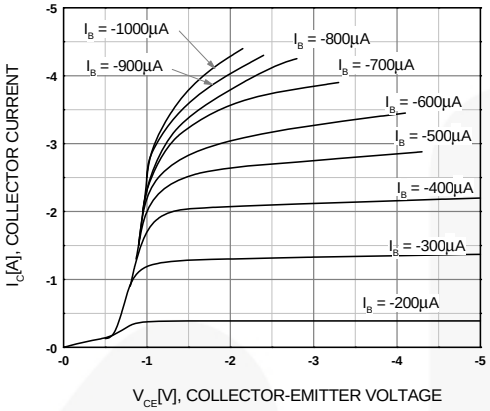



**Figure 1. Static Characteristic**

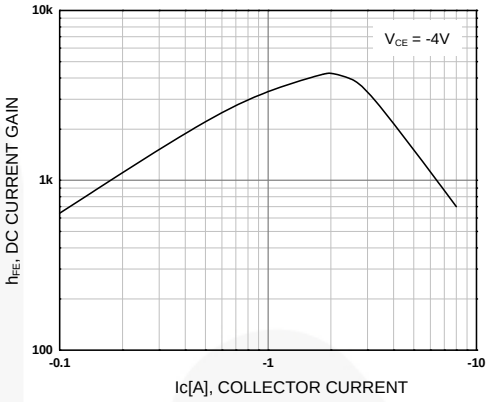



**Figure 2. DC Current Gain**

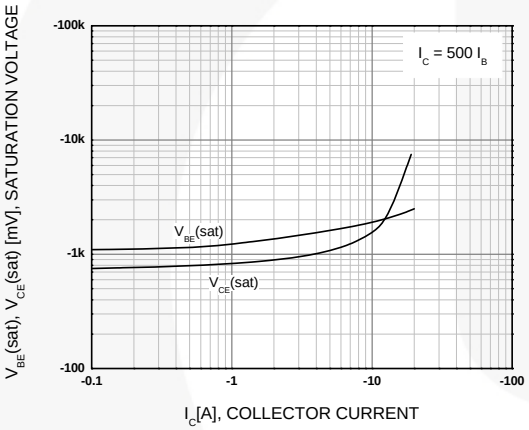



**Figure 3. Collector-Emitter Saturation Voltage and Base-Emitter Saturation Voltage**

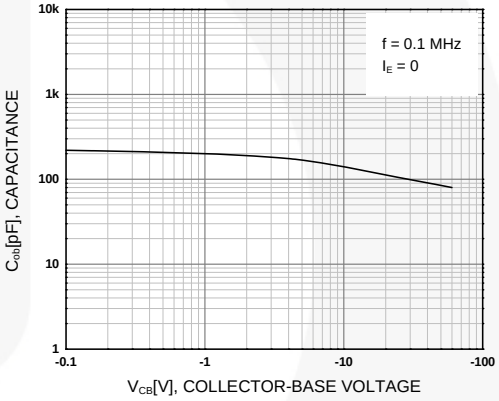



**Figure 4. Collector Output Capacitance**

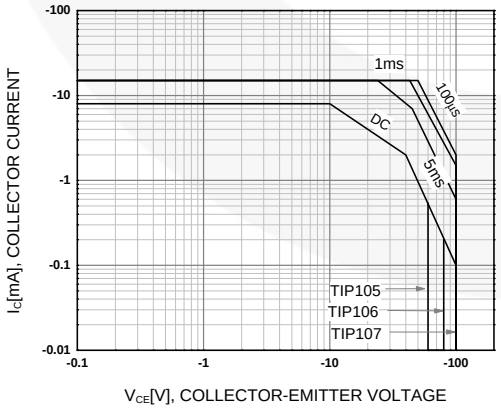



**Figure 5. Safe Operating Area**

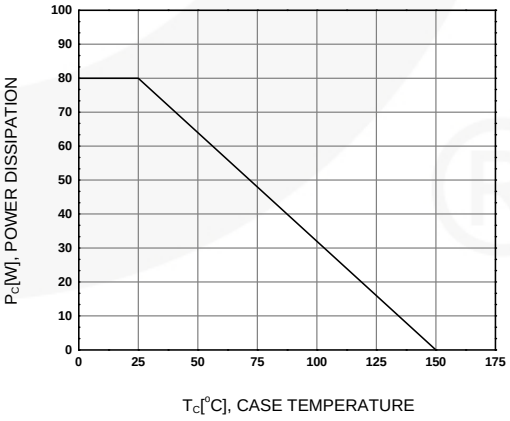



**Figure 6. Power Derating**

## Physical Dimensions

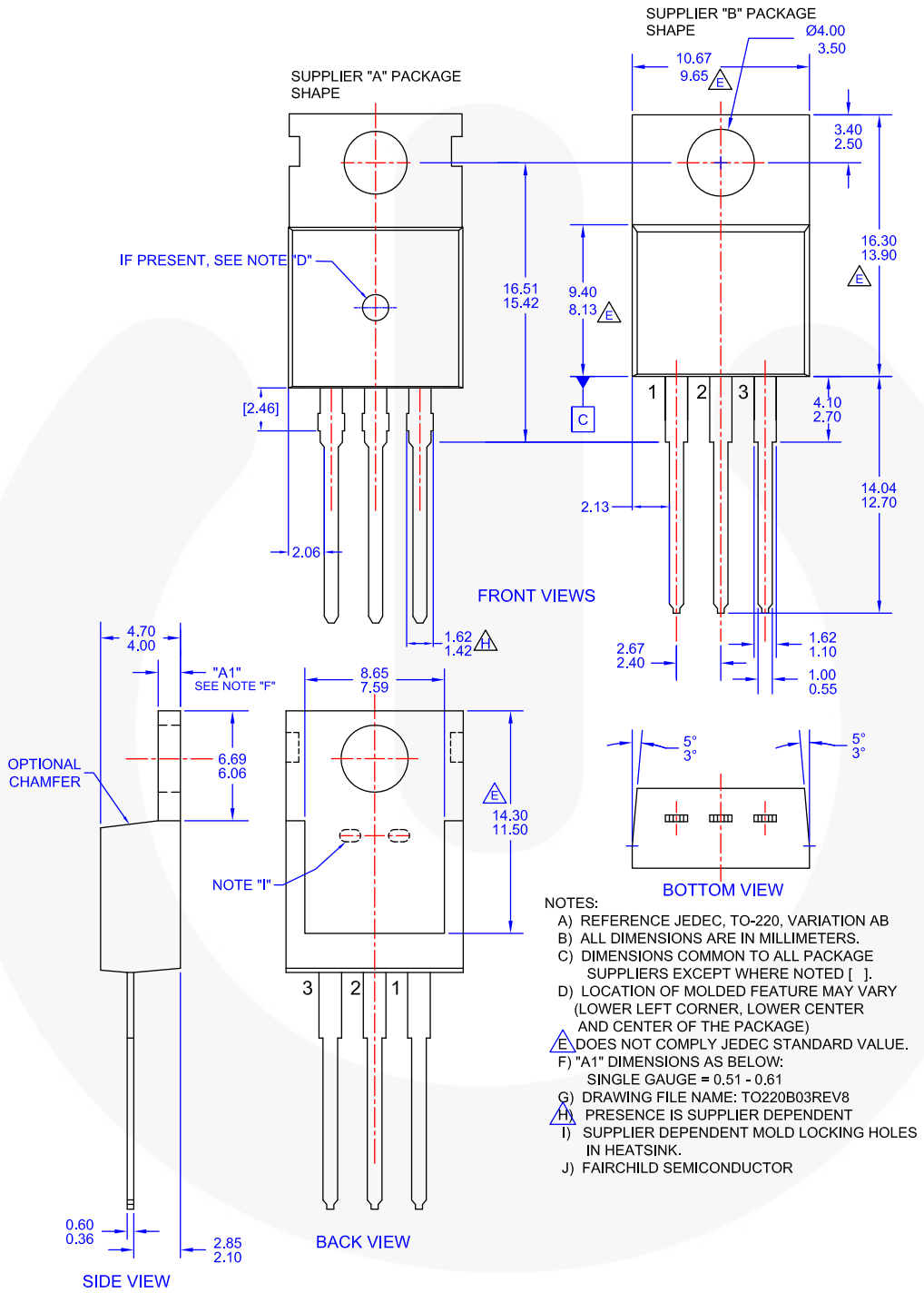



**Figure 7. TO-220, MOLDED, 3LEAD, JEDEC VARIATION AB**

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