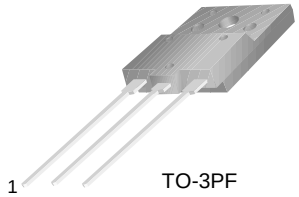
FAIRCHILD
SEMICONDUCTOR®

# TIP140F/141F/142F

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

- Complement to TIP145F/146F/147F
- High DC Current Gain : $h_{FE}$ = 1000 @ $V_{CE}$ = 4V, $I_C$ = 5A (Min.)
- Industrial Use



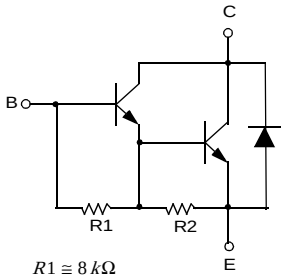
TO-3PF
1.Base 2.Collector 3.Emitter

## NPN Epitaxial Darlington Transistor

### Absolute Maximum Ratings $T_C$=25°C unless otherwise noted

| Symbol | Parameter | | Value | Units |
|---|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | : TIP140F | 60 | V |
| | | : TIP141F | 80 | V |
| | | : TIP142F | 100 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | : TIP140F | 60 | V |
| | | : TIP141F | 80 | V |
| | | : TIP142F | 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°C) | | 60 | W |
| $T_J$ | Junction Temperature | | 150 | °C |
| $T_{STG}$ | Storage Temperature | | - 65 ~ 150 | °C |

Equivalent Circuit




$R1 \cong 8\,k\Omega$
$R2 \cong 0.12\,k\Omega$

### Electrical Characteristics $T_C$=25°C unless otherwise noted

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| $V_{CEO}$(sus) | Collector-Emitter Sustaining Voltage | | | | | |
| | : TIP140F | $I_C$ = 30mA, $I_B$ = 0 | 60 | | | V |
| | : TIP141F | | 80 | | | V |
| | : TIP142F | | 100 | | | V |
| $I_{CEO}$ | Collector Cut-off Current | | | | | |
| | : TIP140F | $V_{CE}$ = 30V, $I_B$ = 0 | | | 2 | mA |
| | : TIP141F | $V_{CE}$ = 40V, $I_B$ = 0 | | | 2 | mA |
| | : TIP142F | $V_{CE}$ = 50V, $I_B$ = 0 | | | 2 | mA |
| $I_{CBO}$ | Collector Cut-off Current | | | | | |
| | : TIP140F | $V_{CB}$ = 60V, $I_E$ = 0 | | | 1 | mA |
| | : TIP141F | $V_{CB}$ = 80V, $I_E$ = 0 | | | 1 | mA |
| | : TIP142F | $V_{CB}$ = 100V, $I_E$ = 0 | | | 1 | mA |
| $I_{EBO}$ | Emitter Cut-off Current | $V_{BE}$ = 5V, $I_C$ = 0 | | | 2 | mA |
| $h_{FE}$ | DC Current Gain | $V_{CE}$ = 4V, $I_C$ = 5A | 1000 | | | |
| | | $V_{CE}$ = 4V, $I_C$ = 10A | 500 | | | |
| $V_{CE}$(sat) | Collector-Emitter Saturation Voltage | $I_C$ = 5A, $I_B$ = 10mA | | | 2 | V |
| | | $I_C$ = 10A, $I_B$ = 40mA | | | 3 | V |
| $V_{BE}$(sat) | Base-Emitter Saturation Voltage | $I_C$ = 10A, $I_B$ = 40mA | | | 3.5 | V |
| $V_{BE}$(on) | Base-Emitter On Voltage | $V_{CE}$ = 4V, $I_C$ = 10A | | | 3 | V |
| $t_D$ | Delay Time | $V_{CC}$ = 30V, $I_C$ = 5A | | 0.15 | | µs |
| $t_R$ | Rise Time | $I_{B\,1}$= 20mA, $I_{B2}$ = -20mA | | 0.55 | | µs |
| $t_{STG}$ | Storage Time | $R_L$ = 6Ω | | 2.5 | | µs |
| $t_F$ | Fall Time | | | 2.5 | | µs |

# Typical Characteristics

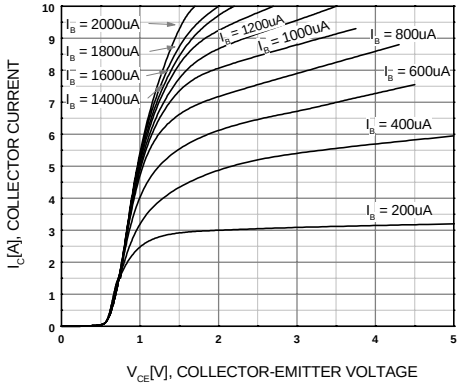



**Figure 1. Static Characteristics**

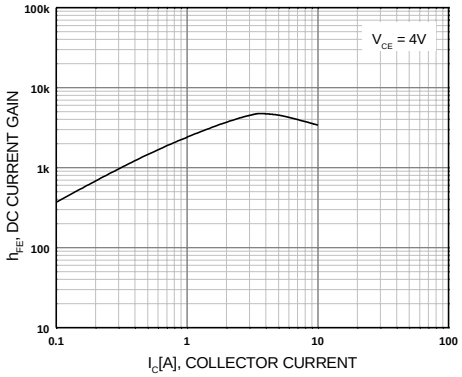



**Figure 2. DC current Gain**

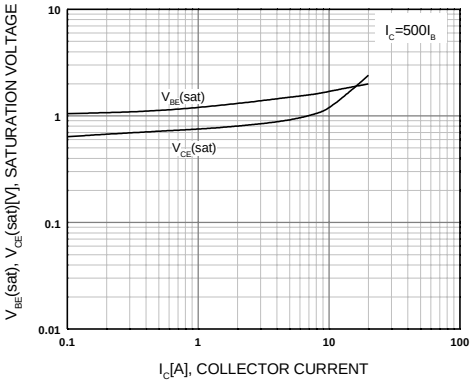



**Figure 3. Base-Emitter Saturation Voltage Collector-Emitter Saturation Voltage**

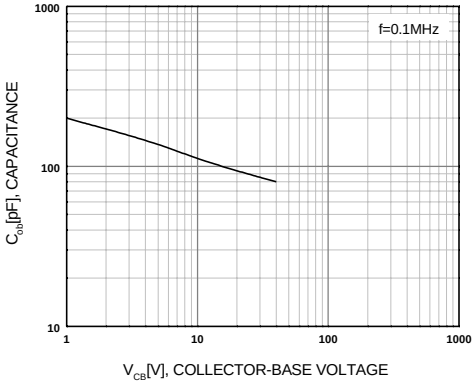



**Figure 4. Collector Output Capacitance**

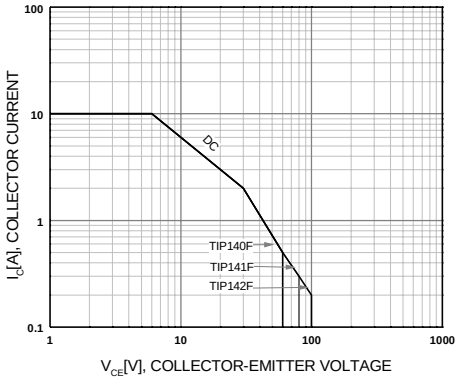



**Figure 5. Safe Operating Area**

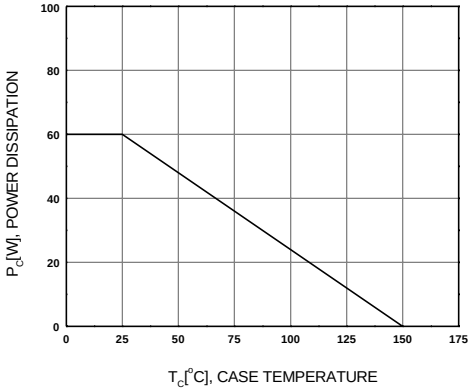
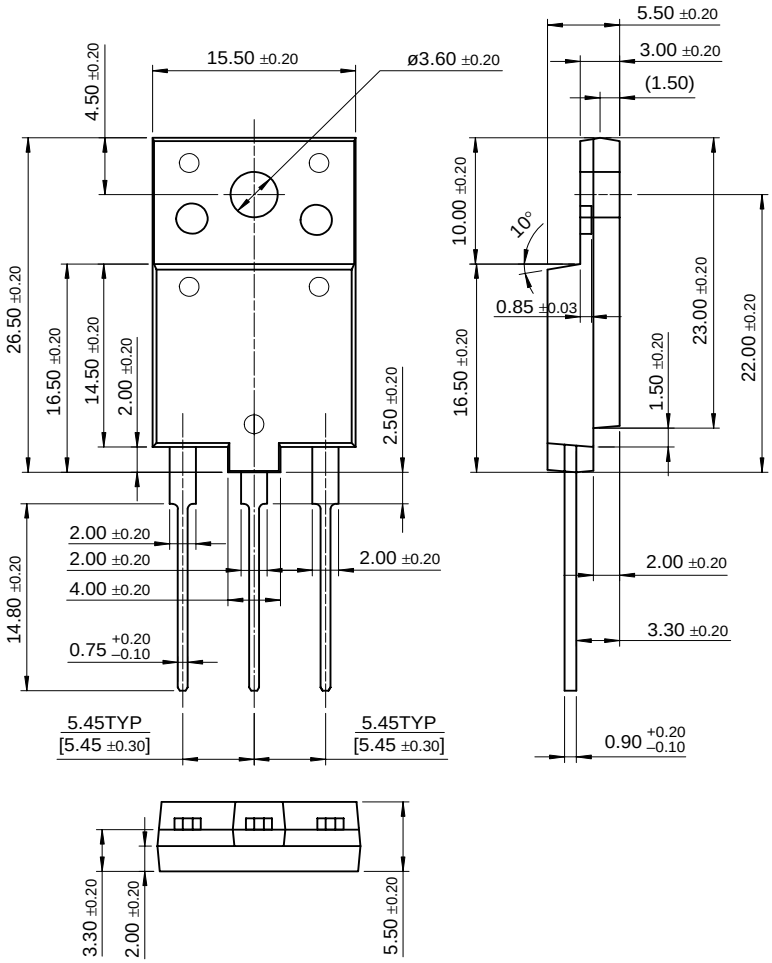



**Figure 6. Power Derating**

## Package Dimensions

# TO-3PF




Dimensions in Millimeters

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