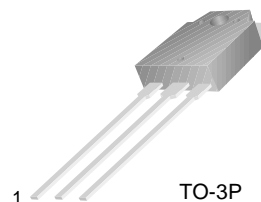


## TIP140/141/142

### 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 TIP145/146/147



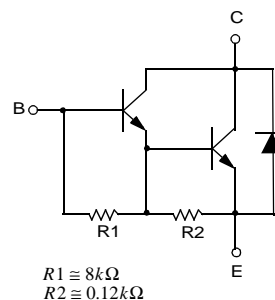
TO-3P  
1.Base 2.Collector 3.Emmitter

### NPN Epitaxial Silicon Darlington Transistor

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

| Symbol    | Parameter  | Value      | Units            |
|-----------|--|------------|------------------|
| $V_{CBO}$ | Collector-Base Voltage : TIP140                  | 60         | V                |
|           | : TIP141   | 80         | V                |
|           | : TIP142   | 100        | V                |
| $V_{CEO}$ | Collector-Emitter Voltage : TIP140               | 60         | V                |
|           | : TIP141   | 80         | V                |
|           | : TIP142   | 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 ( $T_C=25^\circ\text{C}$ ) | 125        | W                |
| $T_J$     | Junction Temperature                             | 150        | $^\circ\text{C}$ |
| $T_{STG}$ | Storage Temperature                              | - 65 ~ 150 | $^\circ\text{C}$ |

Equivalent Circuit



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

| Symbol         | Parameter  | Test Condition   | Min.        | Typ. | Max. | Units         |
|----------------|--|--|-------------|------|------|---------------|
| $V_{CEO(sus)}$ | Collector-Emitter Sustaining Voltage<br>: TIP140<br>: TIP141<br>: TIP142 | $I_C = 30\text{mA}$ , $I_B = 0$  | 60          |      |      | V             |
|                |  |  | 80          |      |      | V             |
|                |  |  | 100         |      |      | V             |
| $I_{CEO}$      | Collector Cut-off Current<br>: TIP140<br>: TIP141<br>: TIP142            | $V_{CE} = 30V$ , $I_B = 0$<br>$V_{CE} = 40V$ , $I_B = 0$<br>$V_{CE} = 50V$ , $I_B = 0$             |             |      | 2    | mA            |
|                |  |  |             |      | 2    | mA            |
|                |  |  |             |      | 2    | mA            |
| $I_{CBO}$      | Collector Cut-off Current<br>: TIP140<br>: TIP141<br>: TIP142            | $V_{CB} = 60V$ , $I_E = 0$<br>$V_{CB} = 80V$ , $I_E = 0$<br>$V_{CB} = 100V$ , $I_E = 0$            |             |      | 1    | mA            |
|                |  |  |             |      | 1    | mA            |
|                |  |  |             |      | 1    | mA            |
| $I_{EBO}$      | Emitter Cut-off Current  | $V_{BE} = 5V$ , $I_C = 0$  |             |      | 2    | mA            |
| $h_{FE}$       | DC Current Gain  | $V_{CE} = 4V$ , $I_C = 5A$<br>$V_{CE} = 4V$ , $I_C = 10A$  | 1000<br>500 |      |      |               |
| $V_{CE(sat)}$  | Collector-Emitter Saturation Voltage                                     | $I_C = 5A$ , $I_B = 10\text{mA}$<br>$I_C = 10A$ , $I_B = 40\text{mA}$                              |             |      | 2    | V             |
|                |  |  |             |      | 3    | V             |
| $V_{BE(sat)}$  | Base-Emitter Saturation Voltage  | $I_C = 10A$ , $I_B = 40\text{mA}$  |             |      | 3.5  | V             |
| $V_{BE(on)}$   | Base-Emitter ON Voltage  | $V_{CE} = 4V$ , $I_C = 10A$  |             |      | 3    | V             |
| $t_D$          | Delay Time   | $V_{CC} = 30V$ , $I_C = 5A$<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  |      | $\mu\text{s}$ |

# Typical Characteristics

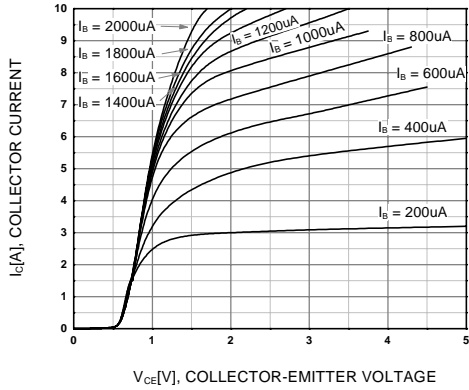


Figure 1. Static Characteristic

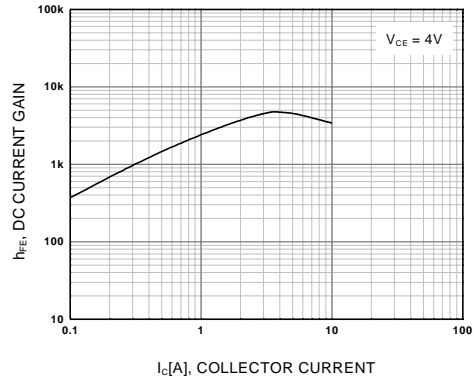


Figure 2. DC current Gain

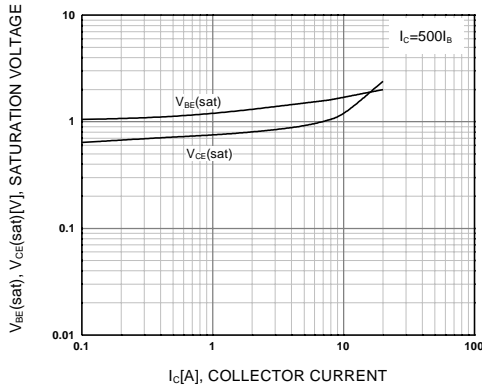


Figure 3. Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage

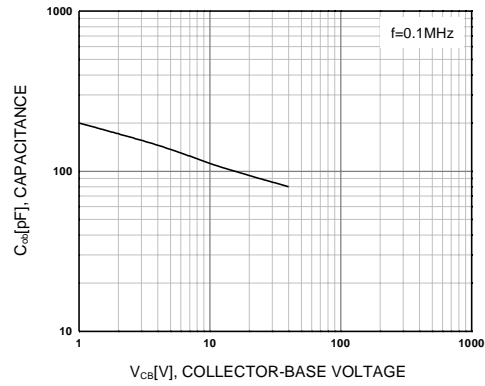


Figure 4. Collector Output Capacitance

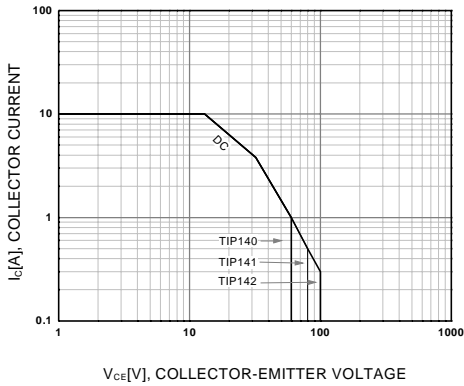


Figure 5. Safe Operating Area

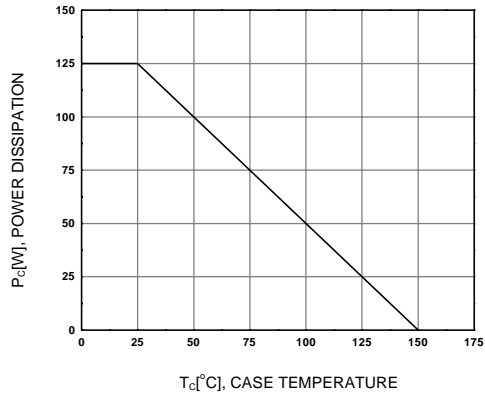
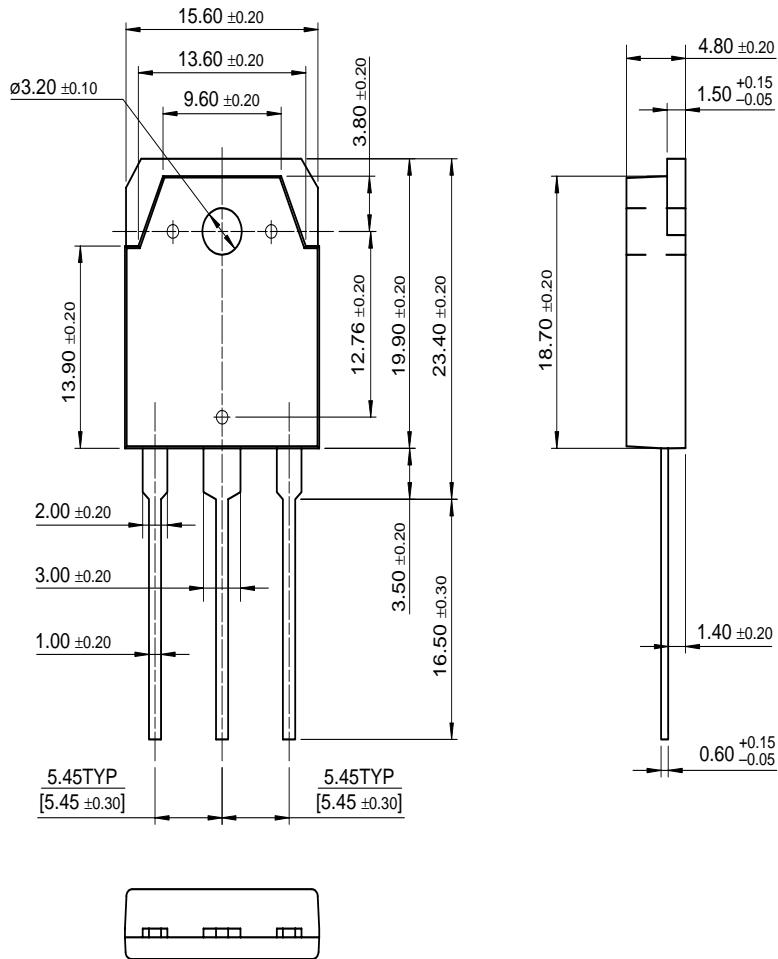


Figure 6. Power Derating

# Package Dimensions

## TO-3P



Dimensions in Millimeters

TIP140/141/142

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TIP141

NPN Epitaxial Silicon Darlington Transistor

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- High DC Current Gain:  $h_{FE}=1000$  @  $V_{CE}=4V$ ,  $I_C=5A$  (Min.)
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|-----------|-----------------|----------|--------------|-------|----------------|
| TIP141TU  | Full Production | \$0.96   | TO-3P        | 3     | RAIL           |
| TIP141LTU | Full Production | \$0.96   | TO-3P        | 3     | RAIL           |

\* 1,000 piece Budgetary Pricing

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| Package & leads | Condition                          | Temperature range | Software version | Revision date |
|-----------------|------------------------------------|-------------------|------------------|---------------|
| PSPICE          |                                    |                   |                  |               |
| TO-3P-3         | <a href="#">Electrical/Thermal</a> | -25°C to 100°C    | 9.2              | Feb 28, 2001  |

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| TIP142LTU | Full Production | \$0.96   | TO-3P        | 3     | RAIL           |

\* 1,000 piece Budgetary Pricing

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\* 1,000 piece Budgetary Pricing

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|-----------------|------------------------------------|-------------------|------------------|---------------|
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