

**SPTECH Silicon NPN Darlington Power Transistor**

**TIP142P**

**DESCRIPTION**

- High DC Current Gain-  
:  $h_{FE} = 1000(\text{Min})@ I_C = 5A$
- Collector-Emitter Sustaining Voltage-  
:  $V_{CEO(\text{SUS})} = 100V(\text{Min})$
- Complement to Type TIP147P

**APPLICATIONS**

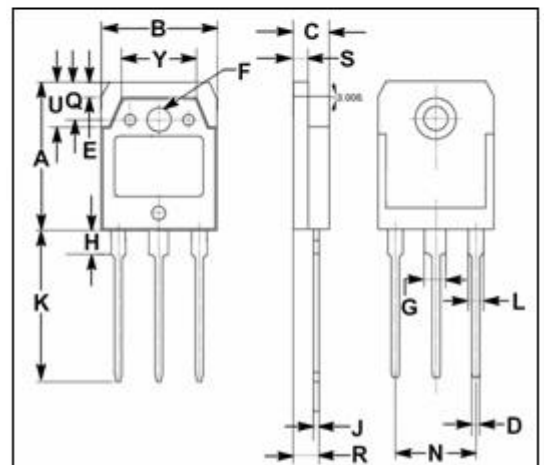
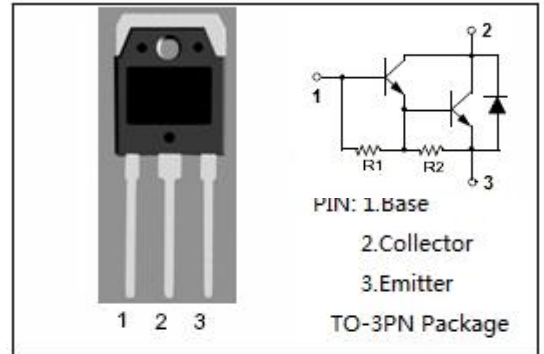
- Designed for general purpose amplifier and low frequency switching applications.

**ABSOLUTE MAXIMUM RATINGS( $T_a=25^\circ\text{C}$ )**

| SYMBOL    | PARAMETER   | VALUE   | UNIT             |
|-----------|---|---------|------------------|
| $V_{CBO}$ | Collector-Base Voltage                                  | 100     | V                |
| $V_{CEO}$ | Collector-Emitter Voltage                               | 100     | V                |
| $V_{EBO}$ | Emitter-Base Voltage                                    | 5       | V                |
| $I_C$     | Collector Current-Continuous                            | 10      | A                |
| $I_{CM}$  | Collector Current-Peak                                  | 15      | A                |
| $I_B$     | Base Current- Continuous                                | 0.5     | A                |
| $P_C$     | Collector Power Dissipation<br>@ $T_C=25^\circ\text{C}$ | 125     | W                |
| $T_j$     | Junction Temperature                                    | 150     | $^\circ\text{C}$ |
| $T_{stg}$ | Storage Temperature Range                               | -65~150 | $^\circ\text{C}$ |

**THERMAL CHARACTERISTICS**

| SYMBOL        | PARAMETER                               | MAX  | UNIT                      |
|---------------|---|------|---------------------------|
| $R_{th\ j-c}$ | Thermal Resistance, Junction to Case    | 1.0  | $^\circ\text{C}/\text{W}$ |
| $R_{th\ j-a}$ | Thermal Resistance, Junction to Ambient | 35.7 | $^\circ\text{C}/\text{W}$ |



| DIM | mm    |       |
|-----|-------|-------|
|     | MIN   | MAX   |
| A   | 19.60 | 20.30 |
| B   | 15.50 | 15.70 |
| C   | 4.70  | 4.90  |
| D   | 0.90  | 1.10  |
| E   | 1.90  | 2.10  |
| F   | 3.40  | 3.60  |
| G   | 2.90  | 3.20  |
| H   | 3.20  | 3.40  |
| J   | 0.595 | 0.605 |
| K   | 19.80 | 20.70 |
| L   | 1.90  | 2.20  |
| N   | 10.89 | 10.91 |
| Q   | 4.90  | 5.10  |
| R   | 3.35  | 3.45  |
| S   | 1.995 | 2.100 |
| U   | 5.90  | 6.20  |
| Y   | 9.90  | 10.10 |

**ELECTRICAL CHARACTERISTICS**

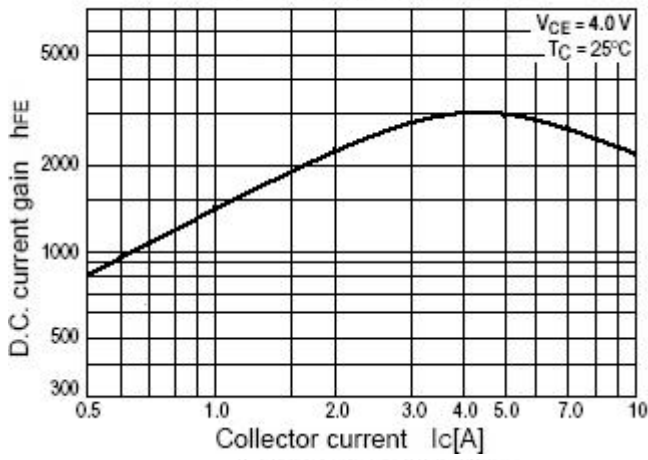
$T_C=25^{\circ}\text{C}$  unless otherwise specified

| SYMBOL          | PARAMETER                            | CONDITIONS                   | MIN  | TYP. | MAX | UNIT |
|-----------------|--------------------------------------|------------------------------|------|------|-----|------|
| $V_{CEO(SUS)}$  | Collector-Emitter Sustaining Voltage | $I_C= 30\text{mA}, I_B= 0$   | 100  |      |     | V    |
| $V_{CE(sat)-1}$ | Collector-Emitter Saturation Voltage | $I_C= 5A, I_B= 10\text{mA}$  |      |      | 2.0 | V    |
| $V_{CE(sat)-2}$ | Collector-Emitter Saturation Voltage | $I_C= 10A, I_B= 40\text{mA}$ |      |      | 3.0 | 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              | $I_C= 10A ; V_{CE}= 4V$      |      |      | 3.0 | V    |
| $I_{CBO}$       | Collector Cutoff current             | $V_{CB}= 100V, I_E= 0$       |      |      | 1   | mA   |
| $I_{CEO}$       | Collector Cutoff current             | $V_{CE}= 50V, I_B= 0$        |      |      | 2   | mA   |
| $I_{EBO}$       | Emitter Cutoff Current               | $V_{EB}= 5V; I_C= 0$         |      |      | 2   | mA   |
| $h_{FE-1}$      | DC Current Gain                      | $I_C= 5A ; V_{CE}= 4V$       | 1000 |      |     |      |
| $h_{FE-2}$      | DC Current Gain                      | $I_C= 10A ; V_{CE}= 4V$      | 500  |      |     |      |

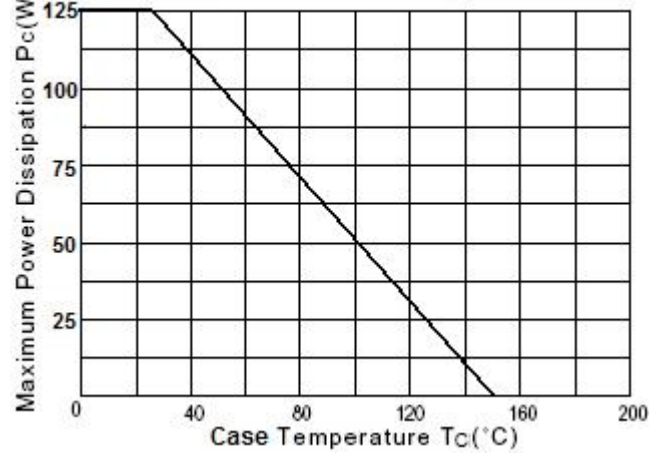
Switching Times

|           |              |   |  |      |  |                |
|-----------|--------------|---|--|------|--|----------------|
| $t_d$     | Delay Time   | $V_{CC} = 30\text{ V}, I_C = 5.0\text{ A},$<br>$I_B = 20\text{ mA};$<br>Duty Cycle $\leq 20\%$<br>$I_{B1} = I_{B2},$<br>$R_C \text{ \& } R_B \text{ Varied},$<br>$T_J = 25^{\circ}\text{C}$ |  | 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  |  | $\mu\text{ s}$ |

**$h_{FE}$ - $I_C$  Characteristics**



**Power Derating**



**Safe Operating Area**

