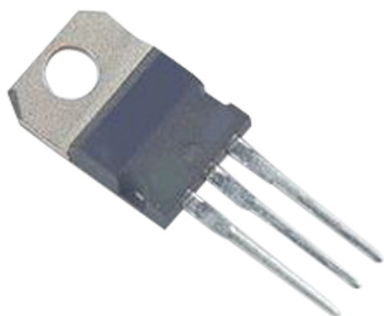




## Features:

- Collector-Emitter sustaining voltage-  
 $V_{CE(sus)} = 80V$  (Min.) - TIP131, TIP136  
 $= 100V$  (Min.) - TIP132
- Collector-Emitter saturation voltage -  
 $V_{CE(sat)} = 2V$  (Max.) at  $I_C = 4A$
- Monolithic construction with Built-in Base-Emitter shunt resistor

## Maximum Ratings

| Characteristic                                                        | Symbol                            | TIP131<br>TIP136 | TIP132 | Unit      |
|-----------------------------------------------------------------------|-----------------------------------|------------------|--------|-----------|
| Collector-Emitter Voltage                                             | V <sub>CEO</sub>                  | 80               | 100    | V         |
| Collector-Base Voltage                                                | V <sub>CBO</sub>                  |                  |        |           |
| Emitter-Base Voltage                                                  | V <sub>EBO</sub>                  | 5                |        |           |
| Collector Current-Continuous<br>-Peak                                 | I <sub>C</sub><br>I <sub>CM</sub> | 8<br>12          |        | A         |
| Base Current                                                          | I <sub>B</sub>                    | 0.3              |        | mA        |
| Total Power Dissipation at T <sub>C</sub> = 25°C<br>Derate above 25°C | P <sub>D</sub>                    | 70<br>0.56       |        | W<br>W/°C |
| Operation and Storage Junction<br>Temperature Range                   | T <sub>J</sub> , T <sub>STG</sub> | -65 to +150      |        | °C        |

## Thermal Characteristics

| Characteristic                      | Symbol          | Max.  | Unit         |
|-------------------------------------|-----------------|-------|--------------|
| Thermal Resistance Junction to Case | $R_{\theta jc}$ | 1.785 | $^\circ C/W$ |

## Electrical Characteristics:

( $T_C = 25^\circ\text{C}$  unless otherwise noted)

| Characteristic | Symbol | Min. | Max. | Unit |
|----------------|--------|------|------|------|
|----------------|--------|------|------|------|

### Off Characteristics

|                                                                                                                            |                |           |            |    |
|----------------------------------------------------------------------------------------------------------------------------|----------------|-----------|------------|----|
| Collector-Emitter Sustaining Voltage (1)<br>$I_C = 30\text{mA}$ , $I_B = 0$ TIP131, TIP136<br>TIP132                       | $V_{CEO(sus)}$ | 80<br>100 | -          | V  |
| Collector Cut off Current<br>$V_{CE} = 40\text{V}$ , $I_B = 0$ TIP131, TIP136<br>$V_{CE} = 50\text{V}$ , $I_B = 0$ TIP132  | $I_{CEO}$      | -         | 0.5<br>0.5 | mA |
| Collector Cut off Current<br>$V_{CB} = 80\text{V}$ , $I_E = 0$ TIP131, TIP136<br>$V_{CB} = 100\text{V}$ , $I_E = 0$ TIP132 | $I_{CBO}$      | -         | 0.2<br>0.2 |    |
| Emitter Cut off Current<br>$V_{EB} = 5\text{V}$ , $I_C = 0$                                                                | $I_{EBO}$      | -         | 5          |    |

### On Characteristics (1)

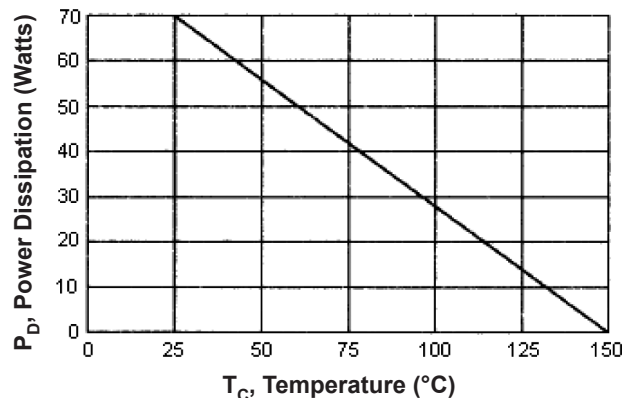
|                                                                                                                            |               |              |        |   |
|----------------------------------------------------------------------------------------------------------------------------|---------------|--------------|--------|---|
| DC Current Gain<br>$I_C = 1\text{A}$ , $V_{CE} = 4\text{V}$<br>$I_C = 4\text{A}$ , $V_{CE} = 4\text{V}$                    | $h_{FE}$      | 500<br>1,000 | 15,000 | - |
| Collector-Emitter Saturation Voltage<br>$I_C = 4\text{A}$ , $I_B = 16\text{mA}$<br>$I_C = 6\text{A}$ , $I_B = 30\text{mA}$ | $V_{CE(sat)}$ | -            | 2<br>3 | V |
| Base-Emitter On Voltage<br>$I_C = 4\text{A}$ , $V_{CE} = 4\text{V}$                                                        | $V_{BE(on)}$  | -            | 2.5    |   |

### Dynamic Characteristics

|                                                                               |          |   |     |    |
|-------------------------------------------------------------------------------|----------|---|-----|----|
| Output Capacitance<br>$V_{CB} = 10\text{V}$ , $I_E = 0$ , $f = 0.1\text{MHz}$ | $C_{ob}$ | - | 250 | pF |
|-------------------------------------------------------------------------------|----------|---|-----|----|

(1) Pulse Test: Pulse Width =  $300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

Figure - 1 Power Derating



## Internal Schematic Diagram

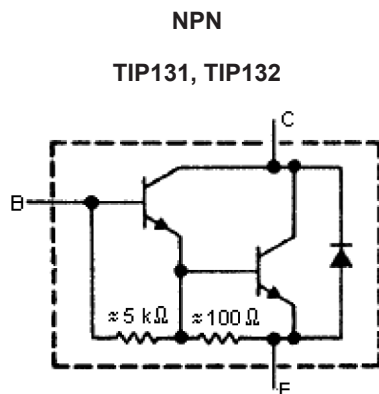


Figure - 2 DC Current Gain

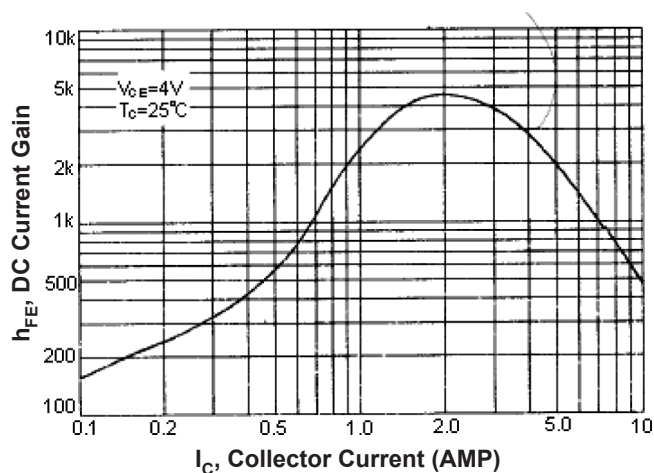


Figure - 4 Collector-Emitter Saturation Voltage

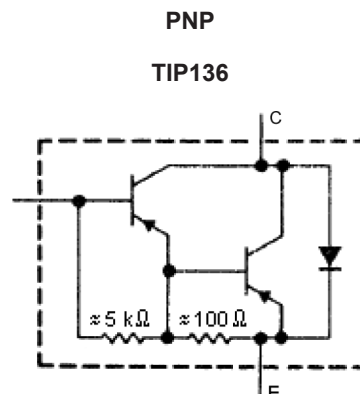
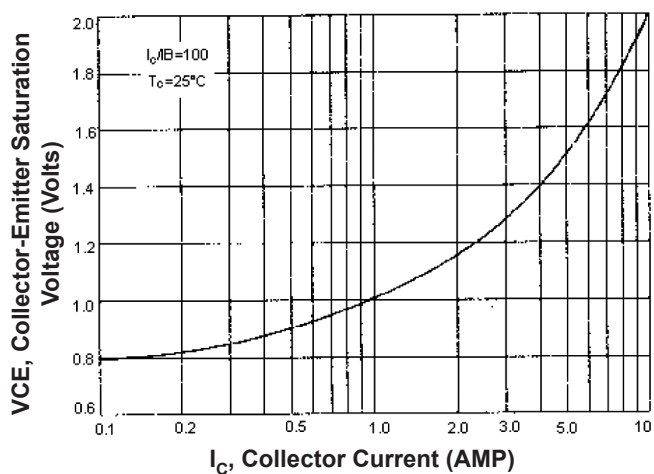


Figure - 3 Base-Emitter Voltage

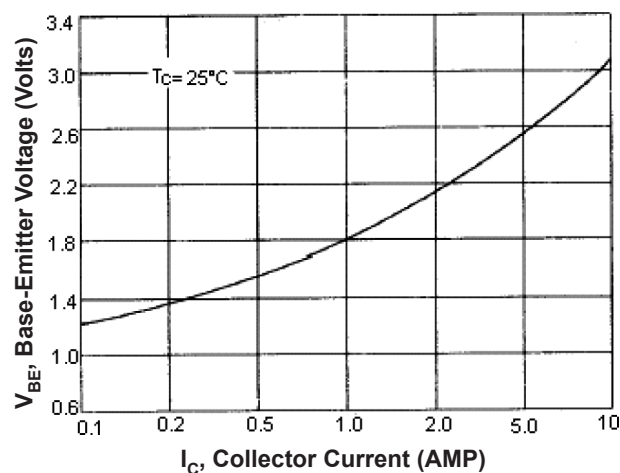
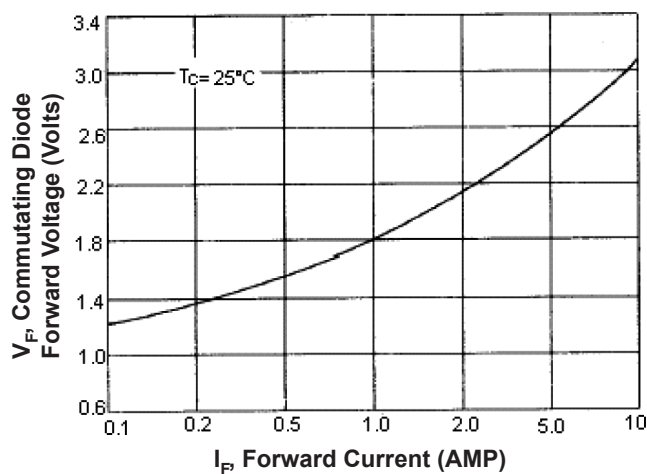
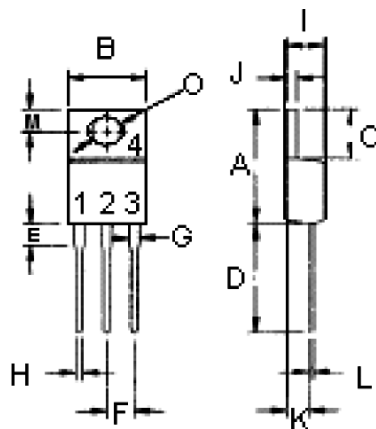
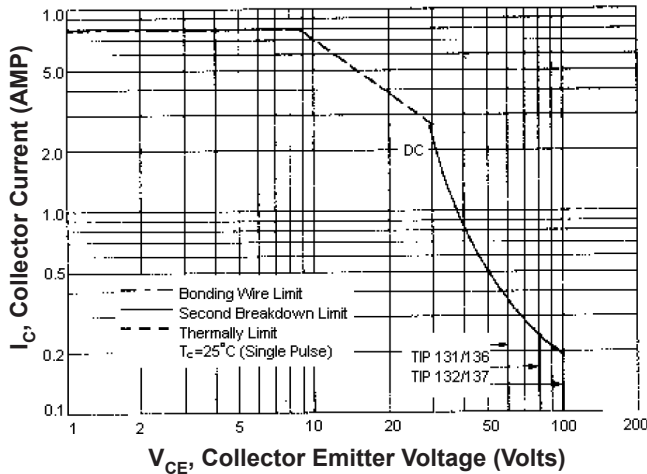


Figure - 5 Forward Voltage Commutating Diode



**Figure - 6 Active Region Safe Operating Area**



**Pin Configuration:**

1. Base
2. Collector
3. Emitter
4. Collector(Case)

There are two limitation on the power handling ability of a transistor: average junction temperature and second breakdown safe operating area curves indicate  $I_C$ - $V_{CE}$  limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure - 5 and 6 is base on  $T_{J(PK)} = 150^\circ\text{C}$ ;  $T_C$  is variable depending on power level. Second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{J(PK)} \leq 150^\circ\text{C}$ . At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

| Dimensions | Min.  | Max.  |
|------------|-------|-------|
| A          | 14.68 | 15.31 |
| B          | 9.78  | 10.42 |
| C          | 5.01  | 6.52  |
| D          | 13.06 | 14.62 |
| E          | 3.57  | 4.07  |
| F          | 2.42  | 3.66  |
| G          | 1.12  | 1.36  |
| H          | 0.72  | 0.96  |
| I          | 4.22  | 4.98  |
| J          | 1.14  | 1.38  |
| K          | 2.2   | 2.97  |
| L          | 0.33  | 0.55  |
| M          | 2.48  | 2.98  |
| O          | 3.7   | 3.9   |

Dimensions : Millimetres

**Part Number Table**

| Description                        | Part Number |
|------------------------------------|-------------|
| Darlington Transistor, NPN, TO-220 | TIP131      |
|                                    | TIP132      |
| Darlington Transistor, PNP, TO-220 | TIP136      |

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