

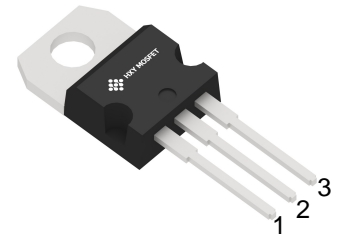


## Features

- Monolithic Darlington configuration
- Integrated antiparallel collector-emitter diode

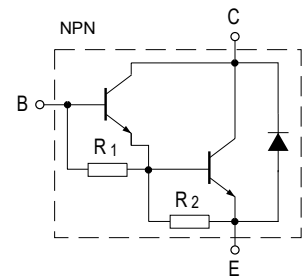
## Maximum Ratings (Ta=25 unless otherwise noted)

| Symbol    | Parameter                                  | Value      | Unit             |
|-----------|--|------------|------------------|
| $V_{CBO}$ | Collector-base voltage ( $I_E = 0$ )       | 100        | V                |
| $V_{CEO}$ | Collector-emitter voltage ( $I_B = 0$ )    | 100        | V                |
| $V_{EBO}$ | Emitter-base voltage ( $I_C = 0$ )         | 5          | V                |
| $I_C$     | Collector current                          | 8          | A                |
| $I_{CM}$  | Collector peak current                     | 12         | A                |
| $I_B$     | Base current                               | 0.3        | A                |
| $P_{TOT}$ | Total dissipation at $T_{case} = 25^\circ$ | 70         | W                |
| $T_{STG}$ | Storage temperature                        | -65 to 150 | $^\circ\text{C}$ |
| $T_J$     | Max. operating junction temperature        | 150        | $^\circ\text{C}$ |



### TO-220S

- 1.BASE
- 2.COLLECTOR
- 3.EMITTER



R1 typ. =5 K R2 typ. =210

## Electrical Characteristics (Ta=25 unless otherwise specified)

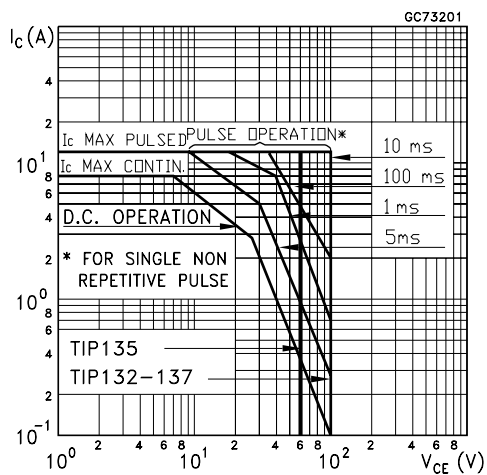
| Symbol           | Parameter  | Test Conditions  | Min.        | Typ. | Max.   | Unit   |
|------------------|--|--|-------------|------|--------|--------|
| $I_{CEO}$        | Collector Cut-off Current ( $I_B = 0$ )            | $V_{CE} = \text{Half Rated } V_{CEO}$                    |             |      | 0.5    | mA     |
| $I_{CBO}$        | Collector Cut-off Current ( $I_E = 0$ )            | $V_{CB} = \text{Rated } V_{CBO}$                         |             |      | 0.2    | mA     |
| $I_{EBO}$        | Emitter Cut-off Current ( $I_C = 0$ )              | $V_{EB} = 5 \text{ V}$                                   |             |      | 5      | mA     |
| $V_{CEO(sus)}^*$ | Collector-Emitter Sustaining Voltage ( $I_B = 0$ ) | $I_C = 30 \text{ mA}$<br>for TIP135<br>for TIP132/TIP137 | 60<br>100   |      |        | V<br>V |
| $V_{CE(sat)}^*$  | Collector-Emitter Saturation Voltage               | $I_C = 4 \text{ A}$<br>$I_C = 6 \text{ A}$               |             |      | 2<br>4 | V<br>V |
| $V_{BE}^*$       | Base-Emitter Voltage                               | $I_C = 4 \text{ A}$<br>$V_{CE} = 4 \text{ V}$            |             |      | 2.5    | V      |
| $h_{FE}^*$       | DC Current Gain                                    | $I_C = 1 \text{ A}$<br>$I_C = 4 \text{ A}$               | 500<br>1000 |      | 15000  |        |

\* Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5 %  
For PNP types voltage and current values are negative.

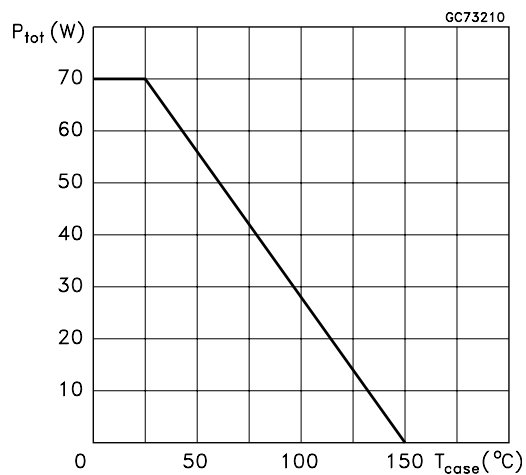


## Typical Characteristics

Safe Operating Areas

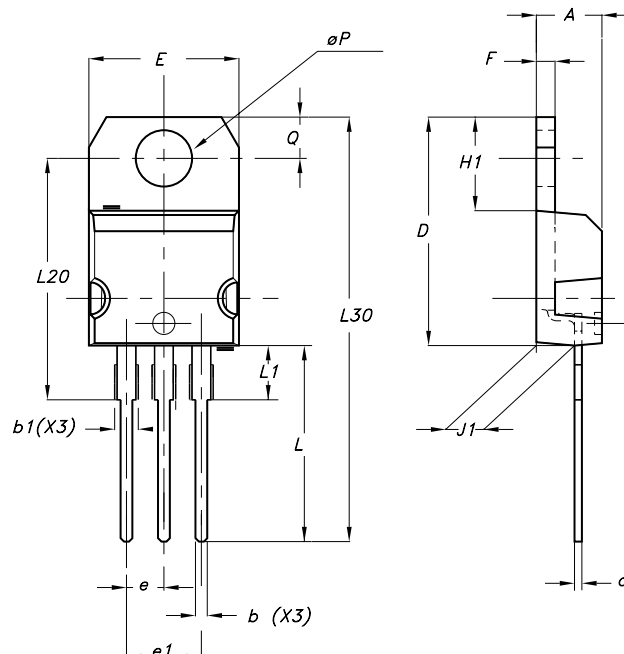


Power Derating Curve





## Package Information TO-220S



| DIM. | mm.   |       |       | inch  |       |       |
|------|-------|-------|-------|-------|-------|-------|
|      | MIN.  | TYP   | MAX.  | MIN.  | TYP.  | MAX.  |
| A    | 4.40  |       | 4.60  | 0.173 |       | 0.181 |
| b    | 0.61  |       | 0.88  | 0.024 |       | 0.034 |
| b1   | 1.15  |       | 1.70  | 0.045 |       | 0.066 |
| c    | 0.49  |       | 0.70  | 0.019 |       | 0.027 |
| D    | 15.25 |       | 15.75 | 0.60  |       | 0.620 |
| E    | 10    |       | 10.40 | 0.393 |       | 0.409 |
| e    | 2.40  |       | 2.70  | 0.094 |       | 0.106 |
| e1   | 4.95  |       | 5.15  | 0.194 |       | 0.202 |
| F    | 1.23  |       | 1.32  | 0.048 |       | 0.052 |
| H1   | 6.20  |       | 6.60  | 0.244 |       | 0.256 |
| J1   | 2.40  |       | 2.72  | 0.094 |       | 0.107 |
| L    | 13    |       | 14    | 0.511 |       | 0.551 |
| L1   | 3.50  |       | 3.93  | 0.137 |       | 0.154 |
| L20  |       | 16.40 |       |       | 0.645 |       |
| L30  |       | 28.90 |       |       | 1.137 |       |
| øP   | 3.75  |       | 3.85  | 0.147 |       | 0.151 |
| Q    | 2.65  |       | 2.95  | 0.104 |       | 0.116 |



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