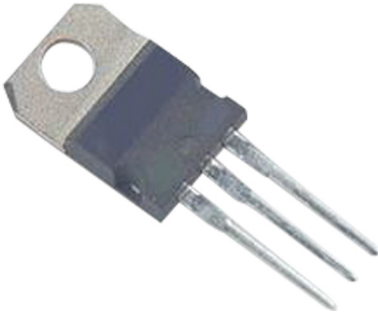


Darlington Transistor



Features:

- They are high voltage, high current devices for fast switching applications
- Collector-emitter sustaining voltage - $V_{CEO(sus)} = 200V$ (Min.) - BU806
- Low Collector-emitter Saturation Voltage - $V_{CE(SAT)} = 1.5V$ (Max.) at $I_C = 5A, I_B = 50mA$

Maximum Ratings

| Characteristic | Symbol | BU406 | Unit |
|----------------------------------------------------------------------------|-------------------|-------------|--------------------|
| Collector-Emitter Voltage | V_{CEO} | 200 | V |
| Collector-Base Voltage | V_{CEV} | 400 | |
| Emitter-Base Voltage | V_{CBO} | 6 | |
| Collector Current-Continuous -Peak | I_C I_{CM} | 8 15 | A |
| Base Current-Continuous | I_B | 2 | |
| Total Power Dissipation at $T_C = 25^\circ C$ Derate above $25^\circ C$ | P_D | 60 0.48 | W W/ $^\circ C$ |
| Operating and Storage Junction Temperature Range | T_J, T_{STG} | -65 to +150 | $^\circ C$ |

Thermal Characteristics

| Characteristic | Symbol | Max. | Unit |
|-------------------------------------|-----------------|------|--------------|
| Thermal Resistance Junction to Case | $R_{\theta jc}$ | 2.08 | $^\circ C/W$ |

Darlington Transistor



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

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

OFF Characteristics

| | | | | |
|---------------------------------------------------------------------------|----------------|-----|-----|----|
| Collector-Emitter Sustaining Voltage (1) $I_C = 100\text{mA}, I_B = 0$ | $V_{CEO(sus)}$ | 200 | - | V |
| Collector Cut off Current $V_{CE} = 400\text{V}, V_{BE} = 0$ | I_{CES} | - | 0.1 | mA |
| Emitter Cut off Current $V_{EB} = 6\text{V}, I_C = 0$ | I_{EBO} | - | 3 | |

ON Characteristics (1)

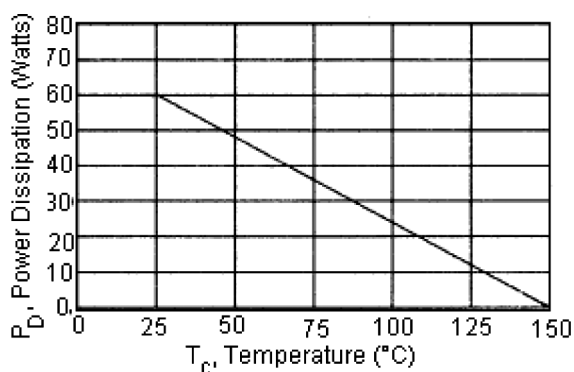
| | | | | |
|------------------------------------------------------------------------------|---------------|---|-----|---|
| Collector-Emitter Saturation Voltage $I_C = 5\text{A}, I_B = 50\text{mA}$ | $V_{CE(sat)}$ | - | 1.5 | - |
| Base-Emitter Saturation Voltage $I_C = 5\text{A}, I_B = 50\text{mA}$ | $V_{BE(sat)}$ | - | 2.4 | V |
| Diode Forward Voltage $I_C = 4\text{A}$ | V_F | - | 2 | |

Switching Characteristics

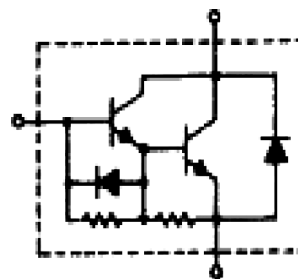
| | | | | |
|--------------|---------------------------------------------------------------------------------------------------------------------|----------|-------------|---------------|
| Turn On Time | $V_{CC} = 100\text{V}, I_C = 5\text{A}$ $I_{B1} = 50\text{mA}, I_{B2} = -500\text{mA}$ $V_{CC} = 100\text{V}$ | t_{on} | 0.35 (Typ.) | μs |
| Storage Time | | t_s | 0.55 (Typ.) | |
| Fall Time | | t_f | 0.2 (Typ.) | |

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

Power Derating



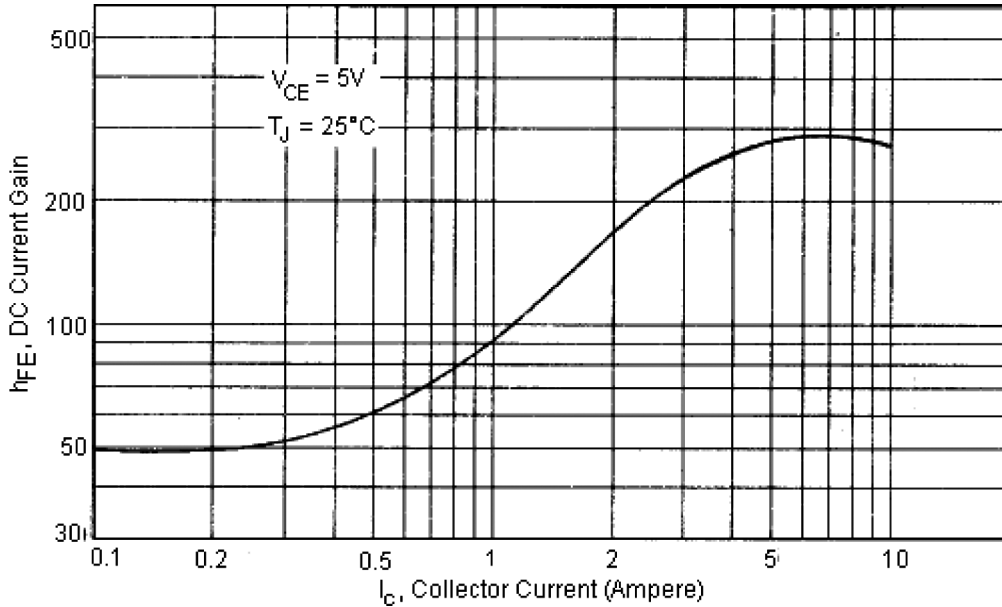
Schematic Diagram



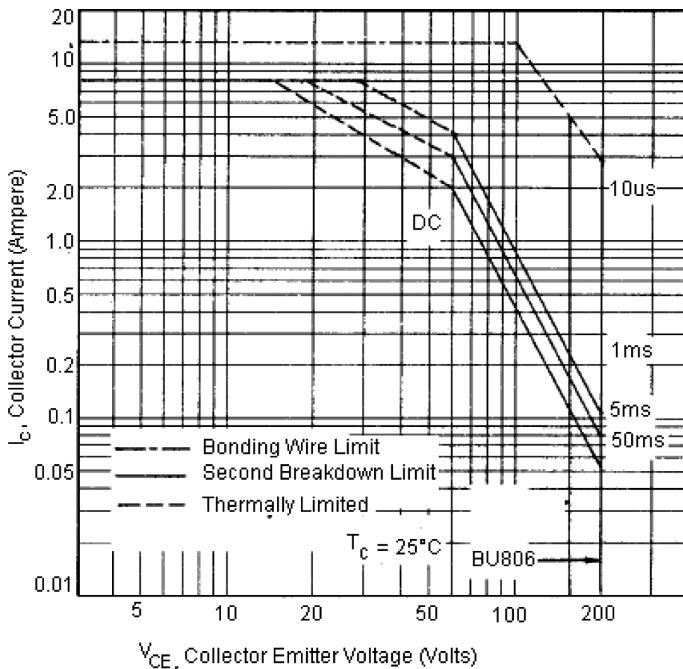
Darlington Transistor



DC Current Gain



Active-Region Safe Operating Area (SOA)

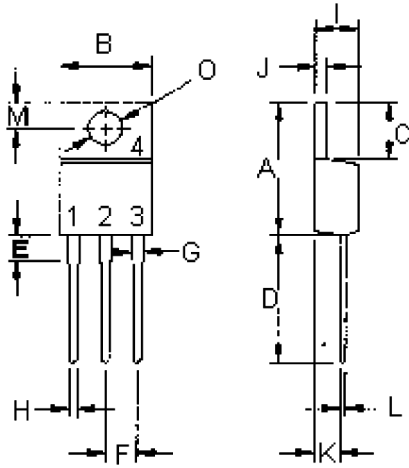


There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown safe operating area curves indicate I_C - V_{CE} limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation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

The data of SOA curve is based 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.



Darlington Transistor



Pin Configuration:

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

| 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, TO-220 | BU806 |

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