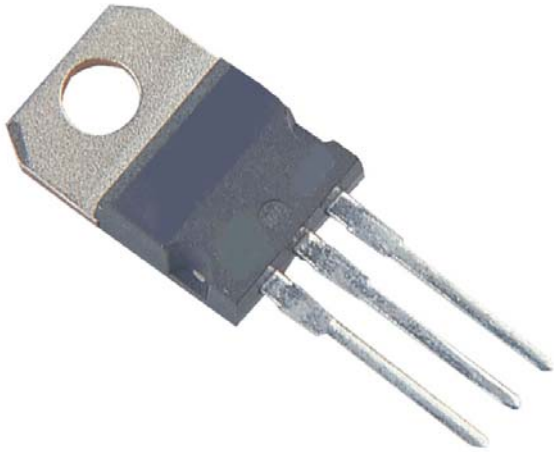


2N6388

Darlington Power Transistor



Darlington silicon power transistors are designed for general-purpose amplifier and low speed switching applications.

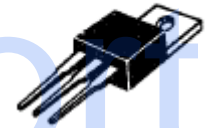
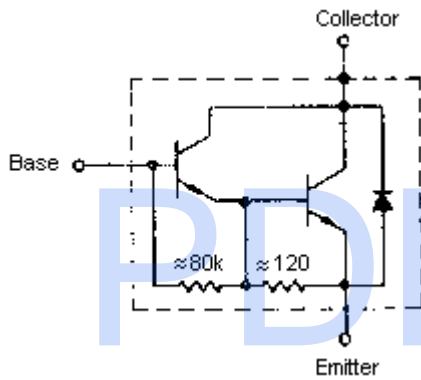
Features:

- Collector-Emitter Sustaining Voltage
 $V_{CE(sus)} = 80V$ (Minimum).
- Collector-Emitter Saturation Voltage
 $V_{CE(sat)} = 2.0V$ (Maximum) at $I_C = 5.0A$.
- DC Current Gain $h_{FE} = 2500$ (Typical) at $I_C = 4.0A$.

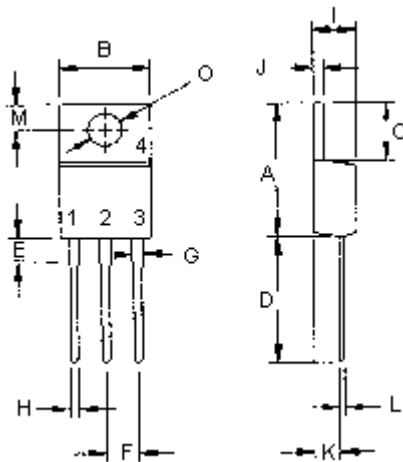
NPN

2N6388

10 Ampere
Darlington
Power Transistors
NPN Silicon
80 Volts
65 Watts



TO-220



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

| Dimensions | Minimum | Maximum |
|------------|---------|---------|
| 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 | 2.20 | 2.97 |
| L | 0.33 | 0.55 |
| M | 2.48 | 2.98 |
| O | 3.70 | 3.90 |

Dimensions : Millimetres



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Darlington Power Transistor



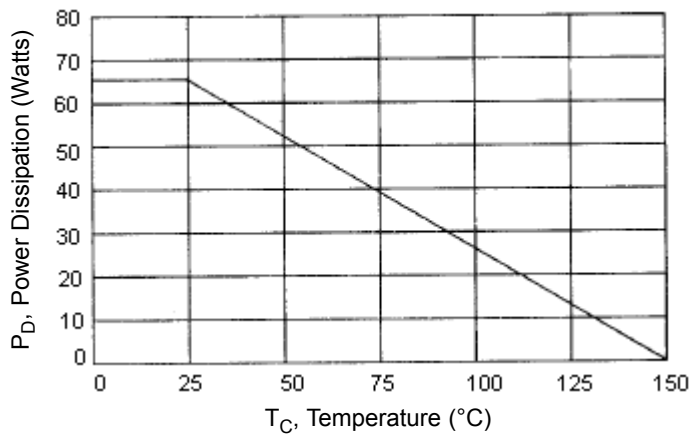
Maximum Ratings

| Characteristic | Symbol | Rating | Unit |
|--|-------------------|-------------|--------------------------------|
| Collector-Emitter Voltage | V_{CEO} | 80 | V |
| Collector-Base Voltage | V_{CBO} | | |
| Emitter-Base Voltage | V_{EBO} | | |
| Collector Current-Continuous -Peak | I_C I_{CM} | 10 15 | A |
| Base Current | I_B | 0.25 | |
| Total Power Dissipation at $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 65 0.52 | W $\text{W}/^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range | T_J, T_{STG} | -65 to +150 | $^\circ\text{C}$ |

Thermal Characteristics

| Characteristic | Symbol | Maximum | Unit |
|-------------------------------------|-----------------|---------|---------------------------|
| Thermal Resistance Junction to Case | $R_{\theta jc}$ | 1.92 | $^\circ\text{C}/\text{W}$ |

Figure - 1 Power Derating



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Darlington Power Transistor



Electrical Characteristics ($T_C = 25^\circ\text{C}$ Unless Otherwise Noted)

| Characteristic | Symbol | Minimum | Maximum | Unit |
|---|----------------|-------------|------------|------|
| OFF Characteristics | | | | |
| Collector-Emitter Sustaining Voltage (1) ($I_C = 200\text{mA}$, $I_B = 0$) | $V_{CEO(sus)}$ | 80 | - | V |
| Collector Cut off Current ($V_{CE} = 80\text{V}$, $I_B = 0$) | I_{CEO} | - | 1.0 | mA |
| Collector Cut off Current ($V_{CE} = 80\text{V}$, $V_{BE(off)} = 1.5\text{V}$) ($V_{CE} = 80\text{V}$, $V_{BE(off)} = 1.5\text{V}$, $T_C = 125^\circ\text{C}$) | I_{CEX} | - | 0.3 3.0 | |
| Emitter Cut off Current ($V_{EB} = 5.0\text{V}$, $I_C = 0$) | I_{EBO} | 5.0 | - | |
| ON Characteristics (1) | | | | |
| DC Current Gain ($I_C = 5.0\text{A}$, $V_{CE} = 3.0\text{V}$) ($I_C = 10\text{A}$, $V_{CE} = 3.0\text{V}$) | h_{FE} | 1000 100 | 20,000 | - |
| Collector-Emitter Saturation Voltage ($I_C = 5.0\text{A}$, $I_B = 10\text{mA}$) ($I_C = 10\text{A}$, $I_B = 100\text{mA}$) | $V_{CE(sat)}$ | - | 2.0 3.0 | V |
| Base-Emitter On Voltage ($I_C = 5.0\text{A}$, $V_{CE} = 3.0\text{V}$) ($I_C = 10\text{A}$, $V_{CE} = 3.0\text{V}$) | $V_{BE(on)}$ | - | 2.8 4.5 | |
| Dynamic Characteristics | | | | |
| Small-Signal Current Gain ($I_C = 1.0\text{A}$, $V_{CE} = 5.0\text{V}$, $f = 1.0\text{KHz}$) | h_{fe} | 1000 | - | - |
| Output Capacitance ($V_{CB} = 10\text{V}$, $I_E = 0$, $f = 1.0\text{MHz}$) | C_{ob} | - | 200 | pF |

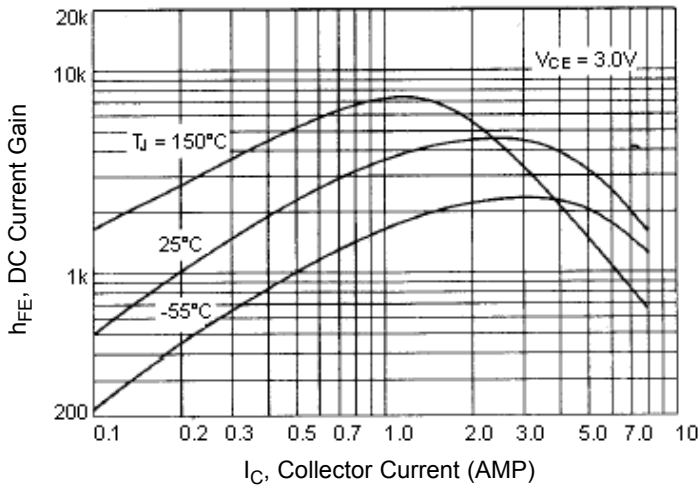
(1) Pulse Test: Pulse Width = $300\mu\text{s}$, Duty Cycle $\leq 2.0\%$.

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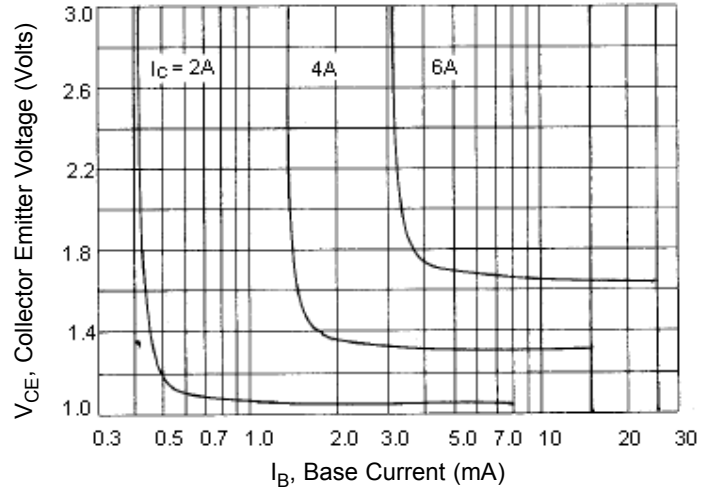
Darlington Power Transistor



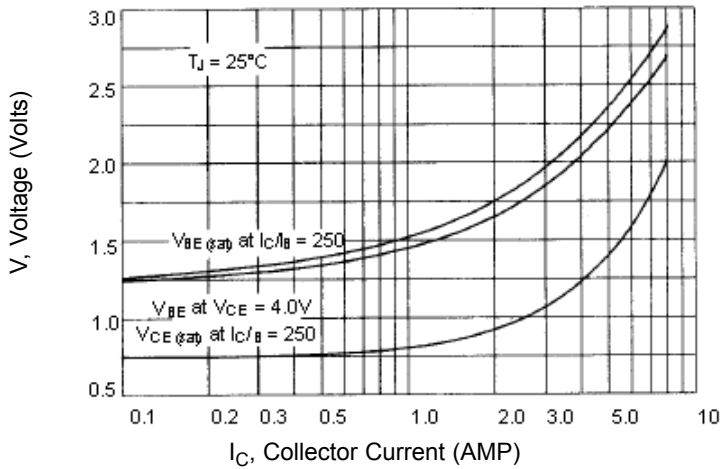
DC Current Gain



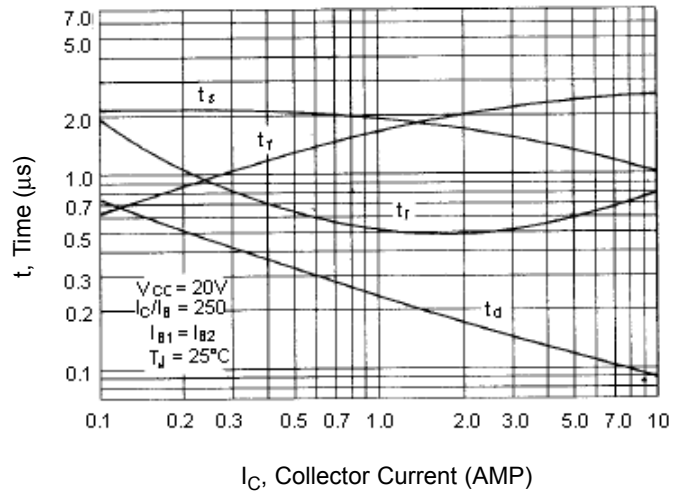
Collector Saturation Region



"ON" Voltages



Switching Time

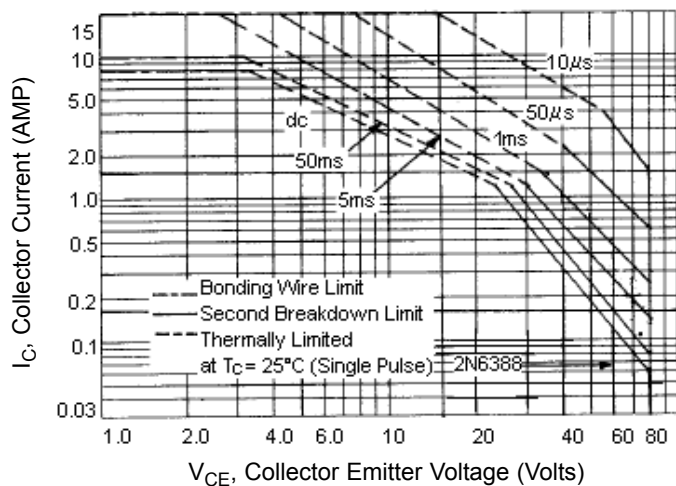


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Darlington Power Transistor



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 that 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 conditions. 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.

Specifications

| $I_{C(av)}$ maximum (A) | V_{CE0} maximum (V) | h_{FE} minimum at $I_C = 5\text{A}$ | P_{tot} at 25°C (W) | Package | Type | Part Number |
|-------------------------------|-----------------------------|---|---|---------|------|-------------|
| 10 | 80 | 1000 | 65 | TO-220 | NPN | 2N6388 |



2N6388

Darlington Power Transistor



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