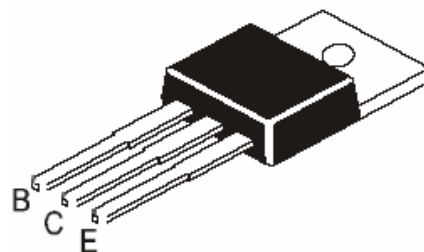


Darlington Power Transistors (NPN)

Features

- Designed for general-purpose amplifier and low speed switching applications
- RoHS Compliant



TO-220



Mechanical Data

| | |
|-------------------|--|
| Case: | TO-220, Plastic Package |
| Terminals: | Solderable per MIL-STD-202, Method 208 |
| Weight: | 0.08 ounces, 2.24 grams |

Maximum Ratings *(T_{Ambient}=25°C unless noted otherwise)*

| Symbol | Description | TIP120 | TIP121 | TIP122 | Unit |
|---------------------------------------|---|-------------|--------|--------|--------|
| V_{CB0} | Collector-Base Voltage | 60 | 80 | 100 | V |
| V_{CEO} | Collector-Emitter Voltage | 60 | 80 | 100 | V |
| V_{EB0} | Emitter-Base Voltage | 5.0 | | | V |
| I_c | Collector Current Continuous | 5.0 | | | A |
| I_{CM} | Collector Current Peak | 8.0 | | | A |
| I_B | Base Current | 120 | | | mA |
| P_D | Power Dissipation upto T _C =25°C | 65 | | | W |
| | Power Dissipation Derate above T _C =25°C | 0.52 | | | W/° C |
| | Power Dissipation upto T _A =25°C | 2.0 | | | W |
| | Power Dissipation Derate above T _A =25°C | 16 | | | mW/° C |
| R_{θJA} | Thermal Resistance from Junction to Ambient in Free Air | 62.5 | | | ° C /W |
| R_{θJC} | Thermal Resistance from Junction to Case | 1.92 | | | ° C /W |
| T_J, T_{STG} | Operating Junction and Storage Temperature Range | -65 to +150 | | | ° C |

Darlington Power Transistors (NPN)

TIP120/121/122

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

| Symbol | Description | Min. | Max. | Unit | Conditions | |
|------------------------------|--------------------------------------|---------------|------|------|--|----------------------|
| *hFE | D.C. Current Gain | 1000 | - | | $V_{CE}=3V, I_C=0.5A$ | |
| | | 1000 | - | | $V_{CE}=3V, I_C=3A$ | |
| *V_{CEO(sus)} | Collector-Emitter Sustaining Voltage | TIP120 | 60 | - | V | $I_C=100mA, I_B=0$ |
| | | TIP121 | 80 | - | V | |
| | | TIP122 | 100 | - | V | |
| *V_{CE(sat)} | Collector-Emitter Saturation Voltage | - | 2.0 | V | $I_C=3A, I_B=12mA$ | |
| | | - | 4.0 | V | $I_C=5A, I_B=20mA$ | |
| *V_{BE(on)} | Base-Emitter On Voltage | - | 2.5 | V | $I_C=3A, V_{CE}=3V$ | |
| I_{CEO} | Collector-Emitter Cut-off Current | TIP120 | - | 0.5 | mA | $V_{CE}=30V, I_B=0$ |
| | | TIP121 | - | 0.5 | | $V_{CE}=40V, I_B=0$ |
| | | TIP122 | - | 0.5 | | $V_{CE}=50V, I_B=0$ |
| I_{CBO} | Collector-Base Cut-off Current | TIP120 | - | 0.2 | mA | $V_{CB}=60V, I_E=0$ |
| | | TIP121 | - | 0.2 | | $V_{CB}=80V, I_E=0$ |
| | | TIP122 | - | 0.2 | | $V_{CB}=100V, I_E=0$ |
| I_{EBO} | Emitter-Base Cut-off Current | - | 2 | mA | $V_{EB}=5V, I_C=0$ | |
| h_{fe} | Small Signal Current Gain | 4.0 | - | | $I_C=3A, V_{CE}=4V, f=1.0MHz,$ | |
| C_{ob} | Output Capacitance | - | 200 | pF | $V_{CB}=10V, I_E=0, f=0.1MHz,$ | |
| t_{on} | Turn on time | Typ. 0.4 | | μS | $I_C=3A, R_L=10\Omega, I_{B1}=I_{B2}=12mA, V_{EB(off)}=5V$ | |
| t_{off} | Turn off time | Typ. 1.2 | | | | |

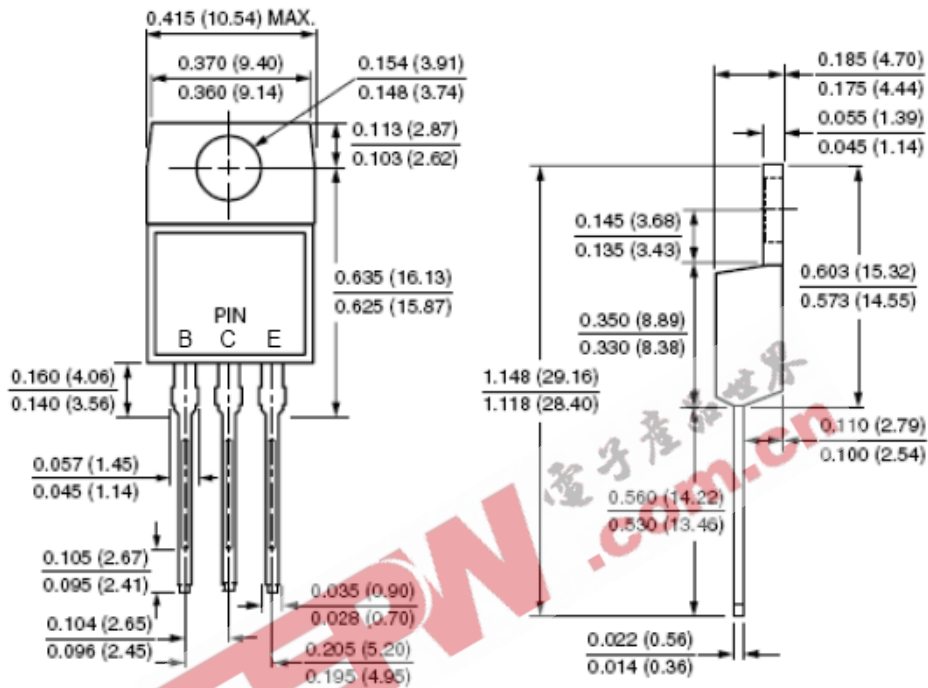
*Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

Darlington Power Transistors (NPN)

TIP120/121/122

Dimensions in inch (mm)

TO-220



Pin Configuration

- B. Base
- C. Collector
- E. Emitter

Darlington Power Transistors (NPN)

TIP120/121/122

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