

TIP150

SILICON DARLINGTON POWER TRANSISTORS

NPN epitaxial-base transistors in a monolithic Darlington circuit and housed in a TO-220 envelope.

High voltage, high forward and reverse energy designed for industrial and consumer applications.

Compliance to RoHS.

ABSOLUTE MAXIMUM RATINGS

| Symbol | Ratings | | Value | Unit |
|-----------|--|-----------------------|-------------|-------|
| V_{CBO} | Collector-Base Voltage | | 300 | V |
| V_{CEO} | Collector-Emitter Voltage | | 300 | V |
| V_{EBO} | Emitter-Base Voltage | | 8 | V |
| I_C | Collector Current | | 7 | A |
| I_{CM} | Collector Peak Current (1) | | 10 | A |
| I_B | Base Current | | 1.5 | A |
| P_T | Power Dissipation at Case Temperature (2) | @ $T_{mb} < 25^\circ$ | 80 | Watts |
| | Power Dissipation at free Air Temperature (3) | | 2 | |
| t_J | Junction Temperature | | -65 to +150 | °C |
| t_s | Storage Temperature range | | -65 to +150 | |
| t_L | Lead Temperature 3.2 mm from case for 10 seconde | | 260 | |

1. This value applies for $t_p < 5ms$, duty cycle $< 10\%$.
2. Derate linearly to 150°C case temperature at the rate of 0.64 W/°C.
3. Derate linearly to 150°C free air temperature at the rate of 16 mW/°C.

THERMAL CHARACTERISTICS

| Symbol | Ratings | Value | Unit |
|------------|--|-------|------|
| R_{thJC} | From Junction to Case Thermal Resistance | 2.5 | °C/W |
| R_{thJA} | From Junction to Free-Air Thermal Resistance | 62.5 | |

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ELECTRICAL CHARACTERISTICS

TC=25°C unless otherwise noted

| Symbol | Ratings | Test Condition(s) | Min | Typ | Max | Unit |
|-----------------|---|--|-----|-----|-----|---------------|
| V_{CBO} | Collector-Base Breakdown Voltage | $I_C = 1 \text{ mA}, I_E = 0$ | 300 | - | - | V |
| V_{CEO} | Collector-Emitter Breakdown Voltage (4) | $I_C = 10 \text{ mA}, I_B = 0$ | 300 | - | - | V |
| I_{CEO} | Collector-Emitter Cutoff Current | $I_B = 0, V_{CE} = 300 \text{ V}$ | - | - | 250 | μA |
| $I_{CEOX(sus)}$ | Collector-Emitter sustaining Current | $I_E = 0, V_{CLAMP} = V_{CEO}$ | 7 | - | - | A |
| I_{EBO} | Emitter Cutoff Current | $V_{EB} = 8 \text{ V}, I_C = 0$ | - | - | 15 | mA |
| $V_{CE(SAT)}$ | Collector-Emitter saturation Voltage (4-5) | $I_C = 1 \text{ A}, I_B = 10 \text{ mA}$ | - | - | 1.5 | V |
| | | $I_C = 2 \text{ A}, I_B = 100 \text{ mA}$ | - | - | 1.5 | |
| | | $I_C = 5 \text{ A}, I_B = 250 \text{ mA}$ | - | - | 2 | |
| $V_{BE(SAT)}$ | Base-Emitter Saturation Voltage (4-5) | $I_C = 2 \text{ A}, I_B = 100 \text{ mA}$ | - | - | 2.2 | V |
| | | $I_C = 5 \text{ A}, I_B = 250 \text{ mA}$ | - | - | 2.3 | |
| h_{FE} | Forward Current transfer ratio (4-5) | $V_{CE} = 5.0 \text{ V}, I_C = 2.5 \text{ A}$ | 150 | - | - | - |
| | | $V_{CE} = 5.0 \text{ V}, I_C = 5 \text{ A}$ | 50 | - | - | |
| | | $V_{CE} = 5.0 \text{ V}, I_C = 7 \text{ A}$ | 15 | - | - | |
| h_{fe} | Small Signal Forward Current transfer ratio | $V_{CE} = 5.0 \text{ V}, I_C = 0.5 \text{ A}$ $f = 1 \text{ kHz}$ | 200 | - | - | - |
| V_F | Diode forward Voltage | $I_F = 7 \text{ A}$ | - | - | 3.5 | V |
| C_{OB} | Output Capacitance | $I_E = 0; V_{CB} = 10 \text{ V}$ $f = 1 \text{ MHz}$ | - | - | 150 | pF |

SWITCHING TIMES.

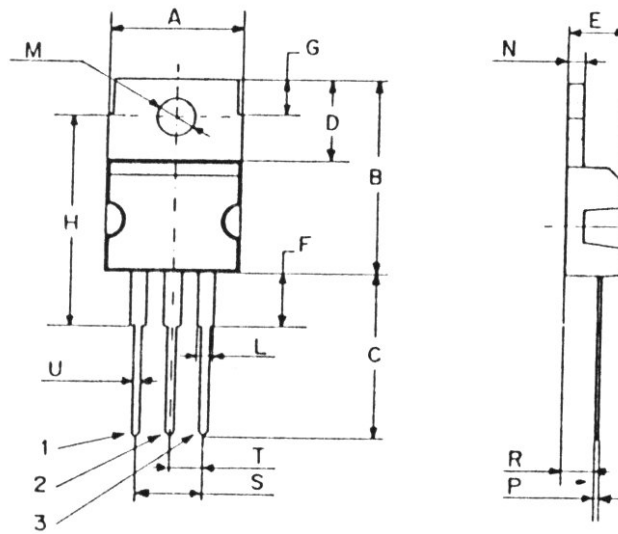
| Symbol | Ratings | Test Condition(s) | Min | Typ | Max | Unit |
|--------|--------------|---|-----|------|-----|---------------|
| t_d | Delay Time | $V_{CC} = 250 \text{ V}; I_C = 5 \text{ A}$ $I_{B1} = -I_{B2} = 250 \text{ mA}$ $t_p = 20 \mu\text{s}, \text{ duty cycle } < 2\%$ | - | 0.03 | - | μs |
| t_r | Rise time | | - | 0.18 | - | |
| t_s | Storage Time | | - | 3.5 | - | |
| t_f | Fall Time | | - | 1.6 | - | |

- These parameters must be measured using pulse techniques, t_p 300 μs , Duty Cycle $< 2.0\%$
- These parameters must be measured using voltage-sensing contacts, separate from the current carrying contacts.

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MECHANICAL DATA CASE TO-220

| DIMENSIONS (mm) | | |
|-----------------|-------|-------|
| | Min. | Max. |
| A | 9,90 | 10,30 |
| B | 15,65 | 15,90 |
| C | 13,20 | 13,40 |
| D | 6,45 | 6,65 |
| E | 4,30 | 4,50 |
| F | 2,70 | 3,15 |
| G | 2,60 | 3,00 |
| H | 15,75 | 17,15 |
| L | 1,15 | 1,40 |
| M | 3,50 | 3,70 |
| N | - | 1,37 |
| P | 0,46 | 0,55 |
| R | 2,50 | 2,70 |
| S | 4,98 | 5,08 |
| T | 2,49 | 2,54 |
| U | 0,70 | 0,90 |



| | |
|---------|-----------|
| Pin 1 : | Base |
| Pin 2 : | Collector |
| Pin 3 : | Emitter |
| Package | Collector |

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