

New Jersey Semi-Conductor Products, Inc.

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NPN SILICON POWER DARLINGTON TRANSISTORS

...designed for use in automotive ignition, switching and motor control applications.

FEATURES:

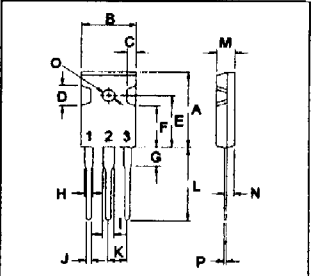
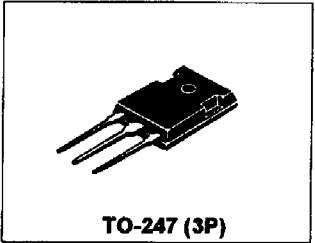
- * Collector-Emitter Sustaining Voltage-
 $V_{CE(sus)}$ = 320 V (Min) - TIP160
 = 350 V (Min) - TIP161
 = 380 V (Min) - TIP162
- * Collector-Emitter Saturation Voltage
 $V_{CE(sat)}$ = 2.9 V (Max.) @ $I_C = 10 A$
- * 10 A Rated Continuous Collector Current

NPN
TIP160
TIP161
TIP162

10 AMPERE
DARLINGTON
POWER TRANSISTORS
320-380 VOLTS
125 WATTS

MAXIMUM RATINGS

| Characteristic | Symbol | TIP160 | TIP161 | TIP162 | Unit |
|---|----------------|-------------|--------|--------|---------------|
| Collector-Emitter Voltage | V_{CEO} | 320 | 350 | 380 | V |
| Collector-Base Voltage | V_{CBO} | 320 | 350 | 380 | V |
| Emitter-Base Voltage | V_{EBO} | 5.0 | | | V |
| Collector Current-Continuous | I_C | 10 | | | A |
| -Peak | I_{CM} | 15 | | | |
| Base Current | I_B | 1.0 | | | A |
| Total Power Dissipation @ $T_C = 25^\circ C$ Derate above $25^\circ C$ | P_D | 125 | | | W |
| | | 1.0 | | | W/ $^\circ C$ |
| Operating and Storage Junction Temperature Range | T_J, T_{STG} | -65 to +150 | | | $^\circ C$ |

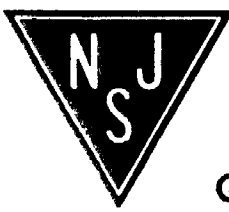
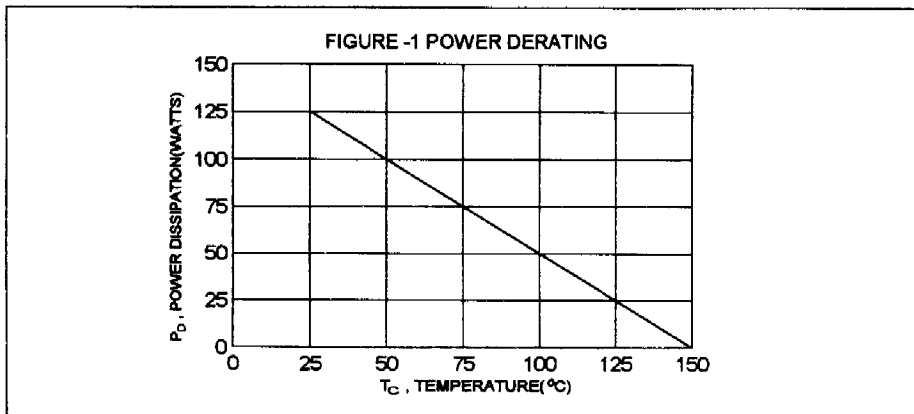


PIN 1. BASE
2. COLLECTOR
3. EMITTER

| DIM | MILLIMETERS | |
|-----|-------------|-------|
| | MIN | MAX |
| A | 20.63 | 22.38 |
| B | 15.38 | 18.20 |
| C | 1.90 | 2.70 |
| D | 5.10 | 6.10 |
| E | 14.81 | 15.22 |
| F | 11.72 | 12.84 |
| G | 4.20 | 4.50 |
| H | 1.82 | 2.46 |
| I | 2.92 | 3.23 |
| J | 0.89 | 1.53 |
| K | 5.26 | 5.66 |
| L | 18.50 | 21.50 |
| M | 4.68 | 5.36 |
| N | 2.40 | 2.80 |
| O | 3.25 | 3.65 |
| P | 0.55 | 0.70 |

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|-------------------------------------|-----------------|-----|--------------|
| Thermal Resistance Junction to Case | $R_{\theta jc}$ | 1.0 | $^\circ C/W$ |



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Quality Semi-Conductors

TIP160, TIP161, TIP162 NPN

ELECTRICAL CHARACTERISTICS ($T_c = 25^\circ\text{C}$ unless otherwise noted)

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

OFF CHARACTERISTICS

| | | | | |
|--|----------------------------|-----------|-------------------|----|
| Collector Cutoff Current ($V_{ce} = 320\text{ V}, I_b = 0$) ($V_{ce} = 350\text{ V}, I_b = 0$) ($V_{ce} = 380\text{ V}, I_b = 0$) | TIP160 TIP161 TIP162 | I_{CEO} | 1.0 1.0 1.0 | mA |
| Emitter Cutoff Current ($V_{EB} = 5.0\text{ V}, I_C = 0$) | | I_{EBO} | 100 | mA |

ON CHARACTERISTICS (1)

| | | | | |
|---|---------------|-----|------------|---|
| DC Current Gain ($I_C = 4.0\text{ A}, V_{CE} = 2.2\text{ V}$) | h_{FE} | 200 | | |
| Collector-Emitter Saturation Voltage ($I_C = 6.5\text{ A}, I_B = 0.1\text{ A}$) ($I_C = 10\text{ A}, I_B = 1.0\text{ A}$) | $V_{CE(sat)}$ | | 2.8 2.9 | V |
| Base-Emitter Saturation Voltage ($I_C = 6.5\text{ A}, I_B = 0.1\text{ A}$) | $V_{BE(sat)}$ | | 2.2 | V |
| Diode Forward Voltage ($I_F = 10\text{ A}$) | V_F | | 3.5 | V |

SWITCHING CHARACTERISTICS

| | | | | | |
|--------------|---|-------|----------|--|---------------|
| Delay Time | $V_{CC} = 33\text{ V}, I_C = 6.5\text{ A}$ $I_{B1} = -I_{B2} = 100\text{ mA}$ $t_p = 20\mu\text{s}, \text{Duty Cycle} \leq 2.0\%$ | t_d | 0.3(Typ) | | μs |
| Rise Time | | t_r | 1.5(Typ) | | μs |
| Storage Time | | t_s | 2.3(Typ) | | μs |
| Fall Time | | t_f | 2.8(Typ) | | μs |

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

