New Jersey Semi-Conductor Products, Inc.

20 STERN AVE.
SPRINGFIELD, NEW JERSEY 07081
U.S.A.

TELEPHONE: (973) 376-2922
(212) 227-6005
FAX: (973) 376-8960

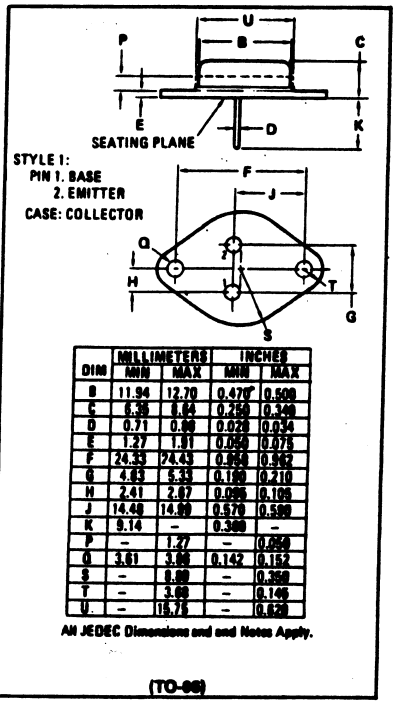
# 2N6211
# 2N6212
# 2N6213

**MEDIUM-POWER HIGH-VOLTAGE PNP POWER TRANSISTORS**

. . . designed for high-speed switching and linear amplifier applications for high-voltage operational amplifiers, switching regulators, converters, inverters, deflection stages and high fidelity amplifiers.

- Collector-Emitter Sustaining Voltage — $V_{CEO(sus)}$ = 225 to 350 Vdc @ $I_C$ = 200 mAdc
- Second Breakdown Collector Current — $I_{s/b}$ = 875 mAdc @ $V_{CE}$ = 40 Vdc
- $t_f$ = 0.6 μs Resistive Fall Time
- Usable DC Current Gain to 2.0 Adc

**2 AMPERE**
**POWER TRANSISTORS**
**PNP SILICON**
**225–350 VOLTS**
**35 WATTS**




| DIM | MILLIMETERS MIN | MILLIMETERS MAX | INCHES MIN | INCHES MAX |
|---|---|---|---|---|
| B | 11.94 | 12.70 | 0.470 | 0.500 |
| C | 6.35 | 8.64 | 0.250 | 0.340 |
| D | 0.71 | 0.86 | 0.028 | 0.034 |
| E | 1.27 | 1.91 | 0.050 | 0.075 |
| F | 24.33 | 24.43 | 0.958 | 0.962 |
| G | 4.83 | 5.33 | 0.190 | 0.210 |
| H | 2.41 | 2.67 | 0.095 | 0.105 |
| J | 14.48 | 14.99 | 0.570 | 0.590 |
| K | 5.14 | – | 0.380 | – |
| P | – | 1.27 | – | 0.050 |
| Q | 3.81 | 3.98 | 0.142 | 0.152 |
| S | – | 9.88 | – | 0.388 |
| T | – | 3.68 | – | 0.146 |
| U | – | 15.75 | – | 0.620 |

All JEDEC Dimensions and and Notes Apply.

(TO-66)

***MAXIMUM RATINGS**

| Rating | Symbol | 2N6211 | 2N6212 | 2N6213 | Unit |
|---|---|---|---|---|---|
| Collector-Emitter Voltage | $V_{CEO}$ | 225 | 300 | 350 | Vdc |
| Collector-Base Voltage | $V_{CB}$ | 275 | 350 | 400 | Vdc |
| Emitter-Base Voltage | $V_{EB}$ | ← 6 → | | | Vdc |
| Collector Current — Continuous | $I_C$ | ← 2 → | | | Adc |
| Peak | | ← 5 → | | | |
| Base Current | $I_B$ | ← 1 → | | | Adc |
| Total Power Dissipation @ $T_C$ = 25°C | $P_D$ | ← 35 → | | | Watts |
| Derate above 25°C | | ← 0.2 → | | | W/°C |
| Operating and Storage Junction Temperature Range | $T_J$, $T_{stg}$ | −65 to +200 | | | °C |

**THERMAL CHARACTERISTICS**

| Characteristic | Symbol | Max | Unit |
|---|---|---|---|
| Thermal Resistance, Junction to Case | $\theta_{JC}$ | 5.0 | °C/W |

NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

**ELECTRICAL CHARACTERISTICS** ($T_C$ = 25°C unless otherwise noted)

| Characteristic | | Symbol | Min | Max | Unit |
|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | |
| *Collector-Emitter Sustaining Voltage (1) ($I_C$ = 200 mAdc, $I_B$ = 0) | 2N6211 | $V_{CEO(sus)}$ | 225 | – | Vdc |
| | 2N6212 | | 300 | – | |
| | 2N6213 | | 350 | – | |
| *Collector-Emitter Sustaining Voltage ($I_C$ = 200 mA, $V_{BE}$ = −1.5 V, L = 10 mH) | 2N6211 | $V_{CEX(sus)}$ | 275 | – | Vdc |
| | 2N6212 | | 350 | – | |
| | 2N6213 | | 400 | – | |
| *Collector-Emitter Sustaining Voltage (1) ($I_C$ = 200 mA, $I_B$ = 0, $R_{BE}$ = 50 Ω) | 2N6211 | $V_{CER(sus)}$ | 250 | – | Vdc |
| | 2N6212 | | 325 | – | |
| | 2N6213 | | 375 | – | |
| *Emitter-Base Breakdown Voltage (1) ($I_E$ = 0.5 mAdc, $I_C$ = 0) | 2N6212/13 | $V_{EBO}$ | 6.0 | – | Vdc |
| ($I_E$ = 1.0 mAdc, $I_C$ = 0) | 2N6211 | | 6.0 | – | |
| *Collector Cutoff Current ($V_{CE}$ = 250 Vdc, $V_{BE(off)}$ = 1.5 Vdc, $T_C$ = 25°C) | | $I_{CEV}$ | – | 0.5 | mAdc |
| ($T_C$ = 100°C) | | | – | 5.0 | |
| ($V_{CE}$ = 315 Vdc, $V_{BE(off)}$ = 1.5 Vdc, $T_C$ = 25°C) | | | – | 0.5 | |
| ($T_C$ = 100°C) | | | – | 5.0 | |
| ($V_{CE}$ = 360 Vdc, $V_{BE(off)}$ = 1.5 Vdc, $T_C$ = 25°C) | | | – | 0.5 | |
| ($T_C$ = 100°C) | | | – | 5.0 | |
| Collector Cutoff Current ($V_{CE}$ = 150 Vdc, $I_B$ = 0) | All Types | $I_{CEO}$ | – | 5.0 | mAdc |
| *Emitter Cutoff Current ($V_{EB}$ = 6.0 Vdc, $I_C$ = 0) | 2N6211 | $I_{EBO}$ | – | 1.0 | mAdc |
| | 2N6212 | | – | 0.5 | |
| | 2N6213 | | – | 0.5 | |
| ***ON CHARACTERISTICS (1)** | | | | | |
| DC Current Gain ($I_C$ = 1.0 Adc, $V_{CE}$ = 2.8 Vdc) | 2N6211 | $h_{FE}$ | 10 | 100 | – |
| ($I_C$ = 1.0 Adc, $V_{CE}$ = 3.2 Vdc) | 2N6212 | | 10 | 100 | |
| ($I_C$ = 1.0 Adc, $V_{CE}$ = 4.0 Vdc) | 2N6213 | | 10 | 100 | |
| Collector-Emitter Saturation Voltage ($I_C$ = 1.0 Adc, $I_B$ = 125 mAdc) | 2N6211 | $V_{CE(sat)}$ | – | 1.4 | Vdc |
| | 2N6212 | | – | 1.6 | |
| | 2N6213 | | – | 2.0 | |
| Base-Emitter Saturation Voltage ($I_C$ = 1.0 Adc, $I_B$ = 125 mAdc) | All Types | $V_{BE(sat)}$ | – | 1.4 | Vdc |
| **DYNAMIC CHARACTERISTICS** | | | | | |
| *Current Gain—Bandwidth Product (2) ($I_C$ = 200 mAdc, $V_{CE}$ = 10 Vdc, $f_{test}$ = 5.0 MHz) | | $f_T$ | 20 | – | MHz |
| Output Capacitance ($V_{CB}$ = 10 Vdc, $I_E$ = 0, f = 1.0 MHz) | | $C_{ob}$ | – | 220 | pF |
| ***SECOND BREAKDOWN** | | | | | |
| *Second Breakdown Collector Current with Base Forward Biased t = 1.0 s (non-repetitive) ($V_{CE}$ = 40 Vdc) | | $I_{s/b}$ | 0.875 | – | Adc |
| ***SWITCHING CHARACTERISTICS** | | | | | |
| Rise Time | ($V_{CC}$ = 200 Vdc, $I_C$ = 1.0 Adc, $I_{B1}$ = $I_{B2}$ = 0.125 Adc) | $t_r$ | – | 0.8 | μs |
| Storage Time | | $t_s$ | – | 2.5 | μs |
| Fall Time | | $t_f$ | – | 0.8 | μs |

*Indicates JEDEC Registered Data.

(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%

**FIGURE 2 – SWITCHING TIME TEST CIRCUIT**