

## PNP HIGH POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/461

### Devices

2N6211

2N6212

2N6213

### Qualified Level

JAN  
JANTX  
JANTXV

### MAXIMUM RATINGS

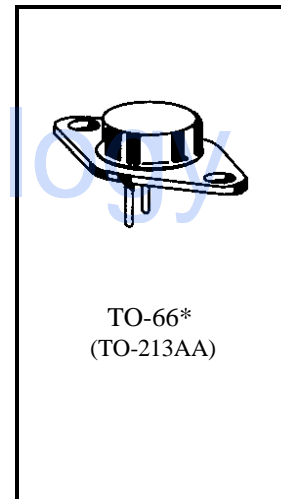
| Ratings                         | Symbol            | 2N6211                     | 2N6212      | 2N6213 | Unit        |
|---------------------------------|-------------------|----------------------------|-------------|--------|-------------|
| Collector-Emitter Voltage       | $V_{CEO}$         | 225                        | 300         | 350    | Vdc         |
| Collector-Base Voltage          | $V_{CBO}$         | 275                        | 350         | 400    | Vdc         |
| Emitter-Base Voltage            | $V_{EBO}$         |                            | 6.0         |        | Vdc         |
| Base Current                    | $I_B$             |                            | 1.0         |        | Adc         |
| Collector Current               | $I_C$             |                            | 2.0         |        | Adc         |
| Total Power Dissipation         | $P_T$             | @ $T_A = +25^{\circ}C$ (1) |             | 3.0    | W           |
|                                 |                   | @ $T_C = +25^{\circ}C$ (2) |             | 35     | W           |
| Operating & Storage Temperature | $T_{op}, T_{stg}$ |                            | -55 to +200 |        | $^{\circ}C$ |

### THERMAL CHARACTERISTICS

| Characteristics                     | Symbol          | Max. | Unit          |
|-------------------------------------|-----------------|------|---------------|
| Thermal Resistance Junction-to-Case | $R_{\theta JC}$ | 5.0  | $^{\circ}C/W$ |

1) Derate linearly 17.1 mW/ $^{\circ}C$  for  $T_A > +25^{\circ}C$

2) Derate linearly 200 mW/ $^{\circ}C$  for  $T_C > +25^{\circ}C$



\*See appendix A for package outline

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

| Characteristics | Symbol | Min. | Max. | Unit |
|-----------------|--------|------|------|------|
|-----------------|--------|------|------|------|

### OFF CHARACTERISTICS

|  |                            |               |                   |     |
|--|----------------------------|---------------|-------------------|-----|
| Collector-Emitter Breakdown Voltage<br>$I_C = 200$ mAdc, $f = 30$ -60 Hz   | 2N6211<br>2N6212<br>2N6213 | $V_{(BR)CEO}$ | 225<br>300<br>350 | Vdc |
| Collector-Emitter Breakdown Voltage<br>$I_C = 200$ mAdc, $f = 30$ -60 Hz, $R_{BE} = 50 \Omega$                       | 2N6211<br>2N6212<br>2N6213 | $V_{(BR)CER}$ | 250<br>325<br>375 | Vdc |
| Collector-Emitter Breakdown Voltage<br>$I_C = 200$ mAdc, $f = 30$ -60 Hz, $R_{BE} = 50 \Omega$ , $V_{BE} = -1.5$ Vdc | 2N6211<br>2N6212<br>2N6213 | $V_{(BR)CEX}$ | 275<br>350<br>400 | Vdc |

**2N6211, 2N6212, 2N6213 JAN SERIES**

**ELECTRICAL CHARACTERISTICS (con't)**

| Characteristics  | Symbol    | Min.                       | Max.              | Unit |
|--|-----------|----------------------------|-------------------|------|
| Collector-Emitter Cutoff Current<br>$V_{CE} = 150 \text{ Vdc}$   | $I_{CEO}$ |                            | 5.0               | mAdc |
| Collector-Emitter Cutoff Current<br>$V_{CE} = 250 \text{ Vdc}, V_{BE} = 1.5 \text{ Vdc}$<br>$V_{CE} = 315 \text{ Vdc}, V_{BE} = 1.5 \text{ Vdc}$<br>$V_{CE} = 360 \text{ Vdc}, V_{BE} = 1.5 \text{ Vdc}$ | $I_{CEX}$ | 2N6211<br>2N6212<br>2N6213 | 0.5<br>0.5<br>0.5 | mAdc |
| Collector-Base Cutoff Current<br>$V_{CB} = 275 \text{ Vdc}$<br>$V_{CB} = 350 \text{ Vdc}$<br>$V_{CB} = 400 \text{ Vdc}$  | $I_{CBO}$ | 2N6211<br>2N6212<br>2N6213 | 15<br>15<br>15    | mAdc |
| Emitter-Base Cutoff Current<br>$V_{EB} = 6.0 \text{ Vdc}$  | $I_{EBO}$ |                            | 0.5               | mAdc |

**ON CHARACTERISTICS <sup>(3)</sup>**

|  |               |  |                                  |  |     |
|--|---------------|--|----------------------------------|--|-----|
| Forward-Current Transfer Ratio<br>$I_C = 1.0 \text{ Adc}, V_{CE} = 2.8 \text{ Vdc}$<br>$I_C = 1.0 \text{ Adc}, V_{CE} = 3.2 \text{ Vdc}$<br>$I_C = 1.0 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}$<br>$I_C = 1.0 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}$ | $h_{FE}$      | 2N6211<br>2N6212<br>2N6213<br>2N6211<br>2N6212<br>2N6213 | 10<br>10<br>10<br>30<br>30<br>30 | 100<br>100<br>100<br>175<br>175<br>150 |     |
| Collector-Emitter Saturation Voltage<br>$I_C = 1.0 \text{ Adc}, I_B = 0.125 \text{ Adc}$   | $V_{CE(sat)}$ | 2N6211<br>2N6212<br>2N6213                               |                                  | 1.4<br>1.6<br>2.0                      | Vdc |
| Base-Emitter Saturation Voltage<br>$I_C = 1.0 \text{ Adc}, I_B = 0.125 \text{ Adc}$  | $V_{BE(sat)}$ |  |                                  | 1.4                                    | Vdc |

**DYNAMIC CHARACTERISTICS**

|  |            |  |     |     |    |
|--|------------|--|-----|-----|----|
| Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio<br>$I_C = 0.2 \text{ Adc}, V_{CE} = 10 \text{ Vdc}, f = 5.0 \text{ MHz}$ | $ h_{fe} $ |  | 4.0 | 20  |    |
| Output Capacitance<br>$V_{CB} = 10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$  | $C_{obo}$  |  |     | 220 | pF |

**SWITCHING CHARACTERISTICS**

|  |           |  |  |     |               |
|--|-----------|--|--|-----|---------------|
| Turn-On Time<br>$V_{CC} = 200 \pm 10 \text{ Vdc}; I_C = 1.0 \text{ Adc}; I_{B1} = -0.125 \text{ Adc}$                              | $t_{on}$  |  |  | 0.6 | $\mu\text{s}$ |
| Turn-Off Time<br>$V_{CC} = 200 \pm 10 \text{ Vdc}; I_C = 1.0 \text{ Adc}; I_{B1} = -0.125 \text{ Adc}, I_{B2} = 0.125 \text{ Adc}$ | $t_{off}$ |  |  | 3.1 | $\mu\text{s}$ |

**SAFE OPERATING AREA**

|  |  |  |  |  |
|--|--|--|--|--|
| <b>DC Tests</b><br>$T_C = +25^{\circ}\text{C}, 1 \text{ Cycle}, t = 1.0 \text{ s}$ |  |  |  |  |
| <b>Test 1</b><br>$V_{CE} = 17.5 \text{ Vdc}, I_C = 2.0 \text{ Adc}$ All Types      |  |  |  |  |
| <b>Test 2</b><br>$V_{CE} = 40 \text{ Vdc}, I_C = 0.875 \text{ Adc}$ All Types      |  |  |  |  |
| <b>Test 3</b><br>$V_{CE} = 225 \text{ Vdc}, I_C = 0.034 \text{ Adc}$ 2N6211        |  |  |  |  |
| <b>Test 4</b><br>$V_{CE} = 300 \text{ Vdc}, I_C = 0.02 \text{ Adc}$ 2N6212         |  |  |  |  |
| <b>Test 5</b><br>$V_{CE} = 350 \text{ Vdc}, I_C = 0.015 \text{ Adc}$ 2N6213        |  |  |  |  |

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

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