

## PNP DARLINGTON POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/539

### Devices

2N6300

2N6301

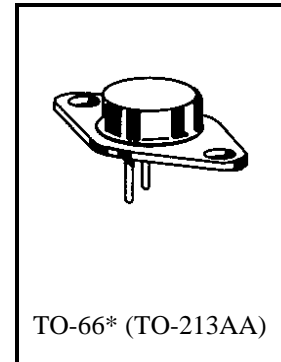
### Qualified Level

JANTX  
JANTXV

### MAXIMUM RATINGS

| Ratings  | Symbol         | 2N6300                            | 2N6301 | Units              |
|--|----------------|-----------------------------------|--------|--------------------|
| Collector-Emitter Voltage                      | $V_{CEO}$      | 60                                | 80     | Vdc                |
| Collector-Base Voltage                         | $V_{CBO}$      | 60                                | 80     | Vdc                |
| Emitter-Base Voltage                           | $V_{EBO}$      | 5.0                               |        | Vdc                |
| Base Current                                   | $I_B$          | 120                               |        | mAdc               |
| Collector Current                              | $I_C$          | 8.0                               |        | Adc                |
| Total Power Dissipation                        | $P_T$          | @ $T_C = 0^{\circ}\text{C}^{(1)}$ | 75     | W                  |
|  |                | @ $T_C = 100^{\circ}\text{C}$     | 32     | W                  |
| Operating & Storage Junction Temperature Range | $T_J, T_{stg}$ | -55 to +200                       |        | $^{\circ}\text{C}$ |

1) Derate linearly 0.428 W/ $^{\circ}\text{C}$  above  $T_C > 0^{\circ}\text{C}$



\*See appendix A for package outline

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

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

#### OFF CHARACTERISTICS

|  |                  |               |            |      |
|--|------------------|---------------|------------|------|
| Collector-Emitter Breakdown Voltage<br>$I_C = 100 \text{ mAdc}$  | 2N6300<br>2N6301 | $V_{(BR)CEO}$ | 60<br>80   | Vdc  |
| Collector-Emitter Cutoff Current<br>$V_{CE} = 30 \text{ Vdc}$<br>$V_{CE} = 40 \text{ Vdc}$   | 2N6300<br>2N6301 | $I_{CEO}$     | 0.5<br>0.5 | mAdc |
| Collector-Emitter Cutoff Current<br>$V_{CE} = 60 \text{ Vdc}, V_{BE} = -1.5 \text{ Vdc}$<br>$V_{CE} = 80 \text{ Vdc}, V_{BE} = -1.5 \text{ Vdc}$ | 2N6300<br>2N6301 | $I_{CEX}$     | 0.5<br>0.5 | mAdc |
| Emitter-Base Cutoff Current<br>$V_{EB} = 5.0 \text{ Vdc}$  |                  | $I_{EBO}$     | 2.0        | mAdc |

**2N6300, 2N6301 JAN SERIES**

**ELECTRICAL CHARACTERISTICS (con't)**

| Characteristics   | Symbol               | Min.              | Max.       | Unit |
|---|----------------------|-------------------|------------|------|
| <b>ON CHARACTERISTICS <sup>(2)</sup></b>  |                      |                   |            |      |
| Forward-Current Transfer Ratio<br>I <sub>C</sub> = 1.0 Adc, V <sub>CE</sub> = 3.0 Vdc<br>I <sub>C</sub> = 4.0 Adc, V <sub>CE</sub> = 3.0 Vdc<br>I <sub>C</sub> = 8.0 Adc, V <sub>CE</sub> = 3.0 Vdc | h <sub>FE</sub>      | 500<br>750<br>100 | 18,000     |      |
| Collector-Emitter Saturation Voltage<br>I <sub>C</sub> = 4.0 Adc, I <sub>B</sub> = 16 mAdc<br>I <sub>C</sub> = 8.0 Adc, I <sub>B</sub> = 80 mAdc  | V <sub>CE(sat)</sub> |                   | 2.0<br>3.0 | Vdc  |
| Base-Emitter Saturation Voltage<br>I <sub>C</sub> = 8.0 Adc, I <sub>B</sub> = 80 mAdc   | V <sub>BE(sat)</sub> |                   | 4.0        | Vdc  |
| Base-Emitter Voltage<br>I <sub>C</sub> = 4.0 Adc, V <sub>CE</sub> = 3.0 Vdc   | V <sub>BE(on)</sub>  |                   | 2.8        | Vdc  |

**DYNAMIC CHARACTERISTICS**

|   |                  |     |     |    |
|---|------------------|-----|-----|----|
| Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio<br>I <sub>C</sub> = 3.0 Adc, V <sub>CE</sub> = 3.0 Vdc, f = 1.0 MHz | h <sub>fe</sub>  | 25  | 350 |    |
| Small-Signal Short-Circuit Forward Current Transfer Ratio<br>I <sub>C</sub> = 3.0 Adc, V <sub>CE</sub> = 3.0 Vdc, f = 1.0 kHz                             | h <sub>fe</sub>  | 300 |     |    |
| Output Capacitance<br>V <sub>CB</sub> = 10 Vdc, I <sub>E</sub> = 0, 100 kHz ≤ f ≤ 1.0 MHz   | C <sub>obo</sub> |     | 200 | pF |

**SWITCHING CHARACTERISTICS**

|  |                  |  |     |    |
|--|------------------|--|-----|----|
| Turn-On Time<br>V <sub>CC</sub> = 30 Vdc; I <sub>C</sub> = 4.0 Adc; I <sub>B1</sub> = 16 mAdc                    | t <sub>on</sub>  |  | 2.0 | μs |
| Turn-Off Time<br>V <sub>CC</sub> = 30 Vdc; I <sub>C</sub> = 4.0 Adc; I <sub>B1</sub> = I <sub>B2</sub> = 16 mAdc | t <sub>off</sub> |  | 8.0 | μs |

**SAFE OPERATING AREA**

|  |        |
|--|--------|
| <b>DC Tests</b><br>T <sub>C</sub> = +25°C, 1 Cycle, t = 1.0 s        |        |
| <b>Test 1</b><br>V <sub>CE</sub> = 8.0 Vdc, I <sub>C</sub> = 8.0 Adc |        |
| <b>Test 2</b><br>V <sub>CE</sub> = 20 Vdc, I <sub>C</sub> = 2.0 Adc  |        |
| <b>Test 3</b><br>V <sub>CE</sub> = 60 Vdc, I <sub>C</sub> = 100 mAdc | 2N6300 |
| V <sub>CE</sub> = 80 Vdc, I <sub>C</sub> = 100 mAdc                  | 2N6301 |

(2) Pulse Test: Pulse Width = 300μs, Duty Cycle ≤ 2.0%.