

## NPN POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/525

### Devices

2N6546

2N6547

### Qualified Level

JAN  
JANTX  
JANTXV

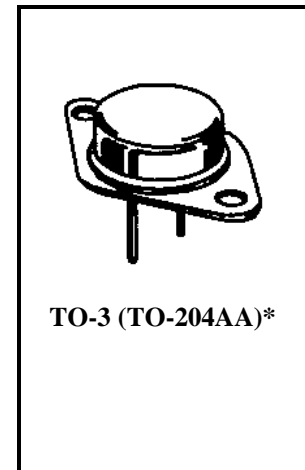
### MAXIMUM RATINGS

| Ratings                               | Symbol            | 2N6546  | 2N6547 | Units              |
|---------------------------------------|-------------------|---|--------|--------------------|
| Collector-Emitter Voltage             | $V_{CEO}$         | 300   | 400    | Vdc                |
| Collector-Base Voltage                | $V_{CEX}$         | 600   | 850    | Vdc                |
| Emitter-Base Voltage                  | $V_{EBO}$         | 8   |        | Vdc                |
| Base Current                          | $I_B$             | 10  |        | Adc                |
| Collector Current                     | $I_C$             | 15  |        | Adc                |
| Total Power Dissipation               | $P_T$             | @ $T_C = +25^{\circ}\text{C}$ <sup>(1)</sup>  | 175    | W                  |
|                                       |                   | @ $T_C = +100^{\circ}\text{C}$ <sup>(1)</sup> | 100    | W                  |
| Operating & Storage Temperature Range | $T_{op}, T_{stg}$ | -65 to +200                                   |        | $^{\circ}\text{C}$ |

### THERMAL CHARACTERISTICS

| Characteristics                      | Symbol          | Max. | Unit                        |
|--------------------------------------|-----------------|------|-----------------------------|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 1.0  | $^{\circ}\text{C}/\text{W}$ |

1) Between  $T_C = +25^{\circ}\text{C}$  and  $T_C = +200^{\circ}\text{C}$ , linear derating factor (average) = 1.0 W/ $^{\circ}\text{C}$



\*See Appendix A for Package Outline

### ELECTRICAL CHARACTERISTICS

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

### OFF CHARACTERISTICS

|  |                  |               |            |      |
|--|------------------|---------------|------------|------|
| Collector-Emitter Breakdown Voltage<br>$I_C = 100 \text{ mAdc}$  | 2N6546<br>2N6547 | $V_{(BR)CEO}$ | 300<br>400 | Vdc  |
| Collector-Emitter Cutoff Current<br>$V_{CE} = 600 \text{ Vdc}; V_{BE} = 1.5 \text{ Vdc}$<br>$V_{CE} = 850 \text{ Vdc}; V_{BE} = 1.5 \text{ Vdc}$ | 2N6546<br>2N6547 | $I_{CEX}$     | 1.0<br>1.0 | mAdc |
| Emitter-Base Cutoff Current<br>$V_{EB} = 8 \text{ Vdc}$  |                  | $I_{EBO}$     | 1.0        | mAdc |

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**2N6546, 2N6547 JAN SERIES**

**ELECTRICAL CHARACTERISTICS (con't)**

| Characteristics  | Symbol               | Min.          | Max.       | Unit |
|--|----------------------|---------------|------------|------|
| <b>ON CHARACTERISTICS<sup>(3)</sup></b>  |                      |               |            |      |
| Forward-Current Transfer Ratio<br>I <sub>C</sub> = 1 Adc; V <sub>CE</sub> = 2 Vdc<br>I <sub>C</sub> = 5 Adc; V <sub>CE</sub> = 2 Vdc<br>I <sub>C</sub> = 10 Adc; V <sub>CE</sub> = 2 Vdc | h <sub>FE</sub>      | 15<br>12<br>6 | 60         |      |
| Base-Emitter Saturated Voltage<br>I <sub>B</sub> = 2.0 Adc; I <sub>C</sub> = 10 Adc  | V <sub>BE(sat)</sub> |               | 1.6        | Vdc  |
| Collector-Emitter Saturated Voltage<br>I <sub>B</sub> = 2.0 Adc; I <sub>C</sub> = 10 Adc<br>I <sub>B</sub> = 3.0 Adc; I <sub>C</sub> = 15 Adc  | V <sub>CE(sat)</sub> |               | 1.5<br>5.0 | Vdc  |

**DYNAMIC CHARACTERISTICS**

|  |                  |     |     |    |
|--|------------------|-----|-----|----|
| Magnitude of Common-Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio<br>I <sub>C</sub> = 0.5 Adc, V <sub>CE</sub> = 10 Vdc, f = 1 MHz | h <sub>fe</sub>  | 6.0 | 30  |    |
| Output Capacitance<br>V <sub>CB</sub> = 10 Vdc, I <sub>E</sub> = 0, 0.1 MHz ≤ f ≤ 1.0 MHz  | C <sub>obo</sub> |     | 500 | pF |

**SWITCHING CHARACTERISTICS**

|  |                  |  |     |    |
|--|------------------|--|-----|----|
| Turn-On Time<br>V <sub>CC</sub> = 250 Vdc; I <sub>C</sub> = 10 Adc; I <sub>B1</sub> = I <sub>B2</sub> = 2 Adc  | t <sub>on</sub>  |  | 1.0 | μs |
| Turn-Off Time<br>V <sub>CC</sub> = 250 Vdc; I <sub>C</sub> = 10 Adc; I <sub>B1</sub> = I <sub>B2</sub> = 2 Adc | t <sub>off</sub> |  | 4.7 | μs |

**SAFE OPERATING AREA**

|   |        |
|---|--------|
| <b>DC Tests</b>   |        |
| T <sub>C</sub> = +25°C; t <sub>p</sub> = 1 s; 1 cycle (See Figure 3 of MIL-PRF-19500/525)   |        |
| <b>Test 1</b>   |        |
| V <sub>CE</sub> = 11.7 Vdc; I <sub>C</sub> = 15 Adc   |        |
| <b>Test 2</b>   |        |
| V <sub>CE</sub> = 20 Vdc; I <sub>C</sub> = 8.75 Adc   |        |
| <b>Test 3</b>   |        |
| V <sub>CE</sub> = 250 Vdc; I <sub>C</sub> = 45 mAdc   | 2N6546 |
| V <sub>CE</sub> = 350 Vdc; I <sub>C</sub> = 30 mAdc   | 2N6547 |
| <b>Unclamped Inductive IOAD</b>   |        |
| T <sub>C</sub> = +25°C; duty cycle ≤ 10%; R <sub>S</sub> = 0.1 Ω; t <sub>r</sub> = t <sub>f</sub> ≤ 500 ns (See Figure 4 of MIL-PRF-19500/525)  |        |
| <b>Test 1</b>   |        |
| T <sub>p</sub> = 5 ms; (vary to obtain I <sub>C</sub> ); R <sub>BB1</sub> = 15 Ω; V <sub>BB1</sub> = 38.5 Vdc; R <sub>BB2</sub> = 50 Ω;<br>V <sub>BB2</sub> = -4 Vdc; V <sub>CC</sub> = 20 Vdc; I <sub>C</sub> = 15 Adc; L = 10 μH  |        |
| <b>Test 2</b>   |        |
| T <sub>p</sub> = 5 ms; (vary to obtain I <sub>C</sub> ); R <sub>BB1</sub> = 15 Ω; V <sub>BB1</sub> = 38.5 Vdc; R <sub>BB2</sub> = 50 Ω;<br>V <sub>BB2</sub> = -4 Vdc; V <sub>CC</sub> = 20 Vdc; I <sub>C</sub> = 100 mAdc; L = 1 mH |        |
| <b>Clamped Inductive Load</b>   |        |
| T <sub>A</sub> = +25°C; duty cycle ≤ 5%; T <sub>p</sub> = 1.5 ms; (vary to obtain I <sub>C</sub> ); V <sub>CC</sub> = 20 Vdc; I <sub>C</sub> = 8 Adc; L = 180 μH<br>(See Figure 5 of MIL-PRF-19500/525)                             |        |
| Clamped Voltage = 350 Vdc   | 2N6546 |
| Clamped Voltage = 450 Vdc   | 2N6547 |

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