

NPN POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/466

Devices

2N5683

2N5684

Qualified Level

JAN
JANTX
JANTXV

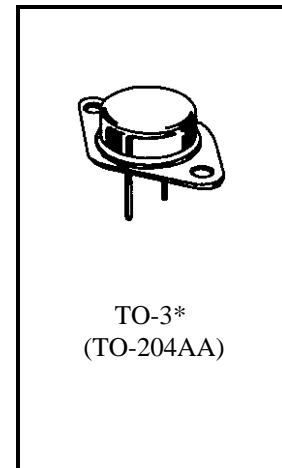
MAXIMUM RATINGS

| Ratings | Symbol | 2N5683 | 2N5684 | Unit |
|--|------------------------|-------------|--------|-------------|
| 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 | 15 | | Adc |
| Collector Current | I_C | 50 | | Adc |
| Total Power Dissipation ⁽¹⁾ | @ $T_C = 25^{\circ}C$ | 300 | | W |
| | @ $T_C = 100^{\circ}C$ | 171 | | W |
| Operating & Storage Junction Temperature Range | T_J, T_{stg} | -65 to +200 | | $^{\circ}C$ |

THERMAL CHARACTERISTICS

| Characteristics | Symbol | Max. | Unit |
|--------------------------------------|-----------------|-------|---------------|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 0.584 | $^{\circ}C/W$ |

1) Derate linearly 1.715 W/ $^{\circ}C$ between $T_C = +25^{\circ}C$ and $T_C = +200^{\circ}C$



*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 $I_C = 200$ mAdc | 2N5683 2N5684 | $V_{(BR)CEO}$ | 60 80 | Vdc |
| Collector-Emitter Cutoff Current $V_{CE} = 30$ Vdc $V_{CE} = 40$ Vdc | 2N5683 2N5684 | I_{CEO} | 5.0 5.0 | μ Adc |
| Collector-Emitter Cutoff Current $V_{CE} = 60$ Vdc, $V_{BE} = 1.5$ Vdc $V_{CE} = 80$ Vdc, $V_{BE} = 1.5$ Vdc | 2N5683 2N5684 | I_{CEX} | 5.0 5.0 | μ Adc |
| Collector-Base Cutoff Current $V_{CB} = 60$ Vdc $V_{CB} = 80$ Vdc | 2N5683 2N5684 | I_{CBO} | 5.0 5.0 | μ Adc |
| Emitter-Base Cutoff Current $V_{EB} = 5.0$ Vdc | | I_{EBO} | 5.0 | μ Adc |

ELECTRICAL CHARACTERISTICS (con't)

| Characteristics | Symbol | Min. | Max. | Unit |
|---|---------------|-----------------|------------|------|
| ON CHARACTERISTICS ⁽²⁾ | | | | |
| Forward-Current Transfer Ratio $I_C = 5.0 \text{ Adc}, V_{CE} = 2.0 \text{ Vdc}$ $I_C = 25 \text{ Adc}, V_{CE} = 2.0 \text{ Vdc}$ $I_C = 50 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}$ | h_{FE} | 30 15 5.0 | 60 | |
| Collector-Emitter Saturation Voltage $I_C = 25 \text{ Adc}, I_B = 2.5 \text{ Adc}$ $I_C = 50 \text{ Adc}, I_B = 10 \text{ Adc}$ | $V_{CE(sat)}$ | | 1.0 5.0 | Vdc |
| Base-Emitter Saturation Voltage $I_C = 25 \text{ Adc}, I_B = 2.5 \text{ Adc}$ | $V_{BE(sat)}$ | | 2.0 | Vdc |
| Base-Emitter Voltage $I_C = 25 \text{ Adc}, V_{CE} = 2.0 \text{ Vdc}$ | $V_{BE(on)}$ | | 2.0 | Vdc |

DYNAMIC CHARACTERISTICS

| | | | | |
|--|------------|-----|-------|----|
| Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 5.0 \text{ Adc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ MHz}$ | $ h_{fe} $ | 2.0 | 20 | |
| Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 10 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}, f = 1.0 \text{ kHz}$ | h_{fe} | 15 | | |
| Output Capacitance $V_{CB} = 10 \text{ Vdc}, I_E = 0, 0.1 \text{ MHz} \leq f \leq 1.0 \text{ MHz}$ | C_{obo} | | 2,000 | pF |

SWITCHING CHARACTERISTICS

| | | | | |
|---|-----------|--|-----|---------------|
| Turn-On Time $V_{CC} = 30 \text{ Vdc}; I_C = 25 \text{ Adc}; I_B = 2.5 \text{ Adc}$ | t_{on} | | 1.5 | μs |
| Turn-Off Time $V_{CC} = 30 \text{ Vdc}; I_C = 25 \text{ Adc}; I_{B1} = I_{B2} = 2.5 \text{ Adc}$ | t_{off} | | 3.0 | μs |

SAFE OPERATING AREA

| | |
|--|-----------|
| DC Tests $T_C = +25^{\circ}\text{C}, 1 \text{ Cycle}, t = 1.0 \text{ s}$ | |
| Test 1 $V_{CE} = 6.0 \text{ Vdc}, I_C = 50 \text{ Adc}$ | All Types |
| Test 2 $V_{CE} = 30 \text{ Vdc}, I_C = 10 \text{ Adc}$ | All Types |
| Test 3 $V_{CE} = 50 \text{ Vdc}, I_C = 560 \text{ mAdc}$ | 2N5683 |
| $V_{CE} = 60 \text{ Vdc}, I_C = 640 \text{ mAdc}$ | 2N5684 |

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