

NPN POWER TRANSISTOR SILICON AMPLIFIER

Qualified per MIL-PRF-19500/583

Devices

2N5681

2N5682

Qualified Level

JAN
JANTX
JANTXV

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Ratings | Symbol | 2N5681 | 2N5682 | Units |
|---------------------------------------|-------------------|-----------------------------------|-------------|------------------|
| Collector-Emitter Voltage | V_{CEO} | 100 | 120 | Vdc |
| Collector-Base Voltage | V_{CBO} | 100 | 120 | Vdc |
| Emitter-Base Voltage | V_{EBO} | 4.0 | 4.0 | Vdc |
| Collector Current | I_C | 1.0 | 1.0 | Adc |
| Base Current | I_B | 0.5 | 0.5 | Adc |
| Total Power Dissipation | P_T | @ $T_A = +25^\circ\text{C}^{(1)}$ | 1.0 | W |
| | | @ $T_C = +25^\circ\text{C}^{(2)}$ | 10 | W |
| Operating & Storage Temperature Range | T_{op}, T_{stg} | -65 to +200 | -65 to +200 | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

| Characteristics | Symbol | Max. | Unit |
|--------------------------------------|-----------------|------|------------------|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 17.5 | $^\circ\text{C}$ |

1) Derate linearly 5.7 mW/ $^\circ\text{C}$ for $T_A > +25^\circ\text{C}$

2) Derate linearly 57 mW/ $^\circ\text{C}$ for $T_C > +25^\circ\text{C}$



TO-39*
(TO-205AD)

*See appendix A for package outline

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

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

OFF CHARACTERISTICS

| | | | | |
|--|------------------|---------------|------------|-----------------|
| Collector-Emitter Breakdown Voltage $I_C = 10 \text{ mAdc}$ | 2N5681 2N5682 | $V_{(BR)CEO}$ | 100 120 | Vdc |
| Emitter-Base Cutoff Current $V_{EB} = 4.0 \text{ Vdc}$ | | I_{EBO} | 1.0 | μAdc |
| Collector-Emitter Cutoff Current $V_{CE} = 70 \text{ Vdc}$ $V_{CE} = 80 \text{ Vdc}$ | 2N5681 2N5682 | I_{CEO} | 10 | μAdc |
| Collector-Emitter Cutoff Current $V_{BE} = 1.5 \text{ Vdc}$ $V_{CE} = 100 \text{ Vdc}$ $V_{CE} = 120 \text{ Vdc}$ | 2N5681 2N5682 | I_{CEX} | 100 | nAdc |
| Collector-Base Cutoff Current $V_{CE} = 100 \text{ Vdc}$ $V_{CE} = 120 \text{ Vdc}$ | 2N5681 2N5682 | I_{CBO} | 100 | nAdc |

2N5681, 2N5682 JAN SERIES

ELECTRICAL CHARACTERISTICS (con't)

| Characteristics | Symbol | Min. | Max. | Unit |
|--|----------------------|---------------|------------|-----------------|
| ON CHARACTERISTICS ⁽³⁾ | | | | |
| Forward Current Transfer Ratio I _C = 250 mA _{dc} , V _{CE} = 2.0 V _{dc} I _C = 500 mA _{dc} , V _{CE} = 2.0 V _{dc} I _C = 1.0 A _{dc} , V _{CE} = 2.0 V _{dc} | h _{FE} | 40 20 5 | 150 | |
| Collector-Emitter Saturation Voltage I _C = 250 mA _{dc} , I _B = 25 mA _{dc} I _C = 500 mA _{dc} , I _B = 50 mA _{dc} | V _{CE(sat)} | | 0.6 1.0 | V _{dc} |
| Base-Emitter Saturation Voltage I _C = 250 mA _{dc} , I _B = 25 mA _{dc} I _C = 500 mA _{dc} , I _B = 50 mA _{dc} | V _{BE(sat)} | | 1.1 1.3 | V _{dc} |

DYNAMIC CHARACTERISTICS

| | | | | |
|---|------------------|-----|----|----|
| Magnitude of Common Emitter Small-Signal Short Circuit Forward-Current Transfer Ratio I _C = 0.1 A _{dc} , V _{CE} = 10 V _{dc} , f = 10 kHz | h _{fe} | 3.0 | | |
| Small Signal Short Circuit Forward-Current Transfer Ratio I _C = 0.2 A _{dc} , V _{CE} = 1.5 V _{dc} , f = 1.0 kHz | h _{fe} | 40 | | |
| Output Capacitance V _{CB} = 20 V _{dc} , I _E = 0, f = 1 MHz | C _{obo} | | 50 | pF |

SAFE OPERATING AREA

| |
|---|
| <p>DC Tests T_C = +25°C, 1 Cycle, t ≥ 0.5 s</p> <p>Test 1 V_{CE} = 2 V_{dc}, I_C = 1.0 A_{dc}</p> <p>Test 2 V_{CE} = 10 V_{dc}, I_C = 1.0 A_{dc}</p> <p>Test 3 V_{CE} = 90 V_{dc}, I_C = 50 mA_{dc}</p> |
|---|

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