

NPN LOW POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/225

Devices

2N1711

2N1890

Qualified Level

JAN
JANTX

MAXIMUM RATINGS

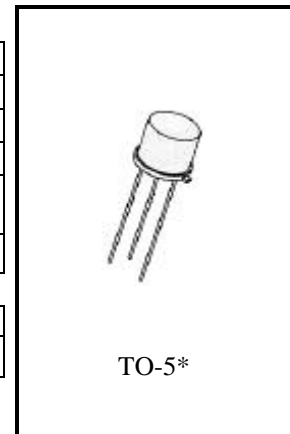
| Ratings | Symbol | 2N1711 | 2N1890 | Unit |
|--|----------------|---------------------------------------|--------|-------------|
| Collector-Base Voltage | V_{CBO} | 75 | 100 | Vdc |
| Emitter-Base Voltage | V_{EBO} | 7.0 | | Vdc |
| Collector Current | I_C | 500 | | mAdc |
| Total Power Dissipation | P_T | @ $T_A = +25^{\circ}C$ ⁽¹⁾ | 0.8 | W |
| | | @ $T_C = +25^{\circ}C$ ⁽²⁾ | 3.0 | W |
| Operating & Storage Junction Temperature Range | T_J, T_{stg} | -65 to +200 | | $^{\circ}C$ |

THERMAL CHARACTERISTICS

| Characteristics | Symbol | Max. | Unit |
|-------------------|-----------------|------|---------------|
| Thermal Impedance | $Z_{\theta JX}$ | 58 | $^{\circ}C/W$ |

1) Derate linearly 4.57 mW/ $^{\circ}C$ for $T_A > 25^{\circ}C$

2) Derate linearly 17.2 mW/ $^{\circ}C$ for $T_C > 25^{\circ}C$



*See appendix A for package outline

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

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

OFF CHARACTERISTICS

| | | | | |
|--|------------------------|---------------|-----------|---------------------------|
| Collector-Base Breakdown Voltage $I_C = 100 \mu A_{dc}$ | 2N1711, S 2N1890, S | $V_{(BR)CBO}$ | 75 100 | Vdc |
| Collector-Emitter Breakdown Voltage $R_{BE} = 10 \Omega, I_C = 100 mA_{dc}$ | 2N1711, S 2N1890, S | $V_{(BR)CER}$ | 50 80 | Vdc |
| Collector-Emitter Breakdown Voltage $I_C = 30 mA_{dc}$ | 2N1711, S 2N1890, S | $V_{(BR)CEO}$ | 30 60 | Vdc |
| Emitter-Base Breakdown Voltage $I_E = 100 \mu A_{dc}$ | | $V_{(BR)EBO}$ | 7.0 | Vdc |
| Collector-Base Cutoff Current $V_{CB} = 60 V_{dc}$ $V_{CB} = 80 V_{dc}$ | 2N1711 2N1890 | I_{CBO} | | 10 10 ηA_{dc} |
| Emitter-Base Cutoff Current $V_{EB} = 5.0 V_{dc}$ | | I_{EBO} | | 5.0 ηA_{dc} |

2N1711, 2N1890 JAN SERIES

| Characteristics | Symbol | Min. | Max. | Unit |
|---|------------------------------------|-----------------|-------------------|------|
| ON CHARACTERISTICS ⁽³⁾ | | | | |
| Forward-Current Transfer Ratio I _C = 10 μAdc, V _{CE} = 10 Vdc I _C = 150 mAdc, V _{CE} = 10 Vdc I _C = 500 mAdc, V _{CE} = 10 Vdc 2N1711, S | h _{FE} | 20 100 50 | 300 | |
| Collector-Emitter Saturation Voltage I _C = 150 mAdc, I _B = 15 mAdc 2N1711, S 2N1890, S I _C = 50 mAdc, I _B = 5.0 mAdc 2N1890, S | V _{CE(sat)} | | 1.5 5.0 1.2 | Vdc |
| Base-Emitter Saturation Voltage I _C = 150 mAdc, I _B = 15 mAdc I _C = 50 mAdc, I _B = 5.0 mVdc 2N1890, S | V _{BE(sat)} | | 1.3 0.9 | Vdc |
| DYNAMIC CHARACTERISTICS | | | | |
| Small-Signal Short-Circuit Forward-Current Transfer Ratio I _C = 1.0 mAdc, V _{CE} = 5.0 Vdc I _C = 5.0 mAdc, V _{CE} = 10 Vdc | h _{fe} | 80 90 | 200 270 | |
| Magnitude of Common Emitter Small-Signal Short-Circuit Forward-Current Transfer Ratio I _C = 50 mAdc, V _{CE} = 10 Vdc; f = 20 MHz | h _{fe} | 3.5 | 12 | |
| Small-Signal Short-Circuit Input Impedance I _C = 5.0 mAdc, V _{CB} = 10 Vdc | h _{ib} | 4.0 | 8.0 | Ω |
| Small-Signal Short-Circuit Output Admittance I _C = 5.0 mAdc, V _{CB} = 10 Vdc 2N1711, S 2N1890, S | h _{ob} | | 1.0 .03 | μΩ |
| Output Capacitance V _{CB} = 10 Vdc, I _E = 0, 100 kHz ≤ f ≤ 1.0 MHz 2N1711, S 2N1890, S | C _{obo} | 8.0 5.0 | 25 15 | pF |
| SWITCHING CHARACTERISTICS | | | | |
| Turn-On Time + Turn-Off Time (See figure 1 of MIL-PRF-19500/225) | t _{on} + t _{off} | | 30 | ηs |

(3) Pulse Test: Pulse Width 250 to 350μs, Duty Cycle ≤ 2.0%.