

## NPN LOW POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/225

### Devices

2N1711

2N1890

### Qualified Level

JAN  
JANTX

### MAXIMUM RATINGS

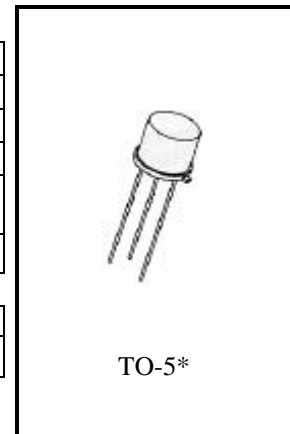
Ratings	Symbol	2N1711	2N1890	Unit
Collector-Base Voltage	$V_{CBO}$	75	100	Vdc
Emitter-Base Voltage	$V_{EBO}$	7.0		Vdc
Collector Current	$I_C$	500		mAdc
Total Power Dissipation	$P_T$	@ $T_A = +25^{\circ}C$ <sup>(1)</sup>	0.8	W
		@ $T_C = +25^{\circ}C$ <sup>(2)</sup>	3.0	W
Operating & Storage Junction 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
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### 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	$I_{CBO}$		$\eta A_{dc}$ 10 10
Emitter-Base Cutoff Current $V_{EB} = 5.0 V_{dc}$		$I_{EBO}$		$\eta A_{dc}$ 5.0

**2N1711, 2N1890 JAN SERIES**

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

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



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