

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 @ $T_A = +25^{\circ}\text{C}$ ⁽¹⁾	P_T	0.8		W
@ $T_C = +25^{\circ}\text{C}$ ⁽²⁾		3.0		W
Operating & Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200		$^{\circ}\text{C}$

THERMAL CHARACTERISTICS

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

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

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



TO-5*

*See appendix A for package outline

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

Characteristics	Symbol	Min.	Max.	Unit
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OFF CHARACTERISTICS

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

2N1711, 2N1890 JAN SERIES

Characteristics	Symbol	Min.	Max.	Unit
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ON CHARACTERISTICS ⁽³⁾

Forward-Current Transfer Ratio $I_C = 10 \mu\text{Adc}, V_{CE} = 10 \text{ Vdc}$ $I_C = 150 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$ $I_C = 500 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$ 2N1711, S	h_{FE}	20 100 50	300	
Collector-Emitter Saturation Voltage $I_C = 150 \text{ mAdc}, I_B = 15 \text{ mAdc}$ 2N1711, S 2N1890, S $I_C = 50 \text{ mAdc}, I_B = 5.0 \text{ mAdc}$ 2N1890, S	$V_{CE(sat)}$		1.5 5.0 1.2	Vdc
Base-Emitter Saturation Voltage $I_C = 150 \text{ mAdc}, I_B = 15 \text{ mAdc}$ $I_C = 50 \text{ mAdc}, I_B = 5.0 \text{ mVdc}$ 2N1890, S	$V_{BE(sat)}$		1.3 0.9	Vdc

DYNAMIC CHARACTERISTICS

Small-Signal Short-Circuit Forward-Current Transfer Ratio $I_C = 1.0 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}$ $I_C = 5.0 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$	h_{fe}	80 90	200 270	
Magnitude of Common Emitter Small-Signal Short-Circuit Forward-Current Transfer Ratio $I_C = 50 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}; f = 20 \text{ MHz}$	$ h_{fe} $	3.5	12	
Small-Signal Short-Circuit Input Impedance $I_C = 5.0 \text{ mAdc}, V_{CB} = 10 \text{ Vdc}$	h_{ib}	4.0	8.0	Ω
Small-Signal Short-Circuit Output Admittance $I_C = 5.0 \text{ mAdc}, V_{CB} = 10 \text{ Vdc}$ 2N1711, S 2N1890, S	h_{ob}		1.0 .03	$\mu\Omega$
Output Capacitance $V_{CB} = 10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$ 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
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(3) Pulse Test: Pulse Width 250 to 350 μs , Duty Cycle $\leq 2.0\%$.

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