

NPN LOW POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/253

Devices

2N930

Qualified Level

**JAN
JANTX
JANTXV**

MAXIMUM RATINGS

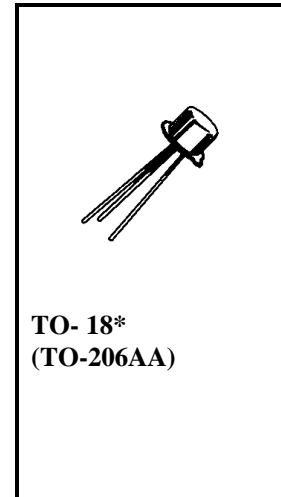
Ratings	Symbol	Value	Units
Collector-Emitter Voltage	V_{CEO}	45	Vdc
Collector-Base Voltage	V_{CBO}	60	Vdc
Emitter-Base Voltage	V_{EBO}	6.0	Vdc
Collector Current	I_C	30	mAdc
Total Power Dissipation @ $T_A = +25^{\circ}\text{C}^{(1)}$ @ $T_C = +25^{\circ}\text{C}^{(2)}$	P_T	300 600	mW
Operating & Storage Junction Temperature Range	T_J, T_{stg}	-55 to +200	$^{\circ}\text{C}$

THERMAL CHARACTERISTICS

Characteristics	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	97	$^{\circ}\text{C}/\text{W}$

1) Derate linearly 2.0 mW/ $^{\circ}\text{C}$ above $T_A = +25^{\circ}\text{C}$

2) Derate linearly 4.0 mW/ $^{\circ}\text{C}$ above $T_C = +25^{\circ}\text{C}$



*See appendix A for package outline

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

Characteristics	Symbol	Min.	Max.	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage $I_C = 10 \text{ mAdc}$	$V_{(BR)CEO}$	45		Vdc
Collector-Base Cutoff Current $V_{CB} = 60 \text{ Vdc}$ $V_{CB} = 45 \text{ Vdc}$	I_{CBO}		10 10	μAdc ηAdc
Emitter-Base Cutoff Current $V_{EB} = 6.0 \text{ Vdc}$ $V_{EB} = 5.0 \text{ Vdc}$	I_{EBO}		10 5.0	μAdc ηAdc
Collector-Emitter Cutoff Current $V_{CE} = 45 \text{ Vdc}$	I_{CES}		2.0	ηAdc
Collector-Base Cutoff Current $V_{CE} = 5.0 \text{ Vdc}$	I_{CEO}		2.0	ηAdc

ELECTRICAL CHARACTERISTICS (con't)

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

Forward-Current Transfer Ratio $I_C = 10 \mu\text{A dc}$, $V_{CE} = 5.0 \text{ V dc}$ $I_C = 500 \mu\text{A dc}$, $V_{CE} = 5.0 \text{ V dc}$ $I_C = 10 \text{ mA dc}$, $V_{CE} = 5.0 \text{ V dc}$	h_{FE}	100 150	300 600	
Collector-Emitter Saturation Voltage $I_C = 10 \text{ mA dc}$, $I_B = 0.5 \text{ mA dc}$	$V_{CE(sat)}$		1.0	Vdc
Base-Emitter Saturation Voltage $I_C = 10 \text{ mA dc}$, $I_B = 0.5 \text{ mA dc}$	$V_{BE(sat)}$	0.6	1.0	Vdc

DYNAMIC CHARACTERISTICS

Magnitude of Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 500 \mu\text{A dc}$, $V_{CE} = 5.0 \text{ V dc}$, $f = 30 \text{ MHz}$	$ h_{fe} $	1.5	6.0	
Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 1.0 \text{ mA dc}$, $V_{CE} = 5.0 \text{ V dc}$, $f = 1.0 \text{ kHz}$	h_{fe}	150	600	
Small-Signal Short-Circuit Input Impedance $V_{CB} = 5.0 \text{ V dc}$, $I_E = 1.0 \text{ mA dc}$, $f = 1.0 \text{ kHz}$	h_{ib}	25	32	Ω
Small-Signal Short-Circuit Output Admittance $V_{CB} = 5.0 \text{ V dc}$, $I_E = 1.0 \text{ mA dc}$, $f = 1.0 \text{ kHz}$	h_{ob}		1.0	$\mu\Omega$
Output Capacitance $V_{CB} = 5.0 \text{ V dc}$, $I_E = 0$, $100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$	C_{obo}		8.0	pF
Noise Figure $V_{CE} = 5 \text{ V dc}$; $I_C = 10 \mu\text{A dc}$; $R_g = 10\text{k}\Omega$ Test 1: $f = 100 \text{ Hz}$ Test 2: $f = 1.0 \text{ kHz}$ Test 3: $f = 10 \text{ kHz}$	NF		5 3 3	dB

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