

## NPN LOW POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/253

### Devices

**2N930**

### Qualified Level

**JAN  
JANTX  
JANTXV**

### MAXIMUM RATINGS

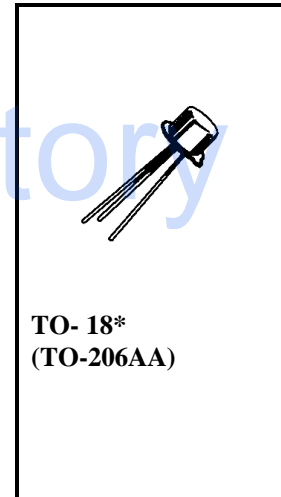
Ratings	Symbol	Value	Units
Collector-Emitter Voltage	$V_{CEO}$	45	Vdc
Collector-Base Voltage	$V_{CBO}$	60	Vdc
Emitter-Base Voltage	$V_{EBO}$	6.0	Vdc
Collector Current	$I_C$	30	mAdc
Total Power Dissipation @ $T_A = +25^{\circ}\text{C}^{(1)}$ @ $T_C = +25^{\circ}\text{C}^{(2)}$	$P_T$	300 600	mW
Operating & 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	$\mu\text{Adc}$ $\eta\text{Adc}$
Emitter-Base Cutoff Current $V_{EB} = 6.0 \text{ Vdc}$ $V_{EB} = 5.0 \text{ Vdc}$	$I_{EBO}$		10 5.0	$\mu\text{Adc}$ $\eta\text{Adc}$
Collector-Emitter Cutoff Current $V_{CE} = 45 \text{ Vdc}$	$I_{CES}$		2.0	$\eta\text{Adc}$
Collector-Base Cutoff Current $V_{CE} = 5.0 \text{ Vdc}$	$I_{CEO}$		2.0	$\eta\text{Adc}$

2N930, JAN SERIES

**ELECTRICAL CHARACTERISTICS (con't)**

Characteristics	Symbol	Min.	Max.	Unit
<b>DC CHARACTERISTICS</b> <sup>(3)</sup>				
Forward-Current Transfer Ratio I <sub>C</sub> = 10 μAdc, V <sub>CE</sub> = 5.0 Vdc I <sub>C</sub> = 500 μAdc, V <sub>CE</sub> = 5.0 Vdc I <sub>C</sub> = 10 mAdc, V <sub>CE</sub> = 5.0 Vdc	h <sub>FE</sub>	100 150	300 600	
Collector-Emitter Saturation Voltage I <sub>C</sub> = 10 mAdc, I <sub>B</sub> = 0.5 mAdc	V <sub>CE(sat)</sub>		1.0	Vdc
Base-Emitter Saturation Voltage I <sub>C</sub> = 10 mAdc, I <sub>B</sub> = 0.5 mAdc	V <sub>BE(sat)</sub>	0.6	1.0	Vdc

**DYNAMIC CHARACTERISTICS**

Magnitude of Small-Signal Short-Circuit Forward Current Transfer Ratio I <sub>C</sub> = 500 μAdc, V <sub>CE</sub> = 5.0 Vdc, f = 30 MHz	h <sub>fe</sub>	1.5	6.0	
Small-Signal Short-Circuit Forward Current Transfer Ratio I <sub>C</sub> = 1.0 mAdc, V <sub>CE</sub> = 5.0 Vdc, f = 1.0 kHz	h <sub>fe</sub>	150	600	
Small-Signal Short-Circuit Input Impedance V <sub>CB</sub> = 5.0 Vdc, I <sub>E</sub> = 1.0 mAdc, f = 1.0 kHz	h <sub>ib</sub>	25	32	Ω
Small-Signal Short-Circuit Output Admittance V <sub>CB</sub> = 5.0 Vdc, I <sub>E</sub> = 1.0 mAdc, f = 1.0 kHz	h <sub>ob</sub>		1.0	μΩ
Output Capacitance V <sub>CB</sub> = 5.0 Vdc, I <sub>E</sub> = 0, 100 kHz ≤ f ≤ 1.0 MHz	C <sub>obo</sub>		8.0	pF
Noise Figure V <sub>CE</sub> = 5 Vdc; I <sub>C</sub> = 10 μAdc; R <sub>g</sub> = 10kΩ Test 1: f = 100 Hz Test 2: f = 1.0 kHz Test 3: f = 10 kHz	NF		5 3 3	dB

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

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