

## NPN POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/369

### Devices

2N3441

### Qualified Level

JANTX

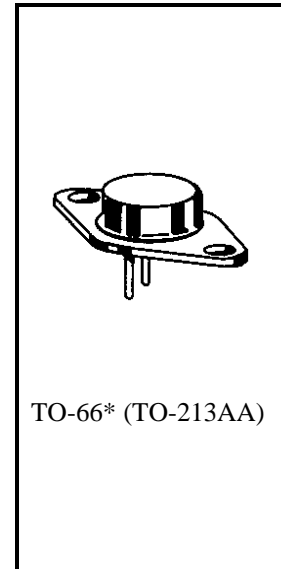
### MAXIMUM RATINGS

Ratings	Symbol	Value	Units
Collector-Emitter Voltage	$V_{CEO}$	140	Vdc
Collector-Base Voltage	$V_{CBO}$	160	Vdc
Collector-Emitter Voltage	$V_{CER}$	150	Vdc
Emitter-Base Voltage	$V_{EBO}$	7.0	Vdc
Base Current	$I_B$	2.0	Adc
Collector Current	$I_C$	3.0	Adc
Total Power Dissipation	$P_T$	@ $T_A = +25^{\circ}\text{C}$ <sup>(1)</sup>	3.0
		@ $T_C = +25^{\circ}\text{C}$ <sup>(2)</sup>	25
Operating & Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +200	$^{\circ}\text{C}$

### THERMAL CHARACTERISTICS

Characteristics	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	7.0	$^{\circ}\text{C}/\text{W}$
Junction-to-Ambient	$R_{\theta JA}$	58.5	$^{\circ}\text{C}/\text{W}$

- 1) Derate linearly @ 17.1 mW/ $^{\circ}\text{C}$  for  $T_A > +25^{\circ}\text{C}$
- 2) Derate linearly @ 143 mW/ $^{\circ}\text{C}$  for  $T_C > +25^{\circ}\text{C}$



\*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 Voltage $I_C = 100 \text{ mAdc}$	$V_{(BR)CEO}$	140		Vdc
Collector-Emitter Breakdown Voltage $I_C = 100 \text{ mAdc}, R_{BE} = 100 \Omega$	$V_{(BR)CER}$	150		Vdc
Collector-Emitter Breakdown Voltage $I_C = 100 \text{ mAdc}, V_{BE} = -1.5 \text{ Vdc}$	$V_{(BR)CEX}$	160		Vdc
Collector-Base Cutoff Current $V_{CB} = 140 \text{ Vdc}, V_{BE} = -1.5 \text{ Vdc}$	$I_{CEX}$		1.0	mAdc
Emitter-Base Cutoff Current $V_{EB} = 7.0 \text{ Vdc}$	$I_{EBO}$		1.0	mAdc

**ELECTRICAL CHARACTERISTICS (con't)**

Characteristics	Symbol	Min.	Max.	Unit
<b>ON CHARACTERISTICS</b> <sup>(3)</sup>				
Forward-Current Transfer Ratio $I_C = 50 \text{ mAdc}, V_{CE} = 4.0 \text{ Vdc}$ $I_C = 0.5 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}$ $I_C = 1.0 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}$	$h_{FE}$	50 25 10	100	
Collector-Emitter Saturation Voltage $I_C = 0.5 \text{ Adc}, I_B = 50 \text{ mAdc}$	$V_{CE(sat)}$		1.0	Vdc
Base-Emitter Voltage $I_C = 0.5 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}$	$V_{BE(on)}$		1.7	Vdc

**DYNAMIC CHARACTERISTICS**

Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 0.5 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}, f = 100 \text{ kHz}$	$ h_{fe} $	4.0	40	
Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 0.5 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}$	$h_{fe}$	15	100	
Output Capacitance $V_{CB} = 10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$	$C_{obo}$		300	pF

**SWITCHING CHARACTERISTICS**

Turn-On Time $V_{CC} = 30 \text{ Vdc}; I_C = 0.5 \text{ Adc}; I_B = 50 \text{ mAdc}$	$t_{on}$		8.0	$\mu\text{s}$
Turn-Off Time $V_{CC} = 30 \text{ Vdc}; I_C = 0.5 \text{ Adc}; I_B = -I_B = 50 \text{ mAdc}$	$t_{off}$		15	$\mu\text{s}$

**SAFE OPERATING AREA**

<b>DC Tests</b> $T_C = +25^\circ\text{C}, 1 \text{ Cycle}, t = 1.0 \text{ s}$ <b>Test 1</b> $V_{CE} = 8.33 \text{ Vdc}, I_C = 3.0 \text{ Adc}$ <b>Test 2</b> $V_{CE} = 30 \text{ Vdc}, I_C = 833 \text{ mAdc}$ <b>Test 3</b> $V_{CE} = 140 \text{ Vdc}, I_C = 178.5 \text{ mAdc}$
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(3) Pulse Test: Pulse Width = 300 $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .