

NPN POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/369

Devices

2N3441

Qualified Level

JANTX

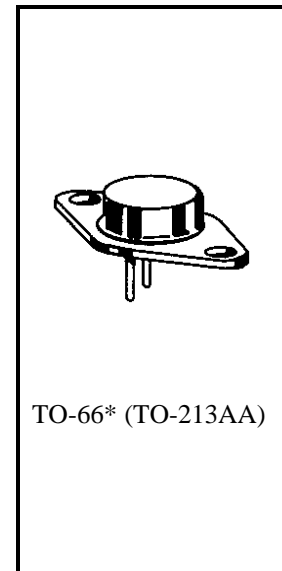
MAXIMUM RATINGS

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	@ $T_A = +25^{\circ}\text{C}$ ⁽¹⁾	3.0
		@ $T_C = +25^{\circ}\text{C}$ ⁽²⁾	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
ON CHARACTERISTICS ⁽³⁾				
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	μs
Turn-Off Time $V_{CC} = 30 \text{ Vdc}; I_C = 0.5 \text{ Adc}; I_B = -I_B = 50 \text{ mAdc}$	t_{off}		15	μs

SAFE OPERATING AREA

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



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