

## NPN POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/369

### Devices

2N3441

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-34970699  
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### Qualified Level

JANTX

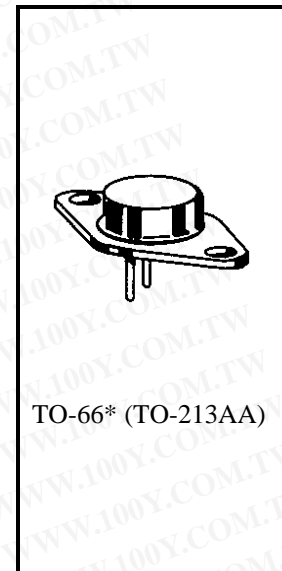
### MAXIMUM RATINGS

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

### THERMAL CHARACTERISTICS

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

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



\*See Appendix A for Package Outline

### ELECTRICAL CHARACTERISTICS ( $T_C = 25^{\circ}C$ 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

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**ELECTRICAL CHARACTERISTICS (con't)**

Characteristics	Symbol	Min.	Max.	Unit
<b>ON CHARACTERISTICS <sup>(3)</sup></b>				
Forward-Current Transfer Ratio I <sub>C</sub> = 50 mA <sub>dc</sub> , V <sub>CE</sub> = 4.0 V <sub>dc</sub> I <sub>C</sub> = 0.5 A <sub>dc</sub> , V <sub>CE</sub> = 4.0 V <sub>dc</sub> I <sub>C</sub> = 1.0 A <sub>dc</sub> , V <sub>CE</sub> = 4.0 V <sub>dc</sub>	h <sub>FE</sub>	50 25 10	100	
Collector-Emitter Saturation Voltage I <sub>C</sub> = 0.5 A <sub>dc</sub> , I <sub>B</sub> = 50 mA <sub>dc</sub>	V <sub>CE(sat)</sub>		1.0	V <sub>dc</sub>
Base-Emitter Voltage I <sub>C</sub> = 0.5 A <sub>dc</sub> , V <sub>CE</sub> = 4.0 V <sub>dc</sub>	V <sub>BE(on)</sub>		1.7	V <sub>dc</sub>

**DYNAMIC CHARACTERISTICS**

Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio I <sub>C</sub> = 0.5 A <sub>dc</sub> , V <sub>CE</sub> = 4.0 V <sub>dc</sub> , f = 100 kHz	h <sub>fe</sub>	4.0	40	
Small-Signal Short-Circuit Forward Current Transfer Ratio I <sub>C</sub> = 0.5 A <sub>dc</sub> , V <sub>CE</sub> = 4.0 V <sub>dc</sub>	h <sub>fe</sub>	15	100	
Output Capacitance V <sub>CB</sub> = 10 V <sub>dc</sub> , I <sub>E</sub> = 0, 100 kHz ≤ f ≤ 1.0 MHz	C <sub>obo</sub>		300	pF

**SWITCHING CHARACTERISTICS**

Turn-On Time V <sub>CC</sub> = 30 V <sub>dc</sub> ; I <sub>C</sub> = 0.5 A <sub>dc</sub> ; I <sub>B</sub> = 50 mA <sub>dc</sub>	t <sub>on</sub>		8.0	μs
Turn-Off Time V <sub>CC</sub> = 30 V <sub>dc</sub> ; I <sub>C</sub> = 0.5 A <sub>dc</sub> ; I <sub>B</sub> = -I <sub>B</sub> = 50 mA <sub>dc</sub>	t <sub>off</sub>		15	μs

**SAFE OPERATING AREA**

<p><b>DC Tests</b> T<sub>C</sub> = +25°C, 1 Cycle, t = 1.0 s</p> <p><b>Test 1</b> V<sub>CE</sub> = 8.33 V<sub>dc</sub>, I<sub>C</sub> = 3.0 A<sub>dc</sub></p> <p><b>Test 2</b> V<sub>CE</sub> = 30 V<sub>dc</sub>, I<sub>C</sub> = 833 mA<sub>dc</sub></p> <p><b>Test 3</b> V<sub>CE</sub> = 140 V<sub>dc</sub>, I<sub>C</sub> = 178.5 mA<sub>dc</sub></p>
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(3) Pulse Test: Pulse Width = 300μs, Duty Cycle ≤ 2.0%.

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