

## NPN POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/407

### Devices

2N3055

### Qualified Level

JAN  
JANTX

### MAXIMUM RATINGS

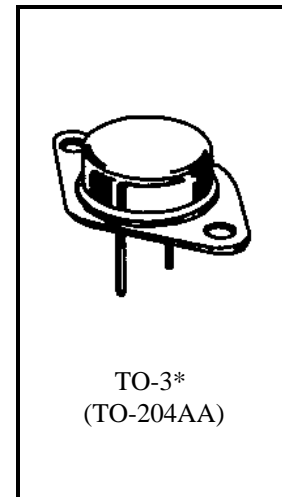
Ratings	Symbol	Value	Units
Collector-Emitter Voltage	$V_{CEO}$	70	Vdc
Collector-Base Voltage	$V_{CBO}$	100	Vdc
Emitter-Base Voltage	$V_{EBO}$	7.0	Vdc
Base Current	$I_B$	7.0	Adc
Collector Current	$I_C$	15	Adc
Total Power Dissipation	$P_T$	@ $T_A = 25^{\circ}\text{C}$ <sup>(1)</sup>	6.0
		@ $T_C = 25^{\circ}\text{C}$ <sup>(2)</sup>	117
Operating & Storage Temperature Range	$T_{op}, T_{stg}$	-65 to +200	$^{\circ}\text{C}$

### THERMAL CHARACTERISTICS

Characteristics	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.5	$^{\circ}\text{C}/\text{W}$

1) Derate linearly @ 34.2 mW/ $^{\circ}\text{C}$  for  $T_A > +25^{\circ}\text{C}$

2) Derate linearly @ 668 mW/ $^{\circ}\text{C}$  for  $T_C > +25^{\circ}\text{C}$



\*See Appendix A for Package Outline

### ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Min.	Max.	Unit
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### OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage $I_C = 200 \text{ mAdc}$	$V_{(BR)CEO}$	70		Vdc
Collector-Emitter Breakdown Voltage $I_C = 200 \text{ mAdc}, R_{BE} = 100\Omega$	$V_{(BR)CER}$	80		Vdc
Collector-Emitter Breakdown Voltage $V_{BE} = -1.5 \text{ Vdc}, I_C = 200 \text{ mAdc}$	$V_{(BR)CEX}$	90		Vdc
Collector-Emitter Cutoff Current $V_{CE} = 60 \text{ Vdc}$	$I_{CEO}$		1.0	mAdc
Collector-Emitter Cutoff Current $V_{BE} = -1.5 \text{ Vdc}; V_{CE} = 100 \text{ Vdc}$	$I_{CEX}$		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
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**ON CHARACTERISTICS**

Forward-Current Transfer Ratio $I_C = 0.5 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}$ $I_C = 4.0 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}$ $I_C = 10 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}$	$h_{FE}$	40 20 5.0	60	
Collector-Emitter Saturation Voltage $I_C = 4.0 \text{ Adc}, I_B = 0.4 \text{ Adc}$ $I_C = 10 \text{ Adc}, I_B = 3.3 \text{ Adc}$	$V_{CE(sat)}$		0.75 2.0	Vdc
Base-Emitter Saturation Voltage $I_C = 4.0 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}$	$V_{BE(sat)}$		1.4	Vdc

**DYNAMIC CHARACTERISTICS**

Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 4.0 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}, f = 100 \text{ kHz}$	$ h_{fe} $	8.0	40	
Output Capacitance $V_{CB} = 10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$	$C_{obo}$		700	pF

**SWITCHING CHARACTERISTICS**

Turn-On Time $V_{CC} = 30 \text{ Vdc}; I_C = 4.0 \text{ Adc}; I_{B1} = 0.4 \text{ Adc}$	$t_{on}$		6.0	$\mu\text{s}$
Turn-Off Time $V_{CC} = 30 \text{ Vdc}; I_C = 4.0 \text{ Adc}; I_{B1} = -I_{B2} = 0.4 \text{ Adc}$	$t_{off}$		12	$\mu\text{s}$

**SAFE OPERATING AREA**

<p><b>DC Tests</b> <math>T_C = +25^\circ\text{C}, 1 \text{ Cycle}, t = 1.0 \text{ s}</math></p> <p><b>Test 1</b> <math>V_{CE} = 7.8 \text{ Vdc}, I_C = 15 \text{ Adc}</math></p> <p><b>Test 2</b> <math>V_{CE} = 70 \text{ Vdc}, I_C = 1.67 \text{ Adc}</math></p> <p><b>Switching Tests</b> <math>T_A = +25^\circ\text{C}; \text{duty cycle} \leq 10\%; R_S \leq 0.1 \Omega</math></p> <p><b>Test 1</b> <math>t_P = 5.0 \text{ ms}; R_{BB1} = 2.0 \Omega; V_{BB1} \geq 10 \text{ Vdc}; R_{BB2} = 100 \Omega; V_{CC} \geq 10 \text{ Vdc}; V_{BB2} = 1.5 \text{ Vdc}; I_C = 15 \text{ Adc}</math></p> <p><b>Test 2</b> <math>t_P = 20 \text{ ms}; R_{BB1} = 30 \Omega; V_{BB1} \geq 10 \text{ Vdc}; R_{BB2} = 100 \Omega; V_{CC} \geq 10 \text{ Vdc}; V_{BB2} = 1.5 \text{ Vdc}; I_C = 3.8 \text{ Adc}</math></p>
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