

## NPN HIGH POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/456

### Devices

2N5302

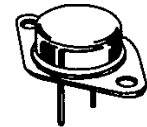
2N5303

### Qualified Level

JANTX  
JANTXV

### MAXIMUM RATINGS

Ratings	Symbol	2N5302	2N5303	Unit
Collector-Emitter Voltage	$V_{CEO}$	60	80	Vdc
Collector-Base Voltage	$V_{CBO}$	60	80	Vdc
Emitter-Base Voltage	$V_{EBO}$	5.0		Vdc
Collector Current	$I_C$	30	20	Adc
Base Current	$I_B$	7.5		Adc
Total Power Dissipation	$P_T$	@ $T_A = +25^{\circ}\text{C}^{(1)}$	5.0	W
		@ $T_C = +100^{\circ}\text{C}^{(2)}$	115	W/ $^{\circ}\text{C}$
Operating & Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +200		$^{\circ}\text{C}$



TO-3\*  
(TO-204AA)

### THERMAL CHARACTERISTICS

Characteristics	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.875	$^{\circ}\text{C}/\text{W}$

1) Derate linearly 28.57 mW/ $^{\circ}\text{C}$  for  $T_A = +25^{\circ}\text{C}$

2) Derate linearly 1.14 W/ $^{\circ}\text{C}$  for  $T_C = +100^{\circ}\text{C}$

\*See appendix A for package outline

### ELECTRICAL CHARACTERISTICS

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

Collector-Emitter Breakdown Current $I_C = 200 \text{ mAdc}, I_B = 0$	2N5302 2N5303	$V_{(BR)CEO}$	60 80	Vdc
Collector-Emitter Cutoff Current $V_{CE} = 60 \text{ Vdc}, I_B = 0$ $V_{CE} = 80 \text{ Vdc}, I_B = 0$	2N5302 2N5303	$I_{CEO}$	10 10	$\mu\text{Adc}$
Emitter-Base Cutoff Current $V_{EB} = 5.0 \text{ Vdc}, I_C = 0$		$I_{EBO}$	5.0	$\mu\text{Adc}$
Collector-Emitter Cutoff Current $V_{BE} = 1.5 \text{ Vdc}, V_{CE} = 60 \text{ Vdc}$ $V_{BE} = 1.5 \text{ Vdc}, V_{CE} = 80 \text{ Vdc}$	2N5302 2N5303	$I_{CEX}$	5.0 5.0	$\mu\text{Adc}$
Collector-Emitter Cutoff Current $V_{CE} = 60 \text{ Vdc}$ $V_{CE} = 80 \text{ Vdc}$	2N5302 2N5303	$I_{CBO}$	5.0 5.0	$\mu\text{Adc}$

**2N5302, 2N5303 JAN SERIES**

**ELECTRICAL CHARACTERISTICS**

Characteristics	Symbol	Min.	Max.	Unit
<b>DC CHARACTERISTICS</b>				
Forward-Current Transfer Ratio I <sub>C</sub> = 1.0 Adc, V <sub>CE</sub> = 2.0 Vdc I <sub>C</sub> = 15 Adc, V <sub>CE</sub> = 2.0 Vdc I <sub>C</sub> = 10 Adc, V <sub>CE</sub> = 2.0 Vdc I <sub>C</sub> = 30 Adc, V <sub>CE</sub> = 4.0 Vdc I <sub>C</sub> = 20 Adc, V <sub>CE</sub> = 4.0 Vdc	h <sub>FE</sub>	40 15 15 5.0 5.0	60 60	
Base-Emitter Saturation Voltage I <sub>C</sub> = 10 Adc, I <sub>B</sub> = 1.0 Adc I <sub>C</sub> = 15 Adc, I <sub>B</sub> = 1.5 Adc I <sub>C</sub> = 15 Adc, I <sub>B</sub> = 1.5 Adc I <sub>C</sub> = 20 Adc, I <sub>B</sub> = 2.0 Adc I <sub>C</sub> = 20 Adc, I <sub>B</sub> = 4.0 Adc	V <sub>BE(sat)</sub>		1.7 1.8 2.0 2.5 2.5	Vdc
Base-Emitter Non-Saturation Voltage V <sub>CE</sub> = 2.0 Vdc; I <sub>C</sub> = 15 Adc V <sub>CE</sub> = 2.0 Vdc; I <sub>C</sub> = 10 Adc V <sub>CE</sub> = 4.0 Vdc; I <sub>C</sub> = 30 Adc V <sub>CE</sub> = 4.0 Vdc; I <sub>C</sub> = 20 Adc	V <sub>BE</sub>		1.8 1.5 3.0 2.5	Vdc
Collector-Emitter Saturation Voltage I <sub>C</sub> = 10 Adc, I <sub>B</sub> = 1.0 Adc I <sub>C</sub> = 10 Adc, I <sub>B</sub> = 1.0 Adc I <sub>C</sub> = 15 Adc, I <sub>B</sub> = 1.5 Adc I <sub>C</sub> = 15 Adc, I <sub>B</sub> = 1.5 Adc I <sub>C</sub> = 20 Adc, I <sub>B</sub> = 2.0 Adc I <sub>C</sub> = 20 Adc, I <sub>B</sub> = 4.0 Adc I <sub>C</sub> = 30Adc, I <sub>B</sub> = 6.0 Adc	V <sub>CE(sat)</sub>		0.75 1.0 1.0 1.5 2.0 2.0 3.0	Vdc

**DYNAMIC CHARACTERISTICS**

Magnitude of Small-Signal Short Circuit Forward Current Transfer Ratio I <sub>C</sub> = 1.0 Adc, V <sub>CE</sub> = 10 Vdc, f = 1.0 MHz	h <sub>fe</sub>	2.0	40	
Output Capacitance V <sub>CB</sub> = 10 Vdc, I <sub>E</sub> = 0, 100 kHz ≤ f ≤ 1.0 MHz	C <sub>obo</sub>		800	pF

**SWITCHING CHARACTERISTICS**

Delay Time	V <sub>CC</sub> = 30 Vdc; I <sub>C</sub> = 10 Adc; I <sub>B</sub> = 1.0 Adc	t <sub>d</sub>	0.2	μs
Rise Time		t <sub>r</sub>	0.9	μs
Storage Time		t <sub>s</sub>	2.0	μs
Fall Time		t <sub>f</sub>	1.0	μs

**SAFE OPERATING AREA**

<b>DC Tests: T<sub>C</sub> = 25°C, 1 Cycle, t ≥ 1.0 s</b>	
<b>Test 1</b>	
V <sub>CE</sub> = 6.67 Vdc, I <sub>C</sub> = 30 Adc	2N5302
V <sub>CE</sub> = 10 Vdc, I <sub>C</sub> = 20 Adc	2N5303
<b>Test 2</b>	
V <sub>CE</sub> = 20 Vdc, I <sub>C</sub> = 10 Adc	2N5302; 2N5303
<b>Test 3</b>	
V <sub>CE</sub> = 40 Vdc, I <sub>C</sub> = 3.0Adc	2N5302; 2N5303
<b>Test 4</b>	
V <sub>CE</sub> = 50 Vdc, I <sub>C</sub> = 600 mAdc	2N5302
V <sub>CE</sub> = 60 Vdc, I <sub>C</sub> = 600 mAdc	2N5303
<b>Clamped Switching: T<sub>A</sub> = 25°C, V<sub>CE</sub> = 15 Vdc</b>	
Clamp Voltage = 60 Vdc, I <sub>C</sub> = 30 Adc	2N5302
Clamp Voltage = 80 Vdc, I <sub>C</sub> = 20 Adc	2N5303