

NPN HIGH POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/456

Devices

2N5302

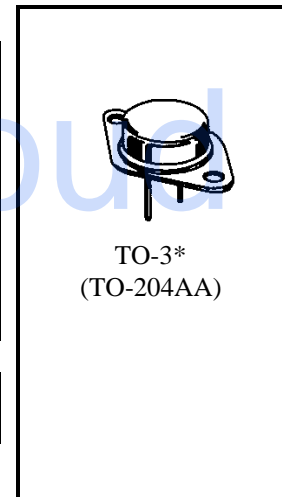
2N5303

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		$^{\circ}\text{C}$



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	μAdc
Emitter-Base Cutoff Current $V_{EB} = 5.0 \text{ Vdc}, I_C = 0$		I_{EBO}	5.0	μAdc
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	μAdc
Collector-Emitter Cutoff Current $V_{CE} = 60 \text{ Vdc}$ $V_{CE} = 80 \text{ Vdc}$	2N5302 2N5303	I_{CBO}	5.0 5.0	μAdc

2N5302, 2N5303 JAN SERIES

ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Min.	Max.	Unit
DC CHARACTERISTICS				
Forward-Current Transfer Ratio I _C = 1.0 Adc, V _{CE} = 2.0 Vdc I _C = 15 Adc, V _{CE} = 2.0 Vdc I _C = 10 Adc, V _{CE} = 2.0 Vdc I _C = 30 Adc, V _{CE} = 4.0 Vdc I _C = 20 Adc, V _{CE} = 4.0 Vdc	h _{FE}	40 15 15 5.0 5.0	60 60	
Base-Emitter Saturation Voltage I _C = 10 Adc, I _B = 1.0 Adc I _C = 15 Adc, I _B = 1.5 Adc I _C = 15 Adc, I _B = 1.5 Adc I _C = 20 Adc, I _B = 2.0 Adc I _C = 20 Adc, I _B = 4.0 Adc	V _{BE(sat)}		1.7 1.8 2.0 2.5 2.5	Vdc
Base-Emitter Non-Saturation Voltage V _{CE} = 2.0 Vdc; I _C = 15 Adc V _{CE} = 2.0 Vdc; I _C = 10 Adc V _{CE} = 4.0 Vdc; I _C = 30 Adc V _{CE} = 4.0 Vdc; I _C = 20 Adc	V _{BE}		1.8 1.5 3.0 2.5	Vdc
Collector-Emitter Saturation Voltage I _C = 10 Adc, I _B = 1.0 Adc I _C = 10 Adc, I _B = 1.0 Adc I _C = 15 Adc, I _B = 1.5 Adc I _C = 15 Adc, I _B = 1.5 Adc I _C = 20 Adc, I _B = 2.0 Adc I _C = 20 Adc, I _B = 4.0 Adc I _C = 30Adc, I _B = 6.0 Adc	V _{CE(sat)}		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 _C = 1.0 Adc, V _{CE} = 10 Vdc, f = 1.0 MHz	h _{fe}	2.0	40	
Output Capacitance V _{CB} = 10 Vdc, I _E = 0, 100 kHz ≤ f ≤ 1.0 MHz	C _{obo}		800	pF

SWITCHING CHARACTERISTICS

Delay Time	V _{CC} = 30 Vdc; I _C = 10 Adc; I _B = 1.0 Adc	t _d	0.2	μs
Rise Time		t _r	0.9	μs
Storage Time		t _s	2.0	μs
Fall Time		t _f	1.0	μs

SAFE OPERATING AREA

DC Tests: T_C = 25°C, 1 Cycle, t ≥ 1.0 s	
Test 1	
V _{CE} = 6.67 Vdc, I _C = 30 Adc	2N5302
V _{CE} = 10 Vdc, I _C = 20 Adc	2N5303
Test 2	
V _{CE} = 20 Vdc, I _C = 10 Adc	2N5302; 2N5303
Test 3	
V _{CE} = 40 Vdc, I _C = 3.0Adc	2N5302; 2N5303
Test 4	
V _{CE} = 50 Vdc, I _C = 600 mAdc	2N5302
V _{CE} = 60 Vdc, I _C = 600 mAdc	2N5303
Clamped Switching: T_A = 25°C, V_{CE} = 15 Vdc	
Clamp Voltage = 60 Vdc, I _C = 30 Adc	2N5302
Clamp Voltage = 80 Vdc, I _C = 20 Adc	2N5303