

NPN HIGH POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/456

Devices

2N5302

2N5303

Qualified Level

JANTX
JANTXV

MAXIMUM RATINGS

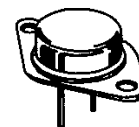
Ratings	Symbol	2N5302	2N5303	Unit
Collector-Emitter Voltage	V_{CEO}	60	80	Vdc
Collector-Base Voltage	V_{CBO}	60	80	Vdc
Emitter-Base Voltage	V_{EBO}	5.0		Vdc
Collector Current	I_C	30	20	Adc
Base Current	I_B	7.5		Adc
Total Power Dissipation @ $T_A = +25^{\circ}\text{C}^{(1)}$	P_T	5.0		W
@ $T_C = +100^{\circ}\text{C}^{(2)}$		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	$^{\circ}\text{C/W}$

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 $T_C = +100^{\circ}\text{C}$



TO-3*
(TO-204AA)

*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
ON CHARACTERISTICS				
Forward-Current Transfer Ratio $I_C = 1.0 \text{ Adc}, V_{CE} = 2.0 \text{ Vdc}$ All Types $I_C = 15 \text{ Adc}, V_{CE} = 2.0 \text{ Vdc}$ 2N5302 $I_C = 10 \text{ Adc}, V_{CE} = 2.0 \text{ Vdc}$ 2N5303 $I_C = 30 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}$ 2N5302 $I_C = 20 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}$ 2N5303	h_{FE}	40 15 15 5.0 5.0	60 60	
Base-Emitter Saturation Voltage $I_C = 10 \text{ Adc}, I_B = 1.0 \text{ Adc}$ All Types $I_C = 15 \text{ Adc}, I_B = 1.5 \text{ Adc}$ 2N5302 $I_C = 15 \text{ Adc}, I_B = 1.5 \text{ Adc}$ 2N5303 $I_C = 20 \text{ Adc}, I_B = 2.0 \text{ Adc}$ 2N5302 $I_C = 20 \text{ Adc}, I_B = 4.0 \text{ Adc}$ 2N5303	$V_{BE(sat)}$		1.7 1.8 2.0 2.5 2.5	Vdc
Base-Emitter Non-Saturation Voltage $V_{CE} = 2.0 \text{ Vdc}; I_C = 15 \text{ Adc}$ 2N5302 $V_{CE} = 2.0 \text{ Vdc}; I_C = 10 \text{ Adc}$ 2N5303 $V_{CE} = 4.0 \text{ Vdc}; I_C = 30 \text{ Adc}$ 2N5302 $V_{CE} = 4.0 \text{ Vdc}; I_C = 20 \text{ Adc}$ 2N5303	V_{BE}		1.8 1.5 3.0 2.5	Vdc
Collector-Emitter Saturation Voltage $I_C = 10 \text{ Adc}, I_B = 1.0 \text{ Adc}$ 2N5302 $I_C = 10 \text{ Adc}, I_B = 1.0 \text{ Adc}$ 2N5303 $I_C = 15 \text{ Adc}, I_B = 1.5 \text{ Adc}$ 2N5302 $I_C = 15 \text{ Adc}, I_B = 1.5 \text{ Adc}$ 2N5303 $I_C = 20 \text{ Adc}, I_B = 2.0 \text{ Adc}$ 2N5302 $I_C = 20 \text{ Adc}, I_B = 4.0 \text{ Adc}$ 2N5303 $I_C = 30 \text{ Adc}, I_B = 6.0 \text{ Adc}$ 2N5302	$V_{CE(sat)}$		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 $I_C = 1.0 \text{ Adc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ MHz}$	$ h_{fe} $	2.0	40	
Output Capacitance $V_{CB} = 10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$	C_{obo}		800	pF

SWITCHING CHARACTERISTICS

Delay Time	$V_{CC} = 30 \text{ Vdc}; I_C = 10 \text{ Adc}; I_B = 1.0 \text{ Adc}$	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: $T_C = 25^\circ\text{C}$, 1 Cycle, $t \geq 1.0 \text{ s}$

Test 1

$V_{CE} = 6.67 \text{ Vdc}, I_C = 30 \text{ Adc}$ 2N5302
 $V_{CE} = 10 \text{ Vdc}, I_C = 20 \text{ Adc}$ 2N5303

Test 2

$V_{CE} = 20 \text{ Vdc}, I_C = 10 \text{ Adc}$ 2N5302; 2N5303

Test 3

$V_{CE} = 40 \text{ Vdc}, I_C = 3.0 \text{ Adc}$ 2N5302; 2N5303

Test 4

$V_{CE} = 50 \text{ Vdc}, I_C = 600 \text{ mAdc}$ 2N5302
 $V_{CE} = 60 \text{ Vdc}, I_C = 600 \text{ mAdc}$ 2N5303

Clamped Switching: $T_A = 25^\circ\text{C}$, $V_{CE} = 15 \text{ Vdc}$

Clamp Voltage = 60 Vdc, $I_C = 30 \text{ Adc}$ 2N5302
Clamp Voltage = 80 Vdc, $I_C = 20 \text{ Adc}$ 2N5303