

NPN POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/534

Devices

2N5002

2N5004

Qualified Level

JAN
JANTX
JANTXV

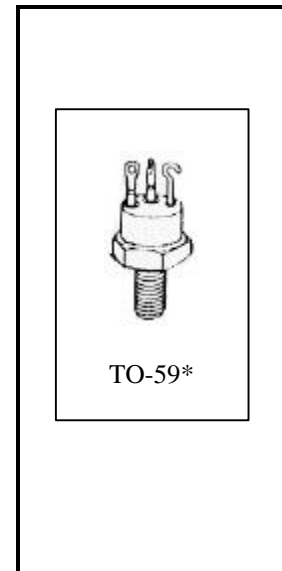
MAXIMUM RATINGS

Ratings	Symbol	Value	Units
Collector-Emitter Voltage	V_{CEO}	80	Vdc
Collector-Base Voltage	V_{CBO}	100	Vdc
Emitter-Base Voltage	V_{EBO}	5.5	Vdc
Collector Current	I_C $I_C^{(3)}$	5.0 10	Adc
Total Power Dissipation @ $T_A = 25^{\circ}C$ ⁽¹⁾ @ $T_C = 25^{\circ}C$ ⁽²⁾	P_T	2.0 58	W
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	$R_{\theta JC}$	3.0	$^{\circ}C/W$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	88	$^{\circ}C/W$

- 1) Derate linearly 11.4 mW/ $^{\circ}C$ for $T_A > 25^{\circ}C$
- 2) Derate linearly 331 mW/ $^{\circ}C$ for $T_C > 25^{\circ}C$
- 3) This value applies for $P_W \leq 8.3$ ms, duty cycle $\leq 1\%$



*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 Breakdown Voltage $I_C = 100$ mAdc,	$V_{(BR)CEO}$	80		Vdc
Collector-Emitter Cutoff Current $V_{CE} = 40$ Vdc, $I_B = 0$	I_{CEO}		50	μ Adc
Collector-Emitter Cutoff Current $V_{CE} = 60$ Vdc, $V_{BE} = 0$ $V_{CE} = 100$ Vdc, $V_{BE} = 0$	I_{CES}		1.0 1.0	μ Adc mAdc
Emitter-Base Cutoff Current $V_{BE} = 4.0$ Vdc, $I_C = 0$ $V_{BE} = 5.5$ Vdc, $I_C = 0$	I_{EBO}		1.0 1.0	mAdc mAdc

2N5002, 2N5004 JAN SERIES

ELECTRICAL CHARACTERISTICS (Con't)

Characteristics	Symbol	Min.	Max.	Unit
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ON CHARACTERISTICS

Forward-Current Transfer Ratio I _C = 50 mA _{dc} , V _{CE} = 5.0 V _{dc} I _C = 2.5 A _{dc} , V _{CE} = 5.0 V _{dc} I _C = 5.0 A _{dc} , V _{CE} = 5.0 V _{dc} 2N5002	h _{FE}	20	90	
I _C = 50 mA _{dc} , V _{CE} = 5.0 V _{dc} I _C = 2.5 A _{dc} , V _{CE} = 5.0 V _{dc} I _C = 5.0 A _{dc} , V _{CE} = 5.0 V _{dc} 2N5004		30		200
		20		40
Base-Emitter Voltage Non-saturated V _{CE} = 5.0 A _{dc} , I _C = 2.5 A _{dc}	V _{BE}		1.45	V _{dc}
Collector-Emitter Saturation Voltage I _C = 2.5 A _{dc} , I _B = 250 mA _{dc} I _C = 5.0 A _{dc} , I _B = 500 mA _{dc}	V _{CE(sat)}		0.25 1.5	V _{dc}
Base-Emitter Saturation Voltage I _C = 2.5 A _{dc} , I _B = 250 mA _{dc} I _C = 5.0 A _{dc} , I _B = 500 mA _{dc}	V _{BE(sat)}		1.45 2.2	V _{dc}

DYNAMIC CHARACTERISTICS

Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio I _C = 500 mA _{dc} , V _{CE} = 5.0 V _{dc} , f = 10 MHz 2N5002 2N5004	h _{fe}	6.0		
		7.0		
Output Capacitance V _{CB} = 10 V _{dc}	C _{obo}		250	pF

SWITCHING CHARACTERISTICS

Turn-On Time I _C = 5 A _{dc} ; I _{B1} = 500 mA _{dc}	t _{on}		0.5	μs
Storage Time I _{B2} = -500 mA _{dc}	t _s		1.4	μs
Fall Time V _{BE(OFF)} = 3.7 V _{dc}	t _f		0.5	μs
Turn-Off Time R _L = 6 Ω	t _{off}		1.5	μs

SAFE OPERATING AREA

<p>DC Tests T_C = +25°C, V_{CE} = 0, t_p = 1 second 1 Cycle</p> <p>Test 1 V_{CE} = 12 V_{dc}, I_C = 5 A_{dc}</p> <p>Test 2 V_{CE} = 32 V_{dc}, I_C = 1.7 A_{dc}</p> <p>Test 3 V_{CE} = 80 V_{dc}, I_C = 100 mA_{dc}</p>
