

NPN POWER SWITCHING SILICON TRANSISTOR

Qualified per MIL-PRF-19500/374

Devices

2N3996 2N3997 2N3998 2N3999

Qualified Level

JAN
JANTX
JANTXV

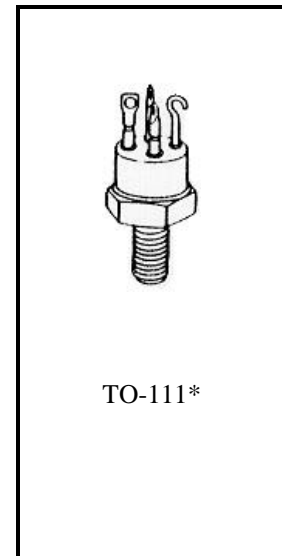
MAXIMUM RATINGS

Ratings	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	80	Vdc
Collector-Base Voltage	V_{CBO}	100	Vdc
Emitter-Base Voltage	V_{EBO}	8.0	Vdc
Base Current	I_B	0.5	Adc
Collector Current	I_C	5.0 10 ⁽¹⁾	Adc
Total Power Dissipation	P_T	2.0 30	W
		@ $T_A = +25^{\circ}\text{C}$ ⁽²⁾ @ $T_C = +100^{\circ}\text{C}$ ⁽³⁾	
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	$R_{\theta JC}$	3.33	$^{\circ}\text{C}/\text{W}$

- 1) This value applies for $t_p \leq 1.0$ ms, duty cycle $\leq 50\%$
- 2) Derate linearly 11.4 mW/ $^{\circ}\text{C}$ for $T_A > +25^{\circ}\text{C}$
- 3) Derate linearly 300 mW/ $^{\circ}\text{C}$ for $T_C > +100^{\circ}\text{C}$



*See appendix A for package outline

ELECTRICAL CHARACTERISTICS ($T_C = 25^{\circ}\text{C}$ unless otherwise noted)

Characteristics	Symbol	Min.	Max.	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage $I_C = 50$ mAdc	$V_{(BR)CEO}$	80		Vdc
Collector-Emitter Breakdown Voltage $I_C = 10$ μ Adc	$V_{(BR)CBO}$	100		Vdc
Collector-Emitter Cutoff Current $V_{CE} = 60$ Vdc	I_{CEO}		10	μ Adc
Collector-Emitter Cutoff Current $V_{CE} = 80$ Vdc, $V_{BE} = 0$	I_{CES}		200	η Adc
Emitter-Base Cutoff Current $V_{EB} = 5.0$ Vdc $V_{EB} = 8.0$ Vdc	I_{EBO}		200 10	η Adc μ Adc

2N3996, 2N3997, 2N3998, 2N3999 JAN SERIES

ELECTRICAL CHARACTERISTICS (con't)

Characteristics	Symbol	Min.	Max.	Unit	
ON CHARACTERISTICS ⁽⁴⁾					
Forward-Current Transfer Ratio I _C = 50 mA _{dc} , V _{CE} = 2.0 V _{dc} I _C = 1.0 A _{dc} , V _{CE} = 2.0 V _{dc} I _C = 5.0 A _{dc} , V _{CE} = 5.0 V _{dc} I _C = 50 mA _{dc} , V _{CE} = 2.0 V _{dc} I _C = 1.0 A _{dc} , V _{CE} = 2.0 V _{dc} I _C = 5.0 A _{dc} , V _{CE} = 5.0 V _{dc}	2N3996, 2N3998 2N3997, 2N3999	h _{FE}	30 40 15 60 80 20	120 240	
Collector-Emitter Saturation Voltage I _C = 1.0 A _{dc} , I _B = 0.1 A _{dc} I _C = 5.0 A _{dc} , I _B = 0.5 A _{dc}		V _{CE(sat)}		0.25 2.0	V _{dc}
Base-Emitter Saturation Voltage I _C = 1.0 A _{dc} , I _B = 0.1 A _{dc} I _C = 5.0 A _{dc} , I _B = 0.5 A _{dc}		V _{BE(sat)}	0.6	1.2 1.6	V _{dc}

DYNAMIC CHARACTERISTICS

Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio I _C = 1.0 A _{dc} , V _{CE} = 5.0 V _{dc} , f = 10 MHz	h _{fe}	3.0	12	
Output Capacitance V _{CB} = 10 V _{dc} , I _E = 0, 100 kHz ≤ f ≤ 1.0 MHz	C _{obo}		150	pF

SAFE OPERATING AREA

<p>DC Tests T_C = 100°C, 1 Cycle, t = 1.0 s</p> <p>Test 1 V_{CE} = 80 V_{dc}, I_C = 0.08 A_{dc}</p> <p>Test 2 V_{CE} = 20 V_{dc}, I_C = 1.5 A_{dc}</p>

(4) Pulse Test: Pulse Width = 300μs, Duty Cycle ≤ 2.0%.