

NPN SILICON TRANSISTOR

Qualified per MIL-PRF-19500/366

Devices

2N3498	2N3499	2N3500	2N3501
2N3498L	2N3499L	2N3500L	2N3501L

Qualified Level

JAN
JANTX
JANTXV
JANS

MAXIMUM RATINGS

Ratings	Symbol	2N3498* 2N3499*	2N3500* 2N3501*	Unit
Collector-Emitter Voltage	V_{CE0}	100	150	Vdc
Collector-Base Voltage	V_{CBO}	100	150	Vdc
Emitter-Base Voltage	V_{EBO}	6.0	6.0	Vdc
Collector Current	I_C	500	300	mAdc
Total Power Dissipation	P_T	1.0 5.0		W
		@ $T_A = 25^{\circ}C$ ⁽¹⁾ @ $T_C = 25^{\circ}C$ ⁽²⁾		
Operating & Storage Junction Temp. Range	T_J, T_{stg}	-55 to +200		$^{\circ}C$

THERMAL CHARACTERISTICS

Characteristics	Symbol	Max.	Unit
Thermal Resistance: Junction-to-Case	$R_{\theta JC}$	35	$^{\circ}C/W$
Junction-to-Ambient	$R_{\theta JA}$	175	

*Electrical characteristics for "L" suffix devices are identical to the "non L" corresponding devices

1) Derate linearly 5.71 W/ $^{\circ}C$ for $T_A > 25^{\circ}C$

2) Derate linearly 28.6 W/ $^{\circ}C$ for $T_C > 25^{\circ}C$



TO-5*
2N3498L, 2N3499L
2N3500L, 2N3501L



TO-39* (TO-205AD)
2N3498, 2N3499
2N3500, 2N3501

*See appendix A for package outline

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

Characteristics	Symbol	Min.	Max.	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage $I_C = 10$ mAdc	2N3498, 2N3499 2N3500, 2N3501	$V_{(BR)CE0}$	100 150	Vdc
Collector-Base Cutoff Current $V_{CB} = 50$ Vdc $V_{CB} = 75$ Vdc $V_{CB} = 100$ Vdc $V_{CB} = 150$ Vdc	2N3498, 2N3499 2N3500, 2N3501 2N3498, 2N3499 2N3500, 2N3501	I_{CBO}	50 50 10 10	η Adc η Adc μ Adc μ Adc
Emitter-Base Cutoff Current $V_{EB} = 4.0$ Vdc $V_{EB} = 6.0$ Vdc		I_{EBO}	25 10	η Adc μ Adc

ELECTRICAL CHARACTERISTICS (con't)

Characteristics	Symbol	Min.	Max.	Unit
ON CHARACTERISTICS ⁽³⁾				
Forward-Current Transfer Ratio I _C = 0.1 mA _{dc} , V _{CE} = 10 V _{dc}	2N3498, 2N3500 2N3499, 2N3501	20 35		
I _C = 1.0 mA _{dc} , V _{CE} = 10 V _{dc}	2N3498, 2N3500 2N3499, 2N3501	25 50		
I _C = 10 mA _{dc} , V _{CE} = 10 V _{dc}	2N3498, 2N3500 2N3499, 2N3501	35 75		
I _C = 150 mA _{dc} , V _{CE} = 10 V _{dc}	2N3498, 2N3500 2N3499, 2N3501	40 100	120 300	
I _C = 300 mA _{dc} , V _{CE} = 10 V _{dc}	2N3500 2N3501	15 20		
I _C = 500 mA _{dc} , V _{CE} = 10 V _{dc}	2N3498 2N3499	15 20		
Collector-Emitter Saturation Voltage I _C = 10 mA _{dc} , I _B = 1.0 mA _{dc}	All Types		0.2	V _{dc}
I _C = 300 mA _{dc} , I _B = 30 mA _{dc}	2N3498, 2N3499		0.6	
I _C = 150 mA _{dc} , I _B = 15 mA _{dc}	2N3500, 2N3501		0.4	
Base-Emitter Saturation Voltage I _C = 10 mA _{dc} , I _B = 1.0 mA _{dc}	All Types		0.8	V _{dc}
I _C = 300 mA _{dc} , I _B = 30 mA _{dc}	2N3498, 2N3499		1.4	
I _C = 150 mA _{dc} , I _B = 15 mA _{dc}	2N3500, 2N3501		1.2	
DYNAMIC CHARACTERISTICS				
Forward Current Transfer Ratio, Magnitude I _C = 20 mA _{dc} , V _{CE} = 20 V _{dc} , f = 100 MHz		h _{fe}	1.5	8.0
Output Capacitance V _{CB} = 10 V _{dc} , I _E = 0, 100 kHz ≤ f ≤ 1.0 MHz	2N3498, 2N3499 2N3500, 2N3501	C _{obo}	10 8.0	pF
Input Capacitance V _{EB} = 0.5 V _{dc} , I _C = 0, 100 kHz ≤ f ≤ 1.0 MHz		C _{ibo}	80	pF
SWITCHING CHARACTERISTICS				
Turn-On Time V _{EB} = 5 V _{dc} ; I _C = 150 mA _{dc} ; I _{B1} = 15 mA _{dc}		t _{on}	115	ns
Turn-Off Time I _C = 150 mA _{dc} ; I _{B1} = I _{B2} = -15 mA _{dc}		t _{off}	1150	ns
SAFE OPERATING AREA				
DC Tests T _C = +25°C, t _r ≥ 10 ns; 1 Cycle, t = 1.0 s				
Test 1 V _{CE} = 10 V _{dc} , I _C = 500 mA _{dc} 2N3498, 2N3499 V _{CE} = 16.67 V _{dc} , I _C = 300 mA _{dc} 2N3500, 2N3501				
Test 2 V _{CE} = 50 V _{dc} , I _C = 100 mA _{dc} All Types				
Test 3 V _{CE} = 80 V _{dc} , I _C = 40 mA _{dc} All Types				
Clamped Switching T _A = +25°C				
Test 1 I _B = 85 mA _{dc} , I _C = 500 mA _{dc} 2N3498, 2N3499 I _B = 50 mA _{dc} , I _C = 300 mA _{dc} 2N3500, 2N3501				

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