Microsemi LAWRENCE

TECHNICAL DATA

NPN SILICON TRANSISTOR

Qualified per MIL-PRF-19500/366

Devices				*Qualified Level*
2N3498	2N3499	2N3500	2N3501	JAN
2N3498L	2N3499L	2N3500L	2N3501L	JANTX
				JANTXV
				JANS

MAXIMUM RATINGS

Ratings	Symbol	2N3498* 2N3499*	2N3500* 2N3501*	Unit
Collector-Emitter Voltage	V_{CEO}	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 @ $T_A = 25^0C$ (1)	P_T	1.0		W
@ $T_C = 25^0C$ (2)		5.0		W
Operating & Storage Junction Temp. Range	T_J, T_{stg}	-55 to +200		^0C

THERMAL CHARACTERISTICS

Characteristics		Symbol	Max.	Unit
Thermal Resistance:	Junction-to-Case	$R_{\theta JC}$	35	$^0C/W$
	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/^{0}C for $T_A > 25^0C$

2) Derate linearly 28.6 W/^{0}C for $T_C > 25^0C$

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

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

*See appendix A for package outline

ELECTRICAL CHARACTERISTICS ($T_A = 25^0C$ unless otherwise noted)

Characteristics		Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage					
I_C = 10 mAdc	2N3498, 2N3499	$V_{(BR)CEO}$	100		Vdc
	2N3500, 2N3501		150		
Collector-Base Cutoff Current					
V_{CB} = 50 Vdc	2N3498, 2N3499	I_{CBO}		50	ηAdc
V_{CB} = 75 Vdc	2N3500, 2N3501			50	ηAdc
V_{CB} = 100 Vdc	2N3498, 2N3499			10	μAdc
V_{CB} = 150 Vdc	2N3500, 2N3501			10	μAdc
Emitter-Base Cutoff Current					
V_{EB} = 4.0 Vdc		I_{EBO}		25	ηAdc
V_{EB} = 6.0 Vdc				10	μAdc

ELECTRICAL CHARACTERISTICS (con't)

Characteristics		Symbol	Min.	Max.	Unit
ON CHARACTERISTICS (3)					
Forward-Current Transfer Ratio					
I_C = 0.1 mAdc, V_{CE} = 10 Vdc	2N3498, 2N3500	h_{FE}	20		
	2N3499, 2N3501		35		
I_C = 1.0 mAdc, V_{CE} = 10 Vdc	2N3498, 2N3500		25		
	2N3499, 2N3501		50		
I_C = 10 mAdc, V_{CE} = 10 Vdc	2N3498, 2N3500		35		
	2N3499, 2N3501		75		
I_C = 150 mAdc, V_{CE} = 10 Vdc	2N3498, 2N3500		40	120	
	2N3499, 2N3501		100	300	
I_C = 300 mAdc, V_{CE} = 10 Vdc	2N3500		15		
	2N3501		20		
I_C = 500 mAdc, V_{CE} = 10 Vdc	2N3498		15		
	2N3499		20		
Collector-Emitter Saturation Voltage					
I_C = 10 mAdc, I_B = 1.0 mAdc	All Types	$V_{CE(sat)}$		0.2	Vdc
I_C = 300 mAdc, I_B = 30 mAdc	2N3498, 2N349			0.6	
I_C = 150 mAdc, I_B = 15 mAdc	2N3500, 2N3501			0.4	
Base-Emitter Saturation Voltage					
I_C = 10 mAdc, I_B = 1.0 mAdc	All Types	$V_{BE(sat)}$		0.8	Vdc
I_C = 300 mAdc, I_B = 30 mAdc	2N3498, 2N3499			1.4	
I_C = 150 mAdc, I_B = 15 mAdc	2N3500, 2N3501			1.2	
DYNAMIC CHARACTERISTICS					
Forward Current Transfer Ratio, Magnitude		$\lvert h_{fe} \rvert$	1.5	8.0	
I_C = 20 mAdc, V_{CE} = 20 Vdc, f = 100 MHz					
Output Capacitance					
V_{CB} = 10 Vdc, I_E = 0, 100 kHz ≤ f ≤ 1.0 MHz	2N3498, 2N3499	C_{obo}		10	pF
	2N3500, 2N3501			8.0	
Input Capacitance		C_{ibo}		80	pF
V_{EB} = 0.5 Vdc, I_C = 0, 100 kHz ≤ f ≤ 1.0 MHz					
SWITCHING CHARACTERISTICS					
Turn-On Time		t_{on}		115	ηs
V_{EB} = 5 Vdc; I_C = 150 mAdc; I_{B1} = 15 mAdc					
Turn-Off Time		t_{off}		1150	ηs
I_C = 150 mAdc; I_{B1} = I_{B2} = -15 mAdc					

SAFE OPERATING AREA

DC Tests	
T_C = +25^{0}C, t_r ≥ 10 ηs; 1 Cycle, t = 1.0 s	
Test 1	
V_{CE} = 10 Vdc, I_C = 500 mAdc	2N3498, 2N3499
V_{CE} = 16.67 Vdc, I_C = 300 mAdc	2N3500, 2N3501
Test 2	
V_{CE} = 50 Vdc, I_C = 100 mAdc	All Types
Test 3	
V_{CE} = 80 Vdc, I_C = 40 mAdc	All Types
Clamped Switching	
T_A = +25^{0}C	
Test 1	
I_B = 85 mAdc, I_C = 500 mAdc	2N3498, 2N3499
I_B = 50 mAdc, I_C = 300 mAdc	2N3500, 2N3501

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