Microsemi LAWRENCE

TECHNICAL DATA

LOW POWER NPN SILICON TRANSISTOR

Qualified per MIL-PRF-19500/391

Devices			*Qualified Level*
2N3019	**2N3057A**	**2N3700**	**JAN**
2N3019S		**2N3700S**	**JANTX**
			JANTXV
			JANS

MAXIMUM RATINGS

Ratings	Symbol	Value	Units
Collector-Emitter Voltage	V_{CEO}	80	Vdc
Collector-Base Voltage	V_{CBO}	140	Vdc
Emitter-Base Voltage	V_{EBO}	7.0	Vdc
Collector Current	I_C	1.0	Adc
Total Power Dissipation @ $T_A = +25^0C$[1]	P_T		W
2N3019; 2N3019S		0.8	
2N3057A		0.4	
2N3700		0.5	
2N3700UB		0.4	
@ $T_C = +25^0C$[2]			W
2N3019; 2N3019S		5.0	
2N3057A		1.8	
2N3700		1.8	
2N3700UB		1.16	
Operating & Storage Jct Temp Range	T_J, T_{stg}	-55 to +175	^0C

1) Derate linearly 4.6 mW/^{0}C for type 2N3019 and 2N3019S; 2.3 mW/^{0}C for type 2N3057A; 2.85 mW/^{0}C for type 2N3700; 6.6 mW/^{0}C for type 2N3700UB for $T_A \geq +25^0C$.
2) Derate linearly 28.6 mW/^{0}C for type 2N3019 and 2N3019S; 10.3 mW/^{0}C for types 2N3057A, 2N3700, & 2N3700UB for $T_C \geq +25^0C$.

TO-39* (TO-205AD)
2N3019, 2N3019S

TO- 18* (TO-206AA)
2N3700

TO-46* (TO-206AB)
2N3057A

3 PIN SURFACE MOUNT*
2N3700UB

*See appendix A for package outline

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

Characteristics	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS				
Collector-Base Breakdown Voltage I_C = 100 µAdc	$V_{(BR)CBO}$	140		Vdc
Emitter-Base Breakdown Voltage I_E = 100 µAdc	$V_{(BR)EBO}$	7.0		Vdc
Collector-Emitter Breakdown Current I_C = 30 mAdc	$V_{(BR)CEO}$	80		Vdc

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ELECTRICAL CHARACTERISTICS (con't)

Characteristics	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS (con't)				
Collector-Emitter Cutoff Current V_{CE} = 90 Vdc	I_{CES}		10	ηAdc
Emitter-Base Cutoff Current V_{EB} = 5.0 Vdc	I_{EBO}		10	ηAdc
ON CHARACTERISTICS (1)				
Forward-Current Transfer Ratio I_C = 150 mAdc, V_{CE} = 10 Vdc I_C = 0.1 mAdc, V_{CE} = 10 Vdc I_C = 10 mAdc, V_{CE} = 10 Vdc I_C = 500 mAdc, V_{CE} = 10 Vdc I_C = 1.0 Adc, V_{CE} = 10 Vdc	h_{FE}	 100 50 90 50 15	 300 200 200 	
Collector-Emitter Saturation Voltage I_C = 150 mAdc, I_B = 15 mAdc I_C = 500 mAdc, I_B = 50 mAdc	$V_{CE(sat)}$		 0.2 0.5	Vdc
Base-Emitter Saturation Voltage I_C = 150 mAdc, I_B = 15 mAdc	$V_{BE(sat)}$		1.1	Vdc
DYNAMIC CHARACTERISTICS				
Small-Signal Short-Circuit Forward Current Transfer Ratio I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc, f = 1.0 kHz	h_{fe}	80	400	
Magnitude of Small-Signal Short-Circuit Forward Current Transfer Ratio I_C = 50 mAdc, V_{CE} = 10 Vdc, f = 20 MHz	$\lvert h_{fe} \rvert$	5.0	20	
Output Capacitance V_{CB} = 10 Vdc, I_E = 0, 100 kHz ≤ f ≤ 1.0 MHz	C_{obo}		12	p^f
Input Capacitance V_{EB} = 0.5 Vdc, I_C = 0, 100 kHz ≤ f ≤ 1.0 MHz	C_{ibo}		60	pF

SAFE OPERATING AREA

DC Tests

$T_C = 25^0$C, 1 Cycle, t = 10 ms

Test 1	V_{CE} = 10 Vdc
2N3019, 2N3019S	I_C = 500 mAdc
2N3057A, 2N3700, 2N3700UB	I_C = 180 mAdc
Test 2	V_{CE} = 40 Vdc
2N3019, 2N3019S	I_C = 125 mAdc
2N3057A, 2N3700, 2N3700UB	I_C = 45 mAdc
Test 3	V_{CE} = 80 Vdc
2N3019, 2N3019S	I_C = 60 mAdc
2N3057A, 2N3700, 2N3700UB	I_C = 22.5 mAdc

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