Microsemi LAWRENCE

TECHNICAL DATA

NPN SILICON SWITCHING TRANSISTOR

Qualified per MIL-PRF-19500/317

Devices		*Qualified Level*
2N2369A	**2N4449**	**JAN**
2N2369AU	**2N4449U**	**JANTX**
2N2369AUA	**2N4449UA**	**JANTXV**
2N2369AUB	**2N4449UB**	

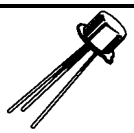
MAXIMUM RATINGS

Ratings		Symbol	All UB	All others	Unit
Collector-Emitter Voltage		V_{CEO}	20	15	Vdc
Emitter-Base Voltage		V_{EBO}	6.0	4.5	Vdc
Collector-Base Voltage		V_{CBO}	40		Vdc
Collector-Emitter Voltage		V_{CES}	40		Vdc
			@ T_A = +25^{0}C	@ T_C = +25^{0}C	
Total Power Dissipation	2N2369A; 2N4449	P_T	0.50(1)	1.2(2)	W
	All UA		0.50(5)	1.2(2)	W
	All UB		0.40(6)	1.4(7)	
	All U		0.60(3)	1.5(4)	
Operating & Storage Junction Temperature Range		T_{op}, T_{stg}	-65 to +200		^{0}C

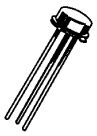
THERMAL CHARACTERISTICS

Characteristics		Symbol	Max.	Unit
Thermal Resistance, Junction-to-Case		$R_{\theta JC}$		^{0}C/mW
	2N2369A; 2N4449		146	
	All UA		125	
	All UB		135	
	All U		117	
Thermal Resistance, Ambient-to-Case		$R_{\theta JA}$		^{0}C/mW
	2N2369A; 2N4449		325	
	All UA		350	
	All UB		437	
	All U		291	

1) Derate linearly 3.08 mW/^{0}C above T_A = +37.5^{0}C
2) Derate linearly 6.85 mW/^{0}C above T_C = +25^{0}C
3) Derate linearly 3.44 mW/^{0}C above T_A = +63.5^{0}C
4) Derate linearly 8.55 mW/^{0}C above T_C = +63.5^{0}C
5) Derate linearly 2.86 mW/^{0}C above T_C = +63.5^{0}C
6) Derate linearly 2.29 mW/^{0}C above T_C = +63.5^{0}C
7) Derate linearly 8.00 mW/^{0}C above T_C = +63.5^{0}C



TO-18* (TO-206AA)
2N2369A



TO-46 (TO-206AB)
2N4449

SURFACE MOUNT
UA*

SURFACE MOUNT
UB*

SURFACE MOUNT
U*

*See appendix A for package outline

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

Characteristics	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage I_C = 10 mAdc	$V_{(BR)CEO}$	15		Vdc
Collector-Emitter Cutoff Current V_{CE} = 20 Vdc	I_{CES}		0.4	µAdc
Emitter-Base Breakdown Voltage V_{EB} = 4.5 Vdc Emitter-Base Cutoff Current V_{EB} = 4.0 Vdc	I_{EBO}		10 0.25	µAdc
Collector-Base Breakdown Voltage V_{CB} = 40 Vdc Collector-Base Cutoff Current V_{CB} = 32 Vdc	I_{CBO}		10 0.2	µAdc
ON CHARACTERISTICS (1)				
Forward-Current Transfer Ratio I_C = 10 mAdc, V_{CE} = 0.35 Vdc I_C = 30 mAdc, V_{CE} = 0.4 Vdc I_C = 10 mAdc, V_{CE} = 1.0 Vdc I_C = 100 mAdc, V_{CE} = 1.0 Vdc	h_{FE}	 40 30 40 20	 120 120 120 120	
Collector-Emitter Saturation Voltage I_C = 10 mAdc, I_B = 1.0 mAdc I_C = 30 mAdc, I_B = 3.0 mAdc I_C = 100 mAdc, I_B = 10 mAdc	$V_{CE(sat)}$		 0.20 0.25 0.45	Vdc
Base-Emitter Saturation Voltage I_C = 10 mAdc, I_B = 1.0 mAdc I_C = 30 mAdc, I_B = 3.0 mAdc I_C = 100 mAdc, I_B = 10 mAdc	$V_{BE(sat)}$	 0.70 0.80	 0.85 0.90 1.20	Vdc
DYNAMIC CHARACTERISTICS				
Forward Current Transfer Ratio I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 100 MHz	$\lvert h_{fe} \rvert$	5.0	10	
Output Capacitance V_{CB} = 5.0 Vdc, I_E = 0, 100 kHz ≤ f ≤ 1.0 MHz	C_{obo}		4.0	pF
Input Capacitance V_{EB} = 0.5 Vdc, I_C = 0, 100 kHz ≤ f ≤ 1.0 MHz	C_{ibo}		5.0	pF

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

SWITCHING CHARACTERISTICS

Turn-On Time I_C = 10 mAdc; I_{B1}= 3.0 mAdc, I_{B2} = 1.5 mAdc	t_{on}		12	ηs
Turn-Off Time I_C = 10 mAdc; I_{B1} = 3.0 mAdc, I_{B2} = 1.5 mAdc	t_{off}		18	ηs
Charge Storage Time I_C = 10 mAdc; I_{B1} = 10 mAdc, I_{B2} = 10 mAdc	t_s		13	ηs