Microsemi LAWRENCE

TECHNICAL DATA

NPN SILICON SWITCHING TRANSISTOR

Qualified per MIL-PRF-19500/255

Devices		*Qualified Level*
2N2221A	**2N2222A**	**JAN**
2N2221AL	**2N2222AL**	**JANTX**
2N2221AUA	**2N2222AUA**	**JANTXV**
2N2221AUB	**2N2222AUB**	**JANS**
		JANHC

MAXIMUM RATINGS

Ratings	Symbol	All Types	Unit
Collector-Emitter Voltage	V_{CEO}	50	Vdc
Collector-Base Voltage	V_{CBO}	75	Vdc
Emitter-Base Voltage	V_{EBO}	6.0	Vdc
Collector Current	I_C	800	mAdc
Total Power Dissipation @ $T_A = +25^0C$ 2N2221A, L; 2N2222A, L (1) 2N2221AUA; 2N2222AUA (2) 2N2221AUB; 2N2222AUB (1)	P_T	 0.5 0.65 0.50	W
Operating & Storage Junction Temperature Range	T_{op}, T_{stg}	-65 to +200	^0C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Ambient 2N2221A, L; 2N2222A, L 2N2221AUA; 2N2222AUA 2N2221AUB; 2N2222AUB	$R_{\theta JA}$	 325 210 325	$^0C/W$

1) Derate linearly 3.08 mW/^{0}C above $T_A > +37.5^0C$
2) Derate linearly 4.76 mW/^{0}C above $T_A > +63.5^0C$



TO-18* (TO-206AA)
2N2221A, 2N2222A



4 PIN*
2N2221AUA, 2N2222AUA



3 PIN*
2N2221AUB, 2N2222AUB

*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	$V_{(BR)CEO}$	50		Vdc
Collector-Base Cutoff Current V_{CB}= 75 Vdc V_{CB}= 60 Vdc	I_{CBO}		 10 10	 µAdc ηAdc
Emitter-Base Cutoff Current V_{EB} = 6.0 Vdc V_{EB} = 4.0 Vdc	I_{EBO}		 10 10	 µAdc ηAdc
Collector-Base Cutoff Current V_{CE} = 50 Vdc	I_{CES}		50	ηAdc

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	2N2221A, L, UA, UB	h_{FE}	30		
	2N2222A, L, UA, UB		50		
I_C = 1.0 mAdc, V_{CE} = 10 Vdc	2N2221A, L, UA, UB		35	150	
	2N2222A, L, UA, UB		75	325	
I_C = 10 mAdc, V_{CE} = 10 Vdc	2N2221A, L, UA, UB		40		
	2N2222A, L, UA, UB		100		
I_C = 150 mAdc, V_{CE} = 10 Vdc	2N2221A, L, UA, UB		40	120	
	2N2222A, L, UA, UB		100	300	
I_C = 500 mAdc, V_{CE} = 10 Vdc	2N2221A, L, UA, UB		20		
	2N2222A, L, UA, UB		30		
Collector-Emitter Saturation Voltage					
I_C = 150 mAdc, I_B = 15 mAdc		$V_{CE(sat)}$		0.3	Vdc
I_C = 500 mAdc, I_B = 50 mAdc				1.0	
Base-Emitter Voltage					
I_C = 150 mAdc, I_B = 15 mAdc		$V_{BE(sat)}$	0.6	1.2	Vdc
I_C = 500 mAdc, I_B = 50 mAdc				2.0	
DYNAMIC CHARACTERISTICS					
Small-Signal Short-Circuit Forward Current Transfer Ratio					
I_C = 1.0 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz	2N2221A, L, UA, UB	^{h}fe		30	
	2N2222A, L, UA, UB			50	
Magnitude of Small-Signal Short-Circuit Forward Current Transfer Ratio		$\lvert h_{fe} \rvert$		2.5	
I_C = 20 mAdc, V_{CE} = 20 Vdc, f = 100 MHz					
Output Capacitance		C_{obo}		8.0	pF
V_{CB} = 10 Vdc, I_E = 0, 100 kHz ≤ f ≤ 1.0 MHz					
Input Capacitance		C_{ibo}		25	pF
V_{EB} = 0.5 Vdc, I_C = 0, 100 kHz ≤ f ≤ 1.0 MHz					
SWITCHING CHARACTERISTICS					
Turn-On Time		^{t}on		35	ηs
See Figure 8 of MIL-PRF-19500/255					
Turn-Off Time		^{t}off		300	ηs
See Figure 9 of MIL-PRF-19500/255					

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