

NPN SILICON SWITCHING TRANSISTOR

Qualified per MIL-PRF-19500/255

Devices

2N2221A	2N2222A
2N2221AL	2N2222AL
2N2221AUA	2N2222AUA
2N2221AUB	2N2222AUB

Qualified Level

JAN
JANTX
JANTXV
JANS
JANHC

MAXIMUM RATINGS

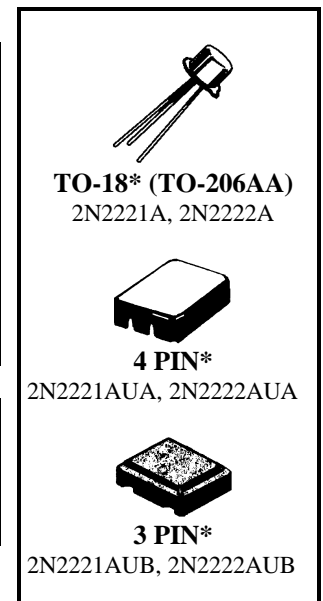
Ratings	Symbol	All Types	Unit
Collector-Emitter Voltage	V_{CEO}	50	Vdc
Collector-Base Voltage	V_{CBO}	75	Vdc
Emitter-Base Voltage	V_{EBO}	6.0	Vdc
Collector Current	I_C	800	mAdc
Total Power Dissipation @ $T_A = +25^{\circ}C$ 2N2221A, L; 2N2222A, L ⁽¹⁾ 2N2221AUA; 2N2222AUA ⁽²⁾ 2N2221AUB; 2N2222AUB ⁽¹⁾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

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	$^{\circ}C/W$

1) Derate linearly 3.08 mW/ $^{\circ}C$ above $T_A > +37.5^{\circ}C$

2) Derate linearly 4.76 mW/ $^{\circ}C$ above $T_A > +63.5^{\circ}C$



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

2N2221A, 2N2221AUA, 2N2221AUB, 2N2222A, 2N2222AUA, 2N2222AUB JAN SERIES

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} 2N2221A, L, UA, UB 2N2222A, L, UA, UB	h _{FE}	30		
I _C = 1.0 mA _{dc} , V _{CE} = 10 V _{dc} 2N2221A, L, UA, UB 2N2222A, L, UA, UB		50	150	
I _C = 10 mA _{dc} , V _{CE} = 10 V _{dc} 2N2221A, L, UA, UB 2N2222A, L, UA, UB		35	325	
I _C = 150 mA _{dc} , V _{CE} = 10 V _{dc} 2N2221A, L, UA, UB 2N2222A, L, UA, UB		75		
I _C = 500 mA _{dc} , V _{CE} = 10 V _{dc} 2N2221A, L, UA, UB 2N2222A, L, UA, UB		40		
		100		
Collector-Emitter Saturation Voltage I _C = 150 mA _{dc} , I _B = 15 mA _{dc} I _C = 500 mA _{dc} , I _B = 50 mA _{dc}	V _{CE(sat)}		0.3 1.0	V _{dc}
Base-Emitter Voltage I _C = 150 mA _{dc} , I _B = 15 mA _{dc} I _C = 500 mA _{dc} , I _B = 50 mA _{dc}	V _{BE(sat)}	0.6	1.2 2.0	V _{dc}
DYNAMIC CHARACTERISTICS				
Small-Signal Short-Circuit Forward Current Transfer Ratio I _C = 1.0 mA _{dc} , V _{CE} = 10 V _{dc} , f = 1.0 kHz 2N2221A, L, UA, UB 2N2222A, L, UA, UB	h _{fe}		30 50	
Magnitude of Small-Signal Short-Circuit Forward Current Transfer Ratio I _C = 20 mA _{dc} , V _{CE} = 20 V _{dc} , f = 100 MHz	h _{fe}		2.5	
Output Capacitance V _{CB} = 10 V _{dc} , I _E = 0, 100 kHz ≤ f ≤ 1.0 MHz	C _{obo}		8.0	pF
Input Capacitance V _{EB} = 0.5 V _{dc} , I _C = 0, 100 kHz ≤ f ≤ 1.0 MHz	C _{ibo}		25	pF
SWITCHING CHARACTERISTICS				
Turn-On Time See Figure 8 of MIL-PRF-19500/255	t _{on}		35	ns
Turn-Off Time See Figure 9 of MIL-PRF-19500/255	t _{off}		300	ns

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