

**2N2218JAN, JTX, JTXV**  
**2N2218AJAN, JTX, JTXV**  
**2N2219JAN, JTX, JTXV**  
**2N2219AJAN, JTX, JTXV, JANS**  
Processed per MIL-S-19500/251  
**NPN Silicon**  
**Small-Signal Transistors**

CRYSTALONCS  
2805 Veterans Highway  
Suite 14  
Ronkonkoma, N.Y. 11779

... designed for general-purpose switching and amplifier applications.

MAXIMUM RATINGS				
Rating	Symbol	2N2218 2N2219	2N2218A 2N2219A	Unit
Collector-Emitter Voltage	$V_{CE0}$	30	50	Vdc
Collector-Base Voltage	$V_{CB0}$	60	75	Vdc
Emitter-Base Voltage	$V_{EB0}$	5.0	6.0	Vdc
Collector Current	$I_C$	800	800	mA <sub>dc</sub>
Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$ @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_T$	0.8 4.6 3.0 17		Watts mW/ $^\circ\text{C}$ Watts mW/ $^\circ\text{C}$
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-65 to 200		$^\circ\text{C}$



ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)					
Characteristic	Symbol	Min	Max	Unit	
<b>OFF CHARACTERISTICS</b>					
Collector-Emitter Breakdown Voltage <sup>(1)</sup> ( $I_C = 10 \text{ mA}_{dc}, I_E = 0$ )	2N2218, 2N2219 2N2218A, 2N2219A	$V_{(BR)CE0}$	30 50	— —	Vdc
Collector-Base Breakdown Voltage ( $I_C = 10 \mu\text{A}_{dc}, I_E = 0$ )	2N2218, 2N2219 2N2218A, 2N2219A	$V_{(BR)CB0}$	60 75	— —	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 10 \mu\text{A}_{dc}$ )	2N2218, 2N2219 2N2218A, 2N2219A	$V_{(BR)EB0}$	5.0 6.0	— —	Vdc
Collector Cutoff Current ( $V_{CB} = 30 \text{ Vdc}$ ) ( $V_{CB} = 50 \text{ Vdc}$ )	2N2218, 2N2219 2N2218A, 2N2219A	$I_{CES}$	— —	0.01 0.01	$\mu\text{A}_{dc}$

<sup>(1)</sup> Pulsed. Pulse Width 200 to 300  $\mu\text{s}$ . Duty Cycle 1.0 to 2.0%.

(CONTINUED)

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ELECTRICAL CHARACTERISTICS — continued (T <sub>A</sub> = 25 °C unless otherwise noted.)					
Characteristic		Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS (continued)</b>					
Collector Cutoff Current (V <sub>CB</sub> = 50 Vdc) (V <sub>CB</sub> = 60 Vdc) @ T <sub>A</sub> = 150 °C (V <sub>CB</sub> = 50 Vdc) (V <sub>CB</sub> = 60 Vdc)	2N2218, 2N2219 2N2218A, 2N2219A  2N2218, 2N2219 2N2218A, 2N2219A	I <sub>CBO</sub>	— — — —	0.01 0.01 10 10	μAdc
Emitter Cutoff Current (V <sub>EB</sub> = 4.0 Vdc, I <sub>C</sub> = 0)		I <sub>EBO</sub>	—	0.01	μAdc
<b>ON CHARACTERISTICS</b>					
DC Current Gain <sup>(1)</sup> (I <sub>C</sub> = 0.1 mAdc, V <sub>CE</sub> = 10 Vdc)	2N2218 2N2219 2N2218A 2N2219A	h <sub>FE</sub>	20 35 30 50	— — — —	—
(I <sub>C</sub> = 1.0 mAdc, V <sub>CE</sub> = 10 Vdc)	2N2218 2N2219 2N2218A 2N2219A		25 50 35 75	150 325 150 325	
(I <sub>C</sub> = 10 mAdc, V <sub>CE</sub> = 10 Vdc)	2N2218 2N2219 2N2218A 2N2219A		35 75 40 100	— — — —	
(I <sub>C</sub> = 150 mAdc, V <sub>CE</sub> = 10 Vdc)	2N2218, 2N2218A 2N2219, 2N2219A		40 100	120 300	
(I <sub>C</sub> = 500 mAdc, V <sub>CE</sub> = 10 Vdc) <sup>(1)</sup>	2N2218, 2N2218A 2N2219, 2N2219A		20 30	— —	
(I <sub>C</sub> = 10 mAdc, V <sub>CE</sub> = 10 Vdc, T <sub>A</sub> = -55 °C)	2N2218, 2N2218A 2N2219, 2N2219A		15 35	— —	
Collector-Emitter Saturation Voltage <sup>(1)</sup> (I <sub>C</sub> = 150 mAdc, I <sub>B</sub> = 15 mAdc)	2N2218, 2N2219 2N2218A, 2N2219A	V <sub>CE(sat)</sub>	— —	0.4 0.3	Vdc
(I <sub>C</sub> = 500 mAdc, I <sub>B</sub> = 50 mAdc)	2N2218, 2N2219 2N2218A, 2N2219A		— —	1.6 1.0	
Base-Emitter Saturation Voltage <sup>(1)</sup> (I <sub>C</sub> = 150 mAdc, I <sub>B</sub> = 15 mAdc)	2N2218, 2N2219 2N2218A, 2N2219A	V <sub>BE(sat)</sub>	0.6 0.6	1.3 1.2	Vdc
(I <sub>C</sub> = 500 mAdc, I <sub>B</sub> = 50 mAdc)	2N2218, 2N2219 2N2218A, 2N2219A		— —	2.6 2.0	
<b>SMALL-SIGNAL CHARACTERISTICS</b>					
Output Capacitance (V <sub>CB</sub> = 10 Vdc, f = 0.1 to 1.0 MHz)		C <sub>obo</sub>	—	8.0	pF
Input Capacitance (V <sub>EB</sub> = 0.5 Vdc, f = 0.1 to 1.0 MHz)		C <sub>ibo</sub>	—	25	pF
Current Gain (I <sub>C</sub> = 1.0 mAdc, V <sub>CE</sub> = 10 Vdc, f = 1.0 kHz)	2N2218 2N2219 2N2218A 2N2219A	h <sub>fe</sub>	25 50 35 75	— — — —	—
Small-Signal Current Transfer Ratio, Magnitude (I <sub>C</sub> = 20 mAdc, V <sub>CE</sub> = 20 Vdc, f = 100 MHz)		h <sub>fe</sub>	2.5	12	—

<sup>(1)</sup> Pulsed. Pulse Width: 250 to 350 μs. Duty Cycle: 1.0 to 2.0%.

10000

**ELECTRICAL CHARACTERISTICS — continued** ( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted.)

Characteristic	Symbol	Min	Max	Unit	
<b>SWITCHING CHARACTERISTICS</b> (See Figure 10) ( $V_{CC} = 30\text{ Vdc}$ , $I_C = 150\text{ mAdc}$ , $I_B = 15\text{ mAdc}$ )					
Turn-On Time	2N2218, 2N2219 2N2218A, 2N2219A	$t_{on}$	— —	40 35	ns
Turn-Off Time	2N2218, 2N2219 2N2218A, 2N2219A	$t_{off}$	— —	250 300	ns

**ASSURANCE TESTING (Pre-Post Burn-In)**

**Burn-In Conditions:**  $T_A = 25 \pm 3\text{ }^\circ\text{C}$ ,  $V_{CB} = 24\text{ Vdc}$  2N2218, 19, 30 Vdc 2N2218A, 19A, 10 Vdc JANS  
 $P_T = 800\text{ mW}$

Characteristics Tested	Symbol	Initial and End Point Limits		Unit	
		Min	Max		
Collector Cutoff Current ( $V_{CB} = 50\text{ Vdc}$ ) ( $V_{CB} = 60\text{ Vdc}$ )	2N2218, 2N2219 2N2218A, 2N2219A	$I_{CBO}$	— —	10 10	nAdc
DC Current Gain <sup>(1)</sup> ( $I_C = 150\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ )	2N2218, 2N2219 2N2218A, 2N2219A	$h_{FE}$	40 100	120 300	—

Delta from Pre-Burn-In Measured Values		Min	Max	
Delta Collector Cutoff Current	$\Delta I_{CBO}$	—	$\pm 100$ or $\pm 5.0$ whichever is greater	% of Initial Value nAdc
Delta DC Current Gain <sup>(1)</sup>	$\Delta h_{FE}$	—	$\pm 15$	% of Initial Value

<sup>(1)</sup> Pulsed Pulse Width 250 to 350  $\mu\text{s}$ , Duty Cycle 1:1 to 2:1.