

SEMICONDUCTOR TECHNICAL DATA

**2N2219,
2N2219A**

**NPN Silicon
Small-Signal Transistors**

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

CRYSTALONCS
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MAXIMUM RATINGS

Rating	Symbol	2N2218 2N2219	2N2218A 2N2219A	Unit
Collector-Emitter Voltage	V _{CEO}	30	50	Vdc
Collector-Base Voltage	V _{CBO}	60	75	Vdc
Emitter-Base Voltage	V _{EBO}	5.0	6.0	Vdc
Collector Current	I _C	800	800	mAdc
Device Dissipation @ T _A = 25°C	P _T			Watts
Derate above 25°C		0.8	4.6	mW/°C
@ T _C = 25°C		3.0	17	Watts
Derate above 25°C				mW/°C
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-65 to 200		°C



CASE 79-04, STYLE 1
TO-205AD (TO-39)

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage ⁽¹⁾ (I _C = 10 mAdc, I _E = 0)	V _{(BR)CEO}	30 50	—	Vdc
Collector-Base Breakdown Voltage (I _C = 10 μAdc, I _E = 0)	V _{(BR)CBO}	60 75	—	Vdc
Emitter-Base Breakdown Voltage (I _E = 10 μAdc)	V _{(BR)EBO}	5.0 6.0	—	Vdc
Collector Cutoff Current (V _{CB} = 30 Vdc) (V _{CB} = 50 Vdc)	I _{CES}	— —	0.01 0.01	μAdc

⁽¹⁾ Pulsed. Pulse Width 250 to 350 μs. Duty Cycle 1:0 to 2:0%.

(continued)

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ELECTRICAL CHARACTERISTICS — continued ($T_A = 25^\circ C$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS (continued)				
Collector Cutoff Current ($V_{CB} = 50 \text{ Vdc}$) ($V_{CB} = 60 \text{ Vdc}$) @ $T_A = 150^\circ C$ ($V_{CB} = 50 \text{ Vdc}$) ($V_{CB} = 60 \text{ Vdc}$)	I_{CBO}	—	0.01 0.01 10 10	$\mu\text{A dc}$
Emitter Cutoff Current ($V_{EB} = 4.0 \text{ Vdc}, I_C = 0$)	I_{EBO}	—	0.01	$\mu\text{A dc}$
ON CHARACTERISTICS				
DC Current Gain ⁽¹⁾ ($I_C = 0.1 \text{ mA dc}, V_{CE} = 10 \text{ Vdc}$) ($I_C = 1.0 \text{ mA dc}, V_{CE} = 10 \text{ Vdc}$) ($I_C = 10 \text{ mA dc}, V_{CE} = 10 \text{ Vdc}$) ($I_C = 150 \text{ mA dc}, V_{CE} = 10 \text{ Vdc}$) ($I_C = 500 \text{ mA dc}, V_{CE} = 10 \text{ Vdc}$) ⁽¹⁾ ($I_C = 10 \text{ mA dc}, V_{CE} = 10 \text{ Vdc}, T_A = -55^\circ C$)	h_{FE}	20 35 30 50 25 50 35 75 35 75 40 100 40 100 20 30 15 35	— — — — 150 325 150 325 — — — — 120 300 — — — — — —	— — — — — — — — — — — — — — — — — —
Collector-Emitter Saturation Voltage ⁽¹⁾ ($I_C = 150 \text{ mA dc}, I_B = 15 \text{ mA dc}$) ($I_C = 500 \text{ mA dc}, I_B = 50 \text{ mA dc}$)	$V_{CE(sat)}$	— — — —	0.4 0.3 1.6 1.0	Vdc
Base-Emitter Saturation Voltage ⁽¹⁾ ($I_C = 150 \text{ mA dc}, I_B = 15 \text{ mA dc}$) ($I_C = 500 \text{ mA dc}, I_B = 50 \text{ mA dc}$)	$V_{BE(sat)}$	0.6 0.6 — —	1.3 1.2 2.6 2.0	Vdc
SMALL-SIGNAL CHARACTERISTICS				
Output Capacitance ($V_{CB} = 10 \text{ Vdc}, f = 0.1 \text{ to } 1.0 \text{ MHz}$)	C_{obo}	—	8.0	pF
Input Capacitance ($V_{EB} = 0.5 \text{ Vdc}, f = 0.1 \text{ to } 1.0 \text{ MHz}$)	C_{ibo}	—	25	pF
Current Gain ($I_C = 1.0 \text{ mA dc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ kHz}$) 2N2218 2N2219 2N2218A 2N2219A	h_{fe}	25 50 35 75	— — — —	—
Small-Signal Current Transfer Ratio, Magnitude ($I_C = 20 \text{ mA dc}, V_{CE} = 20 \text{ Vdc}, f = 100 \text{ MHz}$)	h_{fei}	2.5	12	—

⁽¹⁾, Pulsed Pulse Width: 250 to 350 μs . Duty Cycle 1.0 to 2.0%.

(continued)

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ELECTRICAL CHARACTERISTICS — continued (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
SWITCHING CHARACTERISTICS (See Figure 10)				
V _{CC} = 30 Vdc, I _C = 150 mAdc, I _B = 15 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 ± 3°C, V_{CB} = 24 Vdc 2N2218,19, 30 Vdc 2N2218A,19A, 10 Vdc JANS
P_T = 800 mW**

Characteristics Tested	Symbol	Initial and End Point Limits		Unit
		Min	Max	
Collector Cutoff Current (V _{CB} = 50 Vdc) (V _{CB} = 60 Vdc)	I _{CBO} 2N2218, 2N2219 2N2218A, 2N2219A	— —	10 10	nAdc
DC Current Gain ⁽¹⁾ (I _C = 150 mAdc, V _{CE} = 10 Vdc)	H _{FE} 2N2218, 2N2219 2N2218A, 2N2219A	40 100	120 300	—

Delta from Pre-Burn-In Measured Values		Min	Max	
Delta Collector Cutoff Current	ΔI _{CBO}	—	±100 or ±5.0 whichever is greater	% of Initial Value nAdc
Delta DC Current Gain ⁽¹⁾	ΔH _{FE}	—	±15	% of Initial Value

⁽¹⁾ Pulsed Pulse Width 250 to 350 μs Duty Cycle 1.0 to 2.0%