

2N3019SJAN, JTX, JTXV, JANS 2N3700JAN, JTX, JTXV, JANS

Processed per MIL-S-19500/391

NPN Silicon Small-Signal Transistors

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

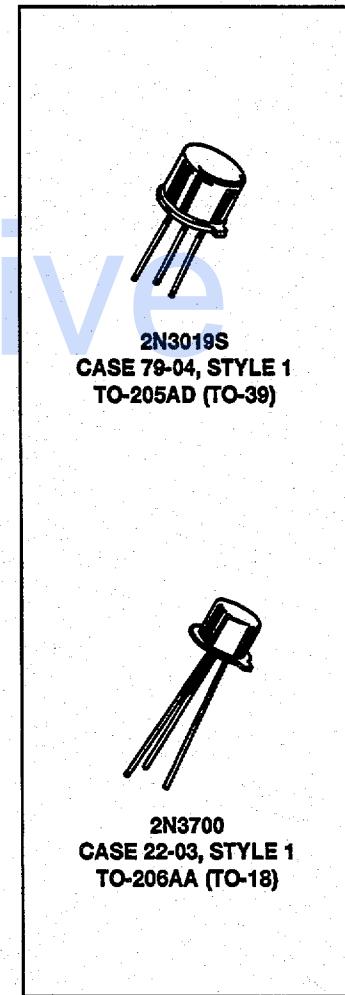


MAXIMUM RATINGS				
Rating	Symbol	2N3019S	2N3700	Unit
Collector-Base Voltage	V_{CBO}	140		Vdc
Collector-Emitter Voltage	V_{CEO}	80		Vdc
Emitter-Base Voltage	V_{EBO}	7.0		Vdc
Collector Current	I_C	1.0		Adc
Device Dissipation @ $T_A = 25^\circ\text{C}$	P_D	0.8	0.5	Watts
Derate above 25°C		4.6	2.85	$\text{mW}/^\circ\text{C}$
@ $T_C = 25^\circ\text{C}$		5.0	1.8	Watts
Derate above 25°C		28.6	10.3	$\text{mW}/^\circ\text{C}$
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 65 to 200		°C

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted.)				
Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage ⁽¹⁾ ($I_C = 30 \mu\text{Adc}$)	$V_{(BR)CEO}$	80	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 100 \mu\text{Adc}$)	$V_{(BR)EBO}$	7.0	—	Vdc
Collector-Base Breakdown Voltage ($I_C = 100 \mu\text{Adc}$)	$V_{(BR)CBO}$	140	—	Vdc
Collector Cutoff Current ($V_{CE} = 90 \text{ Vdc}$) ($V_{CE} = 90 \text{ Vdc}, T_A = 150^\circ\text{C}$)	I_{CES}	— —	10 10	nAdc μAdc
Emitter Cutoff Current ($V_{BE} = 5.0 \text{ Vdc}$)	I_{EBO}	—	10	nAdc

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

(continued)



2N3019S and 2N3700 SERIES

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

Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS				
DC Current Gain ($V_{CE} = 10 \text{ Vdc}, I_C = 150 \text{ mA}\text{dc}$) ($V_{CE} = 10 \text{ Vdc}, I_C = 0.1 \text{ mA}\text{dc}$) ($V_{CE} = 10 \text{ Vdc}, I_C = 10 \text{ mA}\text{dc}$) ($V_{CE} = 10 \text{ Vdc}, I_C = 500 \text{ mA}\text{dc}$) ($V_{CE} = 10 \text{ Vdc}, I_C = 1.0 \text{ mA}\text{dc}$) ($V_{CE} = 10 \text{ Vdc}, I_C = 150 \text{ mA}\text{dc}, T_A = -65^\circ\text{C}$) ⁽¹⁾	h_{FE}	100 50 90 50 15 40	300 200 — 200 — —	—
Collector-Emitter Saturation Voltage ⁽¹⁾ ($I_C = 150 \text{ mA}\text{dc}, I_B = 15 \text{ mA}\text{dc}$) ($I_C = 500 \text{ mA}\text{dc}, I_B = 50 \text{ mA}\text{dc}$)	$V_{CE(\text{sat})}$	— —	0.2 0.5	Vdc
Base-Emitter Saturation Voltage ⁽¹⁾ ($I_C = 150 \text{ mA}\text{dc}, I_B = 15 \text{ mA}\text{dc}$)	$V_{BE(\text{sat})}$	—	1.1	Vdc
SMALL-SIGNAL CHARACTERISTICS				
Small-Signal Current Gain ($V_{CE} = 5.0 \text{ Vdc}, I_C = 1.0 \text{ mA}\text{dc}, f = 1.0 \text{ kHz}$) ($V_{CE} = 10 \text{ Vdc}, I_C = 50 \text{ mA}\text{dc}, f = 20 \text{ MHz}$)	h_{fe}	80 5.0	400 20	—
Input Capacitance ($V_{EB} = 0.5 \text{ Vdc}, I_C = 0, f = 0.1 \text{ to } 1.0 \text{ MHz}$)	C_{ib}	—	60	pF
Output Capacitance ($V_{CB} = 10 \text{ Vdc}, I_E = 0, f = 0.1 \text{ to } 1.0 \text{ MHz}$)	C_{ob}	—	12	pF
Noise Figure ($V_{CE} = 10 \text{ Vdc}, I_C = 100 \mu\text{A}\text{dc}, f = 1.0 \text{ kHz}$ $R_G = 1.0 \text{ kohm}, \text{Pwr. B.W.} = 200 \text{ Hz}$)	NF	—	4.0	dB
Collector Base Time Constant ($V_{CB} = 10 \text{ Vdc}, I_C = 10 \text{ mA}\text{dc}, f = 79.8 \text{ MHz}$)	$r_b' C_C$	—	400	ps
SWITCHING CHARACTERISTICS (See Section 4, Figure 9)				
Turn-On + Turn-Off Time	$t_{on} + t_{off}$	—	30	ns

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

Characteristics Tested	Symbol	Initial and End Point Limits		Unit
		Min	Max	
Collector Cutoff Current ($V_{CE} = 90 \text{ Vdc}$)	I_{CES}	—	10	nA dc
DC Current Gain ⁽¹⁾ ($V_{CE} = 10 \text{ Vdc}, I_C = 150 \text{ mA}\text{dc}$)	h_{FE}	100	300	—

Delta from Pre-Burn-In Measured Values		Min	Max	
Delta Collector Cutoff Current	ΔI_{CES}	—	± 100 or ± 5.0 whichever is greater	% of Initial Value nA dc
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%.

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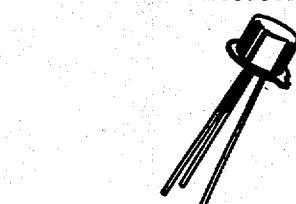
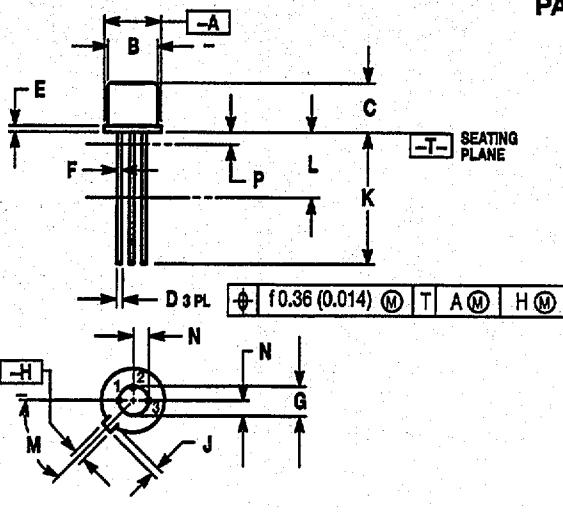
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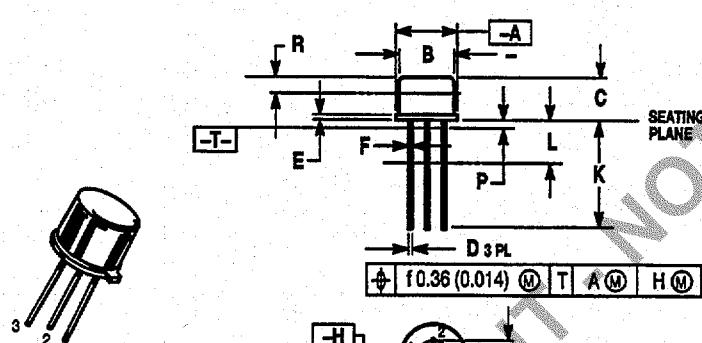
2N3019S and 2N3700 SERIES

PACKAGE DIMENSIONS



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. DIM J MEASURED FROM DIM A MAXIMUM.
 4. DIM F APPLIES BETWEEN DIM P AND L. DIM D APPLIES BETWEEN DIM L AND K MINIMUM. LEAD DIAMETER IS UNCONTROLLED IN DIM P AND BEYOND DIM K MINIMUM.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.31	5.84	0.209	0.230
B	4.52	4.95	0.178	0.195
C	4.32	5.33	0.170	0.210
D	0.406	0.533	0.016	0.021
E	—	0.762	—	0.030
F	0.406	0.483	0.016	0.019
G	2.54 BSC	—	0.100 BSC	—
H	0.914	1.17	0.036	0.046
J	0.711	1.22	0.028	0.048
K	12.70	—	0.500	—
L	6.35	—	0.250	—
M	45° BSC	—	45° BSC	—
N	1.27 BSC	—	0.050 BSC	—
P	—	1.27	—	0.050



STYLE 1:
PIN 1. Emitter
2. Base
3. Collector

STYLE 3:
PIN 1. Cathode
2. Gate
3. Anode

STYLE 2:
PIN 1. Drain
2. Source
3. Gate

STYLE 4:
PIN 1. Main Term. 1
2. Gate
3. Main Term. 2

STYLE 5:
PIN 1. Collector
2. Base
3. Emitter

**CASE 79-04
TO-205AD
(TO-39)**

STYLE 6:
PIN 1. SOURCE
2. GATE
3. DRAIN
(CASE)

STYLE 7:
PIN 1. DRAIN
2. GATE
3. SOURCE

STYLE 8:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 9:
PIN 1. SOURCE
2. DRAIN
3. GATE

STYLE 10:
PIN 1. COLLECTOR
2. Emitter
3. BASE

STYLE 11:
PIN 1. ANODE
2. OPEN
3. CATHODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.51	9.39	0.335	0.370
B	7.75	8.50	0.305	0.335
C	6.10	6.60	0.240	0.260
D	0.41	0.53	0.016	0.021
E	0.23	1.04	0.009	0.041
F	0.41	0.48	0.016	0.019
G	5.08 BSC	—	0.200 BSC	—
H	0.72	0.86	0.028	0.034
J	0.74	1.14	0.029	0.046
K	12.70	19.05	0.500	0.750
L	6.35	—	0.250	—
M	45° BSC	—	45° BSC	—
P	—	1.27	—	0.050
R	2.54	—	0.100	—

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