

2N3019 JAN, JTX, JTXV, JANS
2N3019S JAN, JTX, JTXV, JANS
2N3057A JAN, JTX, JTXV, JANS
2N3700 JAN, JTX, JTXV, JANS
2N3700UB JAN, JTX, JTXV, JANS

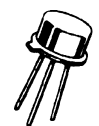


Processed per MIL-PRF-19500/391

LOW-POWER NPN SILICON TRANSISTORS

MAXIMUM RATINGS

Ratings	Symbol	Value	Units
Collector-Emitter Voltage	V_{CEO}	80	Vdc
Collector-Base Voltage	V_{CBO}	140	Vdc
Emitter-Base Voltage	V_{EBO}	7.0	Vdc
Collector Current	I_C	1.0	Adc
Total Power Dissipation @ $T_A = +25^{\circ}\text{C}^{(1)}$	P_T	0.8	W
2N3019; 2N3019S		0.5	
2N3057A		0.5	
2N3700		0.5	
2N3700UB		0.5	
Total Power Dissipation @ $T_C = +25^{\circ}\text{C}^{(2)}$	P_T	5.0	W
2N3019; 2N3019S		1.8	
2N3057A		1.8	
2N3700		1.8	
2N3700UB		1.16	
Operating & Storage Jct Temp Range	T_J, T_{stg}	-65 to +175	$^{\circ}\text{C}$


 2N3019, 2N3019S
 TO-39 (TO-205AD)


 2N3700
 TO-18 (TO-206AA)


 2N3057A
 TO-46 (TO-206AB)


 2N3700UB
 3 PIN
 SURFACE MOUNT

THERMAL CHARACTERISTICS

Characteristics	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Ambient 2N3019, S	$R_{\theta JA}$	175	$^{\circ}\text{C/W}$
All other devices		325	$^{\circ}\text{C/W}$

- Derate linearly 5.7 mW/ $^{\circ}\text{C}$ above $T_A = +60^{\circ}\text{C}$.
- Derate linearly 28.6 mW/ $^{\circ}\text{C}$ for type 2N3019 and 2N3019S; 10.3 mW/ $^{\circ}\text{C}$ for types 2N3057A, 2N3700, & 2N3700UB for $T_C \geq +25^{\circ}\text{C}$.
- Derate linearly at 3.08 mW/ $^{\circ}\text{C}$ above $T_A = +37.5^{\circ}\text{C}$

ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Min.	Max.	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage $I_C = 30 \text{ mAdc}$	$V_{(BR)CEO}$	80		Vdc
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2N3019, 2N3019S, 2N3057A, 2N3700, 2N3700UB JAN SERIES

ELECTRICAL CHARACTERISTICS (con't)

Characteristics	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS (con't)				
Collector-Emitter Cutoff Current $V_{CE} = 90 \text{ Vdc}$	I_{CES}		10	ηAdc
Emitter-Base Cutoff Current $V_{EB} = 5.0 \text{ Vdc}$ $V_{EB} = 7.0 \text{ Vdc}$	I_{EBO}		10 10	ηAdc μAdc
Collector-Base Cutoff Current $V_{CB} = 140 \text{ Vdc}$	I_{CBO}		10	μAdc

ON CHARACTERISTICS (1)

Forward-Current Transfer Ratio $I_C = 150 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$ $I_C = 0.1 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$ $I_C = 10 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$ $I_C = 500 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$ $I_C = 1.0 \text{ Adc}, V_{CE} = 10 \text{ Vdc}$	h_{FE}	100 50 90 50 15	300 200 200	
Collector-Emitter Saturation Voltage $I_C = 150 \text{ mAdc}, I_B = 15 \text{ mAdc}$ $I_C = 500 \text{ mAdc}, I_B = 50 \text{ mAdc}$	$V_{CE(sat)}$		0.2 0.5	Vdc
Base-Emitter Saturation Voltage $I_C = 150 \text{ mAdc}, I_B = 15 \text{ mAdc}$	$V_{BE(sat)}$		1.1	Vdc

DYNAMIC CHARACTERISTICS

Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 1.0 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}, f = 1.0 \text{ kHz}$	h_{fe}	80	400	
Magnitude of Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 50 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 20 \text{ MHz}$	$ h_{fe} $	5.0	20	
Output Capacitance $V_{CB} = 10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$	C_{obo}		12	pF
Input Capacitance $V_{EB} = 0.5 \text{ Vdc}, I_C = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$	C_{ibo}		60	pF
Noise Figure $V_{CE} = 10 \text{ Vdc}, I_C = 100\mu\text{Adc}, R_g = 1 \text{ k}\Omega; \text{Power Bandwidth} = 200 \text{ Hz}$	NF		4	dB
Collector-Base Time Constant $I_C = 10 \text{ mAdc}, V_{CB} = 10 \text{ Vdc}, f = 79.8 \text{ MHz}$	r^1b, C_c		400	ps

SAFE OPERATING AREA

DC Tests $T_C = 25^0\text{C}, 1 \text{ Cycle}, t = 10 \text{ ms}$	
Test 1 2N3019, 2N3019S 2N3057A, 2N3700, 2N3700UB	$V_{CE} = 10 \text{ Vdc}$ $I_C = 500 \text{ mAdc}$ $I_C = 180 \text{ mAdc}$
Test 2 2N3019, 2N3019S 2N3057A, 2N3700, 2N3700UB	$V_{CE} = 40 \text{ Vdc}$ $I_C = 125 \text{ mAdc}$ $I_C = 45 \text{ mAdc}$
Test 3 2N3019, 2N3019S 2N3057A, 2N3700, 2N3700UB	$V_{CE} = 80 \text{ Vdc}$ $I_C = 60 \text{ mAdc}$ $I_C = 22.5 \text{ mAdc}$

(1) Pulse Test: Pulse Width = 300 μ s, Duty Cycle $\leq$ 2.0%.