2N3019, 2N3019S, 2N3700

Low Power Transistors

NPN Silicon

Features

- MIL−PRF−19500/391 Qualified
- Available as JAN, JANTX, and JANTXV

ON Semiconductor®

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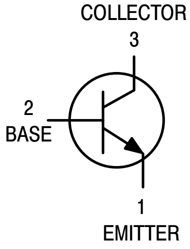


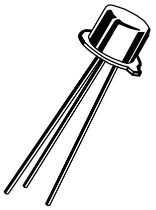
MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Value	Unit
Collector − Emitter Voltage	V_{CEO}	80	Vdc
Collector − Base Voltage	V_{CBO}	140	Vdc
Emitter − Base Voltage	V_{EBO}	7.0	Vdc
Collector Current − Continuous	I_C	1.0	Adc
Total Device Dissipation @ T_A = 25°C 2N3019, 2N3019S 2N3700	P_T	 800 500	mW
Total Device Dissipation @ T_C = 25°C 2N3019, 2N3019S 2N3700	P_T	 5.0 1.0	W
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−65 to +200	°C

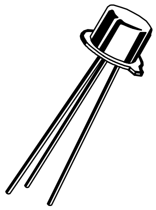
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient 2N3019, 2N3019S 2N3700	$R_{\theta JA}$	 195 325	°C/W
Thermal Resistance, Junction to Case 2N3019, 2N3019S 2N3700	$R_{\theta JC}$	 30 150	°C/W

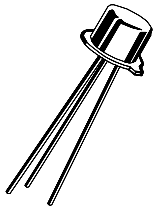
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.



TO−5
CASE 205AA
STYLE 1
2N3019



TO−39
CASE 205AB
STYLE 1
2N3019S



TO−18
CASE 206AA
STYLE 1
2N3700

ORDERING INFORMATION

Device	Package	Shipping
JAN2N3019	TO−5	Bulk
JANTX2N3019		
JANTXV2N3019		
JAN2N3019S	TO−39	Bulk
JANTX2N3019S		
JANTXV2N3019S		
JAN2N3700	TO−18	Bulk
JANTX2N3700		
JANTXV2N3700		

October, 2011 − Rev. 1

Publication Order Number:
2N3019/D

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

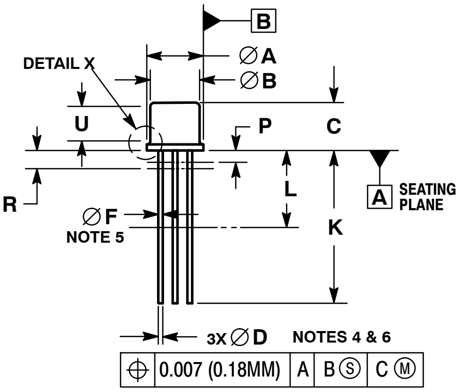
Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector−Emitter Breakdown Voltage (I_C = 30 mAdc)	$V_{(BR)CEO}$	80	–	Vdc
Emitter−Base Cutoff Current (V_{EB} = 5.0 Vdc) (V_{EB} = 7.0 Vdc)	I_{EBO}	– –	10 10	nAdc μAdc
Collector−Emitter Cutoff Current (V_{CE} = 90 Vdc)	I_{CES}	–	10	nAdc
Collector−Base Cutoff Current (V_{CB} = 140 Vdc)	I_{CBO}	–	10	μAdc
ON CHARACTERISTICS (Note 1)				
DC Current Gain (I_C = 0.1 mAdc, V_{CE} = 10 Vdc) (I_C = 10 mAdc, V_{CE} = 10 Vdc) (I_C = 150 mAdc, V_{CE} = 10 Vdc) (I_C = 500 mAdc, V_{CE} = 10 Vdc) (I_C = 1.0 Adc, V_{CE} = 10 Vdc)	h_{FE}	50 90 100 50 15	300 – 300 300 –	–
Collector−Emitter Saturation Voltage (I_C = 150 mAdc, I_B = 15 mAdc) (I_C = 500 mAdc, I_B = 50 mAdc)	$V_{CE(sat)}$	– –	0.2 0.5	Vdc
Base−Emitter Saturation Voltage (I_C = 150 mAdc, I_B = 15 mAdc)	$V_{BE(sat)}$	–	1.1	Vdc
SMALL−SIGNAL CHARACTERISTICS				
Magnitude of Small−Signal Current Gain (I_C = 50 mAdc, V_{CE} = 10 Vdc, f = 20 MHz)	$\|h_{fe}\|$	5.0	20	–
Small−Signal Current Gain (I_C = 1.0 mAdc, V_{CE} = 5 Vdc, f = 1 kHz)	h_{fe}	80	400	–
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, 100 kHz ≤ f ≤ 1.0 MHz)	C_{obo}	–	12	pF
Input Capacitance (V_{EB} = 0.5 Vdc, I_C = 0, 100 kHz ≤ f ≤ 1.0 MHz)	C_{ibo}	–	60	pF
Noise Figure (V_{CE} = 10 Vdc, I_C = 100 μAdc, R_g = 1 kΩ, PBW = 200 Hz)	NF	–	4.0	dB
Collector−Base Time Constant (V_{CB} = 10 Vdc, I_C = 10 mAdc, f = 79.8 MHz)	r'_b, C_C	–	400	ps
SWITCHING CHARACTERISTICS				
Pulse Response (Reference Figure in MIL−PRF−19500/391)	$t_{on} + t_{off}$	–	30	ns

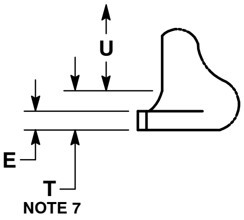
1. Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2.0%.

PACKAGE DIMENSIONS

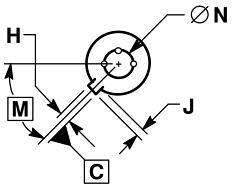
TO−5 3−Lead

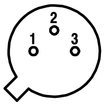
CASE 205AA−01
ISSUE A





DETAIL X





LEAD IDENTIFICATION DETAIL

NOTES:

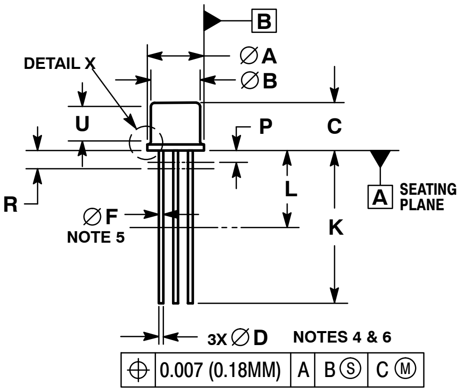
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSION J MEASURED FROM DIAMETER A TO EDGE.
4. LEAD TRUE POSITION TO BE DETERMINED AT THE GUAGE PLANE DEFINED BY DIMENSION R.
5. DIMENSION F APPLIES BETWEEN DIMENSION P AND L.
6. DIMENSION D APPLIES BETWEEN DIMENSION L AND K.
7. BODY CONTOUR OPTIONAL WITHIN ZONE DEFINED BY DIMENSIONS A, B, AND T.
8. DIMENSION B SHALL NOT VARY MORE THAN 0.010 IN ZONE P.

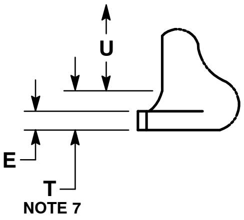
	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	8.89	9.40	0.350	0.370
B	8.00	8.51	0.315	0.335
C	6.10	6.60	0.240	0.260
D	0.41	0.53	0.016	0.021
E	0.23	3.18	0.009	0.125
F	0.41	0.48	0.016	0.019
H	0.71	0.86	0.028	0.034
J	0.73	1.02	0.029	0.040
K	38.10	44.45	1.500	1.750
L	6.35	---	0.250	---
M	45°BSC		45°BSC	
N	5.08 BSC		0.200 BSC	
P	---	1.27	---	0.050
R	1.37 BSC		0.054 BSC	
T	---	0.76	---	0.030
U	2.54	---	0.100	---

STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

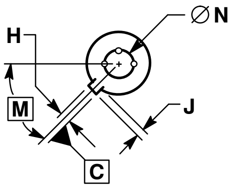
TO−39 3−Lead

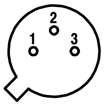
CASE 205AB−01
ISSUE O





DETAIL X





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NOTES:

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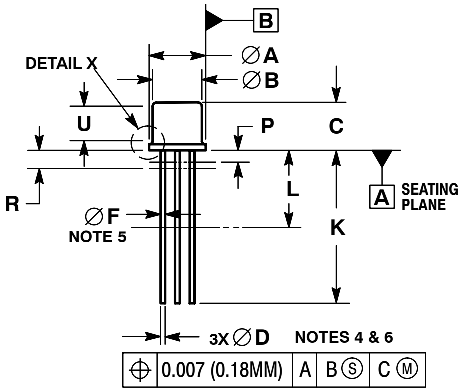
	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	8.89	9.40	0.350	0.370
B	8.00	8.51	0.315	0.335
C	6.10	6.60	0.240	0.260
D	0.41	0.48	0.016	0.019
E	0.23	3.18	0.009	0.125
F	0.41	0.48	0.016	0.019
H	0.71	0.86	0.028	0.034
J	0.73	1.02	0.029	0.040
K	12.70	14.73	0.500	0.580
L	6.35	---	0.250	---
M	45°BSC		45°BSC	
N	5.08 BSC		0.200 BSC	
P	---	1.27	---	0.050
R	1.37 BSC		0.054 BSC	
T	---	0.76	---	0.030
U	2.54	---	0.100	---

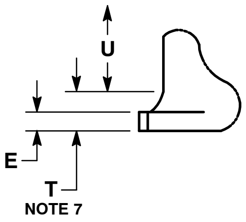
STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

PACKAGE DIMENSIONS

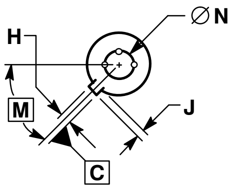
TO−18 3−Lead

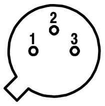
CASE 206AA−01
ISSUE O





DETAIL X





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6. DIMENSION D APPLIES BETWEEN DIMENSION L AND K.
7. BODY CONTOUR OPTIONAL WITHIN ZONE DEFINED BY DIMENSIONS A, B, AND T.

	MILLIMETERS		INCHES	
DIM	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	0.41	0.53	0.016	0.021
E	---	0.76	---	0.030
F	0.41	0.48	0.016	0.019
H	0.91	1.17	0.036	0.046
J	0.71	1.22	0.028	0.048
K	12.70	19.05	0.500	0.750
L	6.35	---	0.250	---
M	45° BSC		45° BSC	
N	2.54 BSC		0.100 BSC	
P	---	1.27	---	0.050
R	1.37 BSC		0.054 BSC	
T	---	0.76	---	0.030
U	2.54	---	0.100	---

STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

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