

# 2N2219, 2N2219A, 2N2219AL

## Small Signal Switching Transistor

### NPN Silicon

#### Features

- MIL-PRF-19500/251 Qualified
- Available as JAN, JANTX, and JANTXV

#### MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CEO}$	50	Vdc
Collector–Base Voltage	$V_{CBO}$	75	Vdc
Emitter–Base Voltage	$V_{EBO}$	6.0	Vdc
Collector Current – Continuous	$I_C$	800	mAdc
Total Power Dissipation @ $T_A = 25^\circ\text{C}$	$P_T$	0.8	W
Total Power Dissipation @ $T_C = 25^\circ\text{C}$	$P_T$	3.0	W
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	–65 to +200	$^\circ\text{C}$

#### THERMAL CHARACTERISTICS

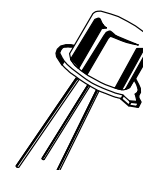
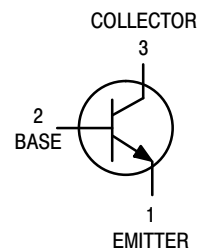
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	50	$^\circ\text{C/W}$

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.

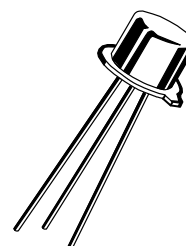


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TO-39  
CASE 205AB  
(2N2219, 2N2219A)



TO-5  
CASE 205AA  
(2N2219AL)

#### ORDERING INFORMATION

Device	Package	Shipping
JAN2N2219/A	TO-39	Bulk
JANTX2N2219/A		
JANTXV2N2219/A		
JAN2N2219AL	TO-5	Bulk
JANTX2N2219AL		
JANTXV2N2219AL		

## 2N2219, 2N2219A, 2N2219AL

### ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector–Emitter Breakdown Voltage ( $I_E = 10\text{ mA}$ )	$V_{(BR)CEO}$	30 50	– –	Vdc
Emitter–Base Cutoff Current ( $V_{EB} = 5.0\text{ Vdc}$ ) ( $V_{EB} = 6.0\text{ Vdc}$ ) ( $V_{EB} = 4.0\text{ Vdc}$ )	$I_{EBO}$	– – –	10 10 10	$\mu\text{Adc}$ $\mu\text{Adc}$ nAdc
Collector–Emitter Cutoff Current ( $V_{CE} = 30\text{ Vdc}$ ) ( $V_{CE} = 50\text{ Vdc}$ )	$I_{CES}$	– –	10 10	nAdc nAdc
Collector–Base Cutoff Current ( $V_{CB} = 50\text{ Vdc}$ ) ( $V_{CB} = 60\text{ Vdc}$ ) ( $V_{CB} = 60\text{ Vdc}$ ) ( $V_{CB} = 75\text{ Vdc}$ )	$I_{CBO}$	– – – –	10 10 10 10	nAdc $\mu\text{Adc}$ nAdc $\mu\text{Adc}$

### ON CHARACTERISTICS (Note 1)

DC Current Gain ( $I_C = 0.1\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ )  ( $I_C = 1.0\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ )  ( $I_C = 10\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ )  ( $I_C = 150\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ ) ( $I_C = 500\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ )	2N2219 2N2219A/AL 2N2219 2N2219A/AL 2N2219 2N2219A/AL 2N2219A/AL 2N2219A/AL	$h_{FE}$	35 50 50 75 75 100 100 30	– – 325 325 – – 300 –	–
Collector–Emitter Saturation Voltage ( $I_C = 150\text{ mA}$ , $I_B = 15\text{ mA}$ )  ( $I_C = 500\text{ mA}$ , $I_B = 50\text{ mA}$ )	2N2219 2N2219A/AL 2N2219 2N2219A/AL	$V_{CE(sat)}$	– – – –	0.4 0.3 1.6 1.0	Vdc
Base–Emitter Saturation Voltage ( $I_C = 150\text{ mA}$ , $I_B = 15\text{ mA}$ )  ( $I_C = 500\text{ mA}$ , $I_B = 50\text{ mA}$ )	2N2219 2N2219A/AL 2N2219 2N2219A/AL	$V_{BE(sat)}$	0.6 0.6 – –	1.3 1.2 2.6 2.0	Vdc

### SMALL–SIGNAL CHARACTERISTICS

Magnitude of Small–Signal Current Gain ( $I_C = 20\text{ mA}$ , $V_{CE} = 20\text{ Vdc}$ , $f = 100\text{ MHz}$ )	$ h_{fe} $	2.5	12	–
Small–Signal Current Gain ( $I_C = 1.0\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 1\text{ kHz}$ )	$h_{fe}$	50 75	– –	–
Output Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $100\text{ kHz} \leq f \leq 1.0\text{ MHz}$ )	$C_{obo}$	–	8.0	pF
Input Capacitance ( $V_{EB} = 0.5\text{ Vdc}$ , $I_C = 0$ , $100\text{ kHz} \leq f \leq 1.0\text{ MHz}$ )	$C_{ibo}$	–	25	pF

### SWITCHING CHARACTERISTICS

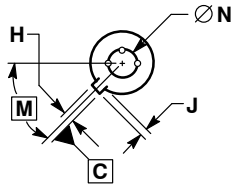
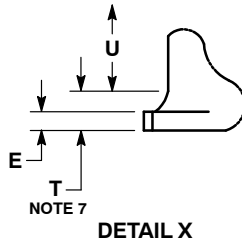
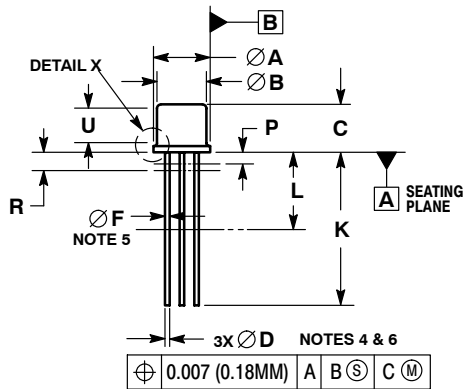
Turn–On Time (Reference Figure in MIL–PRF–19500/251)	$t_{on}$	– –	40 35	ns
Turn–Off Time (Reference Figure in MIL–PRF–19500/251)	$t_{off}$	– –	250 300	ns

1. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

# 2N2219, 2N2219A, 2N2219AL

## PACKAGE DIMENSIONS

### TO-5 3-Lead CASE 205AA ISSUE B



#### 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 GAUGE 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.

DIM	MILLIMETERS		INCHES	
	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	---

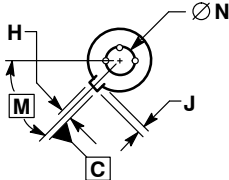
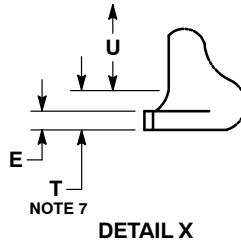
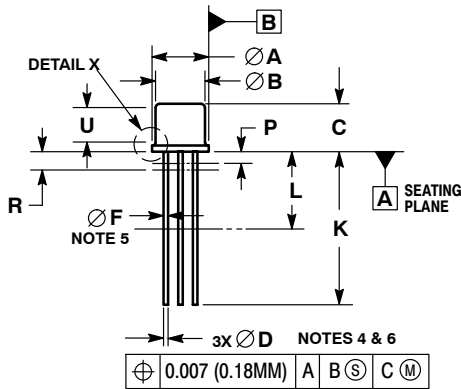
#### STYLE 1:

1. EMITTER
2. BASE
3. COLLECTOR

# 2N2219, 2N2219A, 2N2219AL

## PACKAGE DIMENSIONS

### TO-39 3-Lead CASE 205AB ISSUE A



#### 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 GAUGE 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	0.48	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:

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

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