

# 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

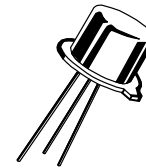
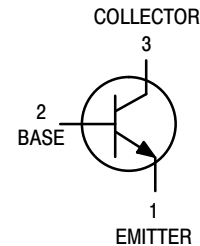
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	50	$^\circ\text{C/W}$

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.

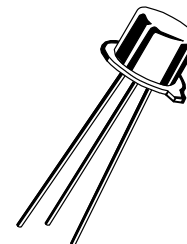


ON Semiconductor®

<http://onsemi.com>



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 ( $I_C = 0.1\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ )  ( $I_C = 1.0\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ )  ( $I_C = 10\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ )  ( $I_C = 150\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ ) ( $I_C = 500\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ )	$h_{FE}$	35 50 50 75 75 100 100 30	– – 325 325 – – 300 –	–
Collector–Emitter Saturation Voltage ( $I_C = 150\text{ mA}$ , $I_B = 15\text{ mA}$ )  ( $I_C = 500\text{ mA}$ , $I_B = 50\text{ mA}$ )	$V_{CE(sat)}$	– – – –	0.4 0.3 1.6 1.0	Vdc
Base–Emitter Saturation Voltage ( $I_C = 150\text{ mA}$ , $I_B = 15\text{ mA}$ )  ( $I_C = 500\text{ mA}$ , $I_B = 50\text{ mA}$ )	$V_{BE(sat)}$	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  $\leq 2.0\%$ .

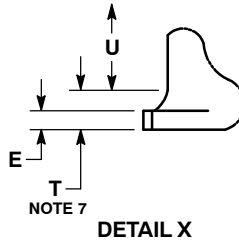
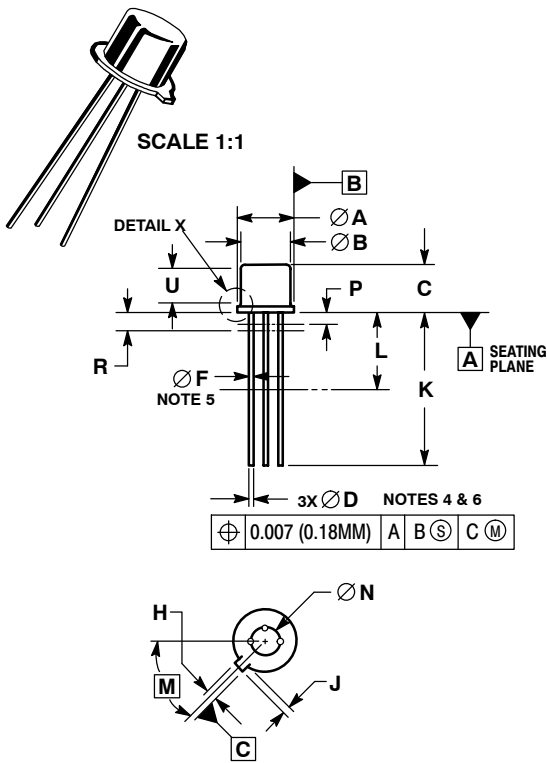
# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

ON Semiconductor®



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

DATE 06 JUL 2012



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

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	---

DOCUMENT NUMBER:	98AON49138E	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
STATUS:	ON SEMICONDUCTOR STANDARD	
NEW STANDARD:		
DESCRIPTION:	TO-5 3-LEAD	PAGE 1 OF 2



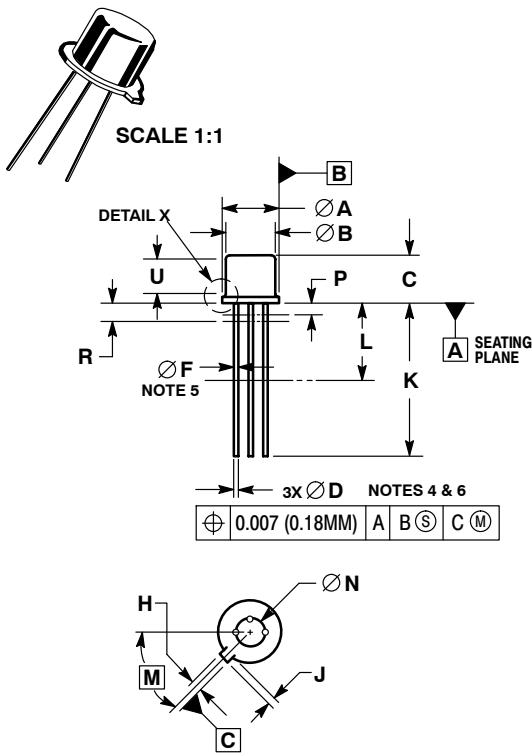
# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

ON Semiconductor®



TO-39 3-Lead  
CASE 205AB  
ISSUE A

DATE 25 JUN 2012



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	0.48	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

DOCUMENT NUMBER:	98AON49134E	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
STATUS:	ON SEMICONDUCTOR STANDARD	
NEW STANDARD:		
DESCRIPTION:	TO-39 3-LEAD	PAGE 1 OF 2



**onsemi**, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## ADDITIONAL INFORMATION

### TECHNICAL PUBLICATIONS:

Technical Library: [www.onsemi.com/design/resources/technical-documentation](http://www.onsemi.com/design/resources/technical-documentation)  
onsemi Website: [www.onsemi.com](http://www.onsemi.com)

### ONLINE SUPPORT: [www.onsemi.com/support](http://www.onsemi.com/support)

For additional information, please contact your local Sales Representative at [www.onsemi.com/support/sales](http://www.onsemi.com/support/sales)