

2N3019, 2N3019S, 2N3700

80V, 1A NPN Small Signal Transistor

Features

- MIL-PRF-19500/391 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} | 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 @ $T_A = 25^\circ\text{C}$ 2N3019, 2N3019S 2N3700 | P_T | 800 500 | mW |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$ 2N3019, 2N3019S 2N3700 | P_T | 5.0 1.0 | W |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | -65 to +200 | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

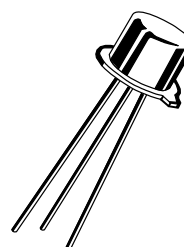
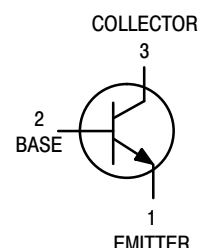
| Characteristic | Symbol | Max | Unit |
|--|-----------------|------------|--------------------|
| Thermal Resistance, Junction to Ambient 2N3019, 2N3019S 2N3700 | $R_{\theta JA}$ | 195 325 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case 2N3019, 2N3019S 2N3700 | $R_{\theta JC}$ | 30 150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

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.

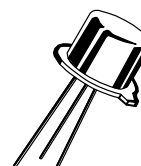


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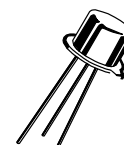
<http://onsemi.com>



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 | | |

2N3019, 2N3019S, 2N3700

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

| Characteristic | Symbol | Min | Max | Unit |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

OFF CHARACTERISTICS

| | | | | |
|---|---------------|--------|----------|-------------------------|
| Collector–Emitter Breakdown Voltage ($I_C = 30\text{ mA}$) | $V_{(BR)CEO}$ | 80 | – | Vdc |
| Emitter–Base Cutoff Current ($V_{EB} = 5.0\text{ Vdc}$) ($V_{EB} = 7.0\text{ Vdc}$) | I_{EBO} | – – | 10 10 | nAdc μAdc |
| Collector–Emitter Cutoff Current ($V_{CE} = 90\text{ Vdc}$) | I_{CEO} | – | 10 | nAdc |
| Collector–Base Cutoff Current ($V_{CB} = 140\text{ Vdc}$) | I_{CBO} | – | 10 | μAdc |

ON CHARACTERISTICS (Note 1)

| | | | | |
|---|---------------|-----------------------------|-----------------------------|-----|
| DC Current Gain ($I_C = 0.1\text{ mA}$, $V_{CE} = 10\text{ Vdc}$) ($I_C = 10\text{ mA}$, $V_{CE} = 10\text{ Vdc}$) ($I_C = 150\text{ mA}$, $V_{CE} = 10\text{ Vdc}$) ($I_C = 500\text{ mA}$, $V_{CE} = 10\text{ Vdc}$) ($I_C = 1.0\text{ A}$, $V_{CE} = 10\text{ Vdc}$) | h_{FE} | 50 90 100 50 15 | 300 – 300 300 – | – |
| Collector–Emitter Saturation Voltage ($I_C = 150\text{ mA}$, $I_B = 15\text{ mA}$) ($I_C = 500\text{ mA}$, $I_B = 50\text{ mA}$) | $V_{CE(sat)}$ | – – | 0.2 0.5 | Vdc |
| Base–Emitter Saturation Voltage ($I_C = 150\text{ mA}$, $I_B = 15\text{ mA}$) | $V_{BE(sat)}$ | – | 1.1 | Vdc |

SMALL-SIGNAL CHARACTERISTICS

| | | | | |
|--|-------------|-----|-----|----|
| Magnitude of Small–Signal Current Gain ($I_C = 50\text{ mA}$, $V_{CE} = 10\text{ Vdc}$, $f = 20\text{ MHz}$) | $ h_{fe} $ | 5.0 | 20 | – |
| Small–Signal Current Gain ($I_C = 1.0\text{ mA}$, $V_{CE} = 5\text{ Vdc}$, $f = 1\text{ kHz}$) | h_{fe} | 80 | 400 | – |
| 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 ($V_{CE} = 10\text{ Vdc}$, $I_C = 100\text{ }\mu\text{Adc}$, $R_g = 1\text{ k}\Omega$, $PBW = 200\text{ Hz}$) | NF | – | 4.0 | dB |
| Collector–Base Time Constant ($V_{CB} = 10\text{ Vdc}$, $I_C = 10\text{ mA}$, $f = 79.8\text{ MHz}$) | 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 $\leq 2.0\%$.

MECHANICAL CASE OUTLINE

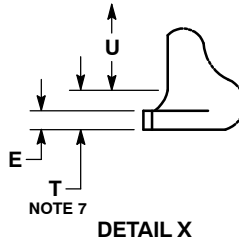
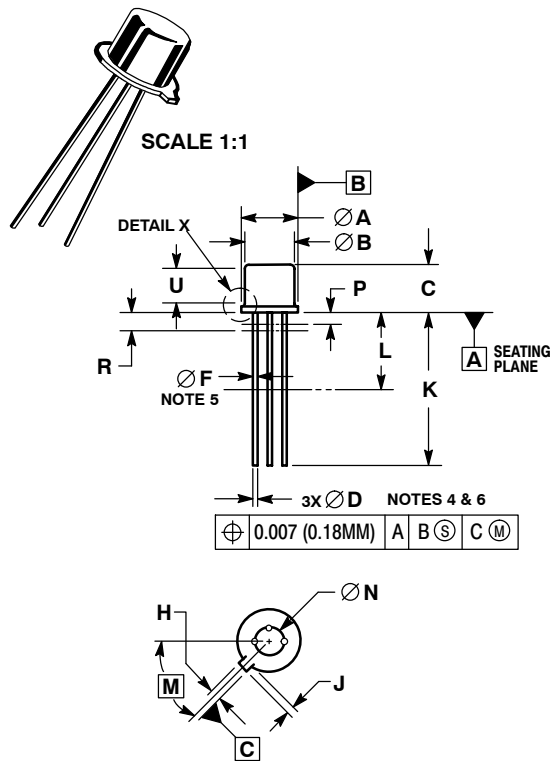
PACKAGE DIMENSIONS

ON Semiconductor®

ON

TO-5 3-Lead CASE 205AA ISSUE B

DATE 06 JUL 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 | 0.53 | 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 | --- |

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| DESCRIPTION: | TO-5 3-LEAD | PAGE 1 OF 2 |

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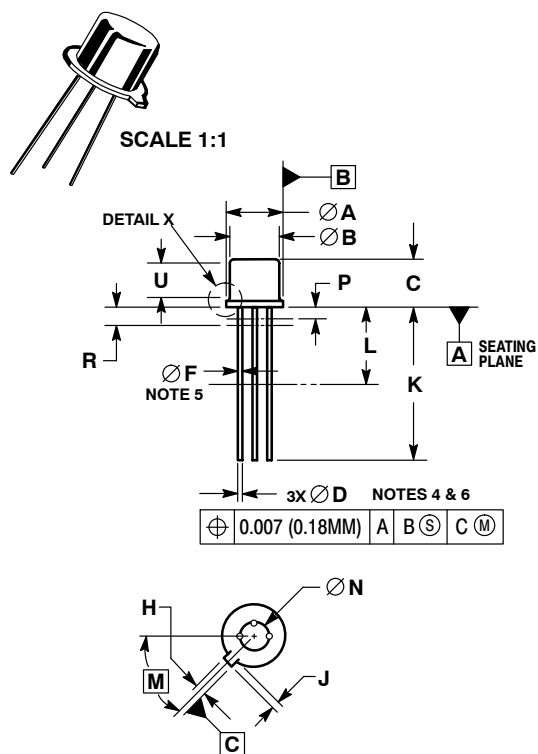
MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

ON Semiconductor®

ON

TO-39 3-Lead CASE 205AB ISSUE A

DATE 25 JUN 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 | 0.48 | 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 | --- |

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| DESCRIPTION: | TO-39 3-LEAD | PAGE 1 OF 2 |

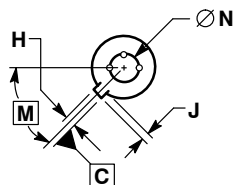
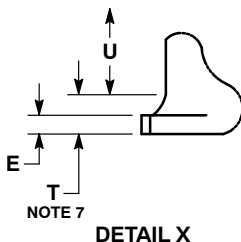
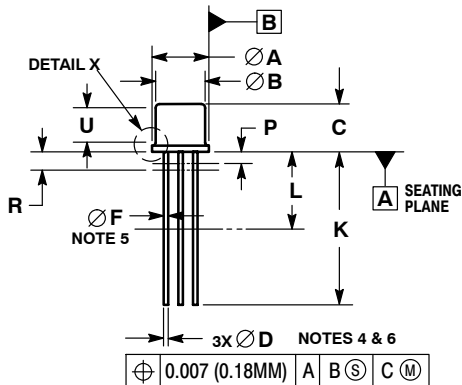
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SCALE 1:1

TO-18
CASE 206AA
ISSUE A

DATE 21 AUG 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.

| 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 | 0.41 | 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

STYLE 4:
PIN 1. SOURCE
2. DRAIN
3. GATE & CASE

STYLE 7:
PIN 1. ANODE
2. BASE
3. CATHODE

STYLE 10:
PIN 1. BASE
2. EMITTER
3. BASE

STYLE 2:
PIN 1. SOURCE, SUBSTRATE
& CASE
2. GATE
3. DRAIN

STYLE 5:
PIN 1. EMITTER
2. BASE 1
3. BASE 2

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

STYLE 11:
PIN 1. DRAIN
2. GATE
3. SOURCE, SUBSTRATE

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

STYLE 6:
PIN 1. CATHODE
2. GATE
3. ANODE

STYLE 9:
PIN 1. ANODE 2
2. ANODE 1
3. GATE
(CONNECTED TO CASE)

STYLE 12:
PIN 1. SOURCE
2. GATE
3. DRAIN (CASE)

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