

2N4029, 2N4033

Product Preview Small Signal Switching Transistor

PNP Silicon

Features

- MIL-PRF-19500/512 Qualified
- Available as JAN, JANTX, and JANTXV

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|----------------|-------------|------------------|
| Collector-Emitter Voltage | V_{CEO} | -80 | Vdc |
| Collector-Base Voltage | V_{CBO} | -80 | Vdc |
| Emitter-Base Voltage | V_{EBO} | -5.0 | Vdc |
| Collector Current - Continuous | I_C | 1 | Adc |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$ 2N4029 2N4033 | P_T | 0.5 0.8 | W |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$ 2N4029 2N4033 | P_T | 1.0 4.0 | W |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | -65 to +200 | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

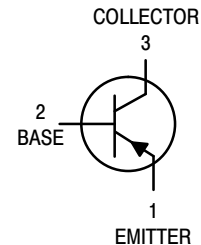
| Characteristic | Symbol | Max | Unit |
|---|-----------------|------------|---------------------------|
| Thermal Resistance, Junction-to-Ambient 2N4029 2N4033 | $R_{\theta JA}$ | 325 195 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Case 2N4029 2N4033 | $R_{\theta JC}$ | 150 40 | $^\circ\text{C}/\text{W}$ |

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.

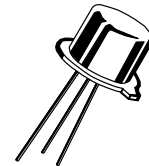


ON Semiconductor®

<http://onsemi.com>



TO-18
CASE 206AA
STYLE 1
2N4029



TO-39
CASE 205AB
STYLE 1
2N4033

ORDERING INFORMATION

| Level | Device | Package | Shipping |
|--------|--------|---------|----------|
| JAN | 2N4029 | TO-18 | Bulk |
| JANTX | 2N4033 | TO-39 | Bulk |
| JANTXV | | | |

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2N4029, 2N4033

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

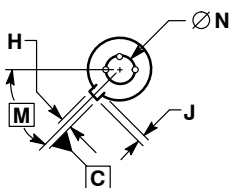
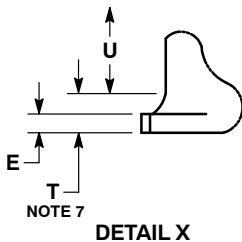
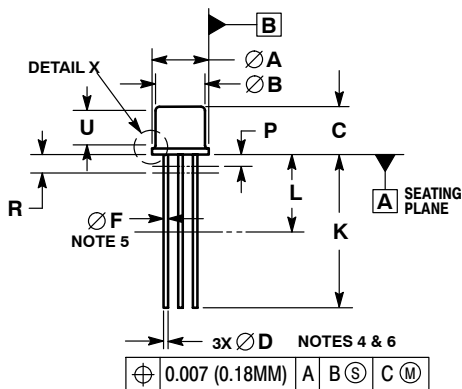
| Characteristic | Symbol | Min | Max | Unit |
|--|---------------|-----------------------|-----------------------|---------------------|
| OFF CHARACTERISTICS | | | | |
| Collector - Emitter Breakdown Voltage ($I_C = -10 \text{ mAdc}$) | $V_{(BR)CEO}$ | -80 | - | Vdc |
| Collector - Emitter Cutoff Current ($V_{CE} = -60 \text{ Vdc}$) | I_{CES} | - | -25 | nAdc |
| Collector - Base Cutoff Current ($V_{CB} = -80 \text{ Vdc}, I_E = 0$) ($V_{CB} = -60 \text{ Vdc}, I_E = 0$) | I_{CBO} | - - | -10 -10 | μA nA |
| Emitter - Base Cutoff Current ($V_{EB} = -5 \text{ Vdc}$) ($V_{EB} = -3 \text{ Vdc}$) | I_{EBO} | - - | -10 -25 | μA nA |
| ON CHARACTERISTICS (Note 1) | | | | |
| DC Current Gain ($I_C = -0.1 \text{ mAdc}, V_{CE} = -5 \text{ Vdc}$) ($I_C = -100 \text{ mAdc}, V_{CE} = -5 \text{ Vdc}$) ($I_C = -500 \text{ mAdc}, V_{CE} = -5 \text{ Vdc}$) ($I_C = -1 \text{ Adc}, V_{CE} = -5 \text{ Vdc}$) | h_{FE} | 50 100 70 25 | - 300 - - | - |
| Collector - Emitter Saturation Voltage ($I_C = -150 \text{ mAdc}, I_B = -15 \text{ mAdc}$) ($I_C = -500 \text{ mAdc}, I_B = -50 \text{ mAdc}$) ($I_C = -1 \text{ Adc}, I_B = -100 \text{ mAdc}$) | $V_{CE(sat)}$ | - - - | -0.15 -0.5 -1.0 | Vdc |
| Base - Emitter Saturation Voltage ($I_C = -150 \text{ mAdc}, I_B = -15 \text{ mAdc}$) ($I_C = -500 \text{ mAdc}, I_B = -50 \text{ mAdc}$) | $V_{BE(sat)}$ | - - | -0.9 -1.2 | Vdc |
| SMALL-SIGNAL CHARACTERISTICS | | | | |
| Magnitude of Small-Signal Current Gain ($I_C = -50 \text{ mAdc}, V_{CE} = -10 \text{ Vdc}, f = 100 \text{ MHz}$) | $ h_{fe} $ | 1.5 | 6.0 | - |
| Output Capacitance ($V_{CB} = -10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$) | C_{obo} | - | 20 | pF |
| Input Capacitance ($V_{EB} = -0.5 \text{ Vdc}, I_C = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$) | C_{ibo} | - | 80 | pF |
| SWITCHING CHARACTERISTICS | | | | |
| Delay Time (Reference Figure in MIL-PRF-19500/512) | t_d | - | 15 | ns |
| Rise Time (Reference Figure in MIL-PRF-19500/512) | t_r | - | 25 | ns |
| Storage Time (Reference Figure in MIL-PRF-19500/512) | t_s | - | 175 | ns |
| Fall Time (Reference Figure in MIL-PRF-19500/512) | t_f | - | 35 | ns |

1. Pulse Test: Pulse Width = 300 μs , Duty Cycle $\leq 2.0\%$.

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PACKAGE DIMENSIONS

TO-18 3
CASE 206AA
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.

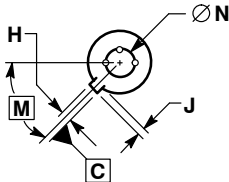
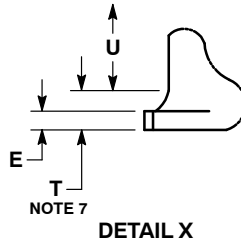
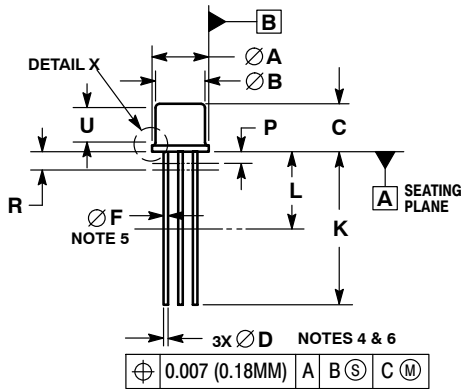
| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|-------|-----------|-------|
| | MIN | MAX | MIN | MAX |
| A | 5.31 | 5.84 | 0.209 | 0.230 |
| B | 4.52 | 4.95 | 0.178 | 0.195 |
| C | 4.32 | 5.33 | 0.170 | 0.210 |
| D | 0.41 | 0.53 | 0.016 | 0.021 |
| E | --- | 0.76 | --- | 0.030 |
| F | 0.41 | 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:
1. EMITTER
 2. BASE
 3. COLLECTOR

2N4029, 2N4033

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.

| 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

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