# 2N3634, 2N3634L, 2N3635, 2N3635L, 2N3636, 2N3636L, 2N3637, 2N3637L

# Low Power Transistors

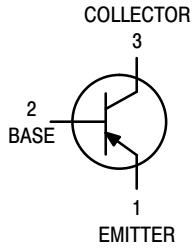
## PNP Silicon

ON Semiconductor®

http://onsemi.com

### Features

- MIL−PRF−19500/357 Qualified
- Available as JAN, JANTX, JANTXV and JANHC



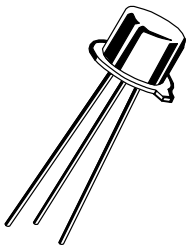

**MAXIMUM RATINGS** ($T_A$ = 25°C unless otherwise noted)

| Characteristic | Symbol | 2N3634/L 2N3635/L | 2N3636/L 2N3637/L | Unit |
|---|---|---|---|---|
| Collector−Emitter Voltage | $V_{CEO}$ | −140 | −175 | Vdc |
| Collector−Base Voltage | $V_{CBO}$ | −140 | −175 | Vdc |
| Emitter−Base Voltage | $V_{EBO}$ | −5.0 | | Vdc |
| Collector Current − Continuous | $I_C$ | 1.0 | | Adc |
| Total Device Dissipation @ $T_A$ = 25°C | $P_T$ | 1.0 | | W |
| Total Device Dissipation @ $T_C$ = 25°C | $P_T$ | 5.0 | | 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 | $R_{\theta JA}$ | 175 | °C/W |
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 35 | °C/W |

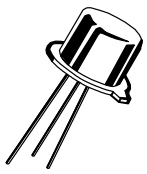
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.



**TO−5**
**CASE 205AA**
**STYLE 1**
**2N3634L**
**2N3635L**
**2N3636L**
**2N3637L**

**ORDERING INFORMATION**

| Level | Device | Package | Shipping |
|---|---|---|---|
| JAN JANTX JANTXV JANHC | 2N3634 | TO−39 | Bulk |
| | 2N3635 | | |
| | 2N3636 | | |
| | 2N3637 | | |
| | 2N3634L | TO−5 | Bulk |
| | 2N3635L | | |
| | 2N3636L | | |
| | 2N3637L | | |



**TO−39**
**CASE 205AB**
**STYLE 1**
**2N3634**
**2N3635**
**2N3636**
**2N3637**

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

| Characteristic | | Symbol | Min | Max | Unit |
|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | |
| Collector−Emitter Breakdown Voltage ($I_C$ = −10 mA) | 2N3634, 2N3635 | $V_{(BR)CEO}$ | −140 | − | V |
| | 2N3636, 2N3637 | | −175 | − | |
| Emitter−Base Cutoff Current ($V_{EB}$ = −3.0 V) | | $I_{EBO}$ | − | −50 | nA |
| ($V_{EB}$ = −5.0 V) | | | − | −10 | μA |
| Collector−Emitter Cutoff Current ($V_{CE}$ = −100 V) | | $I_{CEO}$ | − | −10 | μA |
| Collector−Base Cutoff Current ($V_{CB}$ = −100 V) | | $I_{CBO}$ | − | −100 | nA |
| ($V_{CB}$ = −140 V) | 2N3634, 2N3635 | | − | −10 | μA |
| ($V_{CB}$ = −175 V) | 2N3636, 2N3637 | | − | −10 | μA |
| **ON CHARACTERISTICS** (Note 1) | | | | | |
| DC Current Gain | 2N3634, 2N3636 | $h_{FE}$ | | | − |
| ($I_C$ = −0.1 mA, $V_{CE}$ = −10 V) | | | 25 | − | |
| ($I_C$ = −1.0 mA, $V_{CE}$ = −10 V) | | | 45 | − | |
| ($I_C$ = −10 mA, $V_{CE}$ = −10 V) | | | 50 | − | |
| ($I_C$ = −50 mA, $V_{CE}$ = −10 V) | | | 50 | 150 | |
| ($I_C$ = −150 mA, $V_{CE}$ = −10 V) | | | 30 | − | |
| DC Current Gain | 2N3635, 2N3637 | $h_{FE}$ | | | − |
| ($I_C$ = −0.1 mA, $V_{CE}$ = −10 V) | | | 55 | − | |
| ($I_C$ = −1.0 mA, $V_{CE}$ = −10 V) | | | 90 | − | |
| ($I_C$ = −10 mA, $V_{CE}$ = −10 V) | | | 100 | − | |
| ($I_C$ = −50 mA, $V_{CE}$ = −10 V) | | | 100 | 300 | |
| ($I_C$ = −150 mA, $V_{CE}$ = −10 V) | | | 60 | − | |
| Collector−Emitter Saturation Voltage ($I_C$ = −10 mA, $I_B$ = −1.0 mA) | | $V_{CE(sat)}$ | − | −0.3 | V |
| ($I_C$ = −50 mA, $I_B$ = −5.0 mA) | | | − | −0.6 | |
| Base−Emitter Saturation Voltage ($I_C$ = −10 mA, $I_B$ = −1.0 mA) | | $V_{BE(sat)}$ | − | −0.8 | V |
| ($I_C$ = −50 mA, $I_B$ = −5.0 mA) | | | −0.65 | −0.9 | |
| **SMALL−SIGNAL CHARACTERISTICS** | | | | | |
| Magnitude of Small−Signal Current Gain ($I_C$ = −30 mA, $V_{CE}$ = −30 V, f = 100 MHz) | 2N3634, 2N3636 | $\|h_{fe}\|$ | 1.5 | 8.0 | − |
| | 2N3635, 2N3637 | | 2.0 | 8.5 | |
| Small−Signal Current Gain ($I_C$ = −10 mA, $V_{CE}$ = −10 V, f = 1 kHz) | 2N3634, 2N3636 | $h_{fe}$ | 40 | 160 | − |
| | 2N3635, 2N3637 | | 80 | 320 | |
| Output Capacitance ($V_{CB}$ = −20 V, $I_E$ = 0 A, 100 kHz ≤ f ≤ 1.0 MHz) | | $C_{obo}$ | − | 10 | pF |
| Input Capacitance ($V_{EB}$ = −1.0 V, $I_C$ = 0 A, 100 kHz ≤ f ≤ 1.0 MHz) | | $C_{ibo}$ | − | 75 | pF |
| Noise Figure | | NF | | | dB |
| ($V_{CE}$ = −10 V, $I_C$ = −0.5 mA, $R_g$ = 1 kΩ, f = 100 Hz) | | | − | 5.0 | |
| ($V_{CE}$ = −10 V, $I_C$ = −0.5 mA, $R_g$ = 1 kΩ, f = 1.0 kHz) | | | − | 3.0 | |
| ($V_{CE}$ = −10 V, $I_C$ = −0.5 mA, $R_g$ = 1 kΩ, f = 10 kHz) | | | − | 3.0 | |
| **SWITCHING CHARACTERISTICS** | | | | | |
| Delay Time | (Reference Figure 11 in MIL−PRF−19500/357) | $t_d$ | − | 100 | ns |
| Rise Time | (Reference Figure 11 in MIL−PRF−19500/357) | $t_r$ | − | 100 | ns |
| Storage Time | (Reference Figure 11 in MIL−PRF−19500/357) | $t_s$ | − | 500 | ns |
| Fall Time | (Reference Figure 11 in MIL−PRF−19500/357) | $t_f$ | − | 150 | ns |
| Turn−Off Time | (Reference Figure 11 in MIL−PRF−19500/357) | $t_{off}$ | − | 600 | ns |

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

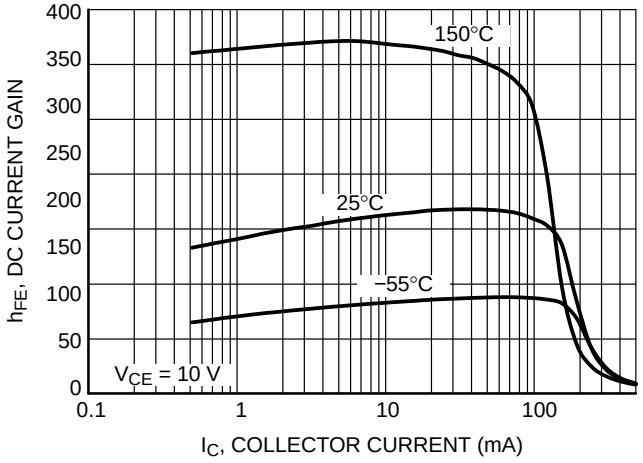



**Figure 1. DC Current Gain**

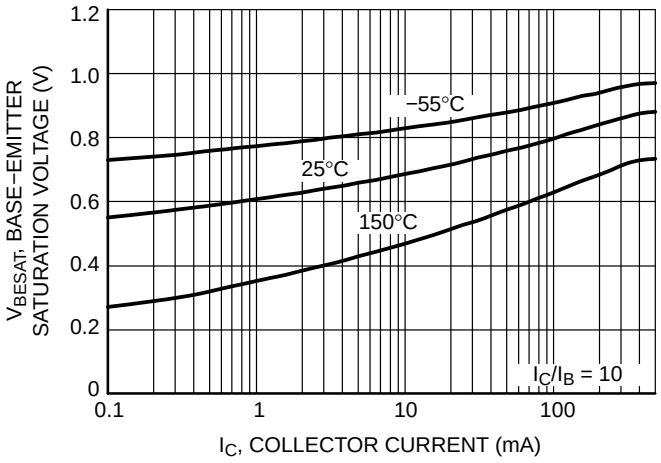



**Figure 2. Base−Emitter Saturation Voltage**

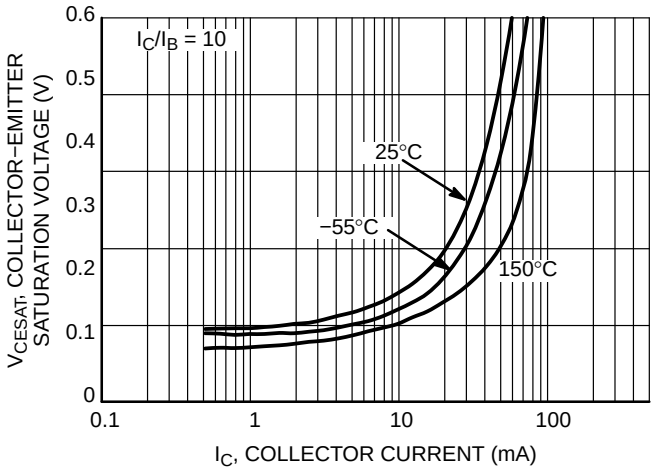



**Figure 3. Collector−Emitter Saturation Voltage**

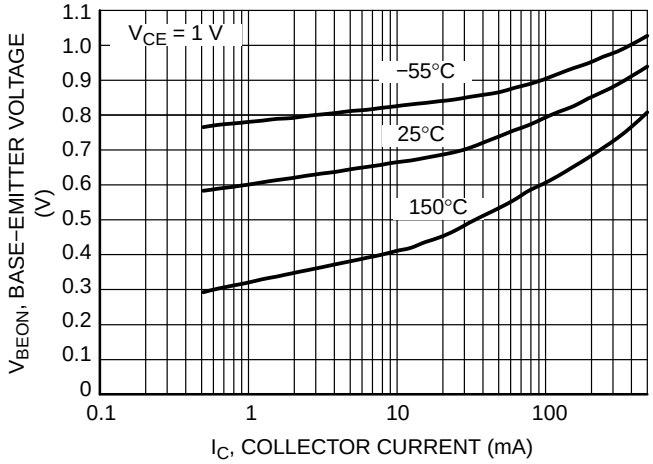



**Figure 4. Base−Emitter Voltage**

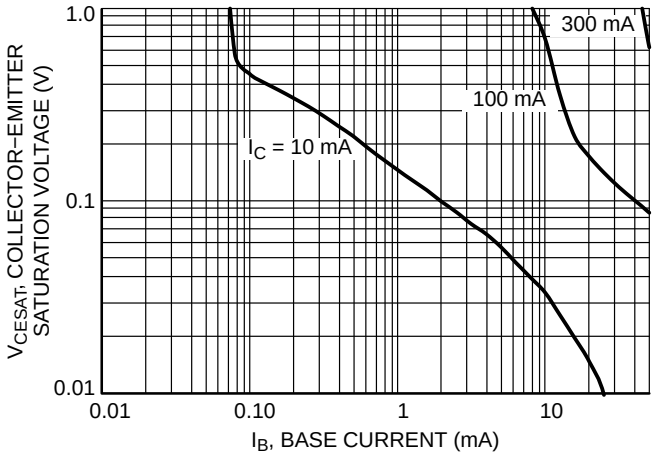



**Figure 5. Collector Saturation Region**

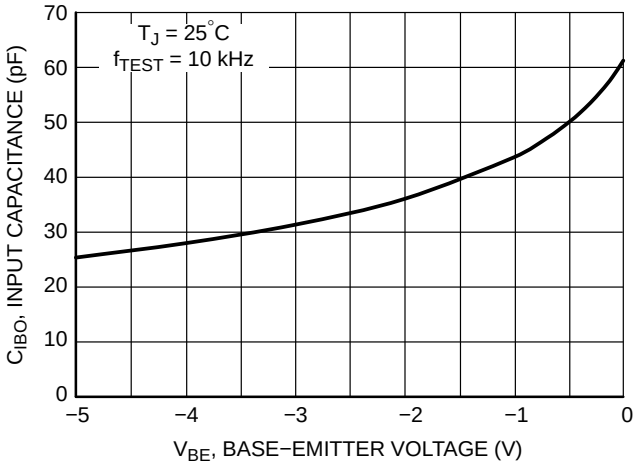



**Figure 6. Input Capacitance**

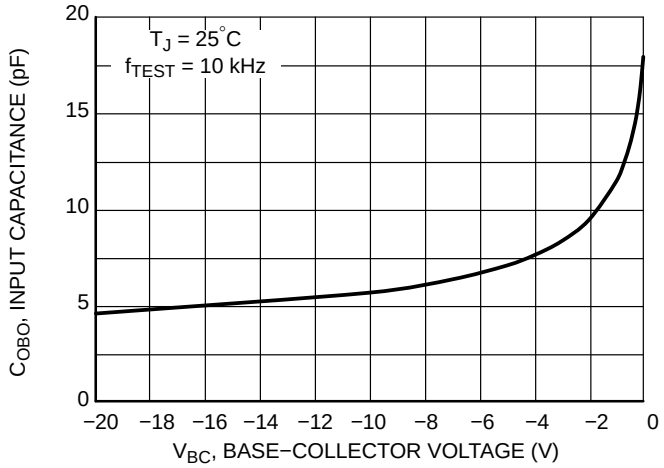



**Figure 7. Output Capacitance**

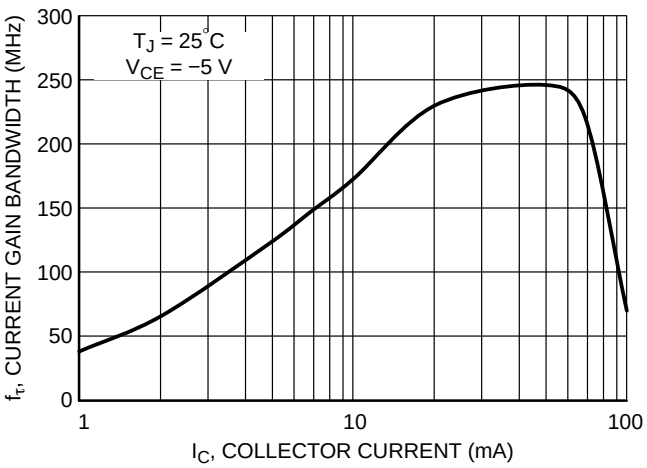
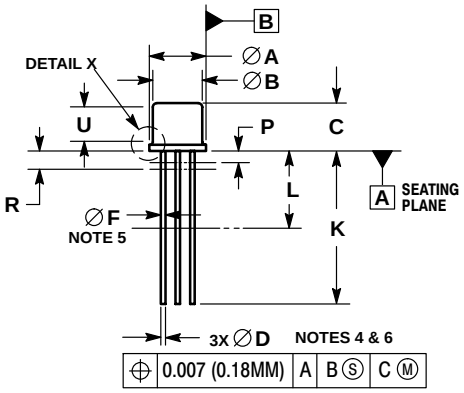
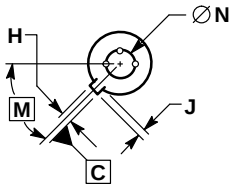


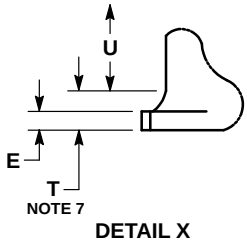

**Figure 8. Current Gain Bandwidth Product**

## PACKAGE DIMENSIONS

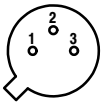
**TO−5 3−Lead**
CASE 205AA
ISSUE B




**DETAIL X**




**LEAD IDENTIFICATION DETAIL**

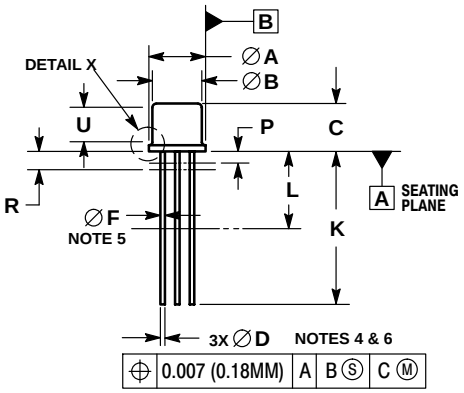
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSION J MEASURED FROM DIAMETER A TO EDGE.
4. LEAD TRUE POSITION TO BE DETERMINED AT THE GUAGE PLANE DEFINED BY DIMENSION R.
5. DIMENSION F APPLIES BETWEEN DIMENSION P AND L.
6. DIMENSION D APPLIES BETWEEN 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.

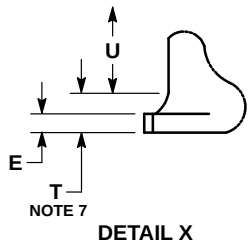
| | MILLIMETERS | | INCHES | |
|---|---|---|---|---|
| DIM | MIN | MAX | MIN | MAX |
| A | 8.89 | 9.40 | 0.350 | 0.370 |
| B | 8.00 | 8.51 | 0.315 | 0.335 |
| C | 6.10 | 6.60 | 0.240 | 0.260 |
| D | 0.41 | 0.53 | 0.016 | 0.021 |
| E | 0.23 | 3.18 | 0.009 | 0.125 |
| F | 0.41 | 0.48 | 0.016 | 0.019 |
| 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

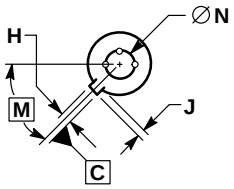
## PACKAGE DIMENSIONS

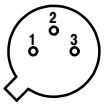
**TO−39 3−Lead**
CASE 205AB
ISSUE A




**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.
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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



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