

PNP SILICON SWITCHING TRANSISTOR

Qualified per MIL-PRF-19500/357

DEVICES

| | | | |
|-----------------|-----------------|-----------------|-----------------|
| 2N3634 | 2N3635 | 2N3636 | 2N3637 |
| 2N3634L | 2N3635L | 2N3636L | 2N3637L |
| 2N3634UB | 2N3635UB | 2N3636UB | 2N3637UB |

LEVELS

JAN
JANTX
JANTXV
JANS

ABSOLUTE MAXIMUM RATINGS ($T_C = +25^\circ\text{C}$ unless otherwise noted)

| Parameters / Test Conditions | Symbol | 2N3634* | 2N3636* | Unit |
|--|---------------------------------|-------------|---------|------------------|
| | | 2N3635* | 2N3637* | |
| Collector-Emitter Voltage | V_{CEO} | 140 | 175 | Vdc |
| Collector-Base Voltage | V_{CBO} | 140 | 175 | Vdc |
| Emitter-Base Voltage | V_{EBO} | 5.0 | 5.0 | Vdc |
| Collector Current | I_C | 1.0 | 1.0 | Adc |
| Total Power Dissipation | @ $T_A = +25^\circ\text{C}$ | 1.0 | | W |
| | @ $T_C = +25^\circ\text{C}$ | 5.0 | | W |
| | UB: @ $T_C = +25^\circ\text{C}$ | 1.5 | | W |
| Operating & Storage Junction Temperature Range | T_J, T_{stg} | -65 to +200 | | $^\circ\text{C}$ |

* Electrical characteristics for "L" suffix devices are identical to the "non L" corresponding devices.

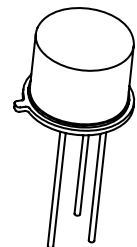
** Consult 19500/357 for De-Rating curves.

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

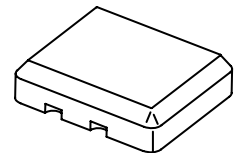
| Parameters / Test Conditions | Symbol | Min. | Max. | Unit |
|--|---------------|------|------|------------------|
| OFF CHARACTERISTICS | | | | |
| Collector-Emitter Breakdown Voltage $I_C = 10\text{mAdc}$ | $V_{(BR)CEO}$ | 140 | | Vdc |
| 2N3634, 2N3635 2N3636, 2N3637 | | 175 | | |
| Collector-Base Cutoff Current $V_{CB} = 100\text{Vdc}$ | I_{CBO} | | 100 | ηAdc |
| $V_{CB} = 140\text{Vdc}$ | | | 10 | μAdc |
| $V_{CB} = 175\text{Vdc}$ | | | 10 | μAdc |
| Emitter-Base Cutoff Current $V_{EB} = 3.0\text{Vdc}$ | I_{EBO} | | 50 | ηAdc |
| $V_{EB} = 5.0\text{Vdc}$ | | | 10 | μAdc |
| Collector-Emitter cutoff Current $V_{CE} = 100\text{Vdc}$ | I_{CEO} | | 10 | μAdc |



TO-5*
 2N3634L, 2N3635L
 2N3636L, 2N3637L



TO-39* (TO-205AD)
 2N3634, 2N3635
 2N3636, 2N3637



3 PIN
 2N3634UB, 2N3635UB
 2N3636UB, 2N3637UB

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

| Parameters / Test Conditions | Symbol | Min. | Max. | Unit |
|--|--|----------|--|--------------------|
| ON CHARACTERISTICS ⁽¹⁾ | | | | |
| Forward-Current Transfer Ratio $I_C = 0.1\text{mA dc}, V_{CE} = 10\text{V dc}$ $I_C = 1.0\text{mA dc}, V_{CE} = 10\text{V dc}$ $I_C = 10\text{mA dc}, V_{CE} = 10\text{V dc}$ $I_C = 50\text{mA dc}, V_{CE} = 10\text{V dc}$ $I_C = 150\text{mA dc}, V_{CE} = 10\text{V dc}$ $I_C = 0.1\text{mA dc}, V_{CE} = 10\text{V dc}$ $I_C = 1.0\text{mA dc}, V_{CE} = 10\text{V dc}$ $I_C = 10\text{mA dc}, V_{CE} = 10\text{V dc}$ $I_C = 50\text{mA dc}, V_{CE} = 10\text{V dc}$ $I_C = 150\text{mA dc}, V_{CE} = 10\text{V dc}$ | 2N3634, 2N3636 2N3635, 2N3637 | h_{FE} | 25 45 50 50 30 55 90 100 100 60 | 150 300 |
| Collector-Emitter Saturation Voltage $I_C = 10\text{mA dc}, I_B = 1.0\text{mA dc}$ $I_C = 50\text{mA dc}, I_B = 5.0\text{mA dc}$ | $V_{CE(sat)}$ | | 0.3 0.6 | Vdc |
| Base-Emitter Saturation Voltage $I_C = 10\text{mA dc}, I_B = 1.0\text{mA dc}$ $I_C = 50\text{mA dc}, I_B = 5.0\text{mA dc}$ | $V_{BE(sat)}$ | 0.65 | 0.8 0.9 | Vdc |

DYNAMIC CHARACTERISTICS

| Parameters / Test Conditions | Symbol | Min. | Max. | Unit |
|---|------------|---|-------------------|---------------|
| Forward Current Transfer Ratio $I_C = 30\text{mA dc}, V_{CE} = 30\text{V dc}, f = 100\text{MHz}$ | $ h_{fe} $ | 1.5 2.0 | 8.0 8.5 | |
| Forward Current Transfer Ratio $I_C = 10\text{mA dc}, V_{CE} = 10\text{V dc}, f = 1.0\text{kHz}$ | h_{fe} | 40 80 | 160 320 | |
| Small-Signal Short-Circuit Input Impedance $I_C = 10\text{mA dc}, V_{CE} = 10\text{V dc}, f = 1.0\text{kHz}$ | h_{ie} | 100 200 | 600 1200 | Ω |
| Small-Signal Open-Circuit Input Impedance $I_C = 10\text{mA dc}, V_{CE} = 10\text{V dc}, f = 1.0\text{kHz}$ | h_{oe} | | 200 | μs |
| Output Capacitance $V_{CB} = 20\text{V dc}, I_E = 0, 100\text{ kHz} \leq f \leq 1.0\text{MHz}$ | C_{obo} | | 10 | pF |
| Input Capacitance $V_{EB} = 1.0\text{V dc}, I_C = 0, 100\text{ kHz} \leq f \leq 1.0\text{MHz}$ | C_{ibo} | | 75 | pF |
| Noise Figure $V_{CE} = 10\text{V dc}, I_C = 0.5\text{mA dc}, R_g = 1.0\text{k}\Omega$ | NF | $f = 100\text{Hz}$ $f = 1.0\text{kHz}$ $f = 10\text{kHz}$ | 5.0 3.0 3.0 | dB |

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



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TECHNICAL DATA SHEET

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SAFE OPERATING AREA

DC Tests

$T_C = 25^\circ\text{C}$, 1 Cycle, $t = 1.0\text{s}$

Test 1

$V_{CE} = 100\text{Vdc}$, $I_C = 30\text{mA}$

2N3634, 2N3635

$V_{CE} = 130\text{Vdc}$, $I_C = 20\text{mA}$

2N3636, 2N3637

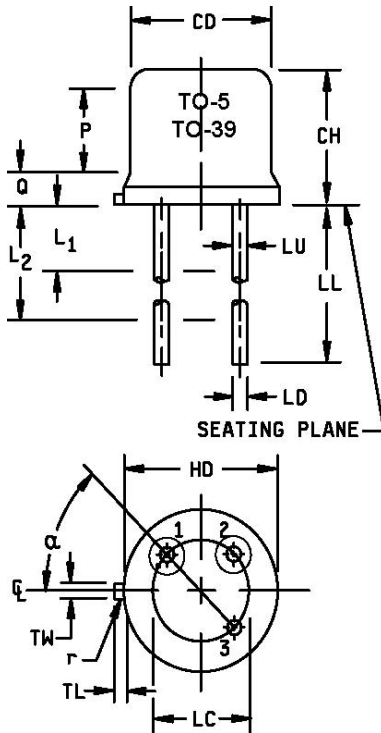
Test 2

$V_{CE} = 50\text{Vdc}$, $I_C = 95\text{mA}$

Test 3

$V_{CE} = 5.0\text{Vdc}$, $I_C = 1.0\text{A}$

PACKAGE DIMENSIONS



| Ltr | Dimensions | | | | Notes |
|----------------|------------------------|------|-------------|-------|-------|
| | Inches | | Millimeters | | |
| | Min | Max | Min | Max | |
| CD | .305 | .335 | 7.75 | 8.51 | |
| CH | .240 | .260 | 6.10 | 6.60 | |
| HD | .335 | .370 | 8.51 | 9.40 | |
| LC | .200 TYP | | 5.08 TYP | | 7 |
| LD | .016 | .021 | 0.41 | 0.53 | 6 |
| LL | See notes 7, 9, and 10 | | | | |
| LU | .016 | .019 | 0.41 | 0.48 | 7 |
| L ₁ | | .050 | | 1.27 | 7 |
| L ₂ | .250 | | 6.35 | | 7 |
| P | .100 | | 2.54 | | 5 |
| Q | | .050 | | 1.27 | |
| r | | .010 | | 0.254 | 8 |
| TL | .029 | .045 | 0.74 | 1.14 | 4 |
| TW | .028 | .034 | 0.71 | 0.86 | 3 |
| α | 45° TP | | 45° TP | | 6 |
| Term 1 | Emitter | | | | |
| Term 2 | Base | | | | |
| Term 3 | Collector | | | | |

NOTES:

- Dimensions are in inches.
- Millimeters are given for general information only.
- Beyond r maximum, TW must be held to a minimum length of .021 inch (0.53 mm).
- TL measured from maximum HD.
- CD shall not vary more than ±.010 inch (0.25 mm) in zone P. This zone is controlled for automatic handling.
- Leads at gauge plane .054 - .055 inch (1.37 - 1.40 mm) below seating plane shall be within .007 inch (0.18 mm) radius of true position (TP) at a maximum material condition (MMC) relative to the tab at MMC. The device may be measured by direct methods or by gauge and gauging procedure.
- LU applies between L₁ and L₂. LD applies between L₂ and L minimum. Diameter is uncontrolled in L₁ and beyond LL minimum.
- r (radius) applies to both inside corners of tab.
- For transistor types 2N3634 through 2N3637, LL is .500 inch (12.70 mm) minimum, and .750 inch (19.05 mm) maximum (TO-39).
- For transistor types 2N3634L through 2N3637L, LL is 1.500 inches (38.10 mm) minimum, and 1.750 inches (44.45 mm) maximum (TO-5).
- In accordance with ASME Y14.5M, diameters are equivalent to φx symbology.

FIGURE 1: Physical dimensions (TO-5 and TO-39)



NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Hatched areas on package denote metallized areas.
4. Pad 1 = Base, Pad 2 = Emitter, Pad 3 = Collector, Pad 4 = Shielding connected to the lid.
5. In accordance with ASME Y14.5M, diameters are equivalent to ϕx symbology

| Ltr | Dimensions | | | | Notes |
|-----------------|------------|------|-------------|------|-------|
| | Inches | | Millimeters | | |
| | Min | Max | Min | Max | |
| BH | .046 | .056 | 1.17 | 1.42 | |
| BL | .115 | .128 | 2.92 | 3.25 | |
| BW | .085 | .108 | 2.16 | 2.74 | |
| CL | | .128 | | 3.25 | |
| CW | | .108 | | 2.74 | |
| LL ₁ | .022 | .038 | 0.56 | 0.96 | |
| LL ₂ | .017 | .035 | 0.43 | 0.89 | |
| LS ₁ | .036 | .040 | 0.91 | 1.02 | |
| LS ₂ | .071 | .079 | 1.81 | 2.01 | |
| LW | .016 | .024 | 0.41 | 0.61 | |
| r | | .008 | | .203 | |
| r ₁ | | .012 | | .305 | |
| r ₂ | | .022 | | .559 | |

FIGURE 2: Physical dimensions, surface mount 2N3634UB through 2N3637UB (UB version).

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