

## PNP SILICON SWITCHING TRANSISTOR

Qualified per MIL-PRF-19500/357

### DEVICES

<b>2N3634</b>	<b>2N3635</b>	<b>2N3636</b>	<b>2N3637</b>
<b>2N3634L</b>	<b>2N3635L</b>	<b>2N3636L</b>	<b>2N3637L</b>
<b>2N3634UB</b>	<b>2N3635UB</b>	<b>2N3636UB</b>	<b>2N3637UB</b>

### 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.

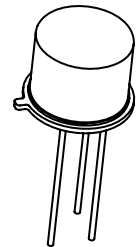
\*\* Consult 19500/357 for De-Rating curves.

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

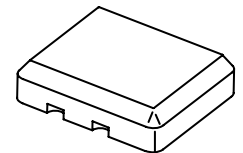
Parameters / Test Conditions	Symbol	Min.	Max.	Unit
<b>OFF CHARACTERISTICS</b>				
Collector-Emitter Breakdown Voltage $I_C = 10\text{mAdc}$	$V_{(BR)CEO}$	140		Vdc
2N3634, 2N3635 2N3636, 2N3637		175		
Collector-Base Cutoff Current $V_{CB} = 100\text{Vdc}$	$I_{CBO}$		100	$\eta\text{Adc}$
$V_{CB} = 140\text{Vdc}$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



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



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



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



# TECHNICAL DATA SHEET

6 Lake Street, Lawrence, MA 01841  
 1-800-446-1158 / (978) 620-2600 / Fax: (978) 689-0803  
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## ELECTRICAL CHARACTERISTICS ( $T_A = +25^\circ\text{C}$ , unless otherwise noted)

Parameters / Test Conditions	Symbol	Min.	Max.	Unit	
<b>ON CHARACTERISTICS <sup>(1)</sup></b>					
Forward-Current Transfer Ratio $I_C = 0.1\text{mA dc}, V_{CE} = 10\text{V dc}$ $I_C = 1.0\text{mA dc}, V_{CE} = 10\text{V dc}$ $I_C = 10\text{mA dc}, V_{CE} = 10\text{V dc}$ $I_C = 50\text{mA dc}, V_{CE} = 10\text{V dc}$ $I_C = 150\text{mA dc}, V_{CE} = 10\text{V dc}$ 2N3634, 2N3636	$h_{FE}$	25	150		
$I_C = 1.0\text{mA dc}, V_{CE} = 10\text{V dc}$		45			
$I_C = 10\text{mA dc}, V_{CE} = 10\text{V dc}$		50			
$I_C = 50\text{mA dc}, V_{CE} = 10\text{V dc}$		50			
$I_C = 150\text{mA dc}, V_{CE} = 10\text{V dc}$		30			
$I_C = 0.1\text{mA dc}, V_{CE} = 10\text{V dc}$ $I_C = 1.0\text{mA dc}, V_{CE} = 10\text{V dc}$ $I_C = 10\text{mA dc}, V_{CE} = 10\text{V dc}$ $I_C = 50\text{mA dc}, V_{CE} = 10\text{V dc}$ $I_C = 150\text{mA dc}, V_{CE} = 10\text{V dc}$ 2N3635, 2N3637		55			300
$I_C = 1.0\text{mA dc}, V_{CE} = 10\text{V dc}$		90			
$I_C = 10\text{mA dc}, V_{CE} = 10\text{V dc}$		100			
$I_C = 50\text{mA dc}, V_{CE} = 10\text{V dc}$		100			
$I_C = 150\text{mA dc}, V_{CE} = 10\text{V dc}$		60			
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 $I_C = 30\text{mA dc}, V_{CE} = 30\text{V dc}, f = 100\text{MHz}$ 2N3634, 2N3636 2N3635, 2N3637	$ h_{fe} $	1.5 2.0	8.0 8.5	
Forward Current Transfer Ratio $I_C = 10\text{mA dc}, V_{CE} = 10\text{V dc}, f = 1.0\text{kHz}$ 2N3634, 2N3636 2N3635, 2N3637	$h_{fe}$	40 80	160 320	
Small-Signal Short-Circuit Input Impedance $I_C = 10\text{mA dc}, V_{CE} = 10\text{V dc}, f = 1.0\text{kHz}$ 2N3634, 2N3636 2N3635, 2N3637	$h_{ie}$	100 200	600 1200	$\Omega$
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	$\mu\text{s}$
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 $V_{CE} = 10\text{V dc}, I_C = 0.5\text{mA dc}, R_g = 1.0\text{k}\Omega$ $f = 100\text{Hz}$ $f = 1.0\text{kHz}$ $f = 10\text{kHz}$	NF		5.0 3.0 3.0	dB

(1) Pulse Test: Pulse Width = 300 $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$



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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

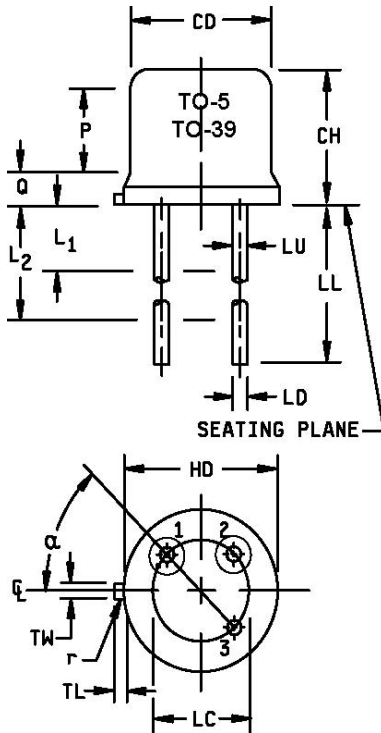
#### Test 2

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

#### Test 3

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

## PACKAGE DIMENSIONS

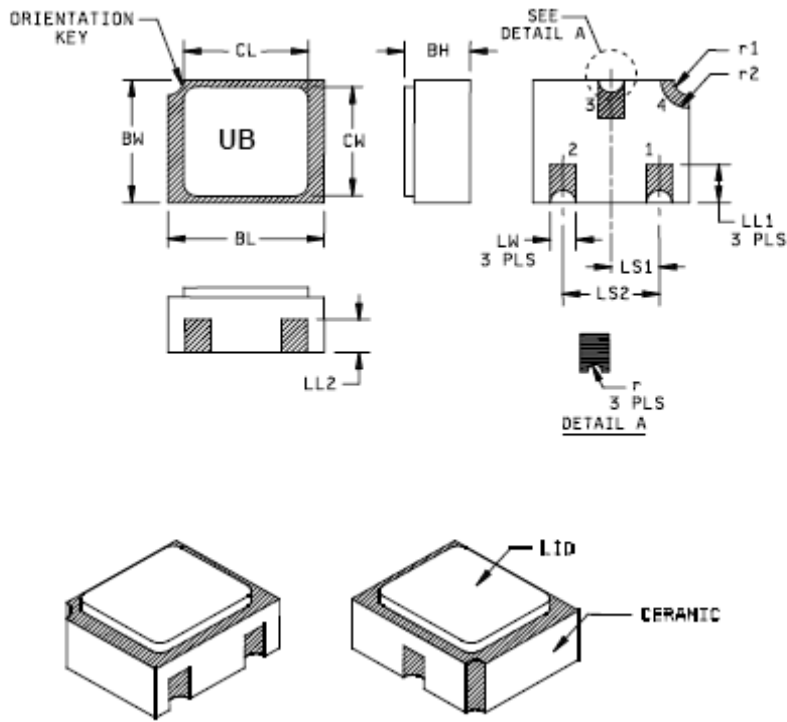


Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	.305	.335	7.75	8.51	
CH	.240	.260	6.10	6.60	
HD	.335	.370	8.51	9.40	
LC	.200 TYP		5.08 TYP		7
LD	.016	.021	0.41	0.53	6
LL	See notes 7, 9, and 10				
LU	.016	.019	0.41	0.48	7
L <sub>1</sub>		.050		1.27	7
L <sub>2</sub>	.250		6.35		7
P	.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 L<sub>1</sub> and L<sub>2</sub>. LD applies between L<sub>2</sub> and L minimum. Diameter is uncontrolled in L<sub>1</sub> 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  $\phi x$  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 <sub>1</sub>	.022	.038	0.56	0.96	
LL <sub>2</sub>	.017	.035	0.43	0.89	
LS <sub>1</sub>	.036	.040	0.91	1.02	
LS <sub>2</sub>	.071	.079	1.81	2.01	
LW	.016	.024	0.41	0.61	
r		.008		.203	
r <sub>1</sub>		.012		.305	
r <sub>2</sub>		.022		.559	

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

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