

## NPN SILICON SWITCHING TRANSISTOR

Qualified per MIL-PRF-19500/395

### DEVICES

<b>2N3735</b>	<b>2N3735L</b>
<b>2N3737</b>	<b>2N3737UB</b>

**LEVELS**  
**JAN**  
**JANTX**  
**JANTXV**  
**JANS**

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

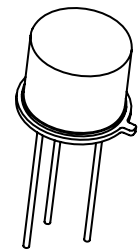
Parameters / Test Conditions	Symbol	Min.	Unit
Collector-Emitter Voltage	$V_{CEO}$	40	Vdc
Collector-Base Voltage	$V_{CBO}$	75	Vdc
Emitter-Base Voltage	$V_{EBO}$	5	Vdc
Collector Current	$I_C$	1.5	Adc
Total Power Dissipation @ $T_A = +25^\circ\text{C}$	2N3735, 2N3735L	1.0 (1)	W
	2N3737	0.5 (3)	W
	2N3737UB	0.5 (5)	W
Total Power Dissipation @ $T_C = +25^\circ\text{C}$	2N3735, 2N3735L	2.9 (2)	W
	2N3737	1.9 (4)	W
	2N3737UB	N/A	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.

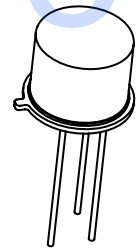
- (1) Derate linearly at 5.71 mW/ $^\circ\text{C}$  above  $T_A = +25^\circ\text{C}$
- (2) Derate linearly at 16.6 mW/ $^\circ\text{C}$  above  $T_A = +25^\circ\text{C}$
- (3) Derate linearly at 2.86 mW/ $^\circ\text{C}$  above  $T_A = +25^\circ\text{C}$
- (4) Derate linearly at 11.3 mW/ $^\circ\text{C}$  above  $T_A = +25^\circ\text{C}$
- (5) Derate linearly at 3.07 mW/ $^\circ\text{C}$  above  $T_A = +25^\circ\text{C}$
- (6)  $T_A = +55^\circ\text{C}$  for UB on printed circuit board (PCB). PCB = FR4 .0625 inch (1.59MM) 1 - layer 1 oz Cu, horizontal, still air, pads (UB) = .034 inch (0.86 mm) x .048 inch (1.2 mm),  $R_{\theta JA}$  with a defined thermal resistance condition included is measured at  $P_T = 500\text{mW}$ .

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

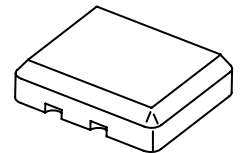
Parameters / Test Conditions	Symbol	Min.	Max.	Unit
<b>OFF CHARACTERISTICS</b>				
Collector-Emitter Breakdown Voltage $I_C = 10\text{mAdc}$	$V_{(BR)CEO}$	40		Vdc
Collector-Base Cutoff Current $V_{CB} = 75\text{Vdc}$ $V_{CB} = 30\text{Vd}$	$I_{CBO}$		10 250	$\mu\text{Adc}$ $\eta\text{Adc}$



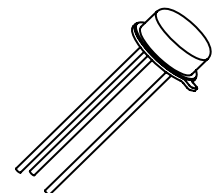
**TO-5\***  
**2N3735L**



**TO-39\* (TO-205AD)**  
**2N3735**



**3 PIN**  
**2N3737UB**



**TO-46 (TO-206AB)**  
**2N3737**

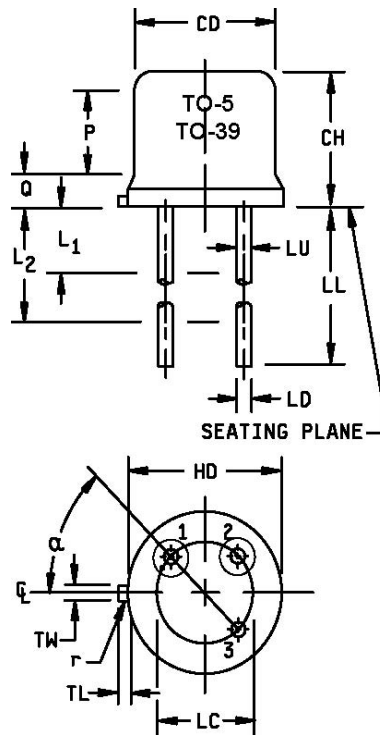
## ELECTRICAL CHARACTERISTICS ( $T_A = +25^\circ\text{C}$ , unless otherwise noted)

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
<b>OFF CHARACTERISTICS</b>				
Collector- Emitter Cutoff Current $V_{CE} = 30\text{Vdc}$ , $V_{EB} = 2.0\text{Vdc}$ $V_{CE} = 30\text{Vdc}$ , $V_{EB} = 2.0\text{Vdc}$ $T_A = +150^\circ\text{C}$	$I_{CEX}$		200 250	nAdc $\mu\text{Adc}$
Emitter-Base Cutoff Current $V_{EB} = 5.0\text{Vdc}$ $V_{EB} = 4.0\text{Vdc}$	$I_{EBO}$		10 100	$\mu\text{Adc}$ nAdc
<b>ON CHARACTERISTICS <sup>(1)</sup></b>				
Forward-Current Transfer Ratio $I_C = 10\text{mAdc}$ , $V_{CE} = 1.0\text{Vdc}$ $I_C = 150\text{mAdc}$ , $V_{CE} = 1.0\text{Vdc}$ $I_C = 500\text{mAdc}$ , $V_{CE} = 1.0\text{Vdc}$ $I_C = 1.0\text{Adc}$ , $V_{CE} = 1.5\text{Vdc}$ $I_C = 1.5\text{Adc}$ , $V_{CE} = 5.0\text{Vdc}$	$h_{FE}$	35 40 40 20 20	150 80	
Collector-Emitter Saturation Voltage $I_C = 10\text{mAdc}$ , $I_B = 1.0\text{mAdc}$ $I_C = 150\text{mAdc}$ , $I_B = 15.0\text{mAdc}$ $I_C = 500\text{mAdc}$ , $I_B = 50.0\text{mAdc}$ $I_C = 1.0\text{Adc}$ , $I_B = 100\text{mAdc}$	$V_{CE(sat)}$		0.2 0.3 0.5 0.9	Vdc
Base-Emitter Saturation Voltage $I_C = 10\text{mAdc}$ , $I_B = 1.0\text{mAdc}$ $I_C = 150\text{mAdc}$ , $I_B = 15.0\text{mAdc}$ $I_C = 500\text{mAdc}$ , $I_B = 50.0\text{mAdc}$ $I_C = 1.0\text{Adc}$ , $I_B = 100\text{mAdc}$	$V_{BE(sat)}$		0.8 1.0 1.2 1.4	Vdc

## DYNAMIC CHARACTERISTICS

Forward Current Transfer Ratio $I_C = 50\text{mAdc}$ , $V_{CE} = 10\text{Vdc}$ , $f = 100\text{MHz}$	$ h_{fe} $	2.5	6.0	
Delay Response $I_C = 1.0\text{Adc}$ , $V_{BE} = 2\text{Vdc}$ , $I_{B2} = 100\text{mA}$ $V_{CC} = 30\text{Vdc}$	$t_d$		8	$\eta\text{s}$
Turn-Off Time $I_C = 1.0\text{Adc}$ , $I_{B1} = I_{B2} = 100\text{mAdc}$ , $V_{CC} = 30\text{Vdc}$	$t_{off}$		60	$\eta\text{s}$
Rise Time $I_C = 1.0\text{Adc}$ , $V_{BE} = 2\text{Vdc}$ , $V_{CC} = 30\text{Vdc}$	$t_r$		40	$\eta\text{s}$
Output Capacitance $V_{CB} = 10\text{Vdc}$ , $I_E = 0$ , $100\text{kHz} \leq f \leq 1.0\text{MHz}$	$C_{obo}$		9	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

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

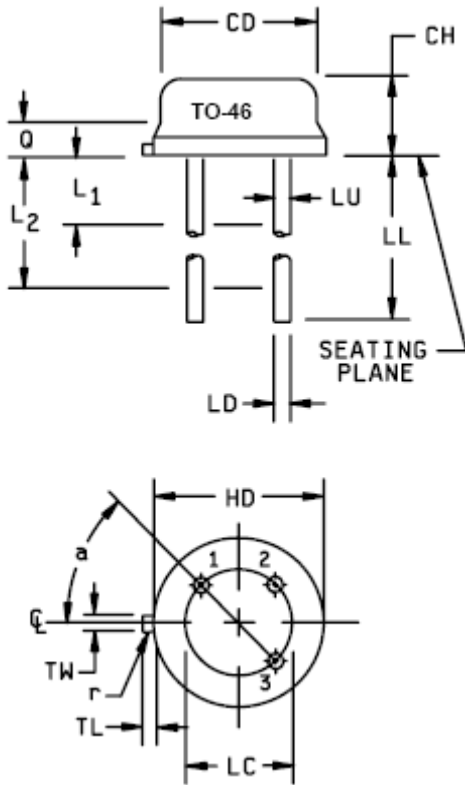
**PACKAGE DIMENSIONS**

**2N3735 Dimensions TO-39**
**2N3735L Dimensions TO-5**

Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	.305	.355	7.75	9.02	
CH	.240	.260	6.10	6.60	
HD	.355	.370	9.02	9.40	
LC	.200 TP		5.08 TP		6
LD	.016	.021	0.41	0.53	7
LL	.500	.750	12.70	19.05	7
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		
TL	.029	.045	0.74	1.14	3
TW	.028	.034	0.71	0.86	9
Q		.040		1.02	4
r		.010		0.25	10
α	45° TP		45° TP		6

Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	.305	.355	7.75	9.02	
CH	.240	.260	6.10	6.60	
HD	.355	.370	9.02	9.40	
LC	.200 TP		5.08 TP		6
LD	.016	.021	0.41	0.53	7
LL	1.500	1.750	38.10	44.45	7
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		
TL	.029	.045	0.74	1.14	3
TW	.028	.034	0.71	0.86	9
Q		.040		1.02	4
R		.010		0.25	10
α	45° TP		45° TP		6

**FIGURE 1: Physical dimensions – TO-39, TO-5**

## PACKAGE DIMENSIONS



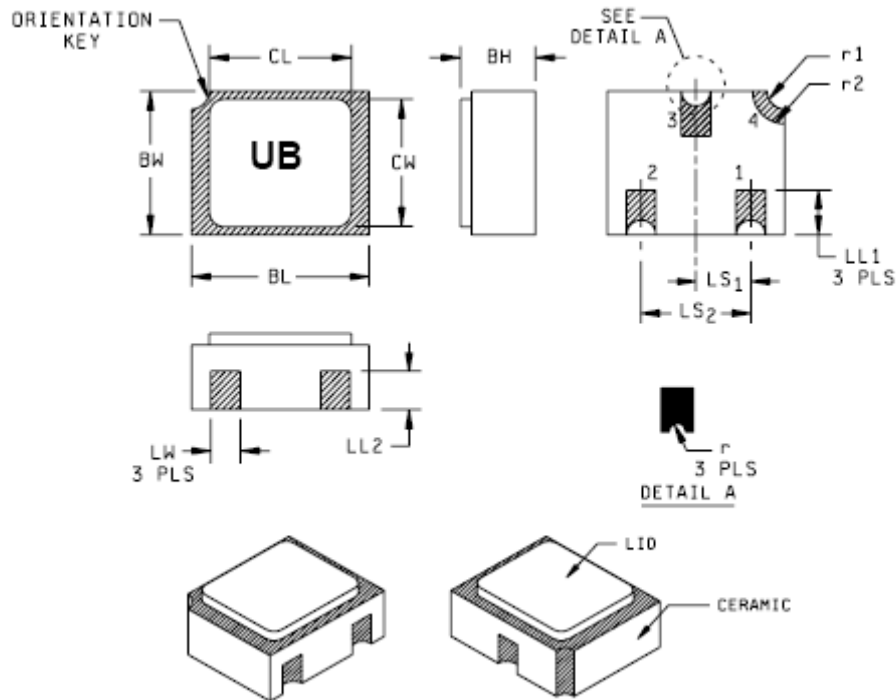
Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	.178	.195	4.52	4.95	
CH	.065	.085	1.65	2.16	
HD	.209	.230	5.31	5.84	
LC	.100 TP		2.54 TP		5
LD	.016	.021	0.41	0.53	
LL	.500	1.750	12.70	44.45	6
LU	.016	.019	0.41	0.48	6
L <sub>1</sub>		.050		1.27	6
L <sub>2</sub>	.250		6.35		6
Q		.040		1.02	3
TL	.028	.048	0.71	1.22	8
TW	.036	.046	0.91	1.17	4
r		.010		0.25	9
$\alpha$	45° TP		45° TP		5

### NOTES:

- Dimensions are in inches.
- Millimeters are given for general information only.
- Symbol TL is measured from HD maximum.
- Details of outline in this zone are optional.
- Leads at gauge plane .054 inch (1.37 mm) +.001 inch (0.03 mm) -.000 inch (0.00 mm) below seating plane shall be within .007 inch (0.18 mm) radius of TP relative to tab. Device may be measured by direct methods or by gauge.
- Symbol LU applies between L1 and L2. Dimension LD applies between L2 and LL minimum.
- Lead number three is electrically connected to case.
- Beyond r maximum, TW shall be held for a minimum length of .011 inch (0.28 mm).
- Symbol r applied to both inside corners of tab.
- In accordance with ASME Y14.5M, diameters are equivalent to  $\phi x$  symbology.
- Lead 1 is emitter, lead 2 is base, and lead 3 is collector.

**FIGURE 2:** Physical dimensions – TO-46 2N3737

## PACKAGE DIMENSIONS



**NOTES:**

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Hatched areas on package denote metalized areas.
4. Lid material: Kovar.
5. Pad 1 = Base, Pad 2 = Emitter, Pad 3 = Collector, Pad 4 = Shielding connected to the lid.
6. In accordance with ASME Y14.5m, diameters are Equivalent to  $\phi x$  symbology.

Symbol	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	
LL1	.022	.038	0.56	0.96	
LL2	.017	.035	0.43	0.89	
LS1	.036	.040	0.91	1.02	
LS2	.071	.079	1.81	2.01	
LW	.016	.024	0.41	0.61	
r		.008		.203	
R1		.012		.305	
R2		.022		.559	