2N3057A, 2N3700, 2N3700UB

NPN Low Power Silicon Transistor

Rev. V1

Features

- JANS Qualified to MIL-PRF-19500/391
- 2N3700 & 2N3700UB available in JANSR JEDEC registered 2N3700, 2N3057
- Lightweight & Low Power
- Ideal for Space, Military, & other High Reliability Applications
- TO-18 (TO-206AA), TO-46 (TO-206AB) Surface Mount UB Package Styles Package

Electrical Characteristics

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Off Characteristics					
Collector - Emitter Breakdown Voltage	I_C = 30 mA	$V_{(BR)CEO}$	V	80	—
Collector - Base Cutoff Current	V_{BC} = 140 V	I_{CBO}	µA	—	10
Emitter - Base Cutoff Current	V_{EB} = 7 V	I_{EBO1}	µA	—	10
Collector - Emitter Cutoff Current	V_{CE} = 90 V	I_{CES}	nA	—	10
Emitter - Base Cutoff Current	V_{EB} = 5 Vdc	I_{EBO2}	nA	—	10
On Characteristics[1]					
Forward Current Transfer Ratio	I_C = 150 mA, V_{CE} = 10 V I_C = 10 mA, V_{CE} = 10 V I_C = 500 mA, V_{CE} = 10 V I_C = 1 mA, V_{CE} = 10 V	H_{FE}	-	100 90 50 15	300 — 300 —
Collector - Emitter Saturation Voltage	I_C = 150 mA, I_B = 15 mA I_C = 500 mA, I_B = 50 mA	$V_{CE(SAT)}$	Vdc	—	0.2 0.5
Base - Emitter Saturation Voltage	I_C = 150 mA, I_B = 15 mA	$V_{BE(SAT)}$	Vdc	—	1.1
Dynamic Characteristics					
Small-Signal Short-Circuit Forward Current Transfer Ratio	I_C = 1 A, V_{CE} = 5 V, f = 1 kHz	H_{FE}		80	400
Magnitude ofSmall-Signal Short-Circuit Forward Current Transfer Ratio	I_C = 50 mA, V_{CE} = 10 V, f = 20 MHz	$\lvert H_{FE} \rvert$		5	20
Output Capacitance	V_{CB} = 10 V, I_E = 0, 100 kHz ≤ f ≤ 1 MHz V_{CB} = 0.5 V, I_E = 0, 100 kHz ≤ f ≤ 1 MHz	C_{OBO} C_{IBO}	pF	—	12 60
Safe Operating Area					
DC Tests:	T_C = +25 °C, I Cycle, t = 10 ms				
Test 1:	V_{CE} = 10 V, I_C = 180 mA				
Test 2:	V_{CE} = 40 V, I_C = 50 mA				
Test 3:	V_{CE} = 80 V, I_C = 15 mA				

1. Pulse Test: Pulse Width = 300 µs, Duty Cycle ≤ 2%.

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Absolute Maximum Ratings

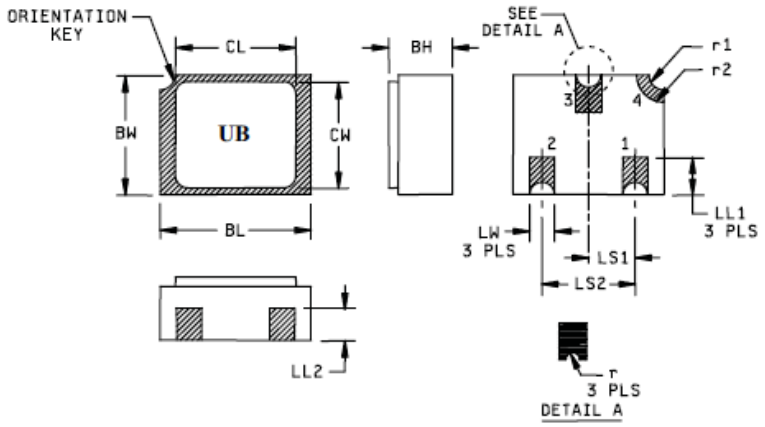
Ratings	Symbol	Value
Collector - Emitter Voltage	V_{CEO}	80 V
Collector - Base Voltage	V_{CBO}	140 V
Emitter - Base Voltage	V_{EBO}	7 V
Collector Current	I_C	1 A
Total Power Dissipation @ T_A = 25°C[2] @ T_C = 25°C[3]	P_T	0.5 W 1.0 W
Operating & Storage Temperature Range	T_{OP}, T_{STG}	-65°C to +200°C

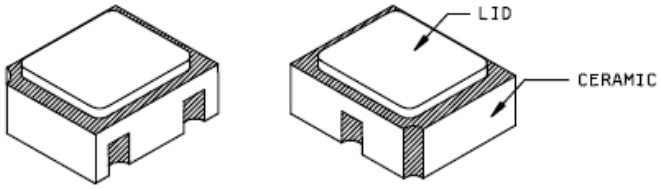
2. Derate linearly @ 2.85 mW / °C for T_A = 25 °C
3. Derate linearly @ 10.3 mW / °C for T_C = 25 °C

Thermal Characteristics

Characteristics	Symbol	Max. Value
Thermal Resistance, Junction to Case	$R_{\theta JC}$	150°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	325°C/W

Outline Drawing (UB Surface Mount)





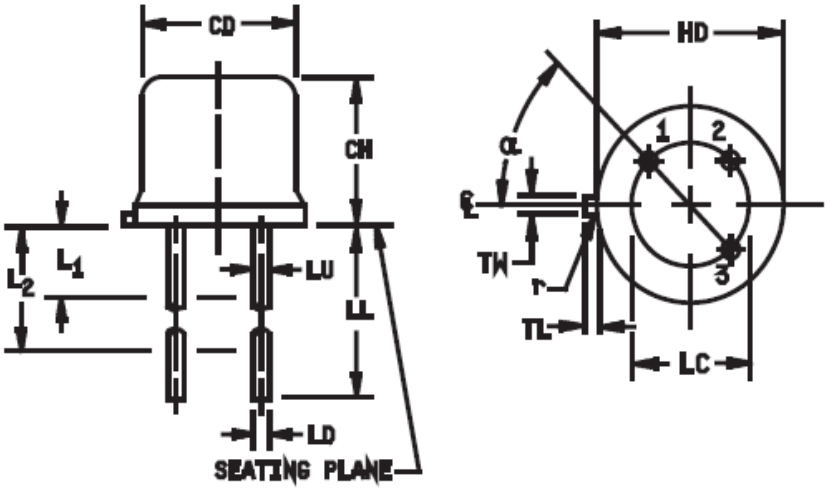
Symbol	Dimensions				Note
	Inches		Millimeters		
	Min	Max	Min	Max	
BH	.046	.056	1.17	1.42	
BL	.115	.128	2.92	3.25	
BW	.085	.108	2.16	2.74	
CL		.128		3.25	
CW		.108		2.74	
LL1	.022	.038	0.56	0.96	
LL2	.017	.035	0.43	0.89	

Symbol	Dimensions				Note
	Inches		Millimeters		
	Min	Max	Min	Max	
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	

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Hatched areas on package denote metalized 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.

Outline Drawing (TO-46) for 2N3057 only



Symbol	Dimensions				Note
	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		6
LD	.016	.021	0.41	0.53	7
LL	.500	1.750	12.70	44.45	7
LU	.016	.019	0.41	0.48	7
L1		.050		1.27	7
L2	.250		6.35		7
TL	.028	.048	0.71	1.22	3
TW	.036	.046	0.91	1.17	2
r		.007		0.18	10, 11
α	45° TP		45° TP		6

NOTES:

1. Dimension are in inches.
2. Millimeters are given for general information only.
3. Beyond r (radius) maximum, TW shall be held for a minimum length of .011 inch (0.28 mm).
4. Dimension TL measured from maximum HD.
5. Leads at gauge plane .054 +.001 -.000 inch (1.37 +0.03 -0.00 mm) below seating plane shall be within .007 inch (0.18 mm) radius of true position (TP) at maximum material condition (MMC) relative to tab at MMC. The device may be measured by direct methods.
6. Dimension LU applies between L_1 and L_2. Dimension LD applies between L_2 and LL minimum. Diameter is uncontrolled in L_1 and beyond LL minimum.
7. All three leads.
8. The collector shall be internally connected to the case.
9. Dimension r (radius) applies to both inside corners of tab.
10. In accordance with ASME Y14.5M, diameters are equivalent to φx symbology.
11. Lead 1 = emitter, lead 2 = base, lead 3 = collector.