

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

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
ON CHARACTERISTICS ⁽³⁾				
Forward-Current Transfer Ratio $I_C = 0.5\text{A}_{dc}$, $V_{CE} = 2.0\text{V}_{dc}$ $I_C = 2.0\text{A}_{dc}$, $V_{CE} = 2.0\text{V}_{dc}$ $I_C = 5.0\text{A}_{dc}$, $V_{CE} = 2.0\text{V}_{dc}$	h_{FE}	60 60 40	240	
Collector-Emitter Saturation Voltage $I_C = 2.0\text{A}_{dc}$, $I_B = 0.2\text{A}_{dc}$ $I_C = 5.0\text{A}_{dc}$, $I_B = 0.5\text{A}_{dc}$	$V_{CE(sat)}$		0.7 1.2	Vdc
Base-Emitter Saturation Voltage $I_C = 2.0\text{A}_{dc}$, $I_B = 0.2\text{A}_{dc}$ $I_C = 5.0\text{A}_{dc}$, $I_B = 0.5\text{A}_{dc}$	$V_{BE(sat)}$		1.2 1.8	Vdc

DYNAMIC CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 0.5\text{A}_{dc}$, $V_{CE} = 10\text{V}_{dc}$, $f = 10\text{MHz}$	$ h_{fe} $	3.0	15	
Output Capacitance $V_{CB} = 10\text{V}_{dc}$, $I_E = 0$, $100\text{kHz} \leq f \leq 1.0\text{MHz}$	C_{obo}		250	pF
Input Capacitance $V_{BE} = 2.0\text{V}_{dc}$, $I_C = 0$, $100\text{kHz} \leq f \leq 1.0\text{MHz}$	C_{ibo}		1,000	pF

SAFE OPERATING AREA

DC Tests

$T_C = +25^\circ\text{C}$, 1 Cycle, $t \geq 0.5\text{s}$

Test 1

$V_{CE} = 2.0\text{V}_{dc}$, $I_C = 5.0\text{A}_{dc}$

Test 2

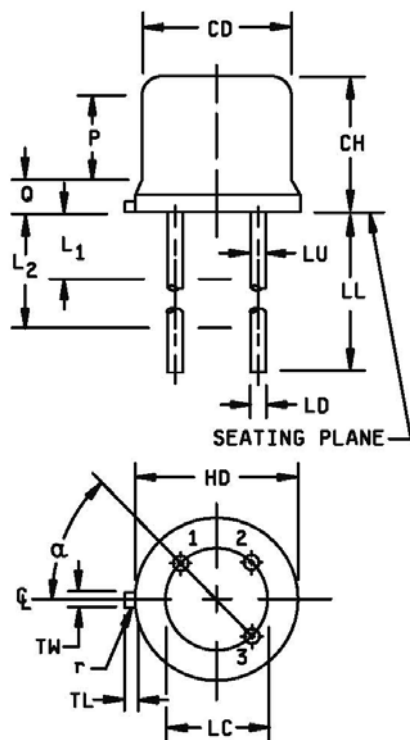
$V_{CE} = 5.0\text{V}_{dc}$, $I_C = 2.0\text{A}_{dc}$

Test 3

$V_{CE} = 90\text{V}_{dc}$, $I_C = 55\text{mA}_{dc}$

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

PACKAGE DIMENSIONS



Symbol	Dimensions				Note
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	.305	.355	7.75	9.02	5
CH	.240	.260	6.10	6.60	
HD	.335	.370	8.51	9.40	3
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 ₁		.050		1.27	7
L ₂	.250		6.35		7
TL	.029	.045	0.74	1.14	3
TW	.028	.034	0.71	0.86	10
P	.100		2.54		5
Q		.050		1.27	4
r		.010		0.25	10, 11
α	45° TP		45° TP		6
Notes	1, 2, 8, 9		1, 2, 8, 9		

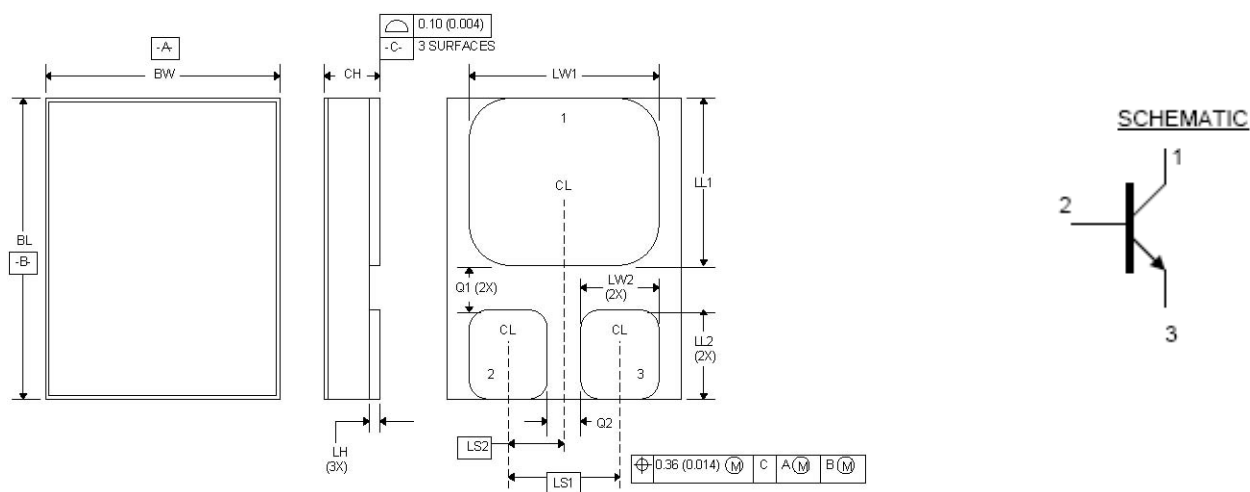
NOTES:

- 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.
- Symbol CD shall not vary more than .010 (0.25 mm) in zone P. This zone is controlled for automatic handling.
- 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 true position (TP) relative to tab. Device may be measured by direct methods or by gauge.
- Symbol LD applies between L₁ and L₂. Dimension LD applies between L₂ and LL minimum.
- Lead designation, depending on device type, shall be as follows:

Lead number	TO-39
1	Emitter
2	Base
3	Collector

- 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 ϕ x symbology.

FIGURE 1. Physical dimensions (TO-39)



NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. In accordance with ASME Y14.5M, diameters are equivalent to ϕx symbology.
4. Terminal 1 - collector, terminal 2 - base, terminal 3 - emitter.

Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
BL	.395	.405	10.03	10.29
BW	.291	.301	7.40	7.65
CH	.1085	.1205	2.76	3.06
LH	.010	.020	0.25	0.51
LW ₁	.281	.291	7.14	7.39
LW ₂	.090	.100	2.29	2.54
LL ₁	.220	.230	5.59	5.84
LL ₂	.115	.125	2.92	3.18
LS ₁	.150 BSC		3.81 BSC	
LS ₂	.075 BSC		1.91 BSC	
Q ₁	.030		0.762	
Q ₂	.030		0.762	

FIGURE 2. Physical dimensions and configuration (U3) (SMD 5) (TO-276AA)