

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 $I_C = 0.1\text{mA}$, $V_{CE} = 10\text{Vdc}$ 2N2904 2N2905 2N2904A, 2N2904AL 2N2905A, 2N2905AL	h_{FE}	20		
		35		
		40		
		75		
$I_C = 1.0\text{mA}$, $V_{CE} = 10\text{Vdc}$ 2N2904 2N2905 2N2904A, 2N2904AL 2N2905A, 2N2905AL		25	175	
		50	450	
		40	175	
		100	450	
$I_C = 10\text{mA}$, $V_{CE} = 10\text{Vdc}$ 2N2904 2N2905 2N2904A, 2N2904AL 2N2905A, 2N2905AL		35		
		75		
		40		
		100		
$I_C = 150\text{mA}$, $V_{CE} = 10\text{Vdc}$ 2N2904, 2N2904A / AL 2N2905, 2N2905A / AL		40	120	
		100	300	
$I_C = 500\text{mA}$, $V_{CE} = 10\text{Vdc}$ 2N2904 2N2905 2N2904A, 2N2904AL 2N2905A, 2N2905AL		20		
		30		
		40		
		50		
Collector-Emitter Saturation Voltage $I_C = 150\text{mA}$, $I_B = 15\text{mA}$ $I_C = 500\text{mA}$, $I_B = 50\text{mA}$	$V_{CE(sat)}$		0.4 1.6	Vdc
Base-Emitter Saturation Voltage $I_C = 150\text{mA}$, $I_B = 15\text{mA}$ $I_C = 500\text{mA}$, $I_B = 50\text{mA}$	$V_{BE(sat)}$		1.3 2.6	Vdc

DYNAMIC CHARACTERISTICS

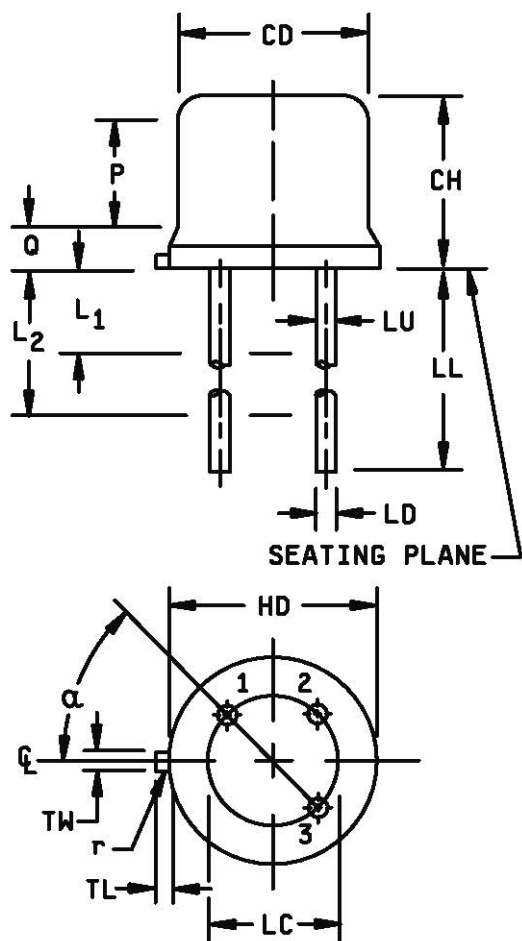
Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Small-Signal Short-Circuit Forward-Current Transfer Ratio $I_C = 1.0\text{mA}$, $V_{CE} = 10\text{Vdc}$, $f = 1.0\text{kHz}$ 2N2904 2N2905 2N2904A, 2N2905A 2N2904AL, 2N2905AL	h_{fe}		25 50 40 100	
Small-Signal Short-Circuit Forward-Current Transfer Ratio $I_C = 50\text{mA}$, $V_{CE} = 20\text{Vdc}$, $f = 100\text{MHz}$	$ h_{fe} $		2.0	
Output Capacitance $V_{CB} = 10\text{Vdc}$, $I_E = 0$, $100\text{kHz} \leq f \leq 1.0\text{MHz}$	C_{obo}		8.0	pF
Input Capacitance $V_{EB} = 2.0\text{Vdc}$, $I_C = 0$, $100\text{kHz} \leq f \leq 1.0\text{MHz}$	C_{ibo}		30	pF

SWITCHING CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Turn-On Time $V_{CC} = 30\text{Vdc}$, $I_C = 150\text{mA}$, $I_{B1} = 15\text{mA}$	t_{on}		45	ns
Turn-Off Time $V_{CC} = 30\text{Vdc}$, $I_C = 150\text{mA}$, $I_{B1} = I_{B2} = 15\text{mA}$	t_{off}		300	ns

(3) Pulse Test: Pulse Width = 300 μ s, Duty Cycle $\leq$ 2.0%

PACKAGE DIMENSIONS



Symbol	Dimensions				Note
	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 TP		5.08 TP		6
LD	.016	.021	0.41	0.53	7, 8
LL	.500	.750	12.70	19.05	7, 8, 12
LU	.016	.019	0.41	0.48	7, 8
L ₁		.050		1.27	7, 8
L ₂	.250		6.35		7, 8
P	.100		2.54		
Q		.050		1.27	5
TL	.029	.045	0.74	1.14	4
TW	.028	.034	0.71	0.86	3
r		.010		0.25	10
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. Body contour optional within zone defined by HD, CD, and Q.
6. 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.
7. Dimension LU applies between L₁ and L₂. Dimension LD applies between L₂ and L minimum. Diameter is uncontrolled in L₁ and beyond LL minimum.
8. All three leads.
9. The collector shall be internally connected to the case.
10. Dimension r (radius) applies to both inside corners of tab.
11. In accordance with ASME Y14.5M, diameters are equivalent to φx symbology.
12. For "L" suffix devices, dimension LL is 1.50 (38.10 mm) minimum, 1.75 (44.45 mm) maximum.
13. Lead 1 = emitter, lead 2 = base, lead 3 = collector.

FIGURE 1. Physical dimensions (similar to TO-39)