

2N2904 2N2904A  
2N2905 2N2905A

**PNP SILICON TRANSISTORS**



**TO-39 CASE**



[www.centrasemi.com](http://www.centrasemi.com)

**DESCRIPTION:**

The CENTRAL SEMICONDUCTOR 2N2904, 2N2905 series types are PNP silicon transistors manufactured by the epitaxial planar process, designed for small signal, general purpose and switching applications.

**MARKING: FULL PART NUMBER**

	SYMBOL	2N2904	2N2904A	UNITS
		2N2905	2N2905A	
Collector-Base Voltage	$V_{CBO}$	60	60	V
Collector-Emitter Voltage	$V_{CEO}$	40	60	V
Emitter-Base Voltage	$V_{EBO}$		5.0	V
Continuous Collector Current	$I_C$		0.6	A
Power Dissipation	$P_D$		0.8	W
Power Dissipation ( $T_C=25^\circ\text{C}$ )	$P_D$		3.0	W
Operating and Storage Junction Temperature	$T_J, T_{stg}$	-65 to +200		$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS: ( $T_A=25^\circ\text{C}$ )		2N2904 2N2905		2N2904A 2N2905A		UNITS
SYMBOL	TEST CONDITIONS	MIN	MAX	MIN	MAX	
$I_{CBO}$	$V_{CB}=50\text{V}$	-	20	-	10	nA
$I_{CEV}$	$V_{CE}=30\text{V}, V_{EB}=0.5\text{V}$	-	-	-	50	nA
$BV_{CBO}$	$I_C=10\mu\text{A}$	60	-	60	-	V
$BV_{CEO}$	$I_C=10\text{mA}$	40	-	60	-	V
$BV_{EBO}$	$I_E=10\mu\text{A}$	5.0	-	5.0	-	V
$V_{CE(SAT)}$	$I_C=150\text{mA}, I_B=15\text{mA}$	-	0.4	-	0.4	V
$V_{CE(SAT)}$	$I_C=500\text{mA}, I_B=50\text{mA}$	-	1.6	-	1.6	V
$V_{BE(SAT)}$	$I_C=150\text{mA}, I_B=15\text{mA}$	-	1.3	-	1.3	V
$V_{BE(SAT)}$	$I_C=500\text{mA}, I_B=50\text{mA}$	-	2.6	-	2.6	V
		2N2904 2N2904A		2N2905 2N2905A		
		MIN	MAX	MIN	MAX	
$h_{FE}$	$V_{CE}=10\text{V}, I_C=100\mu\text{A}$ (2N2904, 2N2905)	20	-	35	-	
$h_{FE}$	$V_{CE}=10\text{V}, I_C=100\mu\text{A}$ (2N2904A, 2N2905A)	40	-	75	-	
$h_{FE}$	$V_{CE}=10\text{V}, I_C=1.0\text{mA}$ (2N2904, 2N2905)	25	-	50	-	
$h_{FE}$	$V_{CE}=10\text{V}, I_C=1.0\text{mA}$ (2N2904A, 2N2905A)	40	-	100	-	
$h_{FE}$	$V_{CE}=10\text{V}, I_C=10\text{mA}$ (2N2904, 2N2905)	35	-	75	-	
$h_{FE}$	$V_{CE}=10\text{V}, I_C=10\text{mA}$ (2N2904A, 2N2905A)	40	-	100	-	
$h_{FE}$	$V_{CE}=10\text{V}, I_C=150\text{mA}$	40	120	100	300	
$h_{FE}$	$V_{CE}=10\text{V}, I_C=500\text{mA}$ (2N2904, 2N2905)	20	-	30	-	
$h_{FE}$	$V_{CE}=10\text{V}, I_C=500\text{mA}$ (2N2904A, 2N2905A)	40	-	50	-	

R2 (6-April 2015)

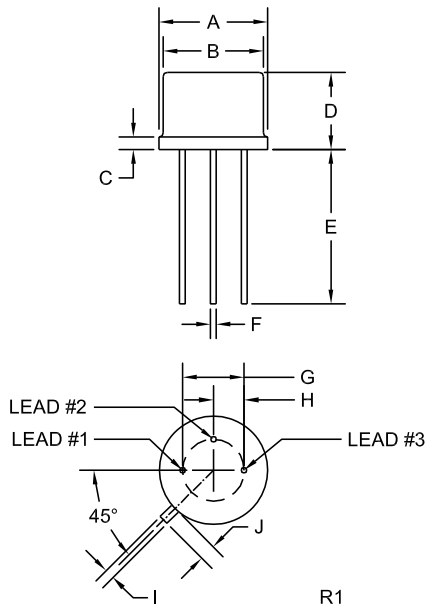
**2N2904 2N2904A**  
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**ELECTRICAL CHARACTERISTICS - Continued:** ( $T_A=25^\circ\text{C}$  unless otherwise noted)

SYMBOL	TEST CONDITIONS	MIN	MAX	UNITS
$f_T$	$V_{CE}=20\text{V}, I_C=50\text{mA}, f=100\text{MHz}$	200		MHz
$C_{ob}$	$V_{CB}=10\text{V}, f=100\text{kHz}$		8.0	pF
$t_{on}$	$V_{CC}=30\text{V}, I_C=150\text{mA}, I_B=15\text{mA}$		45	ns
$t_{off}$	$V_{CC}=6.0\text{V}, I_C=150\text{mA}, I_{B1}=I_{B2}=15\text{mA}$		180	ns

**TO-39 CASE - MECHANICAL OUTLINE**



SYMBOL	DIMENSIONS			
	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A (DIA)	0.335	0.370	8.51	9.40
B (DIA)	0.315	0.335	8.00	8.51
C	-	0.040	-	1.02
D	0.240	0.260	6.10	6.60
E	0.500	-	12.70	-
F (DIA)	0.016	0.021	0.41	0.53
G (DIA)	0.200		5.08	
H	0.100		2.54	
I	0.028	0.034	0.71	0.86
J	0.029	0.045	0.74	1.14

TO-39 (REV: R1)

**LEAD CODE:**

- 1) Emitter
- 2) Base
- 3) Collector

**MARKING: FULL PART NUMBER**

R2 (6-April 2015)

## OUTSTANDING SUPPORT AND SUPERIOR SERVICES



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### PRODUCT SUPPORT

Central's operations team provides the highest level of support to insure product is delivered on-time.

- Supply management (Customer portals)
- Inventory bonding
- Consolidated shipping options
- Custom bar coding for shipments
- Custom product packing

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### DESIGNER SUPPORT/SERVICES

Central's applications engineering team is ready to discuss your design challenges. Just ask.

- Free quick ship samples (2<sup>nd</sup> day air)
- Online technical data and parametric search
- SPICE models
- Custom electrical curves
- Environmental regulation compliance
- Customer specific screening
- Up-screening capabilities
- Special wafer diffusions
- PbSn plating options
- Package details
- Application notes
- Application and design sample kits
- Custom product and package development

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### REQUESTING PRODUCT PLATING

1. If requesting Tin/Lead plated devices, add the suffix "TIN/LEAD" to the part number when ordering (example: 2N2222A TIN/LEAD).
2. If requesting Lead (Pb) Free plated devices, add the suffix "PBFREE" to the part number when ordering (example: 2N2222A PBFREE).

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### CONTACT US

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