

2N2221A  
2N2222A

**SILICON  
NPN TRANSISTORS**



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**DESCRIPTION:**

The CENTRAL SEMICONDUCTOR 2N2221A and 2N2222A are silicon NPN epitaxial planar transistors designed for small signal, general purpose switching applications.

**MARKING: FULL PART NUMBER**



**TO-18 CASE**

**MAXIMUM RATINGS:** ( $T_A=25^\circ\text{C}$ )

Collector-Base Voltage
Collector-Emitter Voltage
Emitter-Base Voltage
Continuous Collector Current
Power Dissipation
Power Dissipation ( $T_C=25^\circ\text{C}$ )
Operating and Storage Junction Temperature
Thermal Resistance
Thermal Resistance

SYMBOL		UNITS
$V_{CB0}$	75	V
$V_{CEO}$	40	V
$V_{EBO}$	6.0	V
$I_C$	800	mA
$P_D$	500	mW
$P_D$	1.8	W
$T_J, T_{stg}$	-65 to +200	$^\circ\text{C}$
$\theta_{JA}$	350	$^\circ\text{C/W}$
$\theta_{JC}$	97	$^\circ\text{C/W}$

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

SYMBOL	TEST CONDITIONS	MIN	MAX	UNITS	
$I_{CBO}$	$V_{CB}=60\text{V}$		10	nA	
$I_{CBO}$	$V_{CB}=60\text{V}, T_A=150^\circ\text{C}$		10	$\mu\text{A}$	
$I_{CEV}$	$V_{CE}=60\text{V}, V_{EB}=3.0\text{V}$		10	nA	
$I_{EBO}$	$V_{EB}=3.0\text{V}$		10	nA	
$BV_{CBO}$	$I_C=10\mu\text{A}$	75		V	
$BV_{CEO}$	$I_C=10\text{mA}$	40		V	
$BV_{EBO}$	$I_E=10\mu\text{A}$	6.0		V	
$V_{CE(SAT)}$	$I_C=150\text{mA}, I_B=15\text{mA}$		0.3	V	
$V_{CE(SAT)}$	$I_C=500\text{mA}, I_B=50\text{mA}$		1.0	V	
$V_{BE(SAT)}$	$I_C=150\text{mA}, I_B=15\text{mA}$	0.6	1.2	V	
$V_{BE(SAT)}$	$I_C=500\text{mA}, I_B=50\text{mA}$		2.0	V	
		<b>2N2221A</b>		<b>2N2222A</b>	
		<b>MIN</b>	<b>MAX</b>	<b>MIN</b>	<b>MAX</b>
$h_{FE}$	$V_{CE}=10\text{V}, I_C=0.1\text{mA}$	20	-	35	-
$h_{FE}$	$V_{CE}=10\text{V}, I_C=1.0\text{mA}$	25	-	50	-
$h_{FE}$	$V_{CE}=10\text{V}, I_C=10\text{mA}$	35	-	75	-
$h_{FE}$	$V_{CE}=10\text{V}, I_C=10\text{mA}, T_A=-55^\circ\text{C}$	15	-	35	-
$h_{FE}$	$V_{CE}=10\text{V}, I_C=150\text{mA}$	40	120	100	300
$h_{FE}$	$V_{CE}=1.0\text{V}, I_C=150\text{mA}$	20	-	50	-
$h_{FE}$	$V_{CE}=10\text{V}, I_C=500\text{mA}$	25	-	40	-

R5 (5-December 2013)

**2N2221A  
2N2222A**

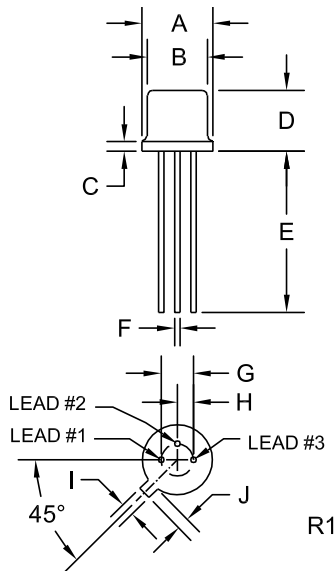
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**ELECTRICAL CHARACTERISTICS - Continued: ( $T_A=25^\circ\text{C}$ )**

SYMBOL	TEST CONDITIONS	2N2221A		2N2222A		UNITS
		MIN	MAX	MIN	MAX	
$f_T$	$V_{CE}=20\text{V}, I_C=20\text{mA}, f=100\text{MHz}$	250	-	300	-	MHz
$C_{ob}$	$V_{CB}=10\text{V}, I_E=0, f=100\text{kHz}$	-	8.0	-	8.0	pF
$C_{ib}$	$V_{EB}=0.5\text{V}, I_C=0, f=100\text{kHz}$	-	25	-	25	pF
$h_{ie}$	$V_{CE}=10\text{V}, I_C=1.0\text{mA}, f=1.0\text{kHz}$	1.0	3.5	2.0	8.0	$k\Omega$
$h_{ie}$	$V_{CE}=10\text{V}, I_C=10\text{mA}, f=1.0\text{kHz}$	0.2	1.0	0.25	1.25	$k\Omega$
$h_{re}$	$V_{CE}=10\text{V}, I_C=1.0\text{mA}, f=1.0\text{kHz}$	-	5.0	-	8.0	$\times 10^{-4}$
$h_{re}$	$V_{CE}=10\text{V}, I_C=10\text{mA}, f=1.0\text{kHz}$	-	2.5	-	4.0	$\times 10^{-4}$
$h_{fe}$	$V_{CE}=10\text{V}, I_C=1.0\text{mA}, f=1.0\text{kHz}$	30	150	50	300	
$h_{fe}$	$V_{CE}=10\text{V}, I_C=10\text{mA}, f=1.0\text{kHz}$	50	300	75	375	
$h_{oe}$	$V_{CE}=10\text{V}, I_C=1.0\text{mA}, f=1.0\text{kHz}$	3.0	15	5.0	35	$\mu\text{S}$
$h_{oe}$	$V_{CE}=10\text{V}, I_C=10\text{mA}, f=1.0\text{kHz}$	10	100	25	200	$\mu\text{S}$
$rb'C_C$	$V_{CB}=10\text{V}, I_E=20\text{mA}, f=31.8\text{MHz}$	-	150	-	150	ps
NF	$V_{CE}=10\text{V}, I_C=100\mu\text{A}, R_S=1.0k\Omega, f=1.0\text{kHz}$	-	-	-	4.0	dB
$t_d$	$V_{CC}=30\text{V}, V_{BE}=0.5\text{V}, I_C=150\text{mA}, I_{B1}=15\text{mA}$	-	10	-	10	ns
$t_r$	$V_{CC}=30\text{V}, V_{BE}=0.5\text{V}, I_C=150\text{mA}, I_{B1}=15\text{mA}$	-	25	-	25	ns
$t_s$	$V_{CC}=30\text{V}, I_C=150\text{mA}, I_{B1}=I_{B2}=15\text{mA}$	-	225	-	225	ns
$t_f$	$V_{CC}=30\text{V}, I_C=150\text{mA}, I_{B1}=I_{B2}=15\text{mA}$	-	60	-	60	ns

**TO-18 CASE - MECHANICAL OUTLINE**



SYMBOL	DIMENSIONS			
	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A (DIA)	0.209	0.230	5.31	5.84
B (DIA)	0.178	0.195	4.52	4.95
C	-	0.030	-	0.76
D	0.170	0.210	4.32	5.33
E	0.500	-	12.70	-
F (DIA)	0.016	0.019	0.41	0.48
G (DIA)	0.100		2.54	
H	0.050		1.27	
I	0.036	0.046	0.91	1.17
J	0.028	0.048	0.71	1.22

TO-18 (REV: R1)

**LEAD CODE:**

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

**MARKING: FULL PART NUMBER**

R5 (5-December 2013)

## 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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http://www.centrasemi.com

# Product End of Life Notification

<b>PDN ID:</b>	PDN01195
<b>Notification Date:</b>	10/20/21
<b>Last Buy Date:</b>	4/20/22
<b>Last Shipment Date</b>	10/20/22

Summary: The CP225 wafer process is discontinued and now classified as End of Life (EOL).

Although Central Semiconductor Corp. makes every effort to continue to produce devices that have been proclaimed EOL (End of Life) by other manufacturers, it is an accepted industry practice to discontinue certain devices when customer demand falls below a minimum level of sustainability. Accordingly, the following product(s) have been transitioned to End of Life status as part of Central's ongoing Product Management Process. Any replacement products are noted below. The effective date for placing last purchase orders will be six (6) months from the date of this notice and twelve (12) months from the notice date for final shipments, and minimum order quantities may apply. The last purchase and shipment dates may be extended if inventory is available.

**\* All Plating types (PBFREE,TIN/LEAD) for each item listed are included in this notice.**

<u>Central Part Number</u>	<u>Suggested Replacement</u>
CP225-2N2218A-WN	N/A
2N2218A	N/A
2N2221A	N/A

Central would be happy to assist you by providing additional information or technical data to help locate an alternate source if we have no replacement available. If you would like assistance, please visit <https://my.centrasemi.com/submit-inquiry?type=ER> to submit an online inquiry.

**DISCLAIMER:** This End of Life (EOL) notification is in accordance with JEDEC standard JESD48 - Product Discontinuance. Central Semiconductor Corp. will make every effort to offer life-time buy (LTB) opportunities and/or offer replacement devices to existing customers for discontinued devices, however, one or both may not be possible for all devices. Please contact your local Central Semiconductor sales representative for LTB opportunities/additional information.