Central™
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Manufacturers of World Class Discrete Semiconductors
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2N2221A
2N2222A

NPN SILICON TRANSISTOR

JEDEC TO-18 CASE

DESCRIPTION:

The CENTRAL SEMICONDUCTOR 2N2221A, 2N2222A types are Silicon NPN Planar Epitaxial Transistors designed for small signal general purpose and switching applications.

MAXIMUM RATINGS: (T_A=25°C)

	SYMBOL		UNITS
Collector-Base Voltage	V_{CBO}	75	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6.0	V
Collector Current	I_C	800	mA
Power Dissipation	P_D	400	mW
Power Dissipation (T_C=25°C)	P_D	1.2	W
Operating and Storage Junction Temperature	T_J,T_{stg}	-65 to +200	°C
Thermal Resistance	Θ_{JA}	438	°C/W
Thermal Resistance	Θ_{JC}	146	°C/W

ELECTRICAL CHARACTERISTICS: (T_A=25°C unless otherwise noted)

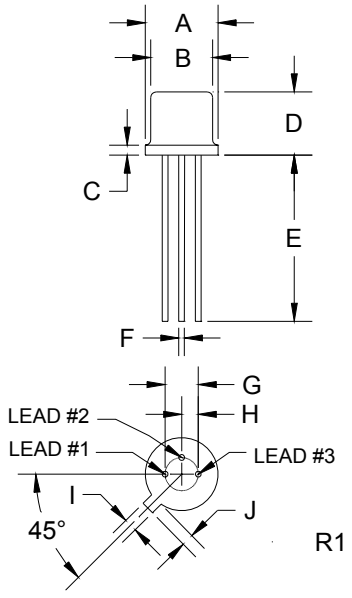
		2N2221A		2N2222A		
SYMBOL	TEST CONDITIONS	MIN	MAX	MIN	MAX	UNITS
I_{CBO}	V_{CB}=60V		10		10	nA
I_{CBO}	V_{CB}=60V, T_A=150°C		10		10	μA
I_{EBO}	V_{EB}=3.0V		10		10	nA
I_{CEV}	V_{CE}=60V, V_{EB}=3.0V		10		10	nA
BV_{CBO}	I_C=10μA	75		75		V
BV_{CEO}	I_C=10mA	40		40		V
BV_{EBO}	I_E=10μA	6.0		6.0		V
$V_{CE(SAT)}$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

(Continued)

ELECTRICAL CHARACTERISTICS: Continued

SYMBOL	TEST CONDITIONS	2N2221A MIN	2N2221A MAX	2N2222A MIN	2N2222A MAX	UNITS
f_T	V_{CE}=20V, I_C=20mA, f=100MHz	250		300		MHz
C_{ob}	V_{CB}=10V, I_E=0, f=100kHz		8.0		8.0	pF
C_{ib}	V_{EB}=0.5V, I_C=0, f=100kHz		25		25	pF
h_{ie}	V_{CE}=10V, I_C=1.0mA, f=1.0kHz	1.0	3.5	2.0	8.0	kΩ
h_{ie}	V_{CE}=10V, I_C=10mA, f=1.0kHz	0.2	1.0	0.25	1.25	kΩ
h_{re}	V_{CE}=10V, I_C=1.0mA, f=1.0kHz		5.0		8.0	$x10^{-4}$
h_{re}	V_{CE}=10V, I_C=10mA, f=1.0kHz		2.5		4.0	$x10^{-4}$
h_{fe}	V_{CE}=10V, I_C=1.0mA, f=1.0kHz	30	150	50	300	
h_{fe}	V_{CE}=10V, I_C=10mA, f=1.0kHz	50	300	75	375	
h_{oe}	V_{CE}=10V, I_C=1.0mA, f=1.0kHz	3.0	15	5.0	35	μmhos
h_{oe}	V_{CE}=10V, I_C=10mA, f=1.0kHz	10	100	25	200	μmhos
$rb'C_c$	V_{CB}=10V, I_E=20mA, f=31.8MHz		150		150	ps
NF	V_{CE}=10V, I_C=100μA, R_S=1.0kΩ, f=1.0kHz				4.0	dB
t_d	V_{CC}=30V, V_{BE}=0.5, I_C=150mA, I_{B1}=15mA		10		10	ns
t_r	V_{CC}=30V, V_{BE}=0.5, I_C=150mA, I_{B1}=15mA		25		25	ns
t_s	V_{CC}=30V, I_C=150mA, I_{B1}=I_{B2}=15mA		225		225	ns
t_f	V_{CC}=30V, I_C=150mA, I_{B1}=I_{B2}=15mA		60		60	ns

TO-18 PACKAGE - MECHANICAL OUTLINE



DIMENSIONS				
	INCHES		MILLIMETERS	
SYMBOL	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

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