NPN 2N2221 – 2N2221A
2N2222 – 2N2222A

SWITCHING SILICON TRANSISTORS

The 2N2221-A and 2N2222-A are NPN transistors mounted in TO-18 metal case . They are designed for high-speed switching applications and feature useful current gain over a wide range of collector current, low leakage currents and low saturation voltages.
Compliance to RoHS

ABSOLUTE MAXIMUM RATINGS

Symbol	Ratings		Value		Unit
			2N2221 2N2222	2N2221A 2N2222A	
V_{CEO}	Collector-Emitter Voltage		30	40	V
V_{CBO}	Collector-Base Voltage		60	75	V
V_{EBO}	Emitter-Base Voltage		5	6	V
I_C	Collector Current		800		mA
P_D	Total Power Dissipation	T_{amb} = 25°	0.5		W
		T_{case}= 25°	1.8		
T_J	*Junction Temperature*		175		°C
T_{Stg}	Storage Temperature range		-65 to +200		°C

THERMAL CHARACTERISTICS

Symbol	Ratings	Value	Unit
R_{thJ-a}	Thermal Resistance, Junction to ambient in free air	50	°C/W
R_{thJ-c}	Thermal Resistance, Junction to case	187.5	°C/W

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ELECTRICAL CHARACTERISTICS

TC=25°C unless otherwise noted

Symbol	Ratings	Test Condition(s)			Min	Typ	Mx	Unit
I_{CBO}	Collector Cutoff Current	V_{CB}= 50 V I_E= 0	T_j= 25°C	2N2221-2N2222	-	-	10	nA
			T_j= 150°C	2N2221-2N2222	-	-	10	µA
		V_{CB}= 60 V I_E= 0	T_j= 25°C	2N2221A-2N2222A	-	-	10	nA
			T_j= 150°C	2N2221A-2N2222A	-	-	10	µA
I_{EBO}	Emitter Cutoff Current	V_{BE}= 3.0 V, I_C=0		2N2221-2N2222	-	-	10	nA
				2N2221A-2N2222A				
I_{CEX}	Collector Cutoff Current	V_{CE}= 60 V, -V_{BE}= 3V		2N2221A-2N2222A	-	-	10	nA
V_{CEO}	Collector Emitter Breakdown Voltage (*)	I_C= 10 mA, I_B= 0		2N2221-2N2222	30	-	-	V
				2N2221A-2N2222A	40	-	-	
V_{CBO}	Collector Base Breakdown Voltage	I_C= 10 µA, I_E= 0		2N2221-2N2222	60	-	-	V
				2N2221A-2N2222A	75	-	-	
V_{EBO}	Emitter Base Breakdown Voltage	I_E= 10 µA, I_C= 0		2N2221-2N2222	5	-	-	V
				2N2221A-2N2222A	6	-	-	
h_{FE}	DC Current Gain (*)	I_C=0.1 mA, V_{CE}=10 V		2N2221-2N2221A	20	-	-	-
				2N2222-2N2222A	35	-	-	
		I_C=1 mA, V_{CE}=10 V		2N2221-2N2221A	25	-	-	
				2N2222-2N2222A	50	-	-	
		I_C=10 mA, V_{CE}=10 V		2N2221-2N2221A	35	-	-	
				2N2222-2N2222A	75	-	-	
		I_C=10 mA, V_{CE}=10 V T_{amb} = -55°C		2N2221A	15	-	-	
				2N2222A	35	-	-	
		I_C=150 mA, V_{CE}=1 V		2N2221-2N2221A	20	-	-	
				2N2222-2N2222A	50	-	-	
		I_C=150 mA, V_{CE}=10 V		2N2221-2N2221A	40	-	120	
				2N2222-2N2222A	100	-	300	
		I_C=500 mA, V_{CE}=10 V		2N2221	20	-	-	
				2N2221A	25			
				2N2222	30	-	-	
				2N2222A	40			

NPN 2N2221 – 2N2221A
2N2222 – 2N2222A

ELECTRICAL CHARACTERISTICS

TC=25°C unless otherwise noted

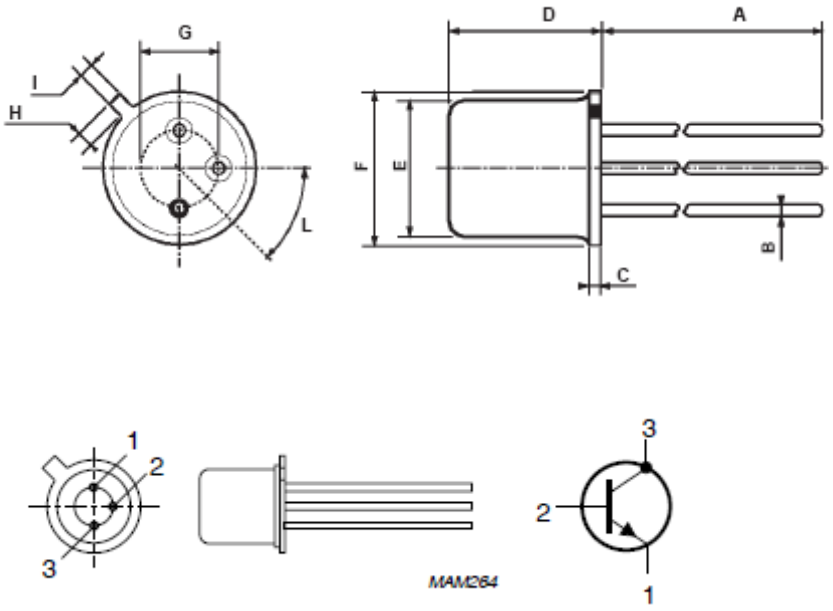
Symbol	Ratings	Test Condition(s)		Min	Typ	Mx	Unit
$V_{CE(SAT)}$	Collector-Emitter saturation Voltage (*)	I_C=150 mA, I_B=15 mA	2N2221-2N2222	-	-	0.4	V
			2N2221A-2N2222A	-	-	0.3	
		I_C=500 mA, I_B=50 mA	2N2221-2N2222	-	-	1.6	
			2N2221A-2N2222A	-	-	1	
$V_{BE(SAT)}$	Base-Emitter saturation Voltage (*)	I_C=150 mA, I_B=15 mA	2N2221-2N2222	-	-	1.3	V
			2N2221A-2N2222A	0.6	-	1.2	
		I_C=500 mA, I_B=50 mA	2N2221-2N2222	-	-	2.6	
			2N2221A-2N2222A	-	-	2	
f_T	Transition frequency	I_C=20 mA, V_{CE}=20 V f= 100MHz	2N2221-2N22218A 2N2222	250	-	-	MHz
			2N2222A	300	-	-	
h_{fe}	Small signal current gain	I_C=1 mA, V_{CE}=10 V f= 1kHz	2N2221A	30	-	150	-
			2N2222A	50	-	300	
		I_C=10 mA, V_{CE}=10 V f= 1kHz	2N2221A	50	-	300	
			2N2222A	75	-	375	
t_d	Delay time	I_C=150 mA, I_B=15 mA $-V_{BB}$=0.5 V, V_{CC}=30 V	2N2221A	-	-	10	ns
			2N2222A				
t_r	Rise time	I_C=150 mA, I_B=15 mA $-V_{BB}$=0.5 V, V_{CC}=30 V	2N2221A	-	-	25	ns
			2N2222A				
t_s	Storage time	I_C=150 mA, V_{CC}=30 V I_{B1} = $-I_{B2}$ =15 mA	2N2221A	-	-	225	ns
			2N2222A				
t_f	Fall time	I_C=150 mA, V_{CC}=30 V I_{B1} = $-I_{B2}$ =15 mA	2N2221A	-	-	60	ns
			2N2222A				
$r_b C_C$	Feedback time constant	I_C=20 mA, V_{CE}=20 V f= 31.8MHz	2N2221A	-	-	150	ps
			2N2212A				

(*) Pulse conditions : tp < 300 μs, δ =2%

NPN 2N2221 – 2N2221A
2N2222 – 2N2222A

MECHANICAL DATA CASE TO-18

DIMENSIONS (mm)		
	min	max
A	12.7	-
B	-	0.49
C	0.9	-
D	-	5.3
E	-	4.9
F	-	5.8
G	2.54	-
H	-	1.2
I	-	1.16
L	45°	-



Pin 1 :	emitter
Pin 2 :	base
Pin 3 :	Collector
Case :	Collector

Revised August 2012