DIGITRON™ Semiconductors

High-reliability discrete products
and engineering services since 1977

2N2221A-2N2222A

NPN SILICON LOW POWER TRANSISTORS

FEATURES

- Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.
- Available as non-RoHS (Sn/Pb plating), standard, and as RoHS by adding "-PBF" suffix.

MAXIMUM RATINGS

Ratings	Symbol	All Types	Unit
Collector-Emitter Voltage	V_{CEO}	50	Vdc
Collector-Base Voltage	V_{CBO}	75	Vdc
Emitter-Base Voltage	V_{EBO}	6.0	Vdc
Collector Current	I_C	800	mAdc
Total Power Dissipation @ T_A = +25°C 2N2221A ; 2N2222A (1)	P_T	0.5	W
Operating & Storage Junction Temperature Range	$T_{op}T_{stg}$	-65 to +200	°C

1) Derate linearly 3.08 mW/°C for T_A > 37.5°C

ELECTRICAL CHARACTERSITICS (T_A = 25°C unless otherwise specified)

Characteristics		Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage I_C = 10 mAdc		$V_{(BR)CEO}$	50		Vdc
Collector-Base Cutoff Current					
V_{CB} = 75 Vdc		I_{CBO}		10	µAdc
V_{CB} = 60 Vdc				10	ηAdc
Emitter-Base Cutoff Current					
V_{EB} = 6.0 Vdc		I_{EBO}		10	µAdc
V_{EB} = 4.0 Vdc				10	ηAdc
Collector-Emitter Cutoff Current V_{CE} = 50 Vdc		I_{CES}		50	ηAdc
ON-CHARACTERISTICS(3)					
Forward –Current Transfer Ratio					
I_C = 0.1 mAdc, V_{CE} = 10 Vdc	2N2221A		30		
	2N2222A		50		
I_C = 1.0 mAdc, V_{CE} = 10 Vdc	2N2221A		35	150	
	2N2222A		75	325	
I_C = 10 mAdc, V_{CE} = 10 Vdc	2N2221A	h_{FE}	40		
	2N2222A		100		
I_C = 150 mAdc, V_{CE} = 10 Vdc	2N2221A		40	120	
	2N2222A		100	300	
I_C = 500 mAdc, V_{CE} = 10 Vdc	2N2221A		20		
	2N2222A		30		
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$			Vdc
I_C = 150 mAdc, I_B = 15 mAdc				0.3	
I_C = 500 mAdc, I_B = 50 mAdc				1.0	

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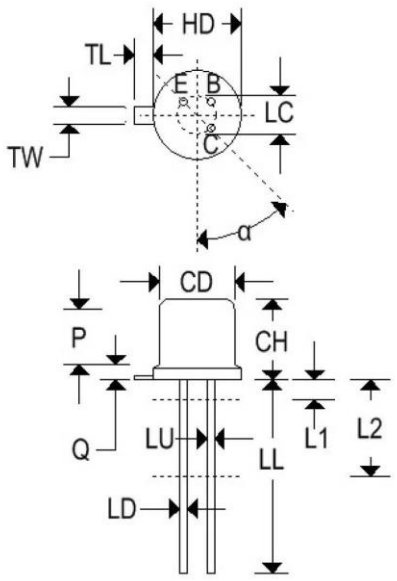
ELECTRICAL CHARACTERSITICS (T_A = 25°C unless otherwise specified)

Base-Emitter Voltage I_C = 150 mAdc, I_B = 15 mAdc I_C = 500 mAdc, I_B = 50 mAdc	$V_{BE(sat)}$	0.6	1.2 2.0	Vdc
DYNAMIC CHARACTERISTICS				
Small Signal Short Circuit Forward Current Transfer Ratio 2N2221A I_C = 1.0 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz 2N2222A	h_{fe}	30 50		
Magnitude of Small-Signal Short Circuit Forward Current Transfer Ratio I_C = 20 mAdc, V_{CE} = 20 Vdc, f = 100 MHz	$\|h_{fe}\|$	2.5		
Output Capacitance V_{CB} = 10 Vdc, I_E = 0, 100 kHz ≤ f ≤ 1.0 MHz	C_{obo}		8.0	pF
Input Capacitance V_{EB} = 0.5 Vdc, I_C = 0, 100 kHz ≤ f ≤ 1.0 MHz	C_{ibo}		25	pF
SWITCHING CHARACTERISTICS				
Turn-on time	ton	-	35	ns
Turn-off time	toff	-	300	ns

MECHANICAL CHARACTERISTICS

Case	TO-18
Marking	Alpha-numeric
Polarity	See below



TO-18 (BJT)				
Dim	**Inches**		**Millimeters**	
	Min	**Max**	**Min**	**Max**
CD	0.178	0.195	4.520	4.950
CH	0.170	0.210	4.320	5.330
HD	0.209	0.230	5.310	5.840
LC	0.100 TP		2.540 TP	
LD	0.016	0.021	0.410	0.530
LL	0.500	0.750	12.700	19.050
LU	0.016	0.019	0.410	0.480
L1	-	0.050	-	1.270
L2	0.250	-	6.350	-
P	0.100	-	2.540	-
Q	-	0.040	-	1.020
TL	0.028	0.048	0.710	1.220
TW	0.036	0.046	0.910	1.170
r	-	0.010	-	0.025
α	45°TP		45°TP	