MICRO ELECTRONICS

2N2222
PN2222
2N2222A
PN2222A

THE 2N2222, 2N2222A, PN2222, PN2222A ARE NPN SILICON PLANAR EPITAXIAL TRANSISTORS FOR GENERAL PURPOSE AMPLIFIERS AND MEDIUM SPEED SWITCHING APPLICATIONS. THEY ARE COMPLEMENTARY TO THE PNP TYPE 2N2907, 2N2907A, PN2907, PN2907A RESPECTIVELY. THE 2N2222, 2N2222A ARE PACKED IN TO-18. THE PN2222, PN2222A ARE PACKED IN TO-92A.

CASE TO-18

CBE

2N2222
2N2222A

CASE TO-92A

EBC

PN2222
PN2222A

ABSOLUTE MAXIMUM RATINGS		2N2222	2N2222A	PN2222	PN2222A
Collector-Base Voltage	V_{CBO}	60V	75V	60V	75V
Collector-Emitter Voltage	V_{CEO}	30V	40V	30V	40V
Emitter-Base Voltage	V_{EBO}	5V	6V	5V	6V
Collector Current	I_C	0.8A	0.8A	0.8A	0.8A
Total Power Dissipation ($T_C \leq 25^oC$)	P_{tot}	1.8W	1.8W	1.2W	1.2W
($T_A \leq 25^oC$)		500mW	500mW	500mW	500mW
Junction Temperature	T_j	175°C	175°C	150°C	150°C
Storage Temperature Range	T_{stg}	-65 to 200°C		-55 to 150°C	

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

PARAMETER	SYMBOL	2N2222 PN2222 MIN	2N2222 PN2222 MAX	2N2222A PN2222A MIN	2N2222A PN2222A MAX	UNIT	TEST CONDITIONS
Collector-Base Breakdown Voltage	BV_{CBO}	60		75		V	I_C=0.01mA I_E=0
Collector-Emitter Breakdown Voltage	LV_{CEO} *	30		40		V	I_C=10mA I_B=0
Emitter-Base Breakdown Voltage	BV_{EBO}	5		6		V	I_E=0.01mA I_C=0
Collector Cutoff Current	I_{CBO}		10			nA	V_{CB}=50V I_E=0
					10	nA	V_{CB}=60V I_E=0
			10			μA	V_{CB}=50V I_E=0 T_A=150°C
					10	μA	V_{CB}=60V I_E=0 T_A=150°C
Collector Cutoff Current	I_{CEV}				10	nA	V_{CE}=60V V_{EB}=3V
Emitter Cutoff Current	I_{EBO}		10		10	nA	V_{EB}=3V I_C=0
Base Cutoff Current	I_{BL}				20	nA	V_{CE}=60V V_{EB}=3V

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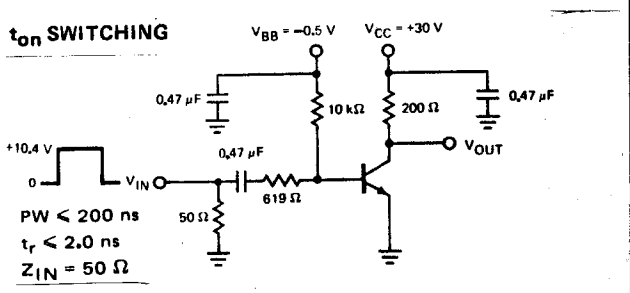
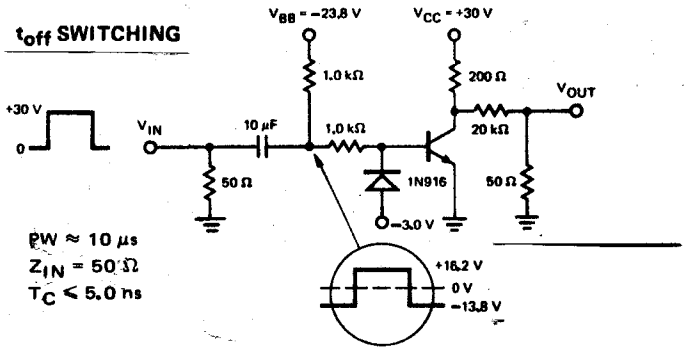
PARAMETER	SYMBOL	2N2222 PN2222 MIN	2N2222 PN2222 MAX	2N2222A PN2222A MIN	2N2222A PN2222A MAX	UNIT	TEST CONDITIONS
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$*		0.4		0.3	V	I_C=150mA I_B=15mA
			1.6		1.0	V	I_C=500mA I_B=50mA
Base-Emitter Saturation Voltage	$V_{BE(sat)}$*		1.3	0.6	1.2	V	I_C=150mA I_B=15mA
			2.6		2.0	V	I_C=500mA I_B=50mA
D.C. Current Gain	H_{FE} *	35		35			I_C=0.1mA V_{CE}=10V
		50		50			I_C=1mA V_{CE}=10V
		75		75			I_C=10mA V_{CE}=10V
		100	300	100	300		I_C=150mA V_{CE}=10V
		30		40			I_C=500mA V_{CE}=10V
		50		50			I_C=150mA V_{CE}=1V
				35			I_C=10mA V_{CE}=10V T_A=-55°C
Current Gain-Bandwidth Product	f_T	250		300		MHz	I_C=20mA V_{CE}=20V
Collector-Base Capacitance	Cob		8		8	pF	V_{CB}=10V I_E=0 f=100kHz
Emitter-Base Capacitance	Cib		25		25	pF	V_{EB}=0.5V I_C=0 f=100kHz
Collector-Base Time Constant	$C_c r_{bb'}$				150	pS	I_C=20mA V_{CE}=20V f=31.8MHz
Noise Figure	NF				4	dB	I_C=0.1mA V_{CE}=10V f=1kHz R_G=1kΩ
Input Impedance	h_{ie}			2	8	KΩ	I_C=1mA V_{CE}=10V f=1kHz
				0.25	1.25	KΩ	I_C=10mA V_{CE}=10V f=1kHz
Voltage Feedback Ratio	h_{re}				8	$x10^{-4}$	I_C=1mA V_{CE}=10V f=1kHz
					4	$x10^{-4}$	I_C=10mA V_{CE}=10V f=1kHz
Small Signal Current Gain	hfe			50	300		I_C=1mA V_{CE}=10V f=1kHz
				75	375		I_C=10mA V_{CE}=10V f=1kHz
Output Admittance	h_{oe}			5	35	μ℧	I_C=1mA V_{CE}=10V f=1kHz
				25	200	μ℧	I_C=10mA V_{CE}=10V f=1kHz
Delay Time	t_d				10	nS	I_C=150mA I_{B1}=15mA V_{cc}=30V
Rise Time	t_r				25	nS	I_C=150mA I_{B1}=15mA V_{cc}=30V
Storage Time	t_s				225	nS	I_C=150mA I_{B1}=-I_{B2}=15mA V_{cc}=30V
Fall Time	t_f				60	nS	I_C=150mA I_{B1}=-I_{B2}=15mA V_{cc}=30V

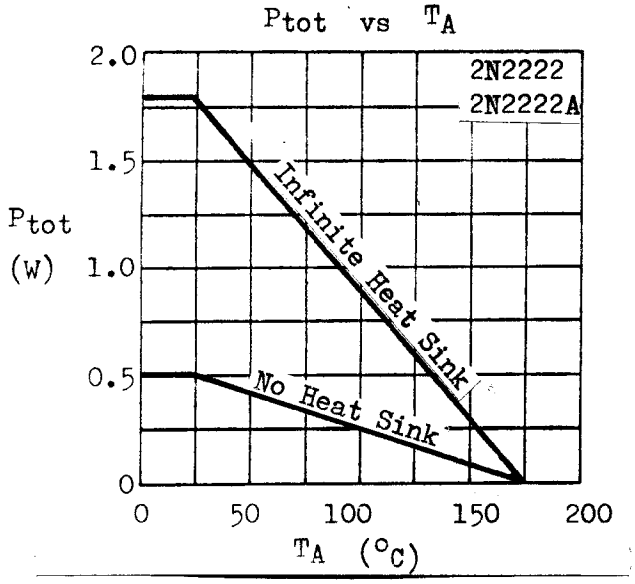
* Pulse Test : Pulse Width=0.3mS, Duty Cycle=1%

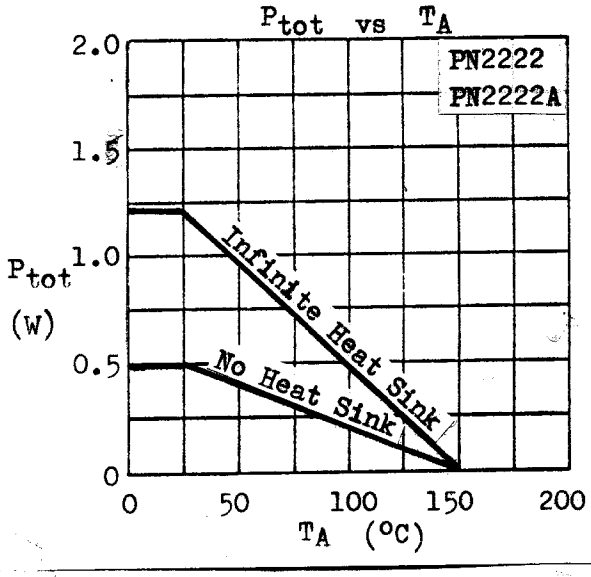
SWITCHING TIME TEST CIRCUITS





All waveforms are monitored on an oscilloscope with Rin ⩾ 100KΩ, $C_{in} \leqslant 12pF$, $t_r \leqslant 5nS$.





TYPICAL CHARACTERISTICS

(T_A=25°C unless otherwise noted)