



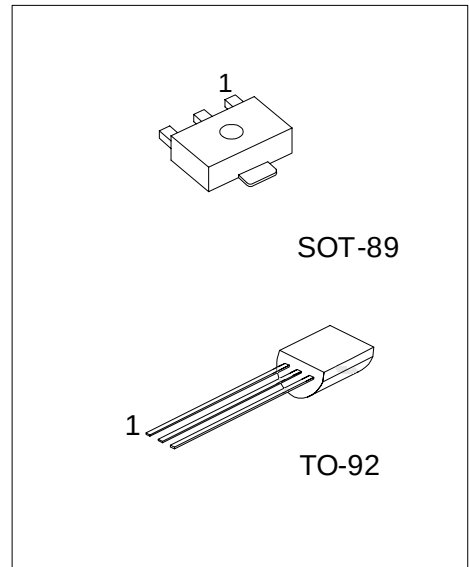
PN2222A

NPN SILICON TRANSISTOR

NPN GENERAL PURPOSE AMPLIFIER

■ FEATURES

* This device is for use as a medium power amplifier and switch requiring collector currents up to 500mA.



*Pb-free plating product number: PN2222AL

■ ORDERING INFORMATION

Order Number		Package	Pin Assignment			Packing
Normal	Lead Free Plating		1	2	3	
PN2222A-AB3-R	PN2222AL-AB3-R	SOT-89	B	C	E	Tape Reel
PN2222A-AB3-T	PN2222AL-AB3-T	SOT-89	B	C	E	Tube
PN2222A-T92-B	PN2222AL-T92-B	TO-92	E	B	C	Tape Box
PN2222A-T92-K	PN2222AL-T92-K	TO-92	E	B	C	Bulk

PN2222AL-AB3-R (1)Packing Type (2)Package Type (3)Lead Plating		(1) B: Tape Box, K: Bulk, R: Tape Reel, T: Tube (2) AB3: SOT-89, T92: TO-92 (3) L: Lead Free Plating, Blank: Pb/Sn
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■ ABSOLUTE MAXIMUM RATING (Ta=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Base Voltage		V_{CBO}	75	V
Collector-Emitter Voltage		V_{CEO}	40	V
Emitter-Base Voltage		V_{EBO}	6	V
Collector Current		I_C	0.6	A
Total Device Dissipation	SOT-89	P_C	1.2	W
	TO-92		625	mW
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-55 ~ +150	°C

Note 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

■ THERMAL DATA (Ta=25°C, unless otherwise noted)

PARAMETER		SYMBOL	RATINGS	UNIT
Thermal resistance, junction to Ambient	SOT-89	θ_{JA}	104	°C/W
	TO-92		200	°C/W

■ ELECTRICAL CHARACTERISTICS (Ta=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =10μA, I _E =0	75			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =10mA, I _B =0	40			V
Emitter-Base Breakdown Voltage	BV _{EBO}	I _E =10μA, I _C =0	6			V
Collector Cut-off Current	I _{CEO}	V _{CE} =60V, V _{EB(OFF)} =3.0V			10	nA
Collector Cut-Off Current	I _{CBO}	V _{CB} =60V, I _E =0			0.01	μA
		V _{CB} =60V, I _E =0, Ta=150°C			10	μA
Emitter Cut-Off Current	I _{EBO}	V _{EB} =3.0V, I _C =0			10	nA
Base Cut-Off Current	I _{BL}	V _{CE} =60V, V _{EB(OFF)} =3.0V			20	nA
ON CHARACTERISTICS						
DC Current Gain	h _{FE}	I _C =0.1mA, V _{CE} =10V	35			
		I _C =1.0mA, V _{CE} =10V	50			
		I _C =10mA, V _{CE} =10V	75			
		I _C =10mA, V _{CE} =10V, Ta=-55°C	35			
		I _C =150mA, V _{CE} =10V*	100		300	
		I _C =150mA, V _{CE} =1.0V*	50			
		I _C =500mA, V _{CE} =10V*	40			
Collector-Emitter Saturation Voltage*	V _{CE(SAT)}	I _C =150mA, I _B =15mA			0.3	V
		I _C =500mA, I _B =50mA			1.0	V
Base-Emitter Saturation Voltage*	V _{BE(SAT)}	I _C =150mA, I _B =15mA	0.6		1.2	V
		I _C =500mA, I _B =50mA			2.0	V
SMALL SIGNAL CHARACTERISTICS						
Transition Frequency	f _T	I _C =20mA, V _{CE} =20V, f=100MHz	300			MHz
Output Capacitance	Cobo	V _{CB} =10V, I _E =0, f=100kHz			8.0	pF
Input Capacitance	Cibo	V _{EB} =0.5V, I _C =0, f=100kHz			25	pF
Collector Base Time Constant	rb'Cc	I _C =20mA, V _{CB} =20V, f=31.8MHz			150	pS
Noise Figure	NF	I _C =100μA, V _{CE} =10V, R _S =1.0kΩ, f=1.0kHz			4.0	dB
Real Part of Common-Emitter High Frequency Input Impedance	Re(hje)	I _C =20mA, V _{CB} =20V, f=300MHz			60	Ω

■ ELECTRICAL CHARACTERISTICS (Ta=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SWITCHING CHARACTERISTICS						
Delay time	t_D	$V_{CC}=30V$, $V_{BE(OFF)}=0.5V$,			10	ns
Rise time	t_R	$I_C=150mA$, $I_{B1}=15mA$			25	ns
Storage time	t_S	$V_{CC}=30V$, $I_C=150mA$,			225	ns
Fall time	t_F	$I_{B1}=I_{B2}=15mA$			60	ns

Note 1. *Pulse test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2.0\%$

■ TEST CIRCUIT

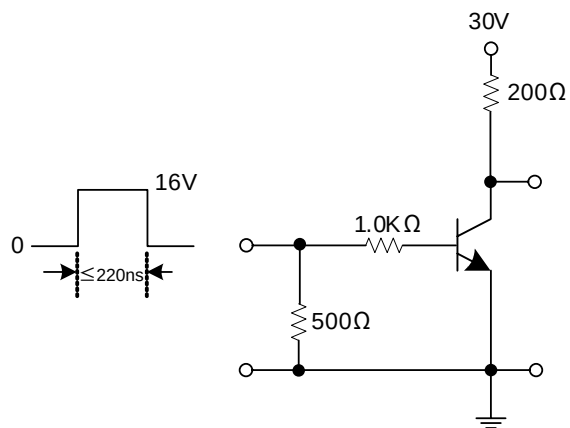


Fig 1. Saturated Turn-On Switching Time

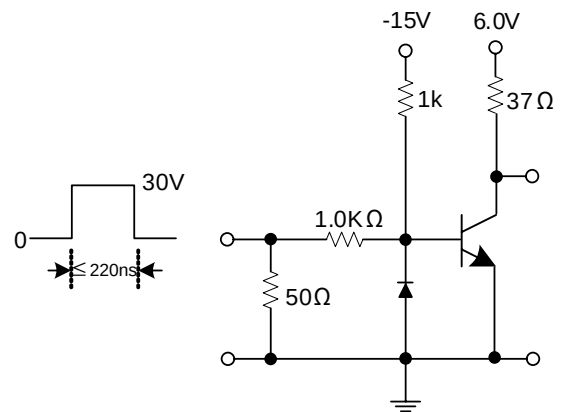
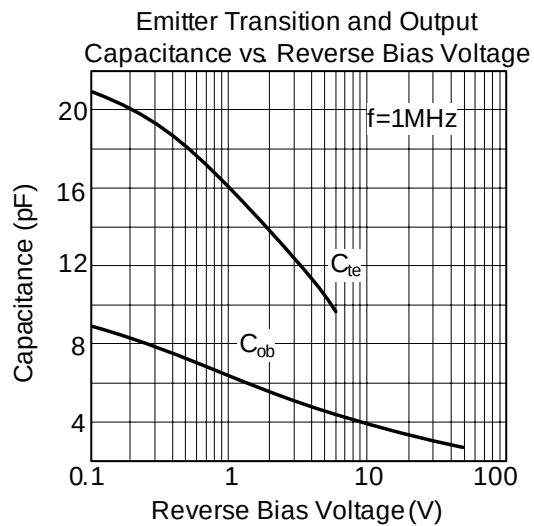
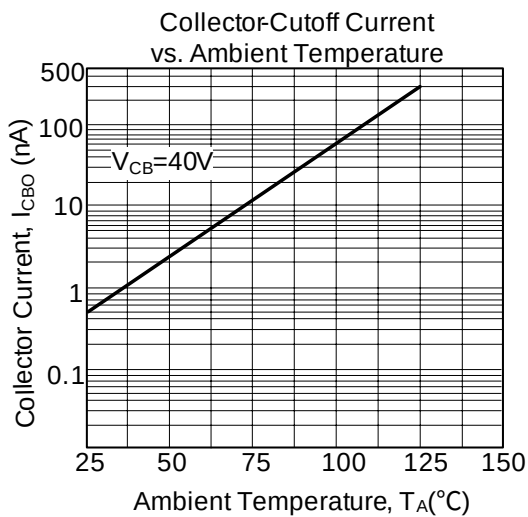
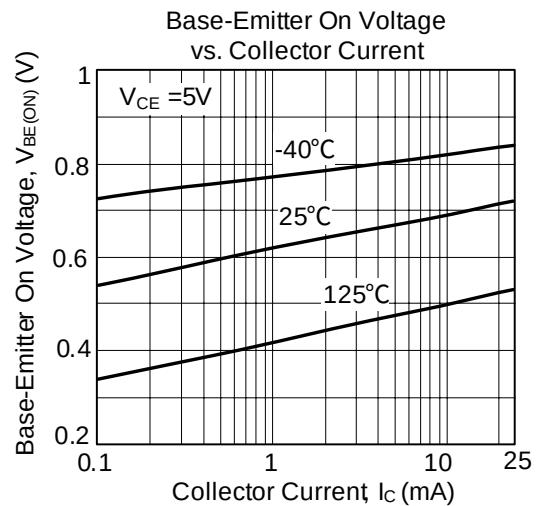
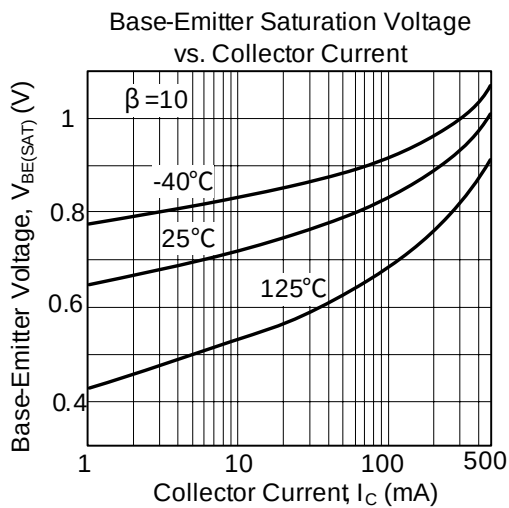
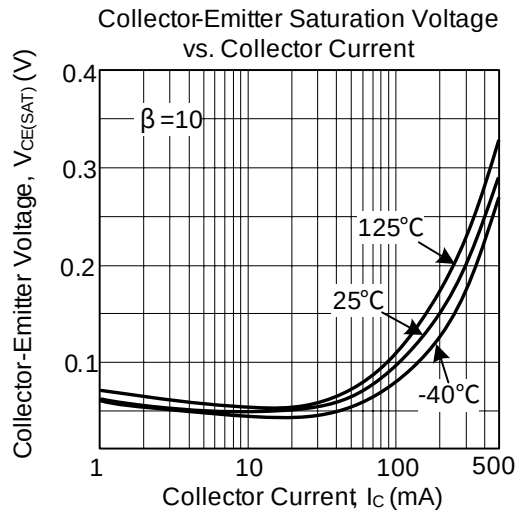
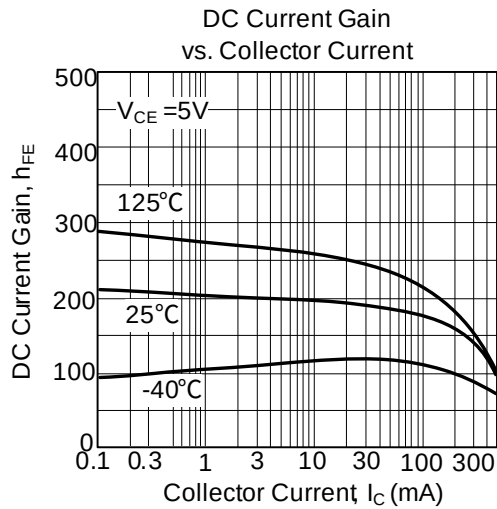
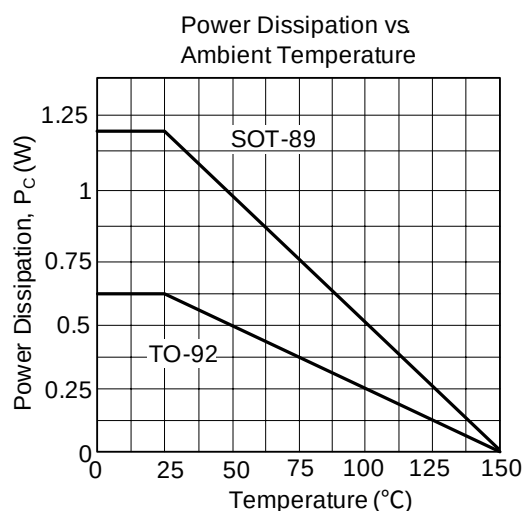
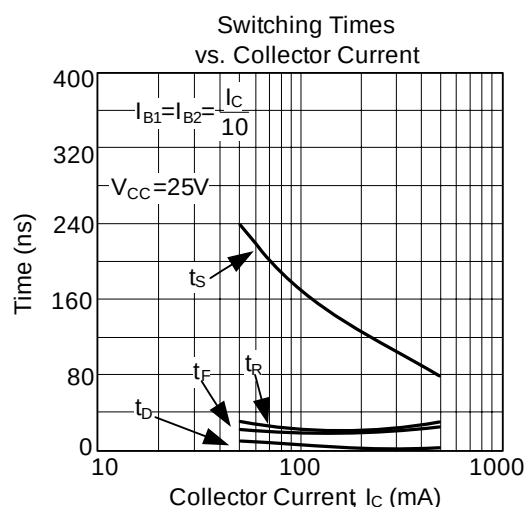
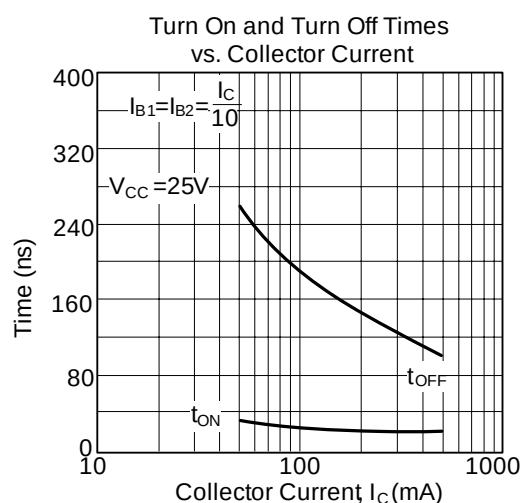


Fig 2. Saturated Turn-Off Switching Time

TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS(Cont.)



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