



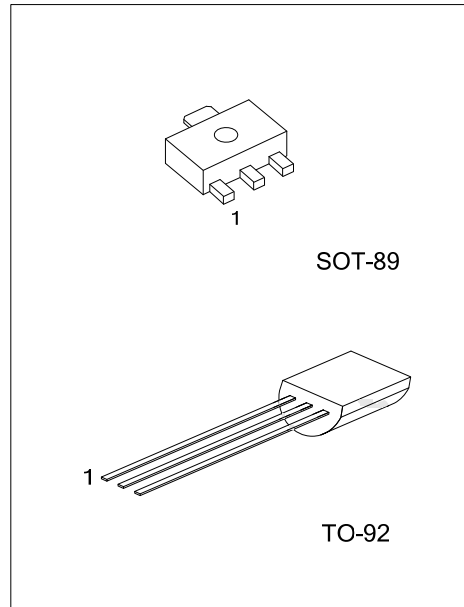
PN2222A

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.



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
PN2222AL-AB3-R	PN2222AG-AB3-R	SOT-89	B	C	E	Tape Reel
PN2222AL-T92-R	PN2222AG-T92-R	TO-92	E	B	C	Tape Reel
PN2222AL-T92-B	PN2222AG-T92-B	TO-92	E	B	C	Tape Box
PN2222AL-T92-K	PN2222AG-T92-K	TO-92	E	B	C	Bulk

PN2222AL-AB3-R 	(1) Packing Type (2) Package Type (3) Lead Plating	(1) R: Tape Reel, B: Tape Box, K: Bulk (2) AB3: SOT-89, T92: TO-92 (3) L: Lead Free, G: Halogen Free
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■ ABSOLUTE MAXIMUM RATING ($T_A=25^{\circ}\text{C}$, 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		0.6	
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
Storage Temperature		T_{STG}	-55 ~ +150	$^{\circ}\text{C}$

Note: 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.

■ THERMAL DATA ($T_A=25^{\circ}\text{C}$, unless otherwise noted)

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-89	θ_{JA}	104	$^{\circ}\text{C}/\text{W}$
	TO-92		200	
Junction to Case	SOT-89	θ_{JC}	38	$^{\circ}\text{C}/\text{W}$
	TO-92		80	

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

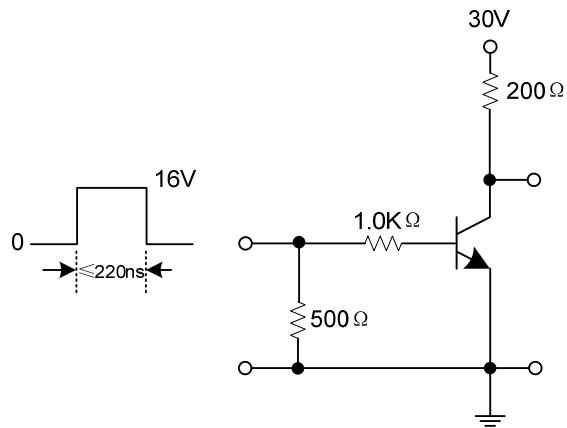
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =10μA, I _E =0	75			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =10mA, I _B =0	40			V
Emitter-Base Breakdown Voltage	BV _{EBO}	I _E =10μA, I _C =0	6			V
Collector Cut-off 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
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 =150mA, V _{CE} =10V (Note)	100		300	
		I _C =150mA, V _{CE} =1.0V (Note)	50			
		I _C =500mA, V _{CE} =10V (Note)	40			
Collector-Emitter Saturation Voltage (Note)	V _{CE(SAT)}	I _C =150mA, I _B =15mA			0.3	V
		I _C =500mA, I _B =50mA			1.0	
Base-Emitter Saturation Voltage (Note)	V _{BE(SAT)}	I _C =150mA, I _B =15mA	0.6		1.2	V
		I _C =500mA, I _B =50mA			2.0	
SMALL SIGNAL CHARACTERISTICS						
Transition Frequency	f _T	I _C =20mA, V _{CE} =20V, f=100MHz	300			MHz
Output Capacitance	C _{obo}	V _{CB} =10V, I _E =0, f=100kHz			8.0	pF
Input Capacitance	C _{ibo}	V _{EB} =0.5V, I _C =0, f=100kHz			25	pF
Collector Base Time Constant	τ _{b'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(h _{je})	I _C =20mA, V _{CB} =20V, f=300MHz			60	Ω
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: Pulse test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2.0%

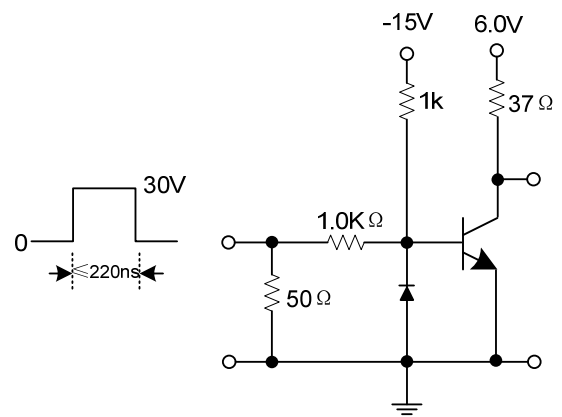
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■ TEST CIRCUIT

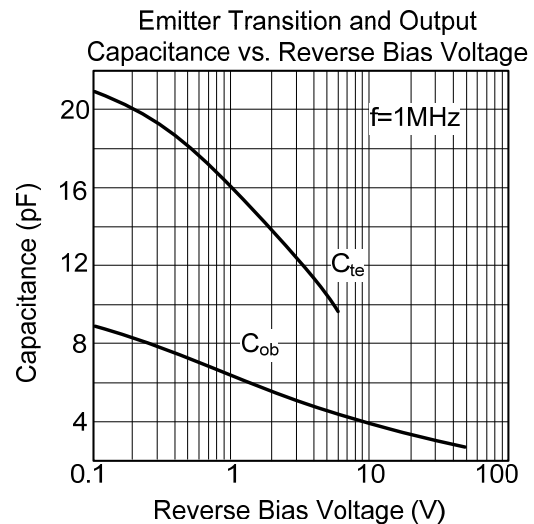
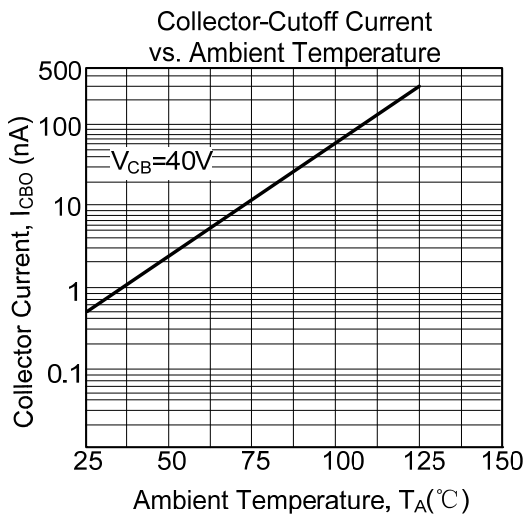
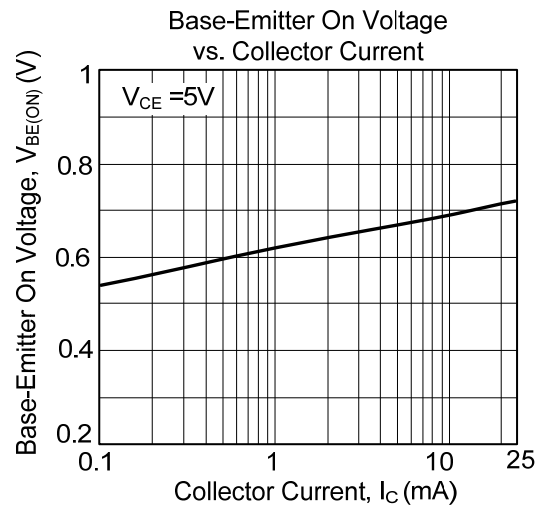
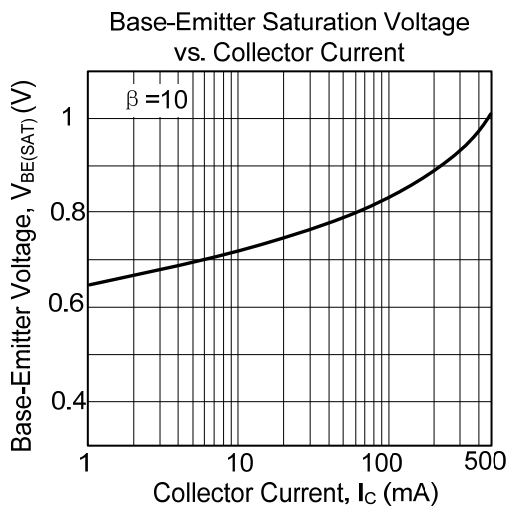
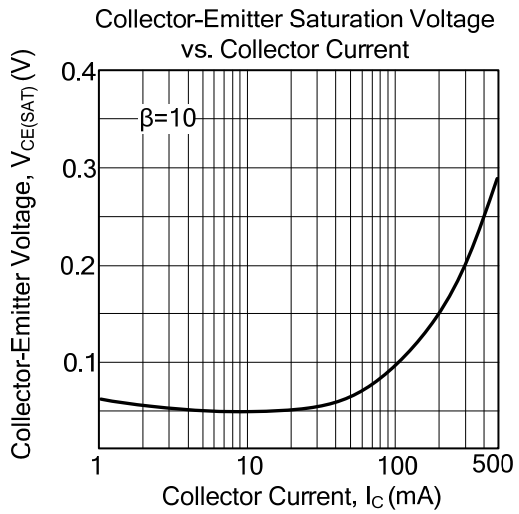
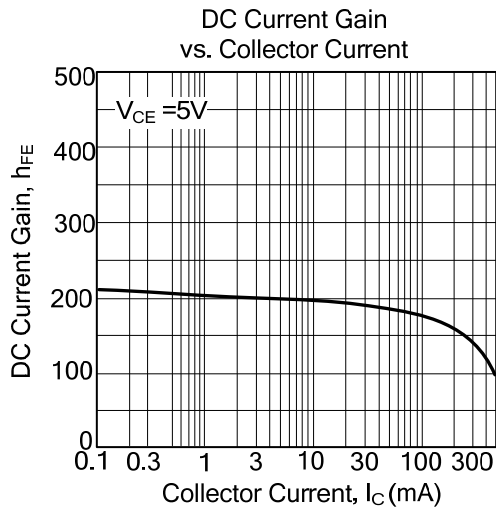


Saturated Turn-On Switching Time

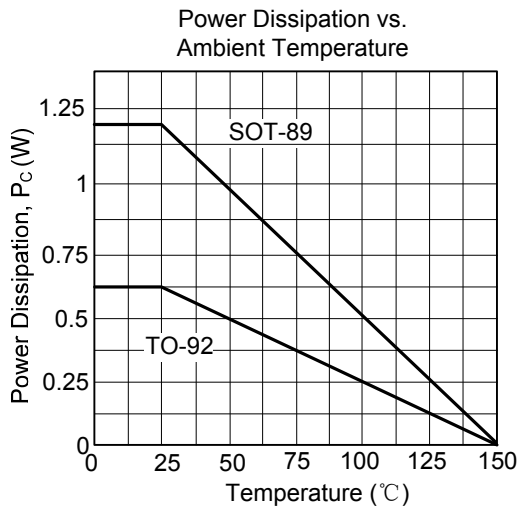
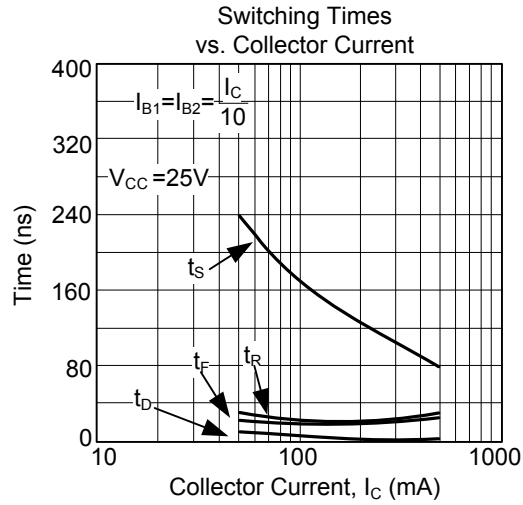
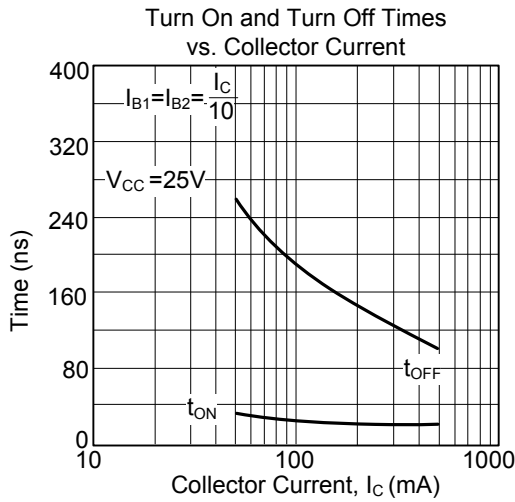


Saturated Turn-Off Switching Time

■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS(Cont.)



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