



2N4402

PNP General Purpose Amplifier

Features

- Halogen free available upon request by adding suffix "-HF"
- This device is designed for use as general purpose amplifiers and switches requiring collector currents to 500mA
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1
- Marking: Type number
- Lead Free Finish/Rohs Compliant ("P" Suffix designates Compliant. See ordering information)

Maximum Ratings*

Symbol	Rating	Rating	Unit
V_{CEO}	Collector-Emitter Voltage	40	V
V_{CBO}	Collector-Base Voltage	40	V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Collector Current, Continuous	600	mA
T_J	Operating Junction Temperature	-55 to +150	°C
T_{STG}	Storage Temperature	-55 to +150	°C

Thermal Characteristics

Symbol	Rating	Max	Unit
P_D	Total Device Dissipation Derate above 25°C	625 5.0	mW mW/°C
R_{JC}	Thermal Resistance, Junction to Case	83.3	°C/W
R_{JA}	Thermal Resistance, Junction to Ambient	200	°C/W

Electrical Characteristics @ 25°C Unless Otherwise Specified

Symbol	Parameter	Min	Max	Units
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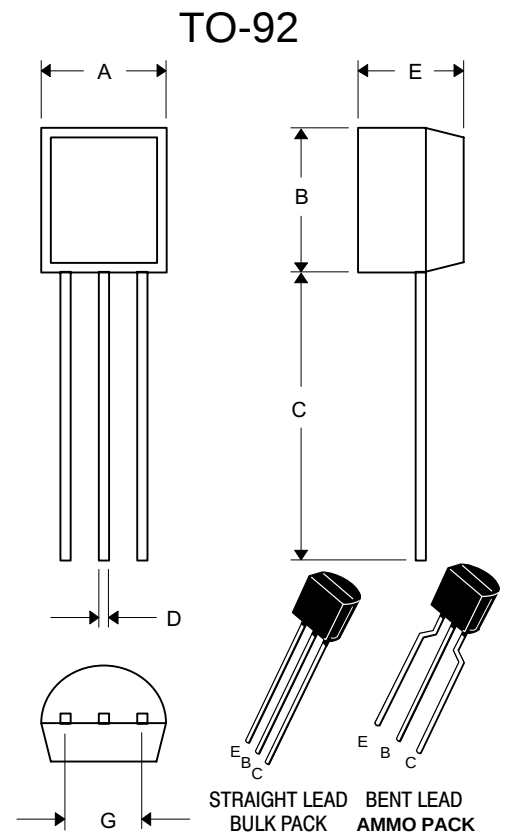
OFF CHARACTERISTICS

$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage* ($I_C=1.0mA$, $I_E=0$)	40	---	Vdc
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage ($I_C=100\mu A$, $I_E=0$)	40	---	Vdc
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage ($I_E=100\mu A$, $I_C=0$)	5.0	---	Vdc
I_{CEX}	Collector Cutoff Current ($V_{CE}=35Vdc$, $V_{EB}=0.4Vdc$)	---	0.1	μA
I_{BL}	Base Cutoff Current ($V_{CE}=35Vdc$, $V_{EB}=0.4Vdc$)	---	0.1	μA

* These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

Notes: 1. These ratings are based on a maximum junction temperature of 150 degrees C.

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



DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	.175	.185	4.45	4.70	
B	.175	.185	4.45	4.70	
C	.500	---	12.70	---	
D	.016	.020	0.41	0.63	
E	.135	.145	3.43	3.68	
G	.095	.105	2.42	2.67	Straight Lead
	.173	.220	4.40	5.60	Bent Lead

* For ammo packing detailed specification, click here to visit our website of product packaging for details.

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Symbol	Parameter	Min	Max	Units
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ON CHARACTERISTICS*

h_{FE}	DC Current Gain ($V_{CE}=1.0V_{dc}$, $I_C=1.0mA_{dc}$) ($V_{CE}=1.0V_{dc}$, $I_C=10mA_{dc}$) ($V_{CE}=2.0V_{dc}$, $I_C=150mA_{dc}$) ($V_{CE}=2.0V_{dc}$, $I_C=500mA_{dc}$)	30 50 50 20	150	---
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage ($I_C=150mA_{dc}$, $I_B=15mA_{dc}$) ($I_C=500mA_{dc}$, $I_B=50mA_{dc}$)	--- ---	0.40 0.75	Vdc Vdc
$V_{BE(sat)}$	Base-Emitter Saturation Voltage ($I_C=150mA_{dc}$, $I_B=15mA_{dc}$) ($I_C=500mA_{dc}$, $I_B=50mA_{dc}$)	0.75	0.95 1.30	Vdc Vdc

SMALL-SIGNAL CHARACTERISTICS

C_{OB}	Output Capacitance ($V_{CB}=10V_{dc}$, $f=140KHz$)	---	8.5	pF
C_{IB}	Input Capacitance ($V_{EB}=0.5V_{dc}$, $f=140KHz$)	---	30	pF
h_{fe}	Small-Signal Current Gain ($I_C=20mA_{dc}$, $V_{CE}=10V_{dc}$, $f=100MHz$)	1.5	---	---
h_{fe}	Small-Signal Current Gain ($I_C=1.0mA_{dc}$, $V_{CE}=10V_{dc}$, $f=1.0KHz$)	30	250	---
h_{fe}	Small-Signal Current Gain ($I_C=1.0mA_{dc}$, $V_{CE}=10V_{dc}$, $f=1.0KHz$)	0.75	7.5	KOHM
h_{fe}	Small-Signal Current Gain ($I_C=1.0mA_{dc}$, $V_{CE}=10V_{dc}$, $f=1.0KHz$)	0.10	8.0	$\times 10^{-4}$
h_{oe}	Small-Signal Current Gain ($I_C=1.0mA_{dc}$, $V_{CE}=10V_{dc}$, $f=1.0KHz$)	1.0	100	umhos

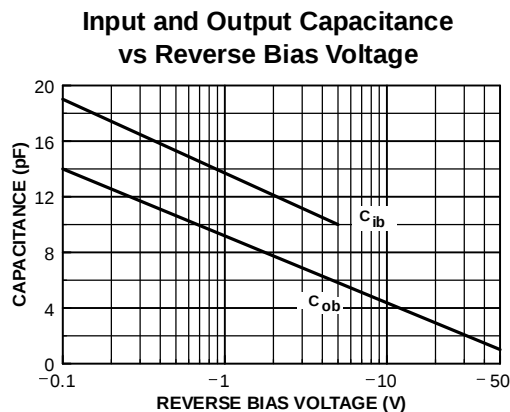
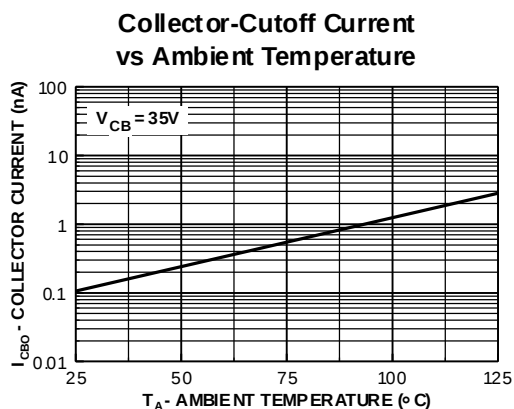
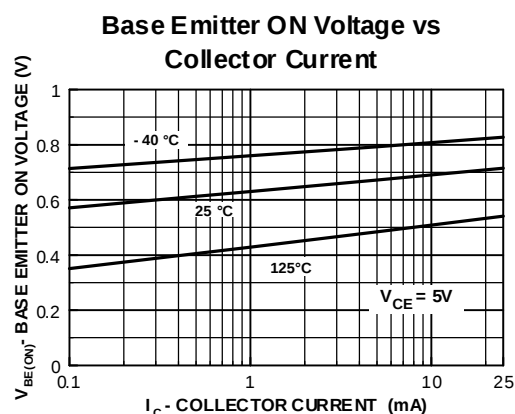
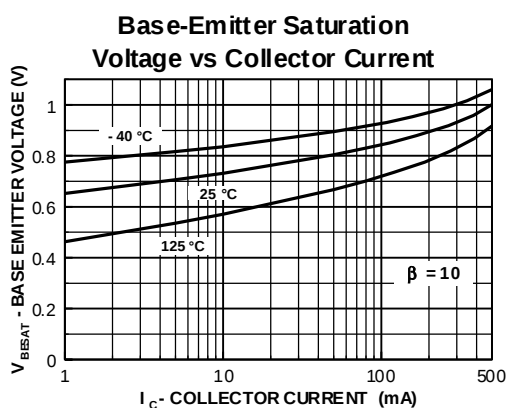
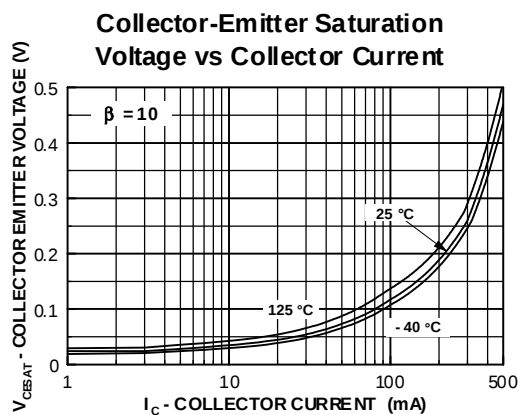
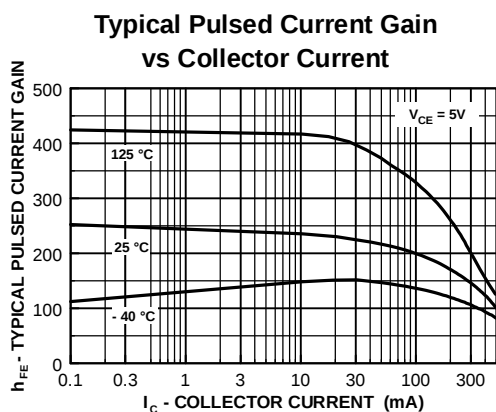
SWITCHING CHARACTERISTICS

T_d	Delay Time	$V_{CC}=30V_{dc}$, $I_C=150mA_{dc}$, $I_{B1}=15mA_{dc}$, $V_{BE(off)}=2.0V_{dc}$	---	15	ns
t_r	Rise Time		---	20	ns
t_s	Storage Time	$V_{CC}=30V_{dc}$, $I_C=150mA_{dc}$, $I_{B1}=I_{B2}=15mA_{dc}$	---	225	ns
t_f	Fall Time		---	30	ns

* Pulse Test: Pulse Width<300us, Duty Cycle<2.0%



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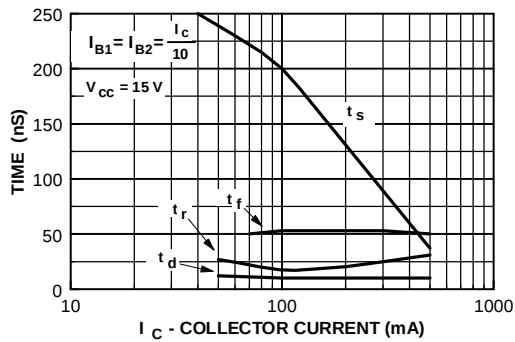


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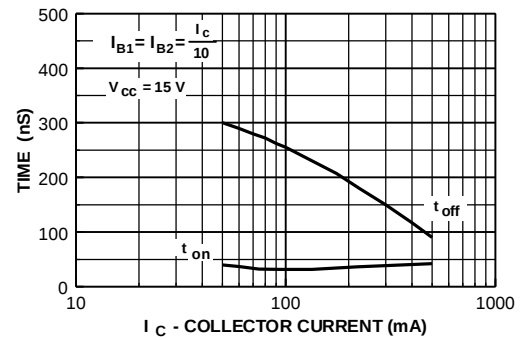
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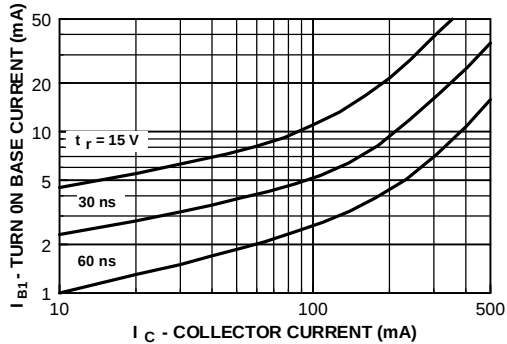
**Switching Times
vs Collector Current**



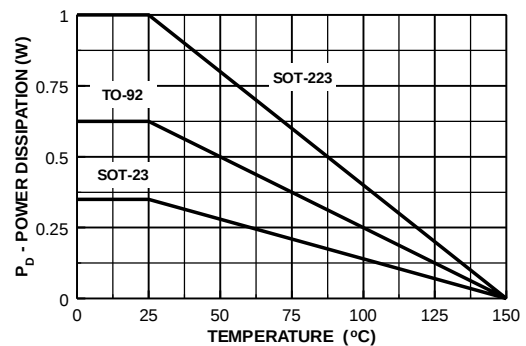
**Turn On and Turn Off Times
vs Collector Current**



**Rise Time vs Collector
and Turn On Base Currents**



**Power Dissipation vs
Ambient Temperature**



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Ordering Information :

Device	Packing
Part Number-AP	Ammo Packing: 20Kpcs/Carton
Part Number-BP	Bulk: 100Kpcs/Carton

Note : Adding "-HF" suffix for halogen free, eg. Part Number-AP-HF

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