



Micro Commercial Components

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2N4400

NPN General Purpose Amplifier

Features

- Lead Free Finish/RoHS Compliant ("P" Suffix designates RoHS Compliant. See ordering information)
- 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

Maximum Ratings*

Symbol	Rating	Rating	Unit
V_{CE0}	Collector-Emitter Voltage	40	V
V_{CBO}	Collector-Base Voltage	60	V
V_{EBO}	Emitter-Base Voltage	6.0	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

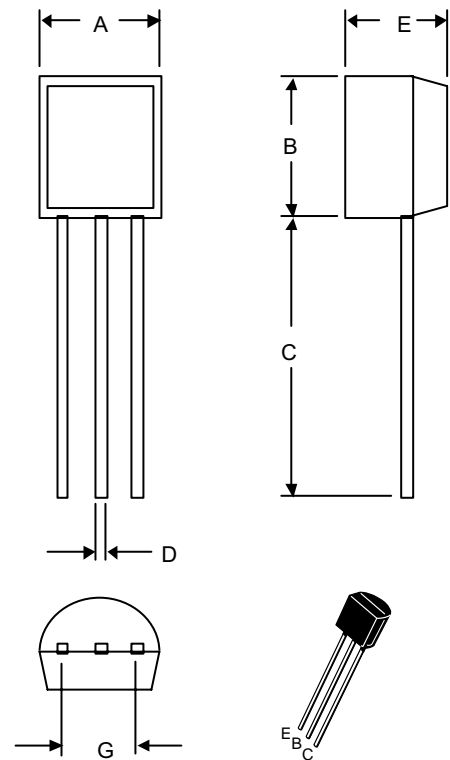
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage* ($I_C=1.0mA$, $I_E=0$)	40	---	Vdc
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage ($I_C=100\mu A$, $I_E=0$)	60	---	Vdc
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage ($I_E=100\mu A$, $I_C=0$)	6.0	---	Vdc
I_{CEX}	Collector Cutoff Current ($V_{CE}=35Vdc$, $V_{EB}=0.4Vdc$)	---	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.

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DIMENSIONS

DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	.170	.190	4.33	4.83	
B	.170	.190	4.30	4.83	
C	.550	.590	13.97	14.97	
D	.010	.020	0.36	0.56	
E	.130	.160	3.30	3.96	
G	.096	.104	2.44	2.64	

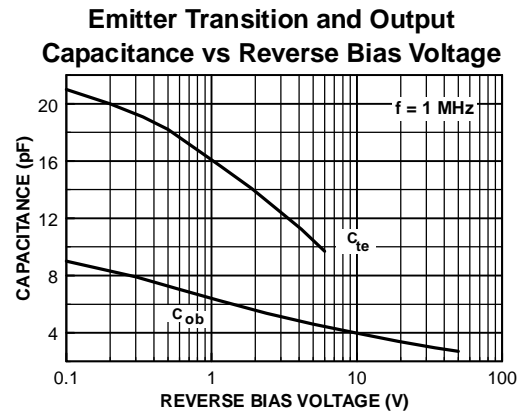
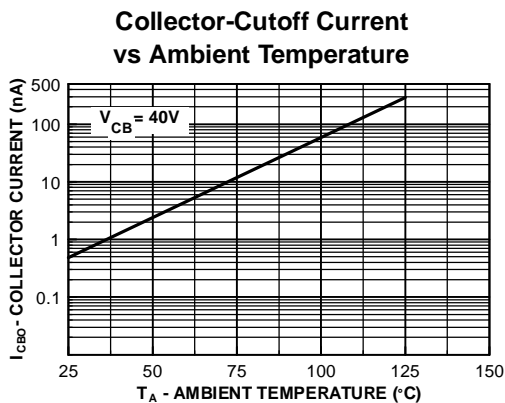
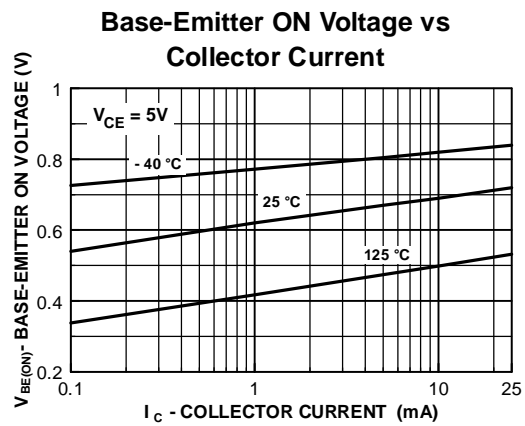
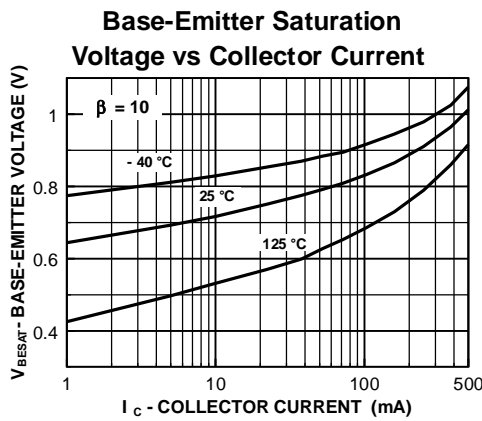
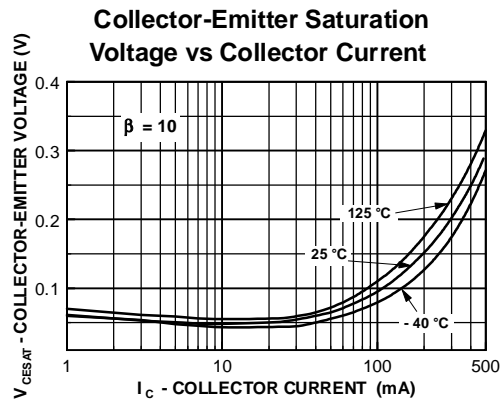
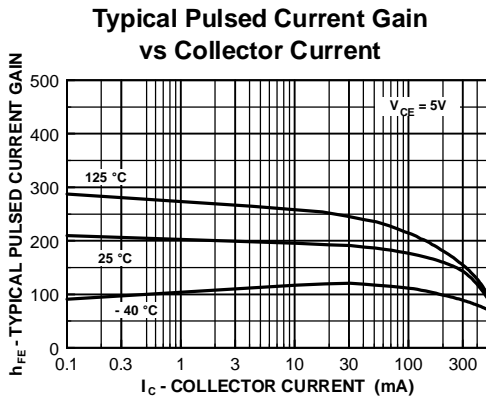
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Symbol	Parameter	Min	Max	Units
ON CHARACTERISTICS				
h_{FE}	DC Current Gain ($V_{CE}=1.0Vdc, I_C=1.0mA$)	40		
	($V_{CE}=1.0Vdc, I_C=10mA$)	40		---
	($V_{CE}=1.0Vdc, I_C=150mA$)	50	150	
	($V_{CE}=2.0Vdc, I_C=500mA$)	20		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage ($I_C=150mA, I_B=15mA$)	---	0.40	Vdc
	($I_C=500mA, I_B=50mA$)	---	0.75	Vdc
$V_{BE(sat)}$	Base-Emitter Saturation Voltage ($I_C=150mA, I_B=15mA$)	0.75	0.95	Vdc
	($I_C=500mA, I_B=50mA$)		1.20	Vdc

SMALL-SIGNAL CHARACTERISTICS				
C_{OB}	Output Capacitance ($V_{CB}=5.0Vdc, f=140KHz$)	---	6.5	pF
C_B	Input Capacitance ($V_{EB}=0.5Vdc, f=140KHz$)	---	30	pF
h_{fe}	Small-Signal Current Gain ($I_C=20mA, V_{CE}=10Vdc, f=100MHz$)	2.0	---	---
h_{fe}	Small-Signal Current Gain ($I_C=1.0mA, V_{CE}=10Vdc, f=1.0KHz$)	150	200	---
h_{ie}	Small-Signal Current Gain ($I_C=1.0mA, V_{CE}=10Vdc, f=1.0KHz$)	0.5	7.5	KOHM
h_{re}	Small-Signal Current Gain ($I_C=1.0mA, V_{CE}=10Vdc, f=1.0KHz$)	0.10	8.0	$\times 10^4$
h_{oe}	Small-Signal Current Gain ($I_C=1.0mA, V_{CE}=10Vdc, f=1.0KHz$)	1.0	30	umhos

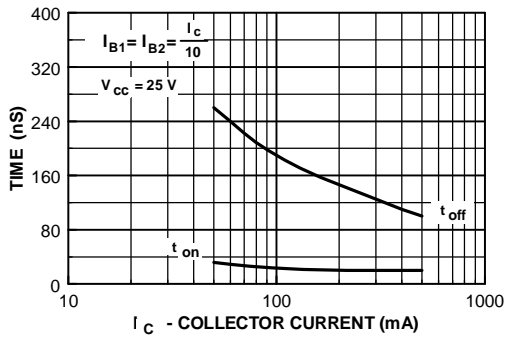
SWITCHING CHARACTERISTICS					
T_d	Delay Time	$V_{CC}=30Vdc, I_C=150mA, I_{B1}=15mA, V_{BE(off)}=2.0Vdc$	---	15	ns
t_r	Rise Time		---	20	ns
t_s	Storage Time	$V_{CC}=30Vdc, I_C=150mA, I_{B1}=I_{B2}=15mA$	---	225	ns
t_f	Fall Time		---	30	ns

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

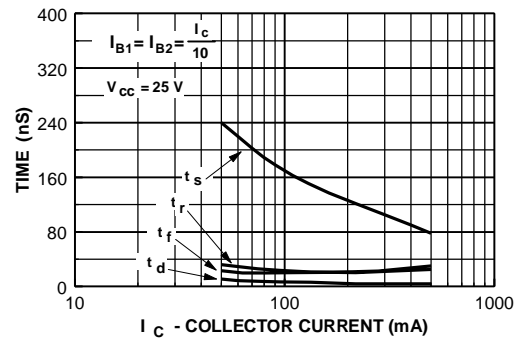


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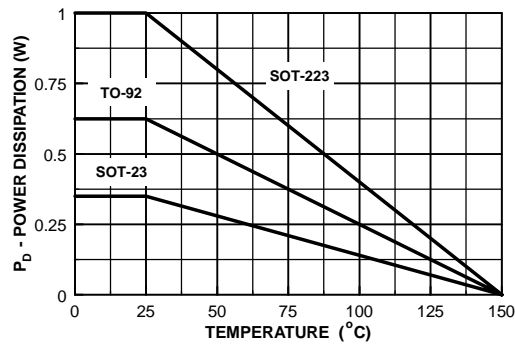
Turn On and Turn Off Times vs Collector Current



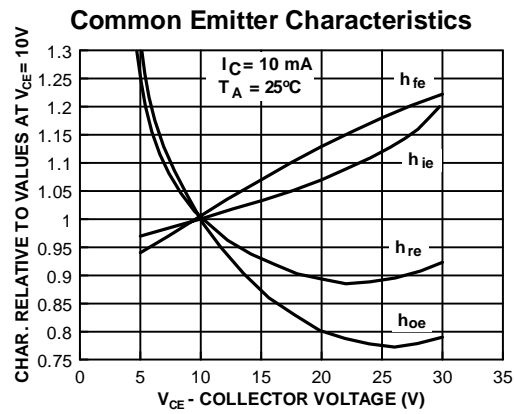
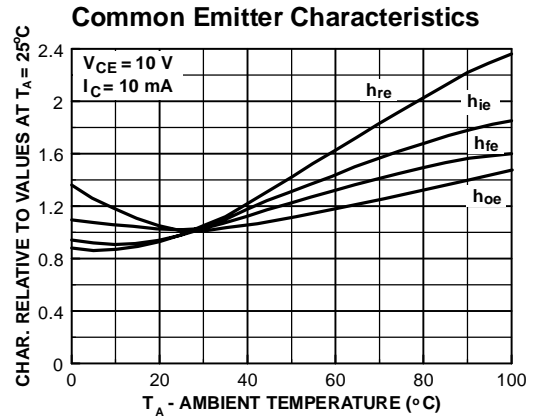
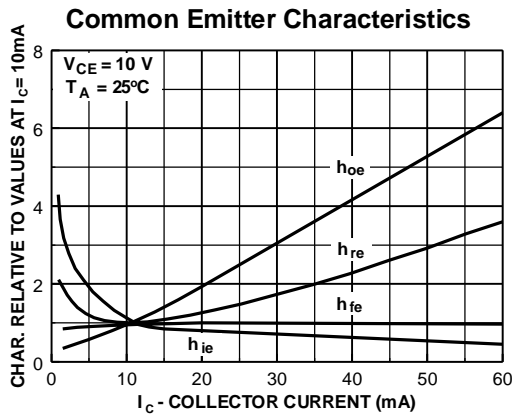
Switching Times vs Collector Current



Power Dissipation vs Ambient Temperature



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Ordering Information :

Device	Packing
Part Number-AP	Ammo Packing: 2Kpcs/Ammo Box
Part Number-BP	Bulk: 100Kpcs/Carton

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