



Micro Commercial Components

Micro Commercial Components  
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**2N3904**

**NPN General Purpose Amplifier**

**Features**

- Through Hole Package
- Capable of 600mWatts of Power Dissipation and 200mA Ic.
- € Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0 and MSL rating 1
- € Marking: Type number
- Lead Free Finish/Rohs Compliant ("P" Suffix designates Compliant. See ordering information)

**Electrical Characteristics @ 25°C Unless Otherwise Specified**

Symbol	Parameter	Min	Max	Units
<b>OFF CHARACTERISTICS</b>				
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage* ( $I_C=1.0mA$ , $I_B=0$ )	40		Vdc
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage ( $I_C=10\mu A$ , $I_E=0$ )	60		Vdc
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage ( $I_E=10\mu A$ , $I_C=0$ )	6.0		Vdc
$I_{BL}$	Base Cutoff Current ( $V_{CE}=30Vdc$ , $V_{BE}=3.0Vdc$ )		50	nAdc
$I_{CEX}$	Collector Cutoff Current ( $V_{CE}=30Vdc$ , $V_{BE}=3.0Vdc$ )		50	nAdc

**ON CHARACTERISTICS**

$h_{FE}$	DC Current Gain* ( $I_C=0.1mA$ , $V_{CE}=1.0Vdc$ ) ( $I_C=1.0mA$ , $V_{CE}=1.0Vdc$ ) ( $I_C=10mA$ , $V_{CE}=1.0Vdc$ ) ( $I_C=50mA$ , $V_{CE}=1.0Vdc$ ) ( $I_C=100mA$ , $V_{CE}=1.0Vdc$ )	40 70 100 60 30	300	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage ( $I_C=10mA$ , $I_B=1.0mA$ ) ( $I_C=50mA$ , $I_B=5.0mA$ )		0.2 0.4	Vdc
$V_{BE(sat)}$	Base-Emitter Saturation Voltage ( $I_C=10mA$ , $I_B=1.0mA$ ) ( $I_C=50mA$ , $I_B=5.0mA$ )	0.65	0.85 0.95	Vdc

**SMALL-SIGNAL CHARACTERISTICS**

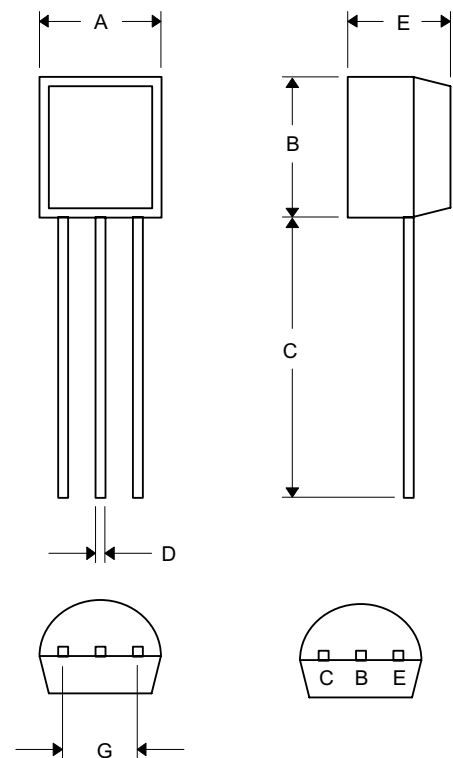
$f_T$	Current Gain-Bandwidth Product ( $I_C=10mA$ , $V_{CE}=20Vdc$ , $f=100MHz$ )	250		MHz
$C_{obo}$	Output Capacitance ( $V_{CB}=5.0Vdc$ , $I_E=0$ , $f=1.0MHz$ )		4.0	pF
$C_{ibo}$	Input Capacitance ( $V_{BE}=0.5Vdc$ , $I_C=0$ , $f=1.0MHz$ )		8.0	pF
NF	Noise Figure ( $I_C=100\mu A$ , $V_{CE}=5.0Vdc$ , $R_S=1.0k\Omega$ , $f=10Hz$ to $15.7kHz$ )		5.0	dB

**SWITCHING CHARACTERISTICS**

$t_d$	Delay Time	( $V_{CC}=3.0Vdc$ , $V_{BE}=0.5Vdc$ )	35	ns
$t_r$	Rise Time	( $I_C=10mA$ , $I_{B1}=1.0mA$ )	35	ns
$t_s$	Storage Time	( $V_{CC}=3.0Vdc$ , $I_C=10mA$ )	200	ns
$t_f$	Fall Time	( $I_{B1}=I_{B2}=1.0mA$ )	50	ns

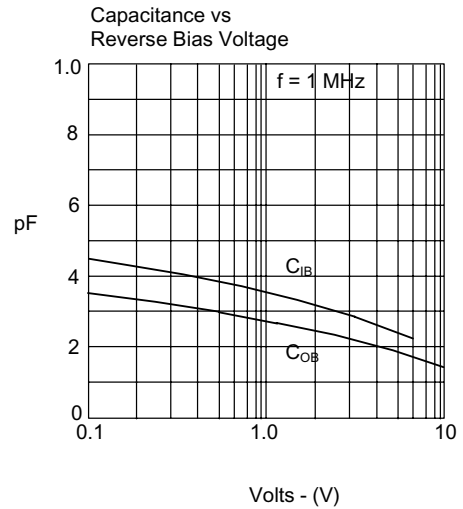
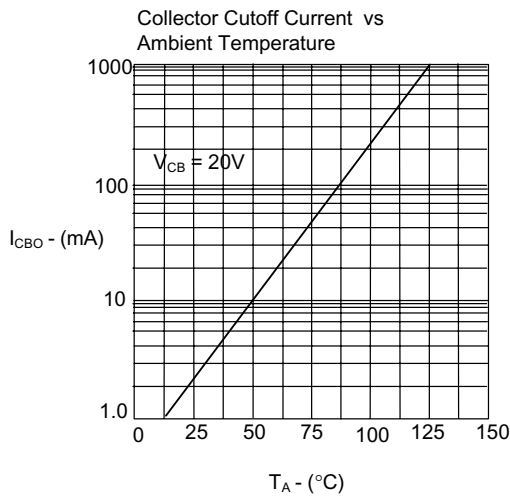
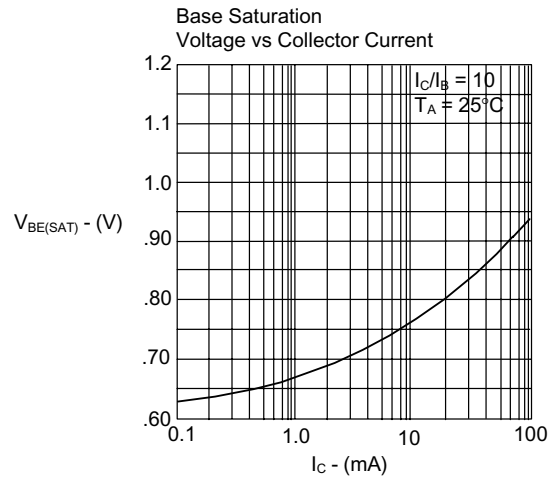
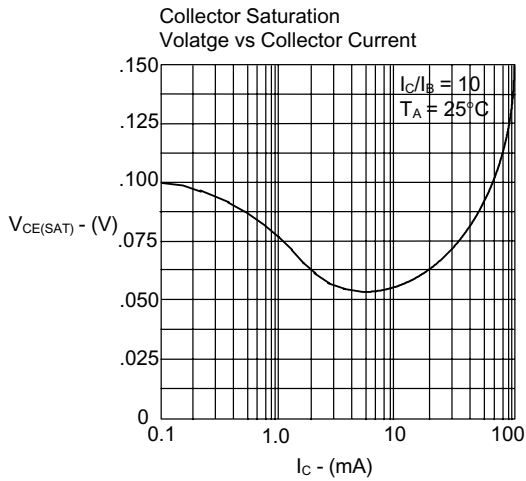
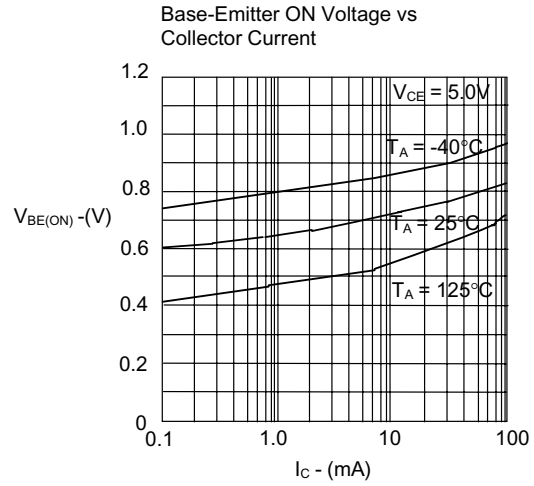
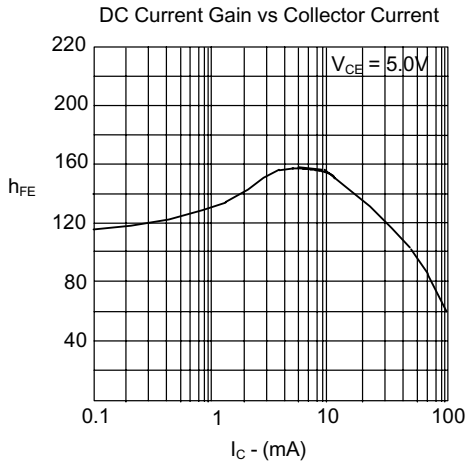
\*Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2.0\%$

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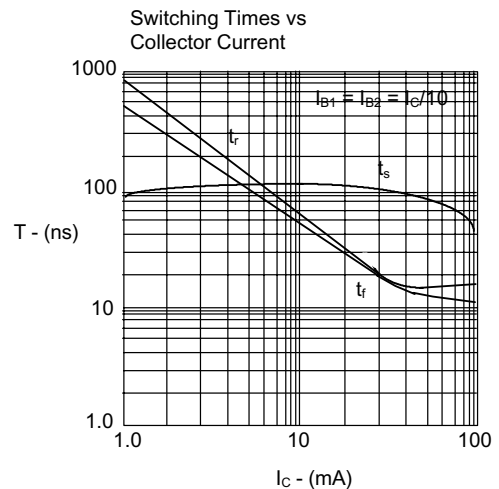
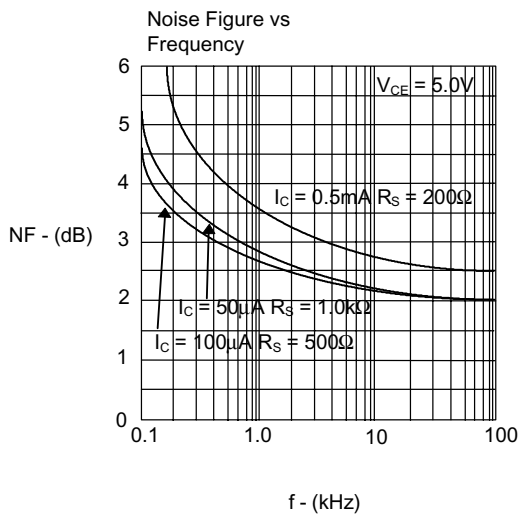
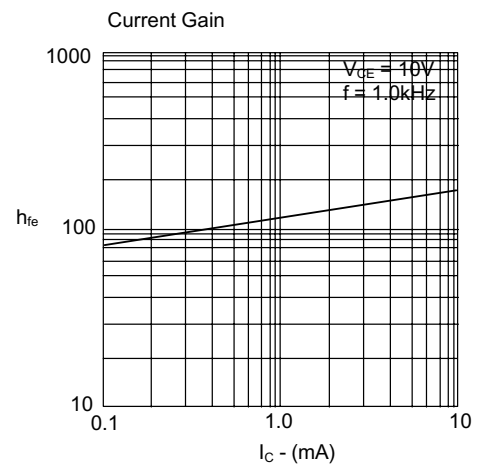
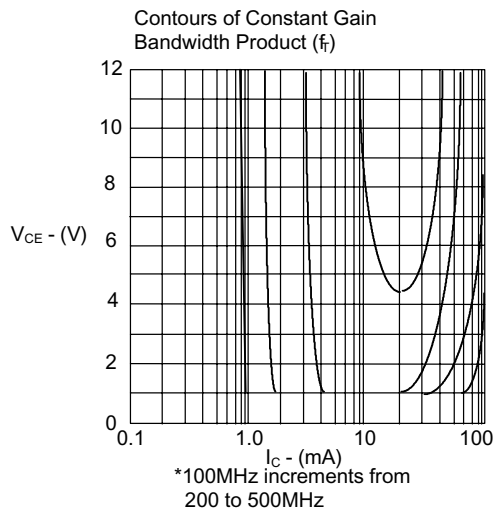
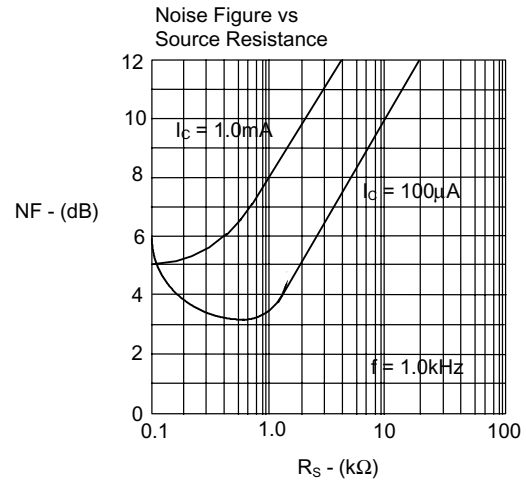
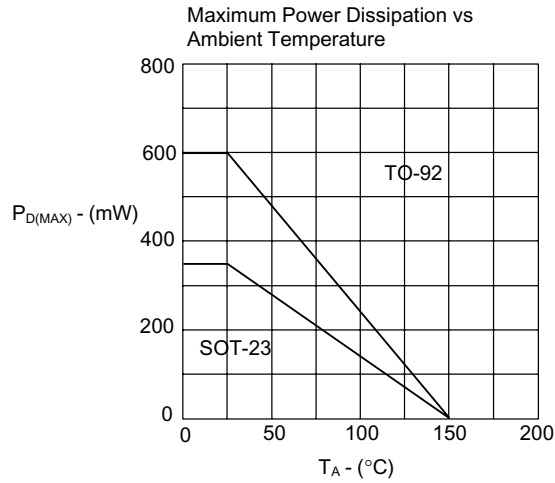


DIM	DIMENSIONS				NOTE
	INCHES		MM		
A	.170	.190	4.33	4.83	
B	.170	.190	4.30	4.83	
C	.550	.590	13.97	14.97	
D	.010	.020	0.36	0.56	
E	.130	.160	3.30	3.96	
G	.010	.104	2.44	2.64	

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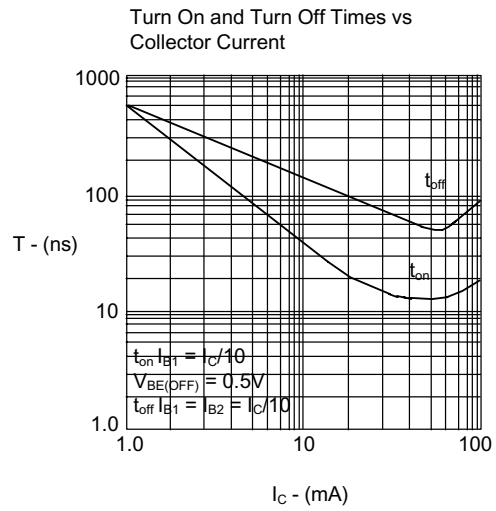
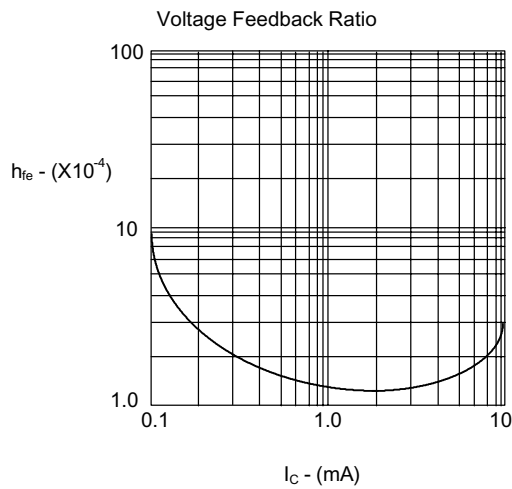
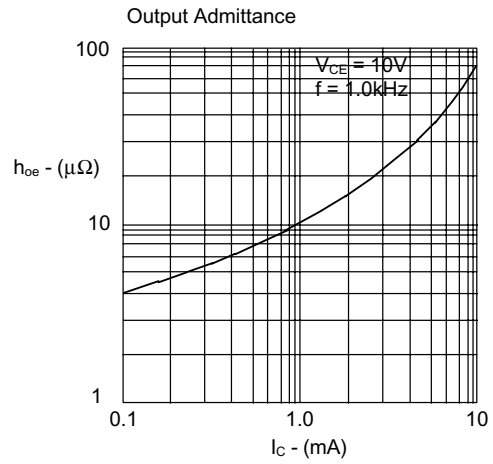
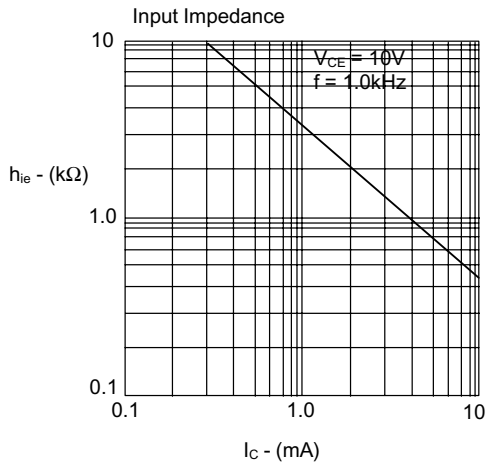
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## Ordering Information

Device	Packing
(Part Number)-AP	Ammo Packing; 2Kpcs/AmmoBox
(Part Number)-BP	Bulk; 1Kpcs/Bag

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