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Part Number	2N3904
product family	TO-92 Plastic-Encapsulate Bipolar Transistors
Product Polarity	NPN
SMD/ThroHole	Through Hole
VCEO	40V
VCBO	60V
VEBO	6.0V
Ic	200mA
PC	600mW
HFE(min)	100
@Ic	10mA
@VCE	1.0V
ICBO	
IEBO	
VCE(sat)	0.3V
VBE(sat)	0.95V
ft	300MHz
nf	
TON_max	
Package Qty	Bulk: 1k/Bag, ,100K/Ctn; T/B: 2K/Ammo Box , 20K/Ctn;

Green/Pb Free/RoHS/REACH

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Micro Commercial Components

2N3904

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)

NPN General Purpose Amplifier

Electrical Characteristics @ 25°C Unless Otherwise Specified

Symbol	Parameter	Min	Max	Units
OFF CHARACTERISTICS				
$V_{(BR)CEO}$	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

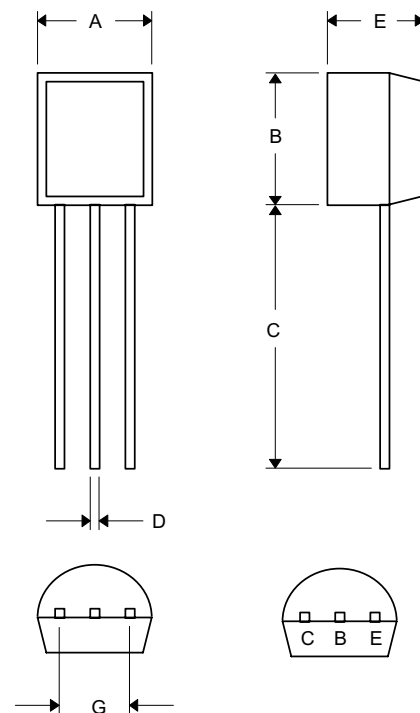
f_T	Current Gain-Bandwidth Product ($I_C=10mA$, $V_{CE}=20Vdc$, $f=100MHz$)	250		MHz
C_{obo}	Output Capacitance ($V_{CE}=5.0Vdc$, $I_E=0$, $f=1.0MHz$)		4.0	pF
C_{ibo}	Input Capacitance ($V_{BE}=0.5Vdc$, $I_C=0$, $f=1.0MHz$)		8.0	pF
NF	Noise Figure ($I_C=100\mu A$, $V_{CE}=5.0Vdc$, $R_S=1.0k\Omega$, $f=10Hz$ 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 $\leq 2.0\%$

TO-92



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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Ordering Information

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