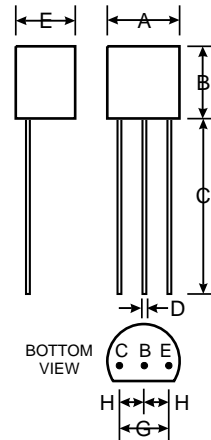




Features

Epitaxial Planar Die Construction
Available in both Through-Hole and Surface Mount Packages
Ideal for Switching and Amplifier Applications
Complementary PNP Type Available (2N3906)



TO-92		
Dim	Min	Max
A	4.32	4.83
B	4.32	4.78
C	12.50	15.62
D	0.36	0.56
E	3.15	3.94
G	2.29	2.79
H	1.14	1.40
All Dimensions in mm		

Mechanical Data

Case: TO-92, Plastic
Leads: Solderable per MIL-STD-202, Method 208
Terminal Connections: See Diagram
Marking: Type Number
Weight: 0.18 grams (approx.)

Maximum Ratings @ T_A = 25 C unless otherwise specified

Characteristic	Symbol	2N3904	Unit
Collector-Base Voltage	V _{CB0}	60	V
Collector-Emitter Voltage	V _{CE0}	40	V
Emitter-Base Voltage	V _{EB0}	5.0	V
Collector Current - Continuous	I _C	100	mA
Collector Current - Peak	I _{CM}	200	mA
Power Dissipation (Note 1)	P _d	500	mW
Thermal Resistance, Junction to Ambient (Note 1)	R _{JA}	250	K/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	C

Notes: 1. Leads maintained at a distance of 2.0mm from body at specified ambient temperature.
2. Pulse test: Pulse width 300 μs, duty cycle 2%.

Electrical Characteristics @ $T_A = 25\text{ C}$ unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
DC Current Gain	h_{FE}	50 70 100 60 30	300		- $V_{CE} = 1.0V, -I_C = 0.1mA$ - $V_{CE} = 1.0V, -I_C = 1.0mA$ - $V_{CE} = 1.0V, -I_C = 10mA$ - $V_{CE} = 1.0V, -I_C = 50mA$ - $V_{CE} = 1.0V, -I_C = 100mA$
Collector Saturation Voltage	$V_{CE(SAT)}$		0.25 0.40	V	(Note 2) - $I_C = 10mA, -I_B = 1.0mA$ - $I_C = 50mA, -I_B = 5.0mA$
Base Saturation Voltage	$V_{BE(SAT)}$		0.85 0.95	V	(Note 2) - $I_C = 10mA, -I_B = 1.0mA$ - $I_C = 50mA, -I_B = 5.0mA$
Collector Cutoff Current	I_{CEX}		50	nA	- $V_{EB} = 3.0V, -V_{CE} = 30V$
Emitter Cutoff Current	I_{BL}		50	nA	- $V_{EB} = 3.0V, -V_{CE} = 30V$
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	60	—	V	- $I_C = 10\mu A, -I_B = 0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	40	—	V	- $I_C = 1.0mA, -I_E = 0$ (Note 2)
Emitter-base Breakdown voltage	$V_{(BR)EBO}$	5.0	—	V	- $I_E = 10\mu A, -I_C = 0$
Gain Bandwidth Product	f_T	250	—	MHz	$V_{CE} = 20V, -I_C = 10mA,$ $-f = 100MHz$
Collector-Base Capacitance	C_{CBO}		4.5	pF	- $V_{CB} = 5.0V, -I_E = 0, f = 100kHz$
Emitter-Base Capacitance	C_{EBO}		10	pF	- $V_{EB} = 0.5V, -I_C = 0, f = 100kHz$
Noise Figure			5.0	dB	- $V_{CE} = 5.0V, -I_C = 100\text{ A},$ $R_G = 1.0k, -f = 10\text{ to }15000Hz$
Delay Time	t_d		35	ns	- $I_{B1} = 1.0mA, -I_C = 10mA,$ $V_{CC} = 3.0V, V_{BE(off)} = 0.5V$
Rise Time	t_r		35	ns	- $I_{B1} = 1.0mA, -I_C = 10mA,$ $-V_{CC} = 3.0V, -V_{BE(off)} = 0.5V$
Storage Time	t_s		225	ns	- $I_{B1} = -I_{B2} = 1.0mA,$ $-I_C = 10mA, -V_{CC} = 3.0V$
Fall Time	t_f		75	ns	- $I_{B1} = -I_{B2} = 1.0mA,$ $-I_C = 10mA, -V_{CC} = 3.0V$

- Notes: 1. Leads maintained at a distance of 2.0mm from body at specified ambient temperature.
2. Pulse test: Pulse width 300 μs , duty cycle 2%.