

TO-92 Plastic-Encapsulate Transistors

2N3904 TRANSISTOR (NPN)

FEATURE

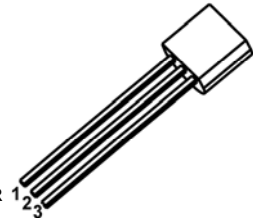
- NPN silicon epitaxial planar transistor for switching and Amplifier applications
- As complementary type, the PNP transistor 2N3906 is Recommended
- This transistor is also available in the SOT-23 case with the type designation MMBT3904

TO-92

1. EMITTER

2. BASE

3. COLLECTOR



MAXIMUM RATINGS (T_a=25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
V _{CBO}	Collector-Base Voltage	60	V
V _{CEO}	Collector-Emitter Voltage	40	V
V _{EBO}	Emitter-Base Voltage	6	V
I _C	Collector Current -Continuous	0.2	A
P _C	Collector Power Dissipation	0.625	W
T _J	Junction Temperature	150	°C
T _{stg}	Storage Temperature	-55-150	°C

ELECTRICAL CHARACTERISTICS (T_a=25°C unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	V _{(BR)CBO}	I _C =10μA, I _E =0	60			V
Collector-emitter breakdown voltage	V _{(BR)CEO}	I _C = 1mA, I _B =0	40			V
Emitter-base breakdown voltage	V _{(BR)EBO}	I _E = 10μA, I _C =0	6			V
Collector cut-off current	I _{CBO}	V _{CB} =60V, I _E =0			0.1	μA
Collector cut-off current	I _{CEO}	V _{CE} = 40V, I _B =0			0.1	μA
Emitter cut-off current	I _{EBO}	V _{EB} = 5V, I _C =0			0.1	μA
DC current gain	h _{FE1}	V _{CE} =1V, I _C =10mA	100		400	
	h _{FE2}	V _{CE} =1V, I _C =50mA	60			
	h _{FE3}	V _{CE} =1V, I _C =100mA	30			
Collector-emitter saturation voltage	V _{CE(sat)}	I _C =50mA, I _B =5mA			0.3	V
Base-emitter saturation voltage	V _{BE(sat)}	I _C =50mA, I _B =5mA			0.95	V
Transition frequency	f _T	V _{CE} =20V, I _C =10mA, f=100MHz	300			MHz
Delay Time	t _d	V _{CC} =3V, V _{BE} =0.5V, I _C =10mA, I _{B1} =1mA			35	ns
Rise Time	t _r				35	ns
Storage Time	t _s	V _{CC} =3V, I _C =10mA			200	ns
Fall Time	t _f	I _{B1} =I _{B2} =1mA			50	ns

CLASSIFICATION OF h_{FE1}

Rank	O	Y	G
Range	100-200	200-300	300-400

Typical Characteristics

2N3904

