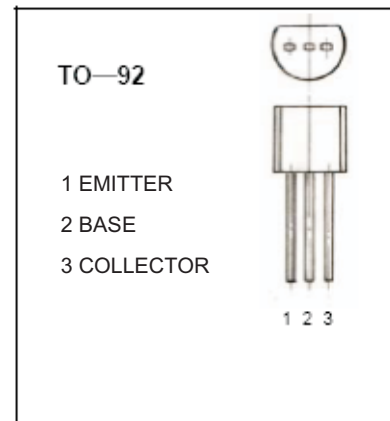


NPN Transistors

2N3904

■ Features

- NPN silicon epitaxial planar transistor for switching and Amplifier applications



■ Absolute Maximum Ratings Ta = 25°C

Parameter	Symbol	Rating	Unit
Collector - Base Voltage	V _{CB0}	60	V
Collector - Emitter Voltage	V _{CE0}	40	V
Emitter - Base Voltage	V _{EB0}	6	V
Collector Current - Continuous	I _c	0.2	A
Collector Power Dissipation	P _c	0.625	W
Junction Temperature	T _J	150	°C
Storage Temperature	T _{stg}	-55 to 150	°C

■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Testconditions	Min	Typ	Max	Unit
Collector- base breakdown voltage	V _{CB0}	I _c = 100 μA, I _E =0	60			V
Collector- emitter breakdown voltage	V _{CE0}	I _c = 1 mA, I _B =0	40			V
Emitter - base breakdown voltage	V _{EB0}	I _E = 10 μA, I _c =0	6			V
Collector cut-off current	I _{cBO}	V _{CB} = 60 V, I _E =0			0.1	μA
Collector cut-off current	I _{CE0}	V _{CE} = 40 V, I _B =0			0.1	μA
Emitter cut-off current	I _{EB0}	V _{EB} = 5V, I _c =0			0.1	μA
DC current gain	h _{FE}	V _{CE} = 1V, I _c = 10mA	100		300	
		V _{CE} = 1V, I _c = 50mA	60			
		V _{CE} = 1V, I _c = 100mA	30			
Collector-emitter saturation voltage	V _{CE(sat)}	I _c =50 mA, I _B = 5mA			0.3	V
Base - emitter saturation voltage	V _{BE(sat)}	I _c = 50 mA, I _B = 5mA			0.95	V
Delay time	t _d	V _{CC} =3.0V, V _{BE} =-0.5V			35	ns
Rise time	t _r	I _c =10mA, I _{B1} =-I _{B2} =1.0mA			35	
Storage time	t _s	V _{CC} =3.0V, I _c =10mA			200	ns
Fall time	t _f	I _{B1} =-I _{B2} =1.0mA			50	
Transition frequency	f _T	V _{CE} = 20V, I _c = 10mA, f=100MHz	300			MHz