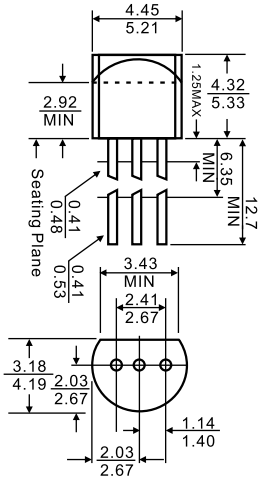
2N3904(NPN)

TO-92 Bipolar Transistors

RoHS COMPLIANT

1. EMITTER
2. BASE
3. COLLECTOR

TO-92



Dimensions in inches and (millimeters)

Features

- ✧ 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

MAXIMUM RATINGS (T_A=25℃ unless otherwise noted)

Symbol	Parameter	Value	Units
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	℃
T_{stg}	Storage Temperature	-55-150	℃

ELECTRICAL CHARACTERISTICS (Tamb=25℃ unless otherwise specified)

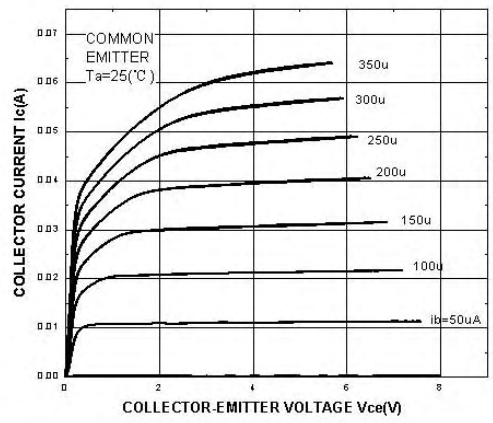
Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Collector-base breakdown voltage	$V_{(BR)CBO}$	I_C=10μA, I_E=0	60			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	I_C= 1mA , I_B=0	40			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	I_E= 10μA, I_C=0	6			V
Collector cut-off current	I_{CBO}	V_{CB}=60V, 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			MH_Z
Delay Time	t_d	V_{CC}=3V,V_{BE}=0.5V,			35	ns
Rise Time	t_r	I_C=10mA,I_{B1}=1mA			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}

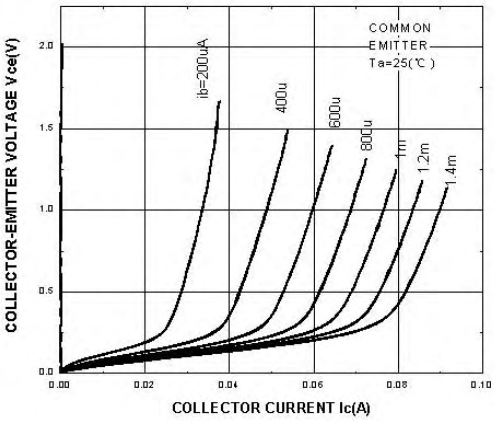
Rank	O	Y	G
Range	100-200	200-300	300-400

Typical Characteristics

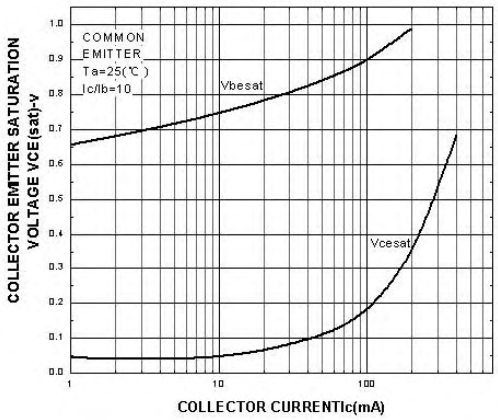
Ic-Vce



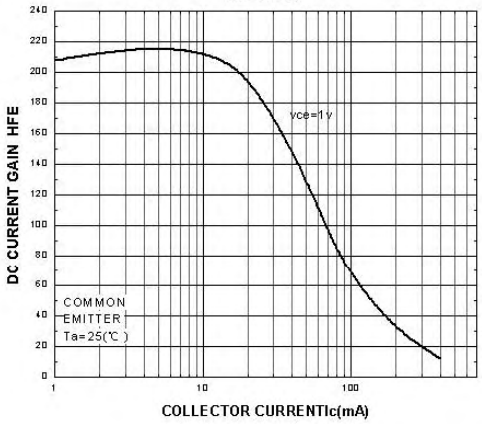
Vce-Ic



Vcesat-Ic
Vbesat-Ic



hFE-Ic



Pc-Ta