

MMBT3904T TRANSISTOR (NPN)

FEATURES

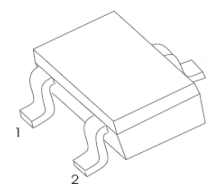
Complementary Type The PNP Transistor MMBT3906T is Recommended
Epitaxial Planar Die Construction

MARKING: 1N

MAXIMUM RATINGS ($T_a=25^{\circ}\text{C}$ 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	200	mA
P_C	Total Device Dissipation	150	mW
$R_{\theta JA}$	Thermal Resistance From Junction to Ambient	833	$^{\circ}\text{C/W}$
T_J	Junction Temperature	-55 ~ +150	$^{\circ}\text{C}$
T_{stg}	Storage Temperature	-55 ~ +150	$^{\circ}\text{C}$

SOT-523

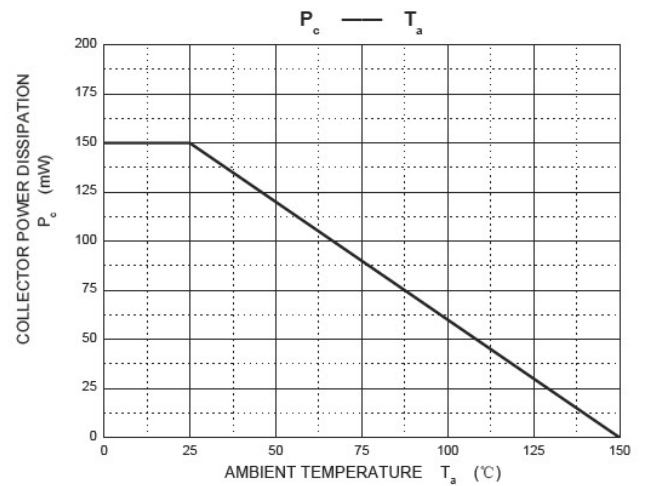
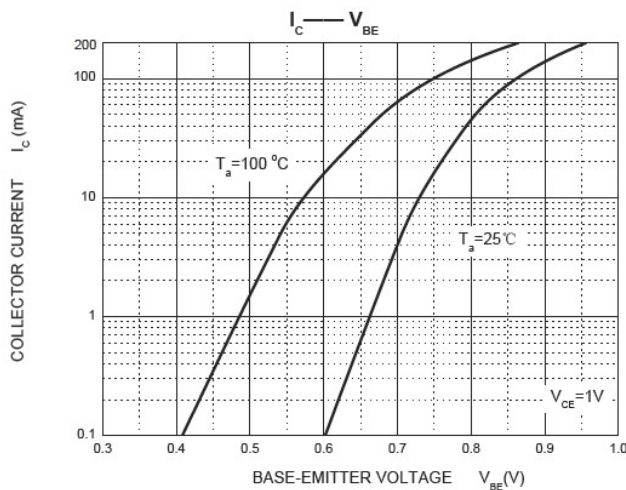
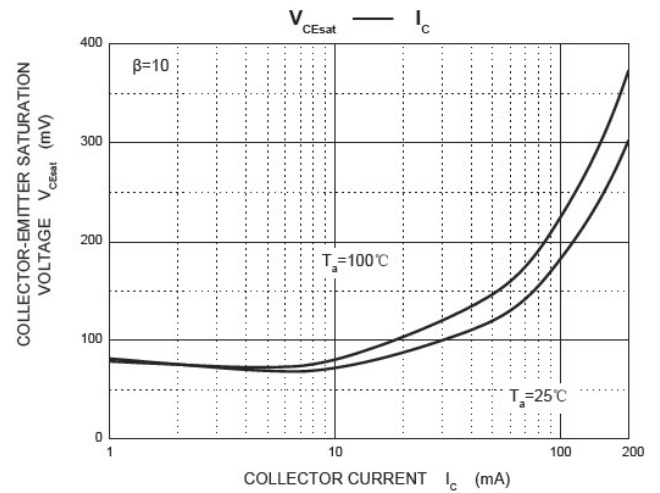
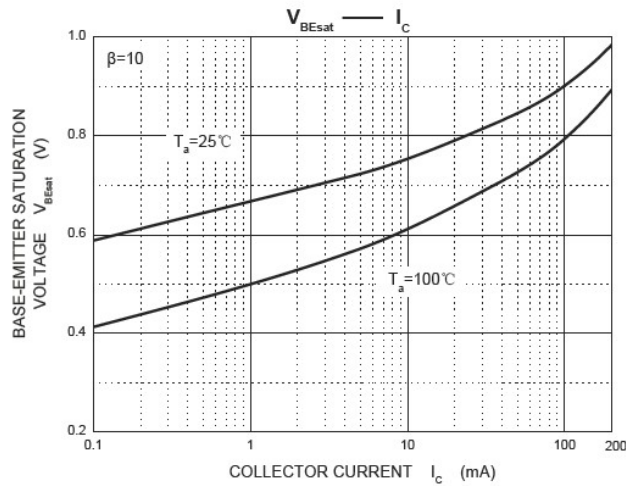
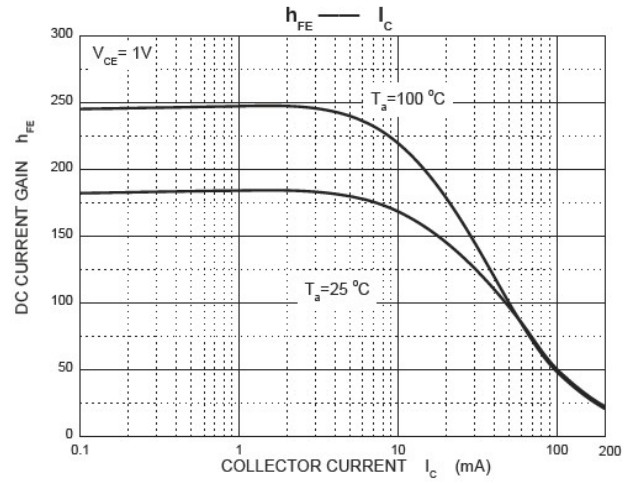
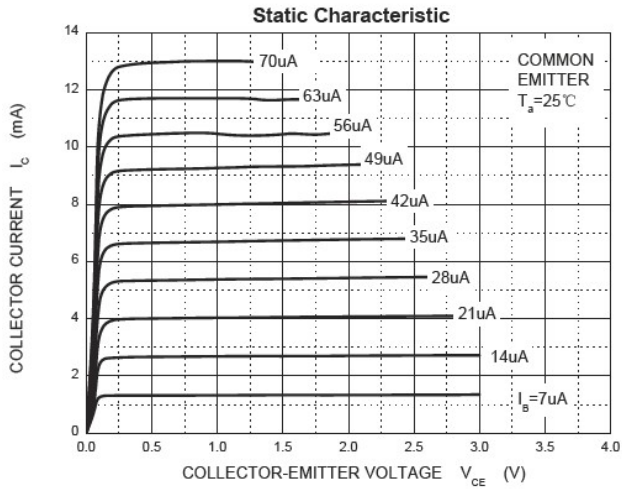


1. BASE
2. EMITTER
3. COLLECTOR

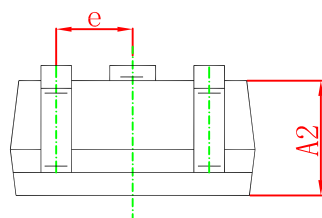
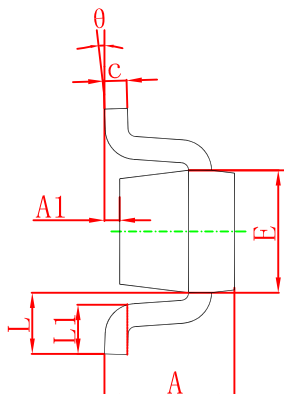
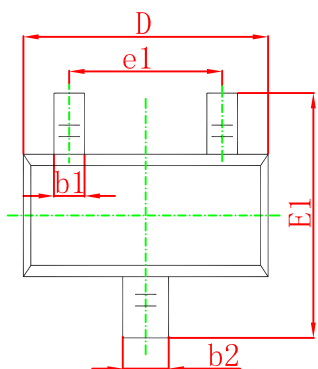
ELECTRICAL CHARACTERISTICS ($T_a=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C=10\mu\text{A}$, $I_E=0$	60			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C=1\text{mA}$, $I_B=0$	40			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=10\mu\text{A}$, $I_C=0$	6			V
Collector cut-off current	I_{CEX}	$V_{CE}=30\text{V}$, $V_{EB(off)}=3\text{V}$			50	nA
Emitter cut-off current	I_{EBO}	$V_{EB}=5\text{V}$, $I_C=0$			100	nA
DC current gain	$h_{FE(1)}$	$V_{CE}=1\text{V}$, $I_C=0.1\text{mA}$	40			
	$h_{FE(2)}$	$V_{CE}=1\text{V}$, $I_C=1\text{mA}$	70			
	$h_{FE(3)}$	$V_{CE}=1\text{V}$, $I_C=10\text{mA}$	100		300	
	$h_{FE(4)}$	$V_{CE}=1\text{V}$, $I_C=50\text{mA}$	60			
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=10\text{mA}$, $I_B=1\text{mA}$			0.2	V
		$I_C=50\text{mA}$, $I_B=5\text{mA}$			0.3	V
Collector-emitter saturation voltage	$V_{BE(sat)}$	$I_C=10\text{mA}$, $I_B=1\text{mA}$	0.65		0.85	V
		$I_C=50\text{mA}$, $I_B=5\text{mA}$			0.95	V
Transition frequency	f_T	$V_{CE}=20\text{V}$, $I_C=10\text{mA}$, $f=100\text{MHz}$	300			MHz
Collector output capacitance	C_{ob}	$V_{CB}=5\text{V}$, $I_E=0$, $f=1\text{MHz}$			4	pF
Base input capacitance	C_{ib}	$V_{EB}=0.5\text{V}$, $I_C=0$, $f=1\text{MHz}$			8	pF
Delay time	t_d	$V_{CC}=3\text{V}$, $V_{BE(off)}=-0.5\text{V}$, $I_C=10\text{mA}$, $I_{B1}=1\text{mA}$			35	ns
Rise time	t_r	$V_{CC}=3\text{V}$, $V_{BE(off)}=-0.5\text{V}$, $I_C=10\text{mA}$, $I_{B1}=1\text{mA}$			35	ns
Storage time	t_s	$V_{CC}=3\text{V}$, $I_C=10\text{mA}$, $I_{B1}=I_{B2}=1\text{mA}$			200	ns
Fall time	t_f	$V_{CC}=3\text{V}$, $I_C=10\text{mA}$, $I_{B1}=I_{B2}=1\text{mA}$			50	ns

Typical Characteristics



SOT-523 PACKAGE OUTLINE Plastic surface mounted package



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.650	0.950	0.026	0.037
A1	0.000	0.100	0.000	0.004
A2	0.650	0.850	0.026	0.033
b1	0.150	0.250	0.006	0.010
b2	0.250	0.350	0.010	0.014
c	0.050	0.200	0.002	0.008
D	1.500	1.700	0.059	0.067
E	0.700	0.900	0.028	0.035
E1	1.450	1.750	0.057	0.069
e	0.500 TYP.		0.020 TYP.	
e1	0.900	1.100	0.035	0.043
L	0.400 REF.		0.016 REF.	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°