MMBT3906

SOT-23 Plastic-Encapsulate Transistors

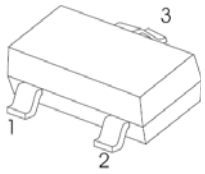
TRANSISTOR (PNP)

FEATURES

- As complementary type, the NPN transistor MMBT3904 is Recommended
- Epitaxial planar die construction

MARKING: 2A

SOT－23



1. BASE

2. EMITTER

3. COLLECTOR

MAXIMUM RATINGS (T_A=25 ℃unless otherwise noted)

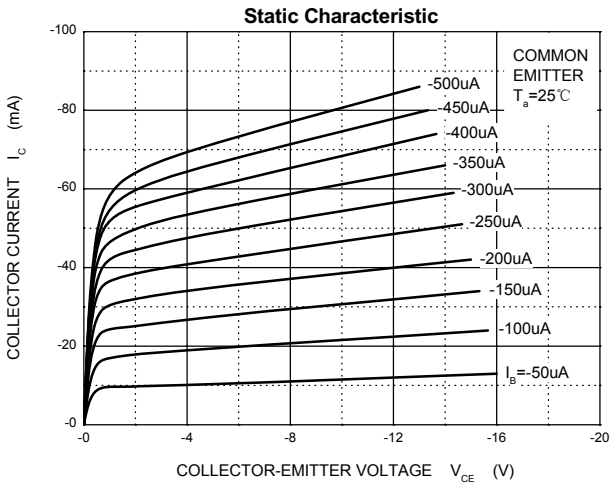
Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	-40	V
V_{CEO}	Collector-Emitter Voltage	-40	V
V_{EBO}	Emitter-Base Voltage	-5	V
I_C	Collector Current -Continuous	-0.2	A
P_C	Collector Dissipation	0.2	W
$R_{\theta JA}$	Thermal resistance junction to ambient	625	℃/W
T_J	Junction Temperature	150	℃
T_{stg}	Storage Temperature	-55~+150	℃

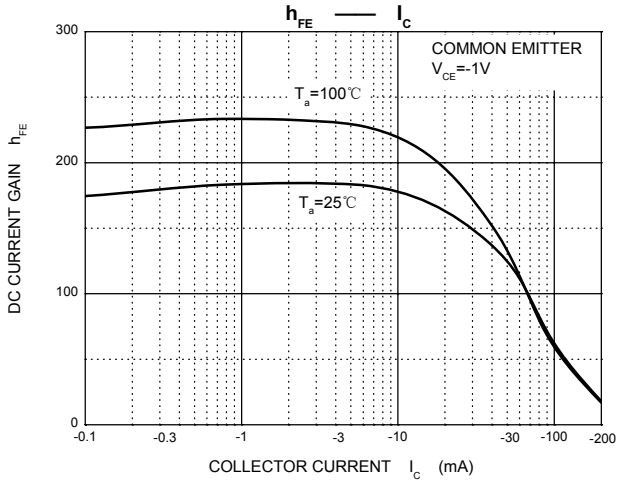
ELECTRICAL CHARACTERISTICS (Tamb=25℃ unless otherwise specified)

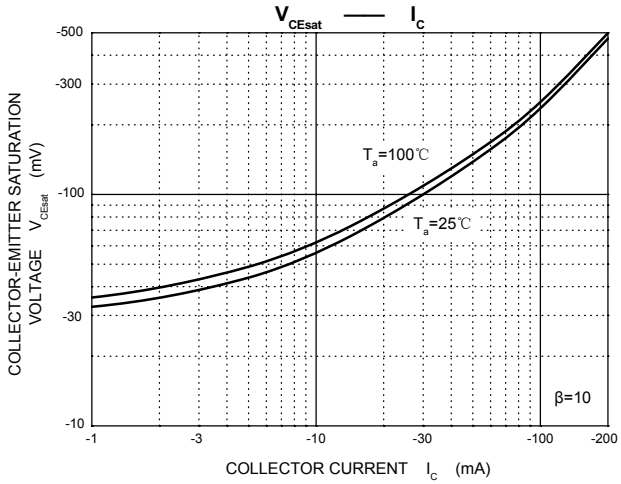
Parameter	Symbol	Test conditions	MIN	MAX	UNIT
Collector-base breakdown voltage	$V_{(BR)CBO}$	I_C=-10μA, I_E=0	-40		V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	I_C= -1mA, I_B=0	-40		V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	I_E= -10μA, I_C=0	-5		V
Collector cut-off current	I_{CBO}	V_{CB}= -40 V, I_E=0		-100	nA
Collector cut-off current	I_{CEX}	V_{CE}=-30V, $V_{BE(off)}$=-3V		-50	nA
Emitter cut-off current	I_{EBO}	V_{EB}= -5V, I_C=0		-100	nA
DC current gain	h_{FE1}	V_{CE}=-1V, I_C= -10mA	100	300	
	h_{FE2}	V_{CE}= -1V, I_C=-50mA	60		
	h_{FE3}	V_{CE}= -2V, I_C=-100mA	30		
Collector-emitter saturation voltage	$V_{CE(sat)1}$	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	td	V_{CC}=-3V,V_{BE}=-0.5V I_C=-10mA, I_{B1}=I_{B2}=-1mA		35	nS
Rise Time	tr			35	nS
Storage Time	ts	V_{CC}=-3V,I_C=-10mA I_{B1}=I_{B2}=-1mA		225	nS
Fall Time	tf			75	nS

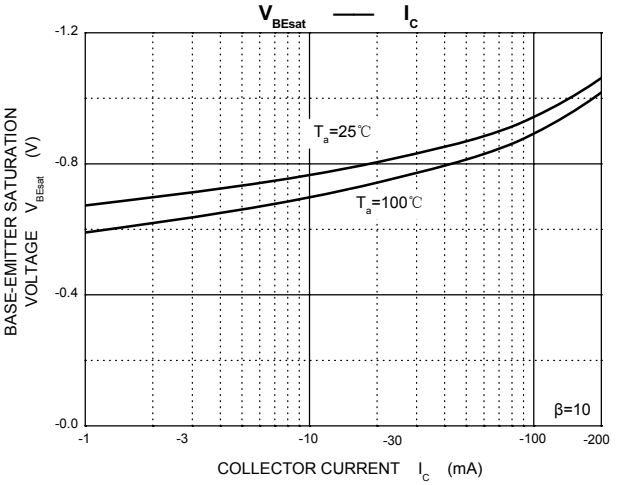
CLASSIFICATION OF $h_{FE(1)}$

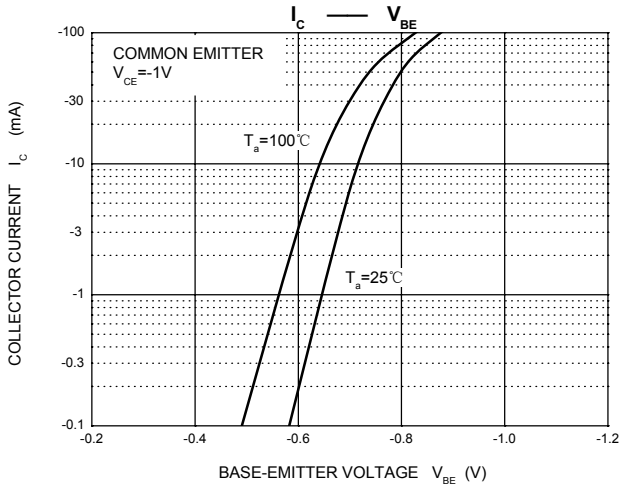
HFE 100-	300	
RANK	**L**	**H**
RANGE	100－200	200－300

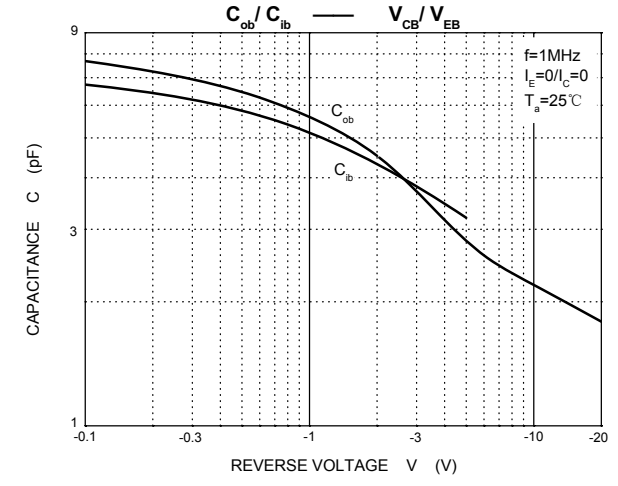

Static Characteristic
COMMON EMITTER
T_a=25℃
-500uA
-450uA
-400uA
-350uA
-300uA
-250uA
-200uA
-150uA
-100uA
I_B=-50uA
COLLECTOR CURRENT I_C (mA)
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)

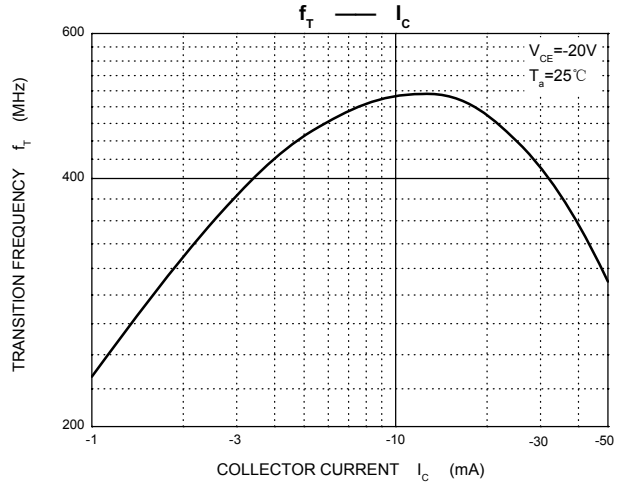

h_{FE} —— I_C
COMMON EMITTER
V_{CE}=-1V
T_a=100℃
T_a=25℃
DC CURRENT GAIN h_{FE}
COLLECTOR CURRENT I_C (mA)

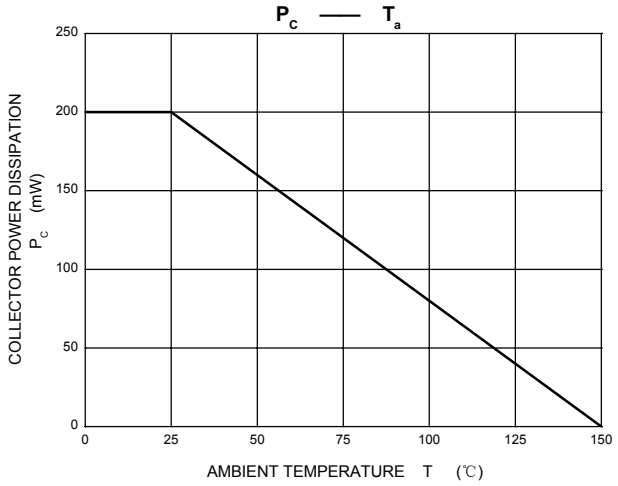

V_{CEsat} —— I_C
T_a=100℃
T_a=25℃
β=10
COLLECTOR-EMITTER SATURATION VOLTAGE V_{CEsat} (mV)
COLLECTOR CURRENT I_C (mA)


V_{BEsat} —— I_C
T_a=25℃
T_a=100℃
β=10
BASE-EMITTER SATURATION VOLTAGE V_{BEsat} (V)
COLLECTOR CURRENT I_C (mA)


I_C —— V_{BE}
COMMON EMITTER
V_{CE}=-1V
T_a=100℃
T_a=25℃
COLLECTOR CURRENT I_C (mA)
BASE-EMITTER VOLTAGE V_{BE} (V)


C_{ob}/ C_{ib} —— V_{CB}/ V_{EB}
f=1MHz
I_E=0/I_C=0
T_a=25℃
C_{ob}
C_{ib}
CAPACITANCE C (pF)
REVERSE VOLTAGE V (V)


f_T —— I_C
V_{CE}=-20V
T_a=25℃
TRANSITION FREQUENCY f_T (MHz)
COLLECTOR CURRENT I_C (mA)


P_C —— T_a
COLLECTOR POWER DISSIPATION P_C (mW)
AMBIENT TEMPERATURE T (℃)

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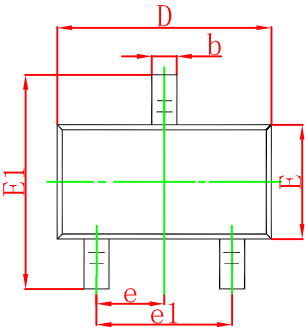
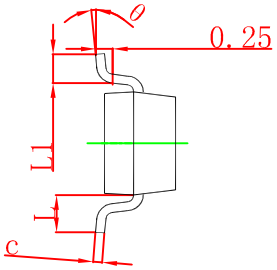
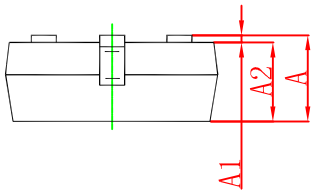
SOT-23 Package Outline Dimensions

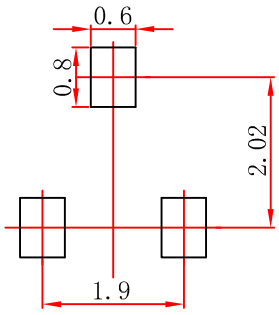






Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

SOT-23 Suggested Pad Layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.

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