



**WBFBP-03B Plastic-Encapsulate Transistors**

**MMBT3906M TRANSISTOR**

**DESCRIPTION**

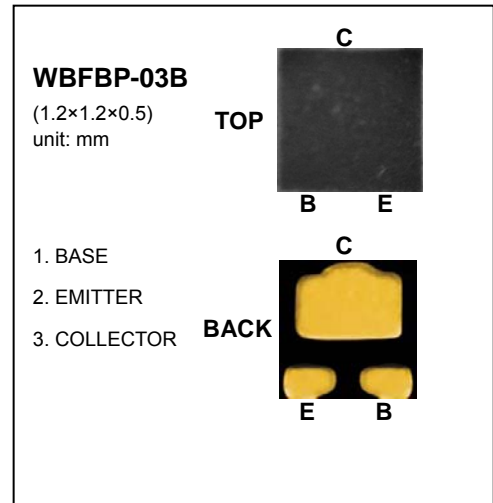
PNP Epitaxial Silicon Transistor

**FEATURES**

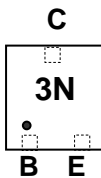
- Epitaxial Planar Die Construction
- Complementary NPN Type Available (MMBT3904M)
- Ultra-Small Surface Mount Package
- Also Available in Lead Free Version

**APPLICATION**

General Purpose Amplifier, switching  
 For portable equipment:(i.e. Mobile phone,MP3, MD,CD-ROM, DVD-ROM, Note book PC, etc.)



**MARKING:3N**



**MAXIMUM RATINGS\* T<sub>A</sub>=25°C unless otherwise noted**

Symbol	Parameter	Value	Units
V <sub>CB0</sub>	Collector-Base Voltage	-40	V
V <sub>CE0</sub>	Collector-Emitter Voltage	-40	V
V <sub>EB0</sub>	Emitter-Base Voltage	-5	V
I <sub>C</sub>	Collector Current -Continuous	-200	mA
P <sub>D</sub>	Power Dissipation	150	mW
R <sub>θJA</sub>	Thermal Resistance, Junction to Ambient	833	°C/W
T <sub>J</sub>	Operating Temperature	150	°C
T <sub>stg</sub>	Storage and Temperature	-55-150	°C

**ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C unless otherwise specified)**

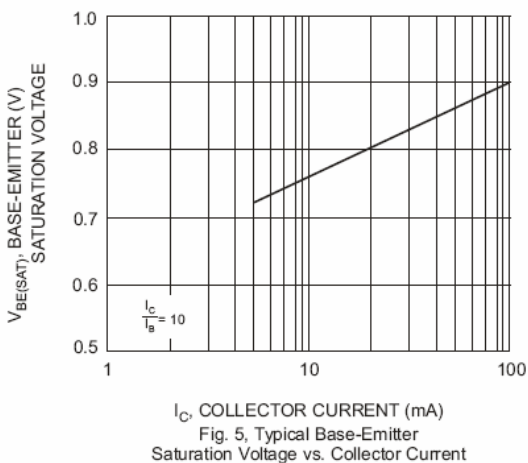
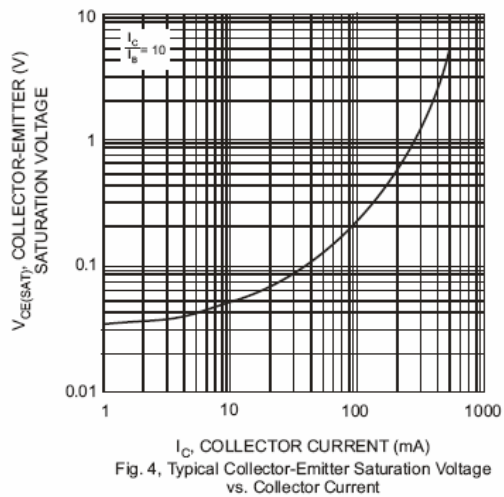
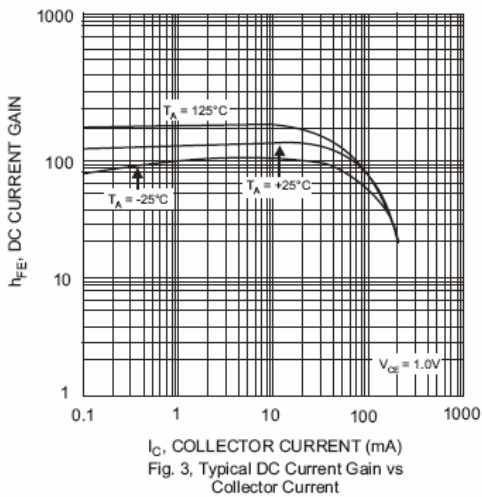
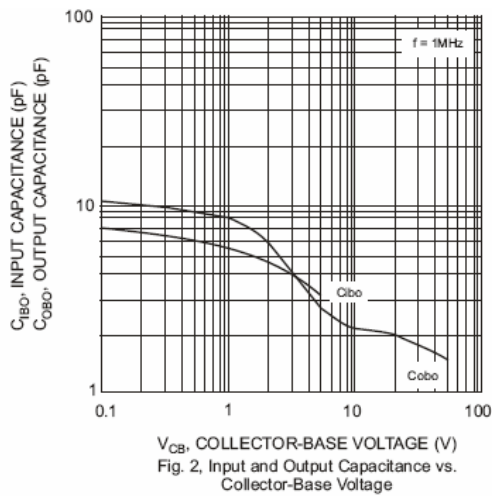
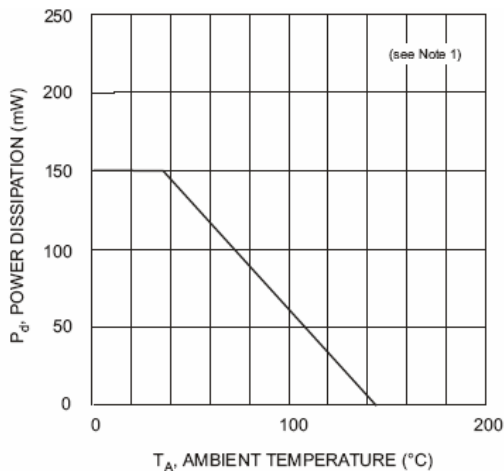
Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Collector-base breakdown voltage	V <sub>(BR)CBO</sub>	I <sub>C</sub> =-10μA, I <sub>E</sub> =0	-40			V
Collector-emitter breakdown voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> =-1mA, I <sub>B</sub> =0	-40			V
Emitter-base breakdown voltage	V <sub>(BR)EBO</sub>	I <sub>E</sub> =-10μA, I <sub>C</sub> =0	-5			V
Collector cut-off current	I <sub>CEX</sub>	V <sub>CE</sub> =-30V, V <sub>EB(off)</sub> =-3V			-0.05	μA
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> =-5V, I <sub>C</sub> =0			-0.1	μA
DC current gain	h <sub>FE(1)</sub>	V <sub>CE</sub> =-1V, I <sub>C</sub> =-0.1mA	60			
	h <sub>FE(2)</sub>	V <sub>CE</sub> =-1V, I <sub>C</sub> =-1mA	80			
	h <sub>FE(3)</sub>	V <sub>CE</sub> =-1V, I <sub>C</sub> =-10mA	100		300	
	h <sub>FE(4)</sub>	V <sub>CE</sub> =-1V, I <sub>C</sub> =-50mA	60			
	h <sub>FE(5)</sub>	V <sub>CE</sub> =-1V, I <sub>C</sub> =-100mA	30			
Collector-emitter saturation voltage	V <sub>CE(sat)1</sub>	I <sub>C</sub> =-10mA, I <sub>B</sub> =-1mA			-0.25	V
	V <sub>CE(sat)2</sub>	I <sub>C</sub> =-50mA, I <sub>B</sub> =-5mA			-0.4	V
Base-emitter saturation voltage	V <sub>BE(sat)1</sub>	I <sub>C</sub> =-10mA, I <sub>B</sub> =-1mA	-0.65		-0.85	V
	V <sub>BE(sat)2</sub>	I <sub>C</sub> =-50mA, I <sub>B</sub> =-5mA			-0.95	V
Transition frequency	f <sub>T</sub>	V <sub>CE</sub> =-20V, I <sub>C</sub> =-10mA, f=100MHZ	250			MHZ

**ELECTRICAL CHARACTERISTICS (Ta=25°C unless otherwise specified)**

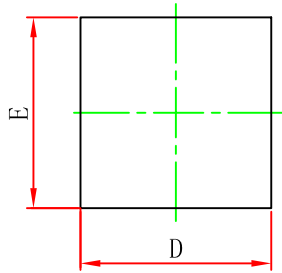
Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Collector output capacitance	$C_{obo}$	$V_{CB}=-5V, I_E=0, f=1MHz$			4.5	pF
Input capacitance	$C_{iob}$	$V_{EB}=-0.5V, I_C=0, f=1MHz$			10	pF
Noise figure	NF	$V_{CE}=-5V, I_C=0.1mA, f=1KHz, R_S=1K\Omega$			4	dB
Delay time	$t_d$	$V_{CC}=-3V, V_{BE(OFF)}=0.5V, I_C=-10mA,$ $I_{B1}=-1mA$			35	nS
Rise time	$t_r$				35	nS
Storage time	$t_s$	$V_{CC}=-3V, I_C=-10mA, I_{B1}= I_{B2}=-1mA$			225	nS
Fall time	$t_f$				75	nS

**Typical Characteristics**

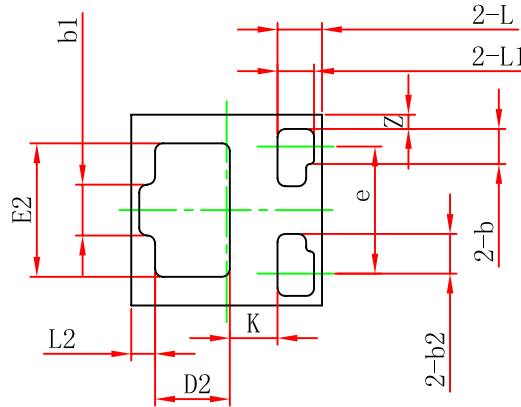
**MMBT3906M**



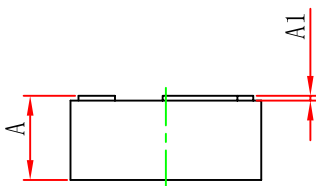
# WBFBP-03B(1.2×1.2×0.5) PACKAGE OUTLINE DIMENSIONS



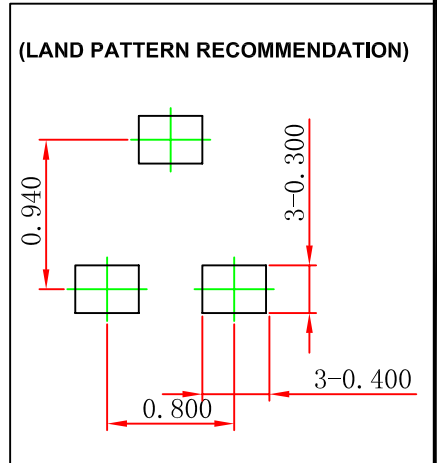
TOP VIEW



BOTTOM VIEW



SIDE VIEW



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.450	0.550	0.018	0.022
A1	0.010	0.090	0.000	0.004
b	0.170	0.270	0.007	0.011
b1	0.270	0.370	0.011	0.015
b2	0.250 REF.		0.010 REF.	
D	1.150	1.250	0.045	0.049
E	1.150	1.250	0.045	0.049
D2	0.470 REF.		0.002 REF.	
E2	0.810 REF.		0.032 REF.	
e	0.800 TYP.		0.032 TYP.	
L	0.280 REF.		0.011 REF.	
L1	0.230 REF.		0.009 REF.	
L2	0.150 REF.		0.006 REF.	
k	0.300 REF.		0.012 REF.	
z	0.090 REF.		0.004 REF.	