



WBFBP-03A Plastic-Encapsulate Transistors

MMBT3906E TRANSISTOR

DESCRIPTION

PNP Epitaxial planar Silicon Transistor

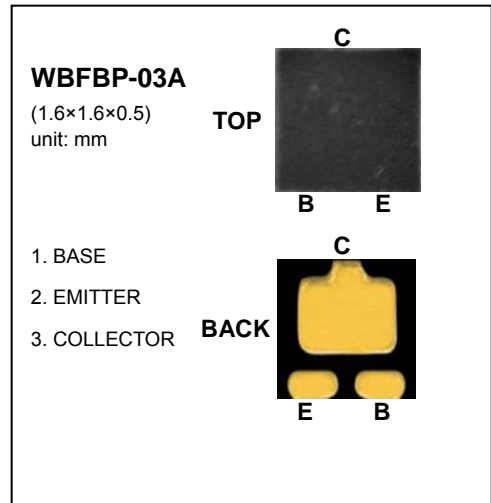
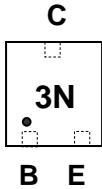
FEATURES

Epitaxial Planar Die Construction
Complementary NPN Type Available (MMBT3904E)
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_A=25°C unless otherwise noted

Symbol	Parameter	Value	Units
V _{CB0}	Collector-Base Voltage	-40	V
V _{CE0}	Collector-Emitter Voltage	-40	V
V _{EB0}	Emitter-Base Voltage	-5	V
I _C	Collector Current -Continuous	-200	mA
P _D	Power Dissipation	150	mW
R _{θJA}	Thermal Resistance, Junction to Ambient	833	°C/W
T _J	Operating Temperature	150	°C
T _{sta}	Storage and Temperature	-55-150	°C

ELECTRICAL CHARACTERISTICS (T_a=25°C unless otherwise specified)

Parameter	Symbol	Test conditions	MIN	TYP	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 _{CEX}	V _{CE} =-30V, V _{EB(off)} =-3V			-0.05	μA
Emitter cut-off current	I _{EBO}	V _{EB} =-5V, I _C =0			-0.1	μA
DC current gain	h _{FE(1)}	V _{CE} =-1V, I _C =-0.1mA	60			
	h _{FE(2)}	V _{CE} =-1V, I _C =-1mA	80			
	h _{FE(3)}	V _{CE} =-1V, I _C =-10mA	100		300	
	h _{FE(4)}	V _{CE} =-1V, I _C =-50mA	60			
	h _{FE(5)}	V _{CE} =-1V, I _C =-100mA	30			
Collector-emitter saturation voltage	V _{CE(sat)1}	I _C =-10mA, I _B =-1mA			-0.25	V
	V _{CE(sat)2}	I _C =-50mA, I _B =-5mA			-0.4	V
Base-emitter saturation voltage	V _{BE(sat)1}	I _C =-10mA, I _B =-1mA	-0.65		-0.85	V
	V _{BE(sat)2}	I _C =-50mA, I _B =-5mA			-0.95	V
Transition frequency	f _T	V _{CE} =-20V, I _C =-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

MMBT3906E

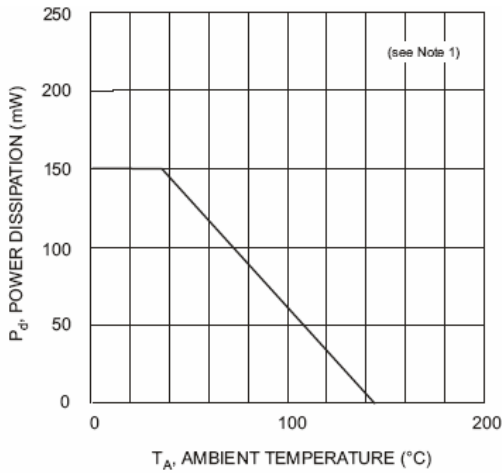


Fig. 1, Power Derating Curve

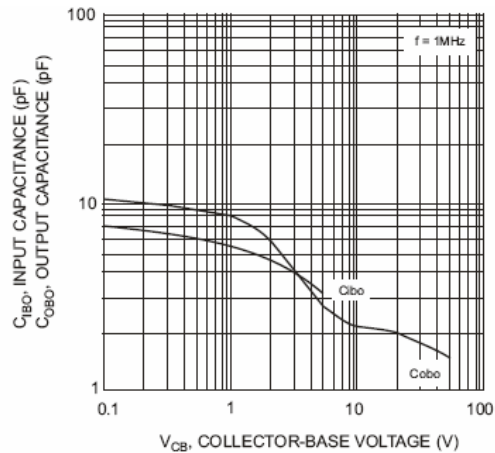


Fig. 2, Input and Output Capacitance vs. Collector-Base Voltage

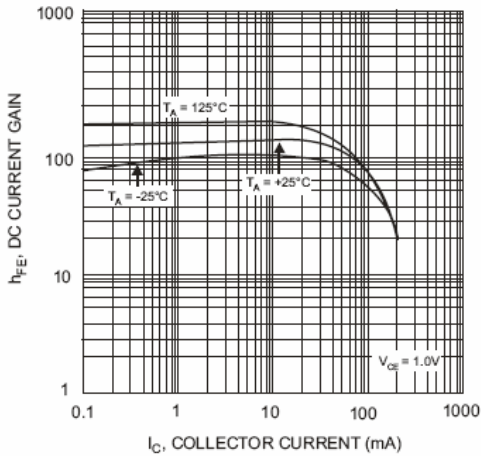


Fig. 3, Typical DC Current Gain vs. Collector Current

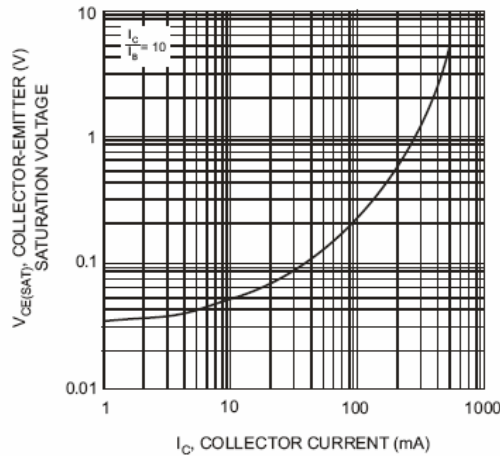


Fig. 4, Typical Collector-Emitter Saturation Voltage vs. Collector Current

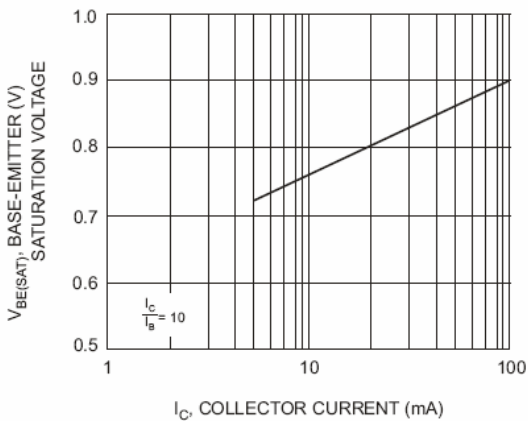
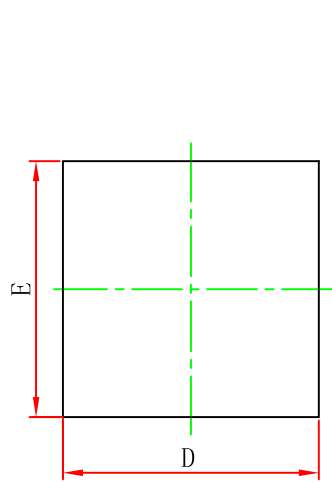
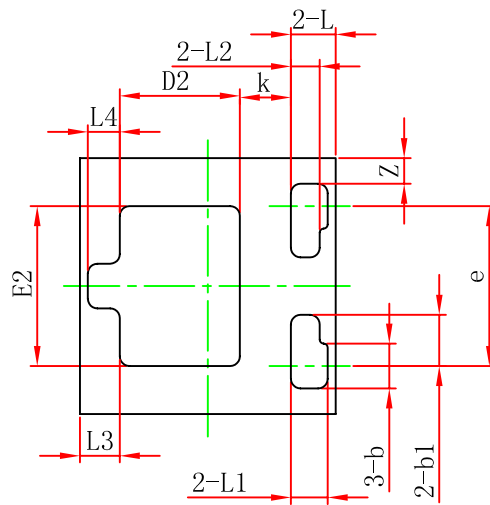


Fig. 5, Typical Base-Emitter Saturation Voltage vs. Collector Current

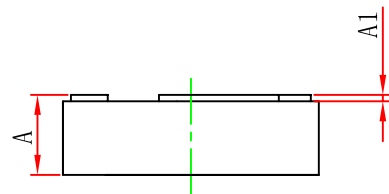
WBFBP-03A(1.6×1.6×0.5) PACKAGE OUTLINE DIMENSIONS



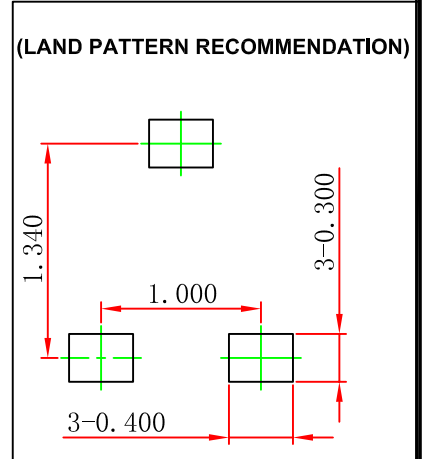
TOP VIEW



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	0.230	0.330	0.009	0.013
b1	0.320 REF.		0.013 REF.	
D	1.550	1.650	0.061	0.065
E	1.550	1.650	0.061	0.065
D2	0.750 REF.		0.030 REF.	
E2	1.000 REF.		0.040 REF.	
e	1.000 TYP.		0.040 TYP.	
L	0.280 REF.		0.011 REF.	
L1	0.230 REF.		0.009 REF.	
L2	0.180 REF.		0.007 REF.	
L3	0.250 REF.		0.010 REF.	
L4	0.200 REF.		0.008 REF.	
k	0.320 REF.		0.013 REF.	
z	0.160 REF.		0.006 REF.	