

RoHS Compliant Product
A suffix of "-C" specifies halogen and lead free

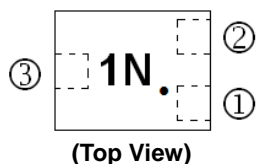
FEATURES

- Ultra small SMD plastic package

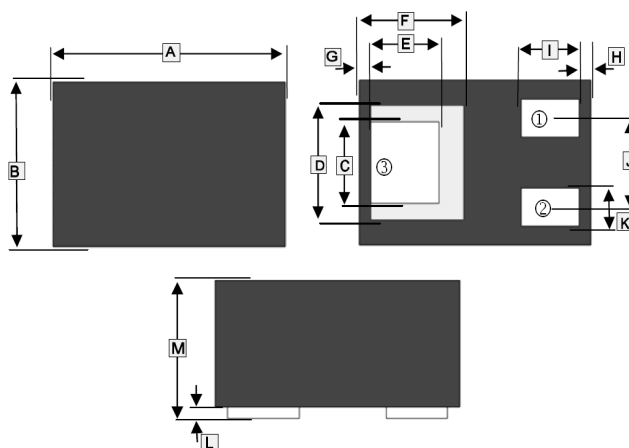
APPLICATION

- General switching and amplification.

MARKING



WBFBP-03E



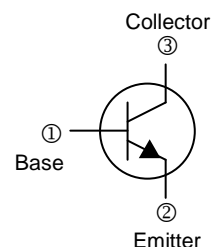
PACKAGING DIMENSION

Package	MPQ	Leader Size
WBFBP-03E	10K	7 inch

REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	0.95	1.05	H	0.05 REF.	
B	0.55	0.65	I	0.20	0.30
C	0.27	0.37	J	0.30	0.40
D	0.45 REF.		K	0.10	0.20
E	0.27	0.37	L	0.01	0.10
F	0.45 REF.		M	0.45	0.55
G	0.05 REF.				

ORDER INFORMATION

Part Number	Type
MMBT3904ZW	Lead (Pb)-free
MMBT3904ZW-C	Lead (Pb)-free and Halogen-free



ABSOLUTE MAXIMUM RATINGS (T_A=25°C unless otherwise specified)

Parameters	Symbol	Rating	Unit
Collector-Base Voltage	V _{CB0}	60	V
Collector-Emitter Voltage	V _{CE0}	40	V
Emitter-Base Voltage	V _{EBO}	6	V
Collector Current-Continuous	I _C	200	mA
Collector Power Dissipation	P _D ¹	100	mW
	P _D ²	590	
Thermal Resistance from Junction to Ambient	R _{θJA} ¹	1250	°C / W
	R _{θJA} ²	212	
Junction and Storage Temperature	T _J , T _{STG}	150, -55~150	°C

Notes:

1. Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
2. Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1cm².

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

Parameters	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	40	-	-	V	$I_C=1\text{mA}, I_B=0$
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	60	-	-	V	$I_C=10\mu\text{A}, I_E=0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	6	-	-	V	$I_E=10\mu\text{A}, I_C=0$
Collector Cut-Off Current	I_{CBO}	-	-	0.1	μA	$V_{CB}=60\text{V}, I_E=0$
Collector Cut-Off Current	I_{CEX}	-	-	50	nA	$V_{CE}=30\text{V}, V_{BE(off)}=3\text{V}$
Emitter Cut-Off Current	I_{EBO}	-	-	0.1	μA	$V_{EB}=5\text{V}, I_C=0$
DC Current Gain	h_{FE}	100	-	300		$I_C=10\text{mA}, V_{CE}=1\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	-	-	0.3	V	$I_C=50\text{mA}, I_B=5\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	-	-	0.95	V	$I_C=50\text{mA}, I_B=5\text{mA}$
Current-Gain-Bandwidth Product	f_T	300	-	-	MHz	$I_C=10\text{mA}, V_{CE}=20\text{V}, f=100\text{MHz}$
Delay Time	T_d	-	35	-	nS	$V_{CC}=3\text{V}, V_{BE(off)}=0.5\text{V},$ $I_C=10\text{mA}, I_{B1}=1\text{mA}$
Rise Time	T_r	-	35	-	nS	
Storage Time	T_s	-	200	-	nS	$V_{CC}=3\text{V}, I_C=10\text{mA},$ $I_{B1}=I_{B2}=1\text{mA}$
Fall Time	T_f	-	50	-	nS	

TYPICAL CHARACTERISTICS

Static Characteristic

