



# Micro Commercial Components Corp.

Complete Discrete Semiconductor Solutions

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Part Number	MMBT3904
product family	SOT-23 Plastic-Encapsulate Bipolar Transistors
Product Polarity	NPN
SMD/ThroHole	SMD
VCEO	40V
VCBO	60V
VEBO	5.0V
Ic	200mA
PC	350mW
HFE(min)	100
@Ic	10mA
@VCE	1.0V
ICBO	50nA
IEBO	
VCE(sat)	0.2V
VBE(sat)	0.85V
ft	300MHz
nf	
TON_max	
Package Qty	Tape: 3K/Reel , 120K/Ctn;

**Green/Pb Free/RoHS/REACH**

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Micro Commercial Components

# MMBT3904

## Features

- Capable of 350mWatts of Power Dissipation and 200mA I<sub>c</sub>.
- Operating and Storage Junction Temperatures: -55°C to 150°C
- Surface Mount SOT-23 Package
- Case Material:Molded Plastic. UL Flammability Classificatio Rating 94-0 and MSL Rating 1
- Marking:1AM

## NPN General Purpose Amplifier

### Electrical Characteristics @ 25°C Unless Otherwise Specified

Symbol	Parameter	Min	Max	Units
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#### OFF CHARACTERISTICS

V <sub>(BR)CEO</sub>	Collector-Emitter Breakdown Voltage* (I <sub>c</sub> =1.0mA, I <sub>b</sub> =0)	40		Vdc
V <sub>(BR)CBO</sub>	Collector-Base Breakdown Voltage (I <sub>c</sub> =10μA, I <sub>E</sub> =0)	60		Vdc
V <sub>(BR)EBO</sub>	Emitter-Base Breakdown Voltage (I <sub>E</sub> =10μA, I <sub>C</sub> =0)	6.0		Vdc
I <sub>CBO</sub>	Collector Cutoff Current (V <sub>CB</sub> =30Vdc, V <sub>BE</sub> =3.0Vdc)		50	nAdc
I <sub>CEX</sub>	Collector Cutoff Current (V <sub>CE</sub> =30Vdc, V <sub>BE</sub> =3.0Vdc)		50	nAdc

#### ON CHARACTERISTICS

h <sub>FE</sub>	DC Current Gain* (I <sub>c</sub> =0.1mA, V <sub>CE</sub> =1.0Vdc) (I <sub>c</sub> =1.0mA, V <sub>CE</sub> =1.0Vdc) (I <sub>c</sub> =10mA, V <sub>CE</sub> =1.0Vdc) (I <sub>c</sub> =50mA, V <sub>CE</sub> =1.0Vdc) (I <sub>c</sub> =100mA, V <sub>CE</sub> =1.0Vdc)	40 70 100 60 30	300	
V <sub>CE(sat)</sub>	Collector-Emitter Saturation Voltage (I <sub>c</sub> =10mA, I <sub>B</sub> =1.0mA) (I <sub>c</sub> =50mA, I <sub>B</sub> =5.0mA)		0.2 0.3	Vdc
V <sub>BE(sat)</sub>	Base-Emitter Saturation Voltage (I <sub>c</sub> =10mA, I <sub>B</sub> =1.0mA) (I <sub>c</sub> =50mA, I <sub>B</sub> =5.0mA)	0.65	0.85 0.95	Vdc

#### SMALL-SIGNAL CHARACTERISTICS

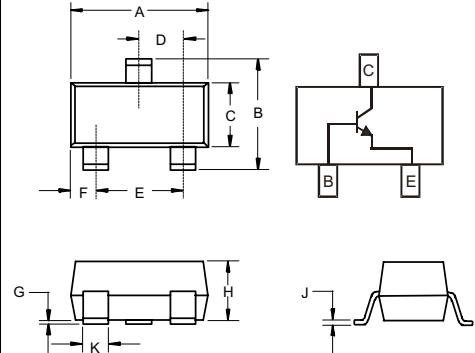
f <sub>T</sub>	Current Gain-Bandwidth Product (I <sub>c</sub> =10mA, V <sub>CE</sub> =20Vdc, f=100MHz)	300		MHz
C <sub>obo</sub>	Output Capacitance (V <sub>CB</sub> =5.0Vdc, I <sub>E</sub> =0, f=1.0MHz)		4.0	pF
C <sub>ibo</sub>	Input Capacitance (V <sub>BE</sub> =0.5Vdc, I <sub>C</sub> =0, f=1.0MHz)		8.0	pF
NF	Noise Figure (I <sub>c</sub> =100μA, V <sub>CE</sub> =5.0Vdc, R <sub>S</sub> =1.0kΩ f=10Hz to 15.7kHz)		5.0	dB

#### SWITCHING CHARACTERISTICS

t <sub>d</sub>	Delay Time	(V <sub>CC</sub> =3.0Vdc, V <sub>BE</sub> =0.5Vdc I <sub>C</sub> =10mA, I <sub>B1</sub> =1.0mA)	35	ns
t <sub>r</sub>	Rise Time		35	ns
t <sub>s</sub>	Storage Time	(V <sub>CC</sub> =3.0Vdc, I <sub>C</sub> =10mA I <sub>B1</sub> =I <sub>B2</sub> =1.0mA)	200	ns
t <sub>f</sub>	Fall Time		50	ns

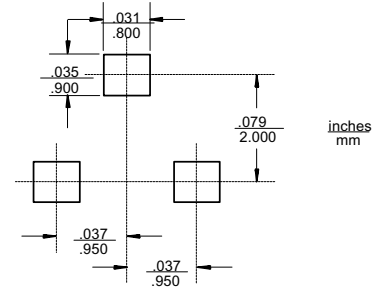
\*Pulse Width ≤ 300μs, Duty Cycle ≤ 2.0%

### SOT-23



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	.110	.120	2.80	3.04	
B	.083	.098	2.10	2.64	
C	.047	.055	1.20	1.40	
D	.035	.041	.89	1.03	
E	.070	.081	1.78	2.05	
F	.018	.024	.45	.60	
G	.0005	.0039	.013	.100	
H	.035	.044	.89	1.12	
J	.003	.007	.085	.180	
K	.015	.020	.37	.51	

### Suggested Solder Pad Layout





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## Ordering Information

Device	Packing
(Part Number)-TP	Tape&Reel;3Kpcs/Reel