



Micro Commercial Components



Micro Commercial Components  
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# MMBT3904

## NPN General Purpose Amplifier

### Features

- Halogen free available upon request by adding suffix "-HF"
- 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
- Lead Free Finish/RoHS Compliant ("P" Suffix designates RoHS Compliant. See ordering information)
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1
- Marking Code: 1AM
- Thermal Resistance Junction to Ambient: 357 °C/W
- Thermal Resistance Junction to Case: 185 °C/W

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

Symbol	Parameter	Min	Max	Units
<b>OFF CHARACTERISTICS</b>				
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

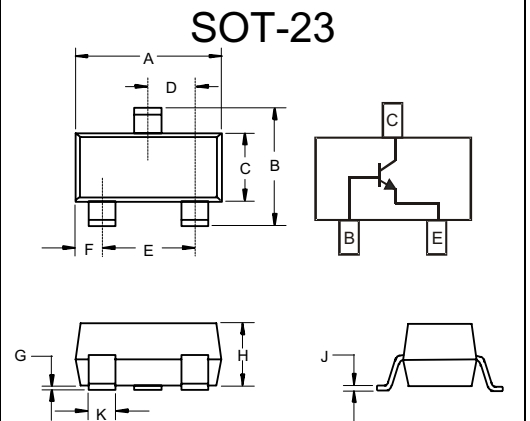
### SMALL-SIGNAL CHARACTERISTICS

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

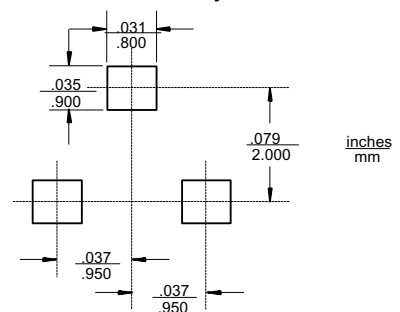
t <sub>d</sub>	Delay Time	(V <sub>CC</sub> =3.0Vdc, V <sub>BE</sub> =0.5Vdc)	35	ns
t <sub>r</sub>	Rise Time	(I <sub>C</sub> =10mA, I <sub>B1</sub> =1.0mA)	35	ns
t <sub>s</sub>	Storage Time	(V <sub>CC</sub> =3.0Vdc, I <sub>C</sub> =10mA)	200	ns
t <sub>f</sub>	Fall Time	(I <sub>B1</sub> =I <sub>B2</sub>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

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



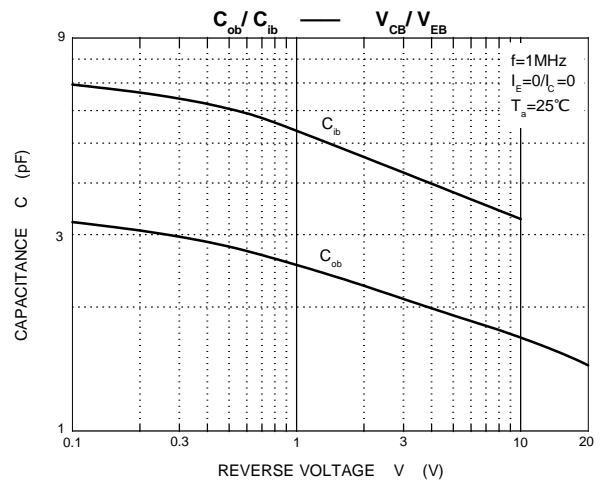
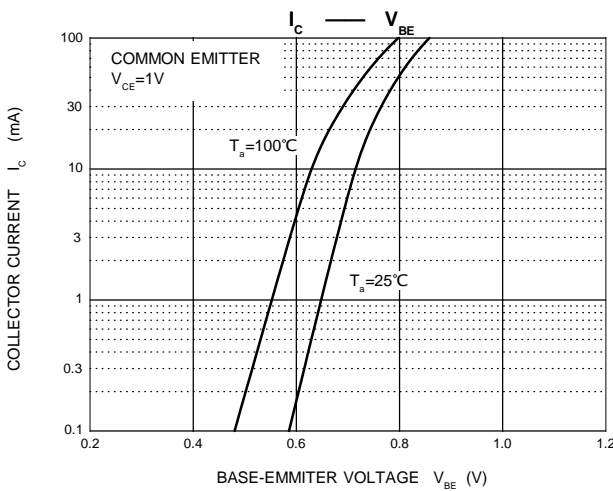
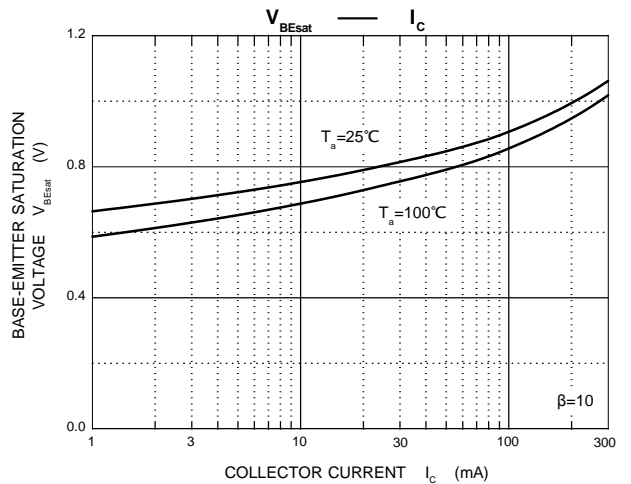
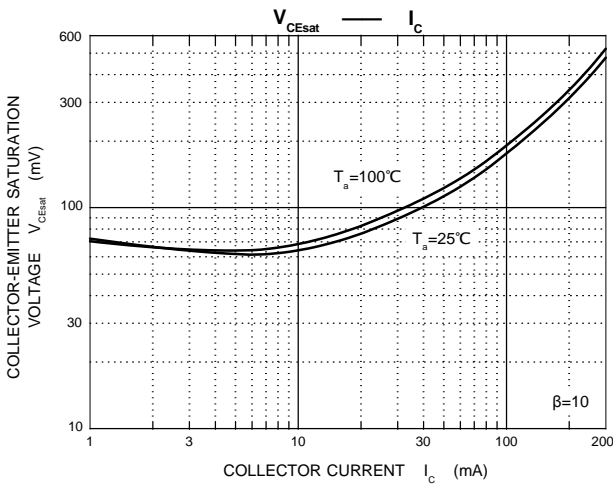
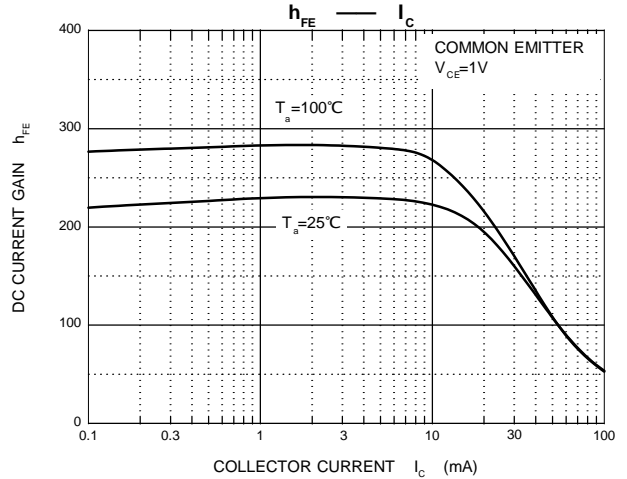
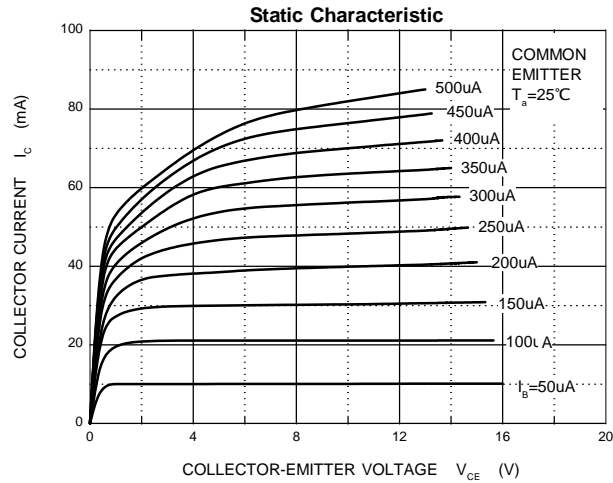
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	.110	.120	2.80	3.04	
B	.083	.104	2.10	2.64	
C	.047	.055	1.20	1.40	
D	.035	.041	.89	1.03	
E	.070	.081	1.78	2.05	
F	.018	.024	.45	.60	
G	.0005	.0039	.013	.100	
H	.035	.044	.89	1.12	
J	.003	.007	.085	.180	
K	.015	.020	.37	.51	

### Suggested Solder Pad Layout

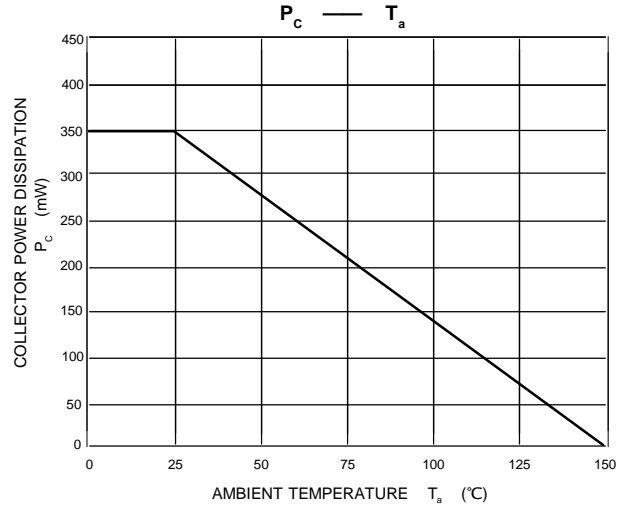
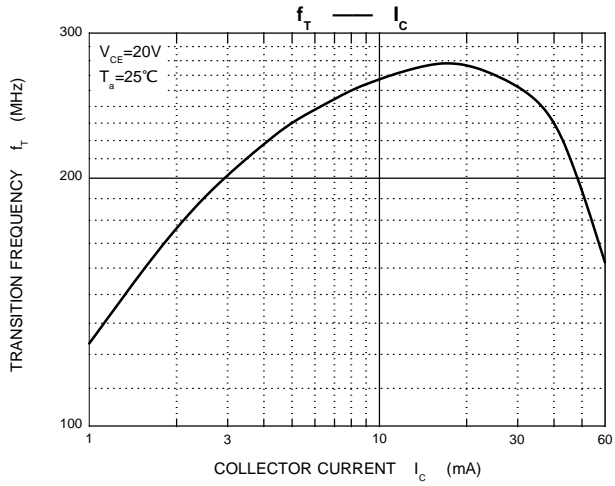


# MMBT3904

## Typical Characteristics



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### Ordering Information :

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

Note : Adding "-HF" suffix for halogen free, eg. Part Number-TP-HF

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