



Micro Commercial Components



Micro Commercial Components  
20736 Marilla Street Chatsworth  
CA 91311  
Phone: (818) 701-4933  
Fax: (818) 701-4939

# MMBT3904T

## 150mW NPN General Purpose Amplifier

### Features

- Halogen free available upon request by adding suffix "-HF"
- Lead Free Finish/RoHS Compliant ("P" Suffix designates RoHS Compliant. See ordering information)
- Operating and Storage Junction Temperatures: -55°C to 150°C
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1
- Collector Current: 0.2A
- Marking: 1N

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

Symbol	Parameter	Min	Max	Units
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#### OFF CHARACTERISTICS

$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage* ( $I_C=1.0mA_{dc}$ , $I_B=0$ )	40		Vdc
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage ( $I_C=10\mu A_{dc}$ , $I_E=0$ )	60		Vdc
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage ( $I_E=10\mu A_{dc}$ , $I_C=0$ )	6.0		Vdc
$I_{CBO}$	Collector Cut-off Current ( $V_{CB}=30V_{dc}$ , $I_E=0$ )		50	nAdc
$I_{EBO}$	Emitter Cut-off Current ( $V_{EB}=5V_{dc}$ , $I_C=0$ )		50	nAdc

#### ON CHARACTERISTICS

$h_{FE}$	DC Current Gain* ( $I_C=0.1mA_{dc}$ , $V_{CE}=1.0V_{dc}$ ) ( $I_C=1.0mA_{dc}$ , $V_{CE}=1.0V_{dc}$ ) ( $I_C=10mA_{dc}$ , $V_{CE}=1.0V_{dc}$ ) ( $I_C=50mA_{dc}$ , $V_{CE}=1.0V_{dc}$ ) ( $I_C=100mA_{dc}$ , $V_{CE}=1.0V_{dc}$ )	40 70 100 60 30	300	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage ( $I_C=10mA_{dc}$ , $I_B=1.0mA_{dc}$ ) ( $I_C=50mA_{dc}$ , $I_B=5.0mA_{dc}$ )		0.2 0.3	Vdc
$V_{BE(sat)}$	Base-Emitter Saturation Voltage ( $I_C=10mA_{dc}$ , $I_B=1.0mA_{dc}$ ) ( $I_C=50mA_{dc}$ , $I_B=5.0mA_{dc}$ )	0.65	0.85 0.95	Vdc

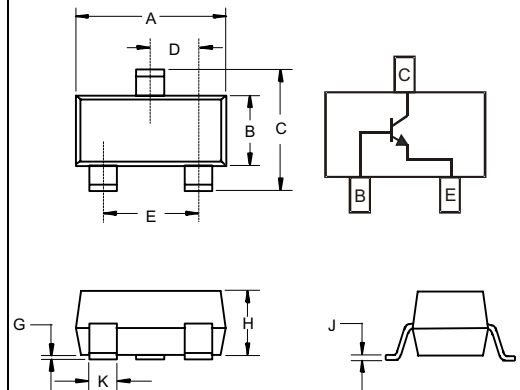
#### SMALL-SIGNAL CHARACTERISTICS

$f_T$	Current Gain-Bandwidth Product ( $I_C=10mA_{dc}$ , $V_{CE}=20V_{dc}$ , $f=100MHz$ )	300		MHz
$C_{obo}$	Output Capacitance ( $V_{CB}=5.0V_{dc}$ , $I_E=0$ , $f=1.0MHz$ )		4.0	pF
NF	Noise Figure ( $I_C=100\mu A_{dc}$ , $V_{CE}=5.0V_{dc}$ , $R_S=1.0k\Omega$ , $f=1MHz$ )		5.0	dB

#### SWITCHING CHARACTERISTICS

$t_d$	Delay Time	$(V_{CC}=3.0V_{dc}$ , $V_{BE}=0.5V_{dc}$ )	35	ns
$t_r$	Rise Time	$I_C=10mA_{dc}$ , $I_{B1}=1.0mA_{dc}$	35	ns
$t_s$	Storage Time	$(V_{CC}=3.0V_{dc}$ , $I_C=10mA_{dc}$ )	200	ns
$t_f$	Fall Time	$I_{B1}=I_{B2}=1.0mA_{dc}$	50	ns

### SOT-523



DIM	DIMENSIONS				NOTE
	INCHES		MM		
A	.059	.067	1.50	1.70	
B	.030	.033	0.75	0.85	
C	.057	.069	1.45	1.75	
D	.020 Nominal		0.50Nominal		
E	.035	.043	0.90	1.10	
G	.000	.004	.000	.100	
H	.028	.031	.70	0.80	
J	.004	.008	.100	.200	
K	.010	.014	.25	.35	

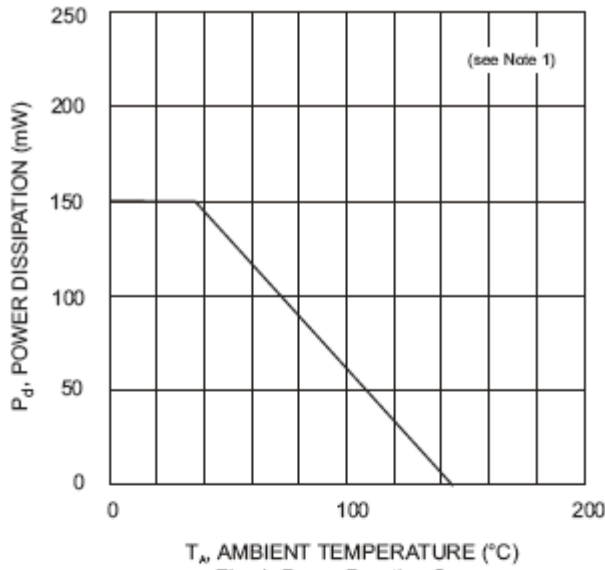


Fig. 1, Power Derating Curve

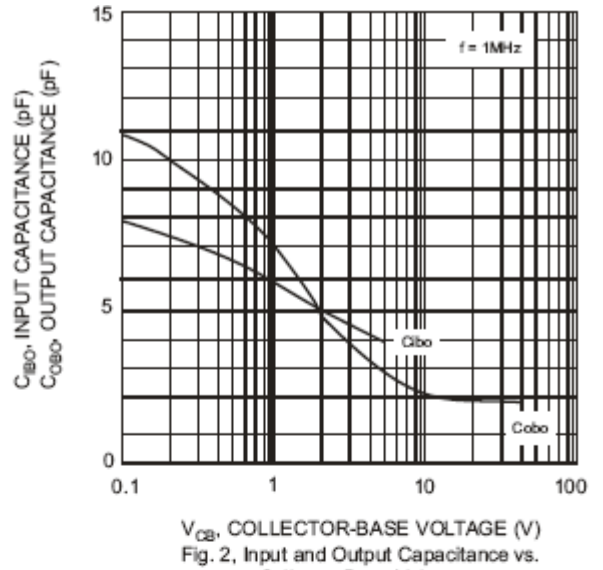


Fig. 2, Input and Output Capacitance vs. Collector-Base Voltage

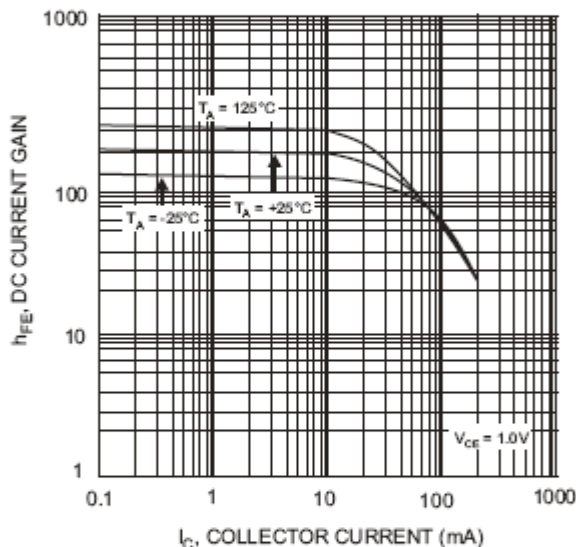


Fig. 3, Typical DC Current Gain vs. Collector Current

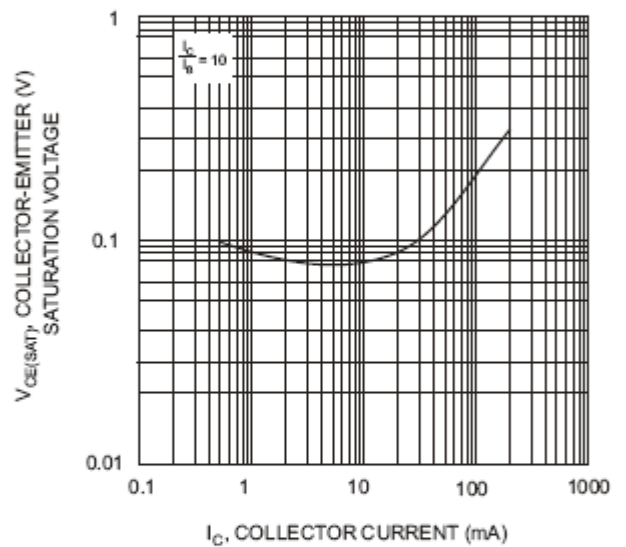


Fig. 4, Typical Collector-Emitter Saturation Voltage vs. Collector Current

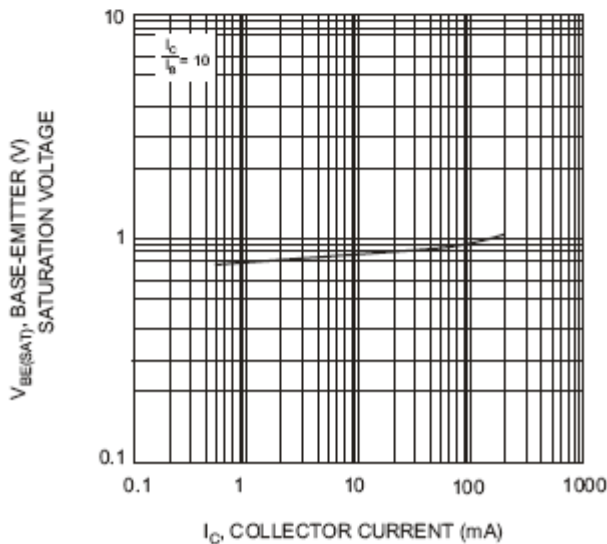


Fig. 5, Typical Base-Emitter Saturation Voltage vs. Collector Current



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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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