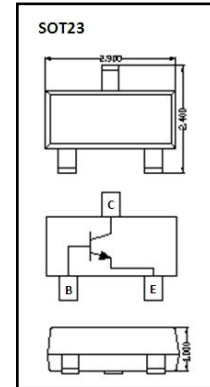


## General Purpose Amplifier/ DATA SHEET

### MMBT3904

- ◇ Capable of 200 mWatts of Power Dissipation and 200mA  $I_c$
- ◇ Operating and Storage Junction Temperatures:  $-55^{\circ}\text{C}$  to  $150^{\circ}\text{C}$
- ◇ Surface Mount SOT-23 Package
- ◇ RoHS compliant / Green EMC

Device Marking Code	
MMBT3904	1AM



### MAXIMUM RATINGS ( $T_a=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Unit
$V_{CB0}$	Collector-Base Voltage	60	V
$V_{CE0}$	Collector-Emitter Voltage	40	V
$V_{EB0}$	Emitter-Base Voltage	6	V
$I_c$	Collector Current	200	mA
$P_c$	Collector Power Dissipation	200	mW
$R_{\theta JA}$	Thermal Resistance From Junction To Ambient	625	$^{\circ}\text{C}/\text{W}$
$T_j$	Junction Temperature	150	$^{\circ}\text{C}$
$T_{stg}$	Storage Temperature	$-55 \sim +150$	$^{\circ}\text{C}$

### ELECTRICAL CHARACTERISTICS @ $25^{\circ}\text{C}$ Unless Otherwise Specified

Symbol	Parameter	Test Conditions	Min	Max	Units
$V_{CE0}$	Collector-Emitter Breakdown Voltage	$I_c=1.0\text{mA}, I_B=0$	40		V
$V_{CB0}$	Collector-Base Breakdown Voltage	$I_c=10\mu\text{A}, I_E=0$	60		V
$V_{EB0}$	Emitter-Base Breakdown Voltage	$I_E=10\mu\text{A}, I_c=0$	6.0		V
$I_{CB0}$	Collector Cutoff Current	$V_{CB}=30\text{V}, V_{BE}=3.0\text{V}$		50	nA
$I_{CEX}$	Collector Cutoff Current	$V_{CE}=30\text{V}, V_{BE}=3.0\text{V}$		50	nA



General Purpose Amplifier/ DATA SHEET

$h_{FE}$	DC Current Gain	$I_C=0.1mA, V_{CE}=1.0V$ $I_C=1.0mA, V_{CE}=1.0V$ $I_C=10mA, V_{CE}=1.0V$ $I_C=50mA, V_{CE}=1.0V$ $I_C=100mA, V_{CE}=1.0V$	 40 70 100 60 30	300	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=10mA, I_B=1.0mA$ $I_C=50mA, I_B=5.0mA$		0.2 0.3	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C=10mA, I_B=1.0mA$ $I_C=50mA, I_B=5.0mA$	0.65	0.85 0.95	V
$f_T$	Current Gain-Bandwidth Product	$I_C=10mA,$ $V_{CE}=20V, f=100MHz$	300		MHZ
Cobo	Output Capacitance	$V_{CB}=5.0V, I_E=0, f=1.0MHz$		4.0	PF
Cibo	Input Capacitance	$V_{BE}=0.5V, I_C=0, f=1.0MHz$		8.0	PF
NF	Noise Figure	$(I_C=100\mu A, V_{CE}=5.0V,$ $R_s=1.0k\Omega, f=10Hz$ to $15.7kHz$		5.0	dB

SWITCHING CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min	Max	Units
$t_d$	Delay Time	$V_{CC}=3.0V, V_{BE}=0.5V$		35	ns
$t_r$	Rise Time	$I_C=10mA, I_{B1}=1.0mA$		35	ns
$t_s$	Storage Time	$V_{CC}=3.0V, I_C=10mA$		200	ns
$t_f$	Fall Time	$I_{B1}=I_{B2}=1.0mA$		50	ns

ORDERING INFORMATION

Device	Package	Shipping	Tape wide	Emboss pitch	Tape specification	Notes
MMBT3904	SOT23	Tape & Reel 3000pcs /7" Reel	8mm	4mm	Conductive	



ANMEI Semiconductor

### General Purpose Amplifier/ DATA SHEET

#### PACKAGE DIMENSIONS

**Package Outline : SOT23**

Symbol	Dimensions in mm	
	Min.	Max.
A	2.800	3.040
B	2.100	2.640
C	1.200	1.400
D	0.890	1.030
E	1.780	2.050
F	0.450	0.600
G	0.013	0.100
H	0.900	1.110
J	0.090	0.180
K	0.370	0.510

**SOT23 Package Outline**

**Note:**  
 1. Halogen free ,EMC  
 2. Pb free solder  
 3. Lead thickness solder plating  
 4. Lead frame CAC-5  
 5. Other Tolerance  $\pm 0.05$   
 6. Dimensions are exclusive of Burrs Mold Flash and Tie Bar extrusions  
 7. Unit : mm