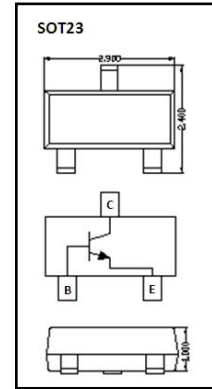


General Purpose Amplifier/ DATA SHEET

MMBT3904

- ◇ Capable of 200 mWatts of Power Dissipation and 200mA I_c
- ◇ Operating and Storage Junction Temperatures: -55°C to 150°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°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	

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 ± 0.05
 6. Dimensions are exclusive of Burrs Mold Flash and Tie Bar extrusions
 7. Unit : mm

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