

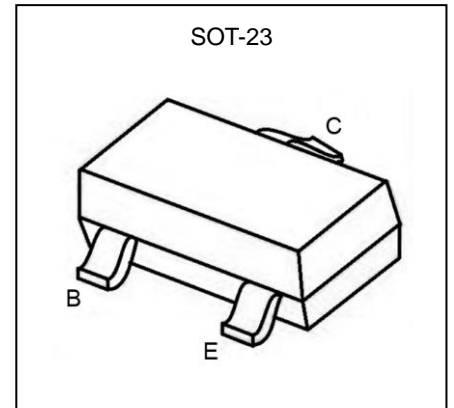
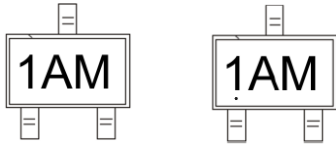


### MMBT3904 Transistor(NPN)

#### Feature

- Switching Transistor
- Collector-emitter voltage  $V_{CE}=40V$
- Collector current  $I_c=0.2A$

#### Marking



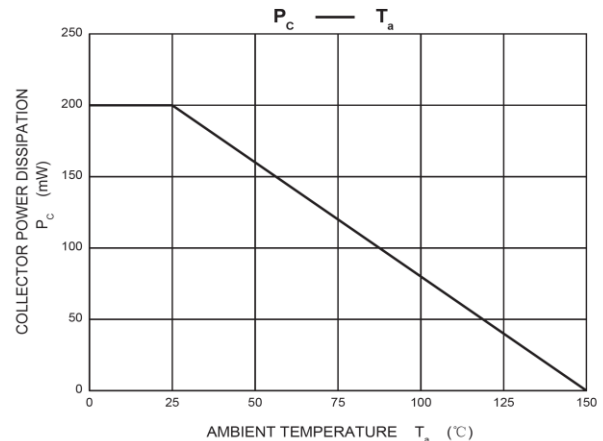
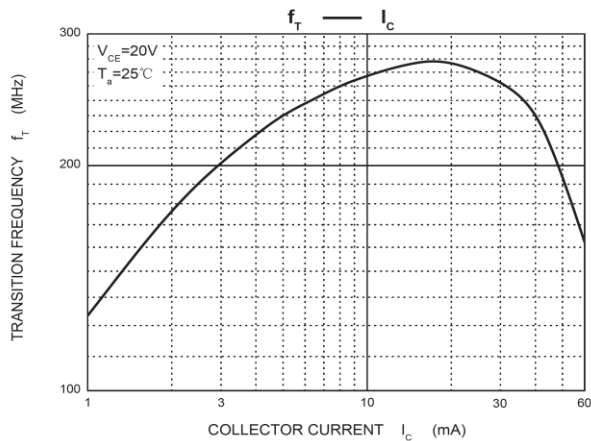
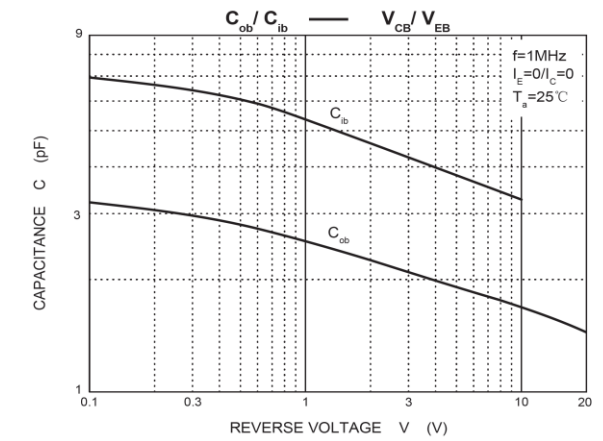
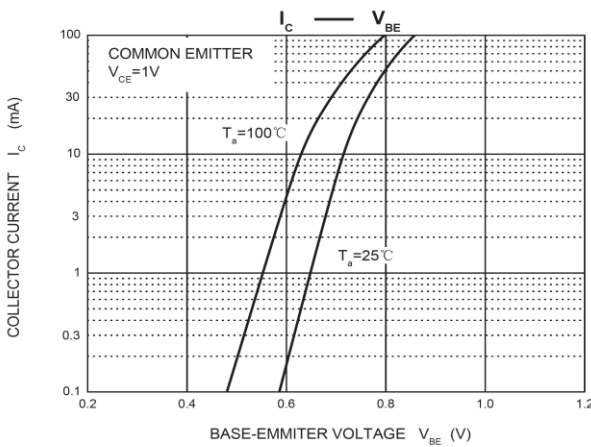
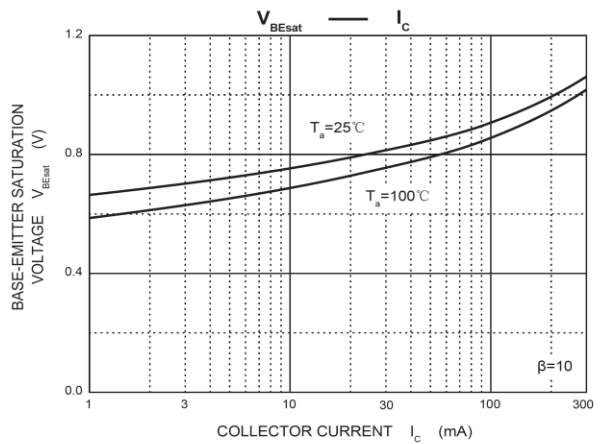
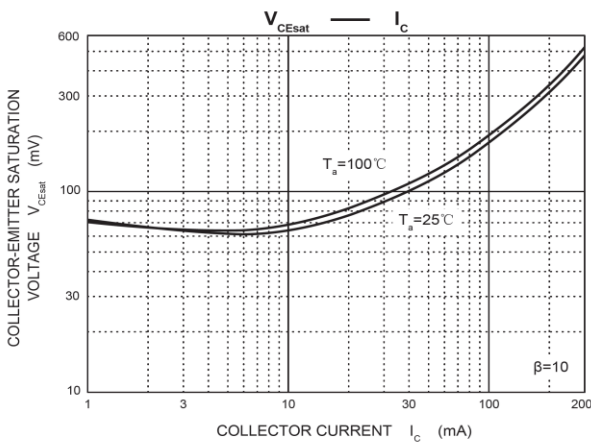
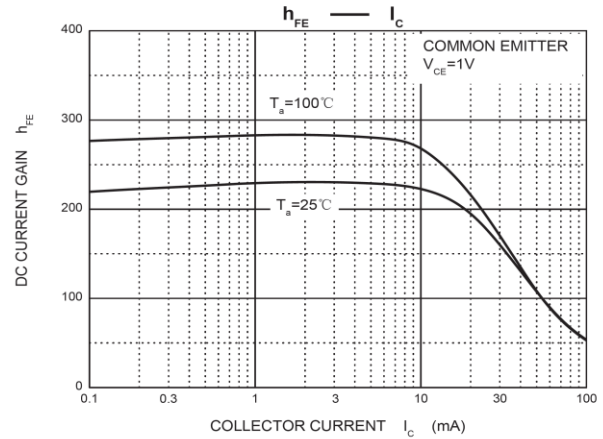
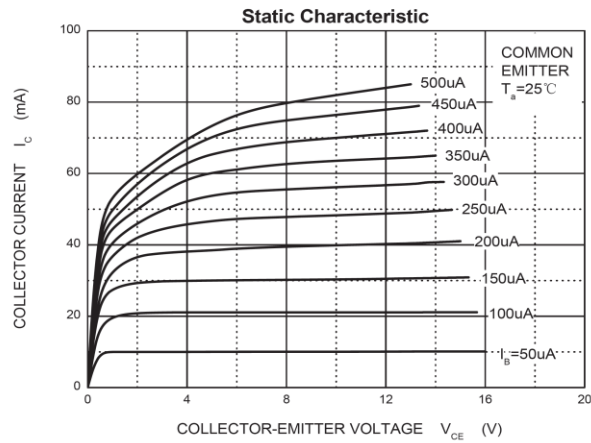
#### MAXIMUM RATINGS ( $T_a=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	60	V
Collector-Emitter Voltage	$V_{CEO}$	40	V
Emitter-Base Voltage	$V_{EBO}$	6	V
Collector Current -Continuous	$I_c$	0.2	A
Power Dissipation	$P_d$	0.35	W
Junction Temperature	$T_J$	150	$^{\circ}C$
Storage Temperature	$T_{STG}$	-55~ +150	$^{\circ}C$

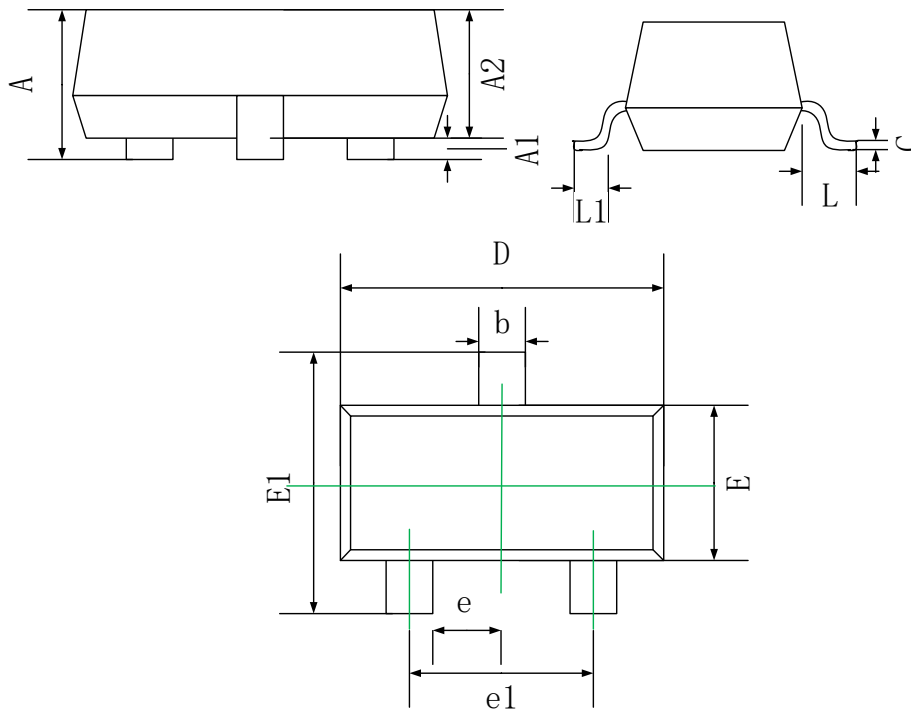
**ELECTRICAL CHARACTERISTICS( $T_a=25^{\circ}\text{C}$  unless otherwise noted)**

Parameter	Symbol	Test Condition	Min	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C=10\mu\text{A}, I_E=0$	60		V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C=1\text{mA}, I_B=0$	40		V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=10\mu\text{A}, I_C=0$	6		V
Collector cut-off current	$I_{CBO}$	$V_{CB}=60\text{V}, I_E=0$		100	nA
Collector cut-off current	$I_{CEX}$	$V_{CE}=30\text{V}, V_{EB(off)}=3\text{V}$		50	nA
Base cut-off current	$I_{BEX}$			50	nA
Emitter cut-off current	$I_{EBO}$	$V_{EB}=5\text{V}, I_C=0$		100	nA
DC current gain	$h_{FE1}$	$V_{CE}=1\text{V}, I_C=0.1\text{mA}$	40		
	$h_{FE2}$	$V_{CE}=1\text{V}, I_C=1\text{mA}$	70		
	$h_{FE3}$	$V_{CE}=1\text{V}, I_C=10\text{mA}$	100	300	
	$h_{FE4}$	$V_{CE}=1\text{V}, I_C=50\text{mA}$	60		
	$h_{FE5}$	$V_{CE}=1\text{V}, I_C=100\text{mA}$	30		
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=50\text{mA}, I_B=5\text{mA}$		0.3	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C=50\text{mA}, I_B=5\text{mA}$		0.95	V
Transition frequency	$f_T$	$V_{CE}=20\text{V}, I_C=10\text{mA}, f=100\text{MHz}$	300		MHZ
Delay Time	$t_d$	$V_{CC}=3\text{V}, I_C=10\text{mA}, V_{BE(off)}=-0.5\text{V}, I_{B1}=1\text{mA}$		35	ns
Rise Time	$t_r$			35	ns
Storage Time	$t_s$	$V_{CC}=3\text{V}, I_C=10\text{mA}, I_{B1}=I_{B2}=1\text{mA}$		200	ns
Fall Time	$t_f$			50	ns

**Typical Characteristics**

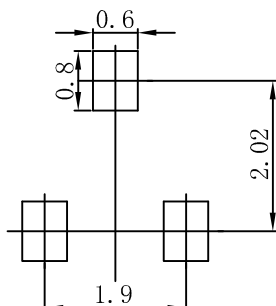


## SOT-23 Package Information



Symbol	Dimensions In Millimeters	
	Min.	Max.
A	0.90	1.15
A1	0.00	0.10
A2	0.90	1.05
b	0.30	0.50
c	0.08	0.15
D	2.80	3.00
E	1.20	1.40
E1	2.25	2.55
e	0.95 REF.	
e1	1.80	2.00
L	0.55 REF.	
L1	0.30	0.50

## SOT-23 Suggested Pad Layout



**Note:**

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.