



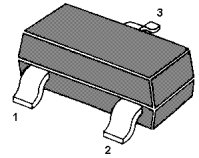
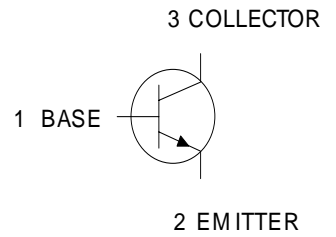
### MMBT3904 Plastic-Encapsulate Transistors

TRANSISTOR (NPN)

#### FEATURES

- Compliment to MMBT3906
- Low current
- Low voltage

MARKING: 1AM



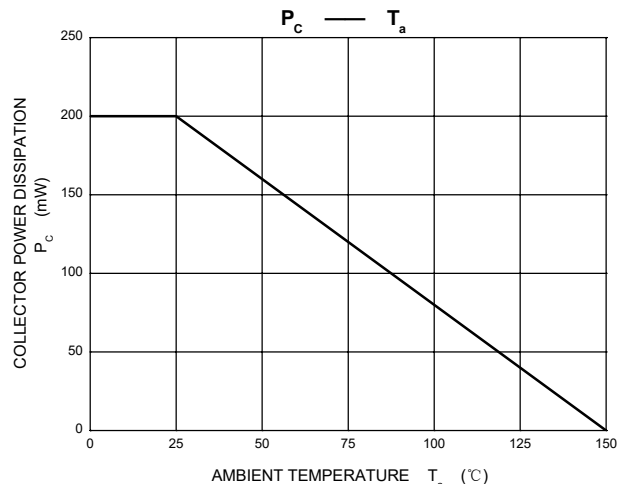
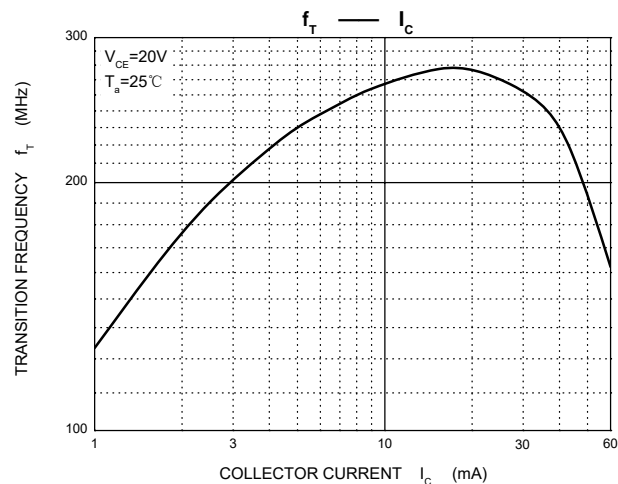
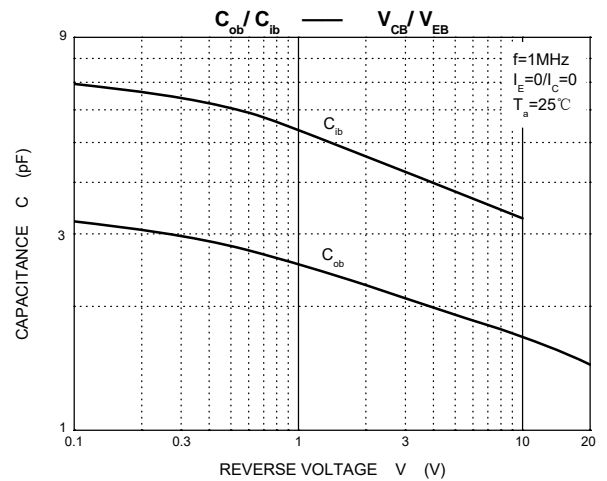
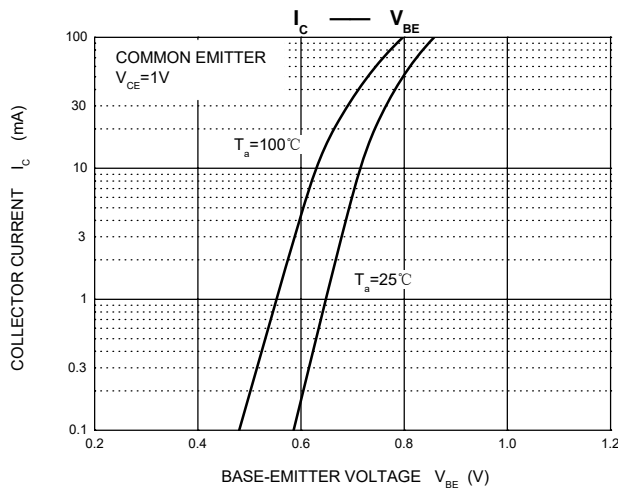
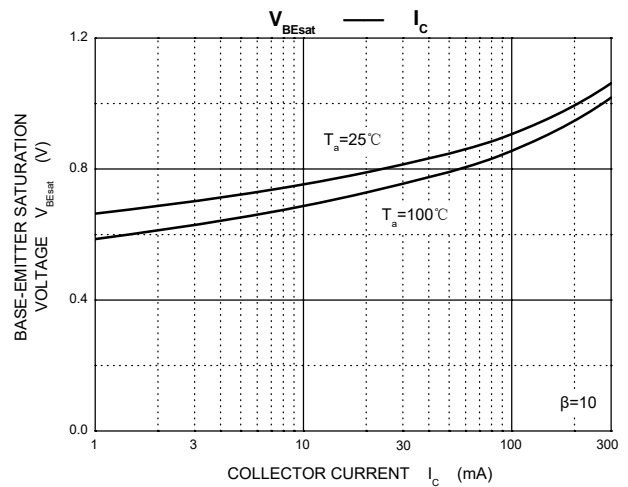
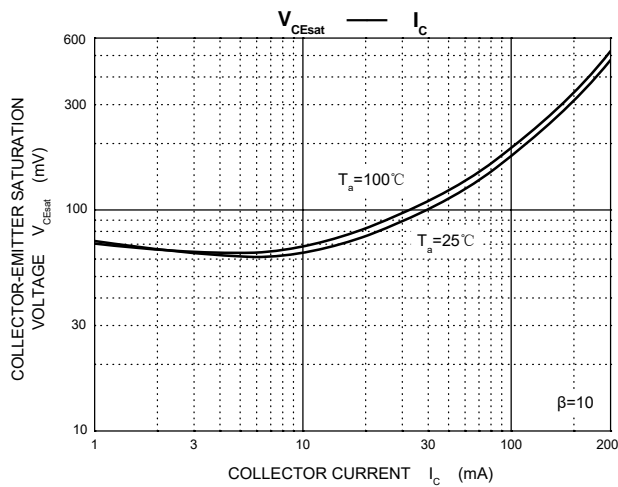
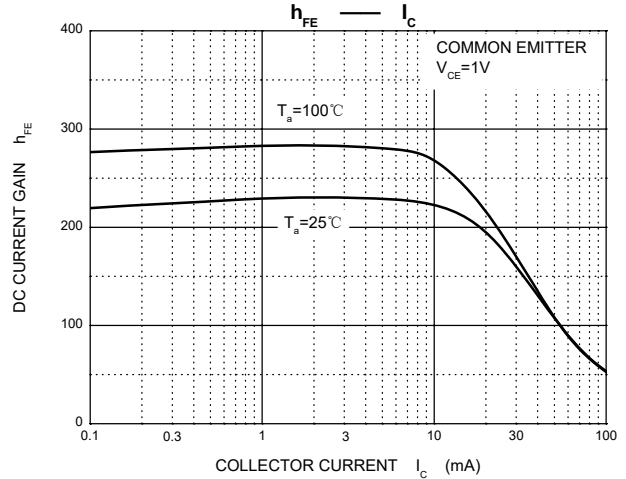
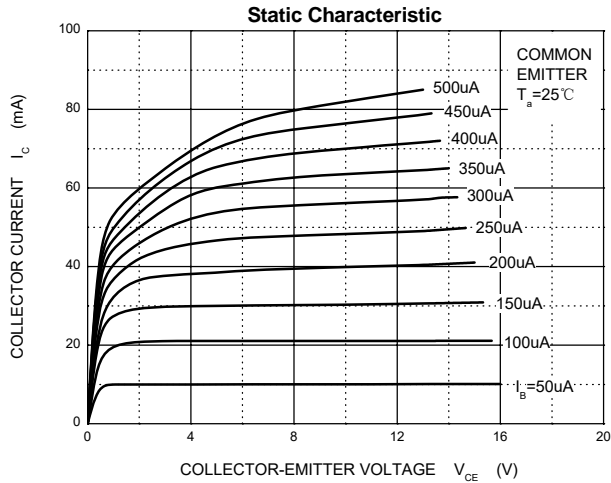
SOT23-3L

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

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

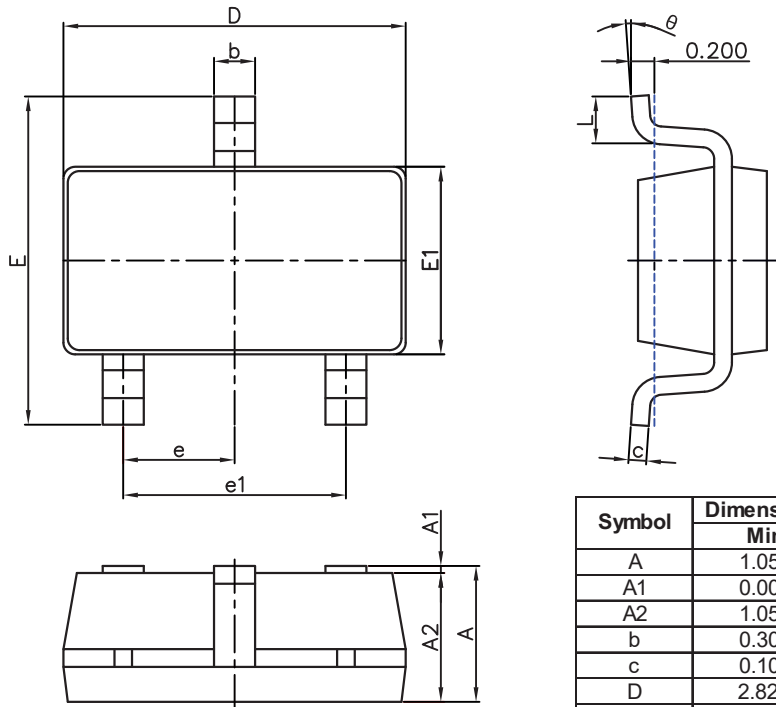
#### ELECTRICAL CHARACTERISTICS ( $T_a=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Typ	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	$I_{CBO}$	$V_{CB}=30\text{V}, I_E=0$			0.05	$\mu\text{A}$
Emitter cut-off current	$I_{EBO}$	$V_{EB}=6\text{V}, I_C=0$			0.05	$\mu\text{A}$
Collector ut-off current	$I_{CEX}$	$V_{CE}=30\text{V}, V_{BE(off)}=3\text{V}$			0.05	$\mu\text{A}$
DC current gain	$h_{FE(1)}$	$V_{CE}=1\text{V}, I_C=0.1\text{mA}$	60			
	$h_{FE(2)}$	$V_{CE}=1\text{V}, I_C=1\text{mA}$	80			
	$h_{FE(3)}$	$V_{CE}=1\text{V}, I_C=10\text{mA}$	100		300	
	$h_{FE(4)}$	$V_{CE}=1\text{V}, I_C=50\text{mA}$	60			
	$h_{FE(5)}$	$V_{CE}=1\text{V}, I_C=100\text{mA}$	30			
Collector-emitter saturation voltage	$V_{CE(sat)1}$	$I_C=10\text{mA}, I_B=1\text{mA}$			0.2	V
	$V_{CE(sat)2}$	$I_C=50\text{mA}, I_B=5\text{mA}$			0.3	V
Base-emitter saturation voltage	$V_{BE(sat)1}$	$I_C=10\text{mA}, I_B=1\text{mA}$	0.65		0.85	V
	$V_{BE(sat)2}$	$I_C=50\text{mA}, I_B=5\text{mA}$			0.95	V
Transition frequency	$f_T$	$V_{CE}=20\text{V}, I_C=10\text{mA}, f=100\text{MHz}$	300			MHz
Collector capacitance	$C_c$	$V_{CB}=5\text{V}, I_E=0, f=1\text{MHz}$			4	pF
Emitter capacitance	$C_e$	$V_{EB}=0.5\text{V}, I_C=0, f=1\text{MHz}$			8	pF
Noise figure	NF	$V_{CE}=5\text{V}, I_C=0.1\text{mA}, f=10\text{Hz}-15.7\text{kHz}, R_S=1\text{K}\Omega$			5	dB
Delay time	$t_d$	$I_C=10\text{mA}, I_{B1}=-I_{B2}=1\text{mA}$			35	ns
Rise time	$t_r$				35	ns
Storage time	$t_s$				200	ns
Fall time	$t_f$				50	ns



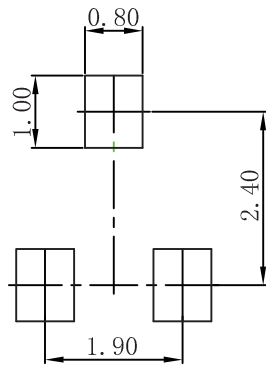


### SOT23-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
K	0°	8°	0°	8°

### SOT23-3L Suggested Pad Lay out



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