



## MMBT3904 Small Signal NPN Transistor

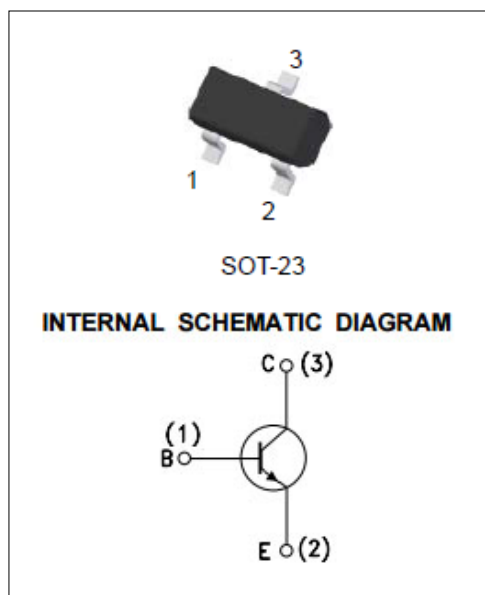
Rev.0.2

### FEATURE:

- Complementary to MMBT3906.
- Power dissipation of 200mW.
- High stability and high reliability.

### MECHANICAL DATA:

- SOT-23 small outline plastic package
- Epoxy UL: 94V-0
- Mounting position: Any
- Marking:1AM



### ABSOLUTE MAXIMUM RATINGS ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified.)

Parameter	Symbol	Value	Unit
Storage temperature range	$T_{\text{stg}}$	-55 to 150	$^{\circ}\text{C}$
Max. operating junction temperature	$T_j$	150	$^{\circ}\text{C}$
Collector-emitter voltage ( $I_B=0$ )	$V_{\text{CEO}}$	40	V
Collector-base voltage ( $I_E=0$ )	$V_{\text{CBO}}$	60	V
Emitter-base voltage ( $I_C=0$ )	$V_{\text{EBO}}$	6	V
Collector current DC	$I_C$	200	mA
Collector power dissipation	$P_C$	200	mW

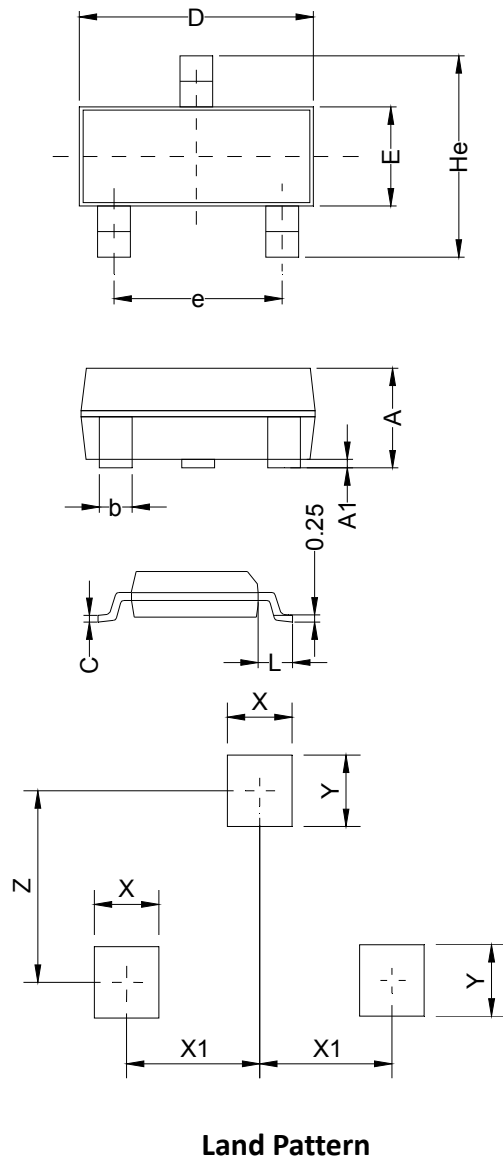
**ELECTRICAL CHARACTERISTICS** ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

Symbol	Test Condition	Value			Unit
		MIN.	TYP.	MAX.	
$V_{(BR)CBO}$	$I_C=10\mu\text{A}, I_E=0$	60			V
$V_{(BR)CEO}$	$I_C=1\text{mA}, I_B=0$	40			V
$V_{(BR)EBO}$	$I_E=10\mu\text{A}, I_C=0$	6			V
$I_{CEX}$	$V_{CE}=30\text{V}, V_{EB}=3\text{V}$			50	nA
$I_{CBO}$	$V_{CB}=60\text{V}, I_E=0$			100	nA
$I_{EBO}$	$V_{EB}=5\text{V}, I_C=0$			100	nA
$h_{FE}^*$	$I_C=10\text{mA}, V_{CE}=1\text{V}$	100		300	
	$I_C=50\text{mA}, V_{CE}=1\text{V}$	60			
	$I_C=100\text{mA}, V_{CE}=1\text{V}$	30			
$V_{CE(sat)}^*$	$I_C=50\text{mA}, I_B=5\text{mA}$	-	-	0.30	V
$V_{BE(sat)}^*$	$I_C=50\text{mA}, I_B=5\text{mA}$	-	-	0.95	V
$f_T$	$V_{CE}=20\text{V}, I_C=10\text{mA}, f=100\text{MHz}$	300			MHz
$t_d$	$V_{CC}=3\text{V}, V_{BE}=0.5\text{V}, I_C=10\text{mA}, I_{B1}=1\text{mA}$			35	ns
$t_r$	$V_{CC}=3\text{V}, V_{BE}=0.5\text{V}, I_C=10\text{mA}, I_{B1}=1\text{mA}$			35	ns
$t_s$	$V_{CC}=3\text{V}, I_C=10\text{mA}, I_{B1}=I_{B2}=1\text{mA}$			200	ns
$t_f$	$V_{CC}=3\text{V}, I_C=10\text{mA}, I_{B1}=I_{B2}=1\text{mA}$			50	ns
* Pulsed: pulse duration = 300 $\mu\text{s}$ , duty cycle $\leq 2\%$					

**THERMAL RESISTANCES**

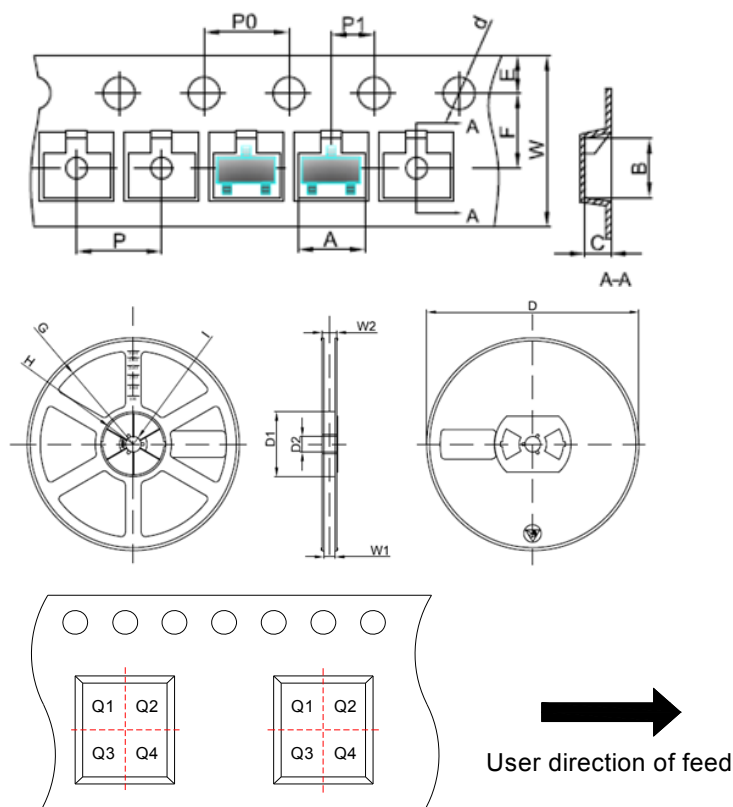
Symbol	Parameter	Value (Max.)	Unit
$R_{th(J-A)}$	junction to ambient	625	$^{\circ}\text{C/W}$

## PACKAGE MECHANICAL DATA



Symbol	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90	1.063	1.15	0.035	0.042	0.045
A1	0.00	0.075	0.14	0.000	0.003	0.006
b	0.30	0.40	0.50	0.012	0.016	0.020
C	0.07	0.10	0.15	0.003	0.004	0.006
D	2.80	2.90	3.00	0.110	0.114	0.118
e	1.80	1.90	2.00	0.071	0.075	0.079
E	1.20	1.30	1.40	0.047	0.051	0.055
L	0.55REF			0.022REF		
He	2.25	2.40	2.55	0.089	0.094	0.100
X	0.80			0.031		
X1	0.95			0.037		
Y	0.80			0.031		
Z	2.02			0.080		

## TAPE AND REEL SPECIFICATION-SOT-23



Pin 1 quadrant: Q3

## Packaging Description:

SOT-23 parts are shipped in tape. The carrier tape is made from a dissipative(carbon filled) polycarbonate resin. The cover tape is a multilayer film(heat activated adhesive in nature)primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000units per 7" or 17.8cm diameter reel. The reels are clear in color and made of polystyrene plastic(anti-static coated).

Symbol	Millimeters	Inches
	Typ.	Typ.
A	3.15	0.124
B	2.77	0.109
C	1.22	0.048
d	Φ1.50	Φ0.059
E	1.75	0.069
F	3.50	0.138
P0	4.00	0.157
P	4.00	0.157
P1	2.00	0.079
W	8.00	0.315
D	Φ178	Φ7.008
D1	54.40	2.142
D2	13.00	0.512
G	R78.00	R3.071
H	R25.60	R1.008
I	R6.50	R0.256
W1	9.50	0.374
W2	12.30	0.484

## ORDERING INFORMATION

Part Number	Package	Reel Size	Quantity Per Reel
MMBT3904	SOT-23	7 Inch	3,000 pcs

FIG.1: Power derating curve

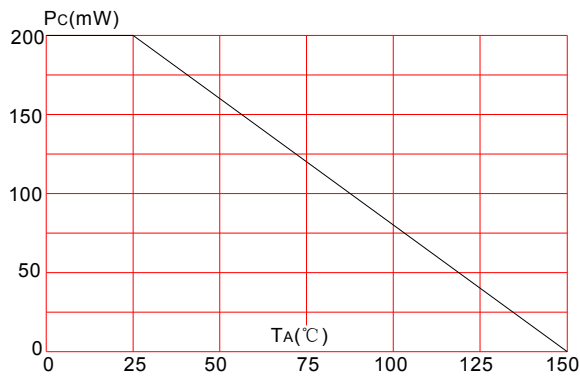
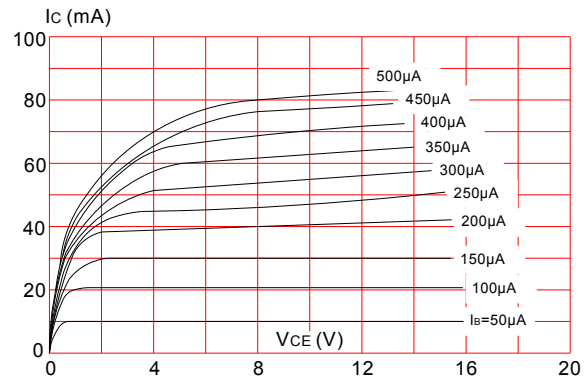


FIG.2: Static characteristic



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