

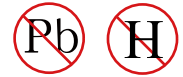


YEA SHIN TECHNOLOGY CO., LTD

MMBT3904M

# General Purpose Transistors

NPN Silicon



## FEATURE

- Complementary to MMBT3906M
- Small Package

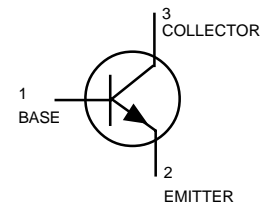
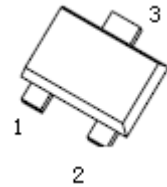
MARKING: 1N

Device	Package	Shipping
MMBT3904M	SOT-723	8000/Tape & Reel

## MAXIMUM RATINGS (T<sub>a</sub>=25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
V <sub>CB0</sub>	Collector-Base Voltage	60	V
V <sub>CE0</sub>	Collector-Emitter Voltage	40	V
V <sub>EBO</sub>	Emitter-Base Voltage	6	V
I <sub>c</sub>	Collector Current -Continuous	0.2	A
P <sub>c</sub>	Power Dissipation	0.1	W
R <sub>θJA</sub>	Thermal Resistance from Junction to Ambient	1250	°C/W
T <sub>J</sub>	Junction Temperature	150	°C
T <sub>stg</sub>	Storage Temperature	-55~+150	°C

SOT-723

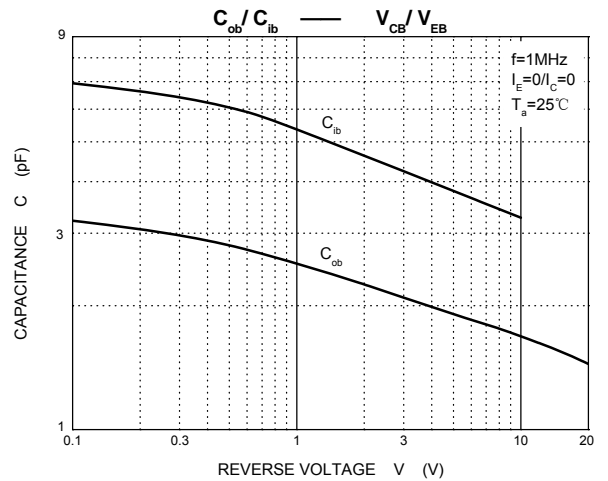
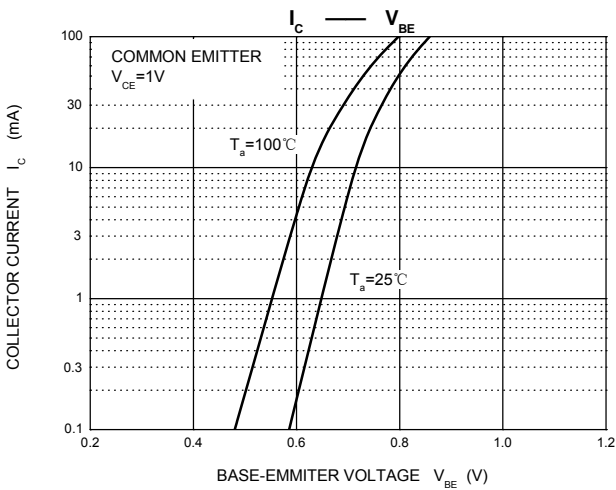
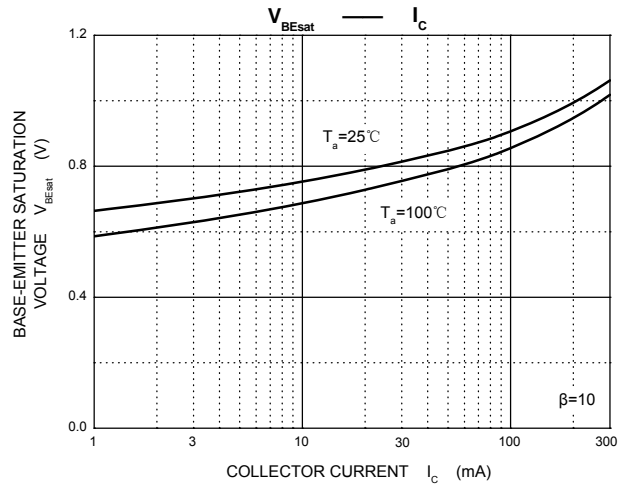
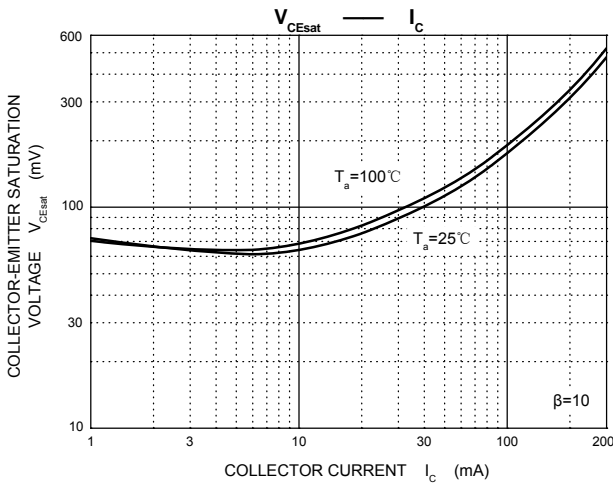
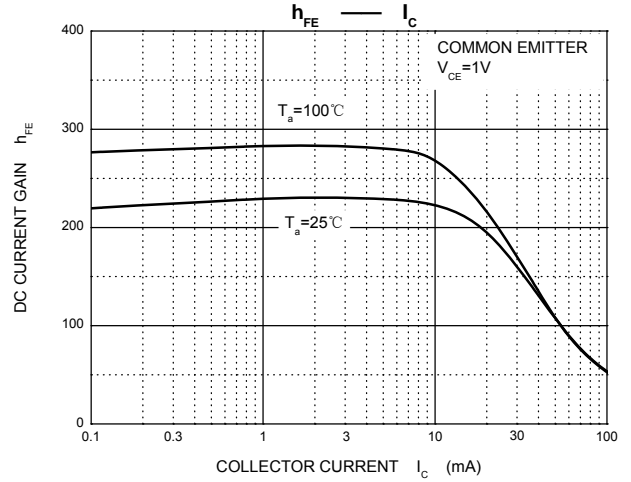
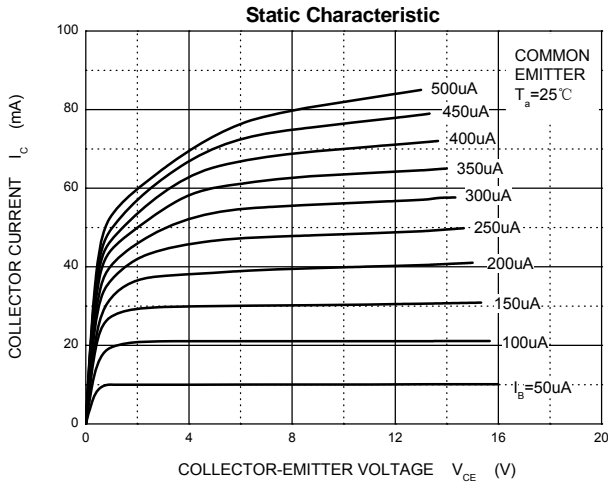


## ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	V <sub>(BR)CBO</sub>	I <sub>c</sub> =10μA, I <sub>E</sub> =0	60			V
Collector-emitter breakdown voltage	V <sub>(BR)CEO</sub>	I <sub>c</sub> =1mA, I <sub>B</sub> =0	40			V
Emitter-base breakdown voltage	V <sub>(BR)EBO</sub>	I <sub>E</sub> =10μA, I <sub>c</sub> =0	6			V
Collector cut-off current	I <sub>CEX</sub>	V <sub>CE</sub> =30V, V <sub>EB(off)</sub> =3V			50	nA
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> =5V, I <sub>c</sub> =0			100	nA
DC current gain	h <sub>FE(1)</sub>	V <sub>CE</sub> =1V, I <sub>c</sub> =0.1mA	40			
	h <sub>FE(2)</sub>	V <sub>CE</sub> =1V, I <sub>c</sub> =1mA	70			
	h <sub>FE(3)</sub>	V <sub>CE</sub> =1V, I <sub>c</sub> =10mA	100		300	
	h <sub>FE(4)</sub>	V <sub>CE</sub> =1V, I <sub>c</sub> =50mA	60			
Collector-emitter saturation voltage	V <sub>CE(sat)1</sub>	I <sub>c</sub> =10mA, I <sub>B</sub> =1mA			0.2	V
	V <sub>CE(sat)2</sub>	I <sub>c</sub> =50mA, I <sub>B</sub> =5mA			0.3	V
Base-emitter saturation voltage	V <sub>BE(sat)1</sub>	I <sub>c</sub> =10mA, I <sub>B</sub> =1mA	0.65		0.85	V
	V <sub>BE(sat)2</sub>	I <sub>c</sub> =50mA, I <sub>B</sub> =5mA			0.95	V
Transition frequency	f <sub>T</sub>	V <sub>CE</sub> =20V, I <sub>c</sub> =10mA, f=100MHz	300			MHz
Output capacitance	C <sub>ob</sub>	V <sub>CB</sub> =5V, I <sub>E</sub> =0, f=1MHz			4	pF
Input capacitance	C <sub>ib</sub>	V <sub>EB</sub> =0.5V, I <sub>c</sub> =0, f=1MHz			8	pF
Noise figure	NF	V <sub>CE</sub> =5V, I <sub>c</sub> =0.1mA, f=1MHz, R <sub>S</sub> =1kΩ			5	dB
Delay time	t <sub>d</sub>	V <sub>CC</sub> =3V, V <sub>BE(off)</sub> =-0.5V, I <sub>c</sub> =10mA, I <sub>B1</sub> =1mA			35	ns
Rise time	t <sub>r</sub>				35	ns
Storage time	t <sub>s</sub>	V <sub>CC</sub> =3V, I <sub>c</sub> =10mA, I <sub>B1</sub> =I <sub>B2</sub> =1mA			200	ns
Fall time	t <sub>f</sub>				50	ns

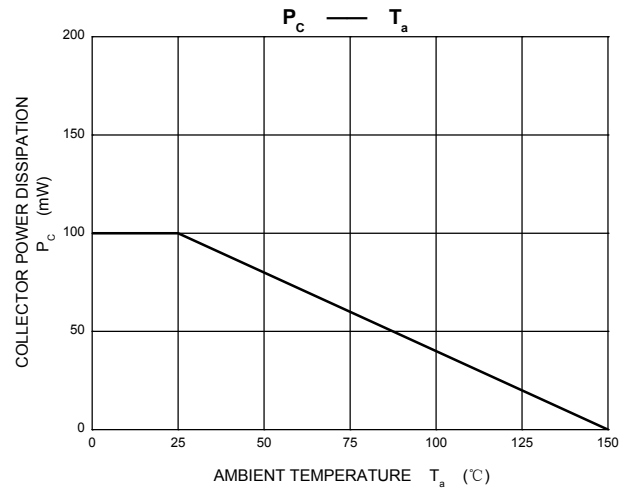
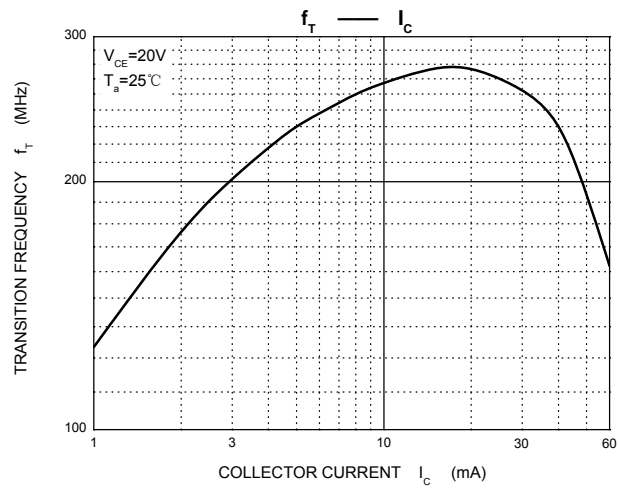
# DEVICE CHARACTERISTICS

## MMBT3904M



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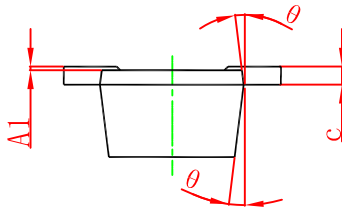
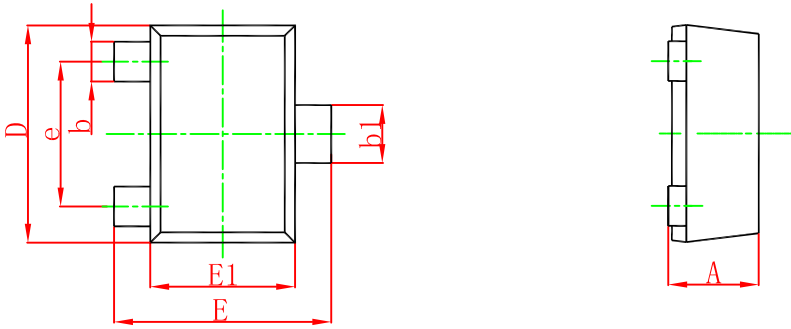
## MMBT3904M



# PACKAGE OUTLINE & DIMENSIONS

## MMBT3904M

### SOT-723 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.430	0.500	0.017	0.020
A1	0.000	0.050	0.000	0.002
b	0.170	0.270	0.007	0.011
b1	0.270	0.370	0.011	0.015
c	0.080	0.150	0.003	0.006
D	1.150	1.250	0.045	0.049
E	1.150	1.250	0.045	0.049
E1	0.750	0.850	0.030	0.033
e	0.800TYP.		0.031TYP.	
$\theta$	7° REF.		7° REF.	

### SOT-723 Suggested Pad Layout

