NPN Silicon Epitaxial Planar Transistor

MMBT3904T

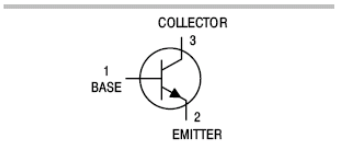
Features

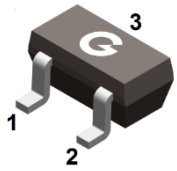
HF

- Epitaxial planar die construction
- Complimentary to MMBT3906T
- Ultra-small surface mount package

Mechanic al Data

- Case: SOT-523
- Molding compound: UL flammability classification rating 94V-0
- Terminals: Tin-plated; solderability per MIL-STD-202, Method 208





SOT-523

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
MMBT3904T	SOT-523	3000 pcs / Tape & Reel	1N

Maximum Ratings (@ T_A = 25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Collector-Base Breakdown Voltage	V_{CBO}	60	V
Collector-Emitter Breakdown Voltage	V_{CEO}	40	V
Emitter-Base Breakdown Voltage	V_{EBO}	6	V
Continuous Collector Current	I_C	0.2	A
Peak Collector Current	I_{CM}	0.2	A
Peak Base Current	I_{BM}	0.1	A

Thermal Characteristics

Parameter	Symbol	Value	Unit
Power Dissipation	P_D	150	mW
Thermal Resistance Junction-to-Air *1	$R_{\theta JA}$	118	°C/W
Thermal Resistance Junction-to-Case *1	$R_{\theta JC}$	65	°C/W
Thermal Resistance Junction-to-Lead *1	$R_{\theta JL}$	53	°C/W
Operating junction Temperature	T_J	-55 ~ +150	°C
Storage Temperature Range	T_{STG}	-55 ~ +150	°C

Note 1: The data tested by surface mounted on a 25.4mm * 25.4mm * 1mm FR4-epoxy P.C.B

Electrical Characteristics (@ T_A = 25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C = 10μA, I_E = 0	60	-	-	V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = 1mA, I_B = 0	40	-	-	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E = 10μA, I_C = 0	6	-	-	V
Collector Cut-off Current	I_{CBO}	V_{CB} = 30V, I_E = 0	-	-	50	nA
Emitter Cut-off Current	I_{EBO}	V_{EB} = 5V, I_C = 0	-	-	50	nA
Collector Cut-off Current	I_{CEX}	V_{CE} = 30V, $V_{EB(OFF)}$ = 3.0V	-	-	50	nA
Base Cut-off Current	I_{BL}	V_{CE} = 30V, $V_{EB(OFF)}$ = 3.0V	-	-	50	nA
DC Current Gain	h_{FE}	V_{CE} = 1V, I_C = 0.1mA	40	-	-	-
		V_{CE} = 1V, I_C = 1mA	70	-	-	-
		V_{CE} = 1V, I_C = 10mA	100	-	300	-
		V_{CE} = 1V, I_C = 50mA	60	-	-	-
		V_{CE} = 1V, I_C = 100mA	30	-	-	-
Collector-emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 10mA, I_B = 1mA	-	-	0.2	V
		I_C = 50mA, I_B = 5mA	-	-	0.3	V
Base-emitter Saturation Voltage	$V_{BE(sat)}$	I_C = 10mA, I_B = 1mA	0.65	-	0.85	V
		I_C = 50mA, I_B = 5mA	-	-	0.95	V
Transition Frequency	f_T	I_C = 10mA, V_{CE} = 20V f=100MHz	300	-	-	MHz
Collector Output Capacitance	C_{OBO}	V_{CB} = 5V, I_E = 0, f = 1MHZ	-	-	4	pF
Input Capacitance	C_{IBO}	V_{EB} = 0.5V, I_C = 0, f = 1MHz	-	-	8	pF
Noise Figure	N_F	V_{CE} = 5V, I_C = 100μA, R_S = 1kΩ f = 10Hz to15.7kHz	-	-	5	dB
Delay Time	t_d	V_{CC} = 3V, I_C = 10mA $V_{BE(OFF)}$ = -0.5V, I_{B1} = 1mA	-	-	35	ns
Rise Time	t_r		-	-	35	ns
Storang Time	t_s	V_{CC} = 3V, I_C = 10mA I_{B1} = I_{B2} = 1mA	-	-	200	ns
Fall Time	t_f		-	-	50	ns

Ratings and Characteristics Curves (@ T_A = 25°C unless otherwise specified)

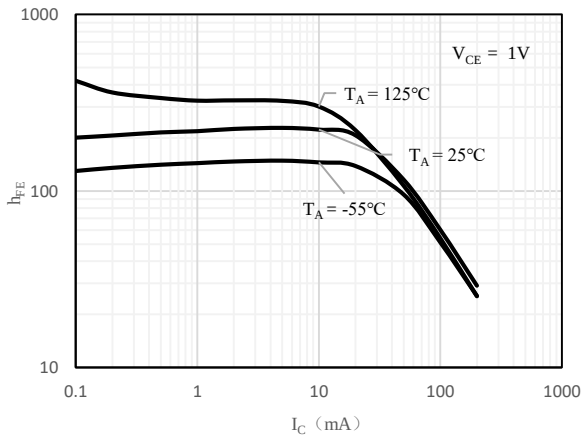


Fig 1 h_{FE} vs. I_C

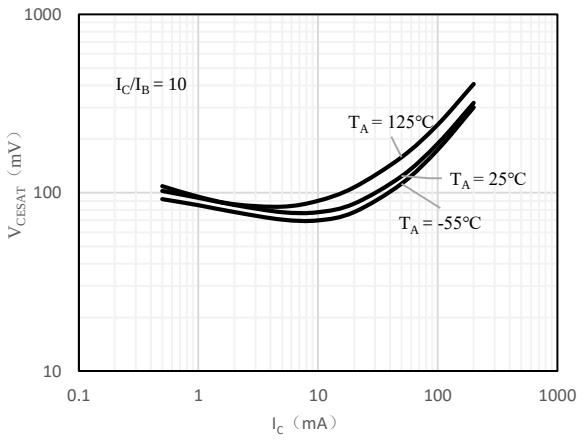


Fig 2 $V_{CE(sat)}$ vs. I_C

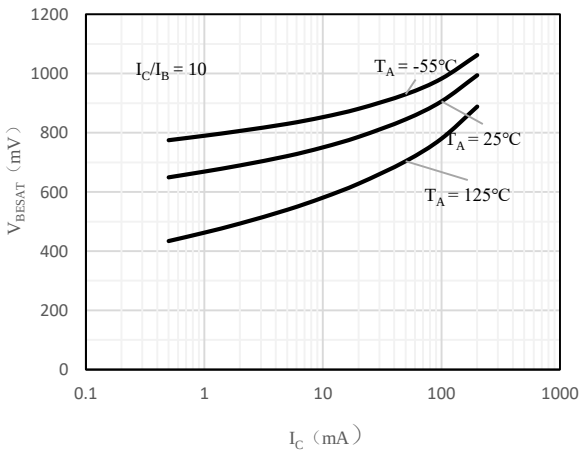


Fig 3 $V_{BE(sat)}$ vs. I_C

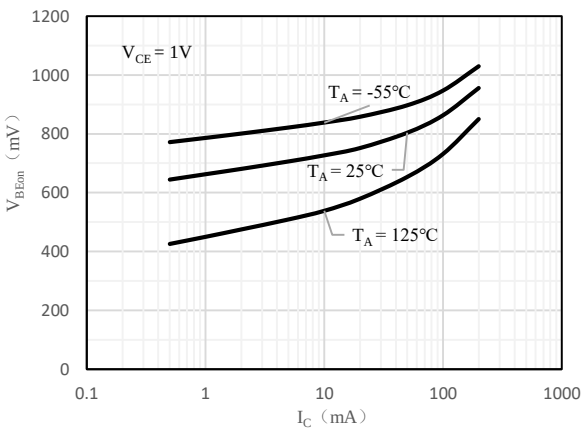
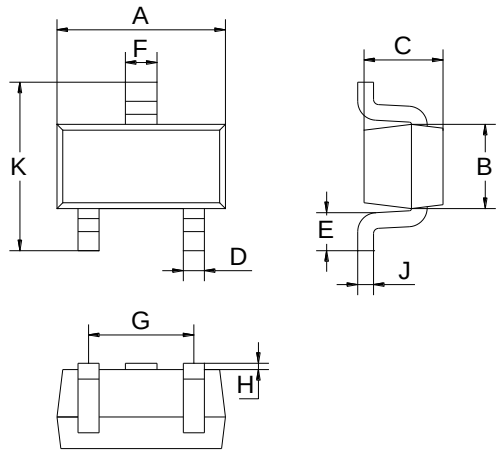


Fig 4 $V_{BE(ON)}$ vs. I_C

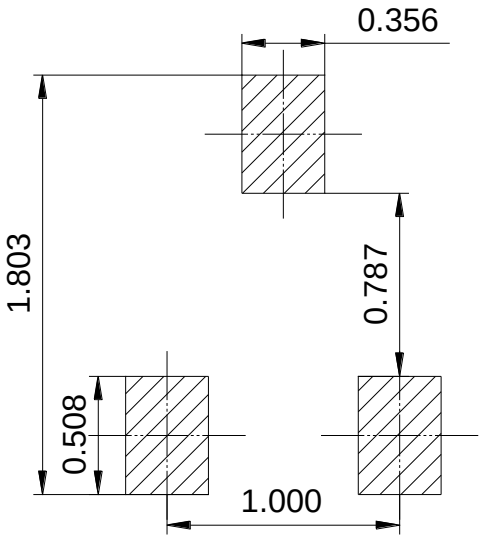
Package Outline Dimensions (Unit: mm)



SOT-523		
Dimension	**Min.**	**Max.**
A	1.50	1.70
B	0.75	0.85
C	0.60	0.80
D	0.15	0.30
E	0.30	0.40
F	0.25	0.40
G	0.90	1.10
H	0.02	0.10
J	0.08	0.18
K	1.45	1.75

Mounting Pad Layout (Unit: mm)

SOT-523



IMPORTANT NOTICE

Changzhou Galaxy Century Microelectronics (GME) reserves the right to make changes without further notice to any product information (copyrighted) herein to make corrections, modifications, improvements, or other changes. GME does not assume any liability arising out of the application or use of any product described herein; neither does it convey any license under its patent rights, nor the rights of others.