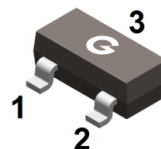
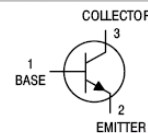


Features

- Epitaxial planar die construction
- Complimentary to MMBT3906
- Ultra-small surface mount package

HF



SOT-23

Mechanical Data

- Case: SOT-23
- Molding compound: UL flammability classification rating 94V-0
- Terminals: Tin-plated; solderability per MIL-STD-202, Method 208

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
MMBT3904	SOT-23	3000 pcs / Tape & Reel	1AM

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	250	mW
Thermal Resistance Junction-to-Air ^{*1}	R _{θJA}	386	°C/W
Thermal Resistance Junction-to-Case ^{*1}	R _{θJC}	221	°C/W
Thermal Resistance Junction-to-Lead ^{*1}	R _{θJL}	168	°C/W
Ambient Temperature	T _A	-55 ~ +150	°C
Operating junction Temperature	T _J	-65 ~ +150	°C
Storage Temperature Range	T _{STG}	-65 ~ +150	°C

Note 1: The data tested by surface mounted on a 15mm * 15mm * 1mm FR4-epoxy P.C.B

Electrical Characteristics (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	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	$V_{(BR)CEO}$	$I_C = 100\mu\text{A}, I_B = 0$	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}	$V_{CB} = 30\text{V}, I_E = 0$	-	-	50	nA
Emitter Cut-off Current	I_{EBO}	$V_{EB} = 6\text{V}, I_C = 0$	-	-	50	nA
DC Current Gain	h_{FE}	$V_{CE} = 1\text{V}, I_C = 0.1\text{mA}$	60	-	-	-
		$V_{CE} = 1\text{V}, I_C = 1\text{mA}$	80	-	-	-
		$V_{CE} = 1\text{V}, I_C = 10\text{mA}$	100	-	300	-
		$V_{CE} = 1\text{V}, I_C = 50\text{mA}$	60	-	-	-
		$V_{CE} = 1\text{V}, I_C = 100\text{mA}$	30	-	-	-
Collector-emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 10\text{mA}, I_B = 1\text{mA}$	-	-	0.2	V
		$I_C = 50\text{mA}, I_B = 5\text{mA}$	-	-	0.3	V
Base-emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 10\text{mA}, I_B = 1\text{mA}$	-	-	0.85	V
		$I_C = 50\text{mA}, I_B = 5\text{mA}$	-	-	0.95	V
Transition Frequency	f_T	$I_C = 10\text{mA}, V_{CE} = 20\text{V}$	300	-	-	MHz
Collector Output Capacitance	C_{OBO}	$V_{CB} = 5\text{V}, I_E = 0, f = 1\text{MHz}$	-	-	4	pF
Input Capacitance	C_{IBO}	$V_{EB} = 0.5\text{V}, I_C = 0, f = 1\text{MHz}$	-	-	8	pF
Noise Figure	N_F	$V_{CE} = 5\text{V}, I_C = 100\mu\text{A}, R_s = 1\text{k}\Omega$ $f = 10\text{Hz to } 15.7\text{kHz}$	-	-	5	dB
Delay Time	t_d	$V_{CC} = 3\text{V}, I_C = 10\text{mA}$	-	-	35	ns
Rise Time	t_r	$V_{BE(OFF)} = -0.5\text{V}, I_{B1} = 1\text{mA}$	-	-	35	ns
Storage Time	t_s	$V_{CC} = 3\text{V}, I_C = 10\text{mA}$	-	-	200	ns
Fall Time	t_f	$I_{B1} = I_{B2} = 1\text{mA}$	-	-	50	ns

Ratings and Characteristics Curves (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

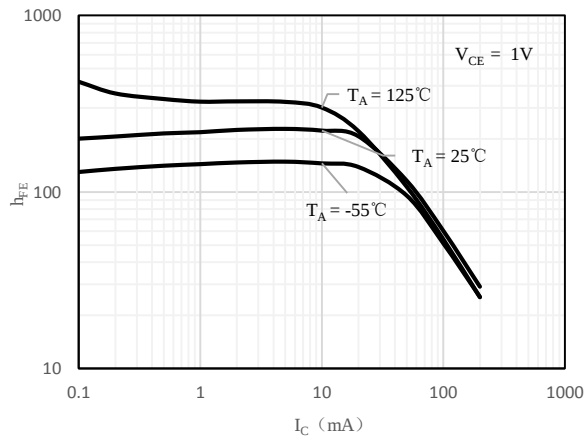


Fig 1 h_{FE} vs. I_C

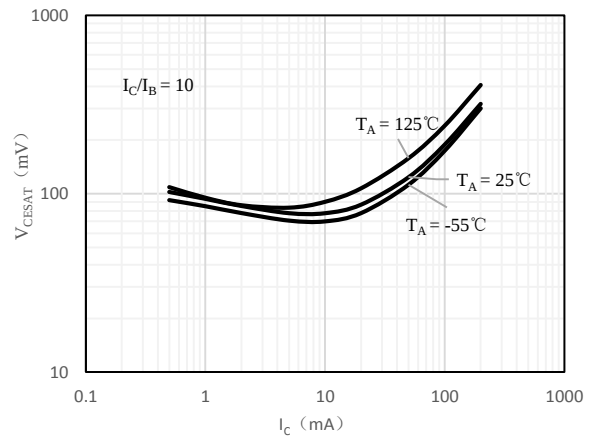


Fig 2 $V_{CE(sat)}$ vs. I_C

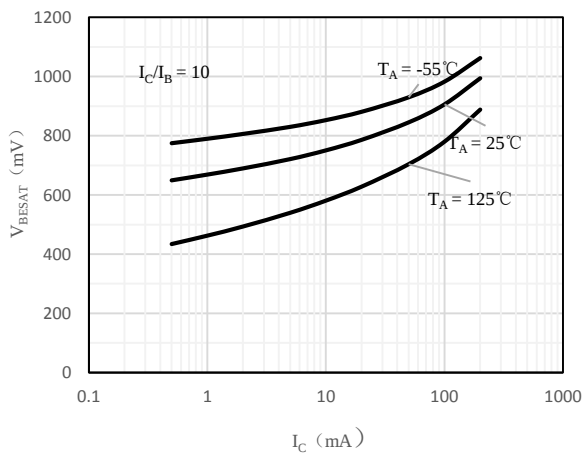


Fig 3 $V_{BE(sat)}$ vs. I_C

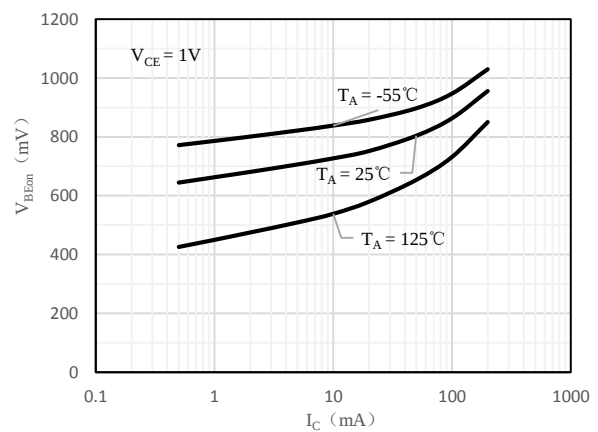


Fig 4 $V_{BE(on)}$ vs. I_C

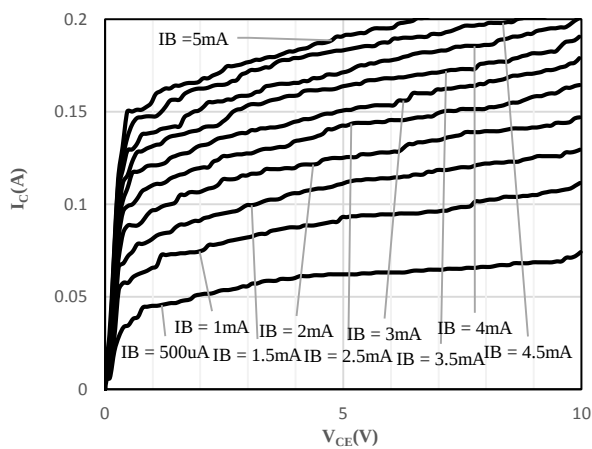


Fig 5 I_C vs. V_{CE}

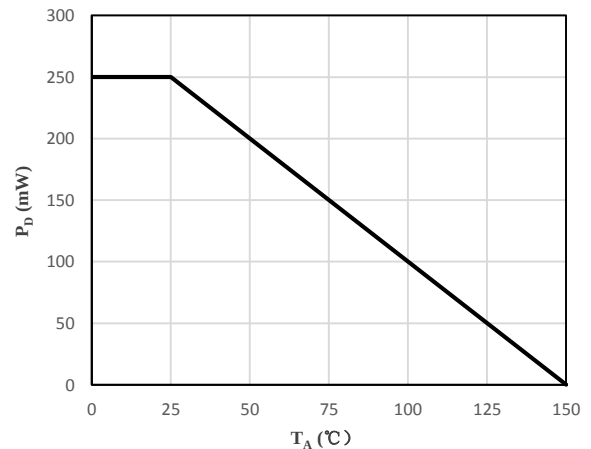


Fig 6 P_D vs. T_A

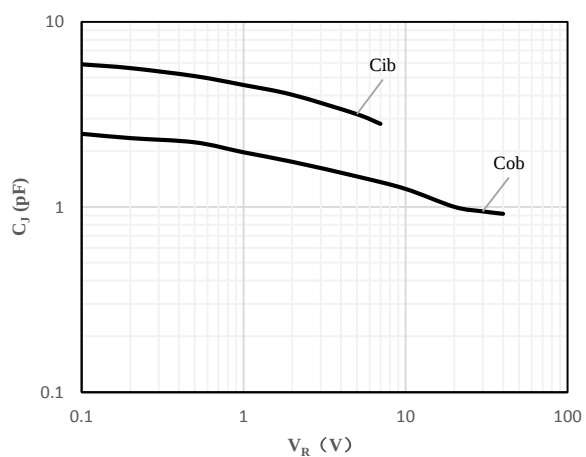
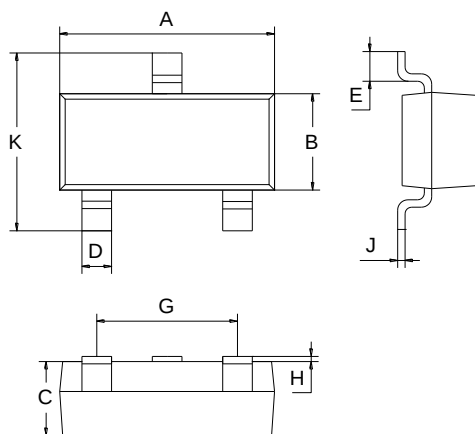


Fig 7 C_j vs. V_R

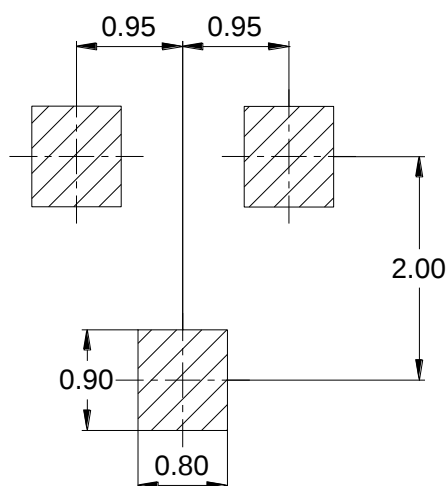
Package Outline Dimensions (Unit: mm)



SOT-23		
Dimension	Min.	Max.
A	2.70	3.10
B	1.10	1.50
C	0.9	1.1
D	0.3	0.5
E	0.35	0.48
G	1.80	2.00
H	0.02	0.1
J	0.05	0.15
K	2.20	2.60

Package Outline Dimensions (Unit: mm)

SOT-23



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