

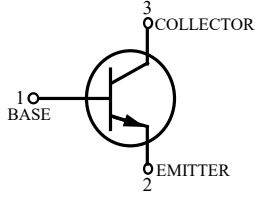
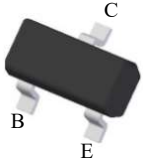


MMBT3904WH

NPN TRANSISTOR

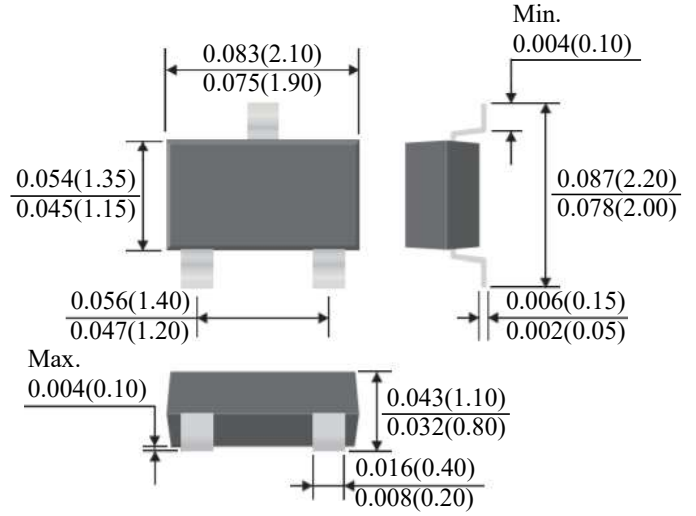
FEATURES

· Suffix "H" indicates Halogen-free parts, ex. MMBT3904WH



B	Base
C	Collector
E	Emitter

SOT-323



Dimensions in inch and (millimeter)

Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector Base Voltage	V_{CBO}	60	V
Collector Emitter Voltage	V_{CEO}	40	V
Emitter Base Voltage	V_{EBO}	6	V
Collector Current	I_C	0.2	A
Power Dissipation	P_D	200	mW
Thermal Resistance from Junction to Ambient (Note 1)	$R_{\theta JA}$	625	$^\circ\text{C}/\text{W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	- 55 to + 150	$^\circ\text{C}$

Note :

1. Device mounted on FR-4 substrate PC board, with minimum recommended pad layout.



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

Parameter	Conditions	Symbol	Min.	Max.	Unit
DC Current	$V_{CE}=1\text{V}, I_C=0.1\text{mA}$	h_{FE}	40	-	-
	$V_{CE}=1\text{V}, I_C=1\text{mA}$		70	-	
	$V_{CE}=1\text{V}, I_C=10\text{mA}$		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 Cutoff Current	$V_{CE}=30\text{V}$	I_{CES}	-	50	nA
Emitter Base Cutoff Current	$V_{EB}=3\text{V}$	I_{EBO}	-	50	nA
Collector Base Breakdown Voltage	$I_C=10\mu\text{A}$	$V_{(BR)CBO}$	60	-	V
Collector Emitter Breakdown Voltage	$I_C=1\text{mA}$	$V_{(BR)CEO}$	40	-	V
Emitter Base Breakdown Voltage	$I_E=10\mu\text{A}$	$V_{(BR)EBO}$	6	-	V
Collector Emitter Saturation Voltage	$I_C=10\text{mA}, I_B=1\text{mA}$	$V_{CE(sat)}$	-	0.2	V
	$I_C=50\text{mA}, I_B=5\text{mA}$		-	0.3	
Base Emitter Saturation Voltage	$I_C=10\text{mA}, I_B=1\text{mA}$	$V_{BE(sat)}$	0.65	0.85	V
	$I_C=50\text{mA}, I_B=5\text{mA}$		-	0.95	
Transition Frequency	$V_{CE}=20\text{V}, I_E=-10\text{mA}, f=100\text{MHz}$	f_T	300	-	MHz
Delay Time	$V_{CC}=3\text{V}, V_{BE(OFF)}=0.5\text{V},$ $I_C=10\text{mA}, I_{B1}=1\text{mA}$	t_d	-	35	ns
Rise Time		t_r	-	35	
Storage Time		t_{stg}	-	200	
Fall Time		t_f	-	50	
Collector output Capacitance	$V_{CB}=10\text{V}, f=100\text{KHz}$	C_{ob}	-	4	pF



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RATINGS AND CHARACTERISTIC CURVES

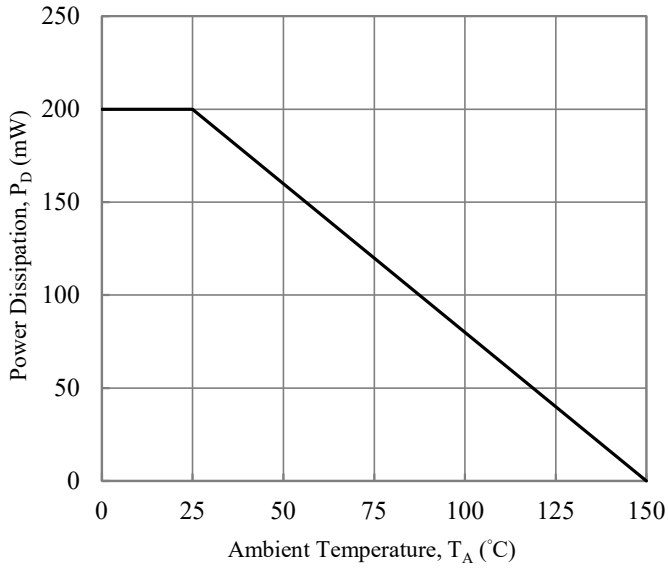


Fig. 1 Power Derating Curves

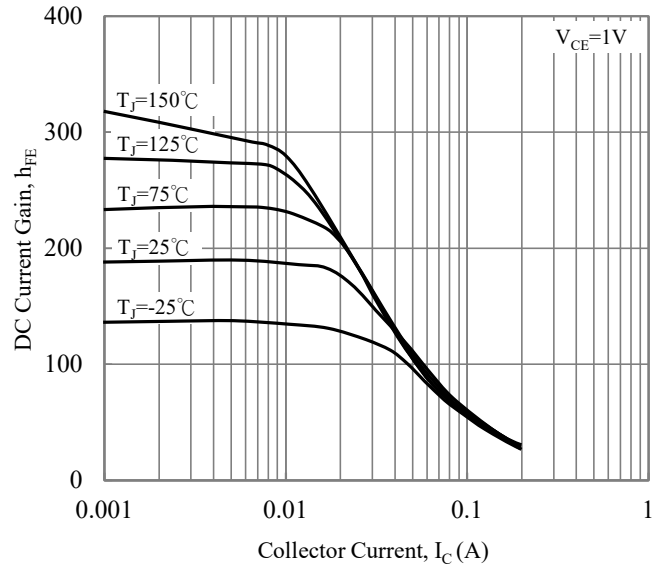


Fig. 2 Current Gain vs. Collector Current

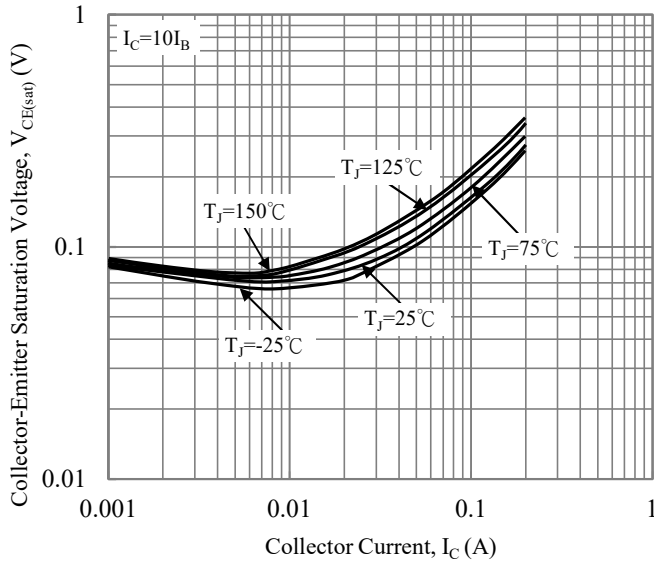


Fig. 3 Collector-Emmitter Saturation Voltage vs. Collector Current

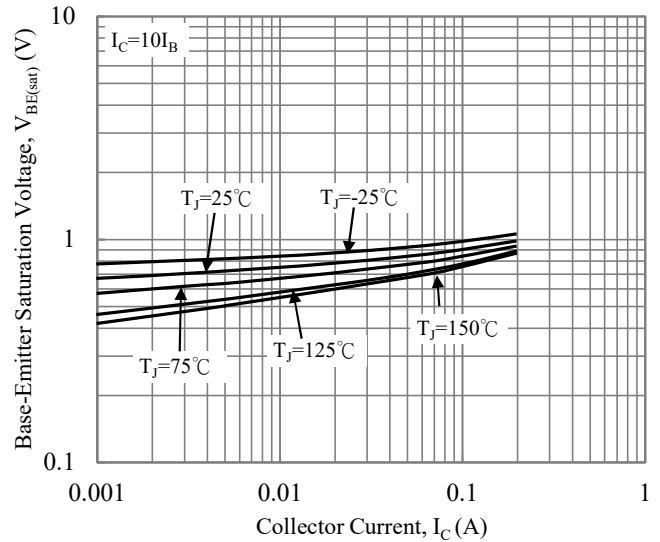


Fig. 4 Base-Emmitter Saturation Voltage vs. Collector Current

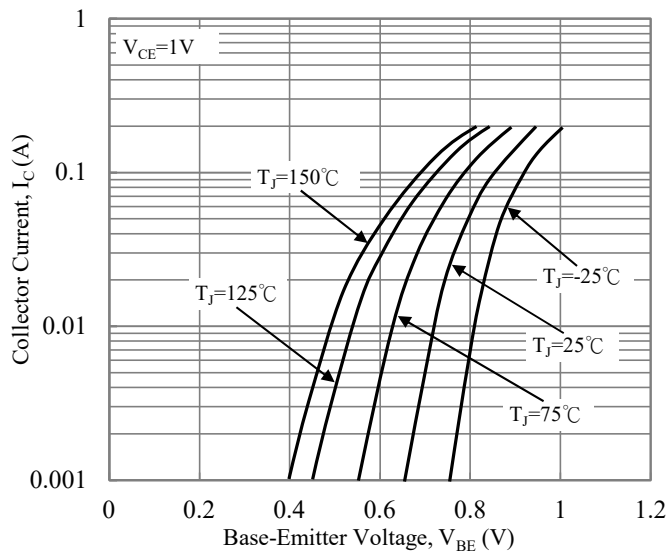


Fig. 5 Base-Emmitter Voltage vs. Collector Current

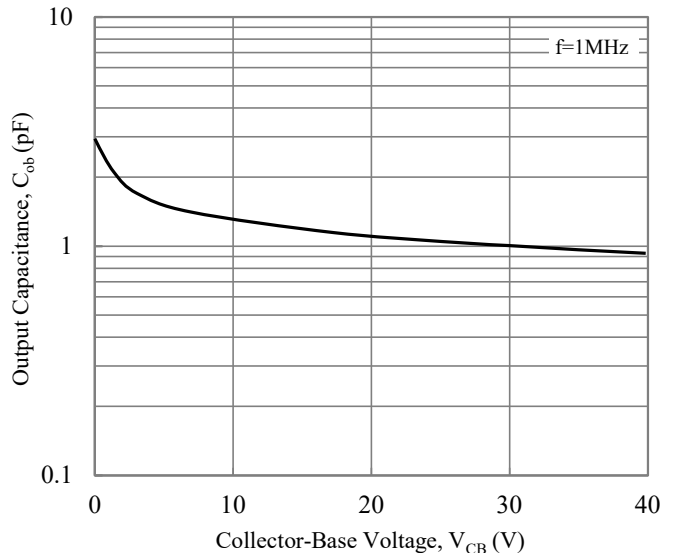


Fig. 6 Output Capacitance



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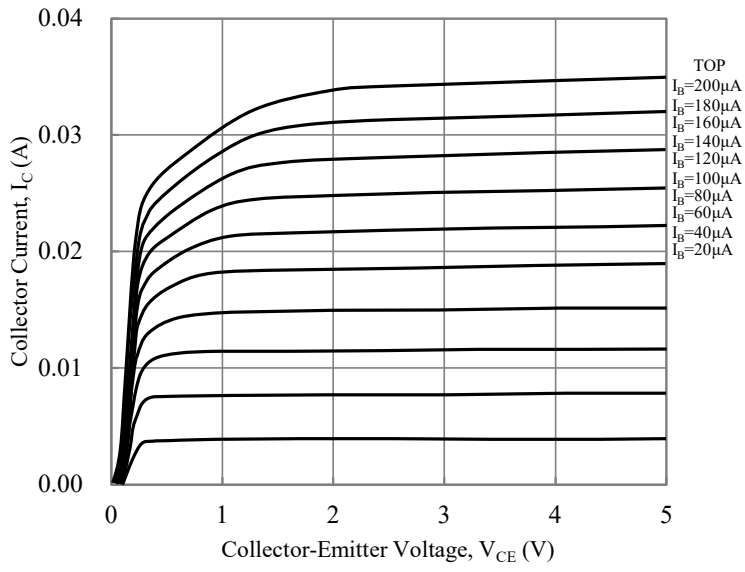


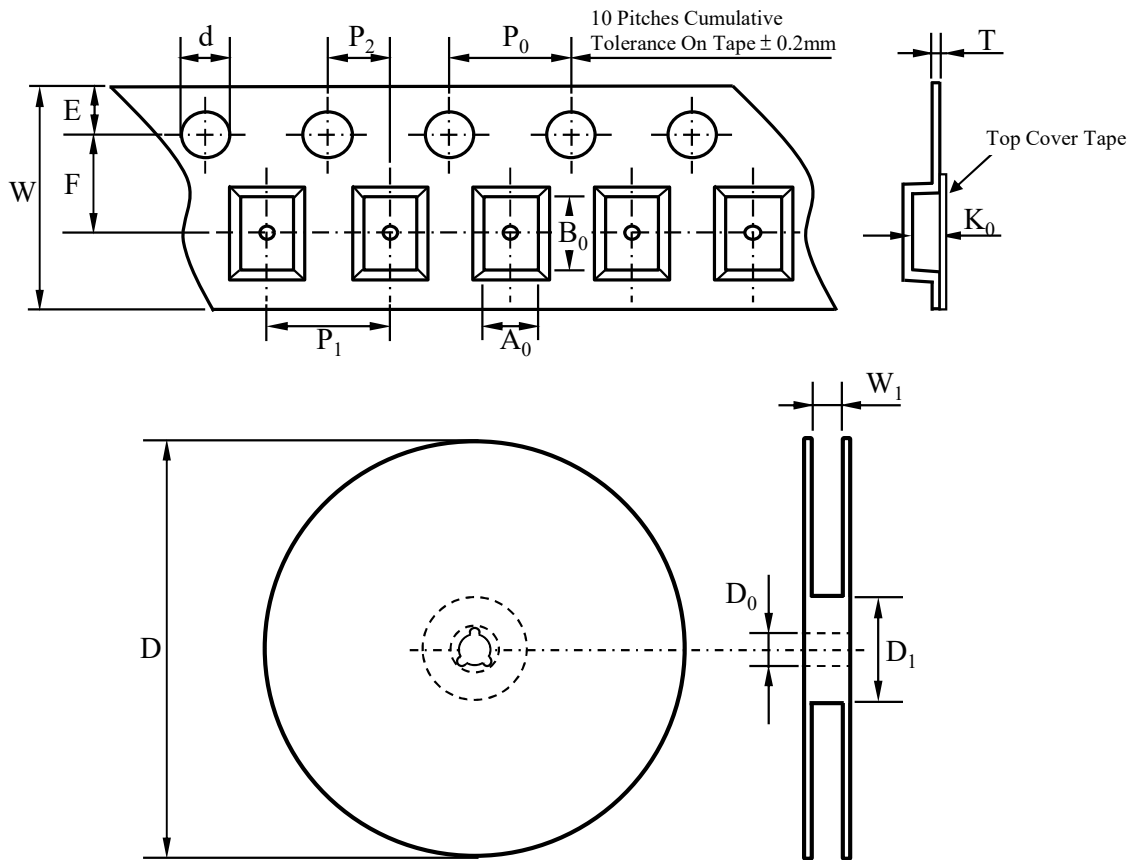
Fig. 7 Output Characteristics Curves



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TAPE & REEL SPECIFICATION



Item	Symbol	SOT-323
Carrier width	A_0	*
Carrier length	B_0	
Carrier depth	K_0	
Sprocket hole	d	1.50 ± 0.10
Reel outside diameter	D	178.00 ± 2.00
Feed hole width	D_0	13.00 ± 0.50
Reel inner diameter	D_1	MIN. 50.00
Sprocket hole position	E	1.75 ± 0.10
Punch hole position	F	3.50 ± 0.10
Sprocket hole pitch	P_0	4.00 ± 0.10
Punch hole pitch	P_1	4.00 ± 0.10
Embossment center	P_2	2.00 ± 0.10
Overall tape thickness	T	0.20 ± 0.05
Tape width	W	8.00 ± 0.20
Reel width	W_1	MAX. 14.50

Note *: A_0 , B_0 , and K_0 are determined by component size. The clearance between the components and the cavity must be within 0.05 mm min. to 0.5 mm max.

ORDER INFORMATION

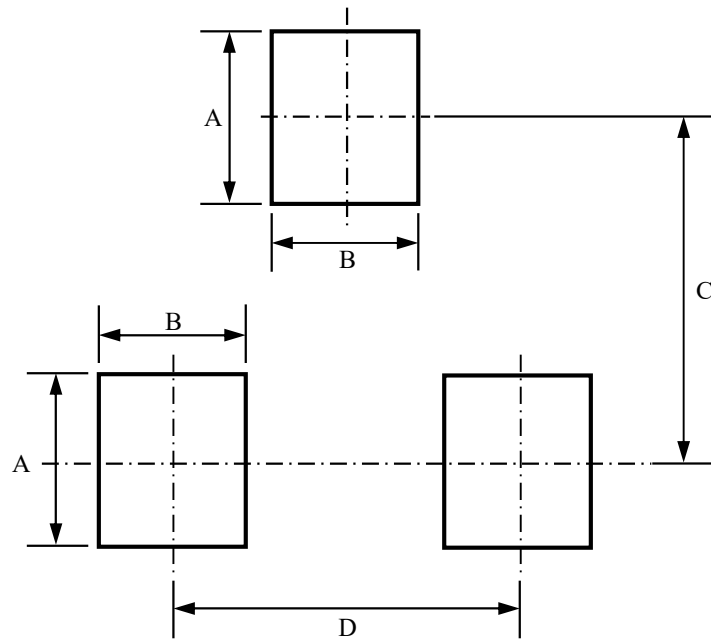
Part Number	Marking Code	Reel Size	Quantity
MMBT3904WH	1E	7"	3,000



MMBT3904WH

NPN TRANSISTOR

SUGGESTED SOLDER PAD LAYOUT



Unit :mm

PACKAGE	A	B	C	D
SOT-323	0.80	0.80	1.60	1.30