

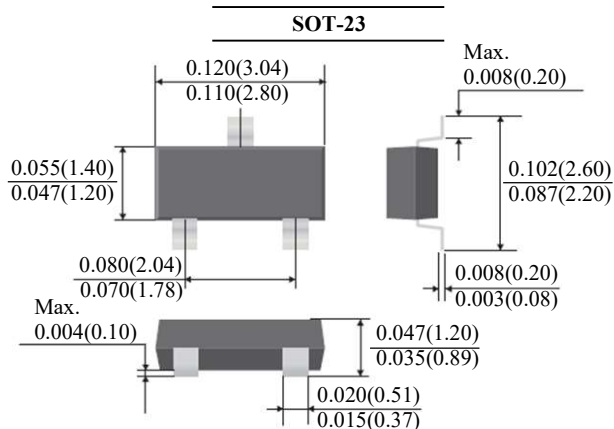
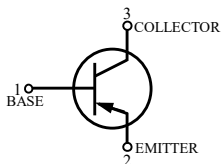


# MMBT9110SH

## PNP TRANSISTOR

### FEATURES

- Low Collector-Emitter Saturation Voltage
- High Collector Current Capability
- Suffix "H" indicates Halogen-free parts, ex. MMBT9110SH



Dimensions in inch and (millimeter)

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

Parameter	Symbol	Value	Unit	
Collector Base Voltage	$V_{CBO}$	-120	V	
Collector Emitter Voltage	$V_{CEO}$	-100	V	
Emitter Base Voltage	$V_{EBO}$	-5	V	
Collector Current	$I_C$	-1	A	
Peak Pulse Current	$I_{CM}$	-3	A	
Power Dissipation	$P_{tot}$	(Note 1)	300	mW
		(Note 2)	480	
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	(Note 1)	417	$^\circ\text{C}/\text{W}$
		(Note 2)	260	
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.
2. Device mounted on FR-4 substrate PC board, 2oz copper, with 1-in square copper plate.



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

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
DC Current Gain	$V_{CE} = -5\text{V}, I_C = -1\text{mA}$	$h_{FE}$	150	-	-	-
	$V_{CE} = -5\text{V}, I_C = -250\text{mA}$		150	-	-	
	$V_{CE} = -5\text{V}, I_C = -500\text{mA}$		130	-	420	
	$V_{CE} = -5\text{V}, I_C = -1000\text{mA}$		85	-	-	
Collector Base Breakdown Voltage	$I_C = -10\mu\text{A}$	$V_{(BR)CBO}$	-120	-	-	V
Collector Emitter Breakdown Voltage	$I_C = -1\text{mA}$	$V_{(BR)CEO}$	-100	-	-	V
Emitter Base Breakdown Voltage	$I_E = -10\mu\text{A}$	$V_{(BR)EBO}$	-5	-	-	V
Collector Base Cutoff Current	$V_{CB} = -80\text{V}$	$I_{CBO}$	-	-	-100	nA
Collector Emitter Cutoff Current	$V_{EB} = -80\text{V}$	$I_{CES}$	-	-	-100	nA
Emitter Base Cutoff Current	$V_{EB} = -4\text{V}$	$I_{EBO}$	-	-	-100	nA
Collector Emitter Saturation Voltage	$I_C = -250\text{mA}, I_B = -25\text{mA}$	$V_{CE(sat)}$	-	-	-130	mV
	$I_C = -500\text{mA}, I_B = -50\text{mA}$		-	-	-220	
	$I_C = -1000\text{mA}, I_B = -100\text{mA}$		-	-	-395	
Base Emitter Saturation Voltage	$I_C = -1000\text{mA}, I_B = -100\text{mA}$	$V_{BE(sat)}$	-	-	-1100	mV
Base Emitter Turn-On Voltage	$V_{CE} = -5\text{V}, I_C = -1000\text{mA}$	$V_{BE(on)}$	-	-	-1000	mV
Junction Capacitance	$V_{CB} = -10\text{V}, f = 1\text{MHz}$	$C_J$	-	11	-	pF
Gain Bandwidth Product	$V_{CE} = -10\text{V}, I_C = -50\text{mA}, f = 100\text{MHz}$	$f_T$	-	85	-	MHz



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## PNP TRANSISTOR

### RATINGS AND CHARACTERISTIC CURVES

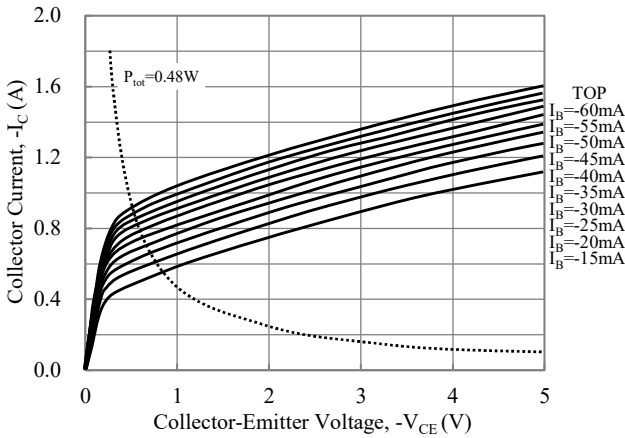


Fig. 1-Output Characteristics Curve

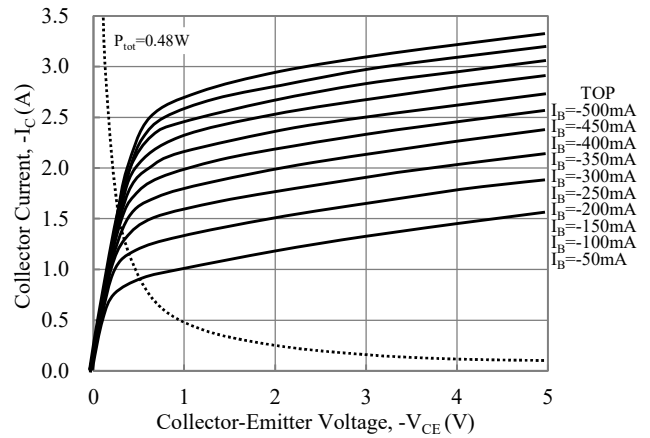


Fig. 2-Output Characteristics Curve

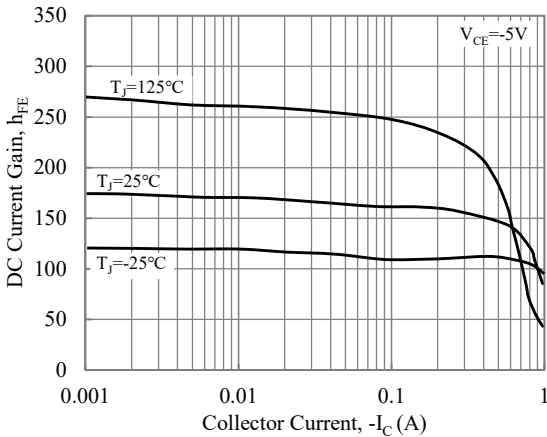


Fig. 3-DC Current Gain vs Collector Current

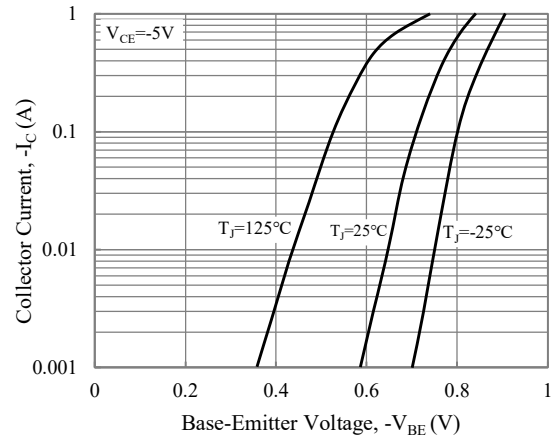


Fig. 4-Collector Current vs Base Emitter Voltage

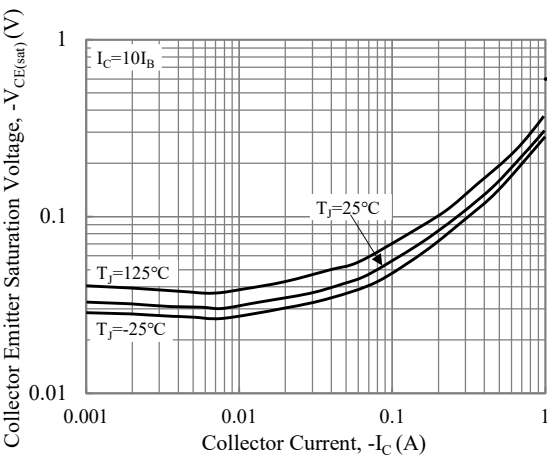


Fig. 5-Collector Emitter Saturation Voltage vs Collector Current

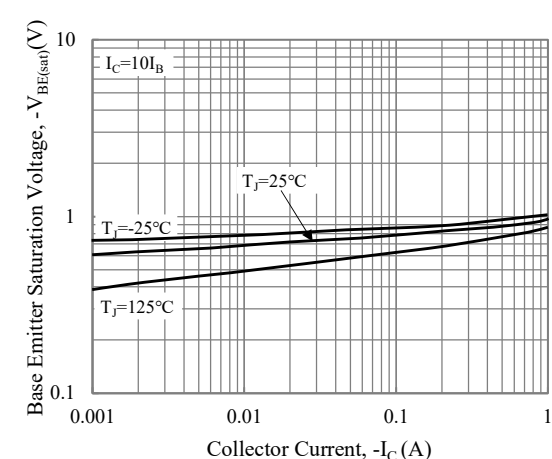
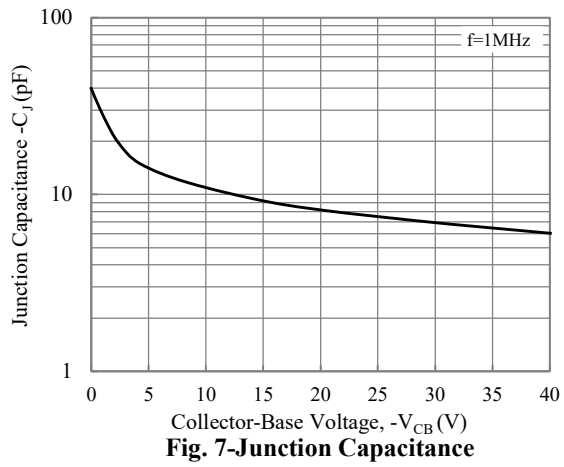


Fig. 6-Base Emitter Saturation Voltage vs Collector Current



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## PNP TRANSISTOR

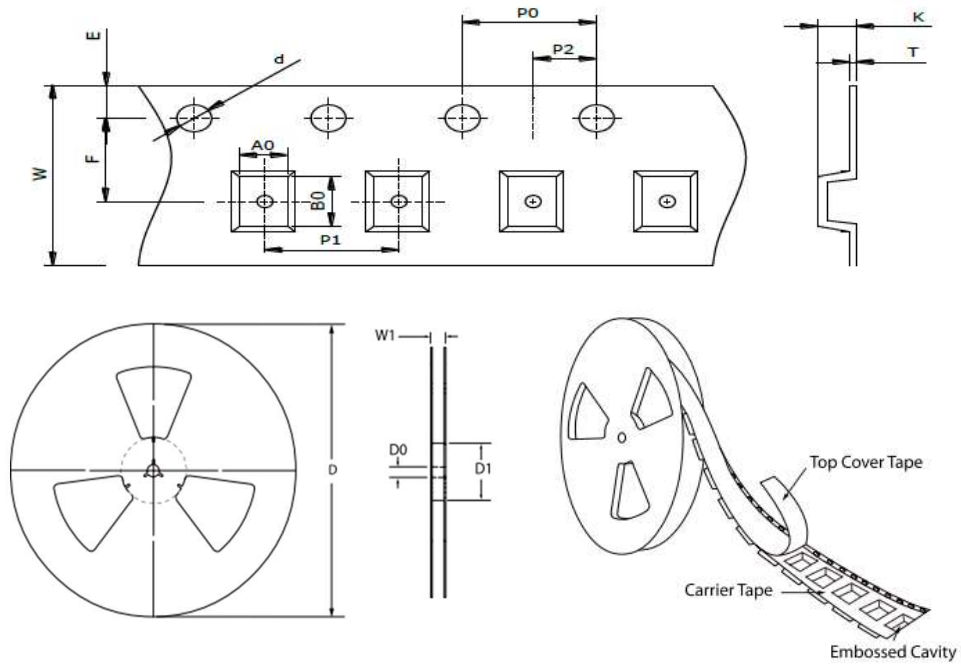




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## PNP TRANSISTOR

### TAPE & REEL SPECIFICATION



Item	Symbol	SOT-23
Carrier width	A <sub>0</sub>	3.30 ± 0.10
Carrier length	B <sub>0</sub>	3.00 ± 0.10
Carrier depth	K	1.70 ± 0.10
Sprocket hole	d	1.50 ± 0.10
Reel outside diameter	D	178.00 ± 2.00
Feed hole width	D <sub>0</sub>	13.00 ± 0.50
Reel inner diameter	D <sub>1</sub>	MIN. 50.00
Sprocket hole position	E	1.75 ± 0.10
Punch hole position	F	3.50 ± 0.10
Sprocket hole pitch	P <sub>0</sub>	4.00 ± 0.10
Punch hole pitch	P <sub>1</sub>	4.00 ± 0.10
Embossment center	P <sub>2</sub>	2.00 ± 0.10
Overall tape thickness	T	0.20 ± 0.05
Tape width	W	8.00 ± 0.20
Reel width	W <sub>1</sub>	MAX. 14.50

### ORDER INFORMATION

Package	Reel Size	Quantity
SOT-23	7"	3,000

### MARKING CODE

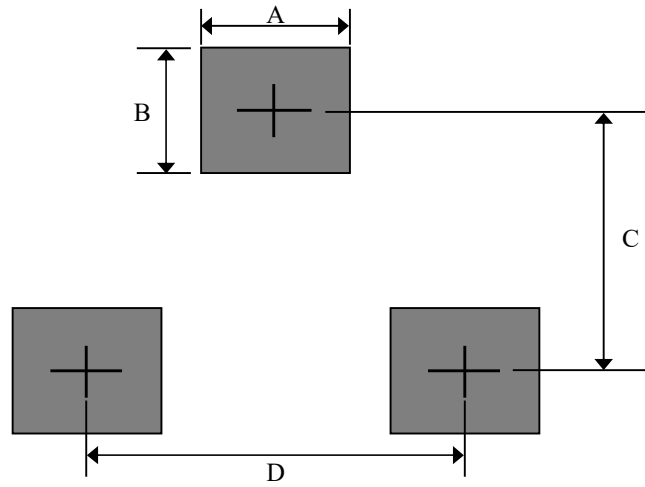
Part Number	Marking Code
MMBT9110SH	9E



# MMBT9110SH

## PNP TRANSISTOR

### SUGGESTED SOLDER PAD LAYOUT



Unit : mm

PACKAGE	A	B	C	D
SOT-23	0.80	1.00	2.40	1.90