



# MMBT3906W

## PNP GENERAL PURPOSE SWITCHING TRANSISTOR

**VOLTAGE** 40 Volt **POWER** 150 mWatt

**SOT-323** Unit : inch(mm)

### FEATURES

- PNP epitaxial silicon, planar design
- Collector-emitter voltage  $V_{CE} = -40V$
- Collector current  $I_C = -200mA$
- Lead free in compliance with EU RoHS 2011/65/EU directive
- Green molding compound as per IEC61249 Std. . (Halogen Free)

### MECHANICAL DATA

- Case: SOT-323, Plastic
- Terminals: Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 0.0001 ounce, 0.005 gram
- Marking: S2A

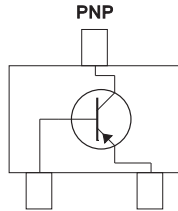
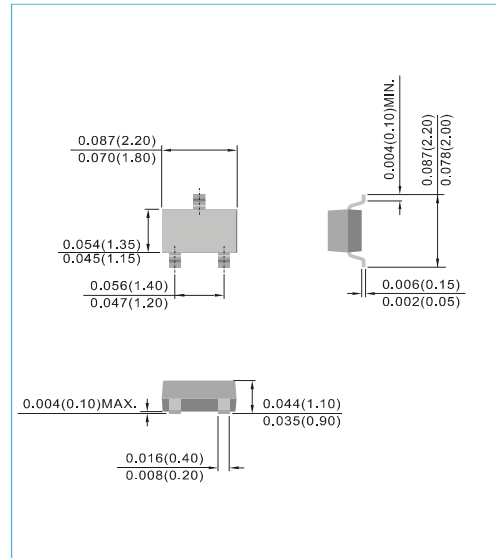


Fig.35



### ABSOLUTE RATINGS

Parameter	Symbol	Value	Units
Collector - Emitter Voltage	$V_{CEO}$	-40	V
Collector - Base Voltage	$V_{CBO}$	-40	V
Emitter - Base Voltage	$V_{EBO}$	-5	V
Collector Current - Continuous	$I_C$	-200	mA

### THERMAL CHARACTERISTICS

Parameter	Symbol	Value	Units
Max Power Dissipation (Note 1)	$P_{TOT}$	150	mW
Thermal Resistance , Junction to Ambient	$R_{\theta JA}$	830	$^{\circ}C/W$
Junction Temperature	$T_J$	-55 to 150	$^{\circ}C$
Storage Temperature	$T_{STG}$	-55 to 150	$^{\circ}C$

Note : 1. Transistor mounted on FR-5 board 1 x 0.75 x 0.062 in.



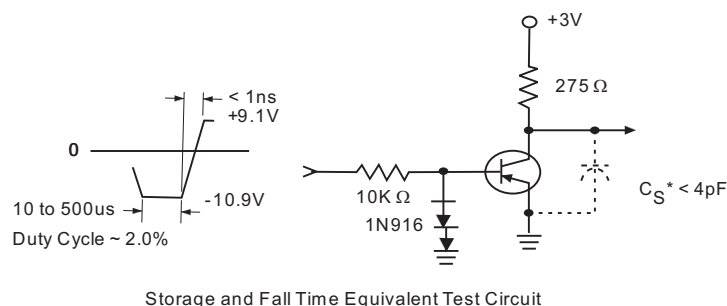
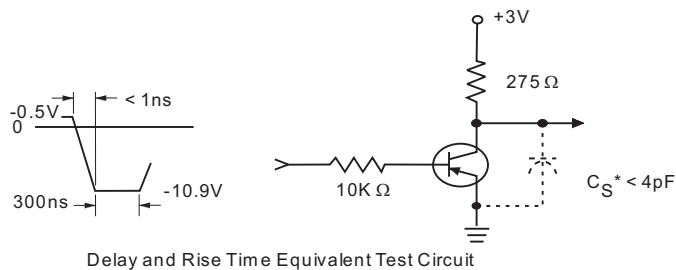
# MMBT3906W

## ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Test Condition	MIN.	TYP.	MAX.	Units
Collector - Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = -1\text{mA}, I_B = 0$	-40	-	-	V
Collector - Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = -10\mu\text{A}, I_E = 0$	-40	-	-	V
Emitter - Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = -10\mu\text{A}, I_C = 0$	-5	-	-	V
Base Cutoff Current	$I_{BL}$	$V_{CE} = -30\text{V}, V_{EB} = -3\text{V}$	-	-	-50	nA
Collector Cutoff Current	$I_{CEX}$	$V_{CE} = -30\text{V}, V_{EB} = -3\text{V}$	-	-	-50	nA
DC Current Gain (Note 2)	$h_{FE}$	$I_C = -0.1\text{mA}, V_{CE} = -1\text{V}$ $I_C = -1\text{mA}, V_{CE} = -1\text{V}$ $I_C = -10\text{mA}, V_{CE} = -1\text{V}$ $I_C = -50\text{mA}, V_{CE} = -1\text{V}$ $I_C = -100\text{mA}, V_{CE} = -1\text{V}$	60 80 100 60 30	- - - - -	- - 300 - -	-
Collector - Emitter Saturation Voltage (Note 2)	$V_{CE(SAT)}$	$I_C = -10\text{mA}, I_B = -1\text{mA}$ $I_C = -50\text{mA}, I_B = -5\text{mA}$	-	-	-0.25 -0.4	V
Base - Emitter Saturation Voltage (Note 2)	$V_{BE(SAT)}$	$I_C = -10\text{mA}, I_B = -1\text{mA}$ $I_C = -50\text{mA}, I_B = -5\text{mA}$	-0.65 -	- -	-0.85 -0.95	V
Collector - Base Capacitance	$C_{CBO}$	$V_{CB} = -5\text{V}, I_E = 0, f = 1\text{MHz}$	-	-	4.5	pF
Emitter - Base Capacitance	$C_{EBO}$	$V_{EB} = -0.5\text{V}, I_C = 0, f = 1\text{MHz}$	-	-	10	pF
Delay Time	$t_d$	$V_{CC} = -3\text{V}, V_{BE} = -0.5\text{V}, I_C = -10\text{mA}, I_B = -1\text{mA}$	-	-	35	ns
Rise Time	$t_r$	$V_{CC} = -3\text{V}, V_{BE} = -0.5\text{V}, I_C = -10\text{mA}, I_B = -1\text{mA}$	-	-	35	ns
Storage Time	$t_s$	$V_{CC} = -3\text{V}, I_C = -10\text{mA}, I_{B1} = I_{B2} = -1\text{mA}$	-	-	225	ns
Fall Time	$t_f$	$V_{CC} = -3\text{V}, I_C = -10\text{mA}, I_{B1} = I_{B2} = -1\text{mA}$	-	-	75	ns
Current Gain-Bandwidth Product	$f_T$	$I_C = -10\text{mA}, V_{CE} = -20\text{V}, f = 100\text{MHz}$	250	-	-	MHz

Note 2: Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

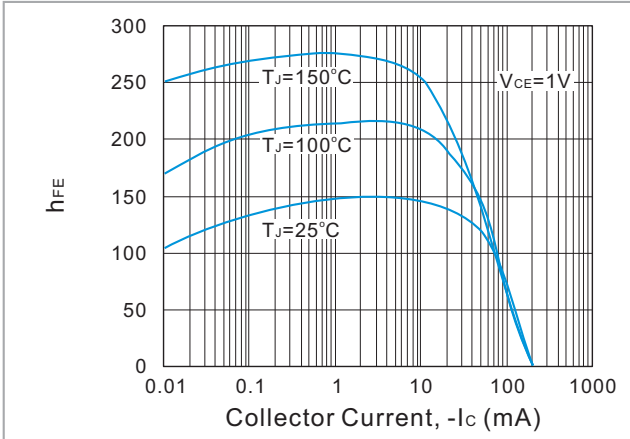
### SWITCHING TIME EQUIVALENT TEST CIRCUITS



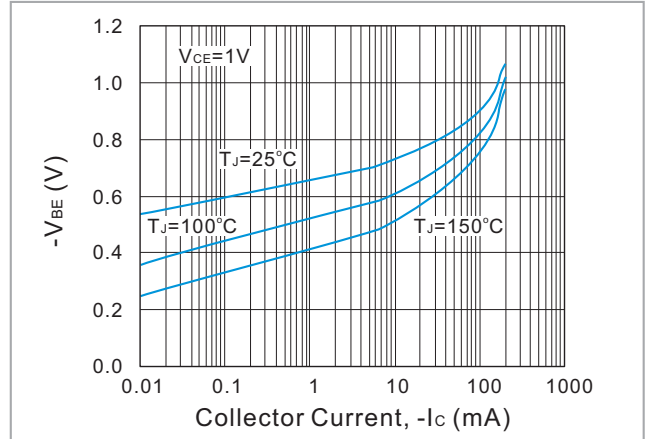


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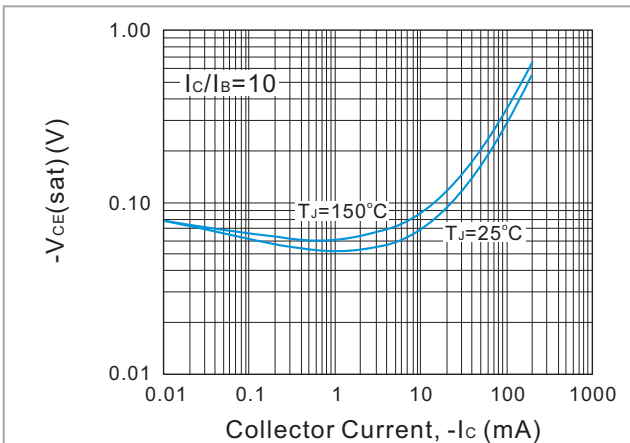
## ELECTRICAL CHARACTERISTICS CURVE



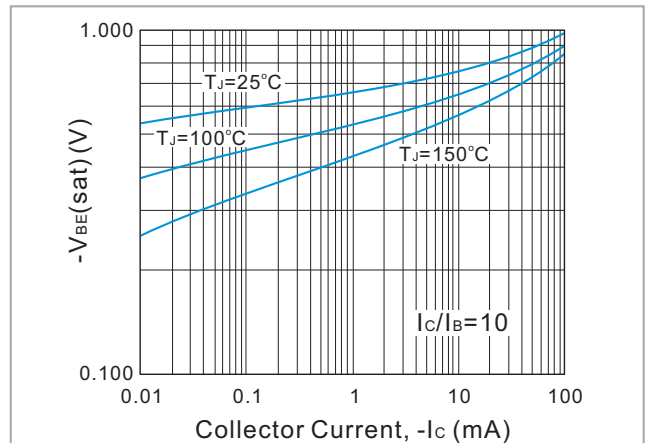
**Fig. 1. Typical  $h_{FE}$  vs Collector Current**



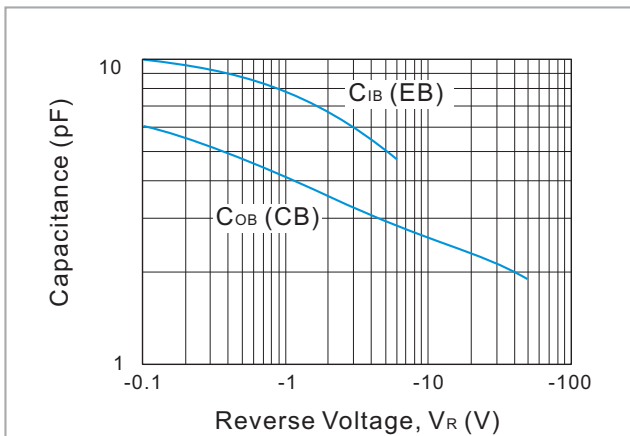
**Fig. 2. Typical  $V_{BE}$  vs Collector Current**



**Fig. 3. Typical  $V_{CE(sat)}$  vs Collector Current**



**Fig. 4. Typical  $V_{BE(sat)}$  vs Collector Current**



**Fig. 5. Typical Capacitances vs Reverse Voltage**

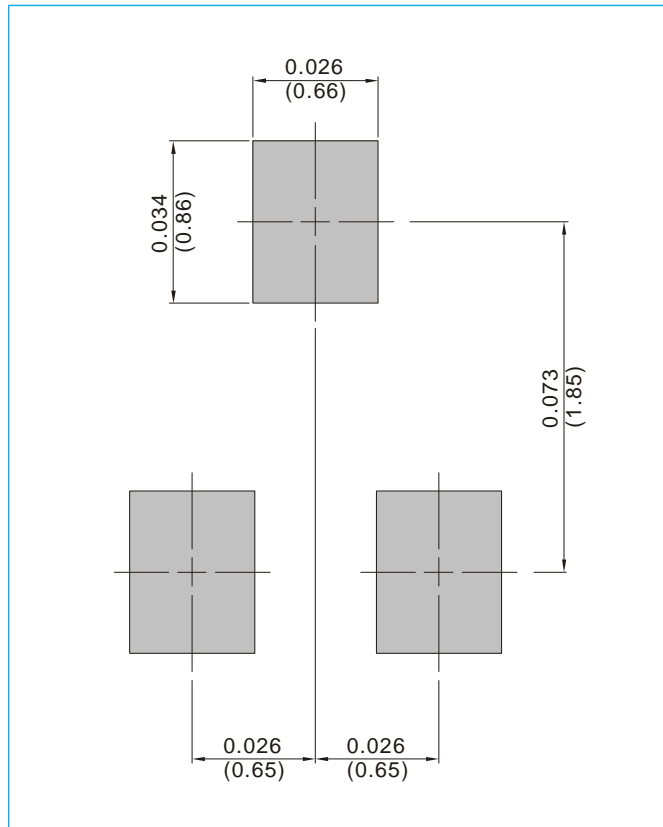


# MMBT3906W

## MOUNTING PAD LAYOUT

SOT-323

Unit : inch(mm)



## ORDER INFORMATION

- Packing information  
T/R - 12K per 13" plastic Reel  
T/R - 3K per 7" plastic Reel



# MMBT3906W

## Part No\_packing code\_Version

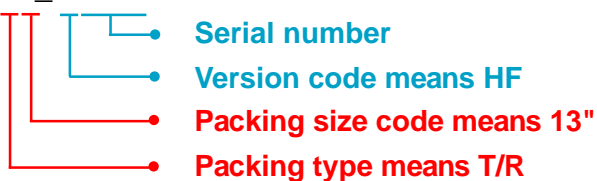
MMBT3906W\_R1\_00001

MMBT3906W\_R2\_00001

For example :

**RB500V-40\_R2\_00001**

Part No.



Packing Code <b>XX</b>				Version Code <b>XXXXX</b>		
Packing type	1 <sup>st</sup> Code	Packing size code	2 <sup>nd</sup> Code	HF or RoHS	1 <sup>st</sup> Code	2 <sup>nd</sup> ~5 <sup>th</sup> Code
Tape and Ammunition Box (T/B)	A	N/A	0	HF	0	serial number
Tape and Reel (T/R)	R	7"	1	RoHS	1	serial number
Bulk Packing (B/P)	B	13"	2			
Tube Packing (T/P)	T	26mm	X			
Tape and Reel (Right Oriented) (TRR)	S	52mm	Y			
Tape and Reel (Left Oriented) (TRL)	L	PANASERT T/B CATHODE UP (PBCU)	U			
FORMING	F	PANASERT T/B CATHODE DOWN (PBCD)	D			



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