



# MMBT3906

## PNP GENERAL PURPOSE SWITCHING TRANSISTOR

**VOLTAGE** 40 Volt    **POWER** 330 mWatt

**SOT-23**    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 2.0
- Green molding compound as per IEC 61249 standard

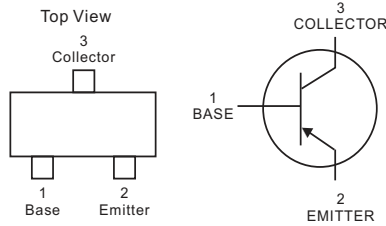
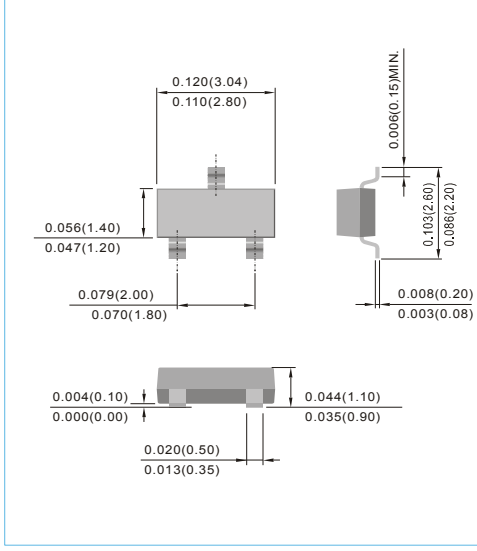
### MECHANICAL DATA

Case: SOT-23, Plastic

Terminals: Solderable per MIL-STD-750, Method 2026

Approx. Weight: 0.0003 ounces, 0.0084 grams

Marking: S2A



### 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)	$P_{TOT}$	330	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	375	$^{\circ}C/W$
Operating Junction Temperature and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^{\circ}C$

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



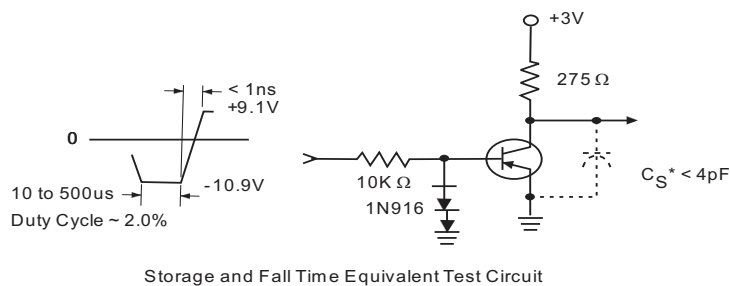
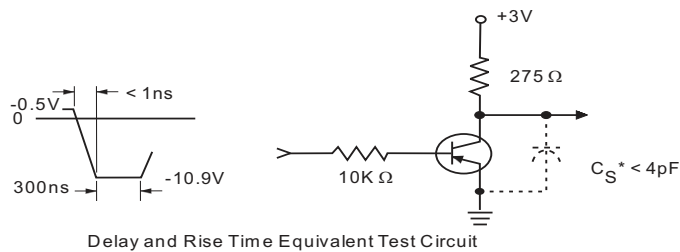
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## ELECTRICAL CHARACTERISTICS

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

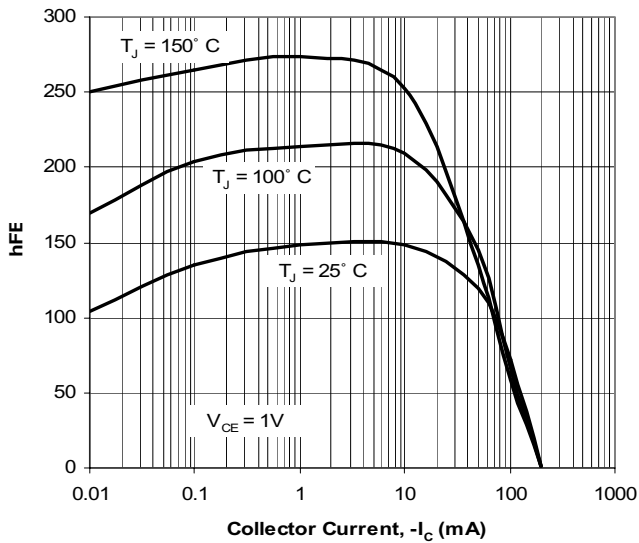
Note 2: Pulse Test: Pulse Width  $\leq 300 \mu s$ , Duty Cycle  $\leq 2.0\%$ .

### SWITCHING TIME EQUIVALENT TEST CIRCUITS

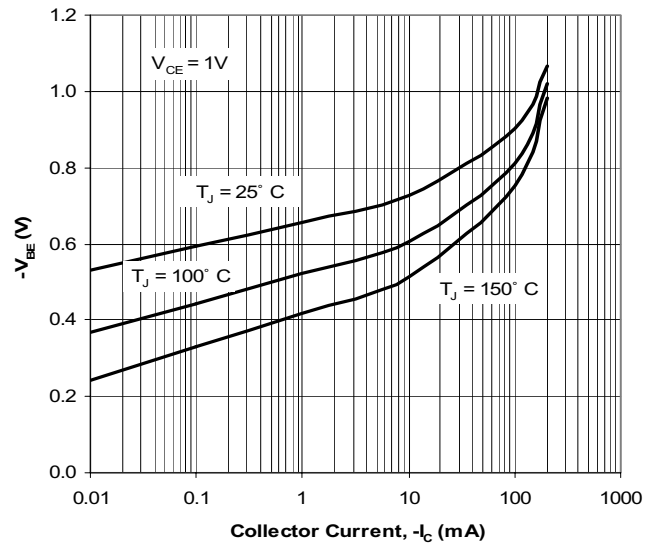




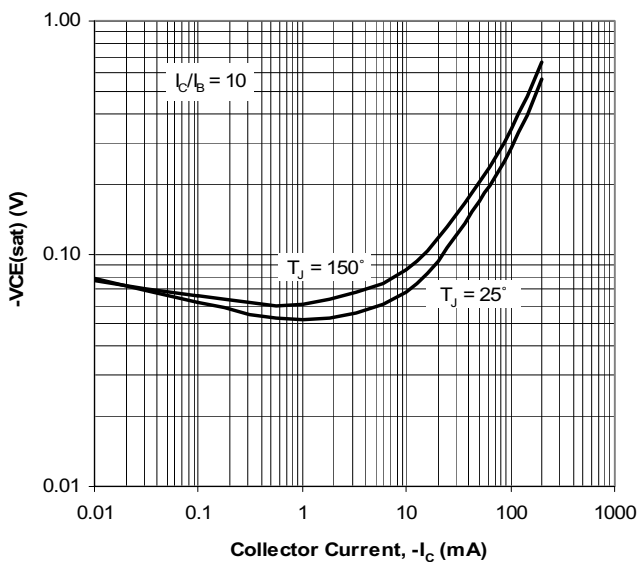
**ELECTRICAL CHARACTERISTICS CURVE**



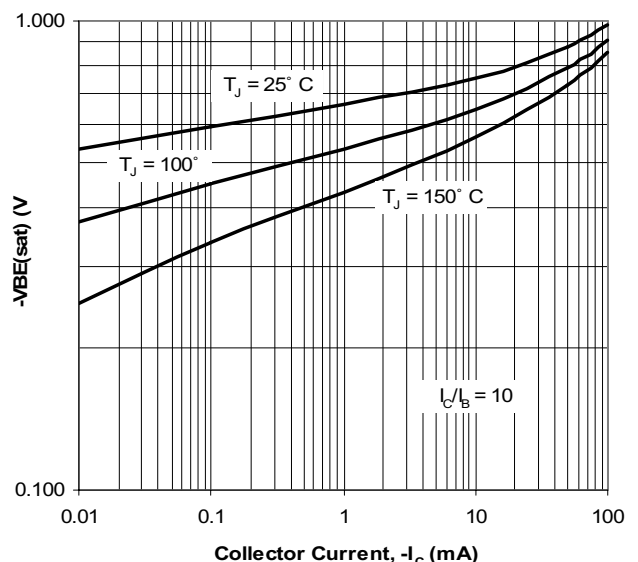
**Fig. 1. Typical  $h_{FE}$  vs. Collector Current**



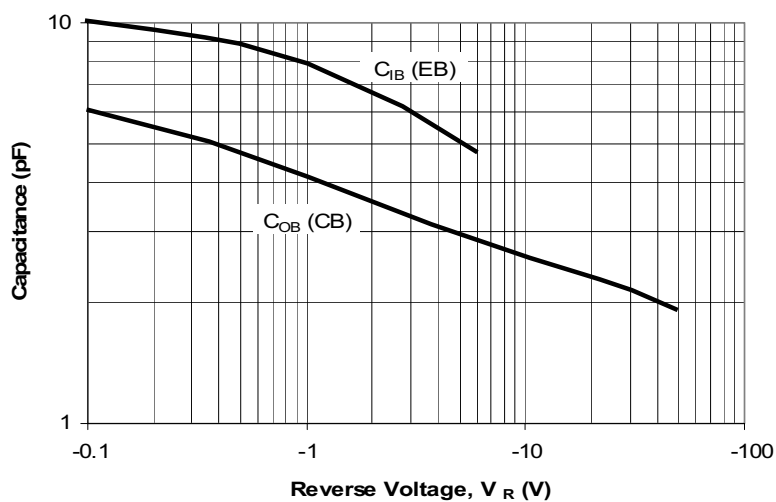
**Fig. 2. Typical  $V_{BE}$  vs. Collector Current**



**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**

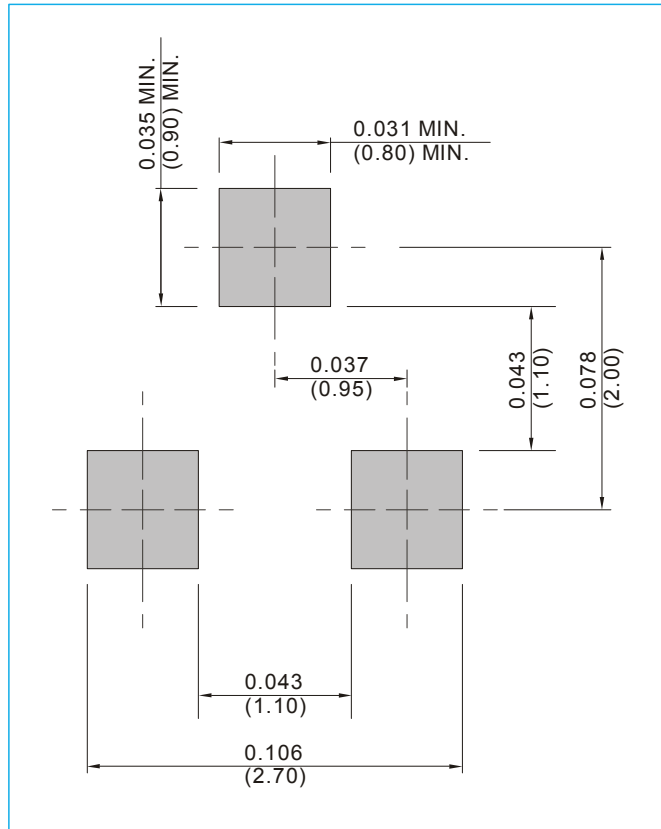


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## MOUNTING PAD LAYOUT

SOT-23

Unit : inch(mm)



## ORDER INFORMATION

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



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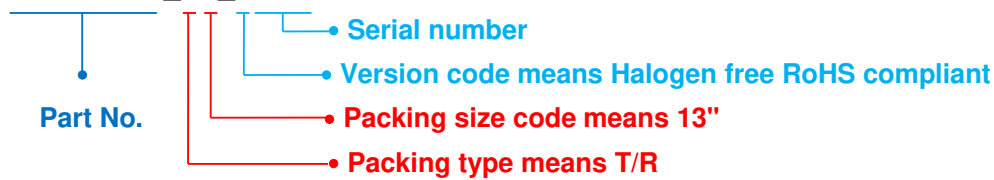
## Part No. \_packing code\_ Version

MMBT3906\_R1\_00001

MMBT3906\_R2\_00001

For example :

RB500V-40\_R2\_00001



Packing Code XX				Version Code X		Serial number XXXX
Packing type	1 <sup>st</sup> Code	Packing size code	2 <sup>nd</sup> Code	HSF Level	1 <sup>st</sup> Code	2 <sup>nd</sup> ~5 <sup>th</sup> Code
Tape and Ammunition Box (T/B)	A	N/A	0	Halogen free RoHS compliant	0	serial number
Tape and Reel (T/R)	R	7"	1	RoHS compliant	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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