



# DATA SHEET

## MMBT4401W

### NPN GENERAL PURPOSE SWITCHING TRANSISTOR

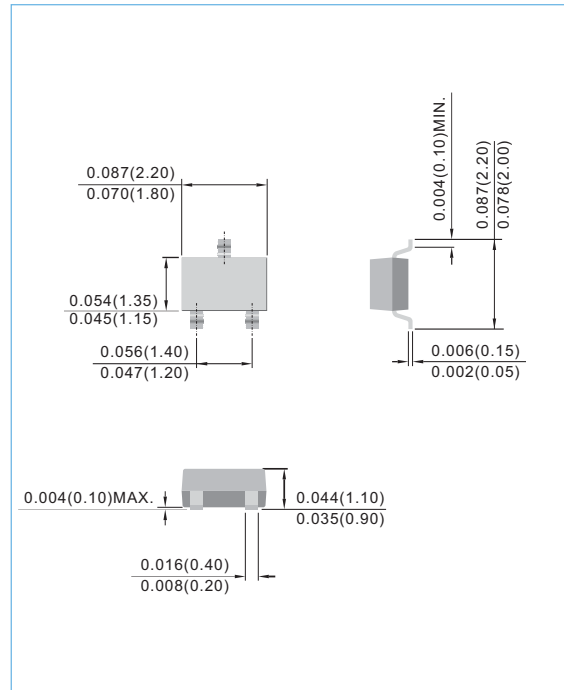
**VOLTAGE** 40 Volts    **POWER** 225mW    **SOT-323**    Unit : inch(mm)

#### FEATURES

- NPN epitaxial silicon, planar design
- Collector-emitter voltage  $V_{CE} = 40V$
- Collector current  $I_C = 600mA$
- Lead free in comply with EU RoHS 42331871GW directives
- Green molding compound as per IEC61249 Std. . (Halogen Free)

#### MECHANICAL DATA

- Case: SOT-323
- Terminals: Solderable per MIL-STD-750, Method 2026
- Approx Weight: 0.0048 gram
- Marking: M4A



#### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	Value	UNIT
Collector - Emitter Voltage	$V_{CEO}$	40	V
Collector - Base Voltage	$V_{CBO}$	60	V
Emitter - Base Voltage	$V_{EBO}$	6.0	V
Collector Current - Continuous	$I_C$	600	mA

#### THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	Value	UNIT
Max Power Dissipation (Note 1)	$P_{TOT}$	225	mW
Storage Temperature	$T_{STG}$	-55 to 150	
Junction Temperature	$T_J$	-55 to 150	
Thermal Resistance , Junction to Ambient	$R_{JA}$	556	/W

Note 1: Transistor mounted on FR-4 board 70 x 60 x 1mm.



**ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C, unless otherwise noted)**

PARAMETER	SYMBOL	Test Condition	MIN.	TYP.	MAX.	UNIT
Collector - Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> =1.0mA, I <sub>B</sub> =0	40	-	-	V
Collector - Base Breakdown Voltage	V <sub>(BR)CBO</sub>	I <sub>C</sub> =100uA, I <sub>E</sub> =0	60	-	-	V
Emitter - Base Breakdown Voltage	V <sub>(BR)EBO</sub>	I <sub>E</sub> =100uA, I <sub>C</sub> =0	6.0	-	-	V
Base Cutoff Current	I <sub>BL</sub>	V <sub>CE</sub> =35V, V <sub>EB</sub> =0.4V	-	-	100	nA
Collector Cutoff Current	I <sub>CEX</sub>	V <sub>CE</sub> =35V, V <sub>EB</sub> =0.4V	-	-	100	nA
DC Current Gain	h <sub>FE</sub>	I <sub>C</sub> =0.1mA, V <sub>CE</sub> =1.0V	20	-	-	
		I <sub>C</sub> =1.0mA, V <sub>CE</sub> =1.0V	40	-	-	
		I <sub>C</sub> =10mA, V <sub>CE</sub> =1.0V	80	-	-	
		I <sub>C</sub> =150mA, V <sub>CE</sub> =1.0V	100	-	300	
		I <sub>C</sub> =500mA, V <sub>CE</sub> =2.0V	40	-	-	
Collector - Emitter Saturation Voltage	V <sub>CE(SAT)</sub>	I <sub>C</sub> =150mA, I <sub>B</sub> =15 mA	-	-	0.4	V
		I <sub>C</sub> =500mA, I <sub>B</sub> =50mA	-	-	0.75	
Base - Emitter Saturation Voltage	V <sub>BE(SAT)</sub>	I <sub>C</sub> =150mA, I <sub>B</sub> =15mA	0.75	-	0.95	V
		I <sub>C</sub> =500mA, I <sub>B</sub> =50mA	-	-	1.2	
Collector - Base Capacitance	C <sub>CBO</sub>	V <sub>CB</sub> =5V, I <sub>E</sub> =0, f=1MHz	-	-	6.5	pF
Emitter - Base Capacitance	C <sub>EBO</sub>	V <sub>CB</sub> =0.5V, I <sub>C</sub> =0, f=1MHz	-	-	30	pF
Current Gain – Bandwidth Product	F <sub>T</sub>	I <sub>C</sub> =20mA, V <sub>CE</sub> =10V, f=100MHz	250	-	-	MHz
Delay Time	t <sub>d</sub>	V <sub>CC</sub> =30V, V <sub>BE</sub> =2.0V, I <sub>C</sub> =150mA, I <sub>B</sub> =15mA	-	-	15	ns
Rise Time	t <sub>r</sub>	V <sub>CC</sub> =30V, V <sub>BE</sub> =2.0V, I <sub>C</sub> =150mA, I <sub>B1</sub> =15mA	-	-	20	ns
Storage Time	t <sub>s</sub>	V <sub>CC</sub> =30V, I <sub>C</sub> =150mA, I <sub>B1</sub> =I <sub>B2</sub> =15mA	-	-	225	ns
Fall Time	t <sub>f</sub>	V <sub>CC</sub> =3V, I <sub>C</sub> =10mA, I <sub>B1</sub> =I <sub>B2</sub> =15mA	-	-	30	ns

**ELECTRICAL CHARACTERISTICS CURVES**

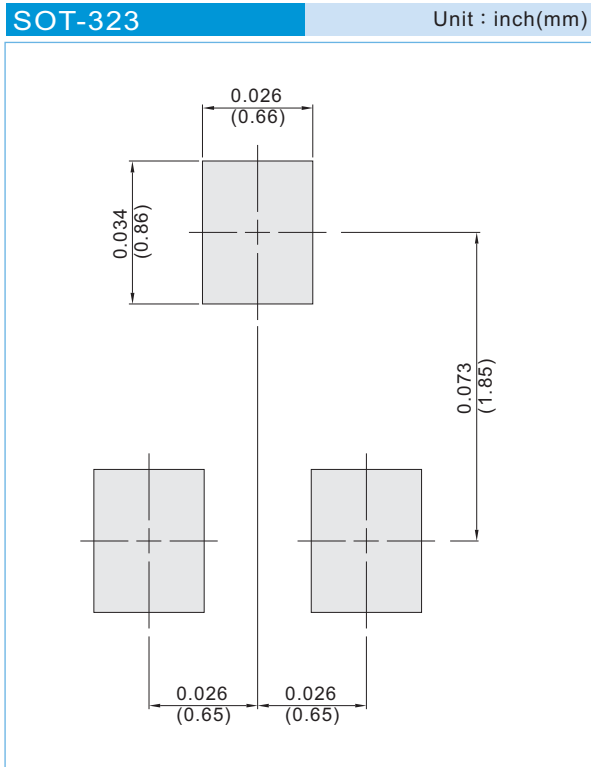
All Curves TBD



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## MOUNTING PAD LAYOUT

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## ORDER INFORMATION

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



**Part No\_packing code\_Version**

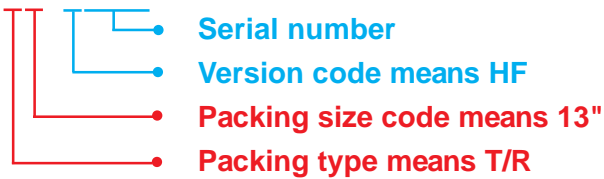
MMBT4401W\_R1\_00001

MMBT4401W\_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)	<b>A</b>	N/A	<b>0</b>	<b>HF</b>	<b>0</b>	serial number
Tape and Reel (T/R)	<b>R</b>	7"	<b>1</b>	<b>RoHS</b>	<b>1</b>	serial number
Bulk Packing (B/P)	<b>B</b>	13"	<b>2</b>			
Tube Packing (T/P)	<b>T</b>	26mm	<b>X</b>			
Tape and Reel (Right Oriented) (TRR)	<b>S</b>	52mm	<b>Y</b>			
Tape and Reel (Left Oriented) (TRL)	<b>L</b>	PANASERT T/B CATHODE UP (PBCU)	<b>U</b>			
FORMING	<b>F</b>	PANASERT T/B CATHODE DOWN (PBCD)	<b>D</b>			



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