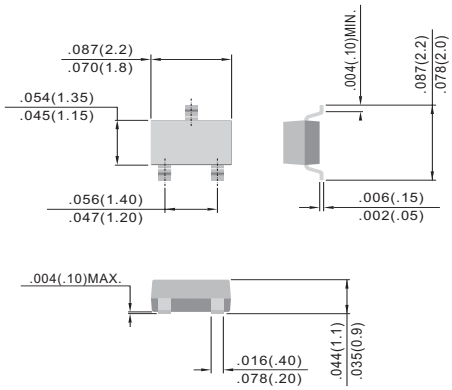
DATA SHEET

MMBT2222AW

NPN GENERAL PURPOSE SWITCHING TRANSISTOR

VOLTAGE 40 Volts **POWER** 150 mWatts

SOT-323 Unit: inch (mm)



FEATURES

- NPN epitaxial silicon, planar design
- Collector-emitter voltage VCE = 40V
- Collector current IC = 600mA
- Both normal and Pb free product are available :
  Normal : 80~95% Sn, 5~20% Pb
  Pb free: 98.5% Sn above

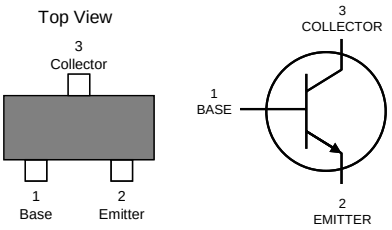
MECHANICAL DATA

Case: SOT-323, Plastic

Terminals: Solderable per MIL-STD-202, Method 208

Approx. Weight: 0.0052 gram

Marking: M2A



ABSOLUTE RATINGS

PARAMETER	Symbol	Value	Units
Collector-Emitter Voltage	V_{CEO}	40	V
Collector-Base Voltage	V_{CBO}	75	V
Emitter-Base Voltage	V_{EBO}	6.0	V
Collector Current-Continuous	I_C	600	mA

THERMAL CHARACTERISTICS

PARAMETER	Symbol	Value	Units
Max Power Dissipation (Note 1)	P_{TOT}	150	mW
Thermal Resistance , Junction to Ambient	$R\theta_{JA}$	833	°C/W
Junction Temperature	T_J	-55 to 150	°C
Storage Temperature	T_{STG}	-55 to 150	°C

Note 1: Transistor mounted on FR-5 board 1.0 x 0.75 x 0.062 in.

ELECTRICAL CHARACTERISTICS

PARAMETER	Symbol	Test Condition	MIN.	TYP.	MAX.	Units
Collector - Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=1.0mA, I_B=0	40	-	-	V
Collector - Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=10uA, I_E=0	75	-	-	V
Emitter - Base Breakdown Voltage	$V_{(BR)EBO}$	I_E=10uA, I_C=0	6.0	-	-	V
Base Cutoff Current	I_{BL}	V_{CE}=60V, V_{EB}=3.0V	-	-	20	nA
Collector Cutoff Current	I_{CEX}	V_{CE}=60V, V_{EB}=3.0V	-	-	10	nA
	I_{CBO}	V_{CE}=60V, I_E=0, V_{CE}=60V, I_E=0, T_J=125°C	-	-	10 10	nA uA
Emitter Cutoff Current	I_{EBO}	V_{EB}=3.0V, I_C=0,	-	-	100	nA
DC Current Gain	h_{FE}	I_C=0.1mA, V_{CE}=10V I_C=1.0mA, V_{CE}=10V I_C=10mA, V_{CE}=10V I_C=10mA, V_{CE}=10V, T_J=125°C I_C=150mA, V_{CE}=10V (Note 2) I_C=150mA, V_{CE}=1V (Note 2) I_C=500mA, V_{CE}=10V (Note 2)	35 50 75 35 100 50 40	- - - - - - -	- - - - 300 - -	-
Collector - Emitter Saturation Voltage (Note 2)	$V_{CE(SAT)}$	I_C=150mA, I_B=15mA I_C=500mA, I_B=50mA	-	-	0.3 1.0	V
Base - Emitter Saturation Voltage (Note 2)	$V_{BE(SAT)}$	I_C=150mA, I_B=15mA I_C=500mA, I_B=50mA	0.6 -	- -	1.2 2.0	V
Collector - Base Capacitance	C_{CBO}	V_{CB}=10V, I_E=0, f=1MHz	-	-	8.0	pF
Emitter - Base Capacitance	C_{EBO}	V_{CB}=0.5V, I_C=0, f=1MHz	-	-	25	pF
Delay Time	td	V_{CC}=3V, V_{BE}=-5V, I_C=150mA, I_B=15mA	-	-	10	ns
Rise Time	tr	V_{CC}=3V, V_{BE}=-5V, I_C=150mA, I_B=15mA	-	-	25	ns
Storage Time	ts	V_{CC}=30V, I_C=150mA I_{B1}=I_{B2}=15mA	-	-	225	ns
Fall Time	tf	V_{CC}=30V, I_C=150mA I_{B1}=I_{B2}=15mA	-	-	60	ns

Note 2: Pulse Test: Pulse Width < 300 us, Duty Cycle < 2.0%.

SWITCHING TIME EQUIVALENT TEST CIRCUITS

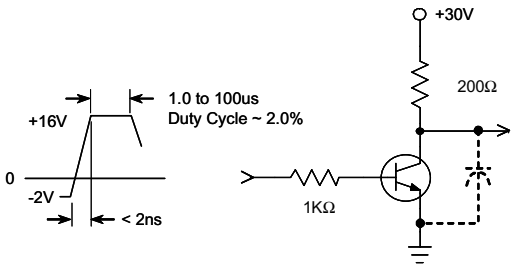
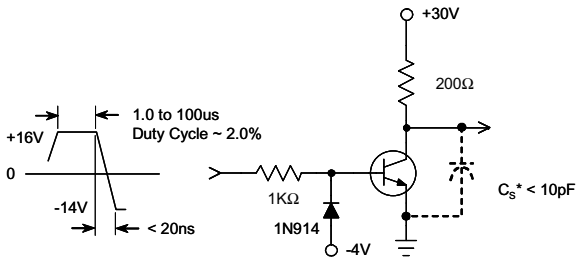


Fig. 1. Turn-On Time



Scope rise time < 4ns

* Total shunt capacitance of test jig, connectors, and oscilloscope

Fig. 2. Turn-Off Time

ELECTRICAL CHARACTERISTICS CURVE

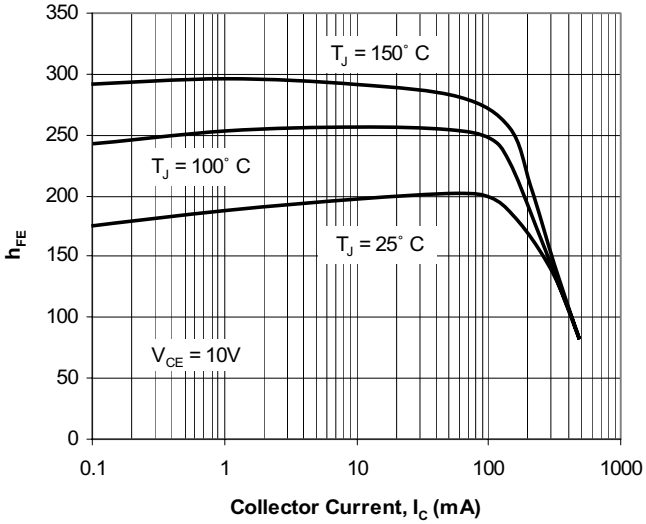


Fig. 3. Typical h_{FE} vs Collector Current

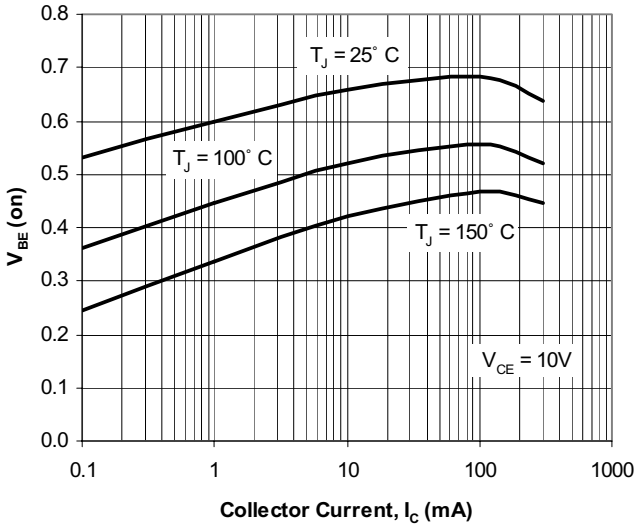


Fig. 4. Typical V_{BE} vs Collector Current

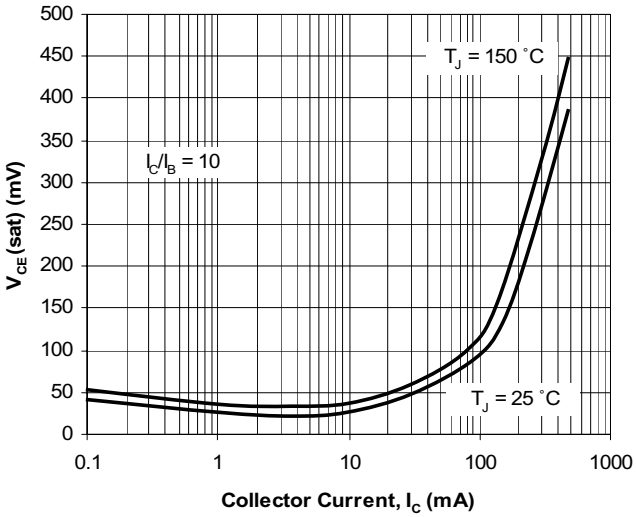


Fig. 5. Typical V_{CE} (sat) vs Collector Current

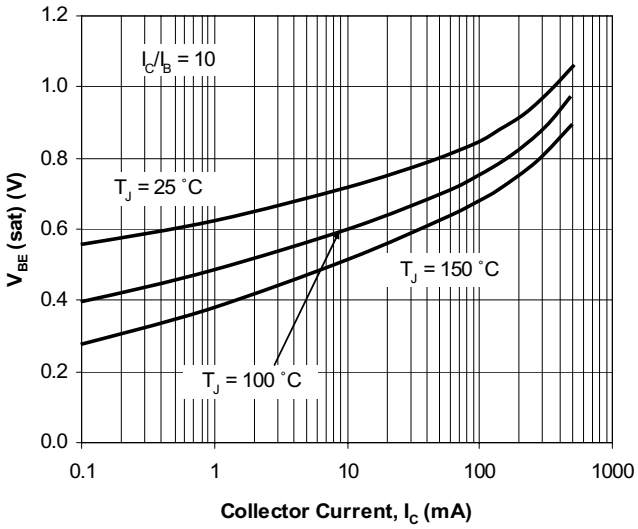


Fig. 6. Typical V_{BE} (sat) vs Collector Current

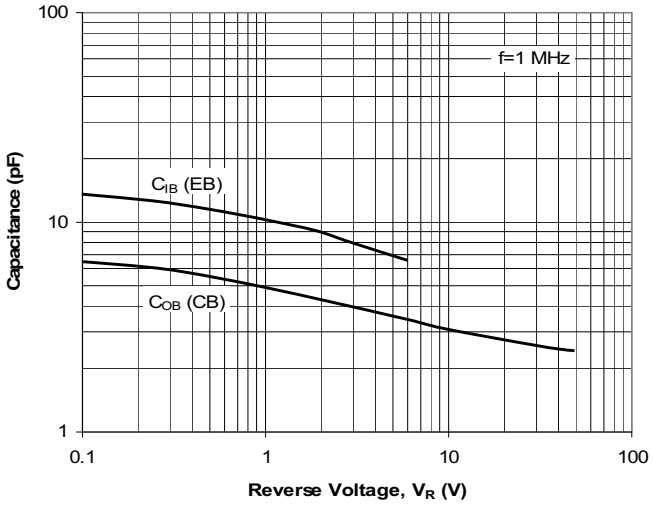
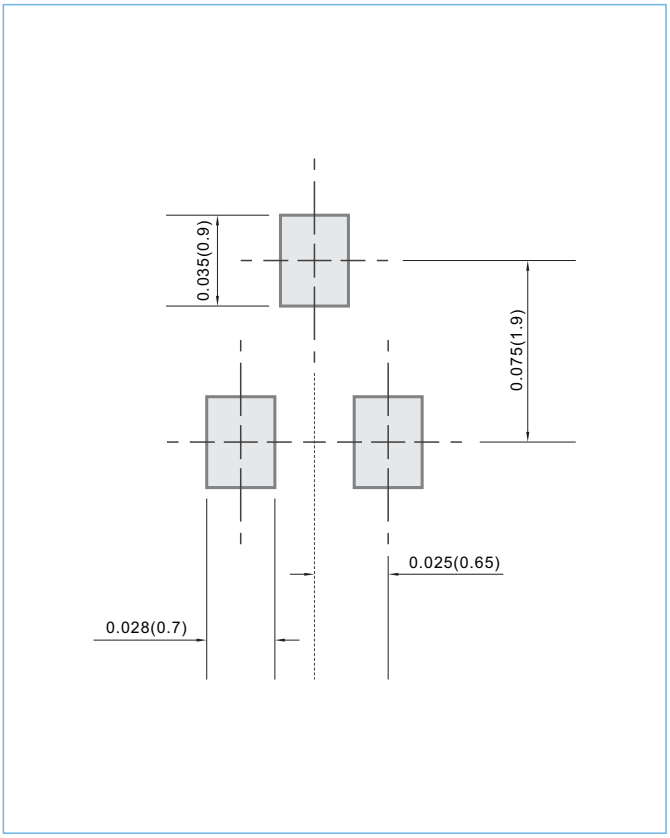


Fig. 7. Typical Capacitances vs Reverse Voltage

MOUNTING PAD LAYOUT

SOT-323 Unit: inch (mm)



ORDER INFORMATION

- Packing information

  T/R - 12K per 13" plastic Reel

  T/R - 3.0K per 7" plastic Reel

LEGAL STATEMENT

IMPORTANT NOTICE

This information is intended to unambiguously characterize the product in order to facilitate the customer's evaluation of the device in the application. The information will help the customer's technical experts determine that the device is compatible and interchangeable with similar devices made by other vendors. The information in this data sheet is believed to be reliable and accurate. The specifications and information herein are subject to change without notice. New products and improvements in products and product characterization are constantly in process. Therefore, the factory should be consulted for the most recent information and for any special characteristics not described or specified.