PANJIT SEMI CONDUCTOR

MMBT2222A

NPN GENERAL PURPOSE SWITCHING TRANSISTOR

VOLTAGE 40 Volt **POWER** 225 mWatt

FEATURES

- NPN epitaxial silicon, planar design
- Collector-emitter voltage VCE = 40V
- Collector current IC = 600mA
- 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: M2A

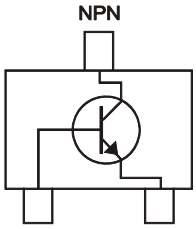
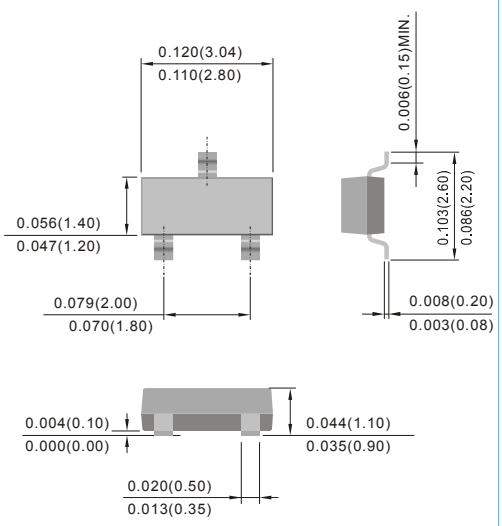


Fig.34(TOP VIEW)

SOT-23 Unit : inch(mm)



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	V
Collector Current - Continuous	I_C	600	mA

THERMAL CHARACTERISTICS

Parameter	Symbol	Value	Units
Max. Power Dissipation (Note 1)	P_{TOT}	225	mW
Thermal Resistance , Junction to Ambient	$R_{\theta JA}$	556	^{O}C/W
Junction Temperature	T_J	-55 to +150	^{O}C
Storage Temperature	T_{STG}	-55 to +150	^{O}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=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

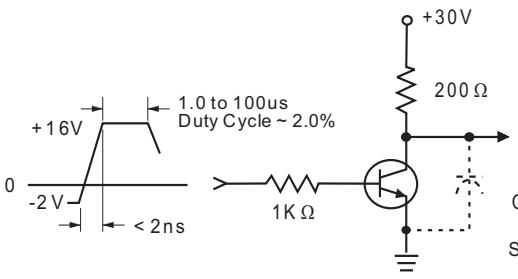
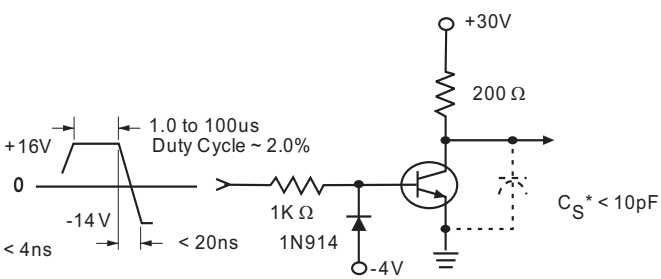


Fig. 1 Turn-On Time



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

Fig. 2 Turn-Off Time

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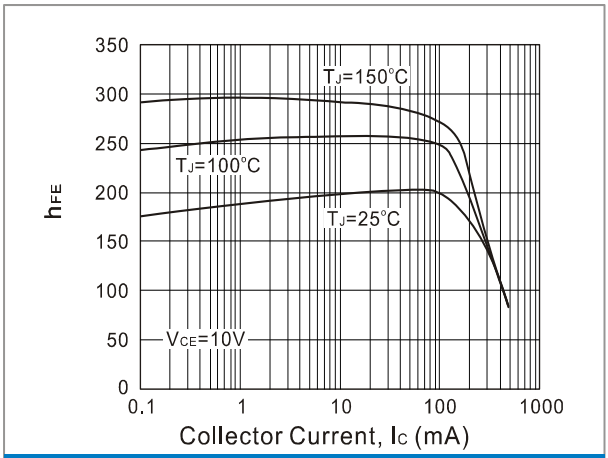

Fig. 3. Typical h_{FE} vs Collector Current

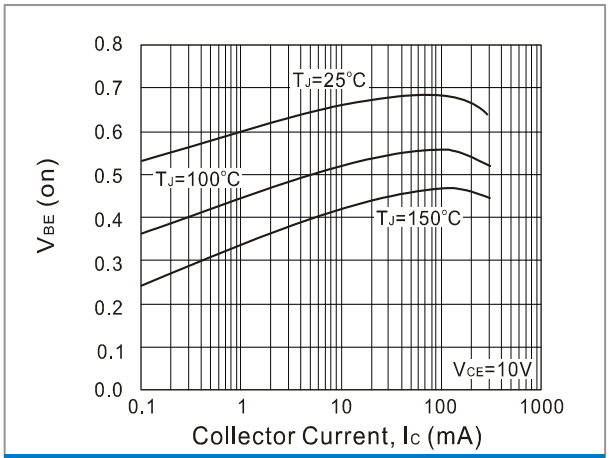

Fig. 4. Typical V_{BE} vs Collector Current

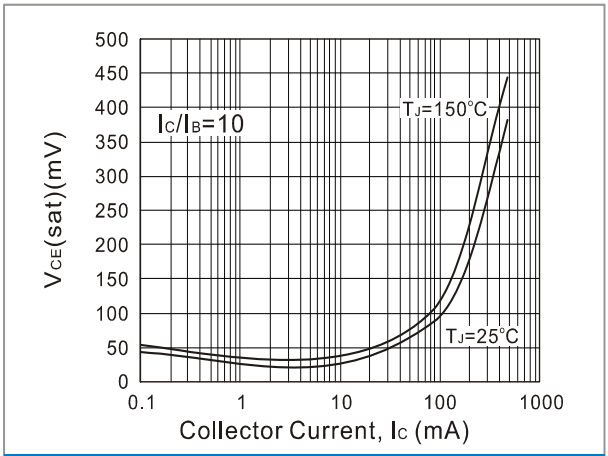

Fig. 5. Typical V_{CE} (sat) vs Collector Current

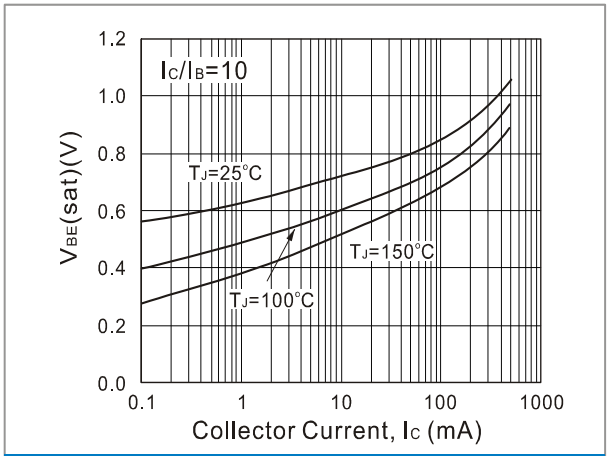

Fig. 6. Typical V_{BE} (sat) vs Collector Current

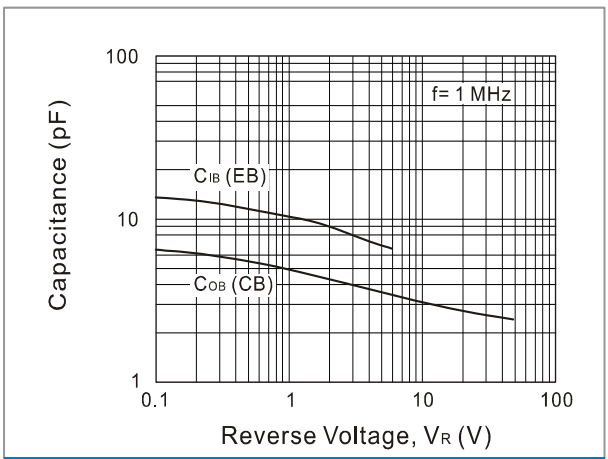

Fig. 7. Typical Capacitances vs Reverse Voltage

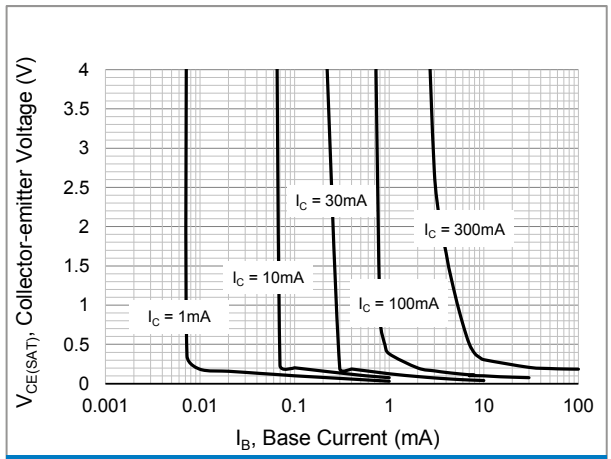

Fig. 8. Typical Collector Saturation Region

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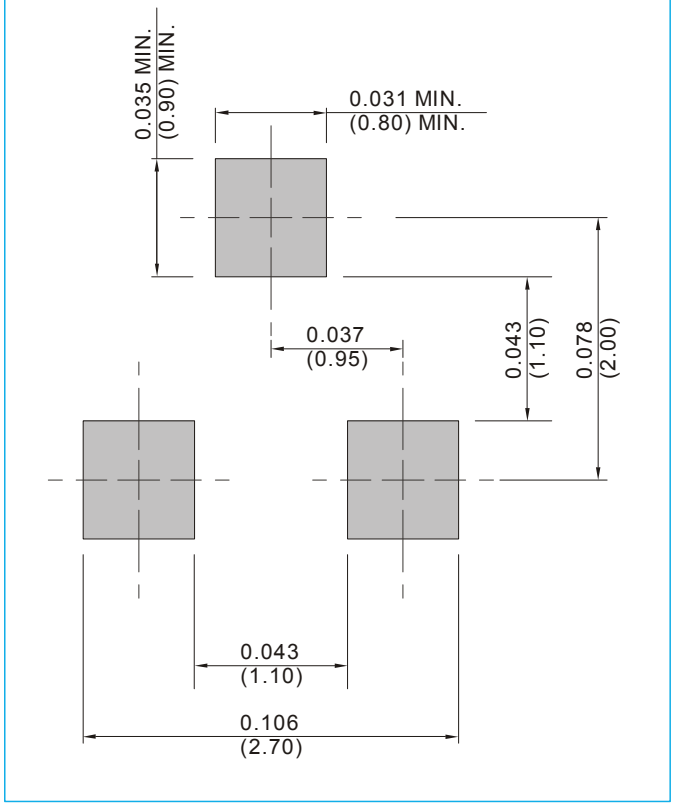
MOUNTING PAD LAYOUT

SOT-23 Unit：inch(mm)



ORDER INFORMATION

- Packing information

  T/R - 12K per 13" plastic Reel

  T/R - 3K per 7" plastic Reel

MMBT2222A

Part No_packing code_Version

MMBT2222A_R1_00001

MMBT2222A_R2_00001

For example :

RB500V-40_R2_00001

Part No.

Serial number

Version code means HF

Packing size code means 13"

Packing type means T/R

Packing Code XX				Version Code XXXXX		
Packing type	1st Code	Packing size code	2nd Code	HF or RoHS	1st Code	2nd~5th 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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