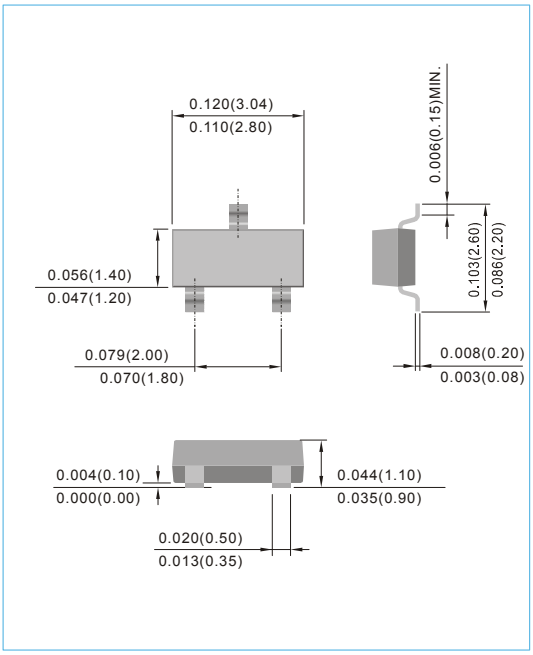
MMBT2222A

NPN GENERAL PURPOSE SWITCHING TRANSISTOR

VOLTAGE 40 Volt **POWER** 225 mWatt

SOT-23 Unit : inch(mm)



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

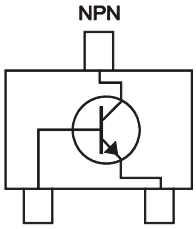


Fig.34(TOP VIEW)

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.

MMBT2222A

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, IC=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

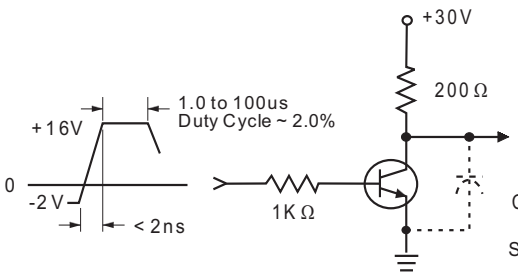
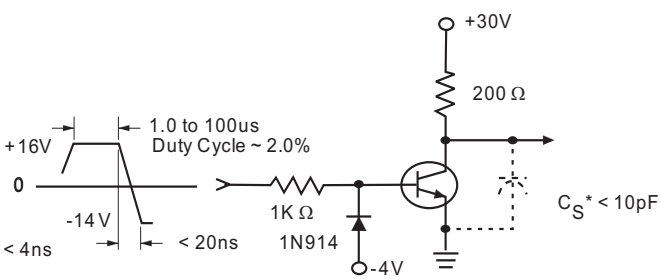


Fig. 1 Turn-On Time



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

Fig. 2 Turn-Off Time

MMBT2222A

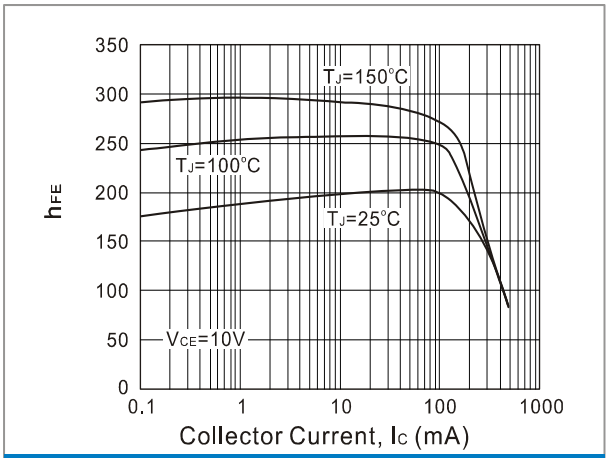


Fig. 3. Typical h_{FE} vs Collector Current

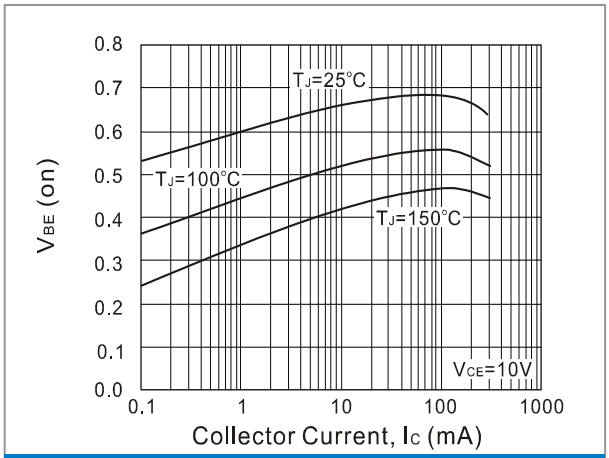


Fig. 4. Typical V_{BE} vs Collector Current

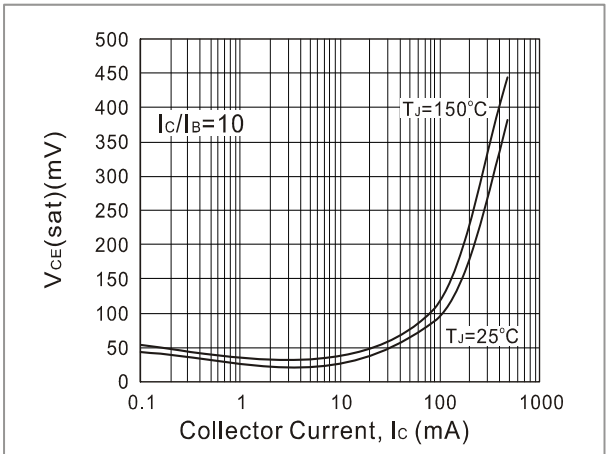


Fig. 5. Typical V_{CE} (sat) vs Collector Current

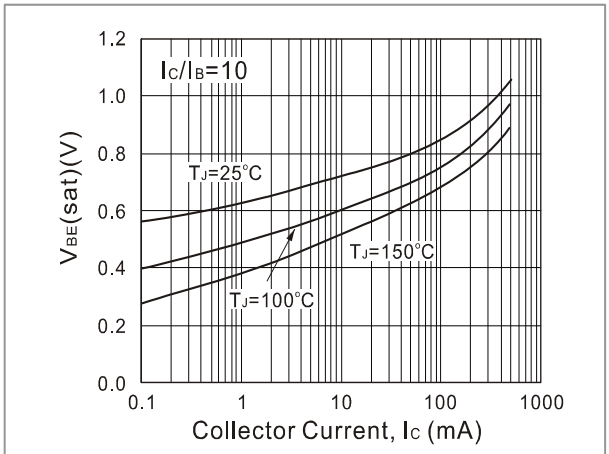


Fig. 6. Typical V_{BE} (sat) vs Collector Current

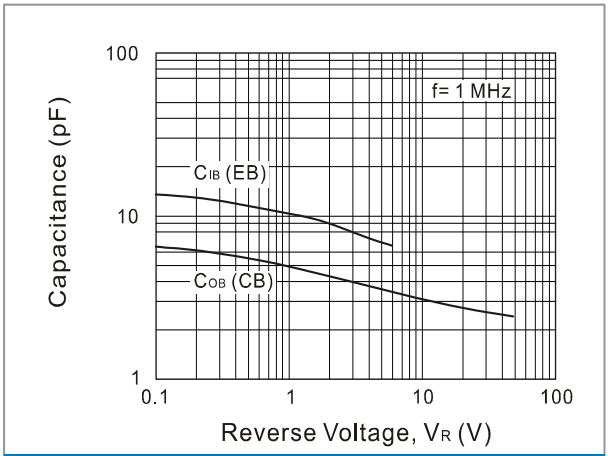


Fig. 7. Typical Capacitances vs Reverse Voltage

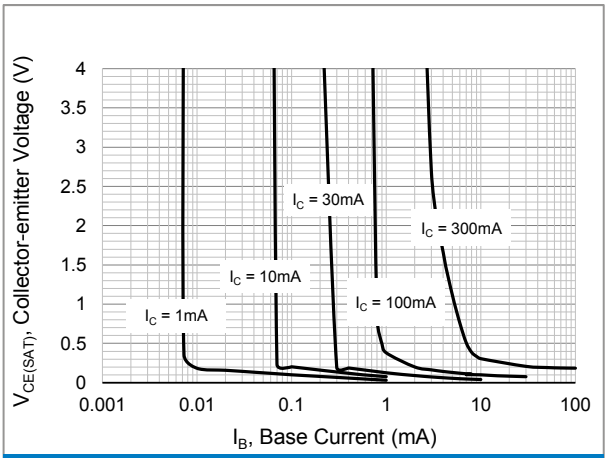


Fig. 8. Typical Collector Saturation Region

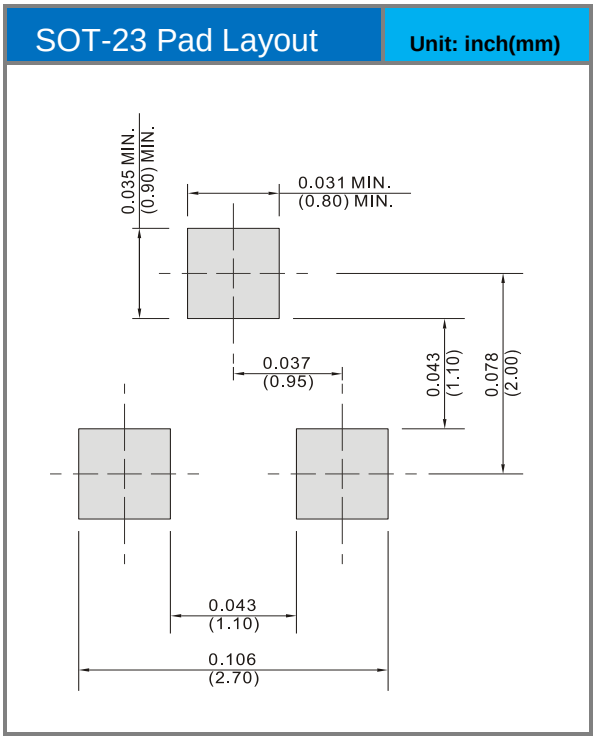
MMBT2222A

Product and Packing Information

Part No.	Package Type	Packing Type	Marking
MMBT2222A	SOT-23	3K pcs / 7” reel	M2A
MMBT2222A	SOT-23	12K pcs / 13” reel	M2A

Mounting Pad Layout

SOT-23 Pad Layout — Unit: inch(mm)



MMBT2222A

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