

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

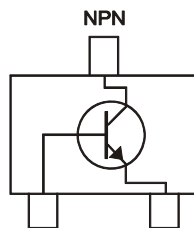
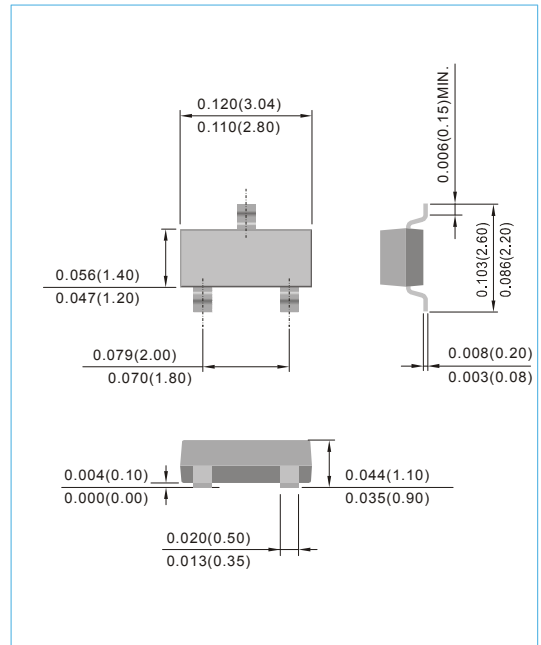


Fig.34(TOP VIEW)



ABSOLUTE RATINGS

Parameter	Symbol	Value	Units
Collector - Emitter Voltage	V _{CEO}	40	V
Collector - Base Voltage	V _{CBO}	75	V
Emitter - Base Voltage	V _{EB0}	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 _{θJA}	556	°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 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	$V_{(BR)CBO}$	$I_C=10\mu A, I_E=0$	75	-	-	V
Emitter - Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=10\mu A, I_C=0$	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}	$V_{CE}=60V, I_E=0, V_{CE}=60V, I_E=0, T_J=125^\circ C$	-	-	10 10	nA uA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=3.0V, I_C=0,$	-	-	100	nA
DC Current Gain	h_{FE}	$I_C=0.1mA, V_{CE}=10V$	35	-	-	-
		$I_C=1.0mA, V_{CE}=10V$	50	-	-	-
		$I_C=10mA, V_{CE}=10V$	75	-	-	-
		$I_C=10mA, V_{CE}=10V, T_J=125^\circ C$	35	-	-	-
		$I_C=150mA, V_{CE}=10V$ (Note 2)	100	-	300	-
		$I_C=150mA, V_{CE}=1V$ (Note 2)	50	-	-	-
$I_C=500mA, V_{CE}=10V$ (Note 2)	40	-	-	-		
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	t_d	$V_{CC}=3V, V_{BE}=-5V, I_C=150mA, I_B=15mA$	-	-	10	ns
Rise Time	t_r	$V_{CC}=3V, V_{BE}=-5V, I_C=150mA, I_B=15mA$	-	-	25	ns
Storage Time	t_s	$V_{CC}=30V, I_C=150mA, I_B1=I_B2=15mA$	-	-	225	ns
Fall Time	t_f	$V_{CC}=30V, I_C=150mA, I_B1=I_B2=15mA$	-	-	60	ns

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

SWITCHING TIME EQUIVALENT TEST CIRCUITS

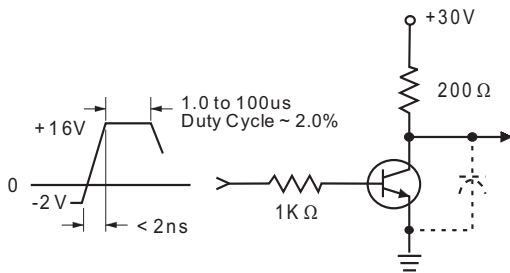


Fig. 1 Turn-On Time

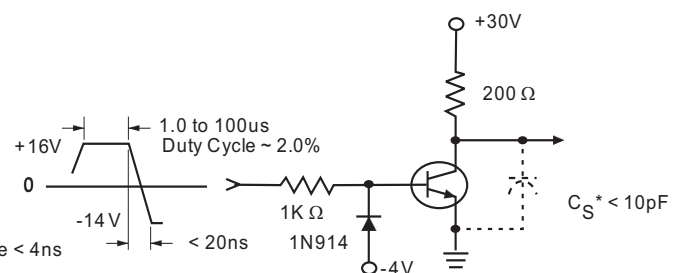


Fig. 2 Turn-Off Time

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

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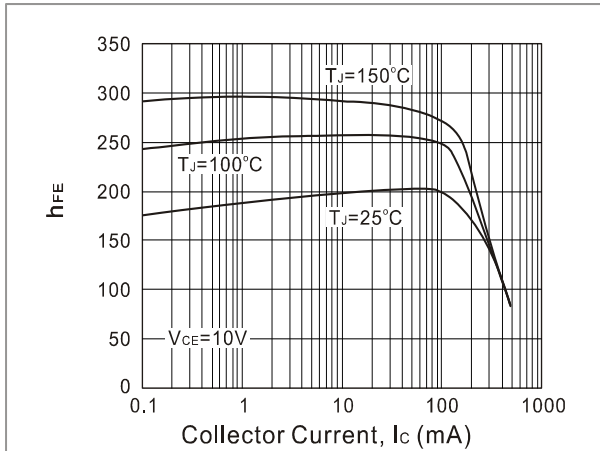


Fig. 3. Typical h_{FE} vs Collector Current

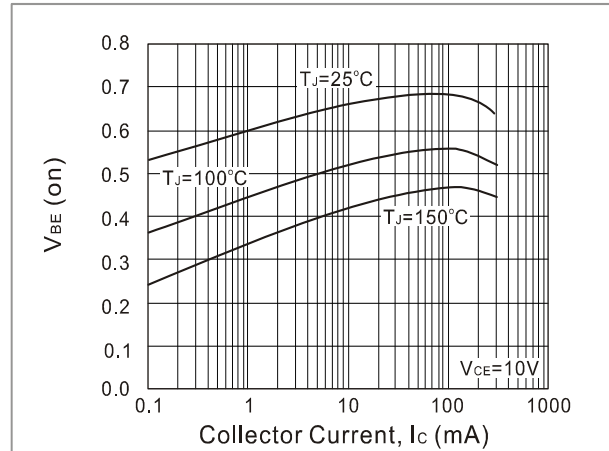


Fig. 4. Typical V_{BE} vs Collector Current

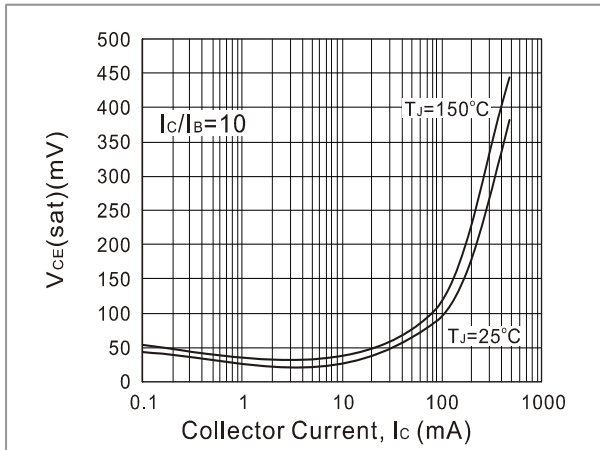


Fig. 5. Typical $V_{CE(sat)}$ vs Collector Current

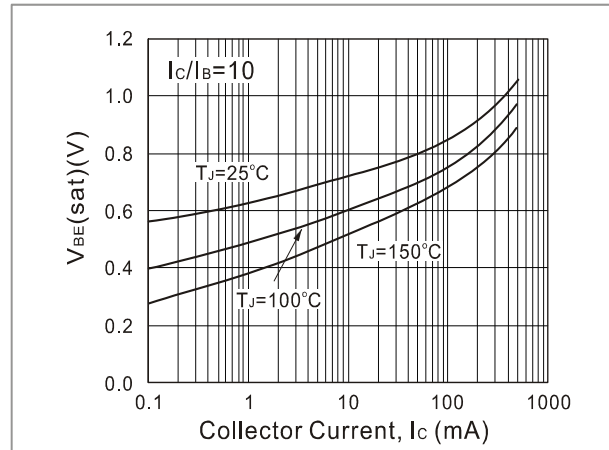


Fig. 6. Typical $V_{BE(sat)}$ vs Collector Current

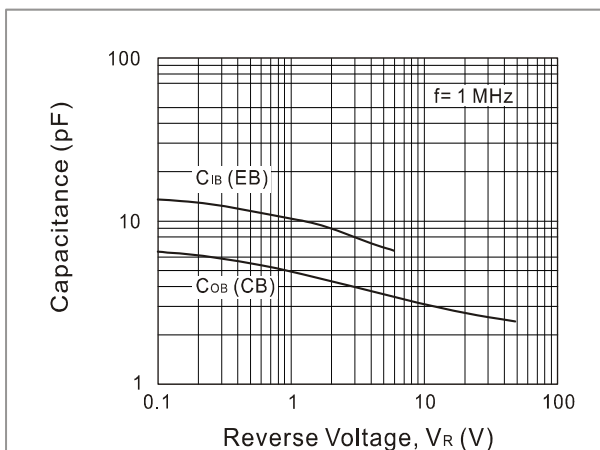


Fig. 7. Typical Capacitances vs Reverse Voltage

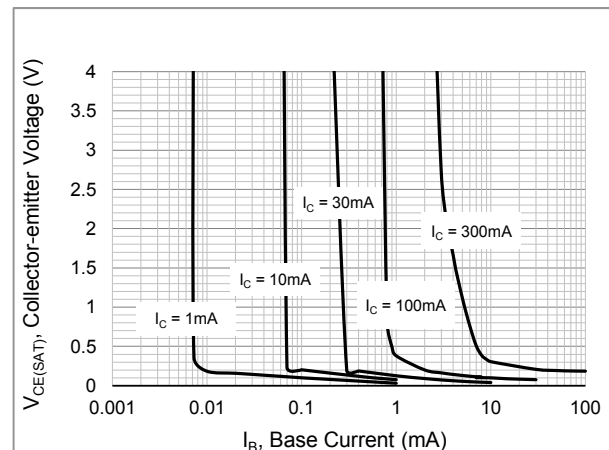


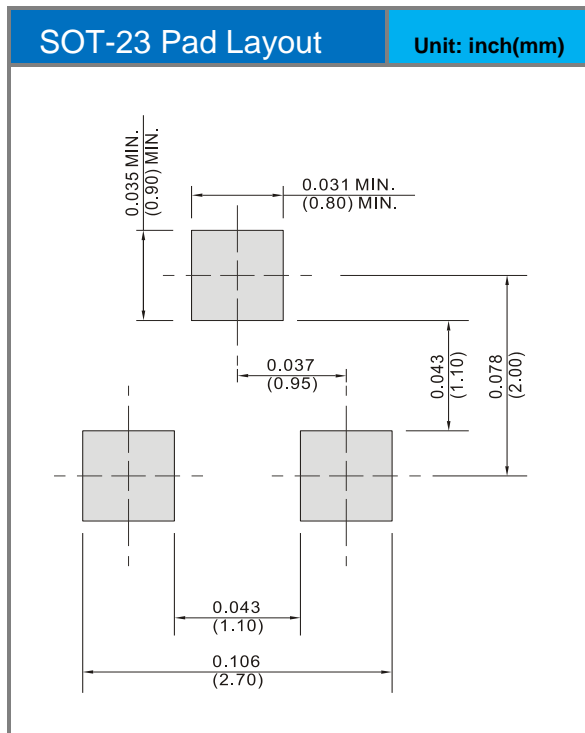
Fig. 8. Typical Collector Saturation Region

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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



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