



MMBT2222A

NPN GENERAL PURPOSE SWITCHING TRANSISTOR

VOLTAGE 40 Volts **POWER** 225 mWatts

SOT-23 Unit : inch(mm)

FEATURES

- NPN epitaxial silicon, planar design
- Collector-emitter voltage VCE = 40V
- Collector current IC = 600mA
- Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 0.0003 ounces, 0.0084 grams
- Marking: M2A

MECHANICAL DATA

- Case: SOT-23, Plastic
- Terminals: Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 0.0003 ounces, 0.0084 grams
- Marking: M2A

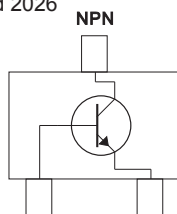
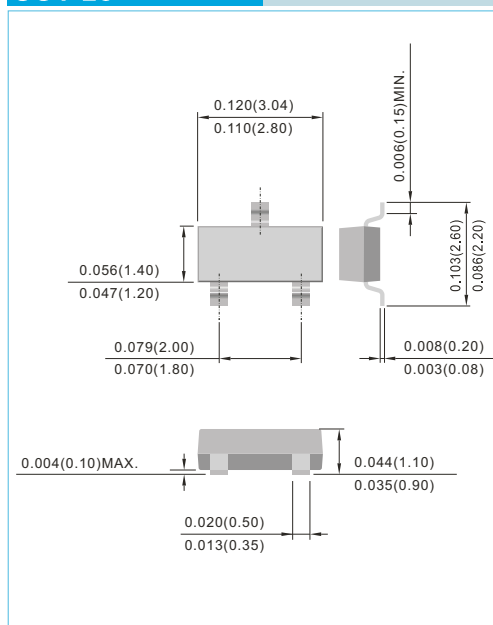


Fig.34



ABSOLUTE RATINGS

PARAMETER	Symbol	Value	Units
Collector - Emitter Voltage	V _{CEO}	40	V
Collector - Base Voltage	V _{CB0}	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}	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 1.0 x 0.75 x 0.062 in.



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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 μA
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	-	-	
Collector - Emitter Saturation Voltage (Note 2)	$V_{CE(SAT)}$	$I_C=150mA, I_B=15mA$	-	-	0.3	V
		$I_C=500mA, I_B=50mA$	-	-	1.0	
Base - Emitter Saturation Voltage (Note 2)	$V_{BE(SAT)}$	$I_C=150mA, I_B=15mA$	0.6	-	1.2	V
		$I_C=500mA, I_B=50mA$	-	-	2.0	
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 < 300 us, Duty Cycle < 2.0%.

SWITCHING TIME EQUIVALENT TEST CIRCUITS

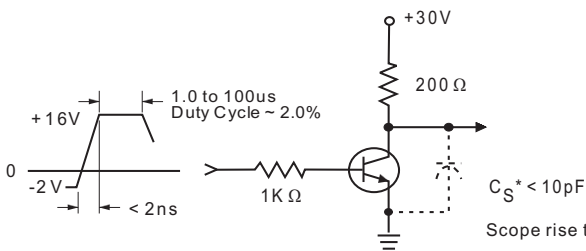


Fig. 1 Turn-On Time

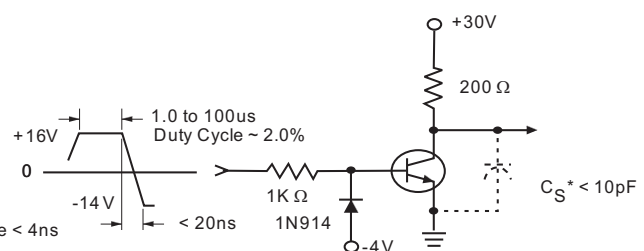


Fig. 2 Turn-Off Time

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



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ELECTRICAL CHARACTERISTICS CURVE

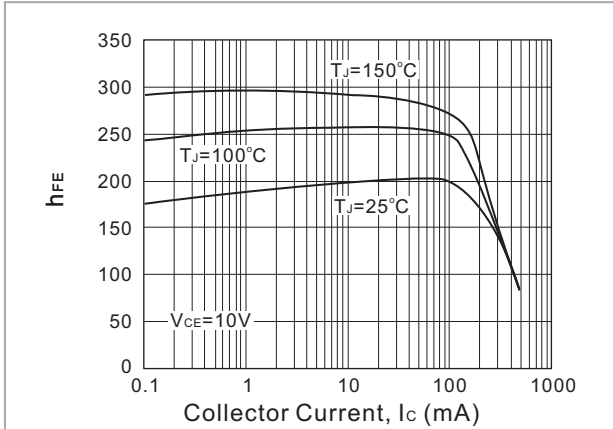


Fig. 3. Typical h_{FE} vs Collector Current

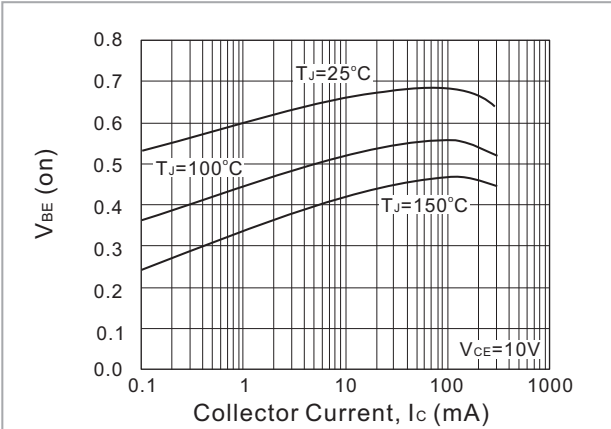


Fig. 4. Typical V_{BE} vs Collector Current

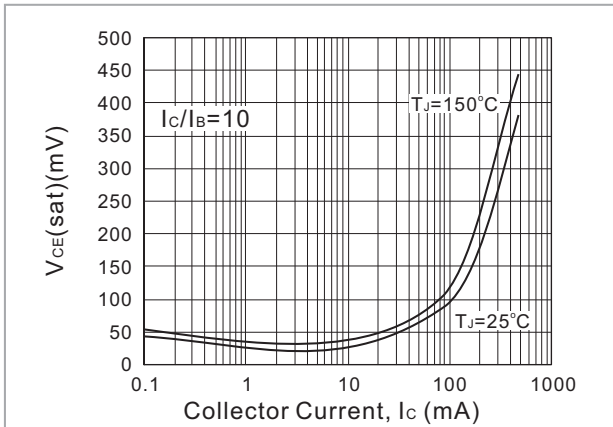


Fig. 5. Typical $V_{CE(sat)}$ vs Collector Current

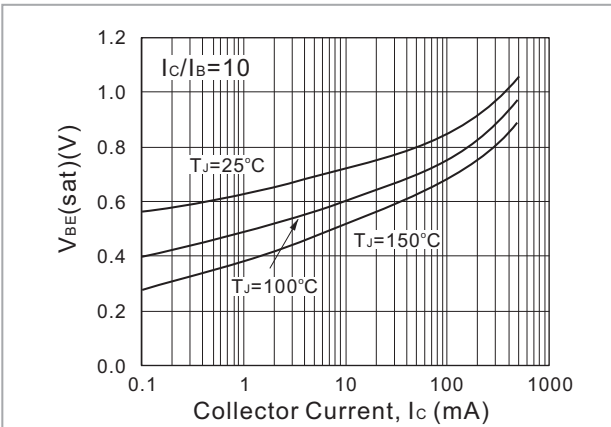


Fig. 6. Typical $V_{BE(sat)}$ vs Collector Current

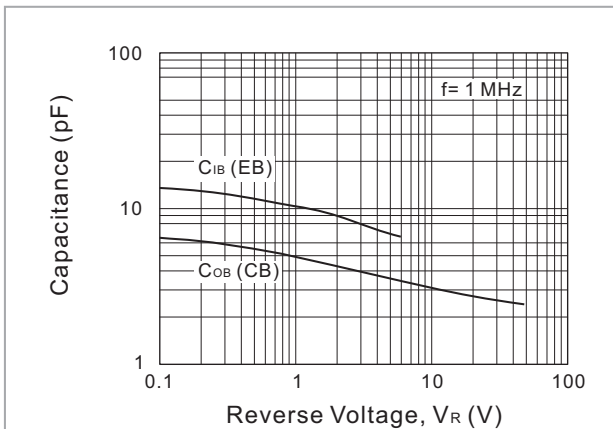
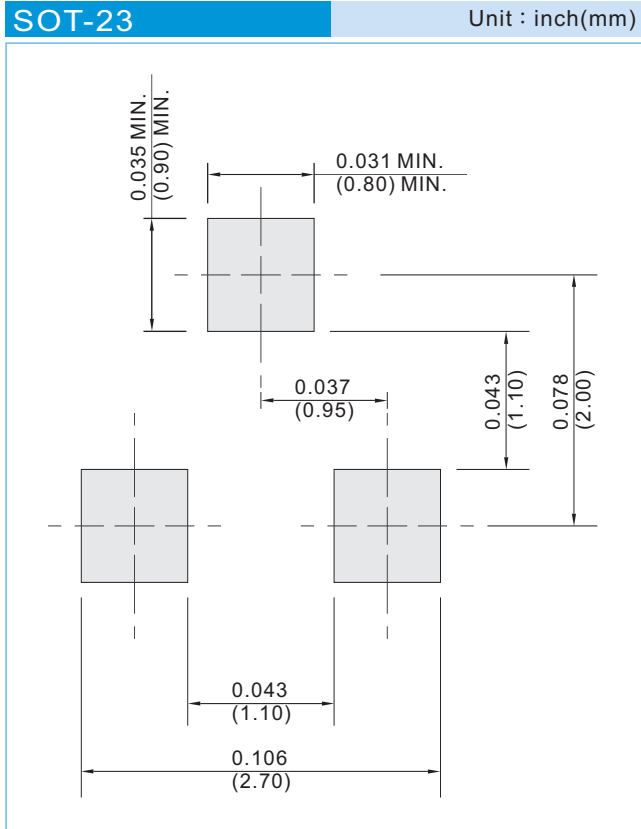


Fig. 7. Typical Capacitances vs Reverse Voltage



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MOUNTING PAD LAYOUT



ORDER INFORMATION

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

LEGAL STATEMENT

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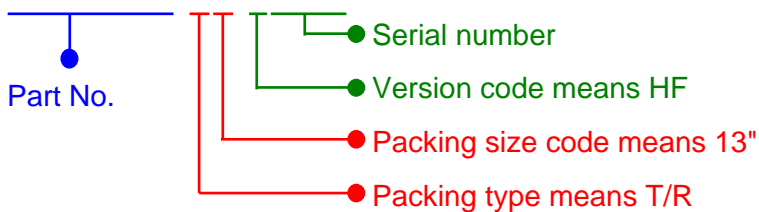


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Part No_packing code_Version

For example :

RB500V-40_R2_00000



Packing Code XX				Version Code XXXXX		
Packing type	1st Code	Packing size code	2nd Code	HF or RoHS	1st Code	2nd~5th Code
T/B	A	N/A	0	HF	0	serial number
T/R	R	7"	1	RoHS	1	serial number
B/P	B	13"	2			
T/P	T	26mm	X			
TRR	S	52mm	Y			
TRL	L	PBCU	U			
FORMING	F	PBCD	D			