

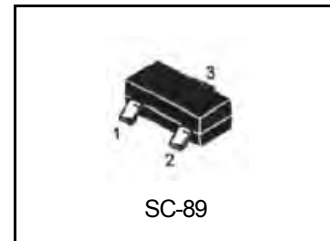
General Purpose Transistor

NPN Silicon

These transistors are designed for general purpose amplifier applications. They are housed in the SC-89 package which is designed for low power surface mount applications.

Features

- We declare that the material of product compliance with RoHS requirements.
 - Pb-Free package is available**
 - RoHS product for packing code suffix "G"
 - Halogen free product for packing code suffix "H"
 - Moisture Sensitivity Level 1



ORDERING INFORMATION

Device	Maring	Shipping
MMBT2222ATT1	1P	3000 / Tape & Reel

MAXIMUM RATINGS (T_A = 25°C)

Rating	Symbol	Max	Unit
Collector-Emitter Voltage	V _{CEO}	40	Vdc
Collector-Base Voltage	V _{CBO}	75	Vdc
Emitter-Base Voltage	V _{EBO}	6.0	Vdc
Collector Current - Continuous	I _C	600	mAdc

THERMAL CHARACTERISTICS

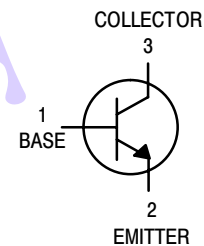
Characteristic	Symbol	Max	Unit
Total Device Dissipation (Note 1) T _A = 25°C	P _D	150	mW
Thermal Resistance, Junction-to-Ambient	R _{θJA}	833	°C/W
Operating and Storage Junction Temperature Range	T _J , T _{stg}	-55 to +150	°C

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

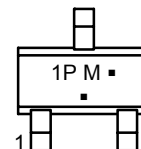
Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage (Note 1) (I _C = 1.0 mAdc, I _B = 0)	V _{(BR)CEO}	40	-	Vdc
Collector-Base Breakdown Voltage (I _C = 10 μAdc, I _E = 0)	V _{(BR)CBO}	75	-	Vdc
Emitter-Base Breakdown Voltage (I _E = 10 μAdc, I _C = 0)	V _{(BR)EBO}	6.0	-	Vdc
Base Cutoff Current (V _{CE} = 60 Vdc, V _{EB} = 3.0 Vdc)	I _{BL}	-	20	nAdc
Collector Cutoff Current (V _{CE} = 60 Vdc, V _{EB} = 3.0 Vdc)	I _{CEX}	-	100	nAdc



MARKING DIAGRAM



- 1P = Specific Device Code
- M = Date Code
- = Pb-Free Package



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ON CHARACTERISTICS (Note 2)

DC Current Gain ($I_C = 0.1 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$) ($I_C = 1.0 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$) ($I_C = 10 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$) ($I_C = 150 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$) ($I_C = 500 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$)	H_{FE}	35 50 75 100 40	- - - - -	-
Collector-Emmitter Saturation Voltage ($I_C = 150 \text{ mAdc}$, $I_B = 15 \text{ mAdc}$) ($I_C = 500 \text{ mAdc}$, $I_B = 50 \text{ mAdc}$)	$V_{CE(sat)}$	- -	0.3 1.0	Vdc
Base-Emmitter Saturation Voltage ($I_C = 150 \text{ mAdc}$, $I_B = 15 \text{ mAdc}$) ($I_C = 500 \text{ mAdc}$, $I_B = 50 \text{ mAdc}$)	$V_{BE(sat)}$	0.6 -	1.2 2.0	Vdc

SMALL-SIGNAL CHARACTERISTICS

Current-Gain - Bandwidth Product ($I_C = 20 \text{ mAdc}$, $V_{CE} = 20 \text{ Vdc}$, $f = 100 \text{ MHz}$)	f_T	250	-	MHz
Output Capacitance ($V_{CB} = 10 \text{ Vdc}$, $I_E = 0$, $f = 1.0 \text{ MHz}$)	C_{obo}	-	8.0	pF
Input Capacitance ($V_{EB} = 0.5 \text{ Vdc}$, $I_C = 0$, $f = 1.0 \text{ MHz}$)	C_{ibo}	-	30	pF
Input Impedance ($V_{CE} = 10 \text{ Vdc}$, $I_C = 10 \text{ mAdc}$, $f = 1.0 \text{ kHz}$)	h_{ie}	0.25	1.25	k Ω
Voltage Feedback Ratio ($V_{CE} = 10 \text{ Vdc}$, $I_C = 10 \text{ mAdc}$, $f = 1.0 \text{ kHz}$)	h_{re}	-	4.0	$\times 10^{-4}$
Small-Signal Current Gain ($V_{CE} = 10 \text{ Vdc}$, $I_C = 10 \text{ mAdc}$, $f = 1.0 \text{ kHz}$)	h_{fe}	75	375	-
Output Admittance ($V_{CE} = 10 \text{ Vdc}$, $I_C = 10 \text{ mAdc}$, $f = 1.0 \text{ kHz}$)	h_{oe}	25	200	μmhos
Noise Figure ($V_{CE} = 10 \text{ Vdc}$, $I_C = 100 \mu\text{Adc}$, $R_S = 1.0 \text{ k ohms}$, $f = 1.0 \text{ kHz}$)	NF	-	4.0	dB

SWITCHING CHARACTERISTICS

Delay Time	$(V_{CC} = 3.0 \text{ Vdc}$, $V_{BE} = -0.5 \text{ Vdc}$, $I_C = 150 \text{ mAdc}$, $I_{B1} = 15 \text{ mAdc}$)	t_d	-	10	ns
Rise Time		t_r	-	25	
Storage Time	$(V_{CC} = 30 \text{ Vdc}$, $I_C = 150 \text{ mAdc}$, $I_{B1} = I_{B2} = 15 \text{ mAdc}$)	t_s	-	225	ns
Fall Time		t_f	-	60	

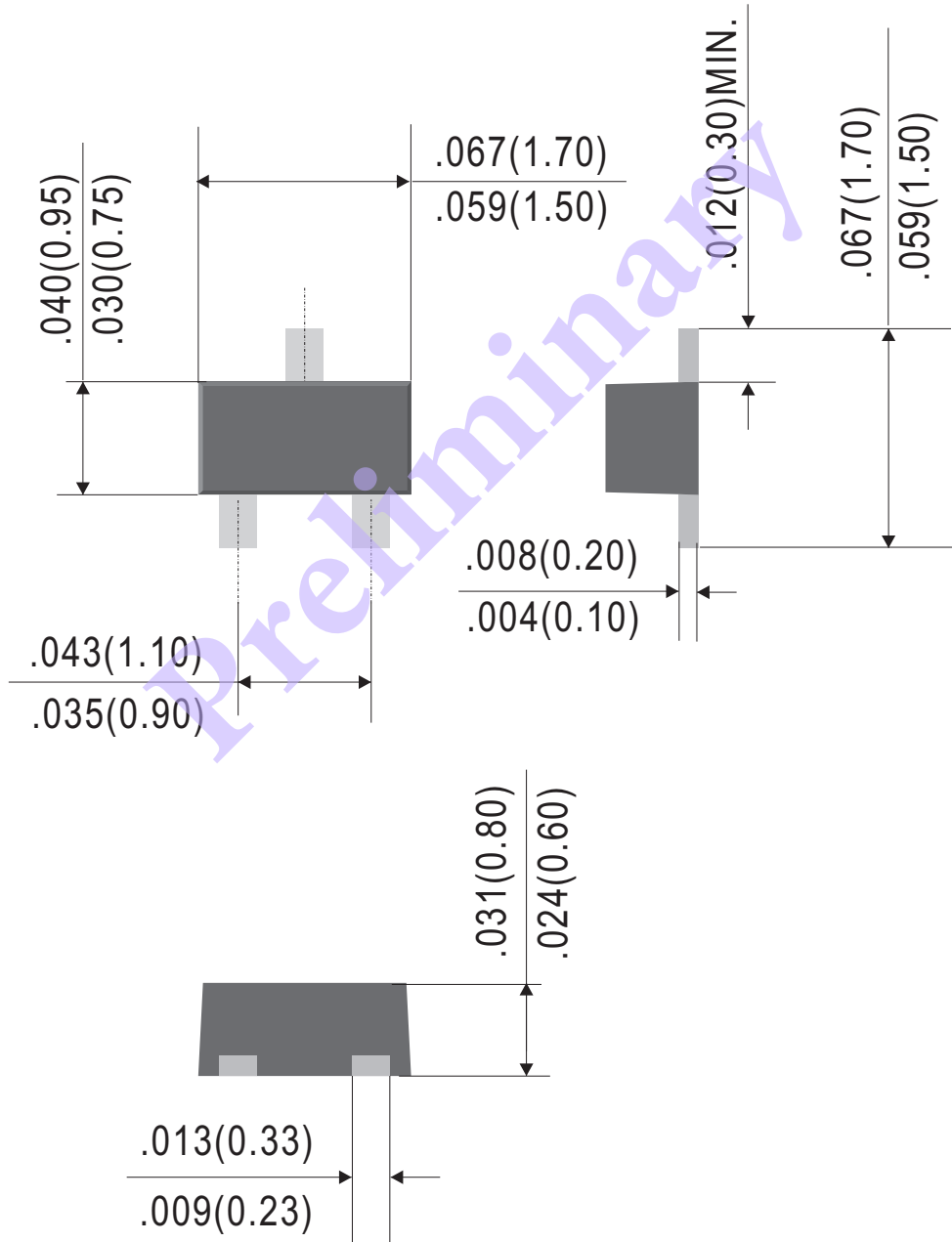
1. Device mounted on FR4 glass epoxy printed circuit board using the minimum recommended footprint.
2. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.



General Purpose Transistor

Outline Drawing

SC-89



Dimensions in inches and (millimeters)

General Purpose Transistor**Ordering Information:**

Device PN	Packing
MMBT2222ATT1 G ⁽¹⁾ -WS	Tape&Reel: 3 Kpcs/Reel

Note: (1) RoHS product for packing code suffix "G" ; Halogen free product for packing code suffix "H"

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