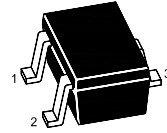


MMBT2222W / MMBT2222AW

NPN Silicon Epitaxial Planar Transistor

for switching and amplifier applications



1.Base 2.Emitter 3.Collector
SOT-323 Plastic Package

Absolute Maximum Ratings ($T_a = 25\text{ }^{\circ}\text{C}$)

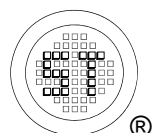
Parameter	Symbol	Value		Unit
		MMBT2222W	MMBT2222AW	
Collector Base Voltage	V_{CBO}	60	75	V
Collector Emitter Voltage	V_{CEO}	30	40	V
Emitter Base Voltage	V_{EBO}	5	6	V
Collector Current	I_C	600		mA
Total Power Dissipation	P_{tot}	460 ¹⁾ 200 ²⁾		mW
Junction Temperature	T_j	150		$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	- 55 to + 150		$^{\circ}\text{C}$

Thermal Resistance Ratings

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Ambient ¹⁾	$R_{\theta JA}$	270 ¹⁾ 625 ²⁾	$^{\circ}\text{C/W}$

¹⁾Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate

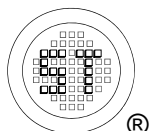
²⁾Device mounted on FR-4 substrate PC board, with minimum recommended pad layout.



MMBT2222W / MMBT2222AW

Characteristics at $T_a = 25\text{ }^{\circ}\text{C}$

Parameter	Symbol	Min.	Max.	Unit
DC Current Gain at $V_{CE} = 10\text{ V}$, $I_C = 0.1\text{ mA}$ at $V_{CE} = 10\text{ V}$, $I_C = 1\text{ mA}$ at $V_{CE} = 10\text{ V}$, $I_C = 10\text{ mA}$ at $V_{CE} = 1\text{ V}$, $I_C = 150\text{ mA}$ at $V_{CE} = 10\text{ V}$, $I_C = 150\text{ mA}$ at $V_{CE} = 10\text{ V}$, $I_C = 500\text{ mA}$ MMBT2222W MMBT2222AW	h_{FE} h_{FE} h_{FE} h_{FE} h_{FE} h_{FE} h_{FE}	35 50 75 50 100 30 40	- - - - 300 - -	- - - - - - -
Collector Base Cutoff Current at $V_{CB} = 50\text{ V}$ at $V_{CB} = 60\text{ V}$ MMBT2222W MMBT2222AW	I_{CBO}	- -	100 100	nA
Emitter Base Cutoff Current at $V_{EB} = 3\text{ V}$	I_{EBO}	-	100	nA
Collector Base Breakdown Voltage at $I_C = 10\text{ }\mu\text{A}$ MMBT2222W MMBT2222AW	$-V_{(BR)CBO}$	60 75	- -	V
Collector Emitter Breakdown Voltage at $I_C = 10\text{ mA}$ MMBT2222W MMBT2222AW	$-V_{(BR)CEO}$	30 40	- -	V
Emitter Base Breakdown Voltage at $I_E = 10\text{ }\mu\text{A}$ MMBT2222W MMBT2222AW	$-V_{(BR)EBO}$	5 6	- -	V
Collector Emitter Saturation Voltage at $I_C = 150\text{ mA}$, $I_B = 15\text{ mA}$ at $I_C = 500\text{ mA}$, $I_B = 50\text{ mA}$ MMBT2222W MMBT2222AW MMBT2222W MMBT2222AW	$-V_{CE(sat)}$	- - - -	0.4 0.3 1.6 1	V
Base Emitter Saturation Voltage at $I_C = 150\text{ mA}$, $I_B = 15\text{ mA}$ at $I_C = 500\text{ mA}$, $I_B = 50\text{ mA}$ MMBT2222W MMBT2222AW MMBT2222W MMBT2222AW	$-V_{BE(sat)}$	- 0.6 - -	1.3 1.2 2.6 2	V
Transition Frequency at $V_{CE} = 20\text{ V}$, $-I_E = 20\text{ mA}$, $f = 100\text{ MHz}$	f_T	300	-	MHz
Collector Output Capacitance at $V_{CB} = 10\text{ V}$, $f = 100\text{ KHz}$	C_{ob}	-	8	pF
Emitter Input Capacitance at $V_{EB} = 0.5\text{ V}$, $f = 100\text{ KHz}$	C_{ib}	-	25	pF
Delay Time at $V_{CC} = 30\text{ V}$, $V_{BE(OFF)} = 0.5\text{ V}$, $I_C = 150\text{ mA}$, $I_{B1} = 15\text{ mA}$	t_d	-	10	ns
Rise Time at $V_{CC} = 30\text{ V}$, $V_{BE(OFF)} = 0.5\text{ V}$, $I_C = 150\text{ mA}$, $I_{B1} = 15\text{ mA}$	t_r	-	25	ns
Storage Time at $V_{CC} = 30\text{ V}$, $I_C = 150\text{ mA}$, $I_{B1} = -I_{B2} = 15\text{ mA}$	t_{stg}	-	225	ns
Fall Time at $V_{CC} = 30\text{ V}$, $I_C = 150\text{ mA}$, $I_{B1} = -I_{B2} = 15\text{ mA}$	t_f	-	60	ns



MMBT2222W / MMBT2222AW

Electrical Characteristics Curves

Fig. 1 Output Characteristics Curve

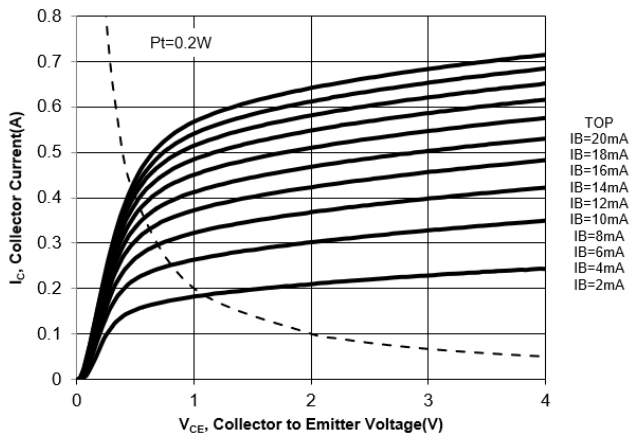


Fig. 2 Output Characteristics Curve

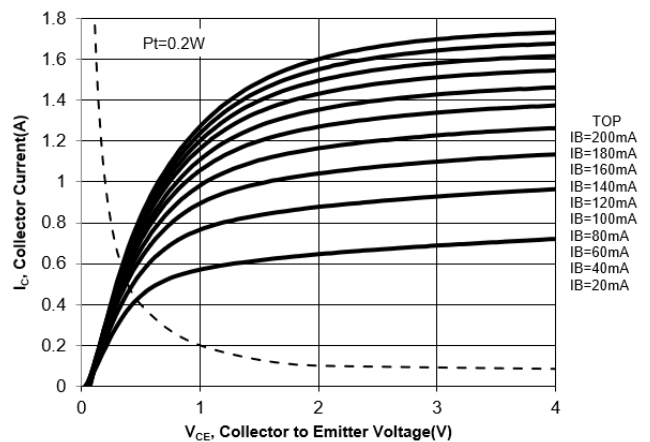


Fig. 3 Collector Current vs. Base to Emitter Voltage

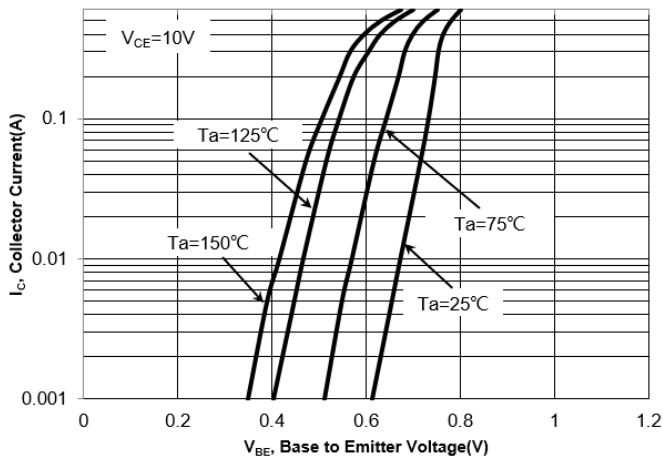


Fig. 4 h_{FE} , DC Current Gain vs. Collector Current

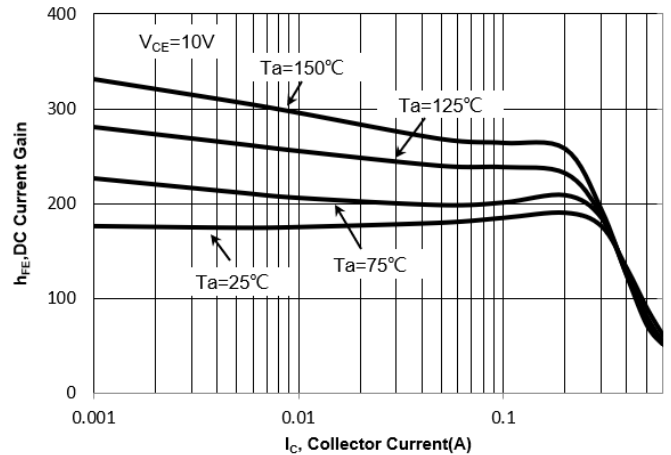


Fig. 5 $V_{BE(sat)}$ vs. Collector Current

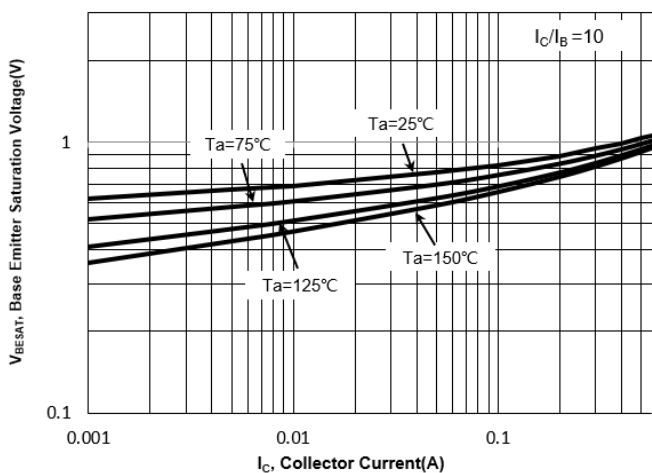
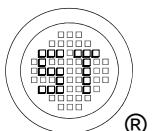
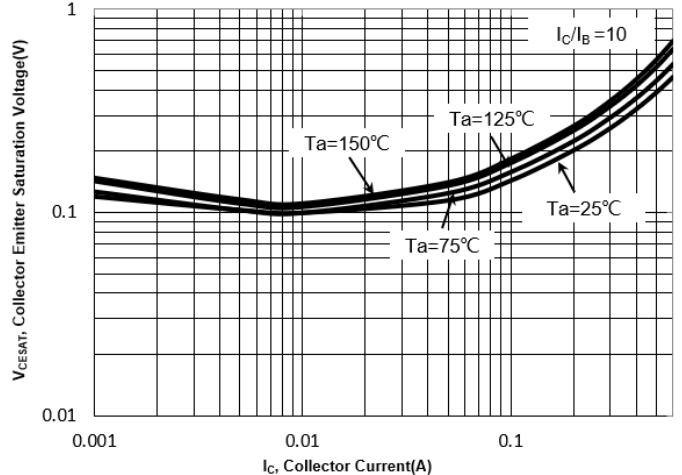


Fig. 6 $V_{CE(sat)}$ vs. Collector Current



MMBT2222W / MMBT2222AW

Electrical Characteristics Curves

Fig. 7 Junction Capacitance

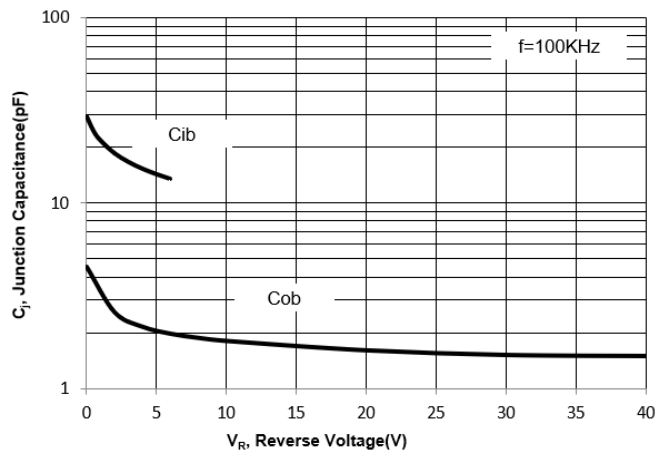
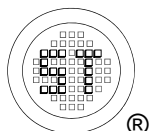
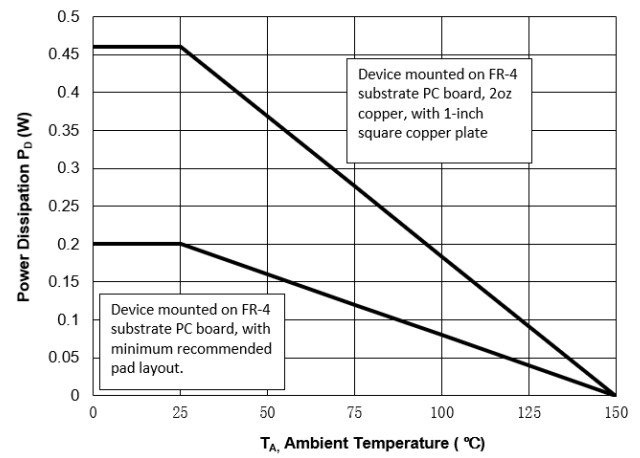


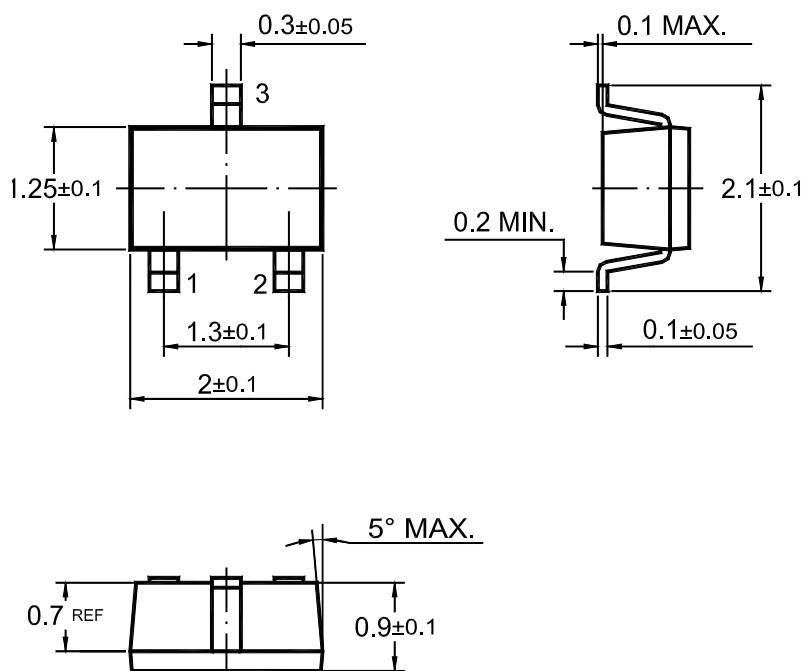
Fig. 8 Power Derating Curve



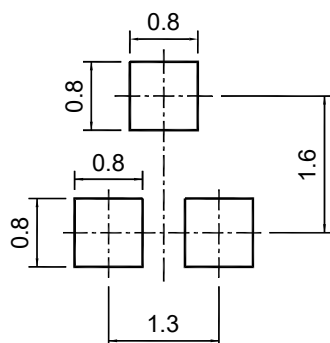
MMBT2222W / MMBT2222AW

PACKAGE OUTLINE(Dimensions in mm)

SOT-323



Recommended Soldering Footprint



Packing information

Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
SOT-323	8	4 ± 0.1	0.157 ± 0.004	178	7	3,000

Marking information

" 1P " = Part No.
 " YM " = Date Code Marking
 " Y " = Year
 " M " = Month
 Font type: Arial

