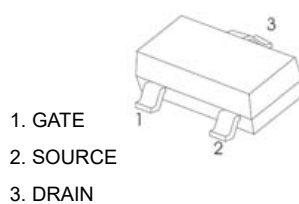


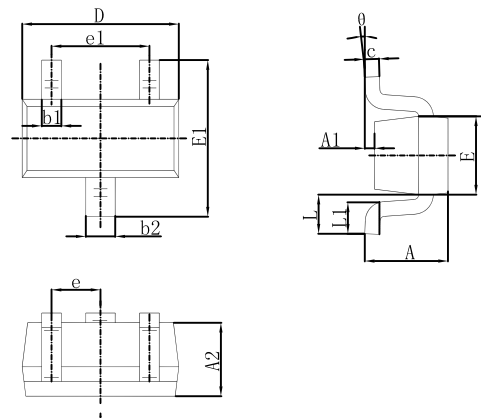
for switching and amplifier applications

Marking : MMBT2222T : M1B

MMBT2222AT :1P



SOT-523



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.900	0.028	0.035
A1	0.000	0.100	0.000	0.004
A2	0.700	0.800	0.028	0.031
b1	0.150	0.250	0.006	0.010
b2	0.250	0.350	0.010	0.014
c	0.100	0.200	0.004	0.008
D	1.500	1.700	0.059	0.067
E	0.700	0.900	0.028	0.035
E1	1.450	1.750	0.057	0.069
e	0.500 TYP.		0.020 TYP.	
e1	0.900	1.100	0.035	0.043
L	0.400 REF.		0.016 REF.	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

Dimensions in inches and (millimeters)

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

Parameter	Symbol	Value		Unit
		MMBT2222T	MMBT2222AT	
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}	200		mW
Junction Temperature	T_j	150		$^\circ\text{C}$
Storage Temperature Range	T_s	-55 to +150		$^\circ\text{C}$

MMBT222T/AT

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

Parameter	Symbol	Min.	Max.	Unit
DC Current Gain				
at $V_{CE} = 10\text{ V}$, $I_C = 0.1\text{ mA}$	h_{FE}	35	-	-
at $V_{CE} = 10\text{ V}$, $I_C = 1\text{ mA}$	h_{FE}	50	-	-
at $V_{CE} = 10\text{ V}$, $I_C = 10\text{ mA}$	h_{FE}	75	-	-
at $V_{CE} = 1\text{ V}$, $I_C = 150\text{ mA}$	h_{FE}	50	-	-
at $V_{CE} = 10\text{ V}$, $I_C = 150\text{ mA}$	h_{FE}	100	300	-
at $V_{CE} = 10\text{ V}$, $I_C = 500\text{ mA}$	h_{FE}	30	-	-
MMBT2222T	h_{FE}	40	-	-
MMBT2222AT	h_{FE}	40	-	-
Collector Base Voltage				
at $I_C = 10\text{ }\mu\text{A}$	V_{CBO}	60	-	V
MMBT2222T	V_{CBO}	75	-	V
MMBT2222AT	V_{CBO}	75	-	V
Collector Emitter Voltage				
at $I_C = 10\text{ mA}$	V_{CEO}	30	-	V
MMBT2222T	V_{CEO}	40	-	V
MMBT2222AT	V_{CEO}	40	-	V
Emitter Base Voltage				
at $I_E = 10\text{ }\mu\text{A}$	V_{EBO}	5	-	V
MMBT2222T	V_{EBO}	6	-	V
MMBT2222AT	V_{EBO}	6	-	V
Collector Base Cutoff Current				
at $V_{CB} = 50\text{ V}$	I_{CBO}	-	100	nA
at $V_{CB} = 60\text{ V}$	I_{CBO}	-	100	nA
MMBT2222T	I_{CBO}	-	100	nA
MMBT2222AT	I_{CBO}	-	100	nA
Emitter Base Cutoff Current				
at $V_{EB} = 3\text{ V}$	I_{EBO}	-	100	nA
MMBT2222T	I_{EBO}	-	100	nA
MMBT2222AT	I_{EBO}	-	100	nA
Collector Emitter Saturation Voltage				
at $I_C = 150\text{ mA}$, $I_B = 15\text{ mA}$	$V_{CE(sat)}$	-	0.4	V
MMBT2222T	$V_{CE(sat)}$	-	0.3	V
MMBT2222AT	$V_{CE(sat)}$	-	0.3	V
at $I_C = 500\text{ mA}$, $I_B = 50\text{ mA}$	$V_{CE(sat)}$	-	1.6	V
MMBT2222T	$V_{CE(sat)}$	-	1	V
MMBT2222AT	$V_{CE(sat)}$	-	1	V
Base Emitter Saturation Voltage				
at $I_C = 150\text{ mA}$, $I_B = 15\text{ mA}$	$V_{BE(sat)}$	-	1.3	V
MMBT2222T	$V_{BE(sat)}$	0.6	1.2	V
MMBT2222AT	$V_{BE(sat)}$	0.6	1.2	V
at $I_C = 500\text{ mA}$, $I_B = 50\text{ mA}$	$V_{BE(sat)}$	-	2.6	V
MMBT2222T	$V_{BE(sat)}$	-	2	V
MMBT2222AT	$V_{BE(sat)}$	-	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

RATING AND CHARACTERISTIC CURVES (MMBT2222T/AT)

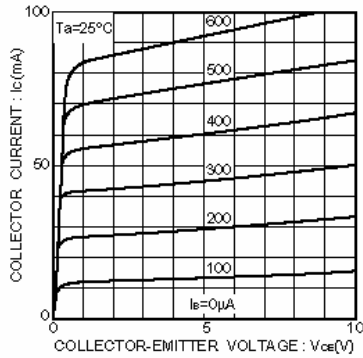


Fig.1 Grounded emitter output characteristics

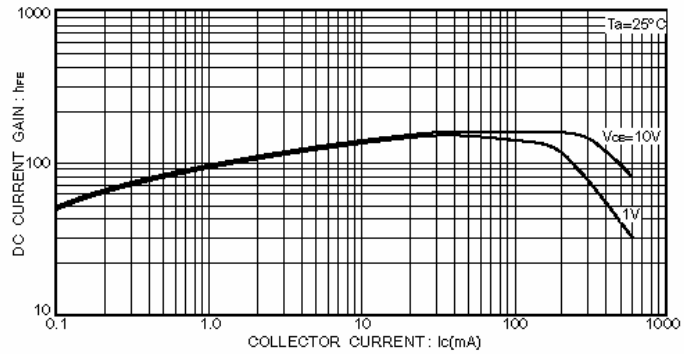


Fig.3 DC current gain vs. collector current(I)

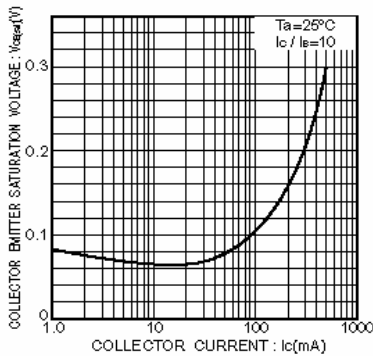


Fig.2 Collector-emitter saturation voltage vs. collector current

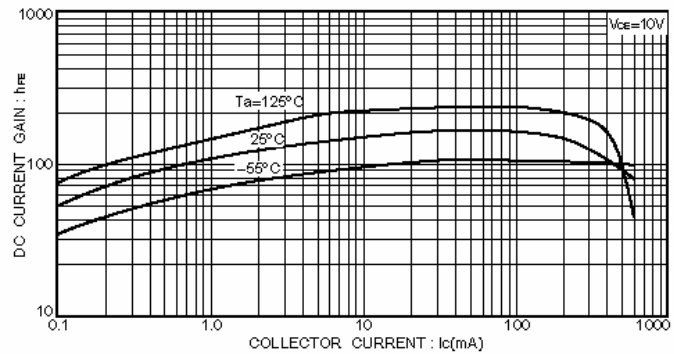


Fig.4 DC current gain vs. collector current(II)

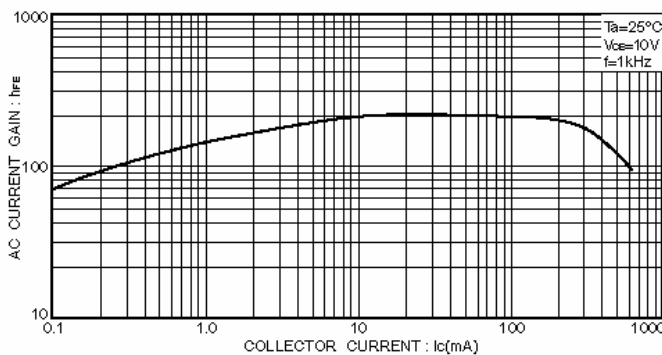


Fig.5 AC current gain vs. collector current

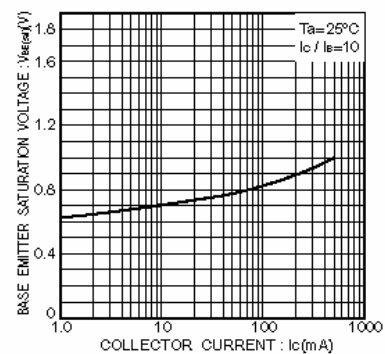


Fig.6 Base-emitter saturation voltage vs. collector current

RATING AND CHARACTERISTIC CURVES (MMBT222T/AT)

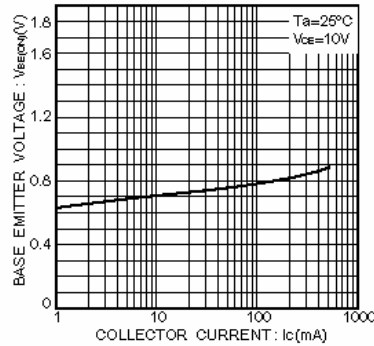


Fig.7 Grounded emitter propagation characteristics

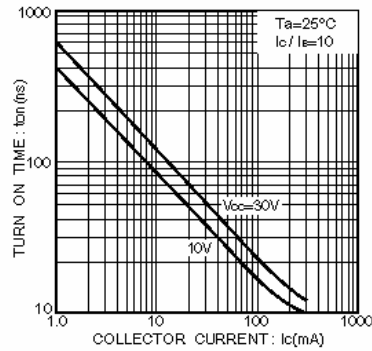


Fig.8 Turn-on time vs. collector current

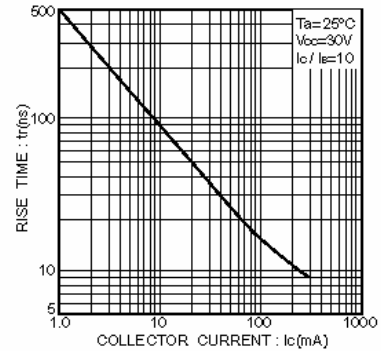


Fig.9 Rise time vs. collector current

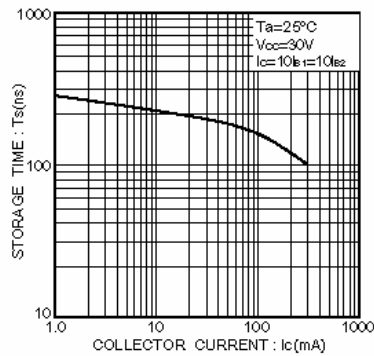


Fig.10 Storage time vs. collector current

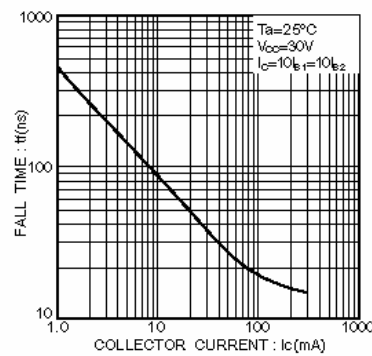


Fig.11 Fall time vs. collector current

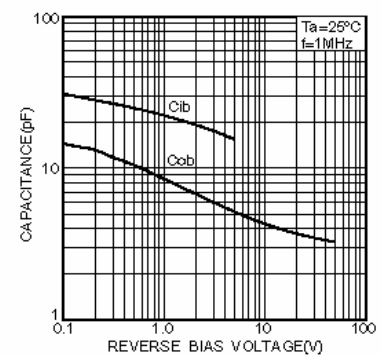


Fig.12 Input / output capacitance vs. voltage

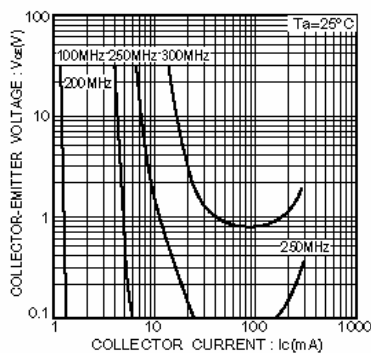


Fig.13 Gain bandwidth product

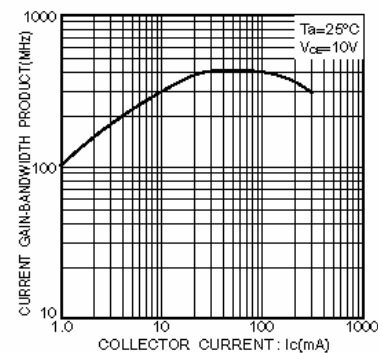


Fig.14 Gain bandwidth product vs. collector current