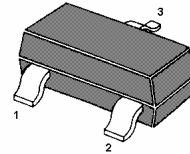




NPN Silicon Epitaxial Planar Medium Power Transistor
for switching and amplifier applications



1. Base 2. Emitter 3. Collector

SOT-23 Plastic Package

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

Parameter	Symbol	Value		Unit
		MMBT2222	MMBT2222A	
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		$^\circ\text{C}$

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	-	-
	MMBT2222			
	MMBT2222A			
Collector Base Voltage				
at $I_C = 10\text{ }\mu\text{A}$	V_{CBO}	60	-	V
	MMBT2222	75	-	
	MMBT2222A			
Collector Emitter Voltage				
at $I_C = 10\text{ mA}$	V_{CEO}	30	-	V
	MMBT2222	40	-	
	MMBT2222A			
Emitter Base Voltage				
at $I_E = 10\text{ }\mu\text{A}$	V_{EBO}	5	-	V
	MMBT2222	6	-	
	MMBT2222A			
Collector Base Cutoff Current				
at $V_{CB} = 50\text{ V}$	I_{CBO}	-	100	nA
at $V_{CB} = 60\text{ V}$	MMBT2222	-	100	
	MMBT2222A			
Emitter Base Cutoff Current				
at $V_{EB} = 3\text{ V}$	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
	MMBT2222	-	0.3	
	MMBT2222A			
at $I_C = 500\text{ mA}$, $I_B = 50\text{ mA}$	MMBT2222	-	1.6	
	MMBT2222A	-	1	
Base Emitter Saturation Voltage				
at $I_C = 150\text{ mA}$, $I_B = 15\text{ mA}$	$V_{BE(sat)}$	-	1.3	V
	MMBT2222	0.6	1.2	
	MMBT2222A			
at $I_C = 500\text{ mA}$, $I_B = 50\text{ mA}$	MMBT2222	-	2.6	
	MMBT2222A	-	2	
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

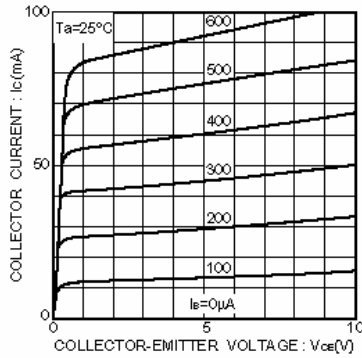


Fig.1 Grounded emitter output characteristics

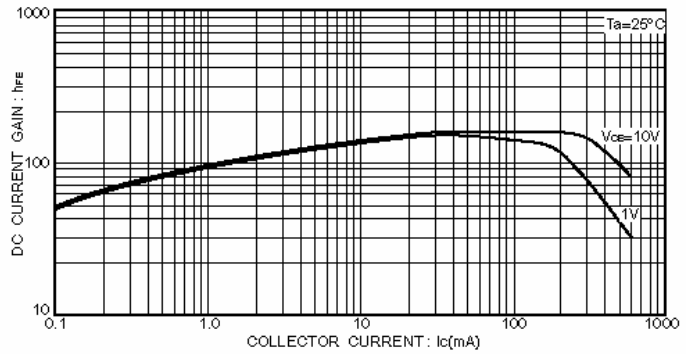


Fig.3 DC current gain vs. collector current(I)

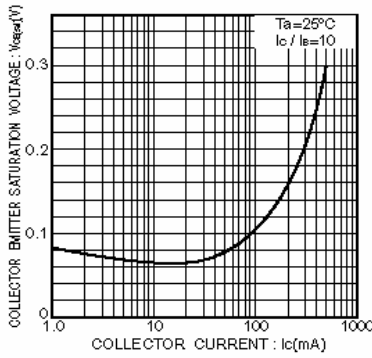


Fig.2 Collector-emitter saturation voltage vs. collector current

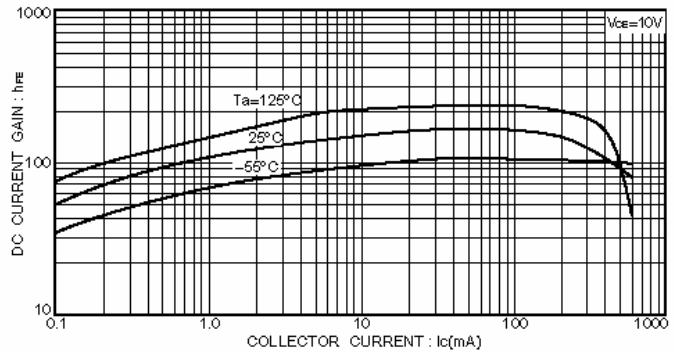


Fig.4 DC current gain vs. collector current(II)

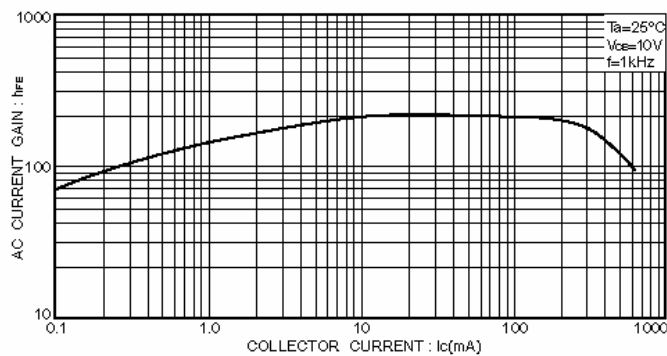


Fig.5 AC current gain vs. collector current

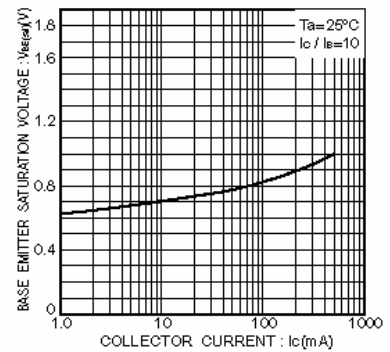


Fig.6 Base-emitter saturation voltage vs. collector current

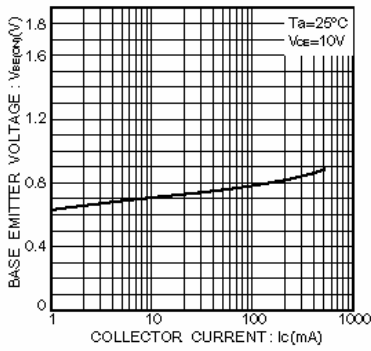


Fig.7 Grounded emitter propagation characteristics

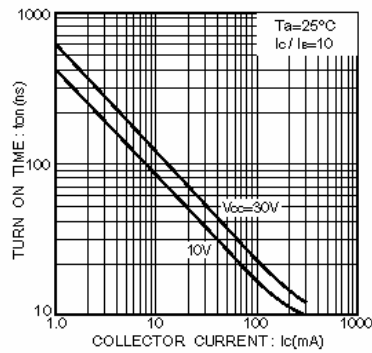


Fig.8 Turn-on time vs. collector current

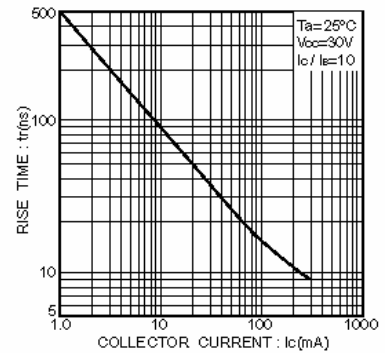


Fig.9 Rise time vs. collector current

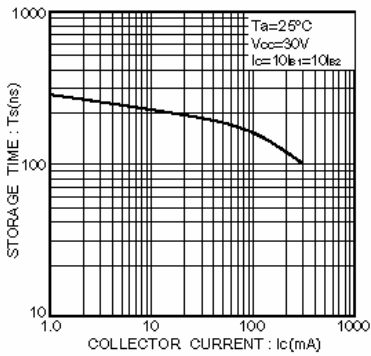


Fig.10 Storage time vs. collector current

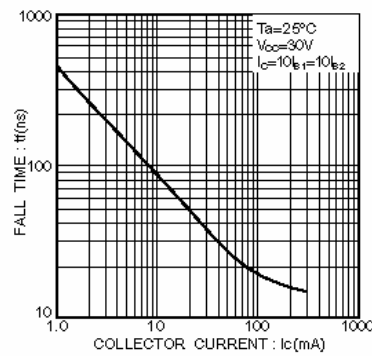


Fig.11 Fall time vs. collector current

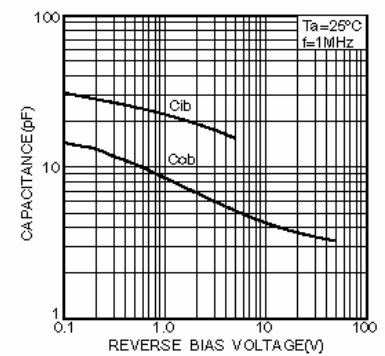


Fig.12 Input / output capacitance vs. voltage

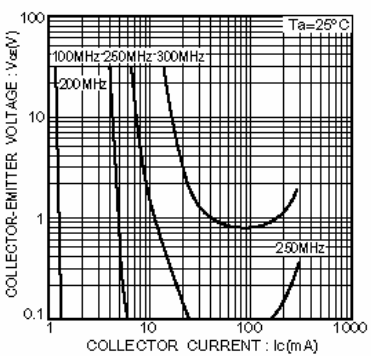


Fig.13 Gain bandwidth product

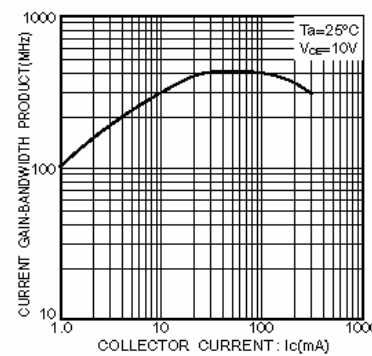


Fig.14 Gain bandwidth product vs. collector current