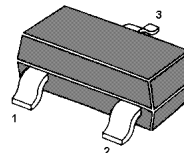


# MMBT2222 / MMBT2222A

## NPN Silicon Epitaxial Planar 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
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
Power Dissipation	$P_{tot}$	350	mW
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	- 55 to + 150	$^\circ\text{C}$

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## 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 $V_{CE} = 10\text{ V}$ , $I_C = 500\text{ mA}$	$h_{FE}$ $h_{FE}$ $h_{FE}$ $h_{FE}$ $h_{FE}$ $h_{FE}$ $h_{FE}$	35 50 75 50 100 30 40	- - - - 300 - -	- - - - - - -
Collector Base Cutoff Current at $V_{CB} = 50\text{ V}$ at $V_{CB} = 60\text{ V}$	$I_{CBO}$	- -	100 100	nA
Emitter Base Cutoff Current at $V_{EB} = 3\text{ V}$	$I_{EBO}$	-	100	nA
Collector Base Breakdown Voltage at $I_C = 10\text{ }\mu\text{A}$	$V_{(BR)CBO}$	60 75	- -	V
Collector Emitter Breakdown Voltage at $I_C = 10\text{ mA}$	$V_{(BR)CEO}$	30 40	- -	V
Emitter Base Breakdown Voltage at $I_E = 10\text{ }\mu\text{A}$	$V_{(BR)EBO}$	5 6	- -	V
Collector Emitter Saturation Voltage at $I_C = 150\text{ mA}$ , $I_B = 15\text{ mA}$ at $I_C = 500\text{ mA}$ , $I_B = 50\text{ mA}$	$V_{CE(sat)}$	- - - -	0.4 0.3 1.6 1	V
Base Emitter Saturation Voltage at $I_C = 150\text{ mA}$ , $I_B = 15\text{ mA}$ at $I_C = 500\text{ mA}$ , $I_B = 50\text{ mA}$	$V_{BE(sat)}$	- 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
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

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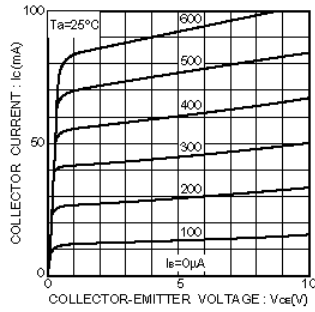


Fig.1 Grounded emitter output characteristics

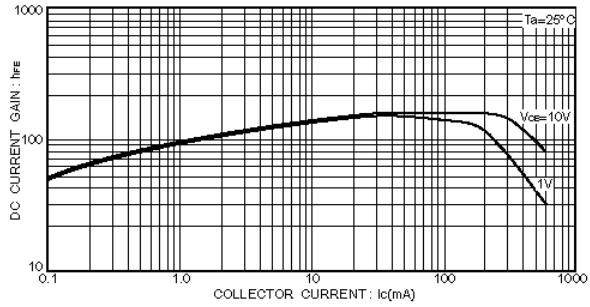


Fig.3 DC current gain vs. collector current (I)

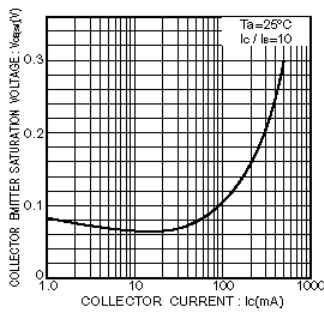


Fig.2 Collector-emitter saturation voltage vs. collector current

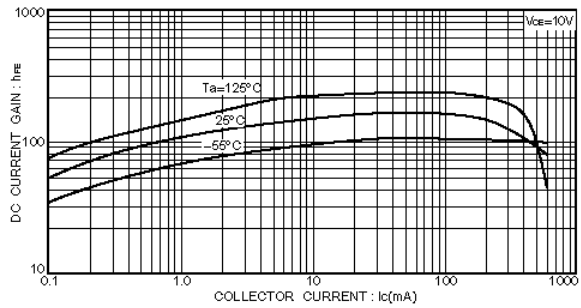


Fig.4 DC current gain vs. collector current (II)

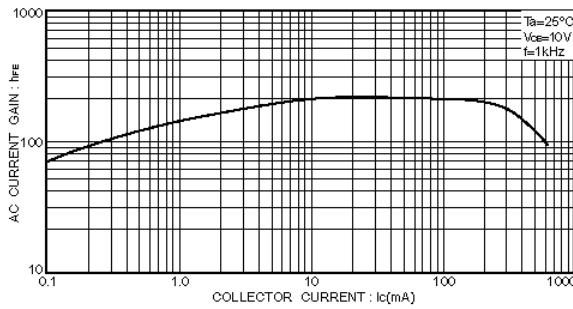


Fig.5 AC current gain vs. collector current

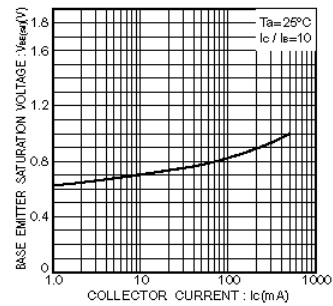


Fig.6 Base-emitter saturation voltage vs. collector current

Fig.7 Pc-Ta

