

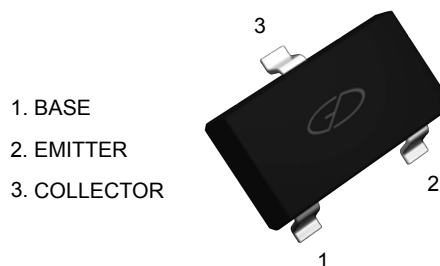
MMBT222A NPN Transistor

Features

- High current low voltage
- Complementary PNP MMBT2907A
- SOT-23 small surface mount package

Applications

- General purpose amplifier
- Switching



SOT-23

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	75	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6.0	V
Collector Current-Continuous	I_C	600	mA
Collector Power Dissipation	P_C	300	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	417	$^{\circ}\text{C/W}$
Operating Temperature	T_J	-55 to +150	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-55 to +150	$^{\circ}\text{C}$

Classification Of $h_{FE(1)}$

h_{FE}	100-300	
Rank	L	H
Range	100-200	200-300

MMBT2222A NPN Transistor

Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameters	Symbol	Test Conditions	Min	Max	Unit
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=10\mu\text{A}$, $I_E=0$	75	-	V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}^1$	$I_C=10\text{mA}$, $I_B=0$	40	-	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=10\mu\text{A}$, $I_C=0$	6	-	V
Collector Cut-off Current	I_{CBO}	$V_{CB}=60\text{V}$, $I_E=0$	-	0.01	μA
Collector Cut-off Current	I_{CEX}	$V_{CE}=30\text{V}$, $V_{BE(off)}=3\text{V}$	-	0.01	μA
Emitter Cut-off Current	I_{EBO}	$V_{EB}=3\text{V}$, $I_C=0$	-	0.1	μA
DC Current Gain	$h_{FE(1)}^1$	$V_{CE}=10\text{V}$, $I_C=150\text{mA}$	100	300	-
	$h_{FE(2)}$	$V_{CE}=10\text{V}$, $I_C=0.1\text{mA}$	40	-	
	$h_{FE(3)}^1$	$V_{CE}=10\text{V}$, $I_C=500\text{mA}$	42	-	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}^1$	$I_C=500\text{mA}$, $I_B=50\text{mA}$	-	1	V
		$I_C=150\text{mA}$, $I_B=15\text{mA}$	-	0.3	
Base-Emitter Saturation Voltage	$V_{BE(sat)}^1$	$I_C=500\text{mA}$, $I_B=50\text{mA}$	-	2.0	V
		$I_C=150\text{mA}$, $I_B=15\text{mA}$	-	1.2	
Transition Frequency	f_T	$V_{CE}=20\text{V}$, $I_C=20\text{mA}$, $f=100\text{MHz}$	300	-	MHz
Delay Time	t_d	$V_{CC}=30\text{V}$, $V_{BE(off)}=-0.5\text{V}$	-	10	nS
Rise Time	t_r	$I_C=150\text{mA}$, $I_{B1}=15\text{mA}$	-	25	nS
Storage Time	t_s	$V_{CC}=30\text{V}$, $I_C=150\text{mA}$	-	225	nS
Fall Time	t_f	$I_{B1}=I_{B2}=15\text{mA}$	-	60	nS

Note:

1. pulse test: pulse width $\leq 300\mu\text{S}$, duty cycle $\leq 2.0\%$.

Electrical Characteristic Curves

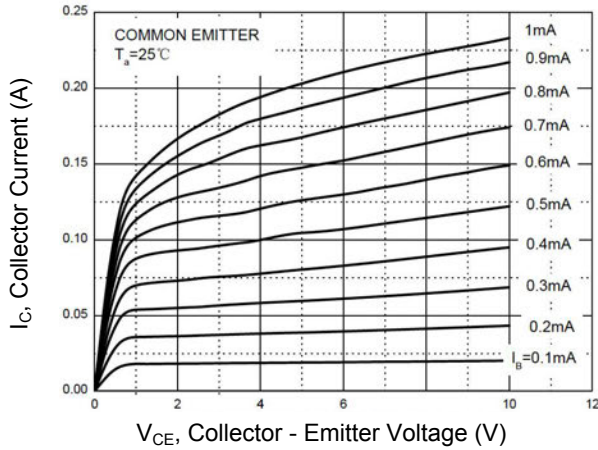


Figure 1. Static Characteristic

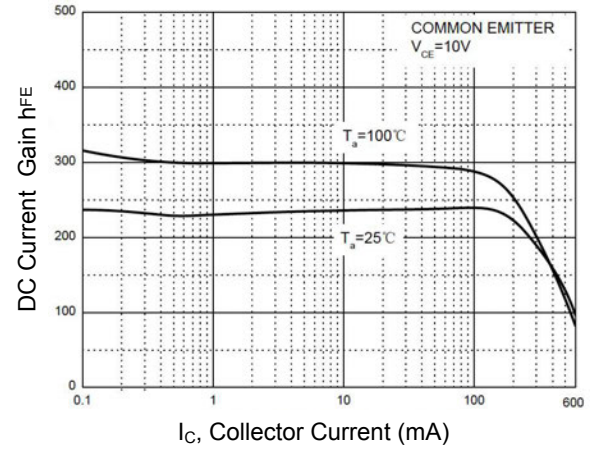


Figure 2. DC Current Gain vs Collector Current

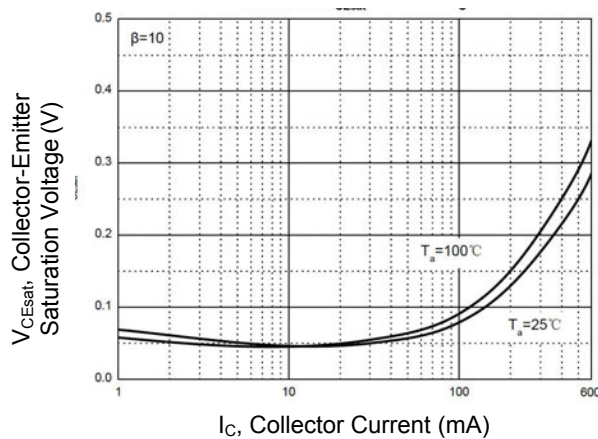


Figure 3. Collector - Emmitter Saturation Voltage vs. Collector Current

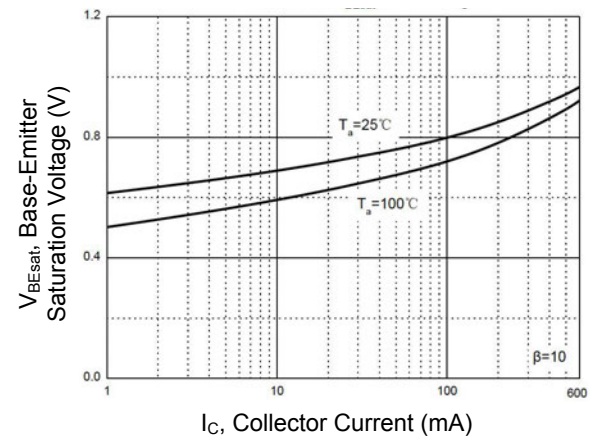


Figure 4. Base - Emmitter Saturation Voltage vs. Collector Current

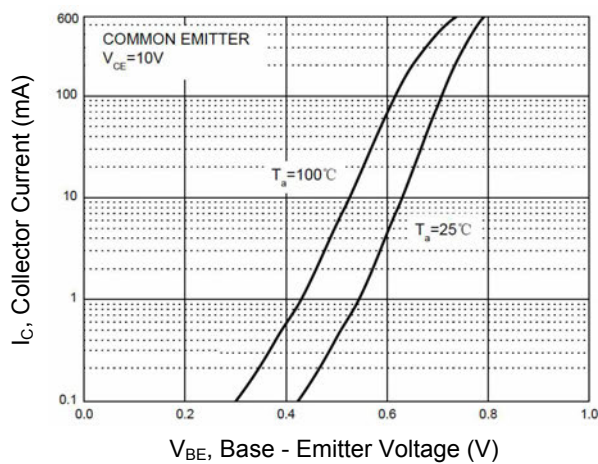


Figure 5. Collector Current vs. Base - Emmitter Voltage

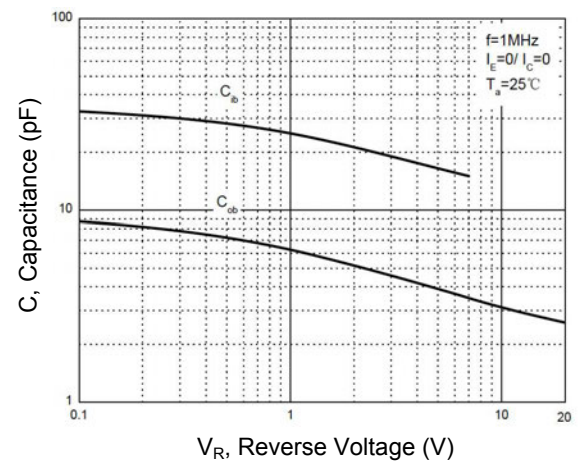


Figure 6. Capacitance Characteristics

Electrical Characteristic Curves

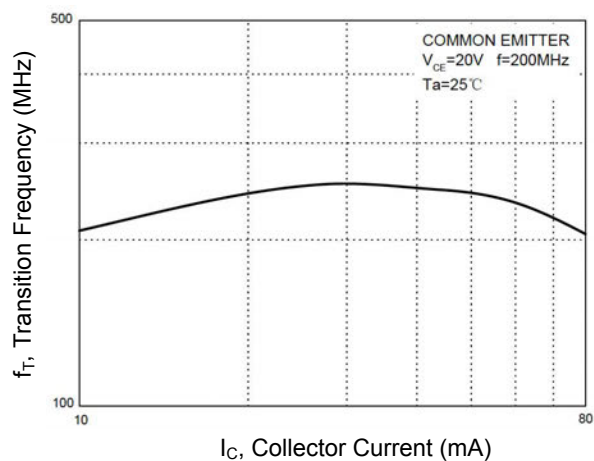


Figure 7. Transition Frequency vs. Collector Current

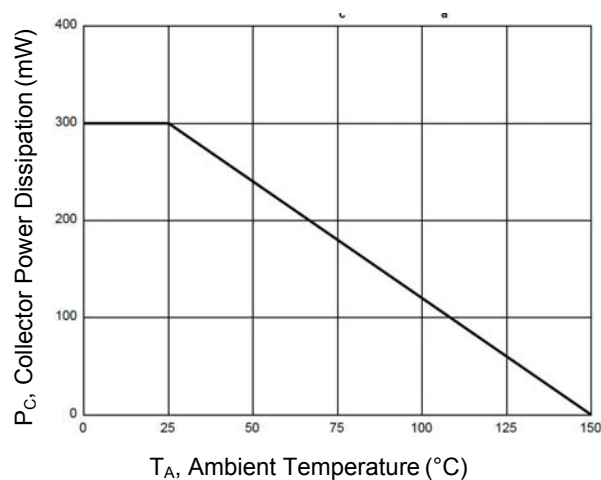
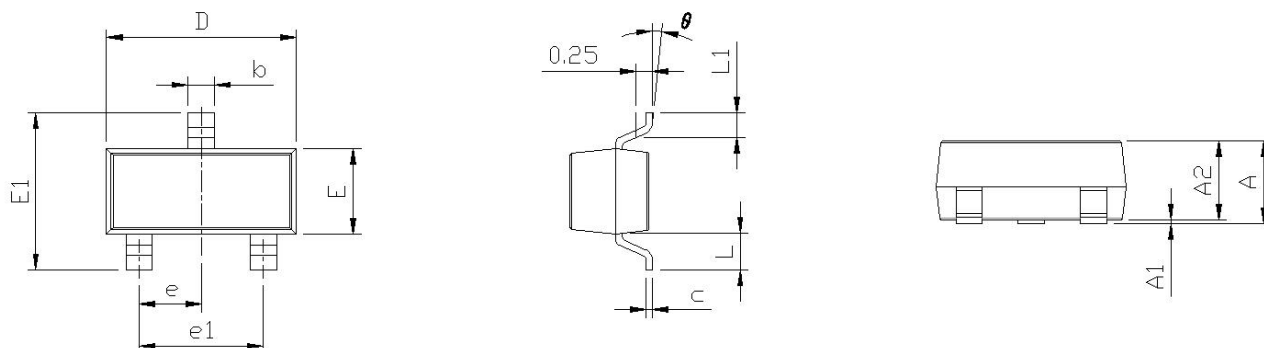


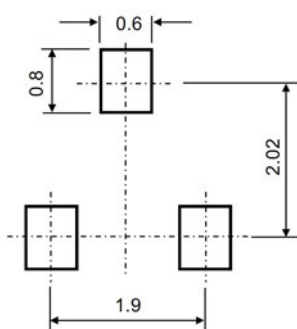
Figure 8. Power Dissipation vs Ambient Temperature

Package Outline Dimensions (SOT-23)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

Suggested Pad Layout



Note:
1. Controlling dimension: in millimeters.
2. General tolerance: ± 0.05 mm.
3. The pad layout is for reference purposes only.

Order Information

Device	Package	Marking	Carrier	Quantity
MMBT2222A	SOT-23	1P	Tape & Reel	3,000 pcs / Reel