300mW, NPN Small Signal Transistor

FEATURES

- Low power loss, high efficiency
- Ideal for automated placement
- High surge current capability
- Moisture sensitivity level: level 1, per J-STD-020
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

APPLICATIONS

- Switching mode power supply (SMPS)
- Adapters
- Lighting application
- On-board DC/DC converter

MECHANICAL DATA

- Case: SOT-23
- Molding compound: UL flammability classification rating 94V-0
- Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 1A whisker test
- Polarity: Indicated by cathode band
- Weight: 8 mg (approximately)

KEY PARAMETERS		
PARAMETER	**VALUE**	**UNIT**
V_{CBO}	75	V
V_{CEO}	40	V
V_{EBO}	6	V
I_C	600	mA
h_{FE}	300	
Package	SOT-23	
Configuration	Single die	

3 Collector

1 Base   **2 Emitter**
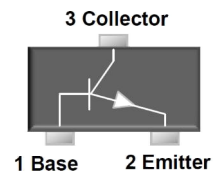
ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

PARAMETER	SYMBOL	MMBT2222A	UNIT
Marking code on the device		1P	
Collector-base voltage, emitter open	V_{CBO}	75	V
Collector-emitter voltage, base open	V_{CEO}	40	V
Emitter-base voltage, collector open	V_{EBO}	6	V
Collector current, dc	I_C	600	mA
Total dc power input to all terminals	P_T	300	mW
Junction temperature	T_J	-55 to +150	°C
Storage temperature	T_{STG}	-55 to +150	°C

ELECTRICAL SPECIFICATIONS (T_A = 25°C unless otherwise noted)

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Collector-base breakdown voltage, emitter open	I_C = 10 µA, I_E = 0	$V_{(BR)CBO}$	75	-	-	V
Collector-emitter breakdown voltage, base open	I_C = 10 mA, I_B = 0	$V_{(BR)CEO}$	40	-	-	V
Emitter-base breakdown voltage, collector open	I_E = 10 µA, I_C = 0	$V_{(BR)EBO}$	6	-	-	V
Collector cutoff current, emitter open	V_{CB} = 60 V, I_E = 0	I_{CBO}	-	-	0.01	µA
Emitter cutoff current, collector open	V_{EB} = 3 V, I_C = 0	I_{EBO}	-	-	0.1	µA
DC Current Gain	V_{CE} = 10 V, I_C = 500 mA	h_{FE}	40	-	-	
	V_{CE} = 10 V, I_C = 150 mA		100	-	300	
	V_{CE} = 10 V, I_C = 10 mA		75	-	-	
	V_{CE} = 10 V, I_C = 1 mA		50	-	-	
	V_{CE} = 10 V, I_C = 0.1 mA		35	-	-	
Collector-emitter saturation voltage	I_C = 500 mA, I_B = 50 mA	$V_{CE(sat)}$	-	-	1	V
Base-emitter saturation voltage	I_C = 500 mA, I_B = 50 mA	$V_{BE(sat)}$	-	-	2	V
Transition frequency	V_{CE} = 20 V , I_C = 20 mA, f= 100MHz	f_T	300	-	-	MHz
Output Capacitance	1 MHz, V_{CB} = 10 V, I_E = 0	C_{OBO}	8			pF
Input Capacitance	1 MHz, V_{EB} = 0.5 V, I_C = 0	C_{IBO}	25			pF
Delay Time	V_{CC}=30V, $V_{BE(off)}$= -0.5V, I_C=150mA	t_d	-	-	10	ns
Rise Time	I_{B1}=15mA	t_r	-	-	25	ns
Storage Time	V_{CC}=30V, I_{B1}= -I_{B2}=15mA, I_C=150mA	t_s	-	-	225	ns
Fall Time	V_{CC}=30V, I_{B1}= -I_{B2}=15mA, I_C=150mA	t_f	-	-	60	ns

ORDERING INFORMATION

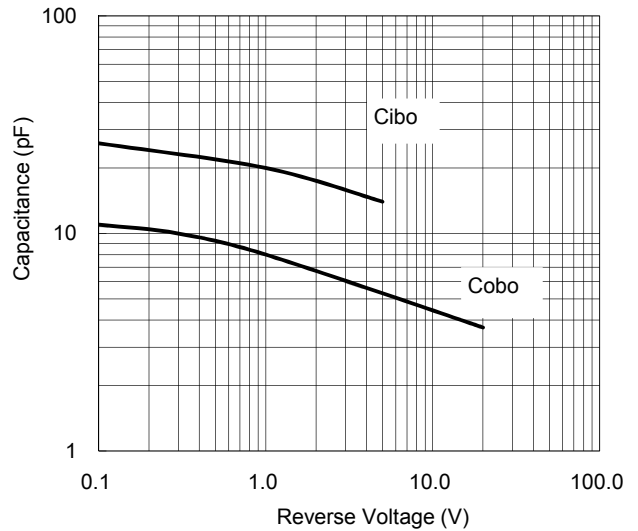| ORDERING CODE	PACKAGE	PACKING
MMBT2222A RFG	SOT-23	3K / 7" Reel

Version: G2001

CHARACTERISTICS CURVES

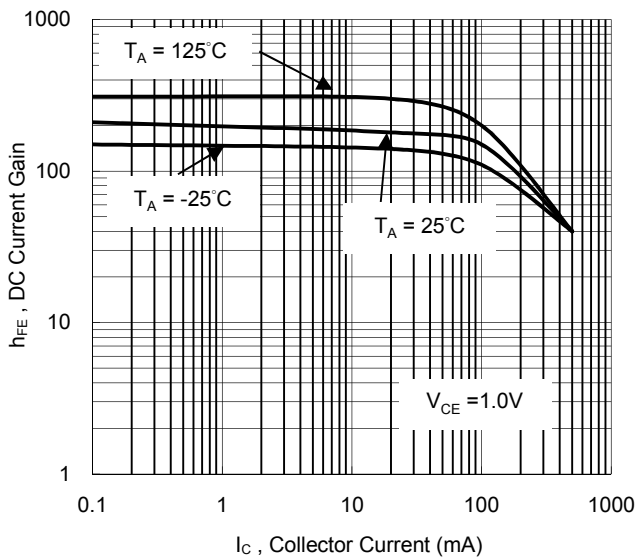(T_A = 25°C unless otherwise noted)

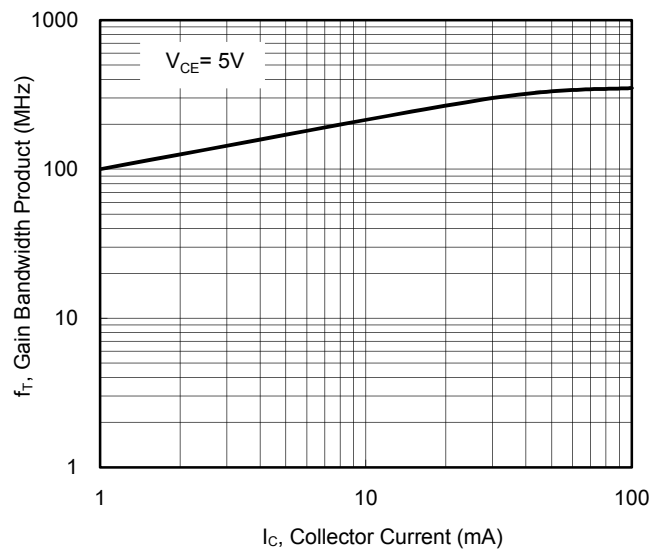**Fig. 1 Max Power Dissipation VS. Ambient Temperature**
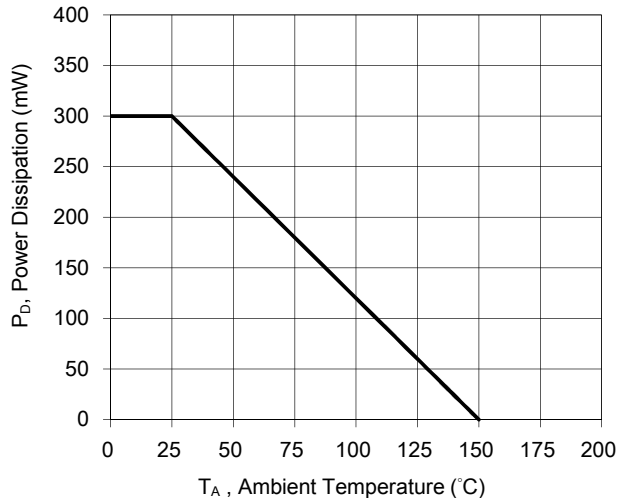
Fig.2 Typical Capacitance

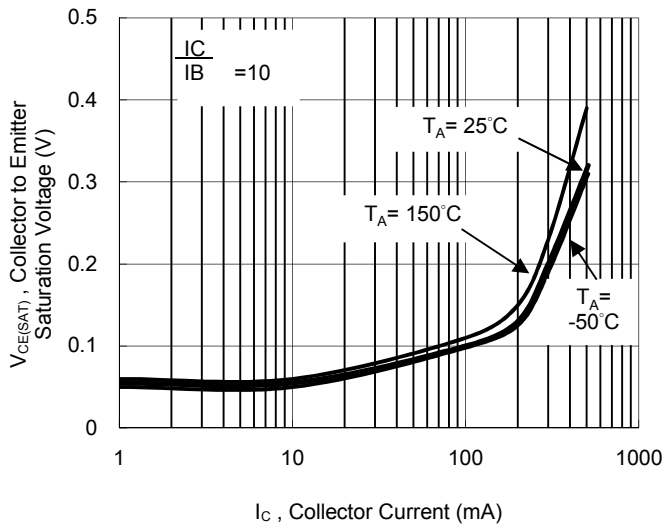**Fig.3 Typical DC Current Gain VS. Collector Current**

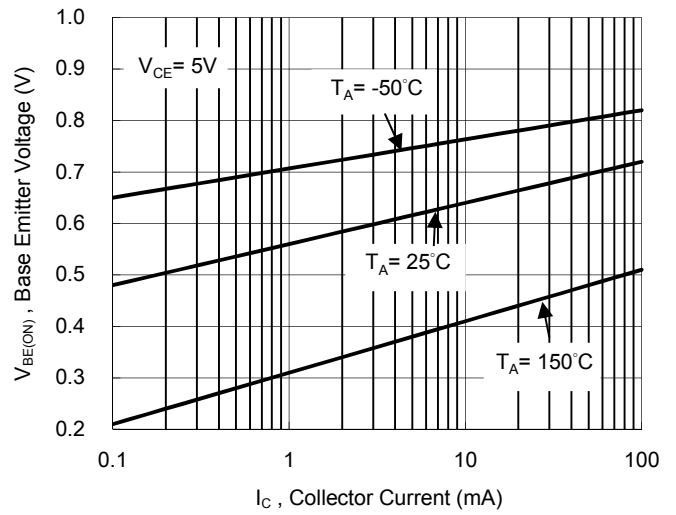**Fig.4 Gain Bandwidth Product VS. Collector Current**

TAIWAN SEMICONDUCTOR

CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

Fig.5 Collector Emitter Saturation Voltage VS. Collector Current

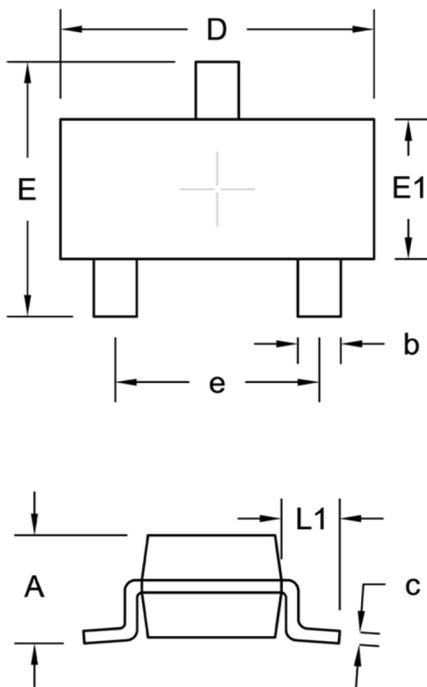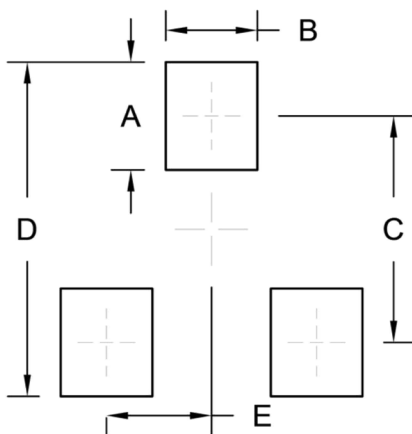**Fig.6 Base Emitter Voltage vs. Collector Current**

MMBT2222A
Taiwan Semiconductor

PACKAGE OUTLINE DIMENSION

SOT-23

DIM.	Unit (mm)		Unit (inch)	
	Min.	Max.	Min.	Max.
A	0.89	1.12	0.035	0.044
b	0.30	0.50	0.012	0.020
c	0.08	0.20	0.003	0.008
D	2.80	3.04	0.110	0.120
E	2.10	2.64	0.083	0.104
E1	1.20	1.40	0.047	0.055
e	1.90 BSC		0.075 BSC	
L1	0.54 REF.		0.021 REF.	

SUGGESTED PAD LAYOUT

Symbol	Unit (mm)	Unit (inch)
A	1.00	0.039
B	0.85	0.033
C	2.10	0.083
D	3.10	0.122
E	0.98	0.039

Version: G2001