300mW, NPN Small Signal Transistor

FEATURES

- Low power loss, high efficiency
- Ideal for automated placement
- High surge current capability
- Compliant to RoHS directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21

APPLICATIONS

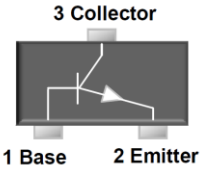
- Switching mode power supply (SMPS)
- Adapters
- Lighting application
- On-board DC/DC converter

MECHANICAL DATA

- Case: SOT-23
- Molding compound: UL flammability classification rating 94V-0
- Moisture sensitivity level: level 1, per J-STD-020
- Packing code with suffix "G" means green compound (halogen-free)
- 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 Dice	

Pb-Free RoHS COMPLIANT HALOGEN FREE



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				
PART NO.	**PACKING CODE**	**PACKING CODE SUFFIX**	**PACKAGE**	**PACKING**
MMBT2222A (Note 1)	RF	G	SOT-23	3K / 7" Reel

Notes:

1. Whole series with green compound

EXAMPLE				
EXAMPLE P/N	**PART NO.**	**PACKING CODE**	**PACKING CODE SUFFIX**	**DESCRIPTION**
MMBT2222A RFG	MMBT2222A	RF	G	Green compound

CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

Fig. 1Max Power Dissipation VS. Ambient Temperature

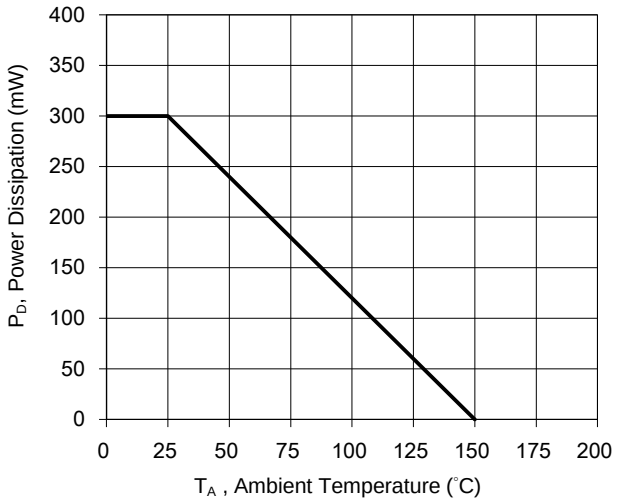


Fig.2 Typical Capacitance

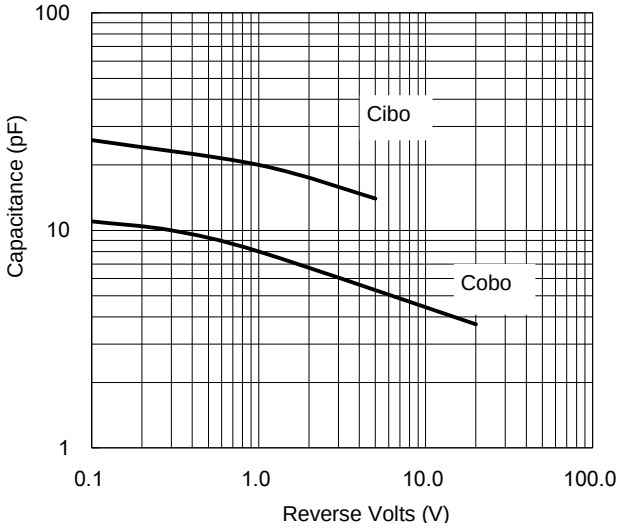


Fig.3 Typical DC Current Gain VS. Collector Current

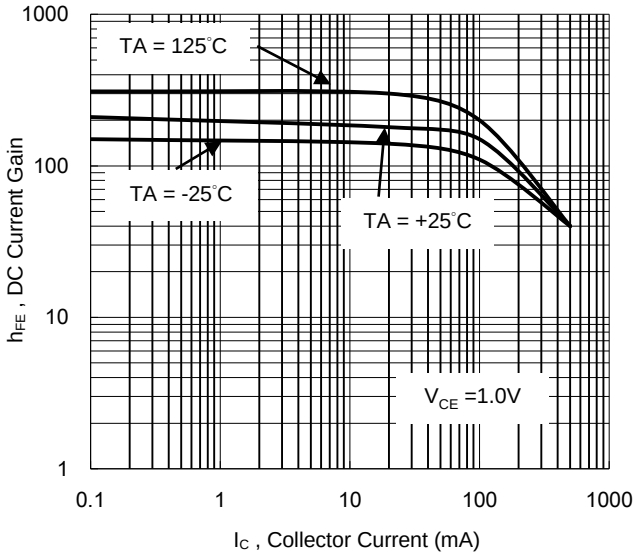
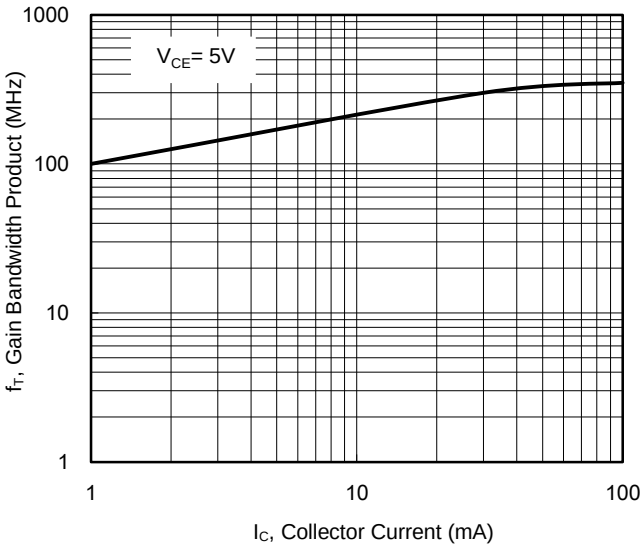


Fig.4 Gain Bandwidth Product VS. Collector Current



CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

Fig.5 Collector Emitter Saturation Voltage VS. Collector Current

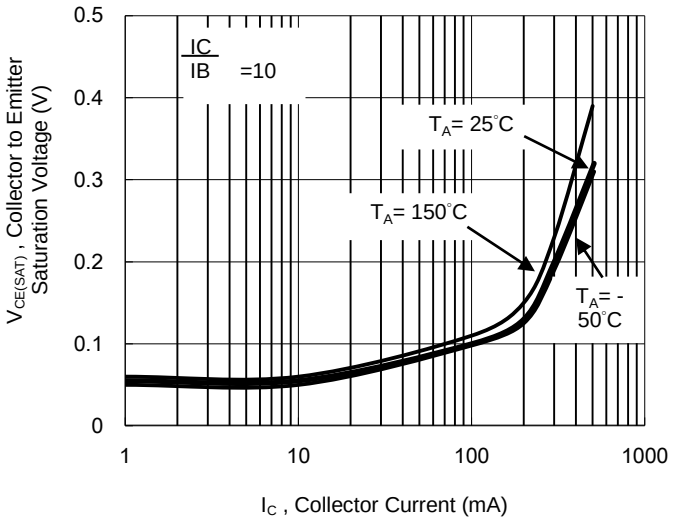
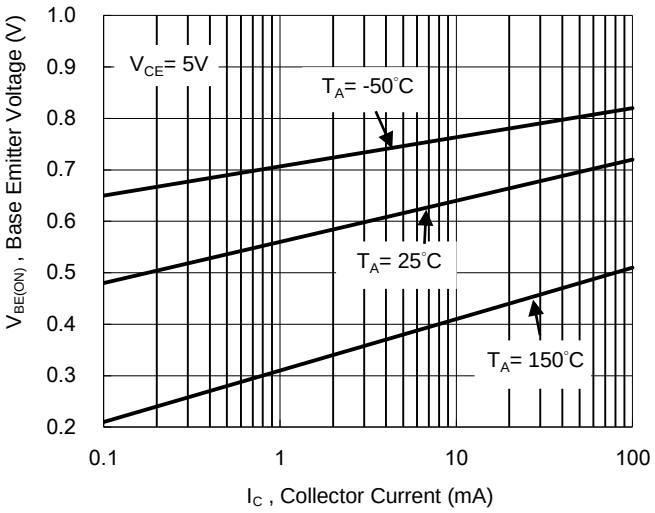
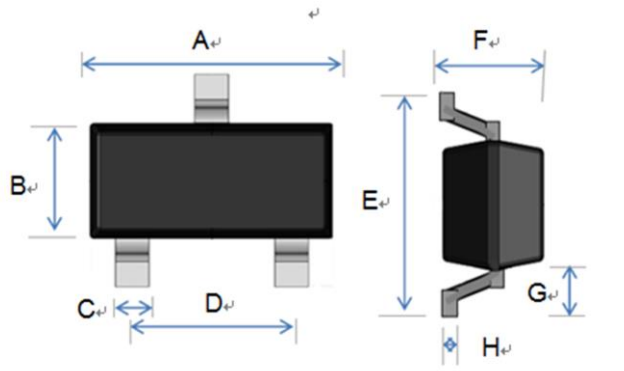


Fig.6 Base Emitter Voltage vs. Collector Current



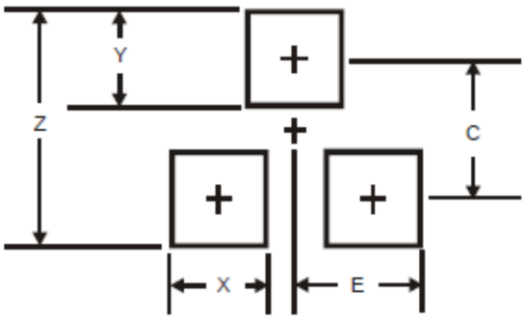
PACKAGE OUTLINE DIMENSION

SOT-23



DIM.	Unit(mm)		Unit(inch)	
	Min	Max	Min	Max
A	2.70	3.10	0.106	0.122
B	1.10	1.50	0.043	0.059
C	0.30	0.51	0.012	0.020
D	1.78	2.04	0.070	0.080
E	2.10	2.64	0.083	0.104
F	0.89	1.30	0.035	0.051
G	0.55 REF		0.022 REF	
H	0.10 REF		0.004 REF	

SUGGEST PAD LAYOUT



DIM.	Unit(mm)	Unit(inch)
	TYP	TYP
Z	2.8	0.11
X	0.7	0.03
Y	0.9	0.04
C	1.9	0.07
E	1.0	0.04

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