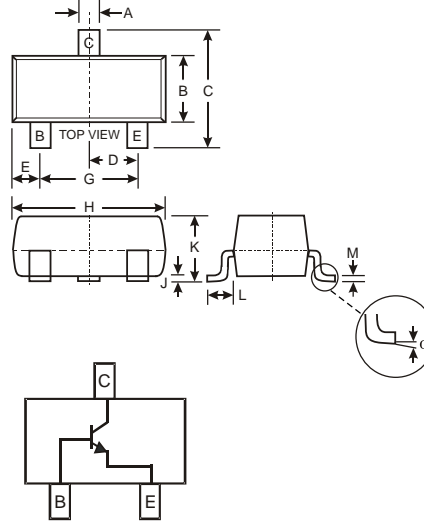


### Features

- Epitaxial Planar Die Construction
- Complementary PNP Type Available (MMBT2907A)
- Ideal for Medium Power Amplification and Switching
- **Lead Free/RoHS Compliant (Note 2)**

### Mechanical Data

- Case: SOT-23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram
- Marking (See Page 2): K1P
- Ordering & Date Code Information: See Page 4
- Weight: 0.008 grams (approximate)



SOT-23		
Dim	Min	Max
A	0.37	0.51
B	1.20	1.40
C	2.30	2.50
D	0.89	1.03
E	0.45	0.60
G	1.78	2.05
H	2.80	3.00
J	0.013	0.10
K	0.903	1.10
L	0.45	0.61
M	0.085	0.180
	0°	8°
All Dimensions in mm		

### Maximum Ratings @ T<sub>A</sub> = 25°C unless otherwise specified

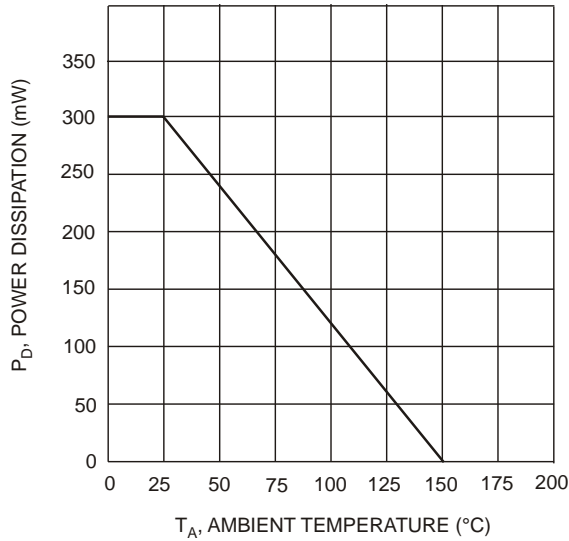
Characteristic	Symbol	MMBT2222A	Unit
Collector-Base Voltage	V <sub>CB0</sub>	75	V
Collector-Emitter Voltage	V <sub>CEO</sub>	40	V
Emitter-Base Voltage	V <sub>EBO</sub>	6.0	V
Collector Current - Continuous	I <sub>C</sub>	600	mA
Peak Collector Current	I <sub>CM</sub>	800	mA
Power Dissipation (Note 1)	P <sub>d</sub>	300	mW
Thermal Resistance, Junction to Ambient (Note 1)	R <sub>JA</sub>	417	°C/W
Operating and Storage and Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- Notes:
1. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
  2. No purposefully added lead.

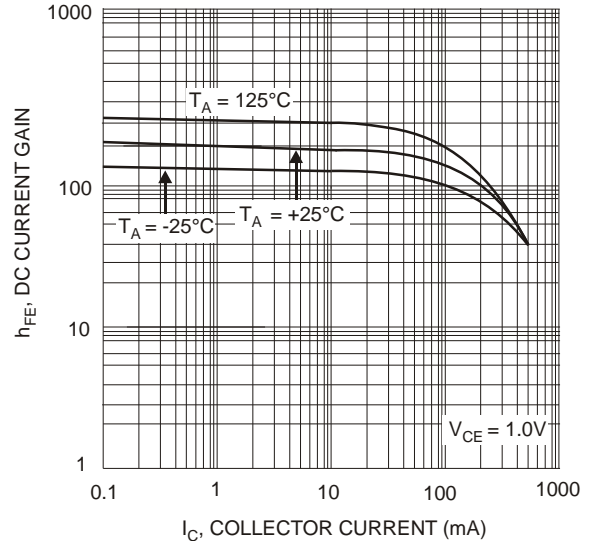
**Electrical Characteristics** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic (Note 3)	Symbol	Min	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>					
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	75		V	$I_C = 10\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	40		V	$I_C = 10\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	6.0		V	$I_E = 10\mu\text{A}, I_C = 0$
Collector Cutoff Current	$I_{CBO}$		10	nA $\mu\text{A}$	$V_{CB} = 60\text{V}, I_E = 0$ $V_{CB} = 60\text{V}, I_E = 0, T_A = 150^\circ\text{C}$
Collector Cutoff Current	$I_{CEX}$		10	nA	$V_{CE} = 60\text{V}, V_{EB(OFF)} = 3.0\text{V}$
Emitter Cutoff Current	$I_{EBO}$		10	nA	$V_{EB} = 3.0\text{V}, I_C = 0$
Base Cutoff Current	$I_{BL}$		20	nA	$V_{CE} = 60\text{V}, V_{EB(OFF)} = 3.0\text{V}$
<b>ON CHARACTERISTICS</b>					
DC Current Gain	$h_{FE}$	35 50 75 100 40 50 35	300		$I_C = 100\mu\text{A}, V_{CE} = 10\text{V}$ $I_C = 1.0\text{mA}, V_{CE} = 10\text{V}$ $I_C = 10\text{mA}, V_{CE} = 10\text{V}$ $I_C = 150\text{mA}, V_{CE} = 10\text{V}$ $I_C = 500\text{mA}, V_{CE} = 10\text{V}$ $I_C = 10\text{mA}, V_{CE} = 10\text{V}, T_A = -55^\circ\text{C}$ $I_C = 150\text{mA}, V_{CE} = 1.0\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$		0.3 1.0	V	$I_C = 150\text{mA}, I_B = 15\text{mA}$ $I_C = 500\text{mA}, I_B = 50\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	0.6	1.2 2.0	V	$I_C = 150\text{mA}, I_B = 15\text{mA}$ $I_C = 500\text{mA}, I_B = 50\text{mA}$
<b>SMALL SIGNAL CHARACTERISTICS</b>					
Output Capacitance	$C_{obo}$		8	pF	$V_{CB} = 10\text{V}, f = 1.0\text{MHz}, I_E = 0$
Input Capacitance	$C_{ibo}$	—	25	pF	$V_{EB} = 0.5\text{V}, f = 1.0\text{MHz}, I_C = 0$
Current Gain-Bandwidth Product	$f_T$	300		MHz	$V_{CE} = 20\text{V}, I_C = 20\text{mA}, f = 100\text{MHz}$
Noise Figure	NF		4.0	dB	$V_{CE} = 10\text{V}, I_C = 100\mu\text{A}, R_S = 1.0\text{k}\Omega, f = 1.0\text{kHz}$
<b>SWITCHING CHARACTERISTICS</b>					
Delay Time	$t_d$		10	ns	$V_{CC} = 30\text{V}, I_C = 150\text{mA}, V_{BE(off)} = -0.5\text{V}, I_{B1} = 15\text{mA}$
Rise Time	$t_r$		25	ns	
Storage Time	$t_s$		225	ns	$V_{CC} = 30\text{V}, I_C = 150\text{mA}, I_{B1} = I_{B2} = 15\text{mA}$
Fall Time	$t_f$		60	ns	

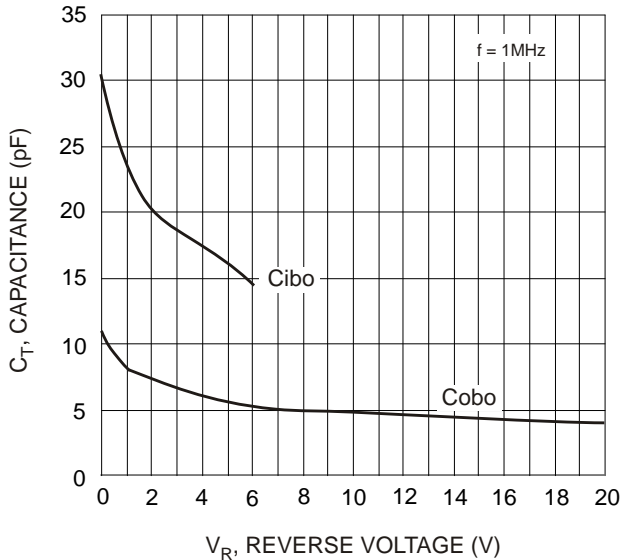
Note: 3. Short duration test pulse used to minimize self-heating effect.



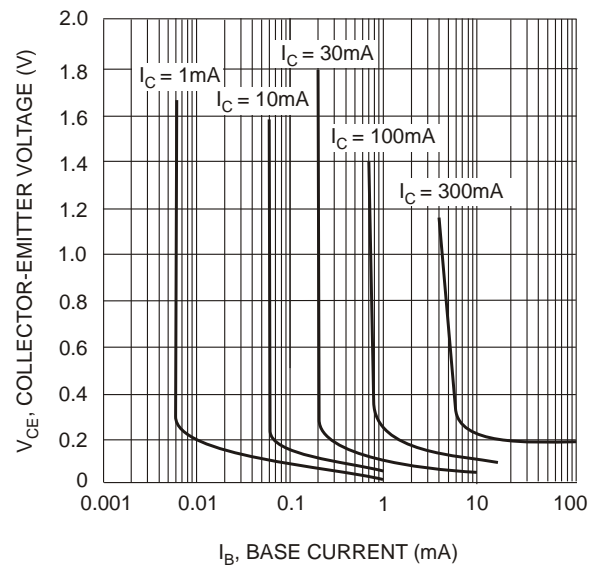
$T_A$ , AMBIENT TEMPERATURE (°C)  
Fig. 1, Max Power Dissipation vs Ambient Temperature



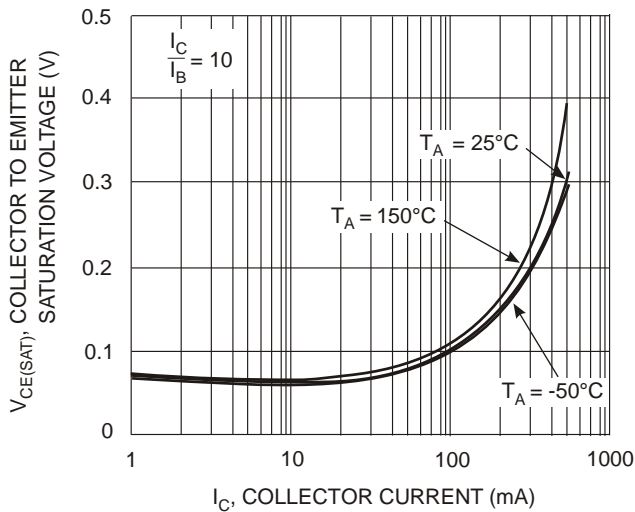
$I_C$ , COLLECTOR CURRENT (mA)  
Fig. 2, Typical DC Current Gain vs Collector Current



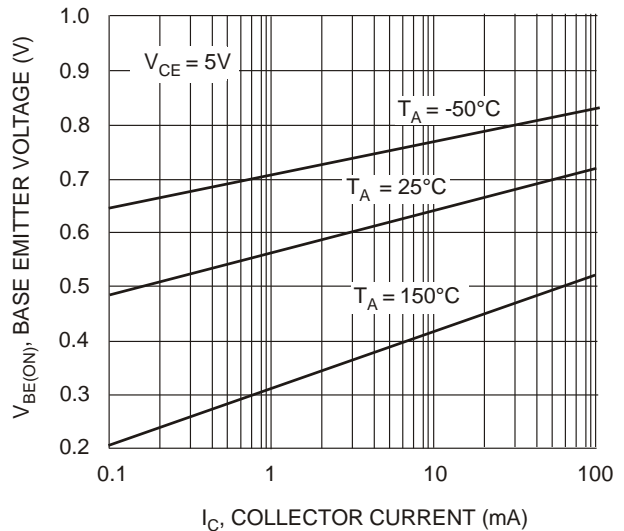
$V_R$ , REVERSE VOLTAGE (V)  
Fig. 3, Typical Capacitance Characteristics



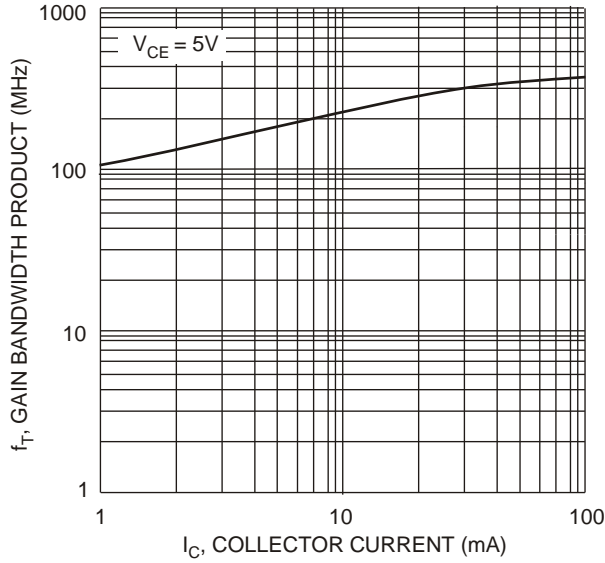
$I_B$ , BASE CURRENT (mA)  
Fig. 4, Typical Collector Saturation Region



$I_C$ , COLLECTOR CURRENT (mA)  
Fig. 5, Collector-Emitter Saturation Voltage vs. Collector Current



$I_C$ , COLLECTOR CURRENT (mA)  
Fig. 6, Base-Emitter Voltage vs. Collector Current

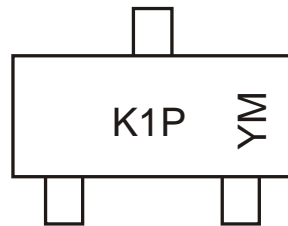


**Ordering Information** (Note 4)

Device	Packaging	Shipping
MMBT222A-7-F	SOT-23	3000/Tape & Reel

Note: 4. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

**Marking Information**



K1P = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year ex: N = 2002  
 M = Month ex: 9 = September

Date Code Key

<b>Year</b>	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>Code</b>	J	K	L	M	N	P	R	S	T	U	V	W
<b>Month</b>	Jan	Feb	March	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Code</b>	1	2	3	4	5	6	7	8	9	O	N	D

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