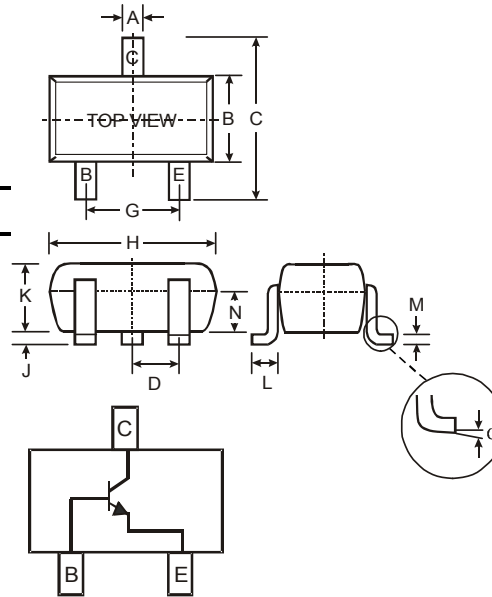


**Features**

- Epitaxial Planar Die Construction
- Complementary PNP Type Available (MMBT2907AT)
- Ultra-Small Surface Mount Package
- **Lead Free/RoHS Compliant (Note 2)**
- **"Green" Device (Note 3 and 4)**

**Mechanical Data**

- Case: SOT-523
- 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 Information: 1P, See Page 4
- Ordering & Date Code Information: See Page 4
- Weight: 0.002 grams (approximate)



SOT-523			
Dim	Min	Max	Typ
A	0.15	0.30	0.22
B	0.75	0.85	0.80
C	1.45	1.75	1.60
D	—	—	0.50
G	0.90	1.10	1.00
H	1.50	1.70	1.60
J	0.00	0.10	0.05
K	0.60	0.80	0.75
L	0.10	0.30	0.22
M	0.10	0.20	0.12
N	0.45	0.65	0.50
$\alpha$	0°	8°	—
All Dimensions in mm			

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</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
Power Dissipation (Note 1)	P <sub>d</sub>	150	mW
Thermal Resistance, Junction to Ambient (Note 1)	R <sub>θJA</sub>	833	°C/W
Operating and Storage 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
  3. Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).
  4. Product manufactured with Date Code UO (week 40, 2007) and newer are built with Green Molding Compound. Product manufactured prior to Date Code UO are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.

## Electrical Characteristics @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 5)</b>					
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	75	—	V	I <sub>C</sub> = 10μA, I <sub>E</sub> = 0
Collector-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	40	—	V	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0
Emitter-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	6.0	—	V	I <sub>E</sub> = 10μA, I <sub>C</sub> = 0
Collector Cutoff Current	I <sub>CEX</sub>	—	10	nA	V <sub>CE</sub> = 60V, V <sub>EB(OFF)</sub> = 3.0V
Base Cutoff Current	I <sub>BL</sub>	—	20	nA	V <sub>CE</sub> = 60V, V <sub>EB(OFF)</sub> = 3.0V
<b>ON CHARACTERISTICS (Note 5)</b>					
DC Current Gain	h <sub>FE</sub>	35	—	—	I <sub>C</sub> = 100μA, V <sub>CE</sub> = 10V
		50	—		I <sub>C</sub> = 1.0mA, V <sub>CE</sub> = 10V
		75	—		I <sub>C</sub> = 10mA, V <sub>CE</sub> = 10V
		100	300		I <sub>C</sub> = 150mA, V <sub>CE</sub> = 10V
		40	—		I <sub>C</sub> = 500mA, V <sub>CE</sub> = 10V
Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>	—	0.3 1.0	V	I <sub>C</sub> = 150mA, I <sub>B</sub> = 15mA I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA
Base-Emitter Saturation Voltage	V <sub>BE(SAT)</sub>	0.6 —	1.2 2.0	V	I <sub>C</sub> = 150mA, I <sub>B</sub> = 15mA I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA
<b>SMALL SIGNAL CHARACTERISTICS</b>					
Output Capacitance	C <sub>obo</sub>	—	8	pF	V <sub>CB</sub> = 10V, f = 1.0MHz, I <sub>E</sub> = 0
Input Capacitance	C <sub>ibo</sub>	—	30	pF	V <sub>EB</sub> = 0.5V, f = 1.0MHz, I <sub>C</sub> = 0
Current Gain-Bandwidth Product	f <sub>T</sub>	300	—	MHz	V <sub>CE</sub> = 20V, I <sub>C</sub> = 20mA, f = 100MHz
Input Impedance	h <sub>ie</sub>	0.25	1.25	kΩ	V <sub>CE</sub> = 10 Vdc, I <sub>C</sub> = 10 mAdc, f = 1.0kHz
Voltage Feedback Ratio	h <sub>re</sub>	—	4.0	X 10 <sup>-4</sup>	V <sub>CE</sub> = 10 Vdc, I <sub>C</sub> = 10 mAdc, f = 1.0kHz
Small-Signal Current Gain	h <sub>fe</sub>	75	375	—	V <sub>CE</sub> = 10 Vdc, I <sub>C</sub> = 10 mAdc, f = 1.0kHz
Output Admittance	h <sub>oe</sub>	25	200	μS	V <sub>CE</sub> = 10 Vdc, I <sub>C</sub> = 10 mAdc, f = 1.0kHz
<b>SWITCHING CHARACTERISTICS</b>					
Delay Time	t <sub>d</sub>	—	10	ns	V <sub>CC</sub> = 30V, I <sub>C</sub> = 150mA,
Rise Time	t <sub>r</sub>	—	25	ns	V <sub>BE(off)</sub> = -0.5V, I <sub>B1</sub> = 15mA
Storage Time	t <sub>s</sub>	—	225	ns	V <sub>CC</sub> = 30V, I <sub>C</sub> = 150mA,
Fall Time	t <sub>f</sub>	—	60	ns	I <sub>B1</sub> = I <sub>B2</sub> = 15mA

Notes: 5. Short duration pulse test used to minimize self-heating effect.

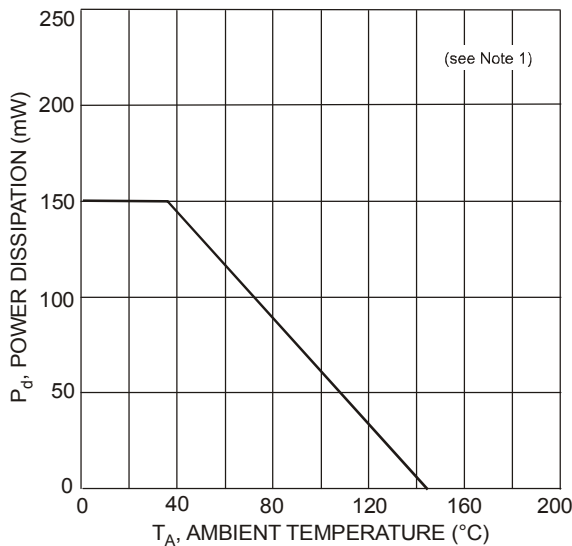


Fig. 1 Power Derating Curve

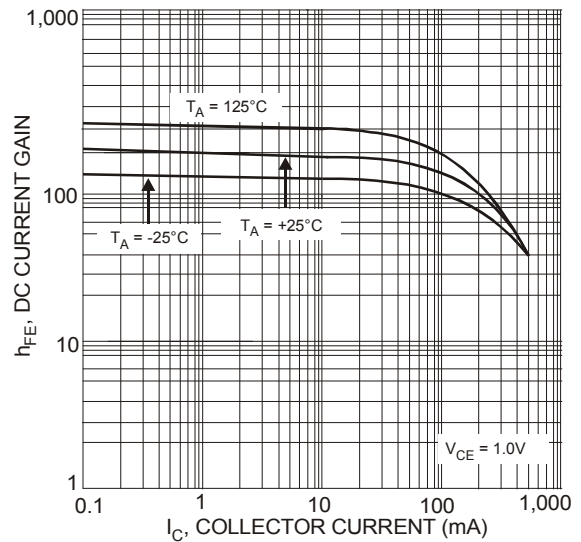


Fig. 2 Typical DC Current Gain vs. Collector Current

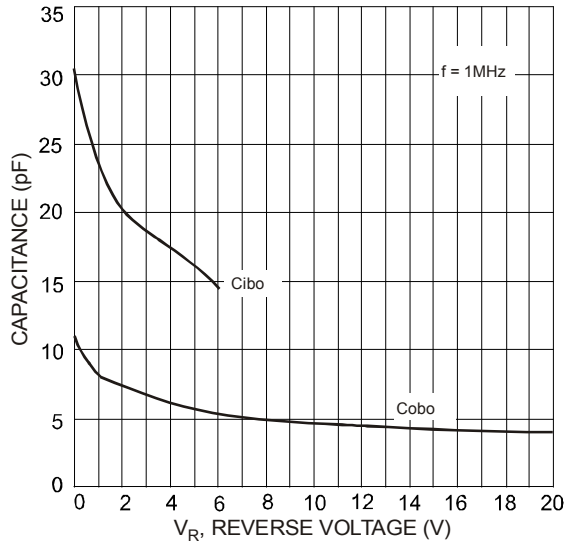


Fig. 3 Typical Capacitance Characteristics

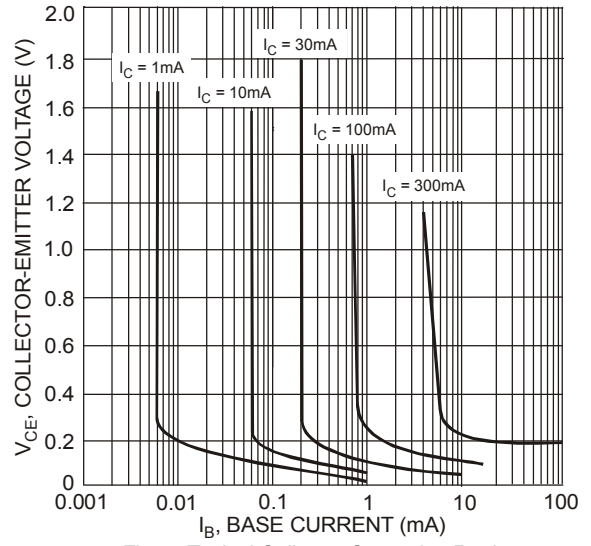


Fig. 4 Typical Collector Saturation Region

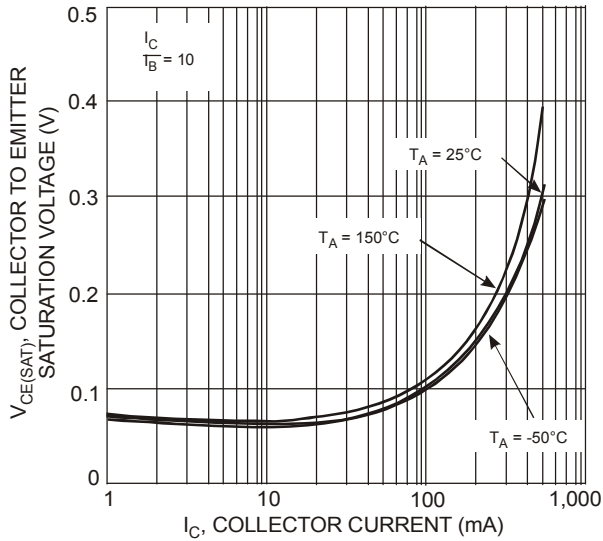


Fig. 5 Typical Collector Emitter Saturation Voltage vs. Collector Current

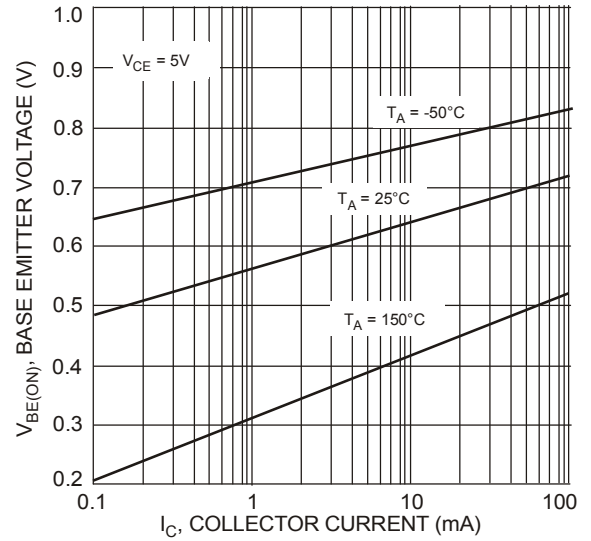


Fig. 6 Typical Base Emitter Voltage vs. Collector Current

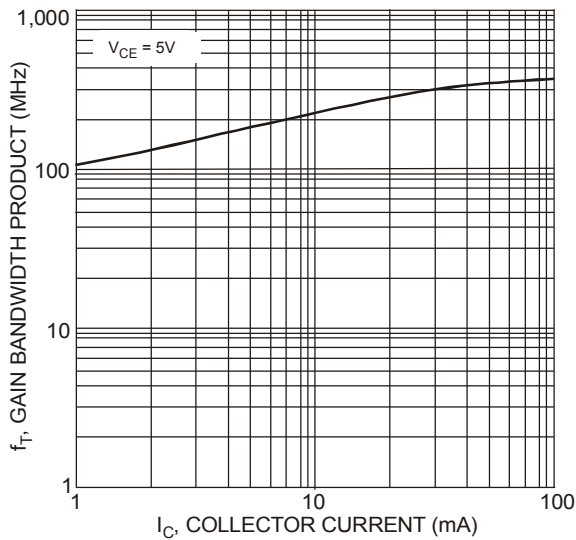


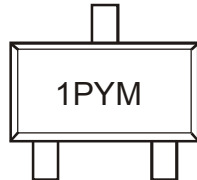
Fig. 7 Typical Gain Bandwidth Product vs. Collector Current

## Ordering Information (Note 6)

Device	Packaging	Shipping
MMBT2222AT-7-F	SOT-523	3000/Tape & Reel

Notes: 6. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



1P = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: N = 2002)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Code	J	K	L	M	N	P	R	S	T	U	V	W	X	Y	Z

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

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