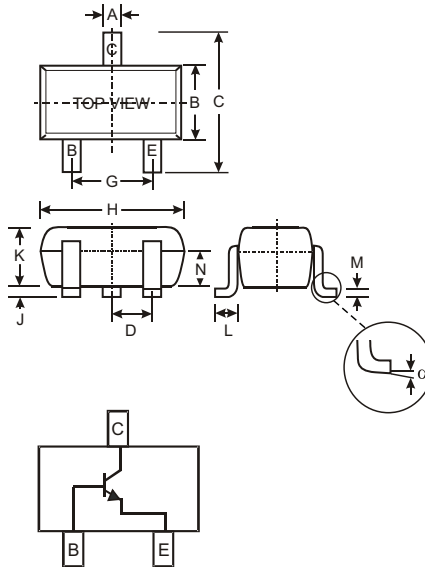


### Features

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

### 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 (See Page 4): 1P  
 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 |
|                      | 0    | 8    |      |
| All Dimensions in mm |      |      |      |

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

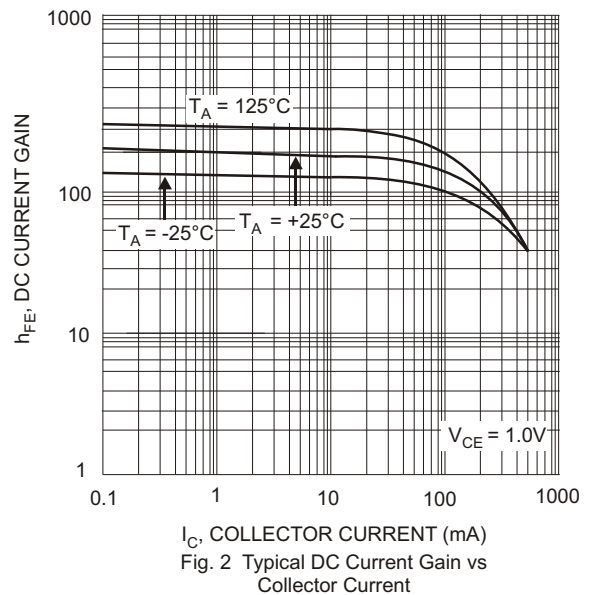
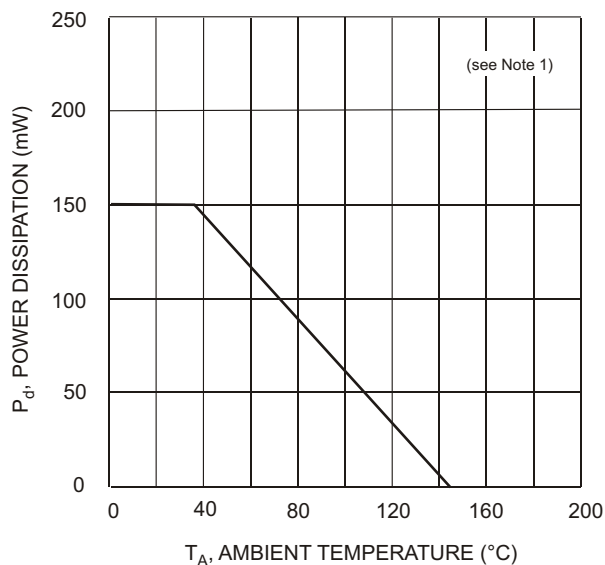
| Characteristic                                   | Symbol                            | Value       | Unit |
|--------------------------------------------------|-----------------------------------|-------------|------|
| Collector-Base Voltage                           | V <sub>CBO</sub>                  | 75          | V    |
| Collector-Emitter Voltage                        | V <sub>CEO</sub>                  | 40          | V    |
| Emitter-Base Voltage                             | V <sub>EB0</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>JA</sub>                   | 833         | °C/W |
| Operating and Storage Temperature Range          | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

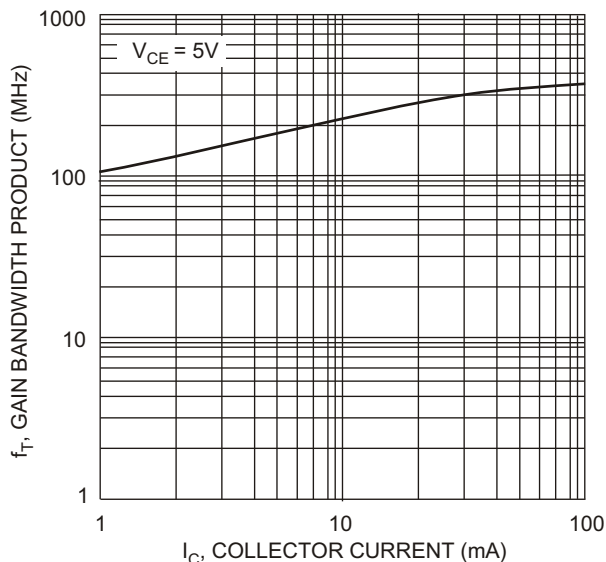
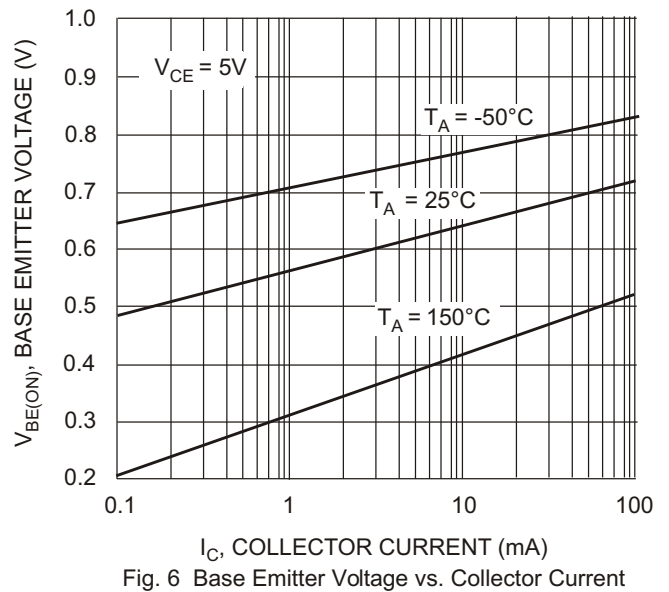
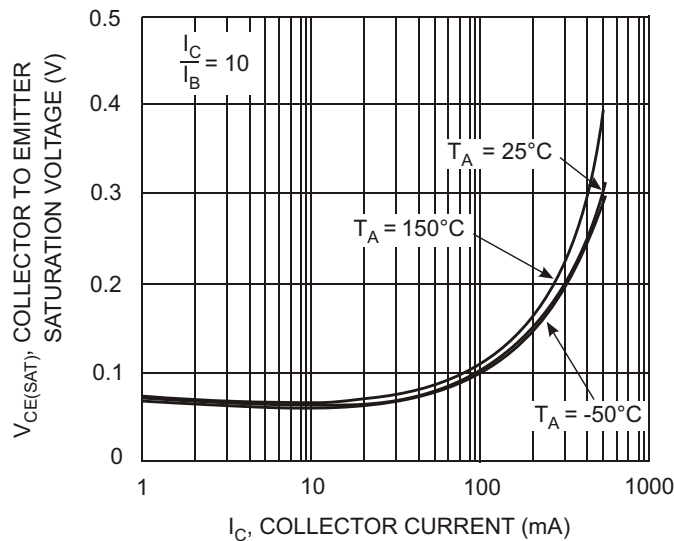
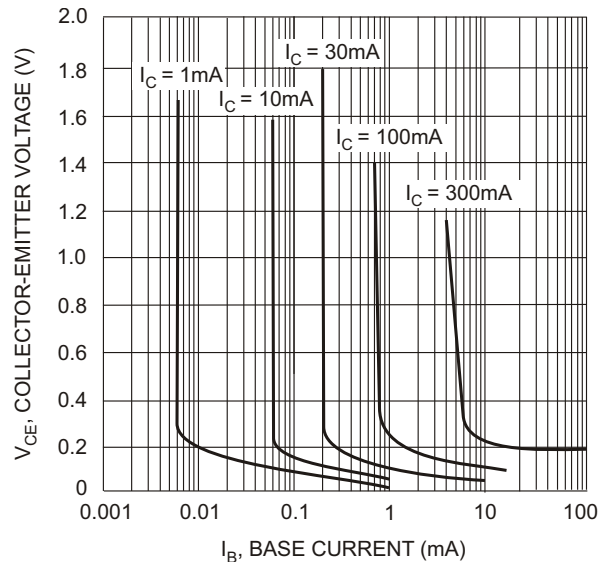
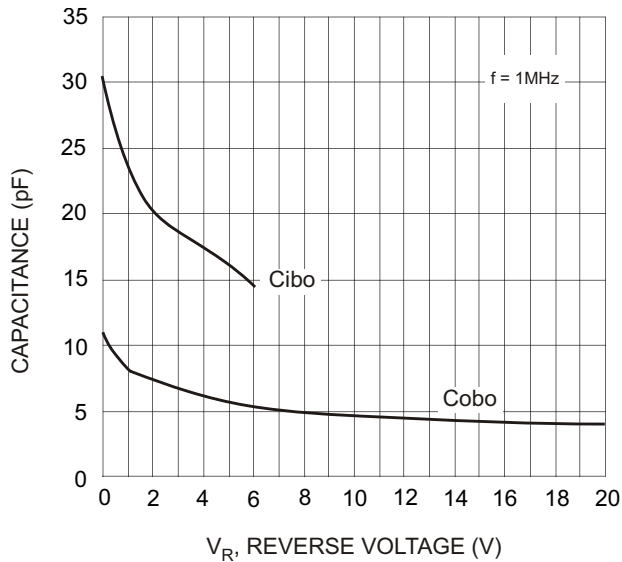
- Notes:
- Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
  - No purposefully added lead

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

| Characteristic                       | Symbol        | Min                         | Max        | Unit             | Test Condition                                                                                                                                                                                                                              |
|--------------------------------------|---------------|-----------------------------|------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>OFF CHARACTERISTICS (Note 3)</b>  |               |                             |            |                  |                                                                                                                                                                                                                                             |
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$ | 75                          |            | V                | $I_C = 10\text{ A}$ , $I_E = 0$                                                                                                                                                                                                             |
| 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                | $I_E = 10\text{ A}$ , $I_C = 0$                                                                                                                                                                                                             |
| Collector Cutoff Current             | $I_{CEX}$     |                             | 10         | nA               | $V_{CE} = 60\text{V}$ , $V_{EB(OFF)} = 3.0\text{V}$                                                                                                                                                                                         |
| Base Cutoff Current                  | $I_{BL}$      |                             | 20         | nA               | $V_{CE} = 60\text{V}$ , $V_{EB(OFF)} = 3.0\text{V}$                                                                                                                                                                                         |
| <b>ON CHARACTERISTICS (Note 3)</b>   |               |                             |            |                  |                                                                                                                                                                                                                                             |
| DC Current Gain                      | $h_{FE}$      | 35<br>50<br>75<br>100<br>40 |            |                  | $I_C = 100\text{ A}$ , $V_{CE} = 10\text{V}$<br>$I_C = 1.0\text{mA}$ , $V_{CE} = 10\text{V}$<br>$I_C = 10\text{mA}$ , $V_{CE} = 10\text{V}$<br>$I_C = 150\text{mA}$ , $V_{CE} = 10\text{V}$<br>$I_C = 500\text{mA}$ , $V_{CE} = 10\text{V}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ |                             | 0.3<br>1.0 | V                | $I_C = 150\text{mA}$ , $I_B = 15\text{mA}$<br>$I_C = 500\text{mA}$ , $I_B = 50\text{mA}$                                                                                                                                                    |
| Base-Emitter Saturation Voltage      | $V_{BE(SAT)}$ | 0.6                         | 1.2<br>2.0 | V                | $I_C = 150\text{mA}$ , $I_B = 15\text{mA}$<br>$I_C = 500\text{mA}$ , $I_B = 50\text{mA}$                                                                                                                                                    |
| <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                    | $C_{ibo}$     | —                           | 30         | pF               | $V_{EB} = 0.5\text{V}$ , $f = 1.0\text{MHz}$ , $I_C = 0$                                                                                                                                                                                    |
| Current Gain-Bandwidth Product       | $f_T$         | 300                         |            | MHz              | $V_{CE} = 20\text{V}$ , $I_C = 20\text{mA}$ ,<br>$f = 100\text{MHz}$                                                                                                                                                                        |
| Input Impedance                      | $h_{ie}$      | 0.25                        | 1.25       | k                | $V_{CE} = 10\text{Vdc}$ , $I_C = 10\text{ mAdc}$ , $f = 1.0\text{kHz}$                                                                                                                                                                      |
| Voltage Feedback Ratio               | $h_{re}$      |                             | 4.0        | $\times 10^{-4}$ | $V_{CE} = 10\text{Vdc}$ , $I_C = 10\text{ mAdc}$ , $f = 1.0\text{kHz}$                                                                                                                                                                      |
| Small-Signal Current Gain            | $h_{fe}$      | 75                          | 375        |                  | $V_{CE} = 10\text{Vdc}$ , $I_C = 10\text{ mAdc}$ , $f = 1.0\text{kHz}$                                                                                                                                                                      |
| Output Admittance                    | $h_{oe}$      | 25                          | 200        | S                | $V_{CE} = 10\text{Vdc}$ , $I_C = 10\text{ mAdc}$ , $f = 1.0\text{kHz}$                                                                                                                                                                      |
| Noise Figure                         | NF            |                             | 4.0        | dB               | $V_{CE} = 10\text{Vdc}$ , $I_C = 100\text{ Adc}$ ,<br>$R_S = 1.0\text{ k ohms}$ , $f = 1.0\text{kHz}$                                                                                                                                       |
| <b>SWITCHING CHARACTERISTICS</b>     |               |                             |            |                  |                                                                                                                                                                                                                                             |
| Delay Time                           | $t_d$         |                             | 10         | ns               | $V_{CC} = 30\text{V}$ , $I_C = 150\text{mA}$ ,<br>$V_{BE(off)} = -0.5\text{V}$ , $I_{B1} = 15\text{mA}$                                                                                                                                     |
| Rise Time                            | $t_r$         |                             | 25         | ns               |                                                                                                                                                                                                                                             |
| Storage Time                         | $t_s$         |                             | 225        | ns               | $V_{CC} = 30\text{V}$ , $I_C = 150\text{mA}$ ,<br>$I_{B1} = I_{B2} = 15\text{mA}$                                                                                                                                                           |
| Fall Time                            | $t_f$         |                             | 60         | ns               |                                                                                                                                                                                                                                             |

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

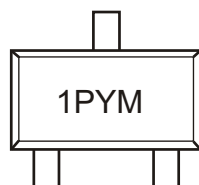




**Ordering Information** (Note 4)

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

Notes: 4. 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 | March | 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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