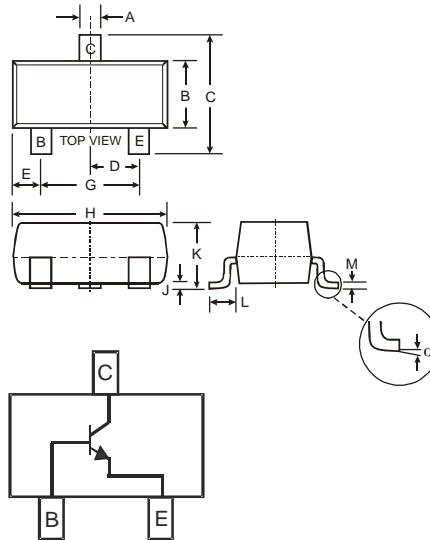


**Features**

- Epitaxial Planar Die Construction
- Ideal for Medium Power Amplification and Switching
- Lead, Halogen and Antimony Free, RoHS Compliant "Green" Device (Notes 2 and 4)

**Mechanical Data**

- Case: SOT-23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- 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: See Page 3
- Ordering Information: See Page 3
- 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 |
| $\alpha$             | 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>CB0</sub>                  | 45          | V    |
| Collector-Emitter Voltage                        | V <sub>CE0</sub>                  | 18          | V    |
| Emitter-Base Voltage                             | V <sub>EB0</sub>                  | 5           | V    |
| Collector Current - Continuous                   | I <sub>C</sub>                    | 1           | A    |
| Power Dissipation (Note 1)                       | P <sub>D</sub>                    | 300         | mW   |
| Thermal Resistance, Junction to Ambient (Note 1) | R <sub>θJA</sub>                  | 417         | °C/W |
| Operating and Storage Temperature Range          | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

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

| Characteristic                       | Symbol               | Min | Max | Unit | Test Condition   |
|--------------------------------------|----------------------|-----|-----|------|--|
| <b>OFF CHARACTERISTICS (Note 3)</b>  |                      |     |     |      |  |
| Collector-Base Breakdown Voltage     | V <sub>(BR)CBO</sub> | 45  | —   | V    | I <sub>C</sub> = 100μA, I <sub>E</sub> = 0               |
| Collector-Emitter Breakdown Voltage  | V <sub>(BR)CEO</sub> | 18  | —   | V    | I <sub>C</sub> = 1mA, I <sub>B</sub> = 0                 |
| Emitter-Base Breakdown Voltage       | V <sub>(BR)EBO</sub> | 5   | —   | V    | I <sub>E</sub> = 100μA, I <sub>C</sub> = 0               |
| Collector Cutoff Current             | I <sub>CBO</sub>     | —   | 1   | μA   | V <sub>CB</sub> = 40V, I <sub>E</sub> = 0                |
| Emitter Cutoff Current               | I <sub>EBO</sub>     | —   | 1   | μA   | V <sub>EB</sub> = 4V, I <sub>C</sub> = 0                 |
| <b>ON CHARACTERISTICS (Note 3)</b>   |                      |     |     |      |  |
| DC Current Gain                      | h <sub>FE</sub>      | 150 | 800 | —    | I <sub>C</sub> = 100mA, V <sub>CE</sub> = 1V             |
| Collector-Emitter Saturation Voltage | V <sub>CE(SAT)</sub> | —   | 0.5 | V    | I <sub>C</sub> = 300mA, I <sub>B</sub> = 30mA            |
| <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    |
| Current Gain-Bandwidth Product       | f <sub>T</sub>       | 100 | —   | MHz  | V <sub>CB</sub> = 10V, I <sub>E</sub> = 50mA, f = 100MHz |

- 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. Halogen and Antimony Free.
  3. Short duration pulse test used to minimize self-heating effect.
  4. Product manufactured with Data Code V9 (week 33, 2008) and newer are built with Green Molding Compound. Product manufactured prior to Date Code V9 are built with Non-Green Molding Compound and may contain Halogens or Sb<sub>2</sub>O<sub>3</sub> Fire Retardants.

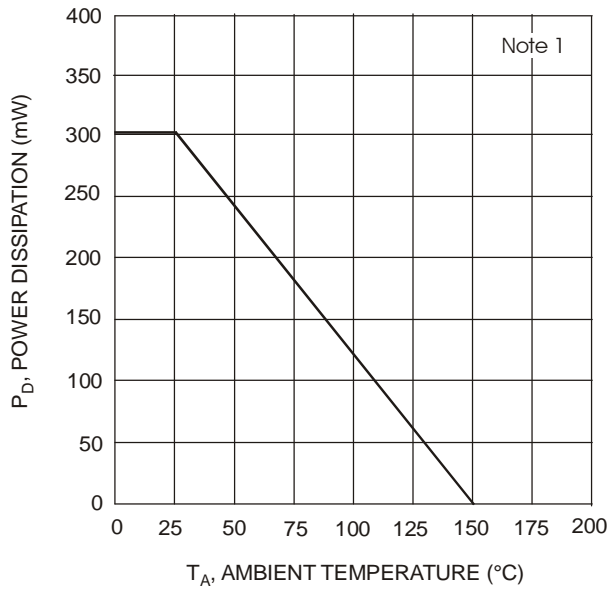


Fig. 1, Max Power Dissipation vs Ambient Temperature

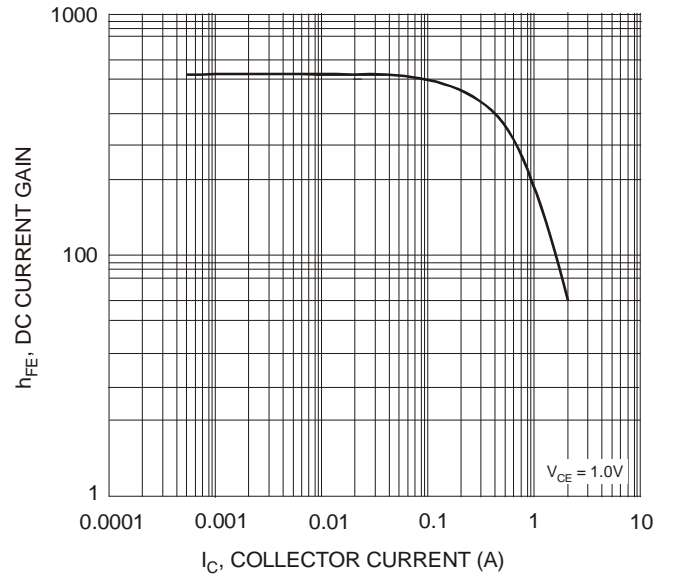


Fig. 2, Typical DC Current Gain vs Collector Current

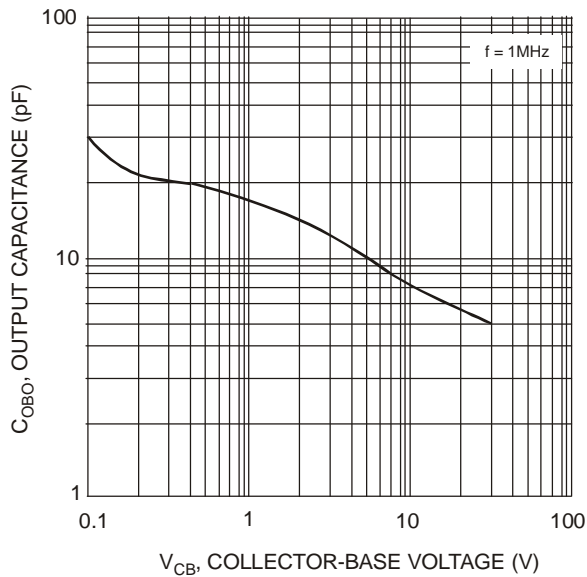


Fig. 3, Output Capacitance vs. Collector-Base Voltage

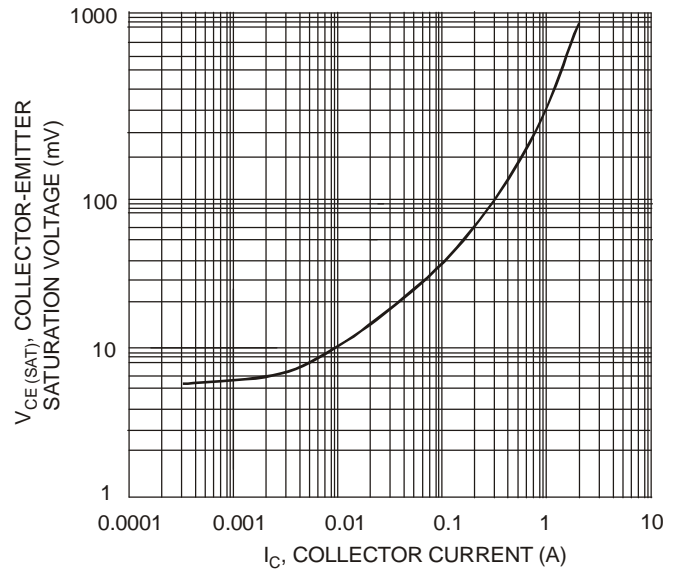


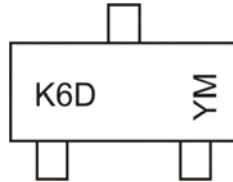
Fig. 4, Collector Saturation Voltage vs Collector Current

## Ordering Information (Note 5)

| Device       | Packaging | Shipping         |
|--------------|-----------|------------------|
| MMBT123S-7-F | SOT-23    | 3000/Tape & Reel |

Notes: 5. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



K6D = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year ex: T = 2006  
 M = Month ex: 9 = September

### Date Code Key

| Year | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | 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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