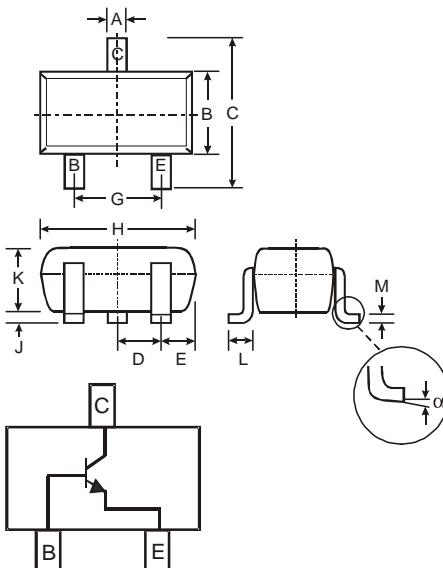


## Features

- Epitaxial Planar Die Construction
- Complementary PNP Type Available (MMSTA92)
- Ideal for Low Power Amplification and Switching
- Ultra-Small Surface Mount Package
- Lead Free/RoHS Compliant (Note 2)**
- "Green" Device (Note 3 and 4)

## Mechanical Data

- Case: SOT-323
- Case Material: Molded Plastic, "Green" Molding Compound, Note 4. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminal Connections: See Diagram
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Marking Information: K3M, See Page 3
- Ordering & Date Code Information: See Page 3
- Weight: 0.006 grams (approximate)



| SOT-323              |              |      |
|----------------------|--------------|------|
| Dim                  | Min          | Max  |
| A                    | 0.25         | 0.40 |
| B                    | 1.15         | 1.35 |
| C                    | 2.00         | 2.20 |
| D                    | 0.65 Nominal |      |
| E                    | 0.30         | 0.40 |
| G                    | 1.20         | 1.40 |
| H                    | 1.80         | 2.20 |
| J                    | 0.0          | 0.10 |
| K                    | 0.90         | 1.00 |
| L                    | 0.25         | 0.40 |
| M                    | 0.10         | 0.18 |
| $\alpha$             | 0°           | 8°   |
| All Dimensions in mm |              |      |

## Maximum Ratings

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

| Characteristic                                   | Symbol          | Value       |  | Unit |
|--|-----------------|-------------|--|------|
| Collector-Base Voltage                           | $V_{CBO}$       | 300         |  | V    |
| Collector-Emitter Voltage                        | $V_{CEO}$       | 300         |  | V    |
| Emitter-Base Voltage                             | $V_{EBO}$       | 6.0         |  | V    |
| Collector Current (Note 1)                       | $I_C$           | 200         |  | mA   |
| Power Dissipation (Note 1)                       | $P_d$           | 200         |  | mW   |
| Thermal Resistance, Junction to Ambient (Note 1) | $R_{\theta JA}$ | 625         |  | °C/W |
| Operating and Storage Temperature Range          | $T_j, T_{STG}$  | -55 to +150 |  | °C   |

## Electrical Characteristics

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

| Characteristic                       | Symbol        | Min            | Max | Unit | Test Condition  |
|--------------------------------------|---------------|----------------|-----|------|---|
| <b>OFF CHARACTERISTICS (Note 5)</b>  |               |                |     |      |   |
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$ | 300            | —   | V    | $I_C = 100\mu\text{A}, I_E = 0$   |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | 300            | —   | V    | $I_C = 1.0\text{mA}, I_B = 0$   |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ | 6.0            | —   | V    | $I_E = 100\mu\text{A}, I_C = 0$   |
| Collector Cutoff Current             | $I_{CBO}$     | —              | 100 | nA   | $V_{CB} = 200\text{V}, I_E = 0$   |
| Collector Cutoff Current             | $I_{EBO}$     | —              | 100 | nA   | $V_{CE} = 6.0\text{V}, I_C = 0$   |
| <b>ON CHARACTERISTICS (Note 5)</b>   |               |                |     |      |   |
| DC Current Gain                      | $h_{FE}$      | 25<br>40<br>40 | —   | —    | $I_C = 1.0\text{mA}, V_{CE} = 10\text{V}$<br>$I_C = 10\text{mA}, V_{CE} = 10\text{V}$<br>$I_C = 30\text{mA}, V_{CE} = 10\text{V}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | —              | 0.5 | V    | $I_C = 20\text{mA}, I_B = 2.0\text{mA}$   |
| Base-Emitter Saturation Voltage      | $V_{BE(SAT)}$ | —              | 0.9 | V    | $I_C = 20\text{mA}, I_B = 2.0\text{mA}$   |
| <b>SMALL SIGNAL CHARACTERISTICS</b>  |               |                |     |      |   |
| Output Capacitance                   | $C_{cb}$      | —              | 3.0 | pF   | $V_{CB} = 20\text{V}, f = 1.0\text{MHz}, I_E = 0$   |
| Current Gain-Bandwidth Product       | $f_T$         | 50             | —   | MHz  | $V_{CE} = 20\text{V}, I_C = 10\text{mA}, f = 100\text{MHz}$   |

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.
- 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).
- Product manufactured with Date Code 0627 (week 27, 2006) and newer are built with Green Molding Compound. Product manufactured prior to Date Code 0627 are built with Non-Green Molding Compound and may contain Halogens or Sb<sub>2</sub>O<sub>3</sub> Fire Retardants.
- Short duration pulse test used to minimize self-heating effect.

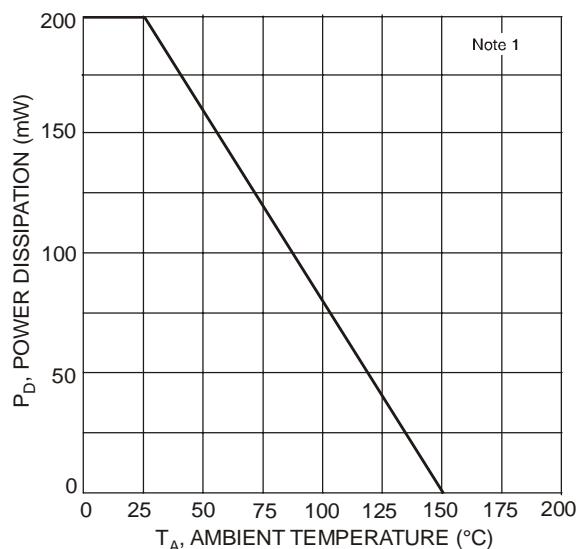


Fig. 1, Max Power Dissipation vs.  
Ambient Temperature

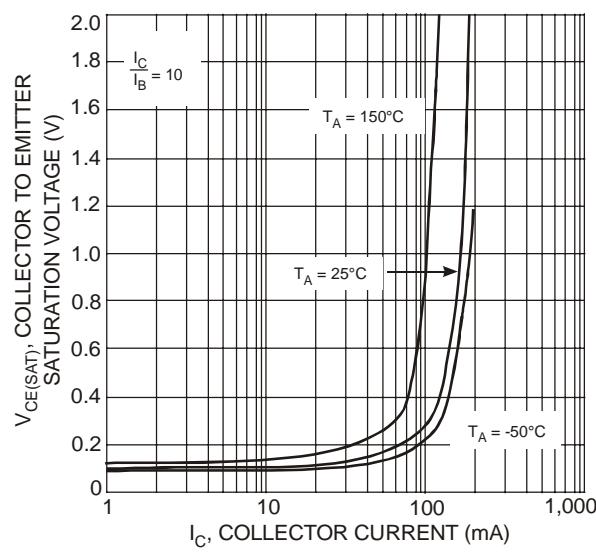


Fig. 2, Collector Emitter Saturation Voltage  
vs. Collector Current

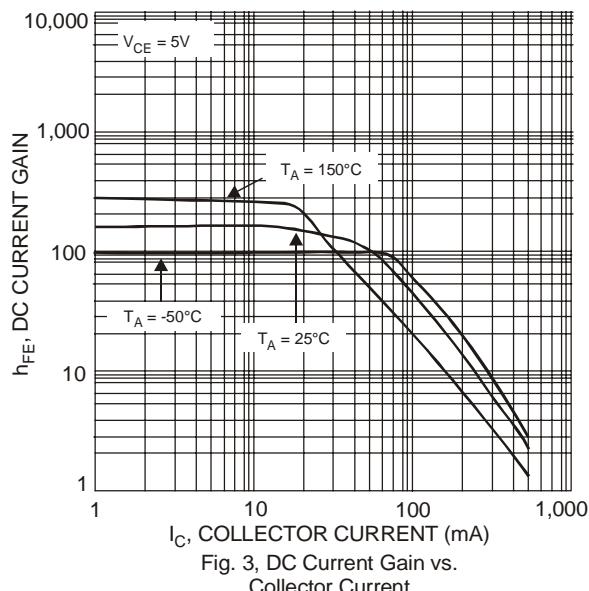


Fig. 3, DC Current Gain vs.  
Collector Current

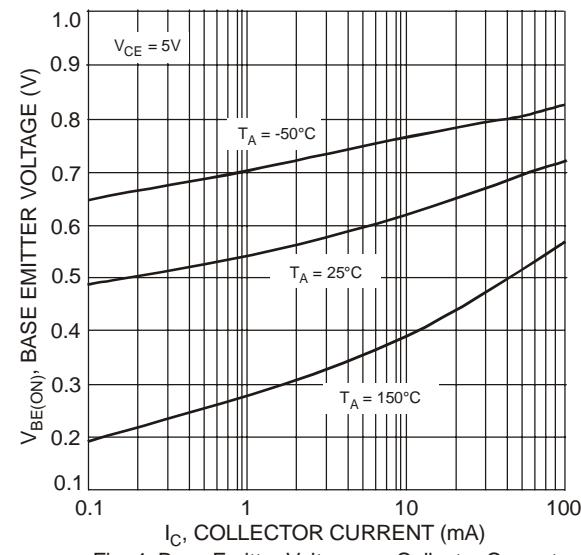


Fig. 4, Base Emitter Voltage vs. Collector Current

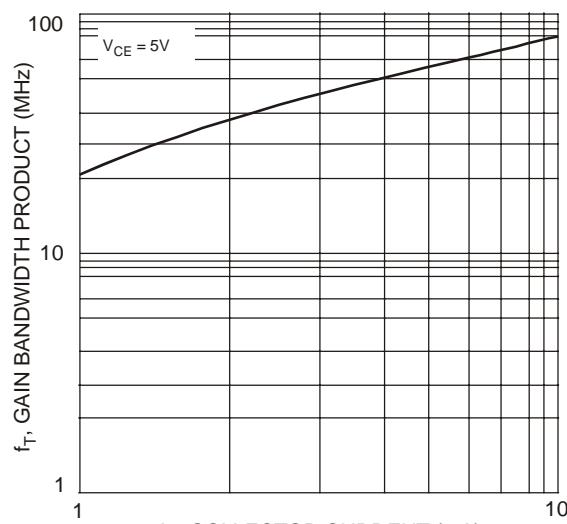


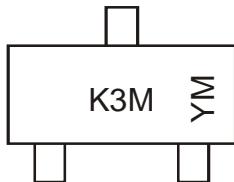
Fig. 5, Gain Bandwidth Product vs.  
Collector Current

**Ordering Information** (Note 4 & 6)

| Device      | Packaging | Shipping         |
|-------------|-----------|------------------|
| MMSTA42-7-F | SOT-323   | 3000/Tape & Reel |

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

**Marking Information**



K3M= 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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