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With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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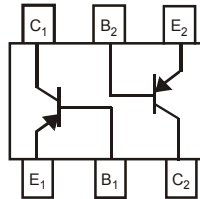
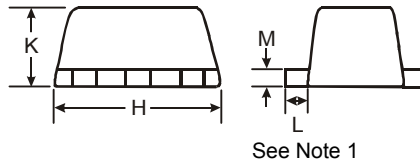
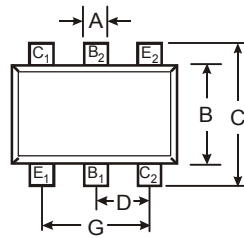


**Features**

- Epitaxial Planar Die Construction
- Ideal for Low Power Amplification and Switching
- Ultra-Small Surface Mount Package
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **"Green" Device (Note 4 and 5)**

**Mechanical Data**

- Case: SOT-563
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminal Connections: See Diagram
- Terminals: Finish - Matte Tin annealed over Alloy 42 leadframe. Solderable per MIL-STD-202, Method 20
- Terminals: Lead bearing terminal plating available. See Ordering information Page 3
- Marking & Type Code Information: See Page 3
- Ordering Information: See Page 3
- Weight: 0.003 grams (approximate)



| SOT-563              |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | 0.15 | 0.30 | 0.25 |
| B                    | 1.10 | 1.25 | 1.20 |
| C                    | 1.55 | 1.70 | 1.60 |
| D                    | 0.50 |      |      |
| G                    | 0.90 | 1.10 | 1.00 |
| H                    | 1.50 | 1.70 | 1.60 |
| K                    | 0.56 | 0.60 | 0.60 |
| L                    | 0.10 | 0.30 | 0.20 |
| M                    | 0.10 | 0.18 | 0.11 |
| All Dimensions in mm |      |      |      |

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

| Characteristic                 | Symbol           | Value | Unit |
|--------------------------------|------------------|-------|------|
| Collector-Base Voltage         | V <sub>CB0</sub> | -40   | V    |
| Collector-Emitter Voltage      | V <sub>CEO</sub> | -40   | V    |
| Emitter-Base Voltage           | V <sub>EBO</sub> | -5.0  | V    |
| Collector Current - Continuous | I <sub>C</sub>   | -200  | mA   |

**Thermal Characteristics**

| Characteristic   | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 3) @ T <sub>A</sub> = 25°C                       | P <sub>d</sub>                    | 150         | mW   |
| Thermal Resistance, Junction to Ambient (Note 3) @ T <sub>A</sub> = 25°C | 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. No purposefully added lead.
  2. Package is non-polarized. Parts may be on reel in orientation illustrated, 180° rotated, or mixed (both ways).
  3. 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>.
  4. 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).
  5. 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 6)</b>  |                      |       |                |                    |   |
| Collector-Base Breakdown Voltage     | V <sub>(BR)CBO</sub> | -40   | —              | 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> = -1.0mA, I <sub>B</sub> = 0   |
| Emitter-Base Breakdown Voltage       | V <sub>(BR)EBO</sub> | -5.0  | —              | V                  | I <sub>E</sub> = -10μA, I <sub>C</sub> = 0  |
| Collector Cutoff Current             | I <sub>CEX</sub>     | —     | -50            | nA                 | V <sub>CE</sub> = -30V, V <sub>EB(OFF)</sub> = -3.0V  |
| Base Cutoff Current                  | I <sub>BL</sub>      | —     | -50            | nA                 | V <sub>CE</sub> = -30V, V <sub>EB(OFF)</sub> = -3.0V  |
| <b>ON CHARACTERISTICS (Note 6)</b>   |                      |       |                |                    |   |
| DC Current Gain                      | h <sub>FE</sub>      | 60    | —              | —                  | I <sub>C</sub> = -100μA, V <sub>CE</sub> = -1.0V  |
|                                      |                      | 80    | —              |                    |   |
|                                      |                      | 100   | 300            |                    |   |
|                                      |                      | 60    | —              |                    |   |
|                                      |                      | 30    | —              |                    |   |
| Collector-Emitter Saturation Voltage | V <sub>CE(SAT)</sub> | —     | -0.25<br>-0.40 | V                  | I <sub>C</sub> = -10mA, I <sub>B</sub> = -1.0mA<br>I <sub>C</sub> = -50mA, I <sub>B</sub> = -5.0mA        |
| Base-Emitter Saturation Voltage      | V <sub>BE(SAT)</sub> | -0.65 | -0.85<br>-0.95 | V                  | I <sub>C</sub> = -10mA, I <sub>B</sub> = -1.0mA<br>I <sub>C</sub> = -50mA, I <sub>B</sub> = -5.0mA        |
| <b>SMALL SIGNAL CHARACTERISTICS</b>  |                      |       |                |                    |   |
| Output Capacitance                   | C <sub>obo</sub>     | —     | 4.5            | pF                 | V <sub>CB</sub> = -5.0V, f = 1.0MHz, I <sub>E</sub> = 0   |
| Input Capacitance                    | C <sub>ibo</sub>     | —     | 10             | pF                 | V <sub>EB</sub> = -0.5V, f = 1.0MHz, I <sub>C</sub> = 0   |
| Input Impedance                      | h <sub>ie</sub>      | 2.0   | 12             | kΩ                 | V <sub>CE</sub> = 10V, I <sub>C</sub> = 1.0mA,<br>f = 1.0kHz  |
| Voltage Feedback Ratio               | h <sub>re</sub>      | 0.1   | 10             | x 10 <sup>-4</sup> |   |
| Small Signal Current Gain            | h <sub>fe</sub>      | 100   | 400            | —                  |   |
| Output Admittance                    | h <sub>oe</sub>      | 3.0   | 60             | μS                 |   |
| Current Gain-Bandwidth Product       | f <sub>T</sub>       | 250   | —              | MHz                |   |
| Noise Figure                         | NF                   | —     | 4.0            | dB                 | V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -100μA,<br>R <sub>S</sub> = 1.0kΩ, f = 1.0kHz                   |
| <b>SWITCHING CHARACTERISTICS</b>     |                      |       |                |                    |   |
| Delay Time                           | t <sub>d</sub>       | —     | 35             | ns                 | V <sub>CC</sub> = -3.0V, I <sub>C</sub> = -10mA,<br>V <sub>BE(off)</sub> = 0.5V, I <sub>B1</sub> = -1.0mA |
| Rise Time                            | t <sub>r</sub>       | —     | 35             | ns                 |   |
| Storage Time                         | t <sub>s</sub>       | —     | 225            | ns                 | V <sub>CC</sub> = -3.0V, I <sub>C</sub> = -10mA,<br>I <sub>B1</sub> = I <sub>B2</sub> = -1.0mA            |
| Fall Time                            | t <sub>f</sub>       | —     | 75             | ns                 |   |

Notes: 6. Short duration pulse test used to minimize self-heating effect.

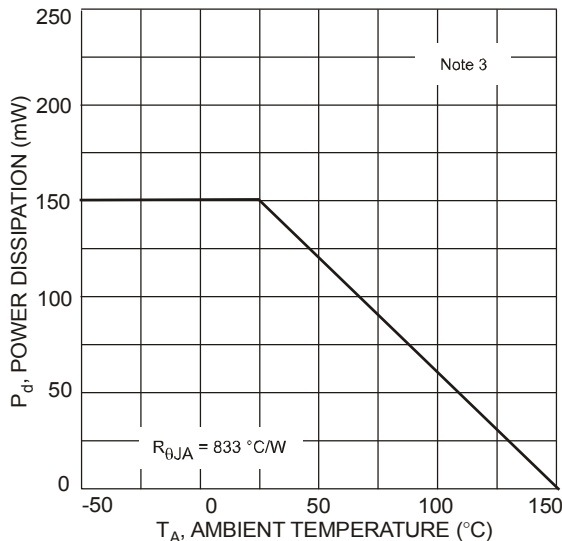


Fig. 1, Derating Curve - Total Device

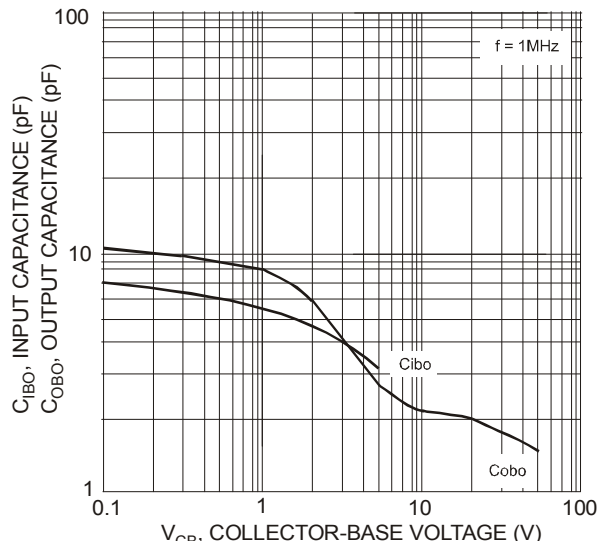


Fig. 2, Input and Output Capacitance vs. Collector-Base Voltage

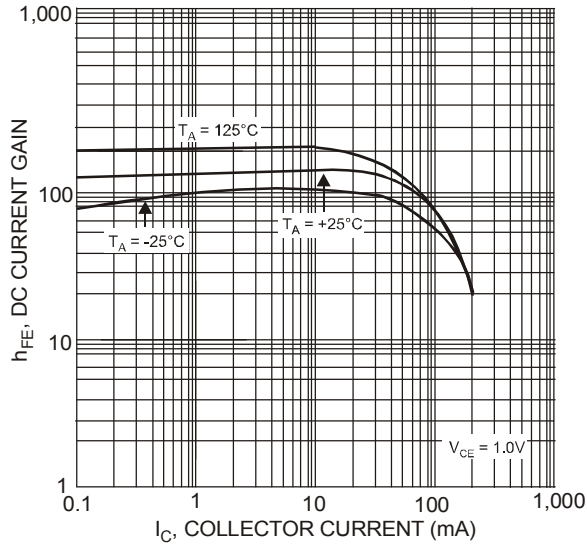


Fig. 3, Typical DC Current Gain vs. Collector Current

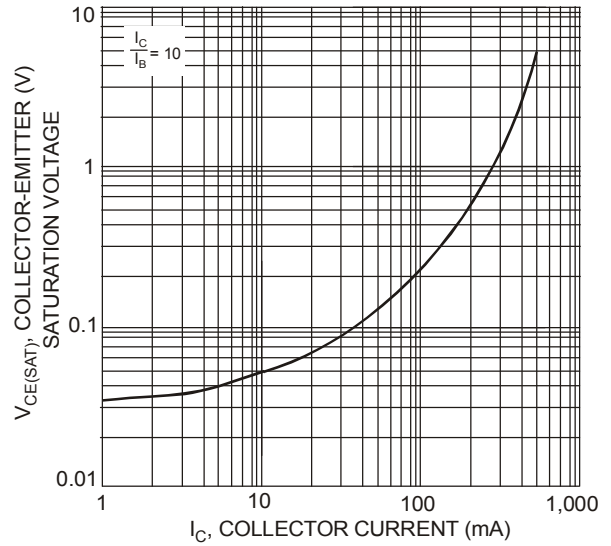


Fig. 4, Typical Collector-Emitter Saturation Voltage vs. Collector Current

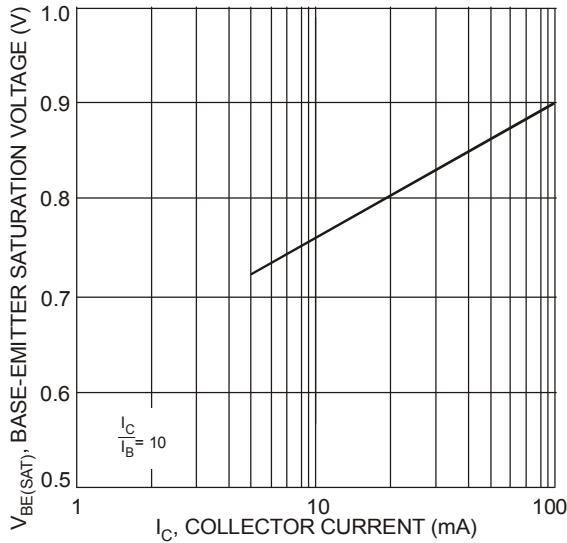


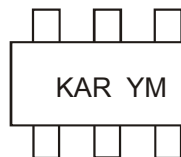
Fig. 5, Typical Base-Emitter Saturation Voltage vs. Collector Current

## Ordering Information (Note 7)

| Device      | Packaging | Shipping         |
|-------------|-----------|------------------|
| MMDT3906V-7 | SOT-563   | 3000/Tape & Reel |

Notes: 7. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



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

### Date Code Key

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