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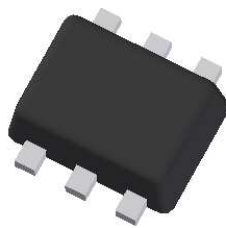
## Features

- $BV_{CEO} > 40V$
- Epitaxial Planar Die Construction
- Ideal for Medium Power Amplification and Switching
- Ultra-Small Surface Mount Package
- Complementary PNP Type: MMDT2907V
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

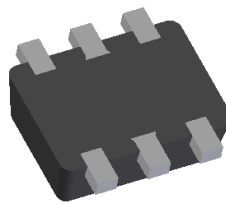
## Mechanical Data

- Case: SOT563
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Finish. Solderable per MIL-STD-202, Method 208 Ⓔ3
- Weight: 0.003 grams (Approximate)

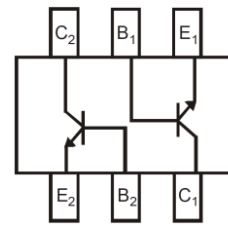
SOT563



Top View



Bottom View



Device Schematic  
Top View

## Ordering Information (Note 4)

| Product     | Status | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-------------|--------|------------|---------|--------------------|-----------------|-------------------|
| MMDT2222V-7 | Active | AEC-Q101   | KAT     | 7                  | 8               | 3,000             |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information

SOT563



KAT = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: A = 2013)  
 M = Month (ex: 9 = September)

### Date Code Key

| Year | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|------|------|------|------|------|------|------|------|------|
| Code | A    | B    | C    | D    | E    | F    | G    | H    |

| 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   |

**Absolute 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         | I <sub>C</sub>   | 600   | mA   |

**Thermal Characteristics**

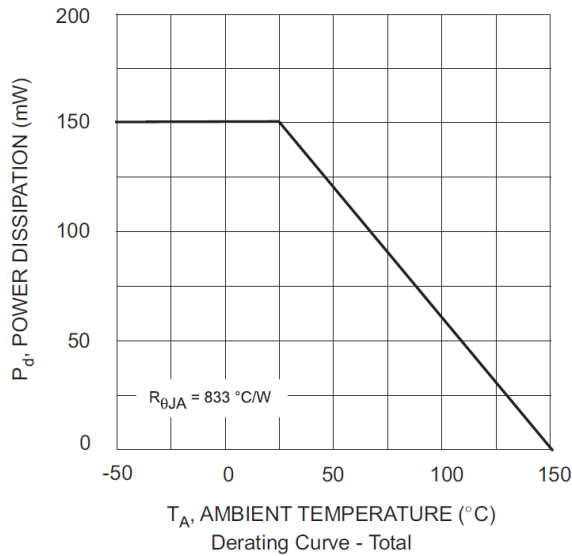
| Characteristic                                   | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 5)                       | P <sub>D</sub>                    | 150         | mW   |
| Thermal Resistance, Junction to Ambient (Note 5) | R <sub>θJA</sub>                  | 833         | °C/W |
| Operating and Storage and Temperature Range      | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

**ESD Ratings** (Note 6)

| Characteristic                             | Symbol  | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V    | 3A          |
| Electrostatic Discharge - Machine Model    | ESD MM  | 400   | V    | C           |

- Notes:
- For the device mounted on minimum recommended pad layout FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
  - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristic and Derating Information**

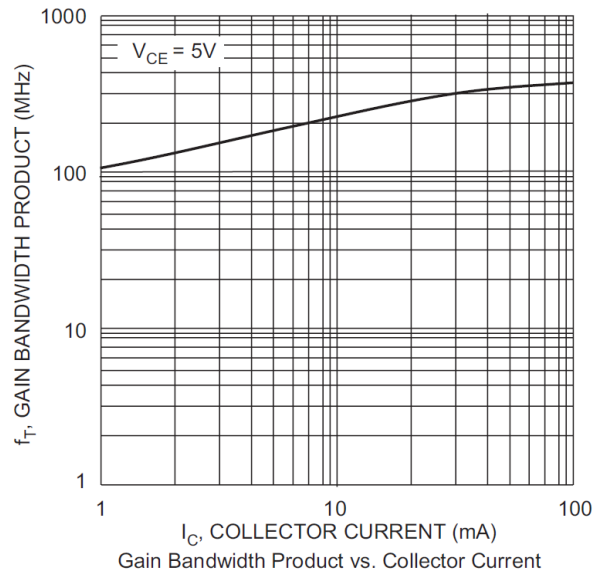
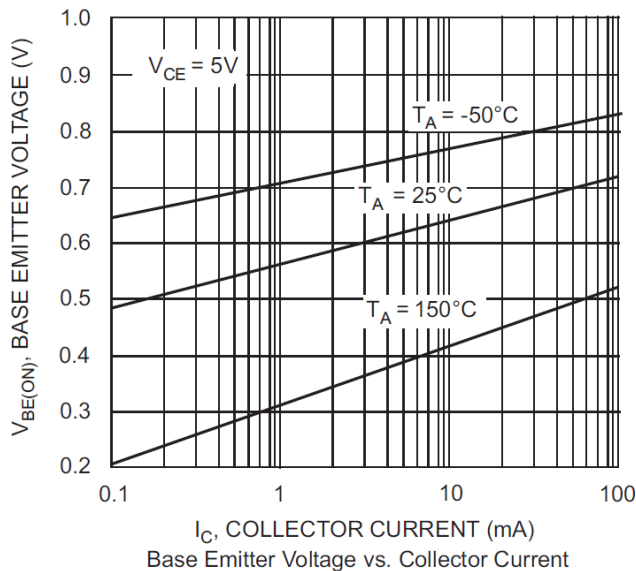
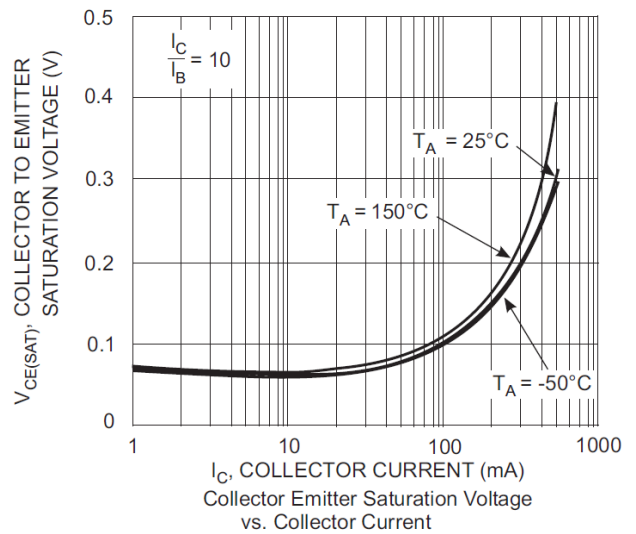
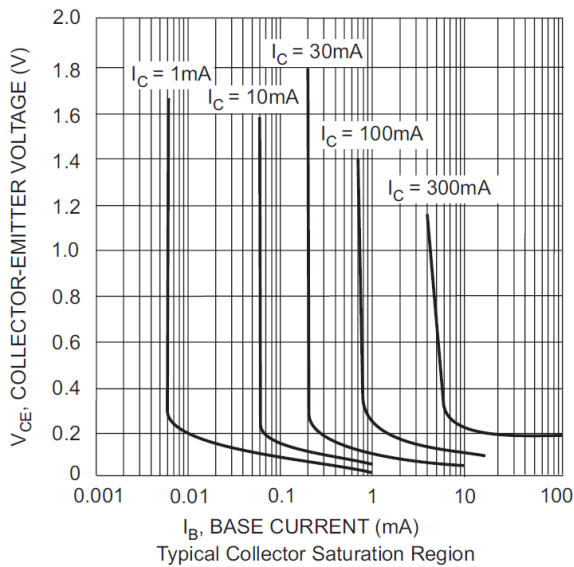
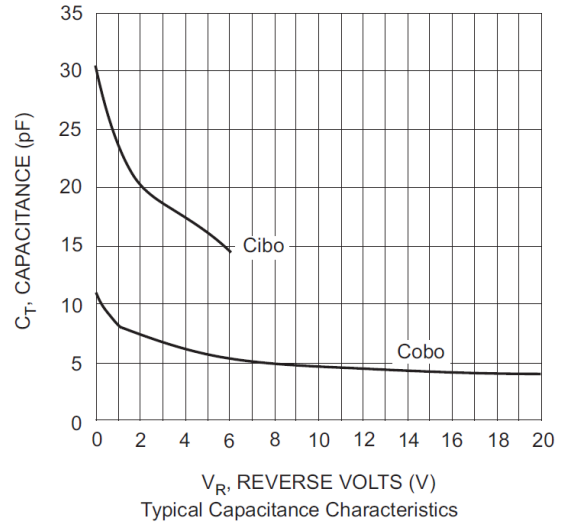
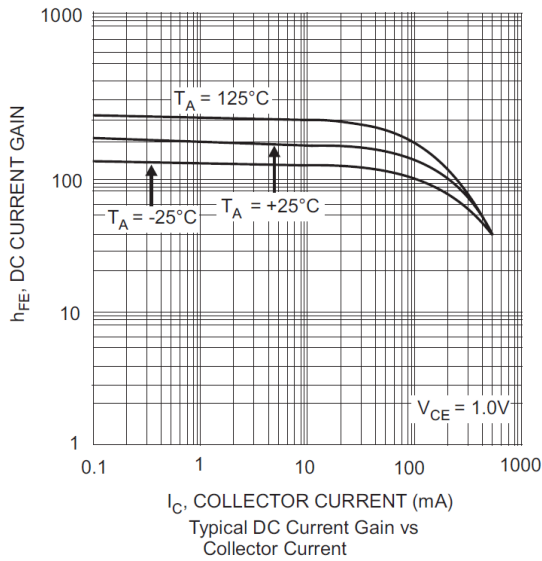


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                               | Symbol               | Min | Max        | Unit     | Test Condition   |
|--|----------------------|-----|------------|----------|--|
| <b>OFF CHARACTERISTICS</b>                   |                      |     |            |          |  |
| Collector-Base Breakdown Voltage             | BV <sub>CBO</sub>    | 75  | —          | V        | I <sub>C</sub> = 10μA, I <sub>E</sub> = 0  |
| Collector-Emitter Breakdown Voltage (Note 7) | BV <sub>CEO</sub>    | 40  | —          | V        | I <sub>C</sub> = 10mA, I <sub>B</sub> = 0  |
| Emitter-Base Breakdown Voltage               | BV <sub>EBO</sub>    | 6.0 | —          | V        | I <sub>E</sub> = 100μA, I <sub>C</sub> = 0   |
| Collector-Base Cut-Off Current               | I <sub>CBO</sub>     | —   | 10         | nA<br>μA | V <sub>CB</sub> = 60V, I <sub>E</sub> = 0<br>V <sub>CB</sub> = 60V, I <sub>E</sub> = 0, T <sub>A</sub> = +150°C  |
| Collector Cut-Off Current                    | I <sub>CEX</sub>     | —   | 10         | nA       | V <sub>CE</sub> = 60V, V <sub>BE(OFF)</sub> = 3.0V   |
| Emitter-Base Cut-Off Current                 | I <sub>EBO</sub>     | —   | 10         | nA       | V <sub>EB</sub> = 3V, I <sub>C</sub> = 0   |
| Base Cut-Off Current                         | I <sub>BL</sub>      | —   | 20         | nA       | V <sub>CE</sub> = 60V, V <sub>BE(OFF)</sub> = 3.0V   |
| <b>ON CHARACTERISTICS (Note 7)</b>           |                      |     |            |          |  |
| DC Current Gain                              | h <sub>FE</sub>      | 35  | —          | —        | I <sub>C</sub> = 100μA, V <sub>CE</sub> = 10V<br>I <sub>C</sub> = 1.0mA, V <sub>CE</sub> = 10V<br>I <sub>C</sub> = 10mA, V <sub>CE</sub> = 10V<br>I <sub>C</sub> = 150mA, V <sub>CE</sub> = 10V<br>I <sub>C</sub> = 500mA, V <sub>CE</sub> = 10V<br>I <sub>C</sub> = 10mA, V <sub>CE</sub> = 10V, T <sub>A</sub> = -55°C<br>I <sub>C</sub> = 150mA, V <sub>CE</sub> = 1.0V |
|  |                      | 50  | —          |          |  |
|  |                      | 75  | —          |          |  |
|  |                      | 100 | 300        |          |  |
|  |                      | 40  | —          |          |  |
|  |                      | 50  | —          |          |  |
| 35   | —                    |     |            |          |  |
| Collector-Emitter Saturation Voltage         | V <sub>CE(sat)</sub> | —   | 0.3<br>1.0 | V        | I <sub>C</sub> = 150mA, I <sub>B</sub> = 15mA<br>I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA   |
| Base-Emitter Saturation Voltage              | V <sub>BE(sat)</sub> | 0.6 | 1.2<br>2.0 | V        | I <sub>C</sub> = 150mA, I <sub>B</sub> = 15mA<br>I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA   |
| <b>SMALL SIGNAL CHARACTERISTICS</b>          |                      |     |            |          |  |
| Output Capacitance                           | C <sub>obo</sub>     | —   | 8.0        | pF       | V <sub>CB</sub> = 10V, f = 1.0MHz, I <sub>E</sub> = 0  |
| Input Capacitance                            | C <sub>ibo</sub>     | —   | 25         | 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,<br>f = 100MHz  |
| Noise Figure                                 | NF                   | —   | 4.0        | dB       | V <sub>CE</sub> = 10V, 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>       | —   | 10         | ns       | V <sub>CC</sub> = 30V, I <sub>C</sub> = 150mA,<br>V <sub>BE(off)</sub> = -0.5V, I <sub>B1</sub> = 15mA   |
| Rise Time                                    | t <sub>r</sub>       | —   | 25         | ns       |  |
| Storage Time                                 | t <sub>s</sub>       | —   | 225        | ns       | V <sub>CC</sub> = 30V, I <sub>C</sub> = 150mA,<br>I <sub>B1</sub> = I <sub>B2</sub> = 15mA   |
| Fall Time                                    | t <sub>f</sub>       | —   | 60         | ns       |  |

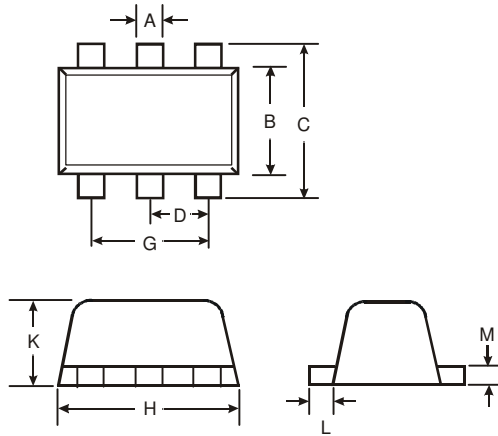
Note: 7. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



**Package Outline Dimensions**

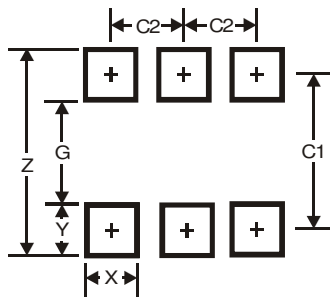
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



| SOT563               |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | 0.15 | 0.30 | 0.20 |
| 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                    | 0.55 | 0.60 | 0.60 |
| L                    | 0.10 | 0.30 | 0.20 |
| M                    | 0.10 | 0.18 | 0.11 |
| All Dimensions in mm |      |      |      |

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.



| Dimensions | SOT563 |
|------------|--------|
| Z          | 2.2    |
| G          | 1.2    |
| X          | 0.375  |
| Y          | 0.5    |
| C1         | 1.7    |
| C2         | 0.5    |

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