



**THE DATASHEET OF
MMDT5551-7-F**



Features

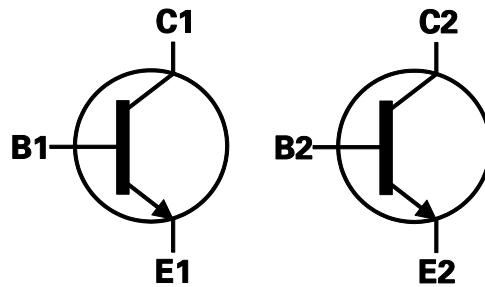
- Epitaxial Planar Die Construction
- Complementary PNP Type – MMDT5401
- Ideal for Medium Power Amplification and Switching
- Ultra-Small Surface-Mount Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**

Mechanical Data

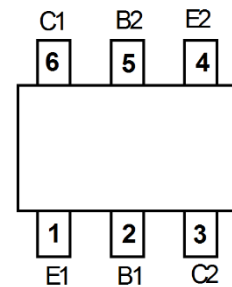
- Package: SOT363
- Package Material: Molded Plastic, “Green” Molding Compound, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Finish. Solderable per MIL-STD-202, Method 208
- Weight: 0.006 grams (Approximate)



Top View



Device Symbol



Top View Pin-Out

Ordering Information (Note 4)

| Part Number | Package | Marking | Reel Size (inches) | Tape Width (mm) | Packing | |
|--------------|---------|---------|--------------------|-----------------|---------|---------|
| | | | | | Qty. | Carrier |
| MMDT5551-7-F | SOT363 | K4N | 7 | 8 | 3000 | Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



K4N = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: L = 2024)
 M = Month (ex: 4 = April)

Date Code Key

| Year | 2012 | - | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 |
|------|------|---|------|------|------|------|------|------|------|------|------|------|
| Code | Z | - | L | M | N | P | R | S | T | U | V | W |

| 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_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CBO} | 180 | V |
| Collector-Emitter Voltage | V _{CEO} | 160 | V |
| Emitter-Base Voltage | V _{EBO} | 6 | V |
| Continuous Collector Current | I _C | 200 | mA |

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Power Dissipation | P _D | 200 | mW |
| | | 320 | |
| Thermal Resistance, Junction to Ambient | R _{θJA} | 625 | °C/W |
| | | 390 | |
| Thermal Resistance, Junction to Case | R _{θJC} | 140 | |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

- Notes:
- 5. For a device mounted on minimum recommended pad layout 1oz weight copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady state.
 - 6. Same as Note 5, except the device is mounted 25mm x 25mm 2oz copper.
 - 7. Maximum combined dissipation.
 - 8. Thermal resistance from junction to the top of package.

Thermal Characteristics and Derating Information

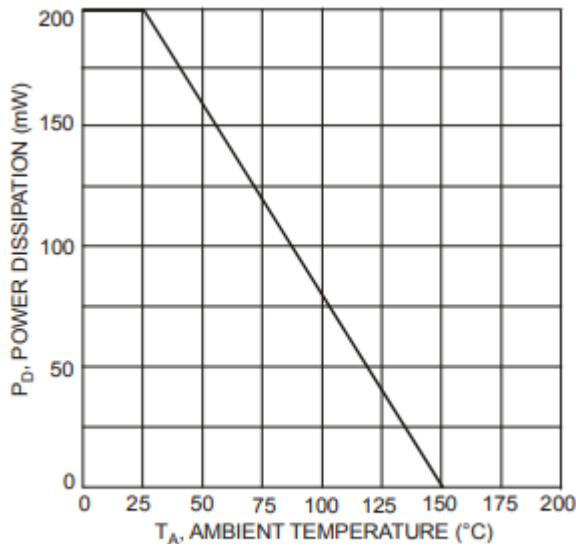


Figure 1. Max Power Dissipation vs. Ambient Temperature

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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------|-----|-----|------|---------------|--|
| OFF CHARACTERISTICS | | | | | | |
| Collector-Base Breakdown Voltage | BV_{CBO} | 180 | — | — | V | $I_C = 100\mu\text{A}, I_E = 0$ |
| Collector-Emitter Breakdown Voltage (Note 9) | BV_{CEO} | 160 | — | — | V | $I_C = 1\text{mA}, I_B = 0$ |
| Emitter-Base Breakdown Voltage | BV_{EBO} | 6 | — | — | V | $I_E = 10\mu\text{A}, I_C = 0$ |
| Collector-Base Cutoff Current | I_{CBO} | — | — | 50 | nA | $V_{CB} = 120\text{V}, I_E = 0$ |
| | | — | — | 50 | μA | $V_{CB} = 120\text{V}, I_E = 0, T_A = +100^\circ\text{C}$ |
| Base-Emitter Cutoff Current | I_{EBO} | — | — | 50 | nA | $V_{EB} = 4\text{V}, I_C = 0$ |
| ON CHARACTERISTICS (Note 9) | | | | | | |
| DC Current Gain | h_{FE} | 80 | — | — | — | $I_C = 1\text{mA}, V_{CE} = 5.0\text{V}$ |
| | | 80 | | 250 | | $I_C = 10\text{mA}, V_{CE} = 5.0\text{V}$ |
| | | 30 | | — | | $I_C = 50\text{mA}, V_{CE} = 5.0\text{V}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | — | — | 0.15 | V | $I_C = 10\text{mA}, I_B = 1.0\text{mA}$ |
| | | | | 0.20 | | $I_C = 50\text{mA}, I_B = 5.0\text{mA}$ |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | — | — | 1.0 | V | $I_C = 10\text{mA}, I_B = 1.0\text{mA}$ |
| | | | | | | $I_C = 50\text{mA}, I_B = 5.0\text{mA}$ |
| SMALL SIGNAL CHARACTERISTICS | | | | | | |
| Output Capacitance | C_{obo} | — | — | 6.0 | pF | $V_{CB} = 10\text{V}, f = 1.0\text{MHz}, I_E = 0$ |
| Small Signal Current Gain | h_{fe} | 50 | — | 250 | — | $I_C = 1\text{mA}, V_{CE} = 10\text{V}, f = 1.0\text{MHz}$ |
| Current Gain-Bandwidth Product | f_T | 100 | — | 300 | MHz | $I_C = 10\text{mA}, V_{CE} = 10\text{V}, f = 100\text{MHz}$ |
| Noise Figure | NF | — | — | 8.0 | dB | $V_{CE} = 5.0\text{V}, I_C = 200\mu\text{A}, R_S = 1\text{k}\Omega, f = 1.0\text{kHz}$ |

Note: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

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

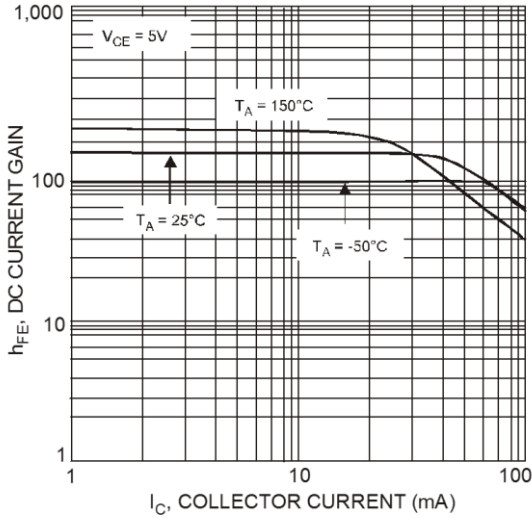


Figure 2. DC Current Gain vs. Collector Current

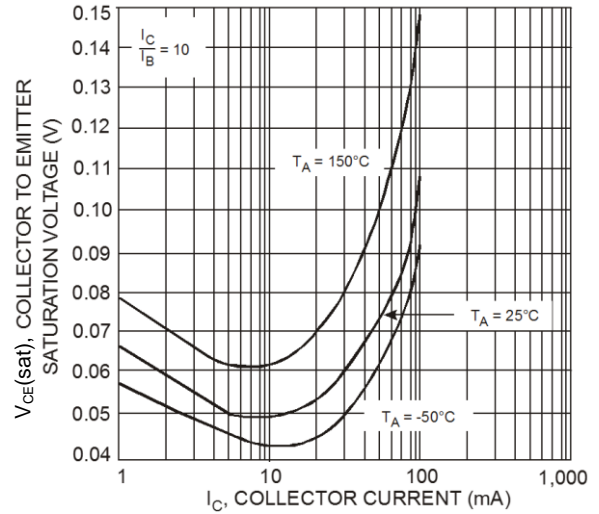


Figure 3. Collector Emitter Saturation Voltage vs. Collector Current

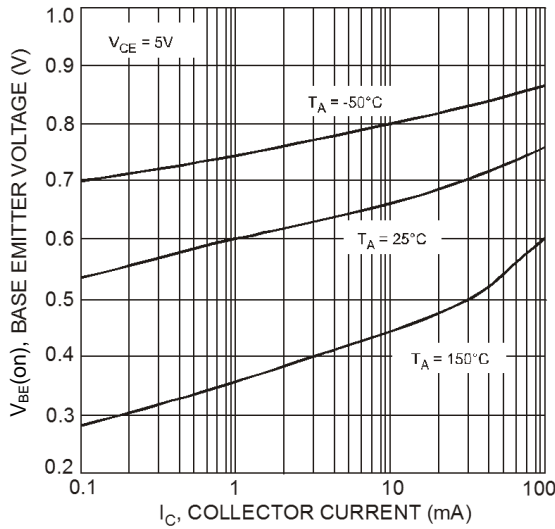


Figure 4. Base Emitter Voltage vs. Collector Current

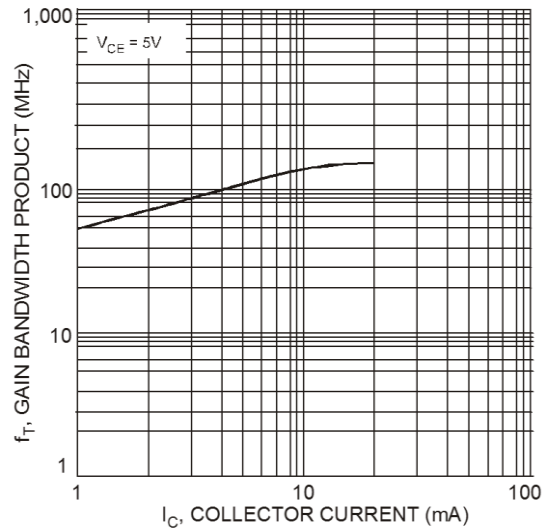
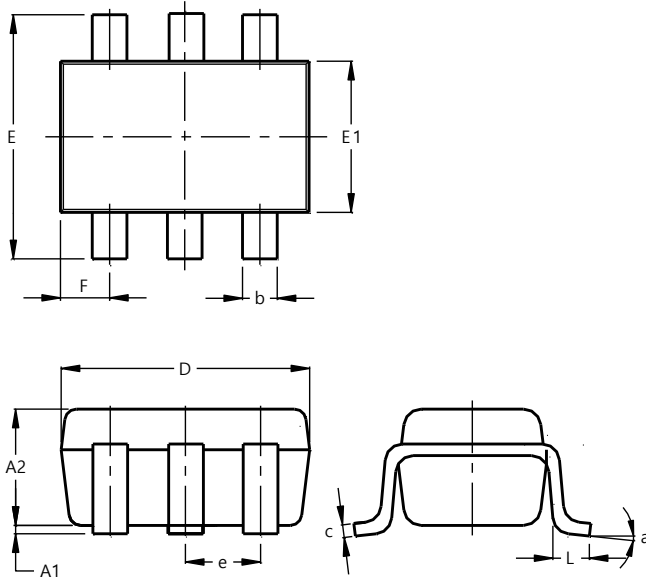


Figure 5. Gain Bandwidth Product vs. Collector Current

Package Outline Dimensions

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

SOT363

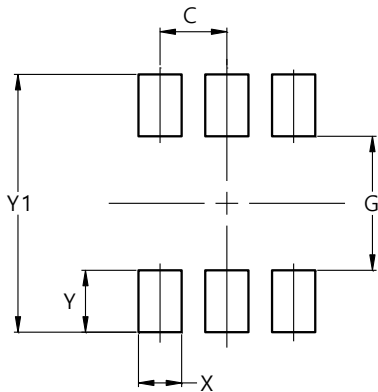


| SOT363 | | | |
|----------------------|-----------|------|-------|
| Dim | Min | Max | Typ |
| A1 | 0.00 | 0.10 | 0.05 |
| A2 | 0.90 | 1.00 | 0.95 |
| b | 0.10 | 0.30 | 0.25 |
| c | 0.10 | 0.22 | 0.11 |
| D | 1.80 | 2.20 | 2.15 |
| E | 2.00 | 2.20 | 2.10 |
| E1 | 1.15 | 1.35 | 1.30 |
| e | 0.650 BSC | | |
| F | 0.40 | 0.45 | 0.425 |
| L | 0.25 | 0.40 | 0.30 |
| a | 0° | 8° | -- |
| All Dimensions in mm | | | |

Suggested Pad Layout

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

SOT363



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 0.650 |
| G | 1.300 |
| X | 0.420 |
| Y | 0.600 |
| Y1 | 2.500 |

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device Terminals and PCB tracking.

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