

Features

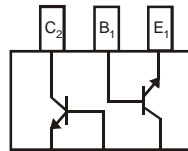
- Epitaxial Planar Die Construction
- Complementary PNP Type Available (MMDT4126)
- Ideal for Medium Power Amplification and Switching
- Ultra-Small Surface Mount Package
- **Lead Free/RoHS Compliant (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **"Green" Device (Notes 5 and 6)**



Top View

Mechanical Data

- Case: SOT-363
- Case Material: Molded Plastic, "Green" Molding Compound, Note 6. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Matte Tin Finish annealed over Alloy 42 leadframe (Lead Free Plating) Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Marking Information: See Page 3
- Ordering Information: See Page 3
- Weight: 0.006 grams (approximate)



Device Schematic

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

| Characteristic | Symbol | Value | Unit |
|---|-----------|-------|------|
| Collector-Base Voltage | V_{CBO} | 30 | V |
| Collector-Emitter Voltage | V_{CEO} | 25 | V |
| Emitter-Base Voltage | V_{EBO} | 5.0 | V |
| Collector Current – Continuous (Note 1) | I_C | 200 | mA |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------|-------------|--------------------|
| Power Dissipation (Notes 1 & 2) | P_D | 200 | mW |
| Thermal Resistance, Junction to Ambient (Note 1) | $R_{\theta JA}$ | 625 | $^\circ\text{C/W}$ |
| Operating and Storage and Temperature Range | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

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

| Characteristic | Symbol | Min | Max | Unit | Test Condition |
|--------------------------------------|---------------|-----------|----------|------|--|
| OFF CHARACTERISTICS (Note 4) | | | | | |
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | 30 | — | V | $I_C = 10\mu\text{A}, I_E = 0$ |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | 25 | — | V | $I_C = 1.0\text{mA}, I_B = 0$ |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | 5.0 | — | V | $I_E = 10\mu\text{A}, I_C = 0$ |
| Collector Cutoff Current | I_{CBO} | — | 50 | nA | $V_{CB} = 20\text{V}, I_E = 0\text{V}$ |
| Emitter Cutoff Current | I_{EBO} | — | 50 | nA | $V_{EB} = 3.0\text{V}, I_C = 0\text{V}$ |
| ON CHARACTERISTICS (Note 4) | | | | | |
| DC Current Gain | h_{FE} | 120 60 | 360 — | — | $I_C = 2.0\text{mA}, V_{CE} = 1.0\text{V}$ $I_C = 50\text{mA}, V_{CE} = 1.0\text{V}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | — | 0.30 | V | $I_C = 50\text{mA}, I_B = 5.0\text{mA}$ |
| Base-Emitter Saturation Voltage | $V_{BE(SAT)}$ | — | 0.95 | V | $I_C = 50\text{mA}, I_B = 5.0\text{mA}$ |
| SMALL SIGNAL CHARACTERISTICS | | | | | |
| Output Capacitance | C_{obo} | — | 4.0 | pF | $V_{CB} = 5.0\text{V}, f = 1.0\text{MHz}, I_E = 0$ |
| Input Capacitance | C_{ibo} | — | 8.0 | pF | $V_{EB} = 0.5\text{V}, f = 1.0\text{MHz}, I_C = 0$ |
| Small Signal Current Gain | h_{fe} | 120 | 480 | — | $V_{CE} = 1.0\text{V}, I_C = 2.0\text{mA}, f = 1.0\text{kHz}$ |
| Current Gain-Bandwidth Product | f_T | 300 | — | MHz | $V_{CE} = 20\text{V}, I_C = 10\text{mA}, f = 100\text{MHz}$ |
| Noise Figure | NF | — | 5.0 | dB | $V_{CE} = 5.0\text{V}, I_C = 100\mu\text{A}, R_S = 1.0\text{k}\Omega, f = 1.0\text{kHz}$ |

- 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. Maximum combined dissipation.
 3. No purposefully added lead.
 4. Short duration pulse test used to minimize self-heating effect.
 5. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
 6. 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.

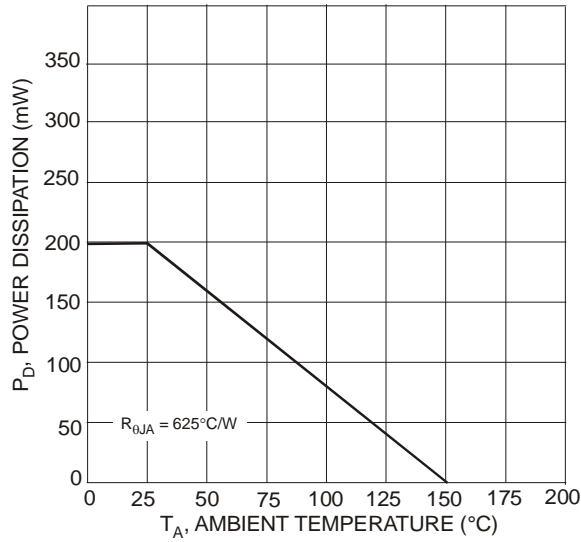


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 1)

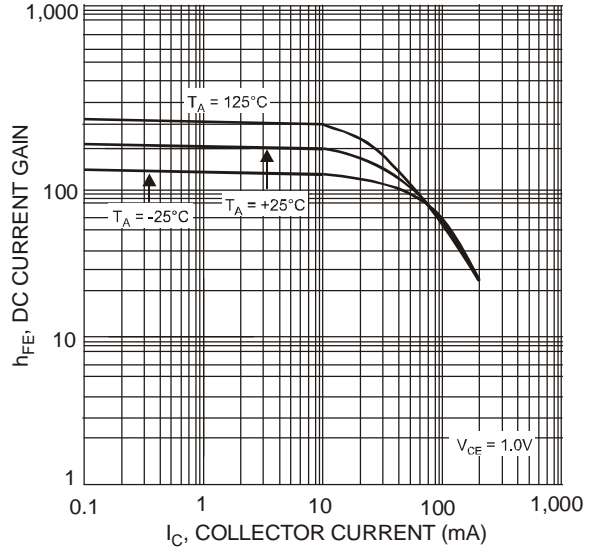


Fig. 2 Typical DC Current Gain vs. Collector Current

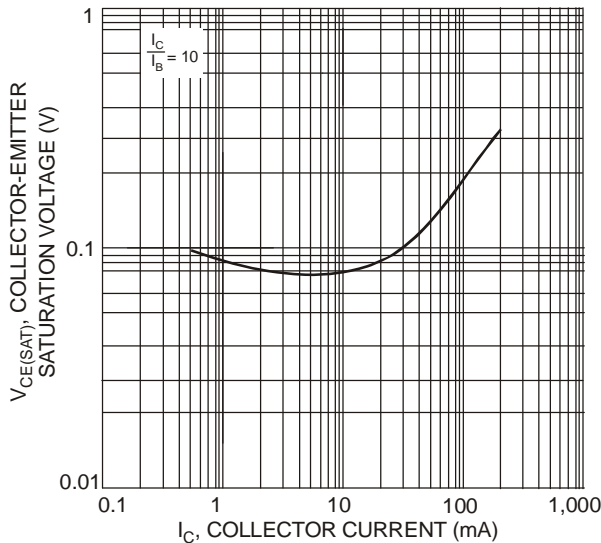


Fig. 3 Typical Collector-Emitter Saturation Voltage vs. Collector Current

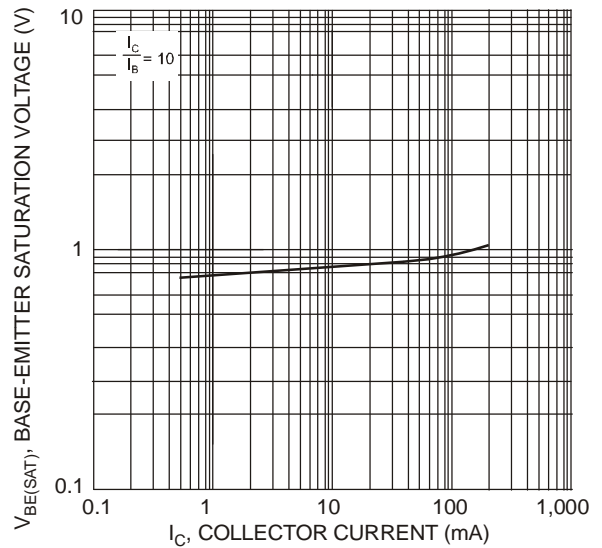


Fig. 4 Typical Base-Emitter Saturation Voltage vs. Collector Current

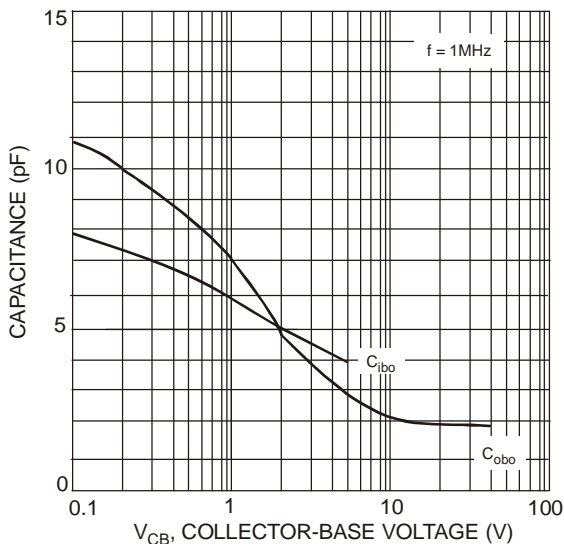


Fig. 5 Typical Capacitance Characteristics

Ordering Information (Note 5)

| Part Number | Case | Packaging |
|--------------|---------|------------------|
| MMDT4124-7-F | SOT-363 | 3000/Tape & Reel |

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

Marking Information



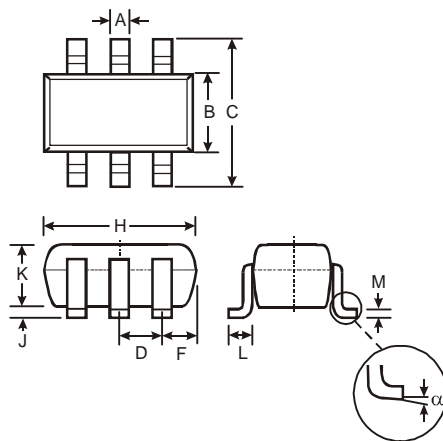
K1B = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: N = 2002)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | J | K | L | M | N | P | R | S | T | U | V | W | X | Y | Z | A | B | C |

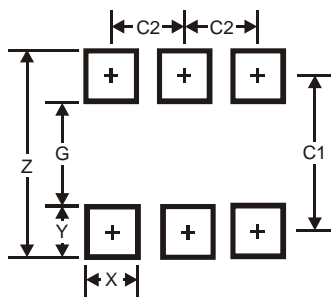
| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | O | N | D |

Package Outline Dimensions



| SOT-363 | | |
|----------------------|----------|------|
| Dim | Min | Max |
| A | 0.10 | 0.30 |
| B | 1.15 | 1.35 |
| C | 2.00 | 2.20 |
| D | 0.65 Typ | |
| F | 0.40 | 0.45 |
| H | 1.80 | 2.20 |
| J | 0 | 0.10 |
| K | 0.90 | 1.00 |
| L | 0.25 | 0.40 |
| M | 0.10 | 0.22 |
| α | 0° | 8° |
| All Dimensions in mm | | |

Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z | 2.5 |
| G | 1.3 |
| X | 0.42 |
| Y | 0.6 |
| C1 | 1.9 |
| C2 | 0.65 |

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Наши контакты:

Телефон: +7 812 627 14 35

Электронная почта: sales@st-electron.ru

Адрес: 198099, Санкт-Петербург,
Промышленная ул, дом № 19, литера Н,
помещение 100-Н Офис 331