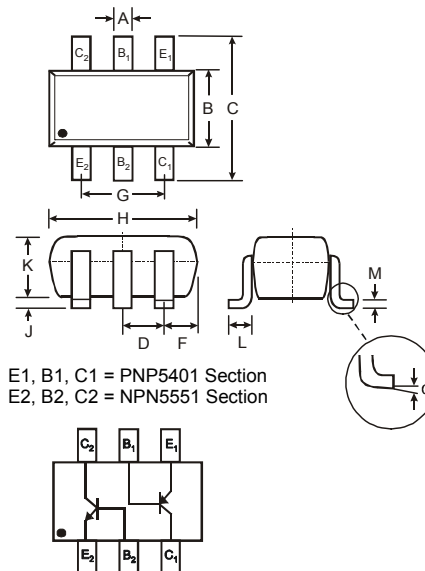


Features

- Complementary Pair One 5551-Type NPN
One 5401-Type PNP
- Epitaxial Planar Die Construction
- Ideal for Medium Power Amplification and Switching
- Ultra-Small Surface Mount Package
- **Lead Free/RoHS Compliant (Note 3)**
- **"Green" Device (Note 4 and 5)**

Mechanical Data

- Case: SOT-363
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram
- Marking Information: KNM, See Page 5
- Ordering & Date Code Information: See Page 5
- Weight: 0.006 grams (approximate)



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

Maximum Ratings, NPN 5551 Section @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | NPN5551 | Unit |
|--|-----------------|-------------|--------------------|
| Collector-Base Voltage | V_{CB0} | 180 | V |
| Collector-Emitter Voltage | V_{CE0} | 160 | V |
| Emitter-Base Voltage | V_{EBO} | 6.0 | V |
| Collector Current - Continuous (Note 1) | I_C | 200 | mA |
| Power Dissipation (Note 1, 2) | P_d | 200 | mW |
| Thermal Resistance, Junction to Ambient (Note 1) | $R_{\theta JA}$ | 625 | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range | T_j, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

Maximum Ratings, PNP 5401 Section @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | PNP5401 | Unit |
|--|-----------------|-------------|------------------|
| Collector-Base Voltage | V_{CB0} | -160 | V |
| Collector-Emitter Voltage | V_{CE0} | -150 | V |
| Emitter-Base Voltage | V_{EBO} | -5.0 | V |
| Collector Current – Continuous (Note 1) | I_C | -200 | mA |
| Power Dissipation (Note 1, 2) | P_d | 200 | mW |
| Thermal Resistance, Junction to Ambient (Note 1) | $R_{\theta JA}$ | 625 | K/W |
| Operating and Storage Temperature Range | T_j, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

- 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. Diodes Inc.'s "Green" policy can be found on our website at 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, NPN 5551 Section @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Min | Max | Unit | Test Condition |
|--------------------------------------|---------------|----------------|---------------|---------------------|--|
| OFF CHARACTERISTICS (Note 6) | | | | | |
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | 180 | — | V | $I_C = 100\mu\text{A}, I_E = 0$ |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | 160 | — | V | $I_C = 1.0\text{mA}, I_B = 0$ |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | 6.0 | — | V | $I_E = 10\mu\text{A}, I_C = 0$ |
| Collector Cutoff Current | I_{CBO} | — | 50 | nA μA | $V_{CB} = 120\text{V}, I_E = 0$ $V_{CB} = 120\text{V}, I_E = 0, T_A = 100^\circ\text{C}$ |
| Emitter Cutoff Current | I_{EBO} | — | 50 | nA | $V_{EB} = 4.0\text{V}, I_C = 0$ |
| ON CHARACTERISTICS (Note 6) | | | | | |
| DC Current Gain | h_{FE} | 80 80 30 | — 250 — | — | $I_C = 1.0\text{mA}, V_{CE} = 5.0\text{V}$ $I_C = 10\text{mA}, V_{CE} = 5.0\text{V}$ $I_C = 50\text{mA}, V_{CE} = 5.0\text{V}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | — | 0.15 0.20 | V | $I_C = 10\text{mA}, I_B = 1.0\text{mA}$ $I_C = 50\text{mA}, I_B = 5.0\text{mA}$ |
| 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 | — | $V_{CE} = 10\text{V}, I_C = 1.0\text{mA}, f = 1.0\text{kHz}$ |
| Current Gain-Bandwidth Product | f_T | 100 | 300 | MHz | $V_{CE} = 10\text{V}, I_C = 10\text{mA}, f = 100\text{MHz}$ |
| Noise Figure | NF | — | 8.0 | dB | $V_{CE} = 5.0\text{V}, I_C = 200\mu\text{A}, R_S = 1.0\text{k}\Omega, f = 1.0\text{kHz}$ |

Electrical Characteristics, PNP 5401 Section @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Min | Max | Unit | Test Condition |
|--------------------------------------|---------------|----------------|---------------|---------------------|--|
| OFF CHARACTERISTICS (Note 6) | | | | | |
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | -160 | — | V | $I_C = -100\mu\text{A}, I_E = 0$ |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | -150 | — | 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 μA | $V_{CB} = -120\text{V}, I_E = 0$ $V_{CB} = -120\text{V}, I_E = 0, T_A = 100^\circ\text{C}$ |
| Emitter Cutoff Current | I_{EBO} | — | -50 | nA | $V_{EB} = -3.0\text{V}, I_C = 0$ |
| ON CHARACTERISTICS (Note 6) | | | | | |
| DC Current Gain | h_{FE} | 50 60 50 | — 240 — | — | $I_C = -1.0\text{mA}, V_{CE} = -5.0\text{V}$ $I_C = -10\text{mA}, V_{CE} = -5.0\text{V}$ $I_C = -50\text{mA}, V_{CE} = -5.0\text{V}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | — | -0.2 -0.5 | V | $I_C = -10\text{mA}, I_B = -1.0\text{mA}$ $I_C = -50\text{mA}, I_B = -5.0\text{mA}$ |
| 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} | 40 | 200 | — | $V_{CE} = -10\text{V}, I_C = -1.0\text{mA}, f = 1.0\text{kHz}$ |
| Current Gain-Bandwidth Product | f_T | 100 | 300 | MHz | $V_{CE} = -10\text{V}, I_C = -10\text{mA}, f = 100\text{MHz}$ |
| Noise Figure | NF | — | 8.0 | dB | $V_{CE} = -5.0\text{V}, I_C = -200\mu\text{A}, R_S = 10\Omega, f = 1.0\text{kHz}$ |

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

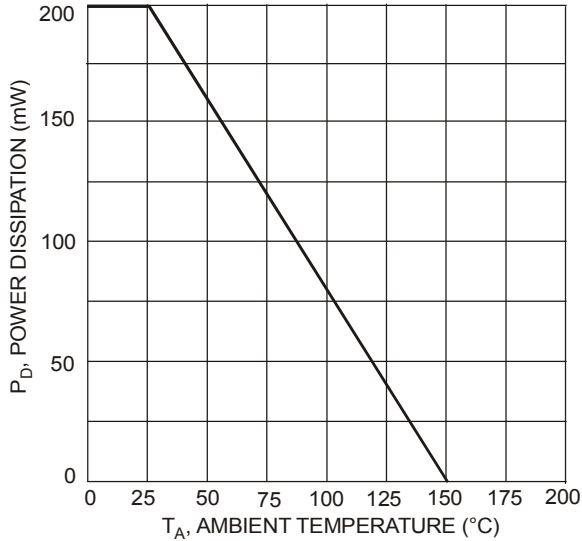


Fig. 1, Max Power Dissipation vs. Ambient Temperature (Total Device)

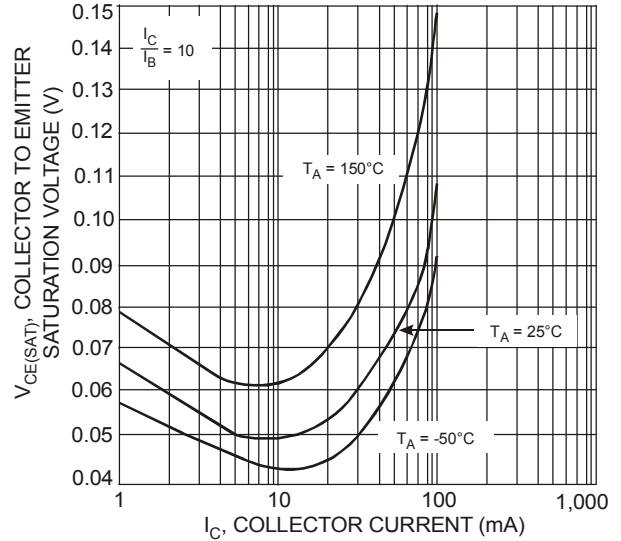


Fig. 2, Collector Emitter Saturation Voltage vs. Collector Current (NPN5551)

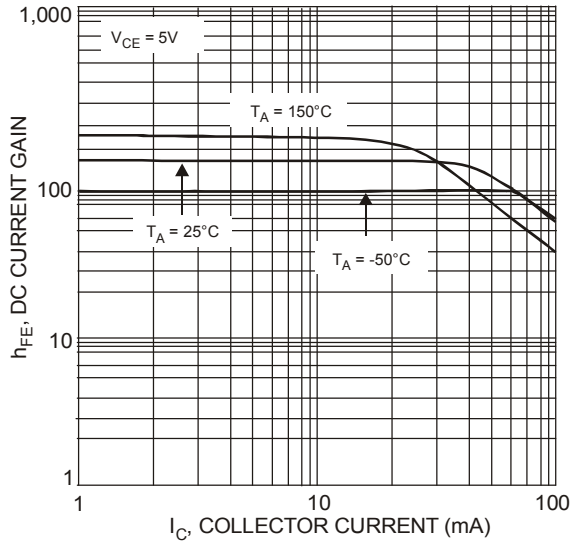


Fig. 3, DC Current Gain vs. Collector Current (NPN5551)

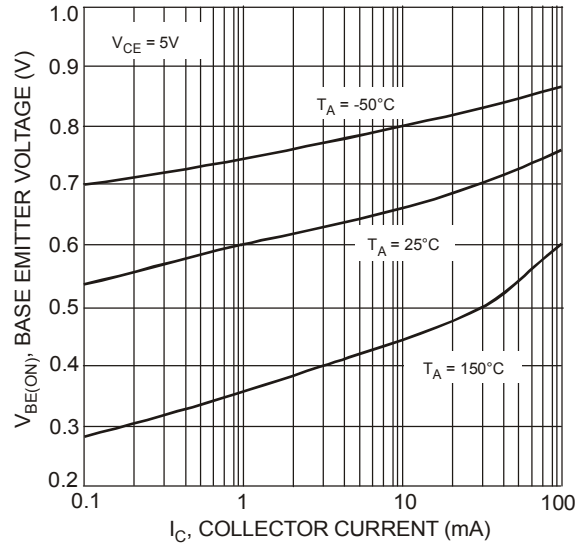


Fig. 4, Base Emitter Voltage vs. Collector Current (NPN5551)

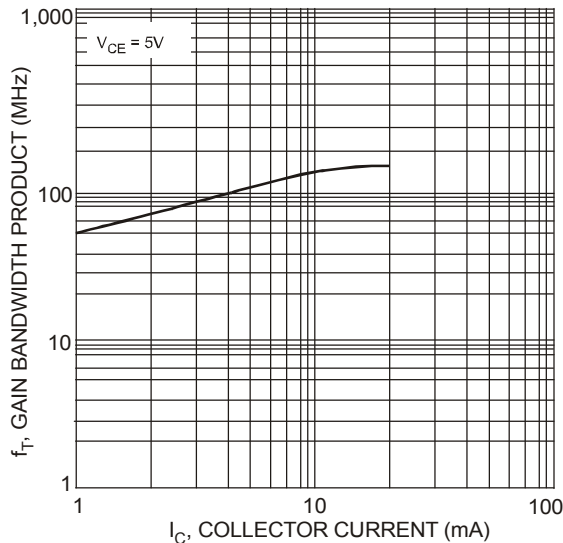


Fig. 5, Gain Bandwidth Product vs. Collector Current (NPN5551)

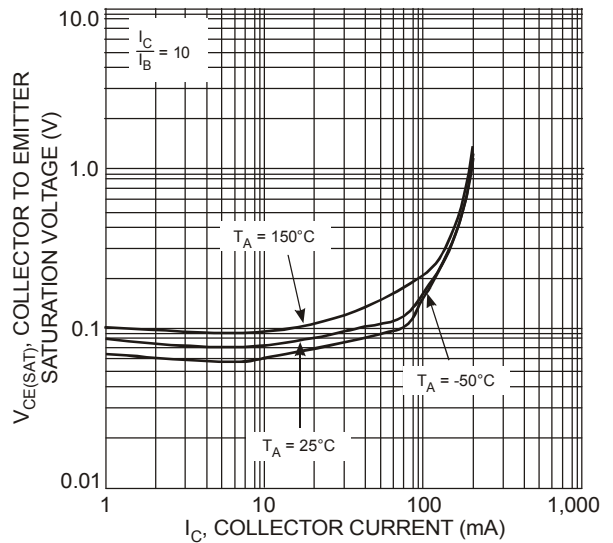


Fig. 6, Collector Emitter Saturation Voltage vs. Collector Current (PNP5401)

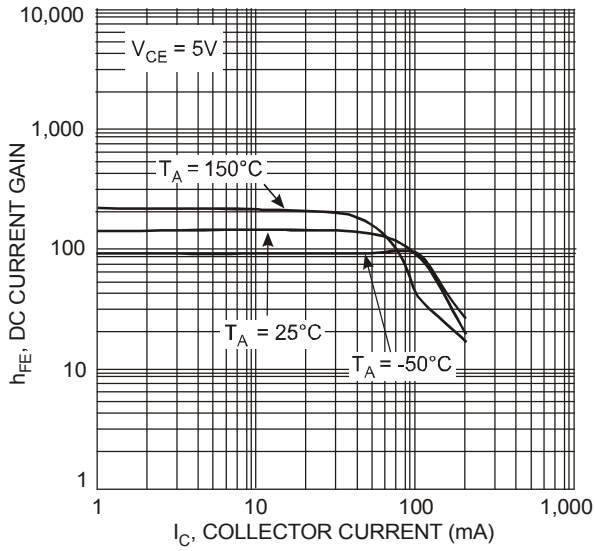


Fig. 7, DC Current Gain vs. Collector Current (PNP5401)

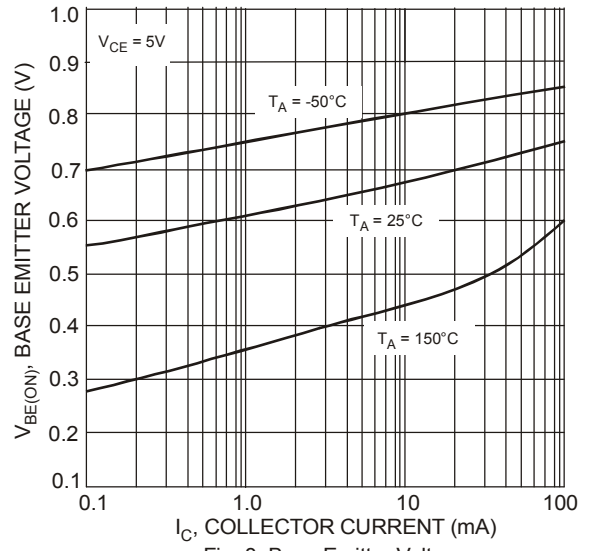


Fig. 8, Base Emitter Voltage vs. Collector Current (PNP5401)

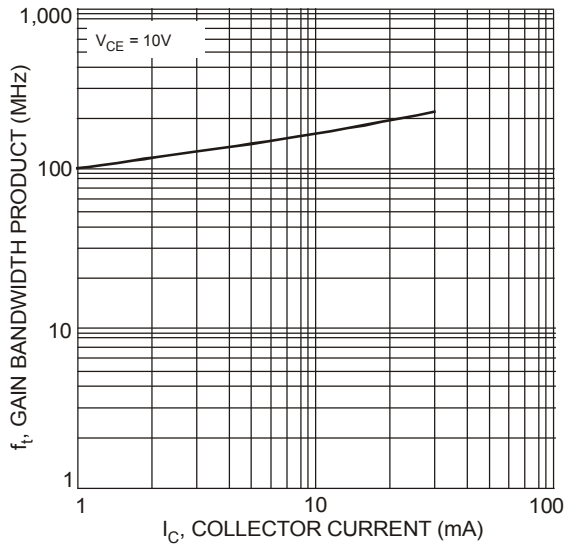


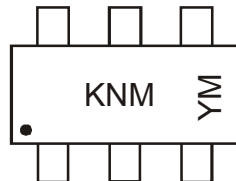
Fig. 9, Gain Bandwidth Product vs. Collector Current (PNP5401)

Ordering Information (Note 7)

| Device | Packaging | Shipping |
|--------------|-----------|------------------|
| MMDT5451-7-F | SOT-363 | 3000/Tape & Reel |

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

Marking Information



KNM = 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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