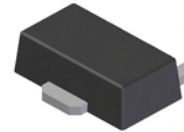


Features

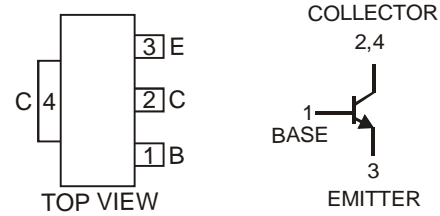
- Epitaxial Planar Die Construction
- Complementary PNP Type Available (2DB1188)
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**



SOT89-3L

Mechanical Data

- Case: SOT89-3L
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Finish — Matte Tin annealed over Copper leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208
- Marking & Type Code Information: See Page 3
- Ordering Information: See Page 3
- Weight: 0.072 grams (approximate)



Schematic and Pin Configuration

Maximum Ratings @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CB0} | 40 | V |
| Collector-Emitter Voltage | V _{CEO} | 32 | V |
| Emitter-Base Voltage | V _{EBO} | 5 | V |
| Peak Pulse Current | I _{CM} | 2.5 | A |
| Continuous Collector Current | I _C | 2 | A |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 3) @ T _A = 25°C | P _D | 1 | W |
| Thermal Resistance, Junction to Ambient Air (Note 3) @ T _A = 25°C | R _{θJA} | 125 | °C/W |
| Operating and Storage Temperature Range | T _j , T _{STG} | -55 to +150 | °C |

Electrical Characteristics @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Conditions |
|--------------------------------------|----------------------|----------|-----|-----|------|--|
| OFF CHARACTERISTICS (Note 4) | | | | | | |
| Collector-Base Breakdown Voltage | V _{(BR)CBO} | 40 | — | — | V | I _C = 50μA, I _E = 0 |
| Collector-Emitter Breakdown Voltage | V _{(BR)CEO} | 32 | — | — | V | I _C = 1mA, I _B = 0 |
| Emitter-Base Breakdown Voltage | V _{(BR)EBO} | 5 | — | — | V | I _E = 50μA, I _C = 0 |
| Collector Cut-Off Current | I _{CBO} | — | — | 1 | μA | V _{CB} = 20V, I _E = 0 |
| Emitter Cut-Off Current | I _{EBO} | — | — | 1 | μA | V _{EB} = 4V, I _C = 0 |
| ON CHARACTERISTICS (Note 4) | | | | | | |
| Collector-Emitter Saturation Voltage | V _{CE(SAT)} | — | 0.3 | 0.8 | V | I _C = 2A, I _B = 0.2A |
| DC Current Gain | h _{FE} | 2DD1766P | 82 | — | 180 | V _{CE} = 3V, I _C = 0.5A |
| | | 2DD1766Q | 120 | — | 270 | |
| | | 2DD1766R | 180 | — | 390 | |
| SMALL SIGNAL CHARACTERISTICS | | | | | | |
| Transition Frequency | f _T | — | 220 | — | MHz | V _{CE} = 5V, I _E = -50mA, f = 100MHz |
| Output Capacitance | C _{ob} | — | 13 | — | pF | V _{CB} = 10V, I _E = 0, f = 1MHz |

- Notes:
1. No purposefully added lead.
 2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
 3. Device mounted on FR-4 PCB; pad layout as shown on page 4 or in Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
 4. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤2%.

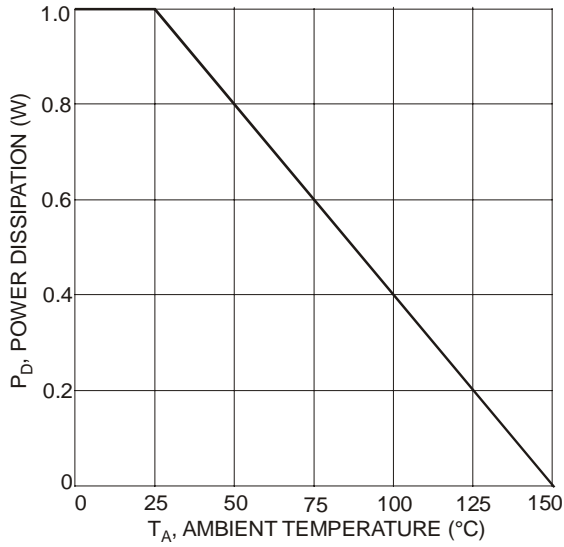


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 3)

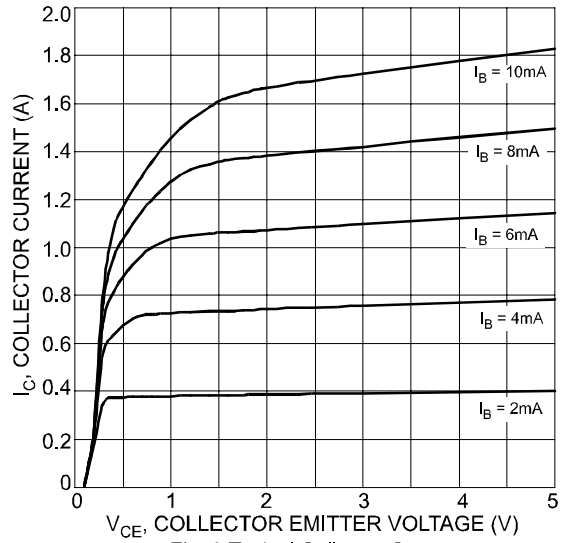


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage



Fig. 3 Typical DC Current Gain vs. Collector Current (2DD1766Q)

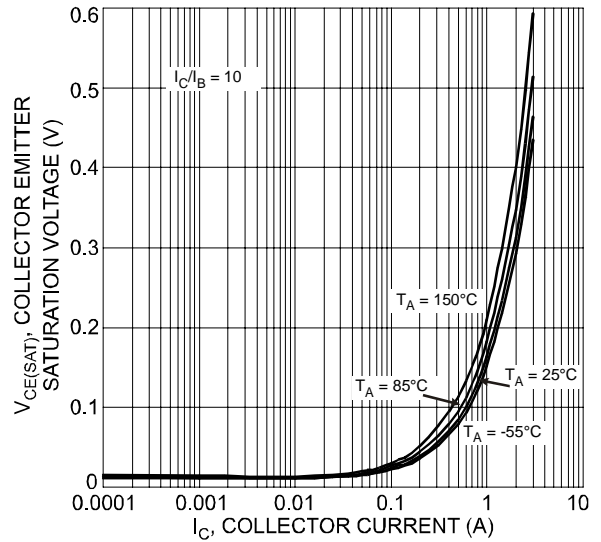


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current



Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current



Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current



Fig. 7 Typical Output Capacitance Characteristics



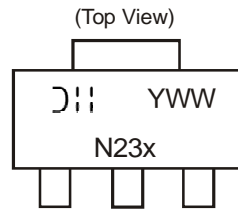
Fig. 8 Typical Gain-Bandwidth Product vs. Emitter Current

Ordering Information (Note 5)

| Device | Packaging | Shipping |
|-------------|-----------|------------------|
| 2DD1766P-13 | SOT89-3L | 2500/Tape & Reel |
| 2DD1766Q-13 | SOT89-3L | 2500/Tape & Reel |
| 2DD1766R-13 | SOT89-3L | 2500/Tape & Reel |

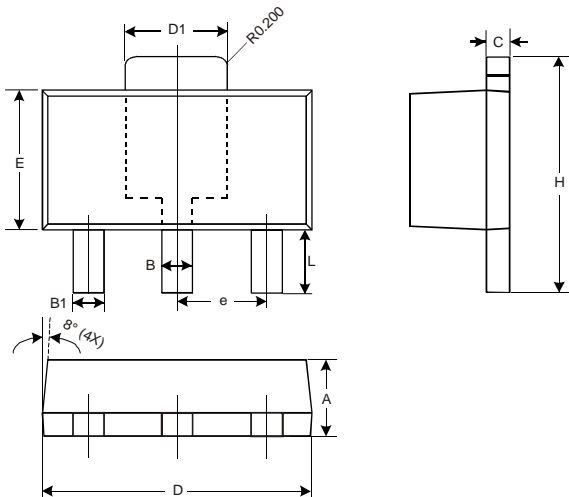
Notes: 5. For packaging details, go to our website at <http://www.diodes.com/ap02007.pdf>.

Marking Information



N23x = Product Type Marking Code:
 Where N23P = 2DD1766P
 N23Q = 2DD1766Q
 N23R = 2DD1766R
 YWW = Date Code Marking
 Y = Last digit of year ex: 7 = 2007
 WW = Week code 01 - 52

Package Outline Dimensions



| SOT89-3L | | | |
|----------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | 1.40 | 1.60 | 1.50 |
| B | 0.45 | 0.55 | 0.50 |
| B1 | 0.37 | 0.47 | 0.42 |
| C | 0.35 | 0.43 | 0.38 |
| D | 4.40 | 4.60 | 4.50 |
| D1 | 1.50 | 1.70 | 1.60 |
| E | 2.40 | 2.60 | 2.50 |
| e | — | — | 1.50 |
| H | 3.95 | 4.25 | 4.10 |
| L | 0.90 | 1.20 | 1.05 |
| All Dimensions in mm | | | |

Suggested Pad Layout



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