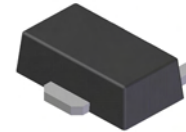


**Features**

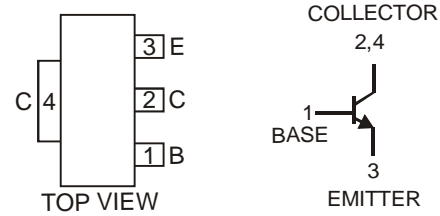
- Epitaxial Planar Die Construction
- Complementary PNP Type Available (2DB1188)
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**



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<sub>A</sub> = 25°C unless otherwise specified

| Characteristic               | Symbol           | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage       | V <sub>CB0</sub> | 40    | V    |
| Collector-Emitter Voltage    | V <sub>CEO</sub> | 32    | V    |
| Emitter-Base Voltage         | V <sub>EBO</sub> | 5     | V    |
| Peak Pulse Current           | I <sub>CM</sub>  | 2.5   | A    |
| Continuous Collector Current | I <sub>C</sub>   | 2     | A    |

**Thermal Characteristics**

| Characteristic   | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 3) @ T <sub>A</sub> = 25°C                           | P <sub>D</sub>                    | 1           | W    |
| Thermal Resistance, Junction to Ambient Air (Note 3) @ T <sub>A</sub> = 25°C | R <sub>θJA</sub>                  | 125         | °C/W |
| Operating and Storage Temperature Range                                      | T <sub>j</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

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

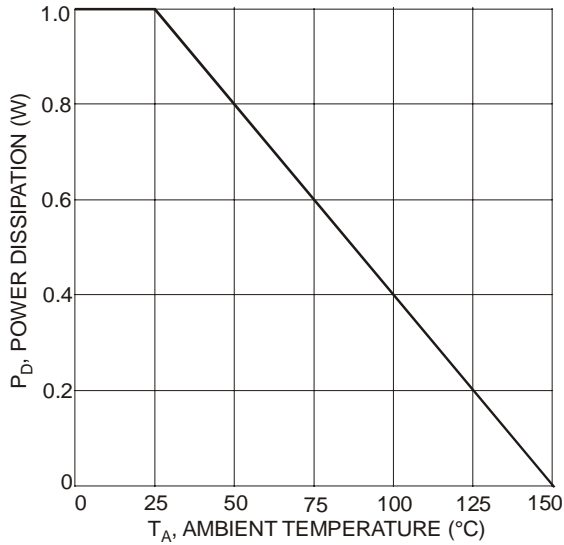


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 3)

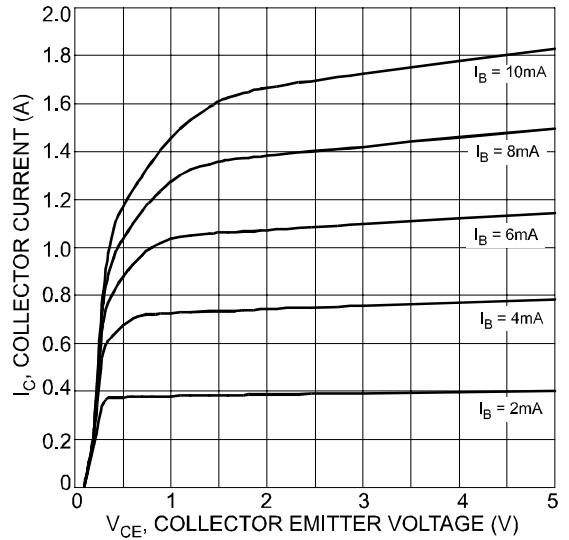


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

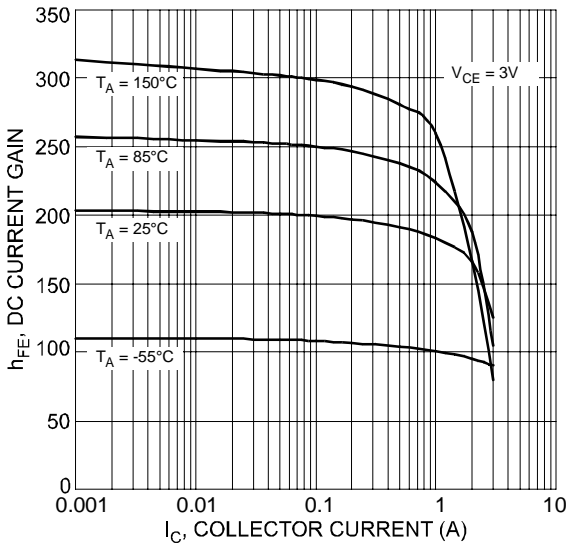


Fig. 3 Typical DC Current Gain vs. Collector Current (2DD1766Q)

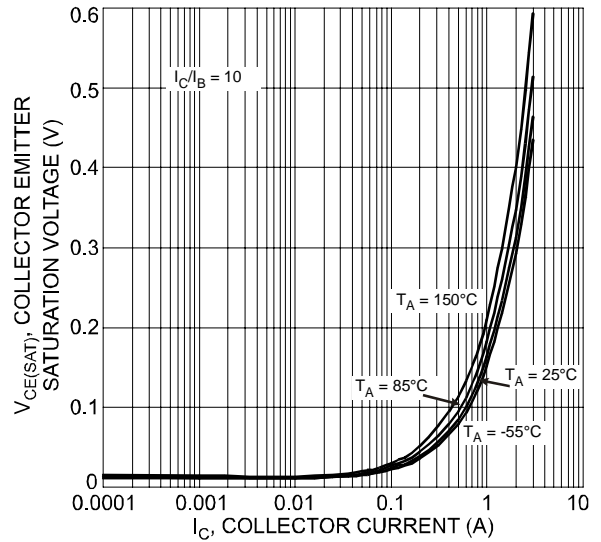


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

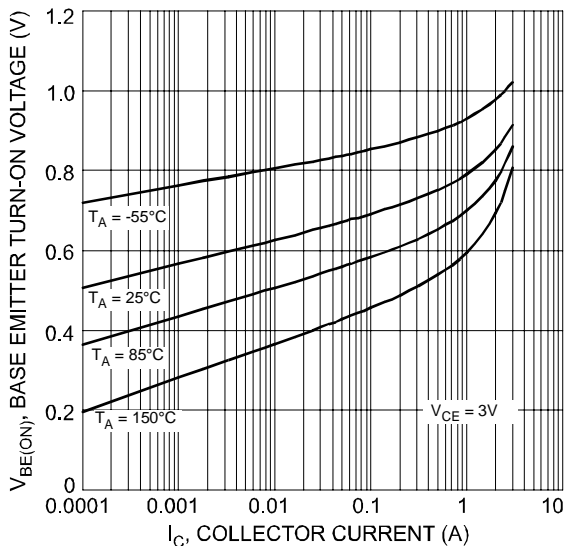


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

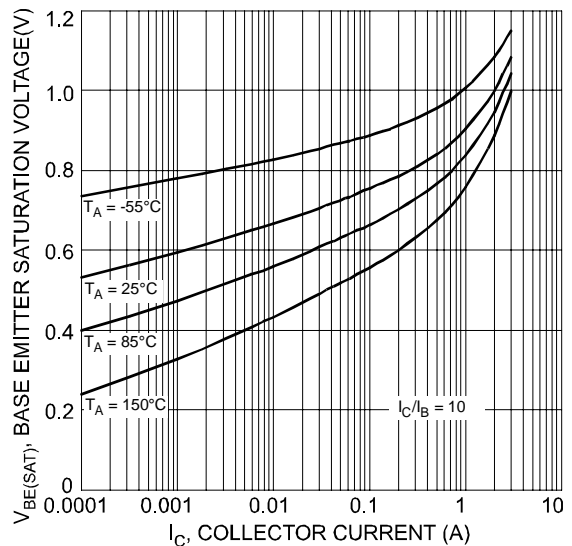


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

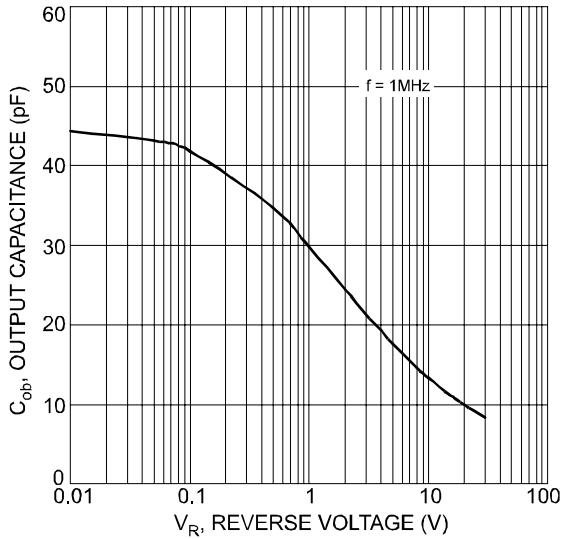


Fig. 7 Typical Output Capacitance Characteristics

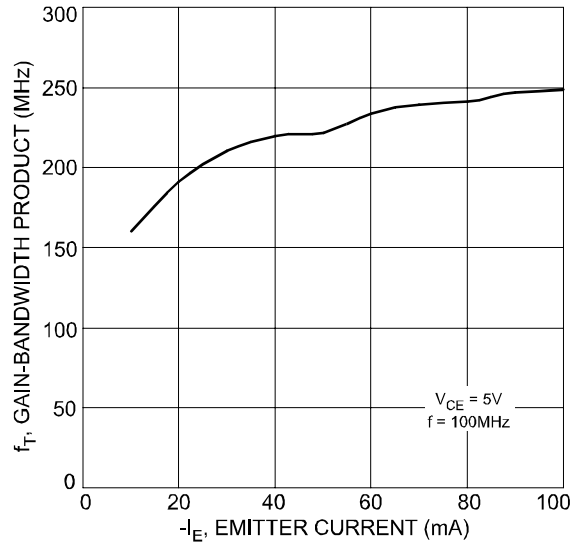


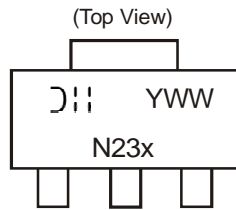
Fig. 8 Typical Gain-Bandwidth Product vs. Emitter Current

## 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 |

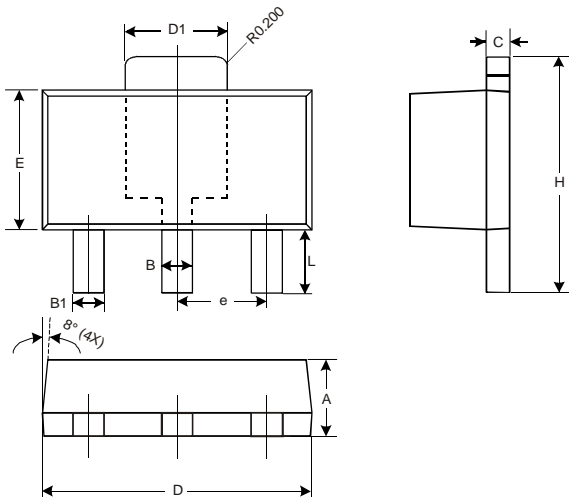
Notes: 5. For packaging details, go to our website at <http://www.diodes.com/ap02007.pdf>.

## Marking Information



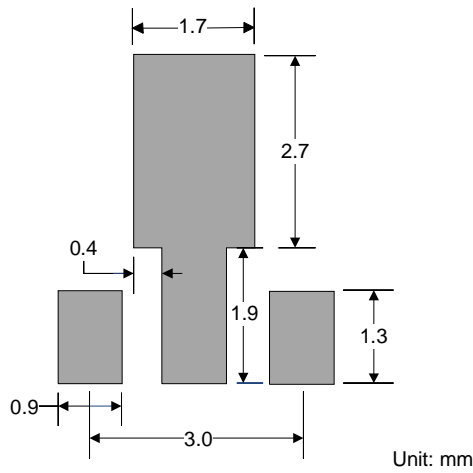
N23x = Product Type Marking Code:  
 Where N23P = 2DD1766P  
 N23Q = 2DD1766Q  
 N23R = 2DD1766R  
 YWW = Date Code Marking  
 Y = Last digit of year ex: 7 = 2007  
 WW = Week code 01 - 52

## 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



Unit: mm

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<http://moschip.ru/get-element>

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### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

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