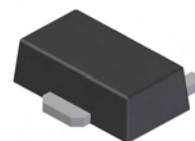


## Features

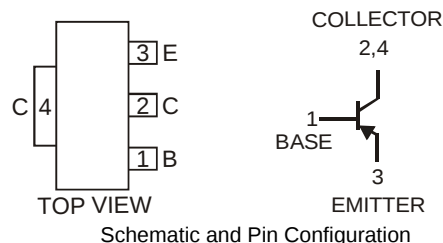
- Epitaxial Planar Die Construction
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**

## 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)



SOT89-3L



## Maximum Ratings @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic               | Symbol           | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage       | V <sub>CB0</sub> | -30   | V    |
| Collector-Emitter Voltage    | V <sub>CEO</sub> | -20   | V    |
| Emitter-Base Voltage         | V <sub>EBO</sub> | -6    | V    |
| Peak Pulse Current           | I <sub>CM</sub>  | -10   | A    |
| Continuous Collector Current | I <sub>C</sub>   | -5    | 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                                              |
|--------------------------------------|----------|----------------------|-----|-------|------|------|---------------------------------------------------------|
| OFF CHARACTERISTICS (Note 4)         |          |                      |     |       |      |      |                                                         |
| Collector-Base Breakdown Voltage     |          | V <sub>(BR)CBO</sub> | -30 | —     | —    | V    | I <sub>C</sub> = -50μA, I <sub>E</sub> = 0              |
| Collector-Emitter Breakdown Voltage  |          | V <sub>(BR)CEO</sub> | -20 | —     | —    | V    | I <sub>C</sub> = -1mA, I <sub>B</sub> = 0               |
| Emitter-Base Breakdown Voltage       |          | V <sub>(BR)EBO</sub> | -6  | —     | —    | V    | I <sub>E</sub> = -50μA, I <sub>C</sub> = 0              |
| Collector Cut-Off Current            |          | I <sub>CBO</sub>     | —   | —     | -0.5 | μA   | V <sub>CB</sub> = -20V, I <sub>E</sub> = 0              |
| Emitter Cut-Off Current              |          | I <sub>EBO</sub>     | —   | —     | -0.5 | μA   | V <sub>EB</sub> = -5V, I <sub>C</sub> = 0               |
| ON CHARACTERISTICS (Note 4)          |          |                      |     |       |      |      |                                                         |
| Collector-Emitter Saturation Voltage |          | V <sub>CE(SAT)</sub> | —   | -0.25 | -1.0 | V    | I <sub>C</sub> = -4A, I <sub>B</sub> = -0.1A            |
| DC Current Gain                      | 2DB1386Q | h <sub>FE</sub>      | 120 | —     | 270  | —    | I <sub>C</sub> = -0.5A, V <sub>CE</sub> = -2V           |
|                                      | 2DB1386R |                      | 180 | —     | 390  |      |                                                         |
| SMALL SIGNAL CHARACTERISTICS         |          |                      |     |       |      |      |                                                         |
| Output Capacitance                   |          | C <sub>obo</sub>     | —   | 55    | —    | pF   | V <sub>CB</sub> = -20V, I <sub>E</sub> = 0, f = 1MHz    |
| Current Gain-Bandwidth Product       |          | f <sub>T</sub>       | —   | 100   | —    | pF   | V <sub>CE</sub> = -6V, I <sub>E</sub> = 50mA, f = 30MHz |

- 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%.

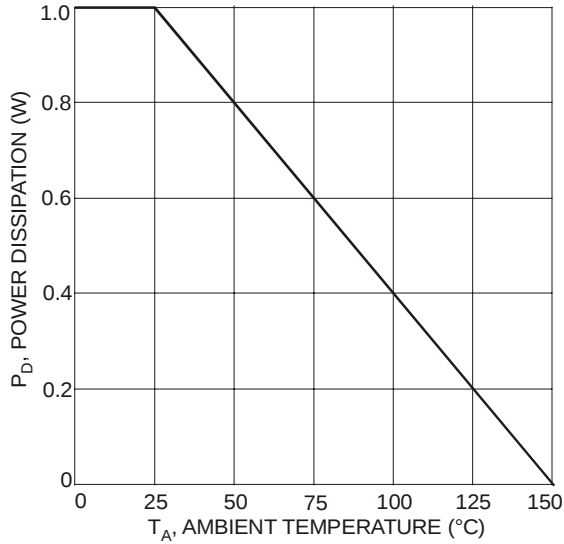


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 3)

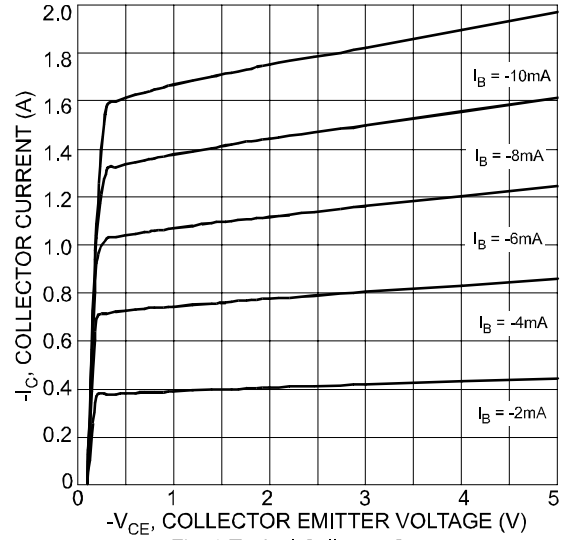


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

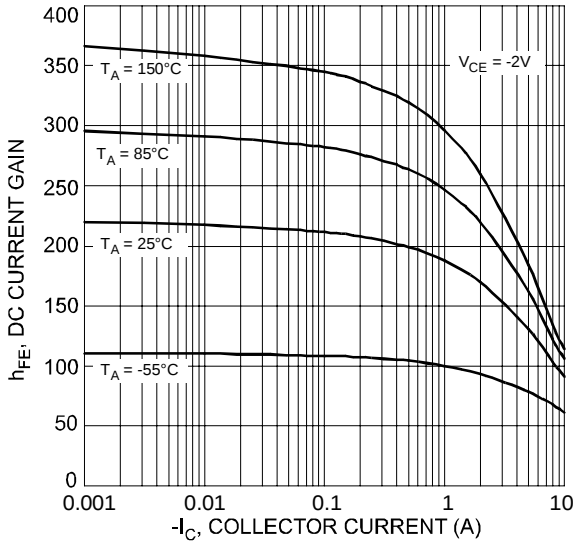


Fig. 3 Typical DC Current Gain vs. Collector Current (2DB1386Q)

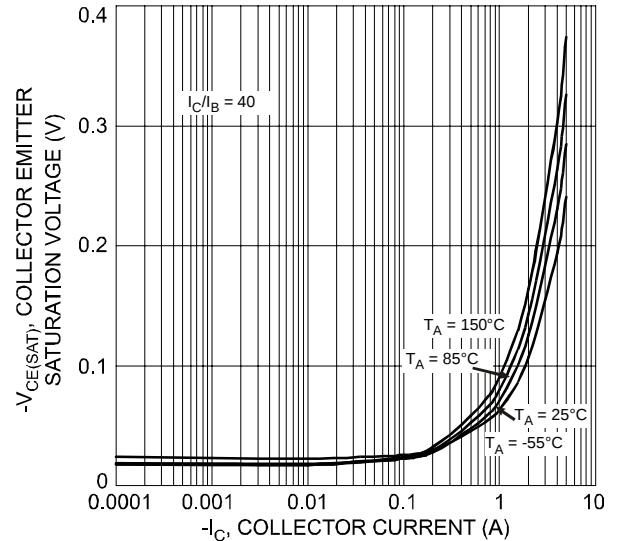


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

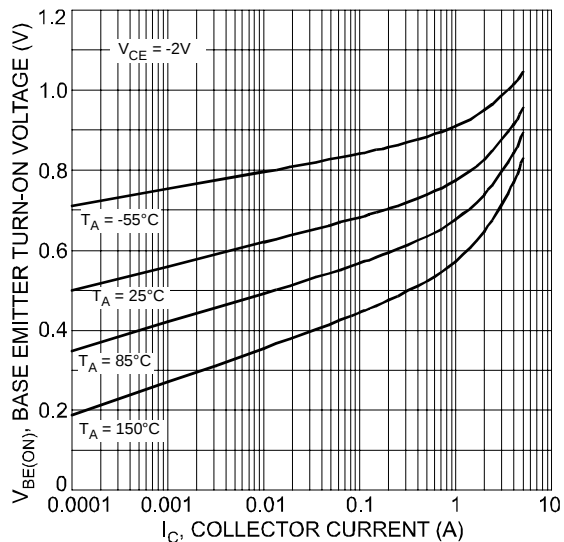


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

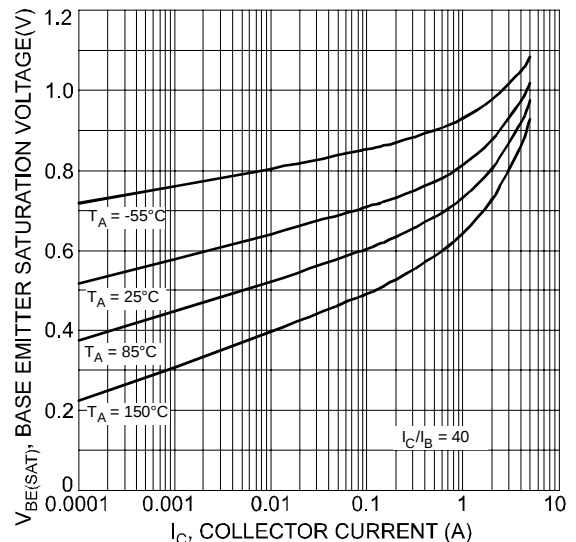
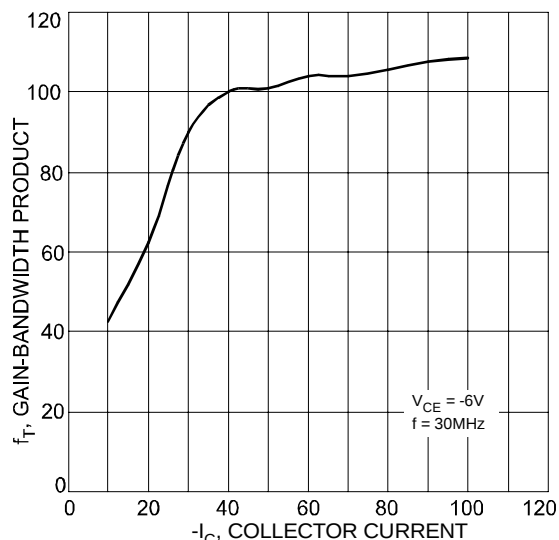
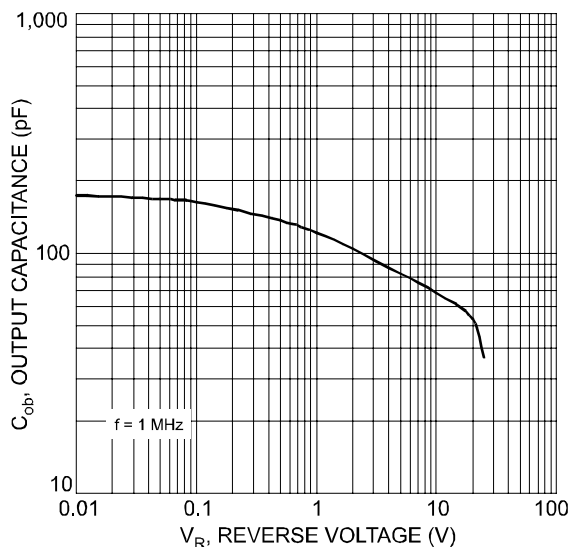


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

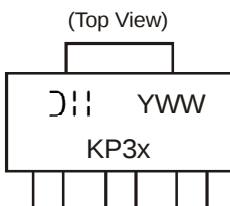


## Ordering Information (Note 5)

| Device      | Packaging | Shipping         |
|-------------|-----------|------------------|
| 2DB1386Q-13 | SOT89-3L  | 2500/Tape & Reel |
| 2DB1386R-13 | SOT89-3L  | 2500/Tape & Reel |

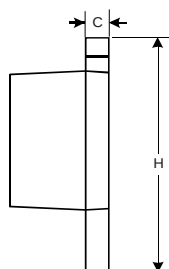
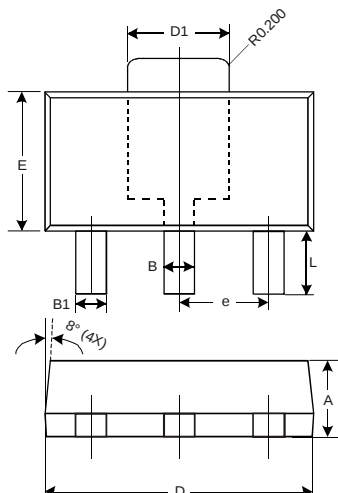
Notes: 5. For packaging details, go to our website at <http://www.diodes.com/ap02007.pdf>.

## Marking Information



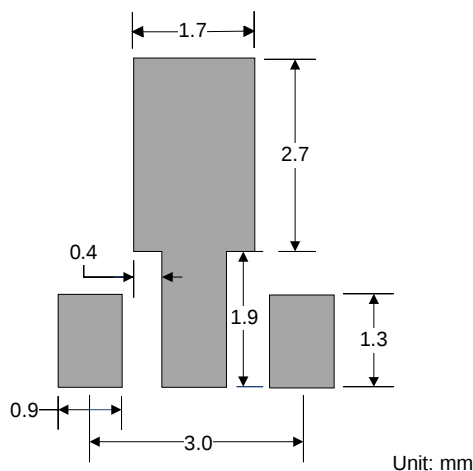
KP3x = Product Type Marking Code,  
 where: KP3Q = 2DB1386Q  
 KP3R = 2DB1386R  
 YWW = Date Code Marking  
 Y = Last digit of year ex: 7 = 2007  
 WW = Week code 01 - 52

## 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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