



# THE DATASHEET OF 2DB1132R-13

**32V PNP POWER SWITCHING TRANSISTOR IN SOT-89**

**Features**

- $BV_{CEO} > -32V$
- $I_C = -1A$  high Continuous Collector Current
- Complementary NPN Type: 2DD1664
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

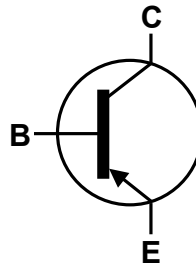
**Mechanical Data**

- Case: SOT89
- Case material: molded Plastic. "Green" molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.055 grams (Approximate)

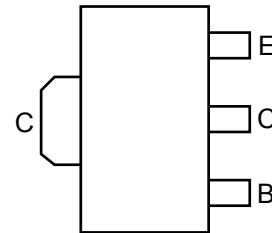
SOT89



Top View



Device Symbol



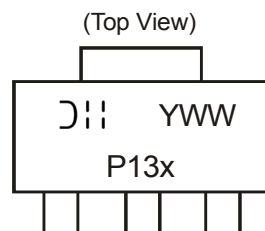
Pin Out  
Top View

**Ordering Information** (Note 4)

| Product      | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|--------------|---------|--------------------|-----------------|-------------------|
| 2DB1132P-13  | P13P    | 13                 | 12              | 2,500             |
| 2DB1132Q-13  | P13Q    | 13                 | 12              | 2,500             |
| 2DB1132R-13  | P13R    | 13                 | 12              | 2,500             |
| 2DB1132R-13R | P13R    | 13                 | 12              | 4,000             |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen and Antimony free, "Green" and Lead-Free.
  3. Halogen and Antimony free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>

**Marking Information**



P13x = Product Type Marking Code:  
 Where P13P = 2DB1132P  
 P13Q = 2DB1132Q  
 P13R = 2DB1132R  
 YWW = Date Code Marking  
 Y = Last digit of year ex: 7 = 2007  
 WW = Week code 01 - 52

**Absolute Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic               | Symbol           | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage       | V <sub>CBO</sub> | -40   | V    |
| Collector-Emitter Voltage    | V <sub>CEO</sub> | -32   | V    |
| Emitter-Base Voltage         | V <sub>EBO</sub> | -5    | V    |
| Continuous Collector Current | I <sub>C</sub>   | -1    | A    |
| Peak Pulse Current           | I <sub>CM</sub>  | -2    | A    |

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

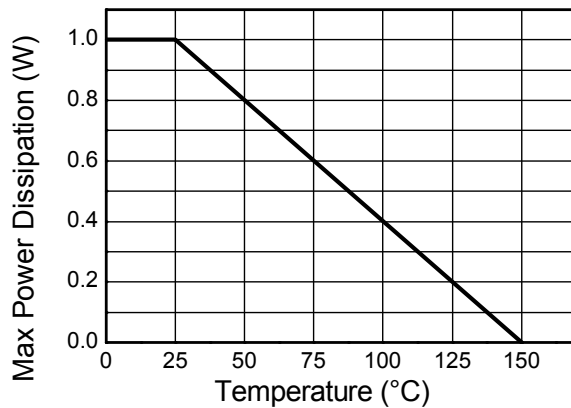
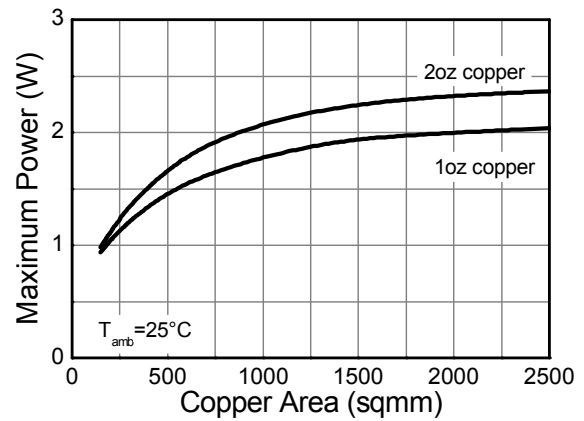
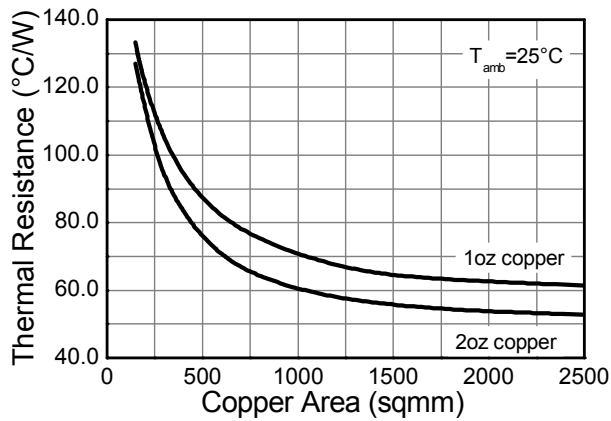
| Characteristic                              |          | Symbol                            | Value       | Unit |
|---------------------------------------------|----------|-----------------------------------|-------------|------|
| Power Dissipation                           | (Note 5) | P <sub>D</sub>                    | 1           | W    |
|                                             | (Note 6) |                                   | 1.5         |      |
|                                             | (Note 7) |                                   | 2.0         |      |
| Thermal Resistance, Junction to Ambient Air | (Note 5) | R <sub>θJA</sub>                  | 125         | °C/W |
|                                             | (Note 6) |                                   | 83          |      |
|                                             | (Note 7) |                                   | 60          |      |
| Thermal Resistance, Junction to Lead        | (Note 8) | R <sub>θJL</sub>                  | 22          | °C/W |
| Operating and Storage Temperature Range     |          | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

**ESD Ratings** (Note 9)

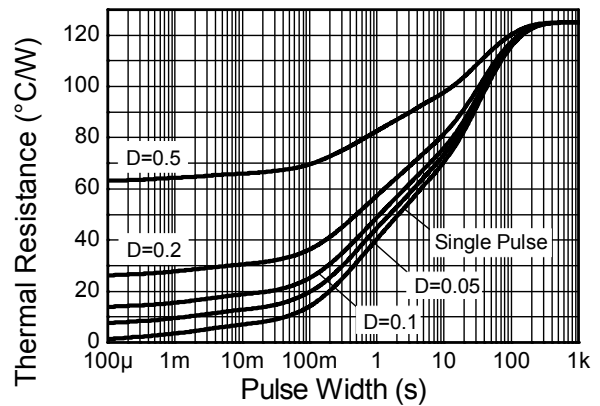
| Characteristic                             | Symbol  | Value | Unit | JEDEC Class |
|--------------------------------------------|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V    | 3A          |
| Electrostatic Discharge - Machine Model    | ESD MM  | 400   | V    | C           |

- Notes:
5. For a device mounted with the exposed collector pad on 15mm x 15mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  6. Same as note (5), except the device is mounted on 25mm x 25mm 1oz copper.
  7. Same as note (5), except the device is mounted on 50mm x 50mm 1oz copper.
  8. Thermal resistance from junction to solder-point (on the exposed collector pad).
  9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

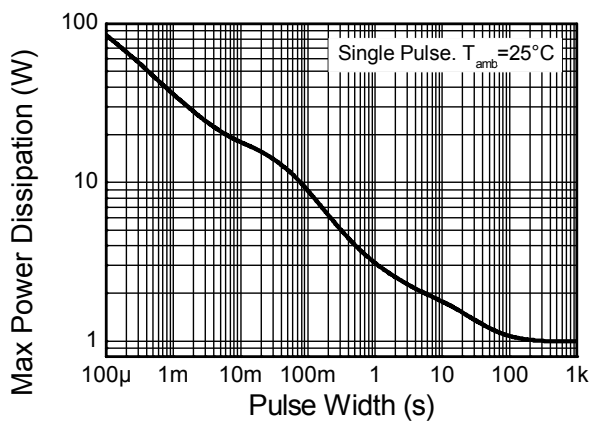
## Thermal Characteristics and Derating Information



Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation

# Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                  | Symbol               | Min | Typ  | Max  | Unit | Test Condition                                        |
|-------------------------------------------------|----------------------|-----|------|------|------|-------------------------------------------------------|
| Collector-Base Breakdown Voltage                | BV <sub>CBO</sub>    | -40 | —    | —    | V    | I <sub>C</sub> = -50μA                                |
| Collector-Emitter Breakdown Voltage (Note 10)   | BV <sub>CEO</sub>    | -32 | —    | —    | V    | I <sub>C</sub> = -1mA                                 |
| Emitter-Base Breakdown Voltage                  | BV <sub>EBO</sub>    | -5  | —    | —    | V    | I <sub>E</sub> = -50μA                                |
| Collector Cut-off Current                       | I <sub>CBO</sub>     | —   | —    | -0.5 | μA   | V <sub>CB</sub> = -20V                                |
| Emitter Cut-off Current                         | I <sub>EBO</sub>     | —   | —    | -0.5 | μA   | V <sub>EB</sub> = -4V                                 |
| Static Forward Current Transfer Ratio (Note 10) | 2DB1132P             | 82  | —    | 180  | —    | I <sub>C</sub> = -100mA, V <sub>CE</sub> = -3V        |
|                                                 | 2DB1132Q             | 120 |      | 270  |      |                                                       |
|                                                 | 2DB1132R             | 180 |      | 390  |      |                                                       |
| Collector-Emitter saturation Voltage (Note 10)  | V <sub>CE(sat)</sub> | —   | -125 | -500 | mV   | I <sub>C</sub> = -500mA, I <sub>B</sub> = -50mA       |
| Transition frequency                            | f <sub>T</sub>       | —   | 190  | —    | MHz  | I <sub>E</sub> = 50mA, V <sub>CE</sub> = -5V, f=30MHz |
| Output Capacitance                              | C <sub>ob</sub>      | —   | 12   | 30   | pF   | I <sub>E</sub> = 0A, V <sub>CB</sub> = -10V, f=1MHz   |

Notes: 10. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

# Typical Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

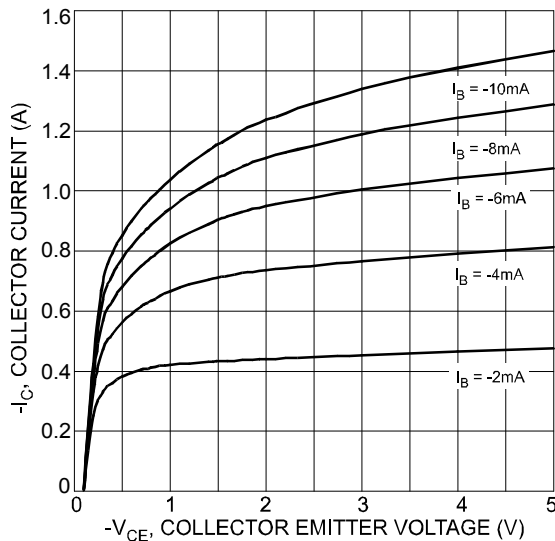


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

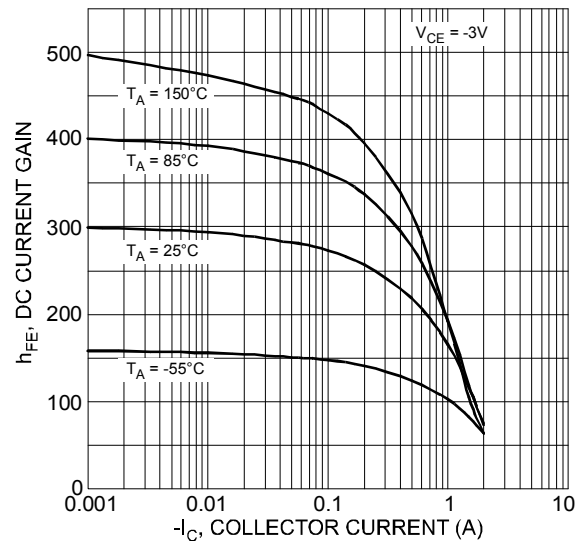


Fig. 3 Typical DC Current Gain vs. Collector Current (2DB1132R)

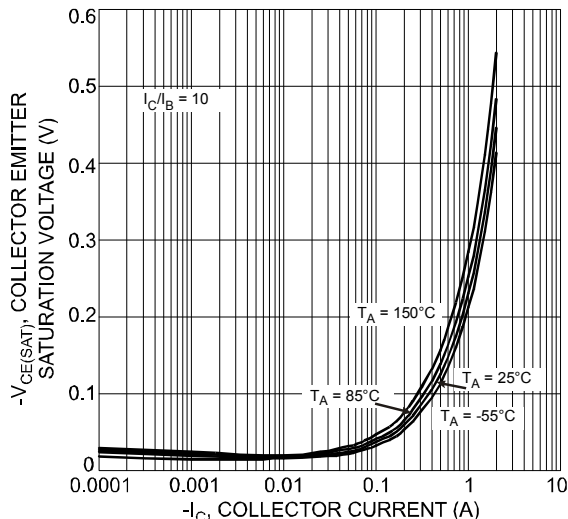


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

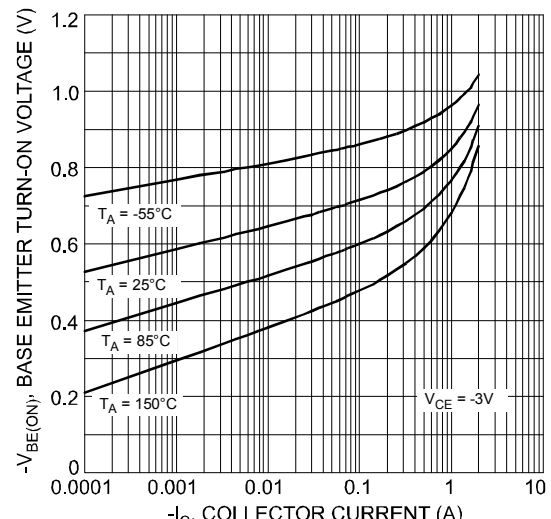


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

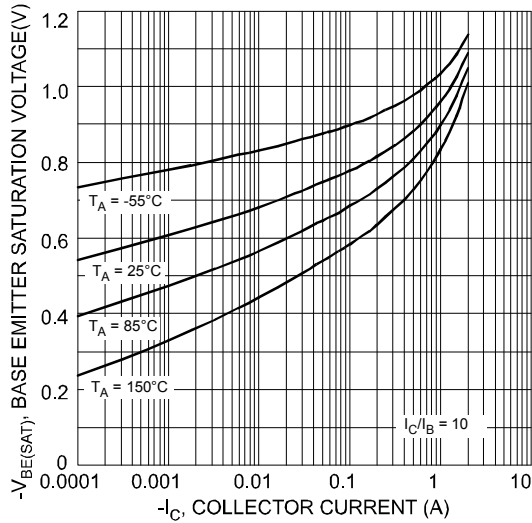


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

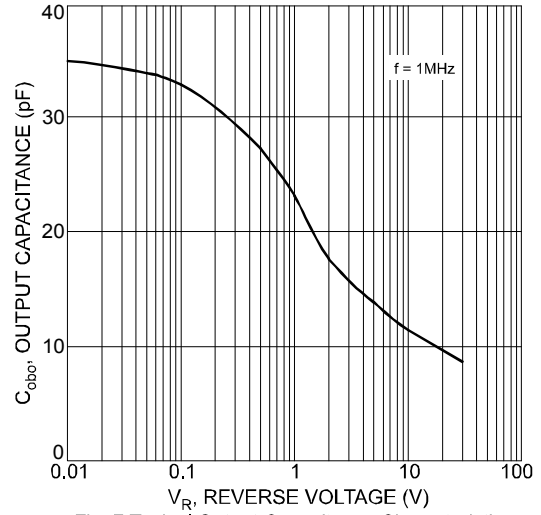


Fig. 7 Typical Output Capacitance Characteristics

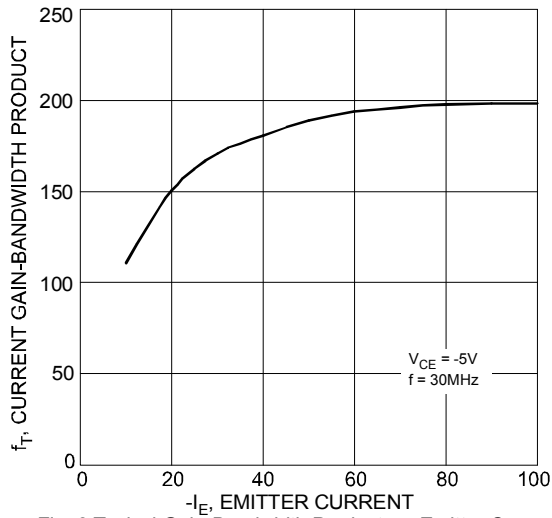
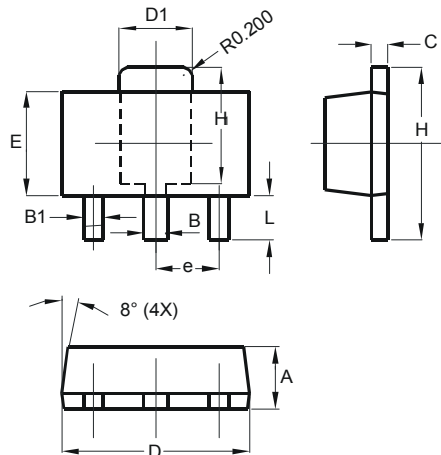


Fig. 8 Typical Gain-Bandwidth Product vs. Emitter Current

## Package Outline Dimensions

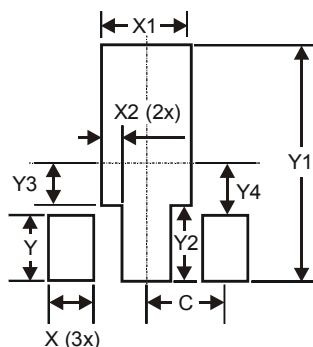
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SOT89                |          |      |
|----------------------|----------|------|
| Dim                  | Min      | Max  |
| A                    | 1.40     | 1.60 |
| B                    | 0.44     | 0.62 |
| B1                   | 0.35     | 0.54 |
| C                    | 0.35     | 0.44 |
| D                    | 4.40     | 4.60 |
| D1                   | 1.62     | 1.83 |
| E                    | 2.29     | 2.60 |
| e                    | 1.50 Typ |      |
| H                    | 3.94     | 4.25 |
| H1                   | 2.63     | 2.93 |
| L                    | 0.89     | 1.20 |
| All Dimensions in mm |          |      |

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| X          | 0.900         |
| X1         | 1.733         |
| X2         | 0.416         |
| Y          | 1.300         |
| Y1         | 4.600         |
| Y2         | 1.475         |
| Y3         | 0.950         |
| Y4         | 1.125         |
| C          | 1.500         |

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