

**ZXTN4002Z**
**100V NPN LED DRIVING TRANSISTOR IN SOT89**

## Features

- $BV_{CEO} > 100V$
- Max continuous current  $I_C (cont) = 1A$
- $h_{FE} > 100$  @  $I_C = 150mA$ ,  $V_{CE} = 200mV$
- **Lead Free, RoHS Compliant (Note 1)**
- **Halogen and Antimony Free "Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

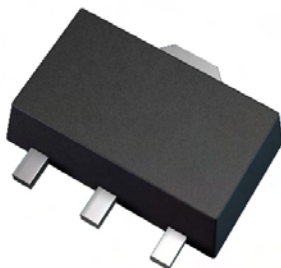
## Applications

LED TV backlight

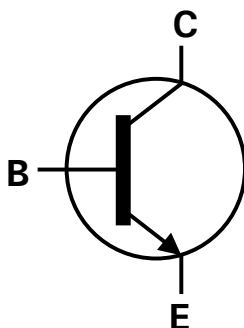
## Mechanical Data

- Case: SOT89
- Case material: molded Plastic. "Green" molding Compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish
- Weight: 0.052 grams (Approximate)

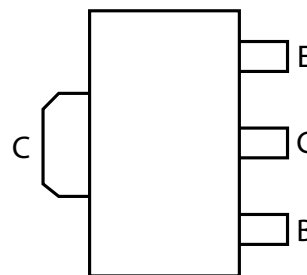
SOT89



Top View



Device symbol

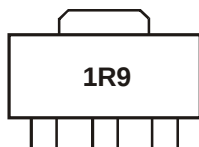

Top View  
Pin Out

## Ordering Information (Note 3)

| Product     | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-------------|---------|--------------------|-----------------|-------------------|
| ZXTN4002ZTA | 1R9     | 7                  | 12mm embossed   | 1000 units        |

- Notes:
1. No purposefully added lead.
  2. Diodes Inc's "Green" Policy can be found on our website at <http://www.diodes.com>
  3. For Packaging Details, go to our website at <http://www.diodes.com>.

## Marking Information



1R9 = Product type Marking Code

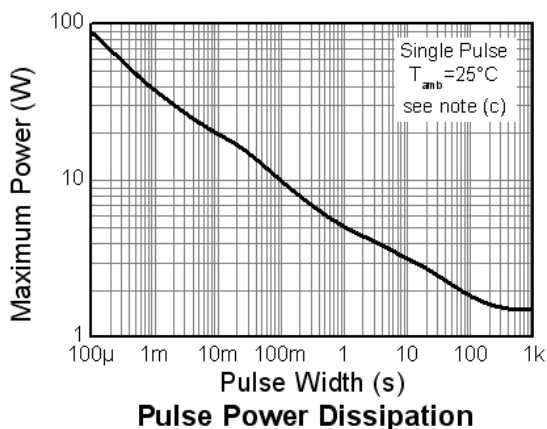
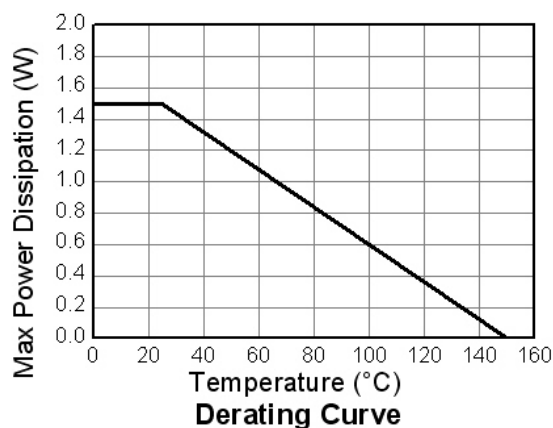
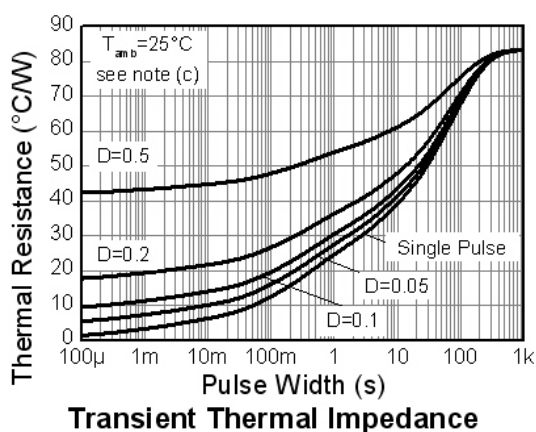
**Maximum Ratings** @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic               | Symbol           | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage       | V <sub>CBO</sub> | 100   | V    |
| Collector-Emitter Voltage    | V <sub>CEO</sub> | 100   | V    |
| Emitter-Base Voltage         | V <sub>EBO</sub> | 7     | V    |
| Continuous Collector Current | I <sub>C</sub>   | 1     | A    |
| Peak Pulse Current (Note 4)  | I <sub>CM</sub>  | 3     | A    |
| Base Current                 | I <sub>B</sub>   | 500   | mA   |

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

| Characteristic                                   | Symbol                            | Value       | Unit |
|--------------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation (Note 5)                       | P <sub>D</sub>                    | 1.5         | W    |
| Thermal Resistance, Junction to Ambient (Note 5) | R <sub>θJA</sub>                  | 83          | °C/W |
| Thermal Resistance, Junction to Leads (Note 6)   | R <sub>θJL</sub>                  | 22.44       | °C/W |
| Operating and Storage Temperature Range          | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

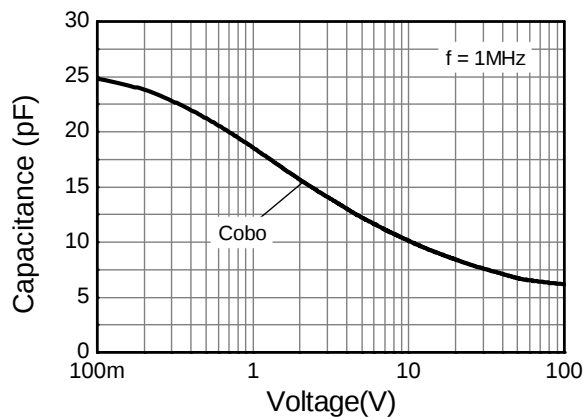
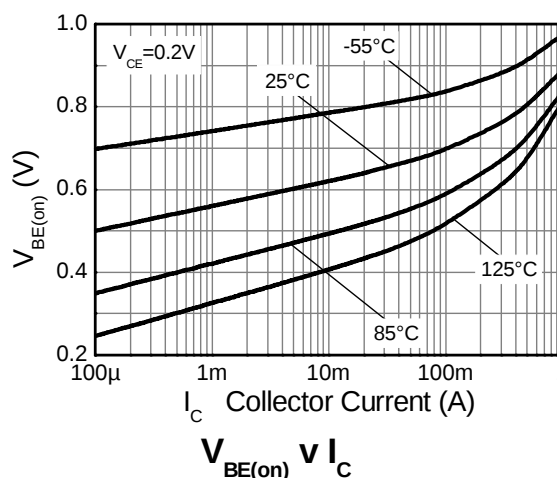
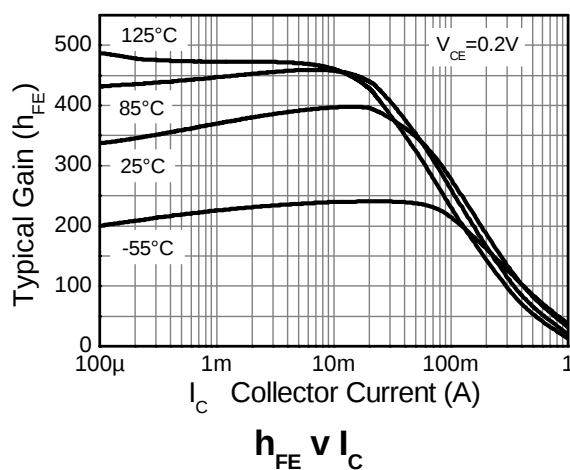
- Notes:
4. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤ 2%.
  5. For a device surface mounted on 25mm X 25mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions
  6. Thermal resistance from junction to solder-point (at the end of the collector lead).

**Thermal Characteristics and Derating information**


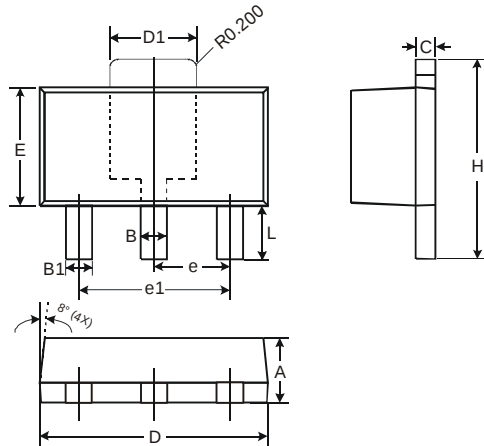
**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                                 | Symbol              | Min | Typ  | Max  | Unit | Test Condition                                                                                         |
|------------------------------------------------|---------------------|-----|------|------|------|--------------------------------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage               | BV <sub>CBO</sub>   | 100 | -    | -    | V    | I <sub>C</sub> = 100μA                                                                                 |
| Collector-Emitter Breakdown Voltage (Note 7)   | BV <sub>CEO</sub>   | 100 | -    | -    | V    | I <sub>C</sub> = 10mA                                                                                  |
| Emitter-Base Breakdown Voltage                 | BV <sub>EBO</sub>   | 7   | 8.3  | -    | V    | I <sub>E</sub> = 100μA                                                                                 |
| Collector Cut-off Current                      | I <sub>CBO</sub>    | -   | -    | 50   | nA   | V <sub>CB</sub> = 100V                                                                                 |
| Emitter Cut-off Current                        | I <sub>EBO</sub>    | -   | -    | 50   | nA   | V <sub>EB</sub> = 7V                                                                                   |
| Static Forward Current Transfer Ratio (Note 7) | h <sub>FE</sub>     | 60  | -    | -    | -    | I <sub>C</sub> = 85mA, V <sub>CE</sub> = 0.15V                                                         |
|                                                |                     | 100 | -    | -    | -    | I <sub>C</sub> = 150mA, V <sub>CE</sub> = 0.2V                                                         |
| Base-Emitter Turn-On Voltage (Note 7)          | V <sub>BE(on)</sub> | -   | 0.72 | 0.95 | V    | I <sub>C</sub> = 150mA, V <sub>CE</sub> = 0.2V                                                         |
| Delay Time                                     | t <sub>d</sub>      | -   | 468  | -    | ns   | V <sub>CC</sub> = 80V, I <sub>C</sub> = 150mA,<br>-I <sub>B2</sub> = 1.5mA, V <sub>CE(ON)</sub> = 0.2V |
| Rise Time                                      | t <sub>r</sub>      | -   | 441  | -    | ns   |                                                                                                        |
| Storage Time                                   | t <sub>s</sub>      | -   | 1540 | -    | ns   |                                                                                                        |
| Fall Time                                      | t <sub>f</sub>      | -   | 251  | -    | ns   | V <sub>CC</sub> = 80V, I <sub>C</sub> = 150mA,<br>-I <sub>B2</sub> = 1.5mA, V <sub>CE(ON)</sub> = 4V   |
| Storage Time                                   | t <sub>s</sub>      | -   | 22   | -    | ns   |                                                                                                        |
| Fall Time                                      | t <sub>f</sub>      | -   | 204  | -    | ns   |                                                                                                        |

Notes: 7. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤ 2%

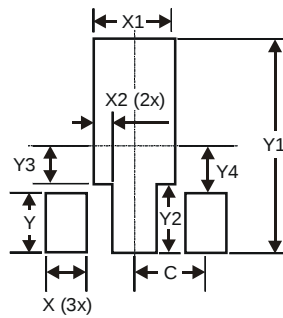
**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified


## Package Outline Dimensions



| SOT89                |          |      |
|----------------------|----------|------|
| Dim                  | Min      | Max  |
| A                    | 1.40     | 1.60 |
| B                    | 0.44     | 0.62 |
| B1                   | 0.35     | 0.54 |
| C                    | 0.35     | 0.43 |
| D                    | 4.40     | 4.60 |
| D1                   | 1.52     | 1.83 |
| E                    | 2.29     | 2.60 |
| e                    | 1.50 Typ |      |
| e1                   | 3.00 Typ |      |
| H                    | 3.94     | 4.25 |
| L                    | 0.89     | 1.20 |
| All Dimensions in mm |          |      |

## Suggested Pad Layout



| 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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