

**ZXTP03200BZ**

**200V PNP LOW  $V_{CE(sat)}$  TRANSISTOR IN SOT-89**

## Features

- $BV_{CEO} > -200V$
- $BV_{ECO} > -2V$
- Continuous current  $I_{C(cont)} = 2A$
- $V_{CE(sat)} < -160mV @ -1A$
- $R_{CE(sat)} = 130m\Omega$
- $P_D = 2.4W$
- 2 Amps continuous current
- Up to 5 Amps peak current
- Very low saturation voltage
- Enhanced switching performance

## Mechanical Data

- Case: SOT-89
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish
- Weight: 0.052 grams (approximate)

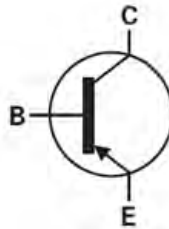
## Applications

- DC-DC Convertors

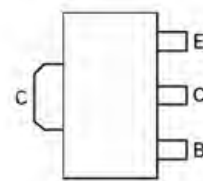
SOT-89



Top View



Device symbol

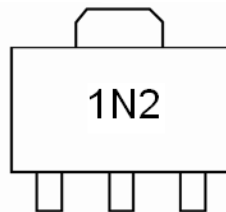


Pin Configuration

## Ordering Information

| Product       | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|---------------|---------|--------------------|-----------------|-------------------|
| ZXTP03200BZTA | 1N2     | 7                  | 12              | 1000              |

## Marking Information



1N2 = Product type Marking Code

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**Maximum Ratings** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

| Characteristic                        | Symbol    | Value | Unit |
|---------------------------------------|-----------|-------|------|
| Collector-Base Voltage                | $V_{CBO}$ | -220  | V    |
| Collector-Emitter Voltage             | $V_{CEO}$ | -200  | V    |
| Emitter-Base Voltage                  | $V_{EBO}$ | -7    | V    |
| Continuous Collector Current (Note a) | $I_C$     | -2    | A    |
| Base Current                          | $I_B$     | -1    | A    |
| Peak Pulse Current                    | $I_{CM}$  | -5    | A    |

**Thermal Characteristics**

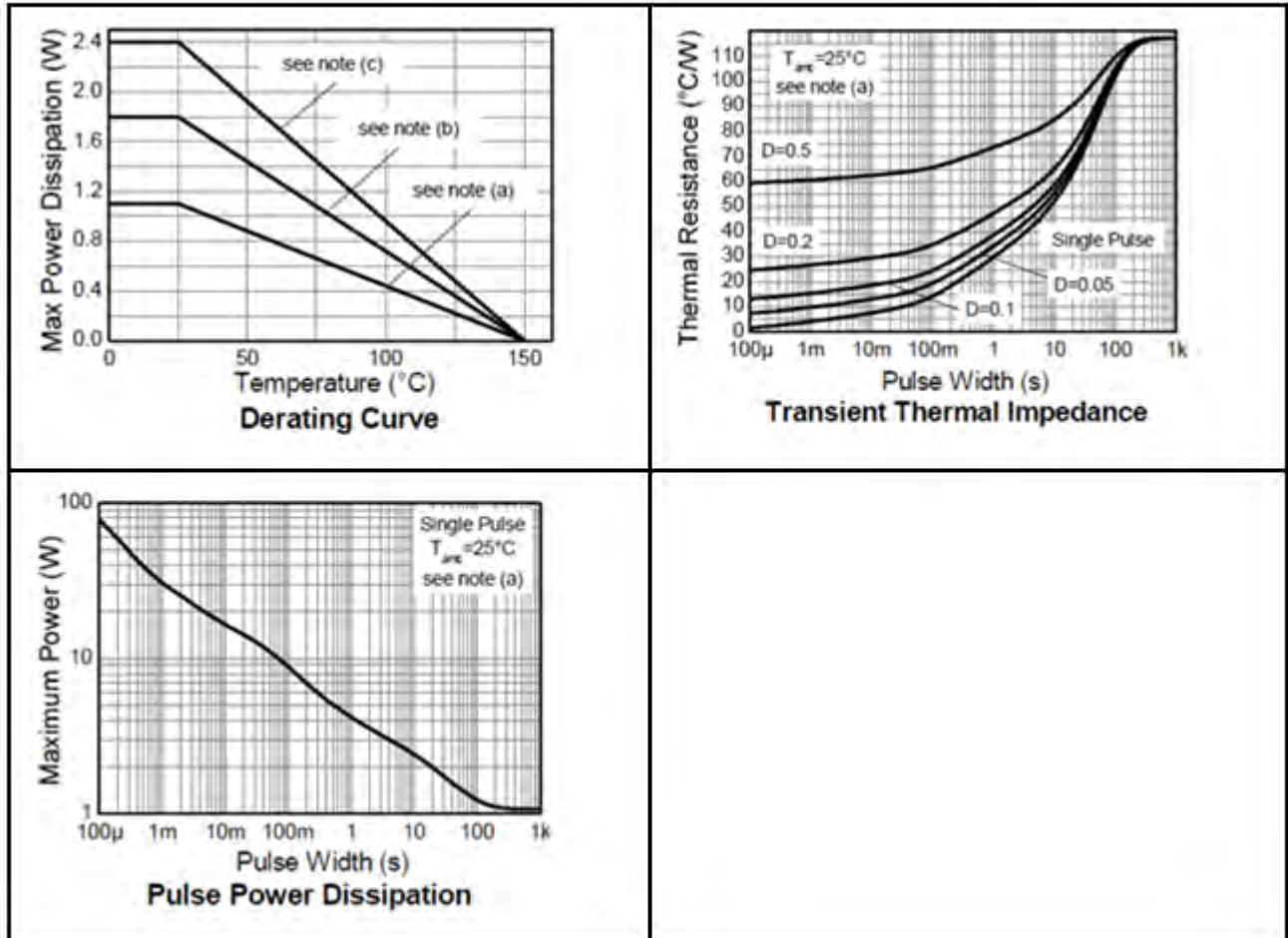
| Characteristic   | Symbol          | Value         | Unit       |
|--|-----------------|---------------|------------|
| Power Dissipation at $T_A = 25^\circ\text{C}$ (Note a)<br>Linear derating factor | $P_D$           | 1.1<br>8.8    | W<br>mW/°C |
| Power Dissipation at $T_A = 25^\circ\text{C}$ (Note b)<br>Linear derating factor | $P_D$           | 1.8<br>14.4   | W<br>mW/°C |
| Power Dissipation at $T_A = 25^\circ\text{C}$ (Note c)<br>Linear derating factor | $P_D$           | 2.4<br>19.2   | W<br>mW/°C |
| Power Dissipation at $T_A = 25^\circ\text{C}$ (Note d)<br>Linear derating factor | $P_D$           | 4.46<br>35.7  | W<br>mW/°C |
| Power Dissipation at $T_A = 25^\circ\text{C}$ (Note e)<br>Linear derating factor | $P_D$           | 38.7<br>309.6 | W<br>mW/°C |
| Junction to Ambient (Note a)   | $R_{\theta JA}$ | 117           | °C/W       |
| Junction to Ambient (Note b)   | $R_{\theta JA}$ | 68            | °C/W       |
| Junction to Ambient (Note c)   | $R_{\theta JA}$ | 51            | °C/W       |
| Junction to Ambient (Note d)   | $R_{\theta JA}$ | 28            | °C/W       |
| Junction to Lead (Note e)  | $R_{\theta JL}$ | 3.23          | °C/W       |
| Operating and Storage Temperature Range  | $T_J, T_{STG}$  | -55 to +150   | °C         |

- Notes:
- For a device surface mounted on 15mm X 15mm X 1.6mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions
  - Mounted on 25mm X 25mm X 1.6mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions.
  - Mounted on 25mm X 25mm X 1.6mm FR4 PCB with high coverage of single sided 2 oz copper, in still air conditions.
  - As (c) above measured at  $t < 5$  seconds
  - Junction to lead from collector Tab. Typical

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**Thermal Characteristics and Derating information**



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**Electrical Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

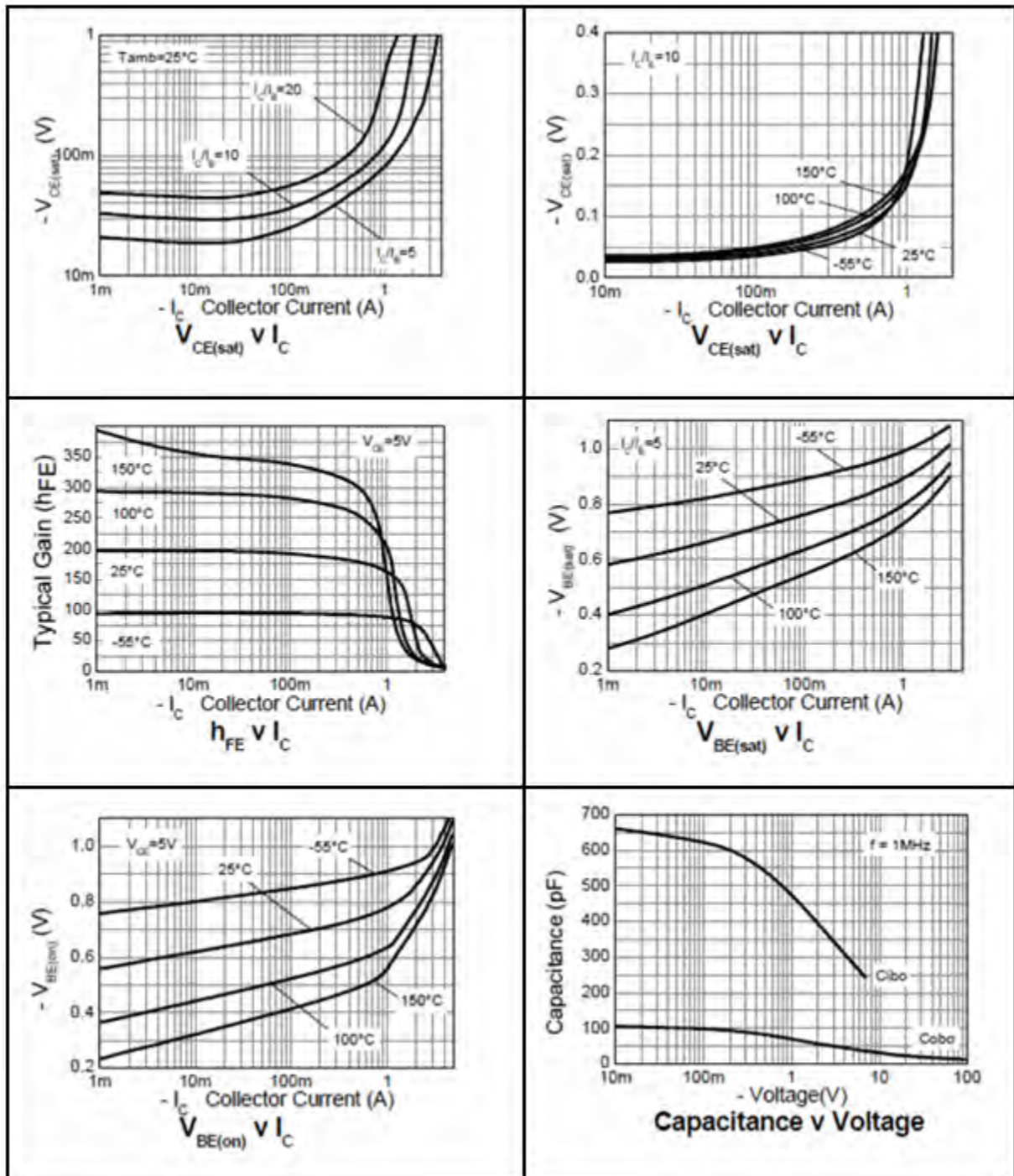
| Characteristic                                 | Symbol        | Min              | Typ                         | Max                         | Unit                 | Test Condition   |
|--|---------------|------------------|-----------------------------|-----------------------------|----------------------|--|
| Collector-Base Breakdown Voltage               | $V_{(BR)CBO}$ | -220             | -245                        |                             | V                    | $I_C = -100\mu\text{A}$  |
| Collector-Emitter Breakdown Voltage            | $V_{(BR)CER}$ | -220             | -245                        |                             | V                    | $I_C = -1\mu\text{A}$ , $R_{BE} \leq 1\text{k}\Omega$  |
| Collector-Emitter Breakdown Voltage (Note f)   | $V_{(BR)CEO}$ | -220             | -225                        |                             | V                    | $I_C = -10\text{mA}$   |
| Emitter-Base Breakdown Voltage                 | $V_{(BR)EBO}$ | -7               | -8.4                        |                             | V                    | $I_E = -100\mu\text{A}$  |
| Collector-Base Cutoff Current                  | $I_{CBO}$     |                  | <1                          | -50<br>-0.5                 | nA<br>$\mu\text{A}$  | $V_{CB} = -200\text{V}$<br>$V_{CB} = -200\text{V}$ , $T_{amb} = 100^\circ\text{C}$   |
| Emitter Cutoff Current                         | $I_{EBO}$     |                  | <1                          | -10                         | nA                   | $V_{EB} = -6\text{V}$  |
| Static Forward Current Transfer Ratio (Note f) | $h_{FE}$      | 100<br>100<br>20 | 195<br>179<br>50<br>5       | 300                         |                      | $I_C = -10\text{mA}$ , $V_{CE} = -5\text{V}$<br>$I_C = -1\text{A}$ , $V_{CE} = -5\text{V}$<br>$I_C = -2\text{A}$ , $V_{CE} = -5\text{V}$<br>$I_C = -5\text{A}$ , $V_{CE} = -5\text{V}$   |
| Collector-Emitter Saturation Voltage (Note f)  | $V_{CE(sat)}$ |                  | -37<br>-120<br>-130<br>-160 | -50<br>-155<br>-160<br>-260 | mV<br>mV<br>mV<br>mV | $I_C = -100\text{mA}$ , $I_B = -10\text{mA}$<br>$I_C = -500\text{mA}$ , $I_B = -25\text{mA}$<br>$I_C = -1\text{A}$ , $I_B = -100\text{mA}$<br>$I_C = -2\text{A}$ , $I_B = -400\text{mA}$ |
| Base-Emitter Saturation Voltage (Note f)       | $V_{BE(sat)}$ |                  | -940                        | -1100                       | mV                   | $I_C = -2\text{A}$ , $I_B = -400\text{mA}$   |
| Base-Emitter Turn-On Voltage (Note f)          | $V_{BE(ON)}$  |                  | -840                        | -1000                       | mV                   | $I_C = -2\text{A}$ , $V_{CE} = -5\text{V}$   |
| Output Capacitance (Note f)                    | $C_{obo}$     |                  | 31                          |                             | pF                   | $V_{CB} = -10\text{V}$ , $f = 1\text{MHz}$   |
| Transition Frequency                           | $f_T$         |                  | 105                         |                             | MHz                  | $V_{CE} = -10\text{V}$ , $I_C = -100\text{mA}$<br>$f = 50\text{MHz}$   |
| Delay Time                                     | $t_d$         |                  | 21                          |                             | ns                   | $V_{CC} = -50\text{V}$ , $I_C = -1\text{A}$<br>$I_{B1} = -I_{B2} = -100\text{mA}$  |
| Rise Time                                      | $t_r$         |                  | 18                          |                             | ns                   |  |
| Storage Time                                   | $T_s$         |                  | 680                         |                             | ns                   |  |
| Fall Time                                      | $T_f$         |                  | 75                          |                             | ns                   |  |

Notes: f. Measured under pulsed conditions. Pulse width = 300  $\mu\text{s}$ . Duty cycle  $\leq 2\%$

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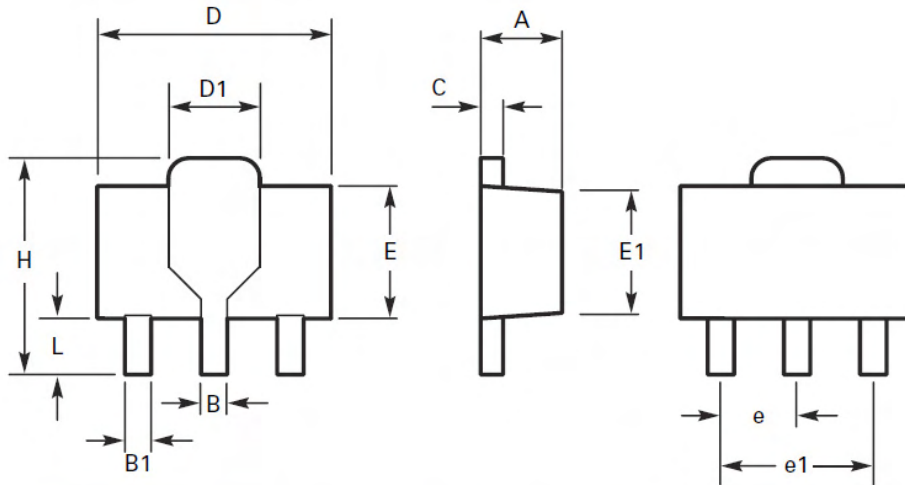
**Typical Characteristics**



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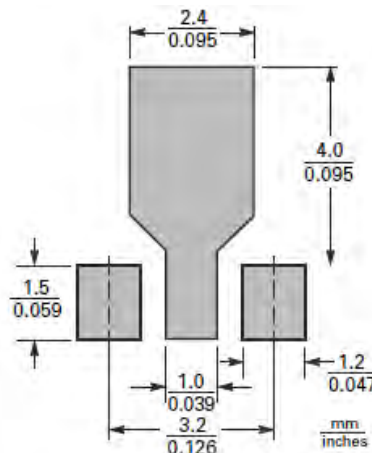
**Package Outline Dimensions**



| DIM | Millimeters |      | Inches |       | DIM | Millimeters |      | Inches    |       |
|-----|-------------|------|--------|-------|-----|-------------|------|-----------|-------|
|     | Min         | Max  | Min    | Max   |     | Min         | Max  | Min       | Max   |
| A   | 1.40        | 1.60 | 0.550  | 0.630 | E   | 2.29        | 2.60 | 0.090     | 0.102 |
| B   | 0.44        | 0.56 | 0.017  | 0.022 | E1  | 2.13        | 2.29 | 0.084     | 0.090 |
| B1  | 0.36        | 0.48 | 0.014  | 0.019 | e   | 1.50 BSC    |      | 0.059 BSC |       |
| C   | 0.35        | 0.44 | 0.014  | 0.017 | e1  | 3.00 BSC    |      | 0.118 BSC |       |
| D   | 4.40        | 4.60 | 0.173  | 0.181 | H   | 3.94        | 4.25 | 0.155     | 0.167 |
| D1  | 1.52        | 1.83 | 0.064  | 0.072 | L   | 0.89        | 1.20 | 0.035     | 0.047 |

Note: Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

**Suggested Pad Layout**





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