

ZTX1049A

### 25V NPN MEDIUM POWER TRANSISTOR IN E-LINE

### **Features**

- BV<sub>CEO</sub> > 25V
- I<sub>C</sub> = 4A High Continuous Collector Current
- I<sub>CM</sub> = 20A Peak Pulse Current
- T<sub>J</sub> up to 200°C for High Temperature Operation
- Low Saturation Voltage < 75mV @ 1A</li>
- P<sub>D</sub> = 1W Power dissipation
- Lead-Free Finish; RoHS compliant (Note 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

# **Applications**

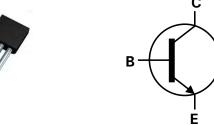
- LCD Backlight Converters
- · Emergency Lighting
- DC-DC Converters

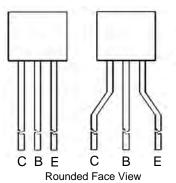
### **Mechanical Data**

- Case: E-Line (TO-92 Compatible)
- Case Material: molded plastic, "Green" Molding Compound
- UL Flammability Classification Rating 94V-0
- Terminals: Finish Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.159 grams (approximate)



E-Line





C B E Ejection Mark on Flat Face

Part Mark on

Rounded Face

Flat Face View

Device Symbol

Pin-Out Configuration

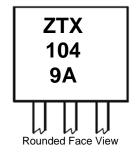
### **Ordering Information** (Note 4)

| Part Number | Marking  | Case   | Leads    | Quantity                 |
|-------------|----------|--------|----------|--------------------------|
| ZTX1049ASTZ | ZTX1049A | E-Line | Joggled  | 2,000 taped per Ammo Box |
| ZTX1049A    | ZTX1049A | E-Line | Straight | 4,000 loose in a Box     |

Notes:

- 1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
- See 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**



ZTX1049A = Product type Marking Code





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

| Characteristic               | Symbol           | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage       | $V_{CBO}$        | 80    | V    |
| Collector-Emitter Voltage    | V <sub>CEO</sub> | 25    | V    |
| Emitter-Base Voltage         | $V_{EBO}$        | 5     | V    |
| Continuous Collector Current | Ic               | 4     | Α    |
| Peak Pulse Current           | I <sub>CM</sub>  | 20    | Α    |
| 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    |
| Power Dissipation (Note 6)                      | P <sub>D</sub>                    | 1           | W    |
| Thermal Resistance Junction to Ambient (Note 5) | $R_{	heta JA}$                    | 116         | °C/W |
| Thermal Resistance Junction to Ambient (Note 6) | $R_{	heta JA}$                    | 175         | °C/W |
| Thermal Resistance Junction to Lead (Note 7)    | $R_{	heta JL}$                    | 63.75       | °C/W |
| Operating and Storage Temperature Range         | T <sub>J</sub> , T <sub>STG</sub> | -55 to +200 | °C   |

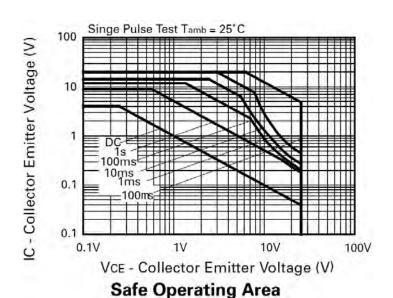
### ESD Ratings (Note 8)

| 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    | С           |

Notes:

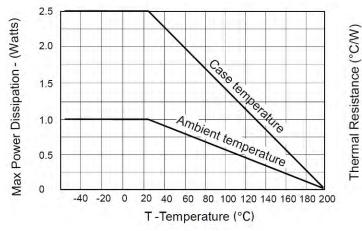
- 5. For a through-hole device mounted at the seating plane (2.5mm lead length) with the collector lead on 25mm X 25mm 1oz weight copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
- 6. Same as note (5), except the device is mounted on minimum recommended pad layout with 12mm lead length from the bottom of package to the board.
- 7. Thermal resistance from junction to solder-point at the seating plane (2.5mm from the bottom of package along the collector lead).
- 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

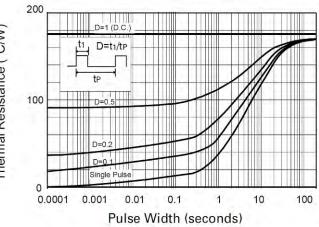
## Thermal Characteristics and Derating Information





ZTX1049A





**Derating curve** 

Maximum transient thermal impedance

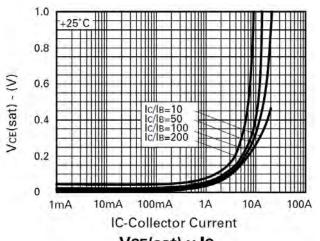
## **Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

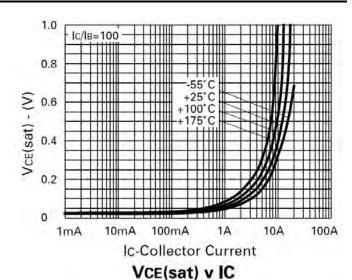
| Characteristic                                | Symbol               | Min                            | Тур                            | Max                    | Unit | Test Condition   |
|---|----------------------|--------------------------------|--------------------------------|------------------------|------|--|
| Collector-Base Breakdown Voltage              | BV <sub>CBO</sub>    | 80                             | 120                            | _                      | V    | $I_{C} = 100 \mu A$  |
| Collector-Emitter Breakdown Voltage           | BV <sub>CES</sub>    | 80                             | 120                            | _                      | V    | $I_{C} = 100 \mu A$  |
| Collector-Emitter Breakdown Voltage (Note 9)  | BV <sub>CEO</sub>    | 25                             | 30                             | _                      | V    | I <sub>C</sub> = 10mA  |
| Collector-Emitter Breakdown Voltage           | BV <sub>CEV</sub>    | 80                             | 120                            | _                      | V    | $I_C = 100 \mu A, V_{EB} = 1 V$  |
| Emitter-Base Breakdown Voltage                | BV <sub>EBO</sub>    | 5                              | 8.75                           | _                      | V    | $I_{E} = 100 \mu A$  |
| Collector Cut-off Current                     | I <sub>CBO</sub>     | _                              | 0.3                            | 10                     | nA   | V <sub>CB</sub> = 50V  |
| Collector Emitter Cut-off Current             | I <sub>CES</sub>     | _                              | 0.3                            | 10                     | nA   | V <sub>CES</sub> = 50V   |
| Emitter Cut-off Current                       | I <sub>EBO</sub>     | _                              | 0.3                            | 10                     | nA   | $V_{EB} = 4V$  |
| Collector-Emitter Saturation Voltage (Note 9) | V <sub>CE(sat)</sub> | _                              | 30<br>60<br>125<br>155         | 45<br>80<br>180<br>220 | mV   | $I_C = 500$ mA, $I_B = 10$ mA<br>$I_C = 1$ A, $I_B = 10$ mA<br>$I_C = 2$ A, $I_B = 10$ mA<br>$I_C = 4$ A, $I_B = 50$ mA  |
| Base-Emitter Saturation Voltage (Note 9)      | V <sub>BE(sat)</sub> | _                              | 890                            | 950                    | mV   | I <sub>C</sub> =4A, I <sub>B</sub> = 50mA  |
| Base-Emitter Turn-On Voltage (Note 9)         | V <sub>BE(on)</sub>  | _                              | 820                            | 900                    | mV   | I <sub>C</sub> = 4A, V <sub>CE</sub> = 2V  |
| DC Current Gain (Note 9)                      | h <sub>FE</sub>      | 250<br>300<br>300<br>200<br>35 | 430<br>450<br>450<br>350<br>70 | <br>1200<br><br>       | _    | $\begin{split} & I_{C} = 10 \text{mA}, \ V_{CE} = 2 \text{V} \\ & I_{C} = 0.5 \text{A}, \ V_{CE} = 2 \text{V} \\ & I_{C} = 1 \text{A}, \ V_{CE} = 2 \text{V} \\ & I_{C} = 4 \text{A}, \ V_{CE} = 2 \text{V} \\ & I_{C} = 20 \text{A}, \ V_{CE} = 2 \text{V} \end{split}$ |
| Current Gain-Bandwidth Product (Note 9)       | f⊤                   | _                              | 180                            | _                      | MHz  | $V_{CE} = 10V, I_{C} = 50mA$<br>f = 50MHz  |
| Output Capacitance (Note 9)                   | $C_obo$              |                                | 45                             | 60                     | pF   | V <sub>CB</sub> = 10V. f = 1MHz  |
| Turn-On Times                                 | t <sub>on</sub>      | _                              | 125                            | _                      | ns   | I <sub>C</sub> = 4A, I <sub>B</sub> = 40mA, V <sub>CC</sub> = 10V  |
| Turn-Off Times                                | t <sub>off</sub>     | _                              | 380                            | _                      | ns   | $I_C = 4A$ , $I_B = 40mA$ , $V_{CC} = 10V$   |

Notes: 9. Measured under pulsed conditions. Pulse width  $\leq$  300  $\mu$ s. Duty cycle  $\leq$  2%

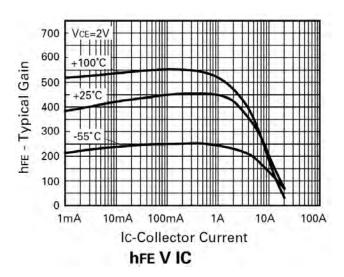


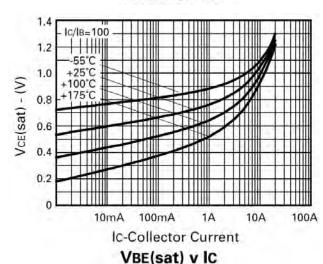
## Typical Electrical Characteristics (@TA = +25°C, unless otherwise specified.)

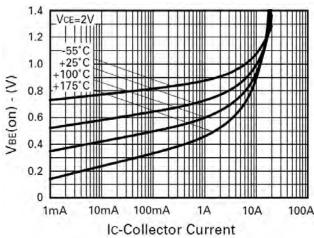








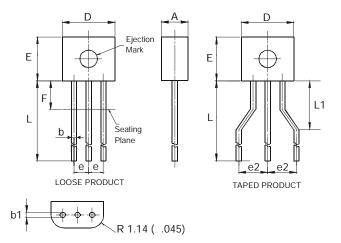






# **Package Outline Dimensions**

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



| E-Line |                      |       |      |  |  |
|--------|----------------------|-------|------|--|--|
| Dim    | Min                  | Max   | Тур  |  |  |
| Α      | 2.16                 | 2.41  | 1    |  |  |
| b      | 0.41                 | 0.495 | _    |  |  |
| b1     | 0.41                 | 0.495 | 1    |  |  |
| D      | 4.37                 | 4.77  | _    |  |  |
| Е      | 3.61                 | 4.01  | -    |  |  |
| е      | -                    | -     | 1.27 |  |  |
| e2     | _                    | _     | 2.54 |  |  |
| F      | _                    | 2.50  | _    |  |  |
| L      | 13.00                | 13.97 | _    |  |  |
| L1     | 2.50                 | 3.50  | -    |  |  |
| All    | All Dimensions in mm |       |      |  |  |





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