



**THE DATASHEET OF  
ZTX1049A**



**ZTX1049A**

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

**Features**

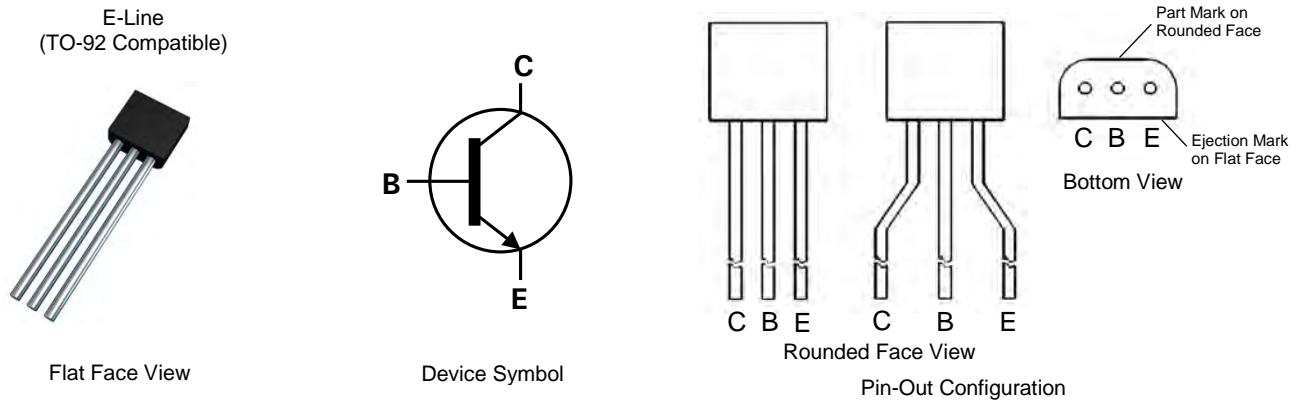
- $BV_{CEO} > 25V$
- $I_C = 4A$  High Continuous Collector Current
- $I_{CM} = 20A$  Peak Pulse Current
- $T_J$  up to  $200^{\circ}C$  for High Temperature Operation
- Low Saturation Voltage  $< 75mV @ 1A$
- $P_D = 1W$  Power dissipation
- **Lead-Free Finish; RoHS compliant (Note 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**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
- Weight: 0.159 grams (approximate)

**Applications**

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

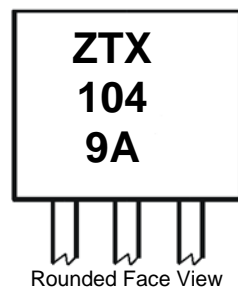


**Ordering Information (Note 4)**

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.
  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**



ZTX1049A = 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>	80	V
Collector-Emitter Voltage	V <sub>CEO</sub>	25	V
Emitter-Base Voltage	V <sub>EBO</sub>	5	V
Continuous Collector Current	I <sub>C</sub>	4	A
Peak Pulse Current	I <sub>CM</sub>	20	A
Base Current	I <sub>B</sub>	500	mA

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

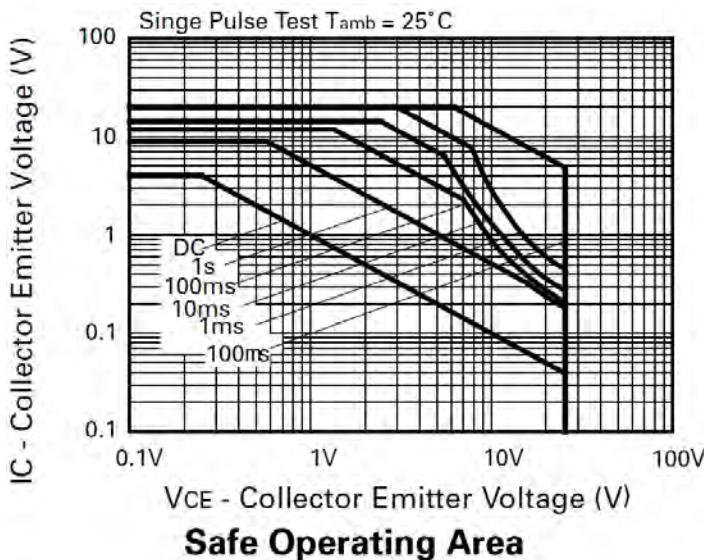
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	1.5	W
Power Dissipation (Note 6)	P <sub>D</sub>	1	W
Thermal Resistance Junction to Ambient (Note 5)	R <sub>θJA</sub>	116	°C/W
Thermal Resistance Junction to Ambient (Note 6)	R <sub>θJA</sub>	175	°C/W
Thermal Resistance Junction to Lead (Note 7)	R <sub>θJL</sub>	63.75	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +200	°C

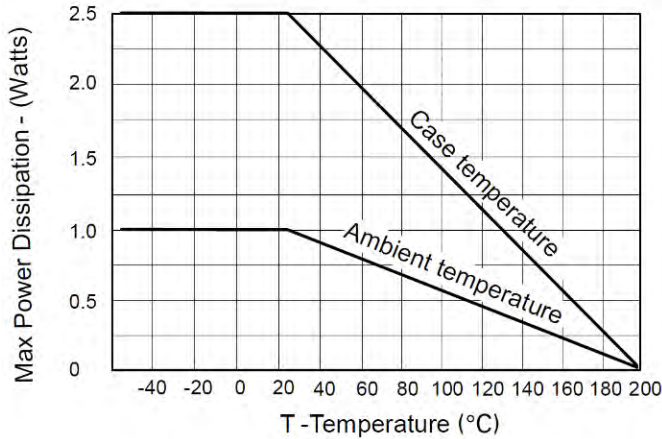
**ESD Ratings** (Note 8)

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	C

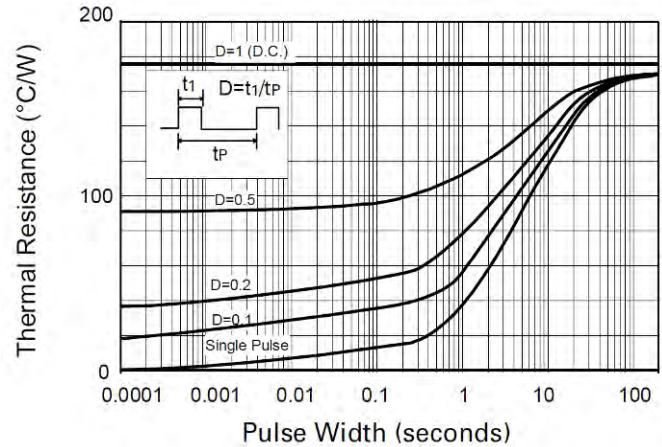
- Notes:
- For a through-hole device mounted at the seating plane (2.5mm lead length) with the collector lead on 25mm X 25mm 1oz weight copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  - Same as note (5), except the device is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

**Thermal Characteristics and Derating Information**





**Derating curve**



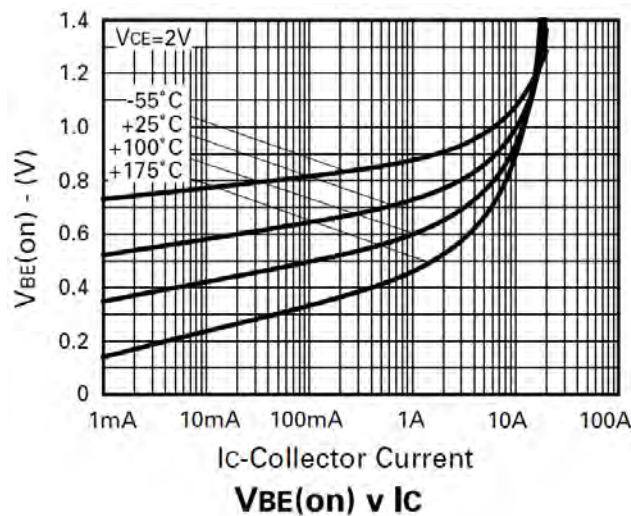
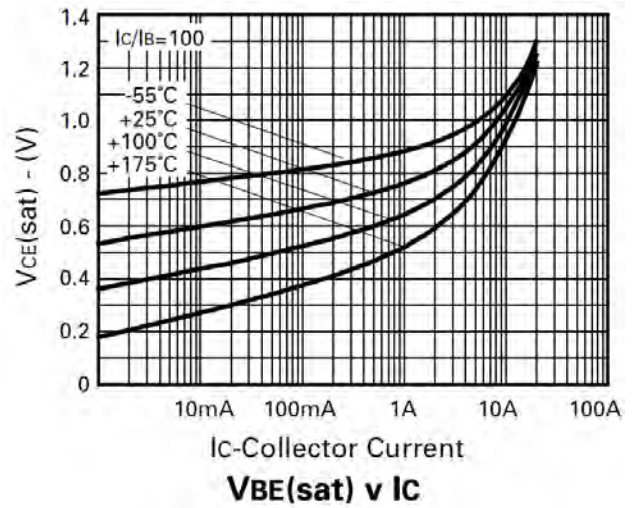
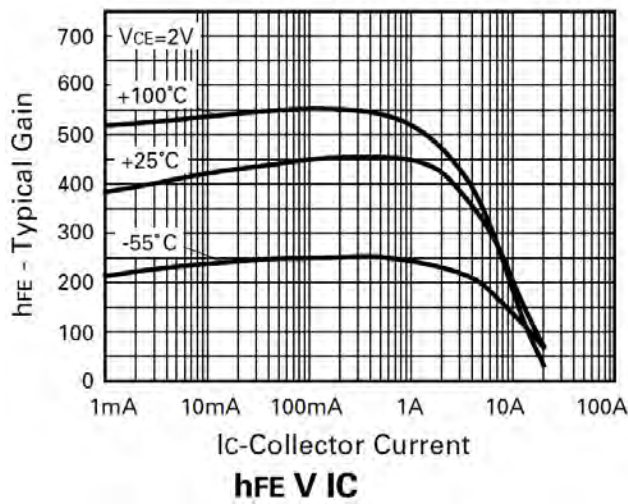
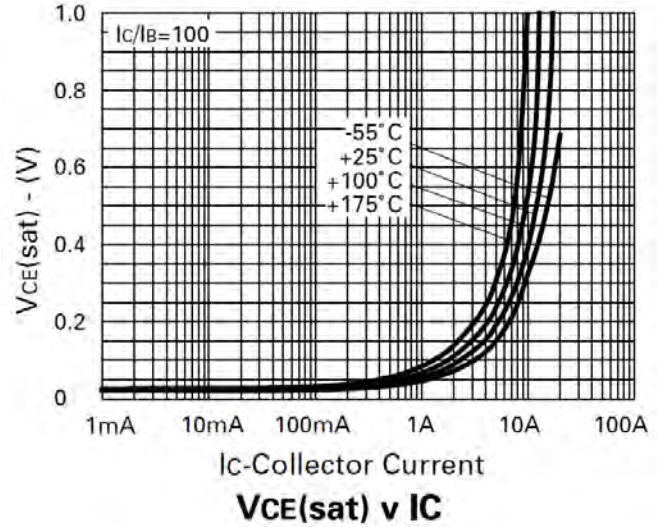
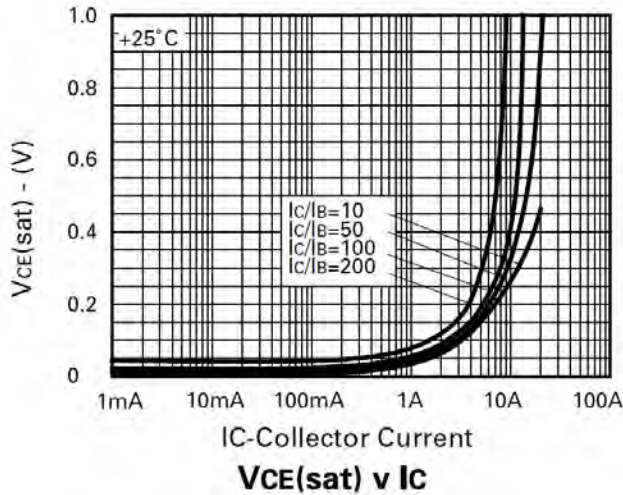
**Maximum transient thermal impedance**

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	80	120	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$BV_{CES}$	80	120	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 9)	$BV_{CEO}$	25	30	—	V	$I_C = 10\text{mA}$
Collector-Emitter Breakdown Voltage	$BV_{CEV}$	80	120	—	V	$I_C = 100\mu\text{A}, V_{EB} = 1\text{V}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	5	8.75	—	V	$I_E = 100\mu\text{A}$
Collector Cut-off Current	$I_{CBO}$	—	0.3	10	nA	$V_{CB} = 50\text{V}$
Collector Emitter Cut-off Current	$I_{CES}$	—	0.3	10	nA	$V_{CES} = 50\text{V}$
Emitter Cut-off Current	$I_{EBO}$	—	0.3	10	nA	$V_{EB} = 4\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	—	30 60 125 155	45 80 180 220	mV	$I_C = 500\text{mA}, I_B = 10\text{mA}$ $I_C = 1\text{A}, I_B = 10\text{mA}$ $I_C = 2\text{A}, I_B = 10\text{mA}$ $I_C = 4\text{A}, I_B = 50\text{mA}$
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	—	890	950	mV	$I_C = 4\text{A}, I_B = 50\text{mA}$
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(on)}$	—	820	900	mV	$I_C = 4\text{A}, V_{CE} = 2\text{V}$
DC Current Gain (Note 9)	$h_{FE}$	250 300 300 200 35	430 450 450 350 70	— — 1200 — —	—	$I_C = 10\text{mA}, V_{CE} = 2\text{V}$ $I_C = 0.5\text{A}, V_{CE} = 2\text{V}$ $I_C = 1\text{A}, V_{CE} = 2\text{V}$ $I_C = 4\text{A}, V_{CE} = 2\text{V}$ $I_C = 20\text{A}, V_{CE} = 2\text{V}$
Current Gain-Bandwidth Product (Note 9)	$f_T$	—	180	—	MHz	$V_{CE} = 10\text{V}, I_C = 50\text{mA}$ $f = 50\text{MHz}$
Output Capacitance (Note 9)	$C_{obo}$	—	45	60	pF	$V_{CB} = 10\text{V}, f = 1\text{MHz}$
Turn-On Times	$t_{on}$	—	125	—	ns	$I_C = 4\text{A}, I_B = 40\text{mA}, V_{CC} = 10\text{V}$
Turn-Off Times	$t_{off}$	—	380	—	ns	$I_C = 4\text{A}, I_B = 40\text{mA}, V_{CC} = 10\text{V}$

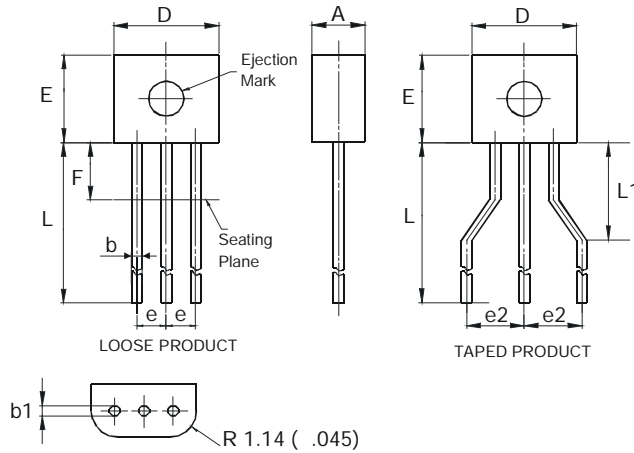
Notes: 9. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$

**Typical Electrical Characteristics** (@T<sub>A</sub> = +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	Typ
A	2.16	2.41	-
b	0.41	0.495	-
b1	0.41	0.495	-
D	4.37	4.77	-
E	3.61	4.01	-
e	-	-	1.27
e2	-	-	2.54
F	-	2.50	-
L	13.00	13.97	-
L1	2.50	3.50	-
<b>All Dimensions in mm</b>			

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