

ZTX415STZ Datasheet

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DiGi Electronics Part Number	ZTX415STZ-DG
Manufacturer	Diodes Incorporated
Manufacturer Product Number	ZTX415STZ
Description	TRANS NPN 100V 0.5A E-LINE
Detailed Description	Bipolar (BJT) Transistor NPN - Avalanche Mode 100 V 500 mA 40MHz 680 mW Through Hole E-Line (TO-92 compatible)



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Purchase and inquiry

Manufacturer Product Number:

ZTX415STZ

Series:

-

Transistor Type:

NPN - Avalanche Mode

Voltage - Collector Emitter Breakdown (Max):

100 V

Current - Collector Cutoff (Max):

100nA (ICBO)

Power - Max:

680 mW

Operating Temperature:

-55°C ~ 175°C (TJ)

Package / Case:

E-Line-3, Formed Leads

Base Product Number:

ZTX415

Manufacturer:

Diodes Incorporated

Product Status:

Active

Current - Collector (Ic) (Max):

500 mA

Vce Saturation (Max) @ Ib, Ic:

500mV @ 1mA, 10mA

DC Current Gain (hFE) (Min) @ Ic, Vce:

25 @ 10mA, 10V

Frequency - Transition:

40MHz

Mounting Type:

Through Hole

Supplier Device Package:

E-Line (TO-92 compatible)

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.21.0095

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

**ZTX415****NPN SILICON PLANAR MEDIUM POWER TRANSISTOR****Features**

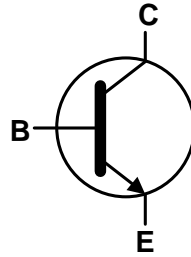
- Avalanche Transistor
- 60A Peak Avalanche Current (Pulse Width = 20ns)
- $BV_{CES} > 260V$
- $BV_{CEO} > 100V$
- Specifically Designed for Avalanche Mode Operation
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

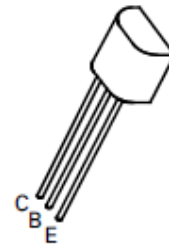
- Case: E-Line
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 e3
- Weight: 159mg (Approximate)



E-Line

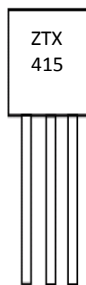


Device Symbol

Top View
Pin-Out**Ordering Information** (Note 4)

Part Number	Compliance	Marking	Quantity
ZTX415	Standard	ZTX415	4000 Bulk
ZTX415STZ	Standard	ZTX415	2000 Taped

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information

ZTX 415 = Product Type Marking Code



ZTX415

Absolute Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	260	V
Collector-Emitter Voltage	V_{CES}	260	V
Collector-Emitter Voltage	V_{CEO}	100	V
Emitter-Base Voltage	V_{EBO}	6	V
Continuous Collector Current	I_C	500	mA
Peak Collector Current (Pulse Width = 20ns)	I_{CM}	60	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation	P_D	680	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	250	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Lead	$R_{\theta JL}$	197	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

ESD Ratings (Note 7)

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 device mounted with the collector lead on 15mm x 15mm 1oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 - Thermal resistance from junction to solder-point (at the end of the collector lead).
 - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

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

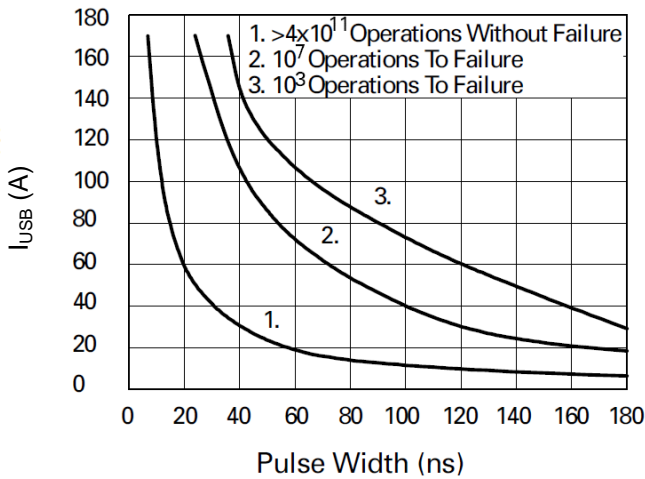
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Emitter Breakdown Voltage	BV_{CES}	260	—	—	V	$I_C = 1\text{mA}$ $T_J = -55$ to $+150^\circ\text{C}$
Collector-Emitter Breakdown Voltage (Note 8)	BV_{CEO}	100	—	—	V	$I_C = 100\mu\text{A}$
Emitter-Base Breakdown Voltage	BV_{EBO}	6	—	—	V	$I_E = 100\mu\text{A}$
Collector Cutoff Current	I_{CBO}	—	—	100 10	nA μA	$V_{CB} = 180\text{V}$ $V_{CB} = 180\text{V}, T_J = +100^\circ\text{C}$
Emitter Cutoff Current	I_{EBO}	—	—	100	nA	$V_{EB} = 4\text{V}$
Static Forward Current Transfer Ratio (Note 8)	h_{FE}	25	—	—	—	$I_C = 10\text{mA}, V_{CE} = 10\text{V}$
Collector-Emitter Saturation Voltage (Note 8)	$V_{CE(sat)}$	—	—	500	mV	$I_C = 10\text{mA}, I_B = 1\text{mA}$
Base-Emitter Saturation Voltage (Note 8)	$V_{BE(sat)}$	—	—	900	mV	$I_C = 10\text{mA}, I_B = 1\text{mA}$
Pulsed Current in Second Breakdown	I_{USB}	—	25 35	—	A	$V_C = 200\text{V}, C_{CE} = 620\text{pF}$ $V_C = 250\text{V}, C_{CE} = 620\text{pF}$
Collector-Emitter inductance	L_{ce}	—	2.5	—	nH	Standard SOT23 Leads
Output Capacitance	C_{obo}	—	—	8	pF	$V_{CB} = 20\text{V}, I_E = 0$ $f = 100\text{MHz}$
Transition Frequency	f_T	40	—	—	MHz	$V_{CE} = 20\text{V}, I_C = 10\text{mA},$ $f = 20\text{MHz}$

- Note: 8. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

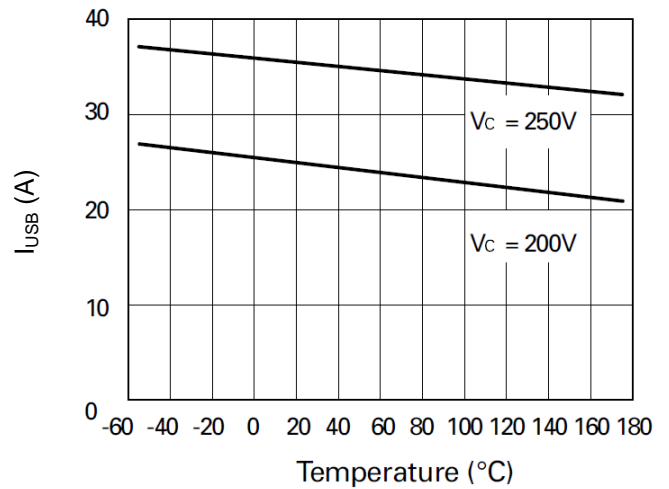


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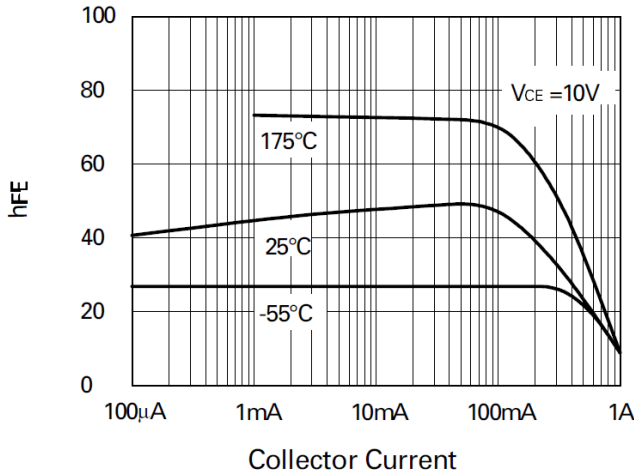
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



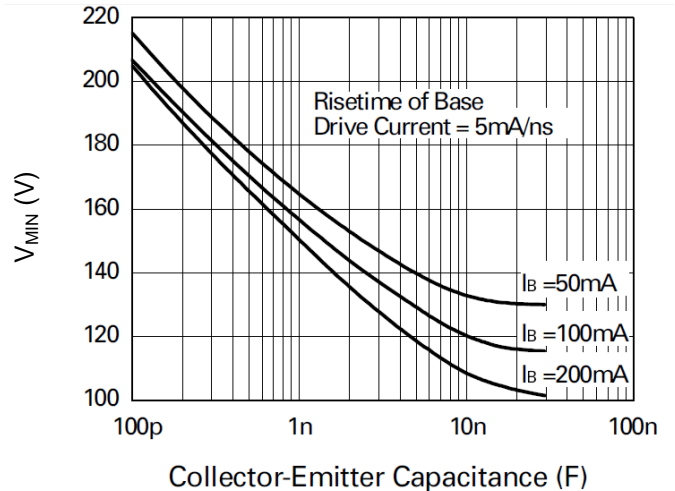
Maximum Avalanche Current v Pulse Width



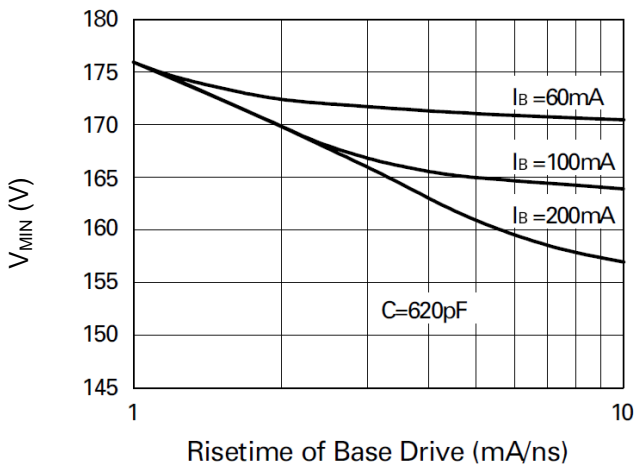
I_{USB} v Temperature for the specified conditions



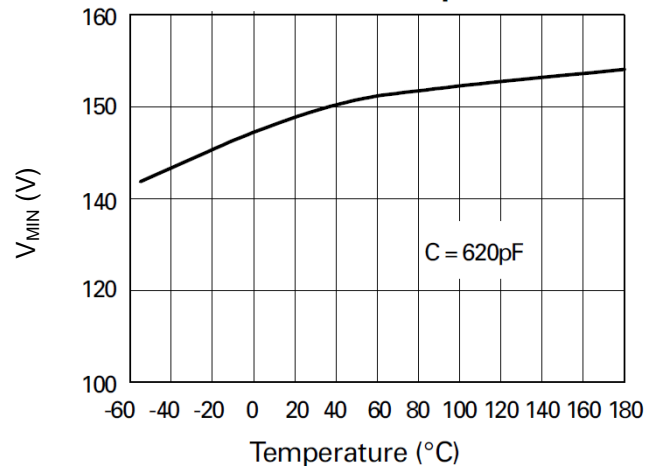
hFE v I_C



Minimum starting voltage as a function of capacitance



Minimum starting voltage as a function of drive current



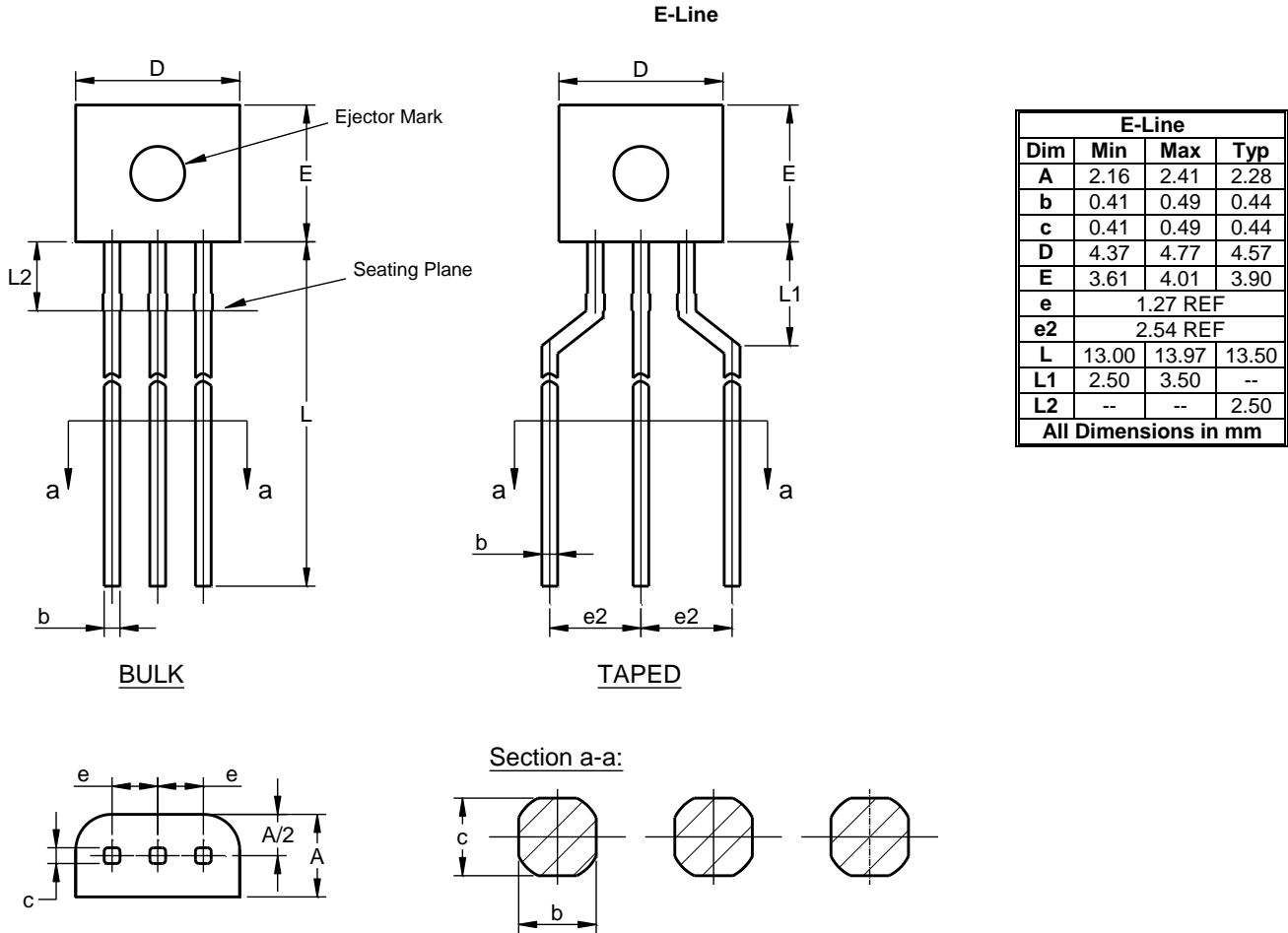
Minimum starting voltage as a function of temperature



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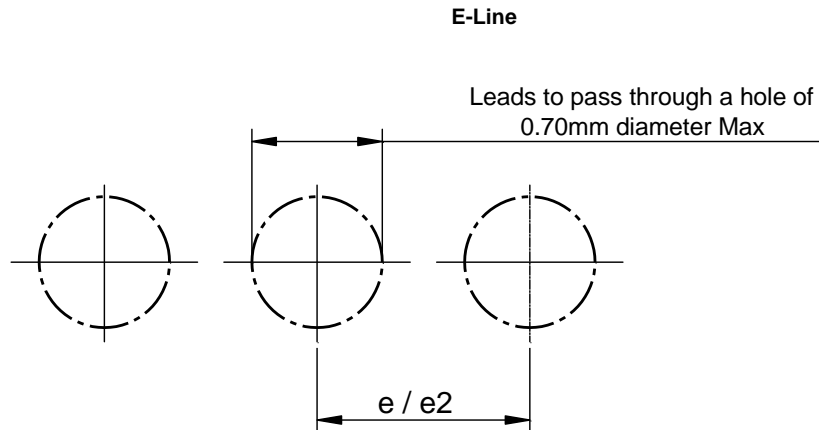
Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.



Suggested Pad Hole

Please see <http://www.diodes.com/package-outlines.html> for the latest version.





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