



THE DATASHEET OF ZTX415



NPN SILICON PLANAR MEDIUM POWER TRANSISTOR

Features

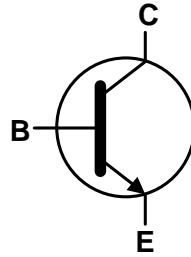
- Avalanche Transistor
- 60A Peak Avalanche Current (Pulse Width = 20ns)
- $BV_{CES} > 260V$
- $BV_{CEO} > 100V$
- Specifically Designed for Avalanche Mode Operation
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

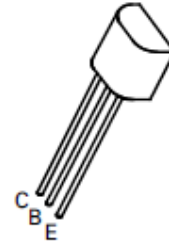
- Case: E-Line
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 ^{Ⓔ3}
- Weight: 159mg (Approximate)



E-Line



Device Symbol



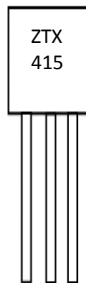
Top View
Pin-Out

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

Absolute Maximum Ratings (@T_A = +25°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°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P _D	680	mW
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	250	°C/W
Thermal Resistance, Junction to Lead (Note 6)	R _{θJL}	197	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°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

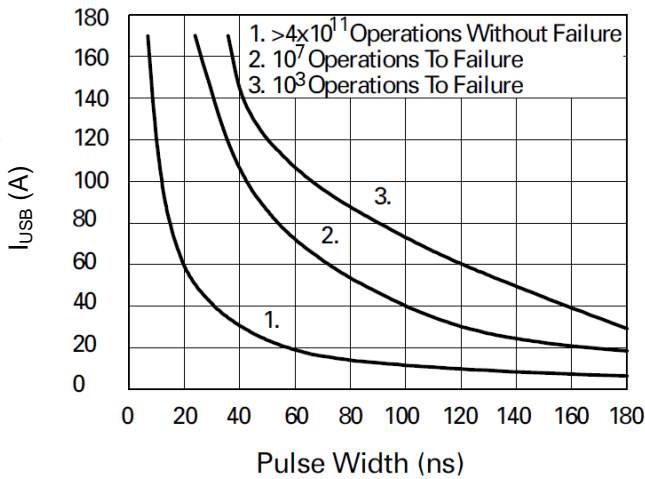
- Notes:
- For a device mounted with the collector lead on 15mm x 15mm 1oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 - Thermal resistance from junction to solder-point (at the end of the collector lead).
 - Refer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

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

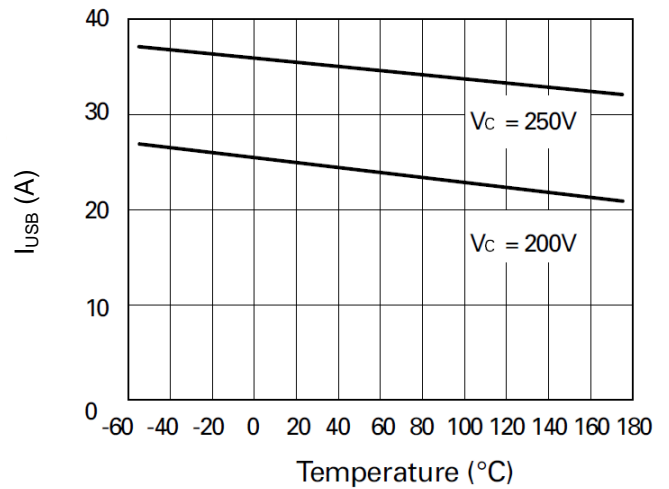
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Emitter Breakdown Voltage	BV _{CES}	260	—	—	V	I _C = 1mA T _J = -55 to +150°C
Collector-Emitter Breakdown Voltage (Note 8)	BV _{CEO}	100	—	—	V	I _C = 100μA
Emitter-Base Breakdown Voltage	BV _{EBO}	6	—	—	V	I _E = 100μA
Collector Cutoff Current	I _{CBO}	—	—	100 10	nA μA	V _{CB} = 180V V _{CB} = 180V, T _J = +100°C
Emitter Cutoff Current	I _{EBO}	—	—	100	nA	V _{EB} = 4V
Static Forward Current Transfer Ratio (Note 8)	h _{FE}	25	—	—	—	I _C = 10mA, V _{CE} = 10V
Collector-Emitter Saturation Voltage (Note 8)	V _{CE(sat)}	—	—	500	mV	I _C = 10mA, I _B = 1mA
Base-Emitter Saturation Voltage (Note 8)	V _{BE(sat)}	—	—	900	mV	I _C = 10mA, I _B = 1mA
Pulsed Current in Second Breakdown	I _{USB}	—	25 35	—	A	V _C = 200V, C _{CCE} = 620pF V _C = 250V, C _{CCE} = 620pF
Collector-Emitter inductance	L _{ce}	—	2.5	—	nH	Standard SOT23 Leads
Output Capacitance	C _{obo}	—	—	8	pF	V _{CB} = 20V, I _E = 0 f = 100MHz
Transition Frequency	f _T	40	—	—	MHz	V _{CE} = 20V, I _C = 10mA, f = 20MHz

- Note: 8. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

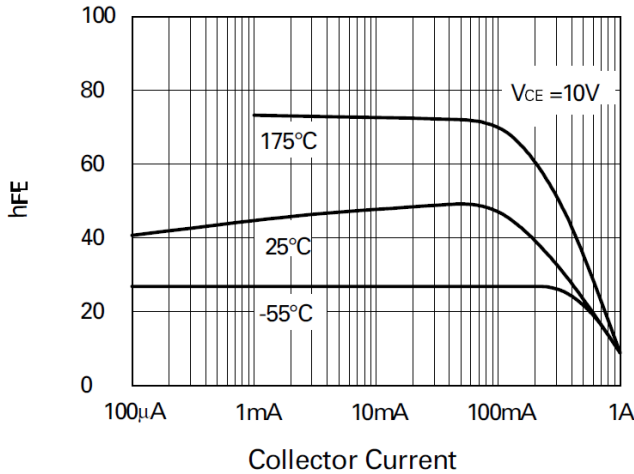
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



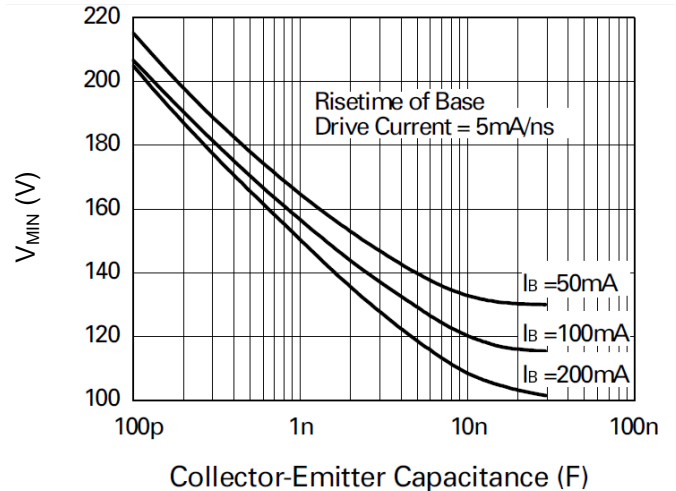
Maximum Avalanche Current v Pulse Width



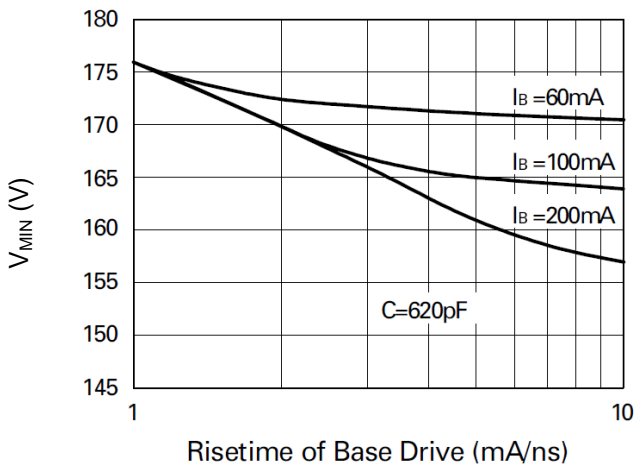
I_{USB} v Temperature for the specified conditions



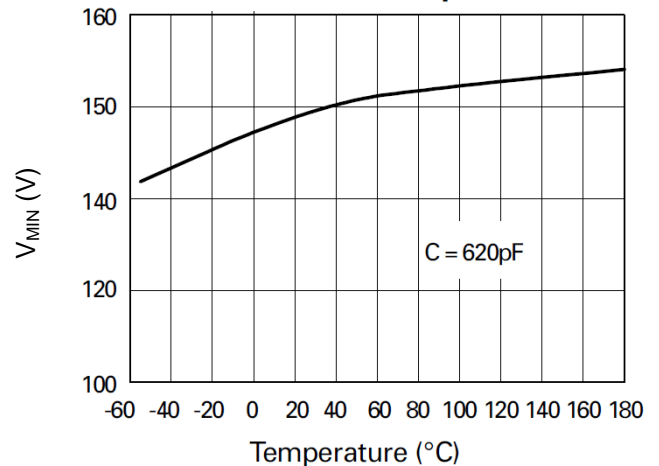
hFE v I_C



Minimum starting voltage as a function of capacitance



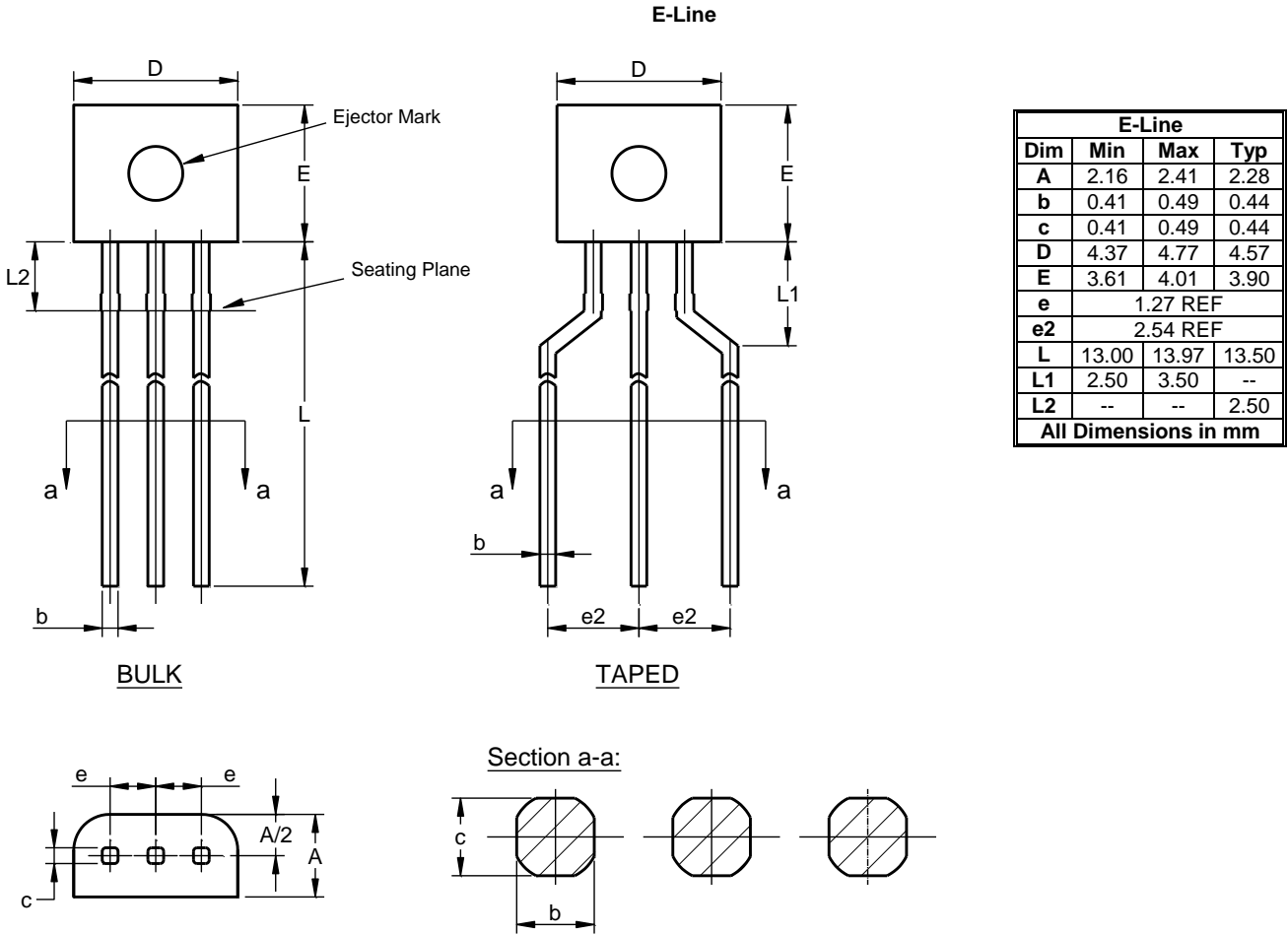
Minimum starting voltage as a function of drive current



Minimum starting voltage as a function of temperature

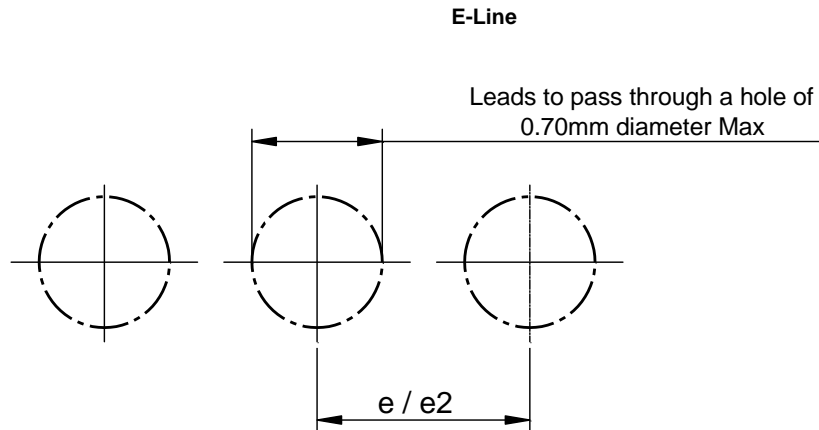
Package Outline Dimensions

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



Suggested Pad Hole

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