



**THE DATASHEET OF
ZXTN2010ZQTA**



Features

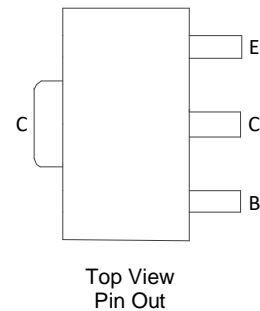
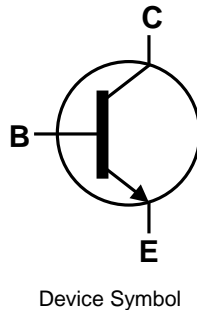
- $BV_{CEO} > 60V$
- $I_C = 5A$ High Continuous Current
- $R_{SAT} = 30m\Omega$ for a Low Equivalent On-Resistance
- Low Saturation Voltage $V_{CE(SAT)} < 65mV @ I_C = 1A$
- h_{FE} Specified Up to 10A for High Current Gain Hold Up
- Complementary PNP Type: ZXTP2012Z
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

Mechanical Data

- Package: SOT89
- Package 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 [Ⓔ]
- Weight: 0.05 grams (Approximate)

Application

- Emergency lighting circuits
- Motor driving (including DC fans)
- Backlight inverters
- Power switches
- Gate-driving MOSFETs and IGBTs

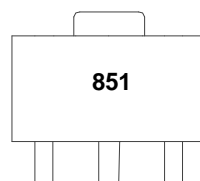


Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
ZXTN2010ZTA	SOT89	851	7	12	1,000	Reel
ZXTN2010Z-13R	SOT89	851	13	12	4,000	Reel

- 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



851 = Product Type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	150	V
Collector-Emitter Voltage	V _{CEO}	60	V
Emitter-Base Voltage	V _{EBO}	7	V
Base Current	I _B	2	A
Continuous Collector Current	I _C	5	A
Peak Pulse Current	I _{CM}	20	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P _D	1.5	W
Linear Derating Factor		12	mW/°C
Power Dissipation (Note 6)	P _D	2.1	W
Linear Derating Factor		16.8	mW/°C
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	83	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	60	°C/W
Thermal Resistance, Junction to Case (Note 5)	R _{θJC}	5.3	°C/W
Thermal Resistance, Junction to Leads (Note 7)	R _{θJL}	3.23	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°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:
5. For a device mounted with the exposed collector pad on 25mm x 25mm 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.
 6. Same as note (5), except the device is mounted on 50mm x 50mm 1oz copper.
 7. Thermal resistance from junction to solder-point (on the exposed collector pad).
 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

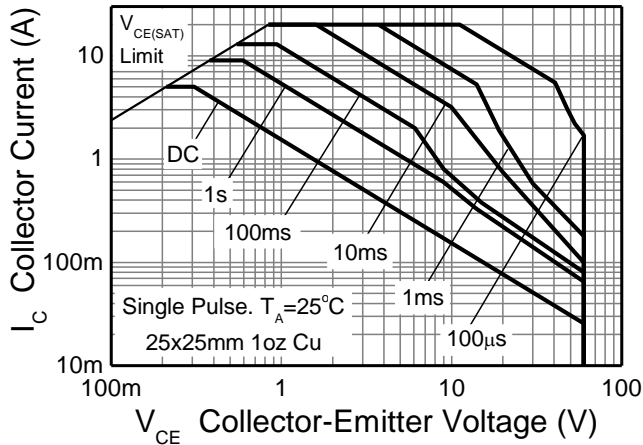


Fig 1. Safe Operating Area

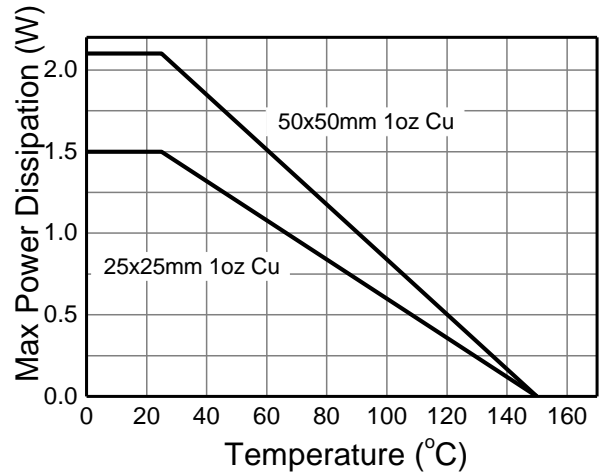


Fig 2. Derating Curve

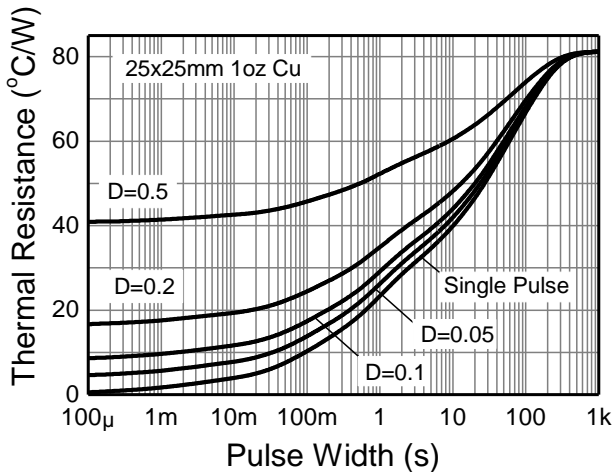


Fig 3. Transient Thermal Impedance

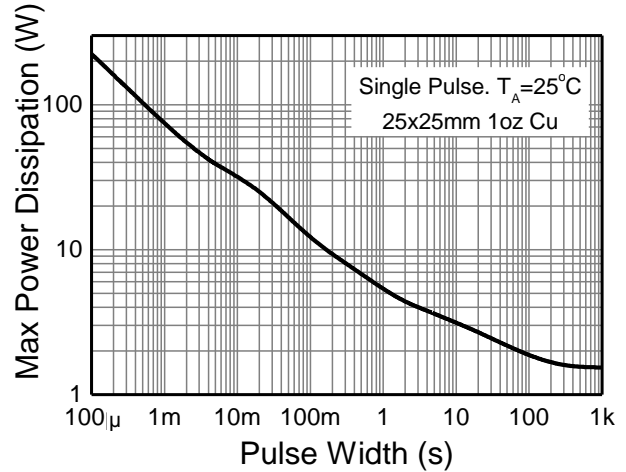


Fig 4. Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	150	190	—	V	I _C = 100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV _{CER}	150	190	—	V	I _C = 1μA, R _B ≤ 1kΩ
Collector-Emitter Breakdown Voltage (Note 9)	BV _{CEO}	60	80	—	V	I _C = 10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	7	8.1	—	V	I _E = 100μA
Collector Cutoff Current	I _{CBO}	—	< 1	50 500	nA nA	V _{CB} = 120V V _{CB} = 120V, T _A = +100°C
Collector Cutoff Current	I _{CER} R ≤ 1kΩ	—	< 1	100 500	nA nA	V _{CB} = 120V V _{CB} = 120V, T _A = +100°C
Emitter Cutoff Current	I _{EBO}	—	< 1	10	nA	V _{EB} = 6V
DC Current Transfer Static Ratio (Note 9)	h _{FE}	100	200	—	—	I _C = 10mA, V _{CE} = 1V
		100	200	300		I _C = 2A, V _{CE} = 1V
		55	105	—		I _C = 5A, V _{CE} = 1V
		20	40	—		I _C = 10A, V _{CE} = 1V
Collector-Emitter Saturation Voltage (Note 9)	V _{CE(sat)}	—	17	30	mV	I _C = 100mA, I _B = 5mA
		—	35	55		I _C = 1A, I _B = 100mA
		—	40	65		I _C = 1A, I _B = 50mA
		—	90	125		I _C = 2A, I _B = 50mA
		—	170	230		I _C = 6A, I _B = 300mA
Base-Emitter Saturation Voltage (Note 9)	V _{BE(sat)}	—	970	1100	mV	I _C = 6A, I _B = 300mA
Base-Emitter Turn-on Voltage (Note 9)	V _{BE(on)}	—	910	1050	mV	I _C = 6A, V _{CE} = 1V
Transitional Frequency	f _T	—	130	—	MHz	I _C = 100mA, V _{CE} = 10V, f = 50MHz
Output Capacitance	C _{OBO}	—	31	—	pF	V _{CB} = 10V, f = 1MHz,
Switching Time	t _{on}	—	42	—	ns	V _{CC} = 10V, I _C = 1A I _{B1} = -I _{B2} = 100mA
	t _{off}	—	760	—		

Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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

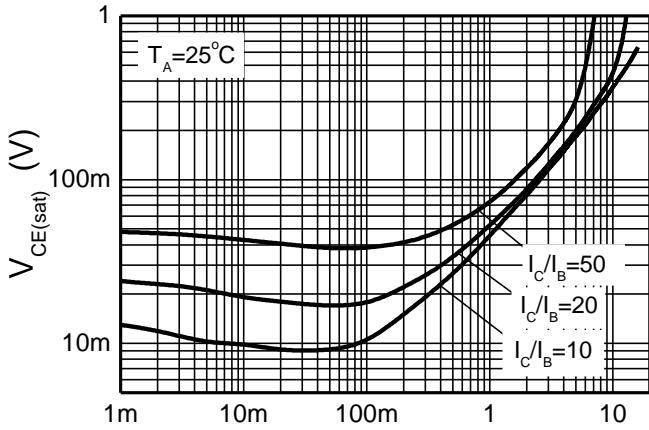


Fig 5. $V_{CE(sat)}$ v I_C

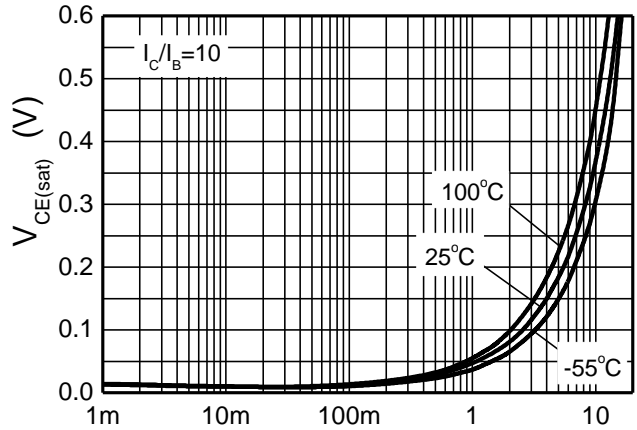


Fig 6. $V_{CE(sat)}$ v I_C

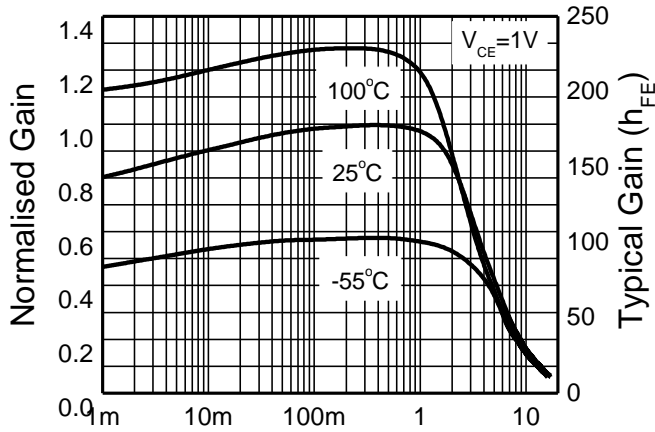


Fig 7. h_{FE} v I_C

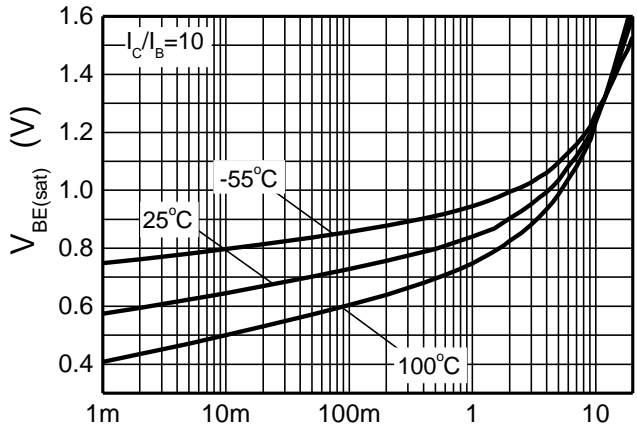


Fig 8. $V_{BE(sat)}$ v I_C

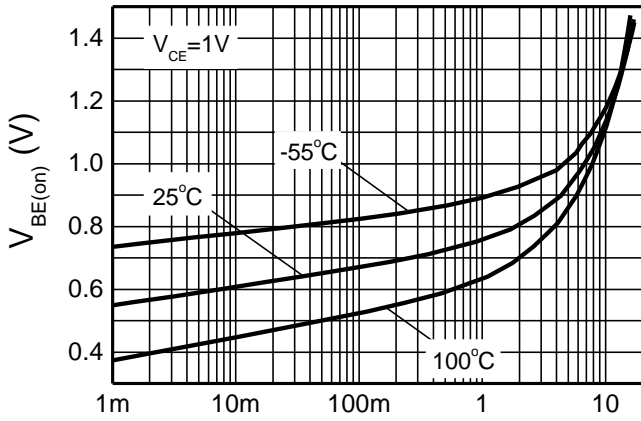
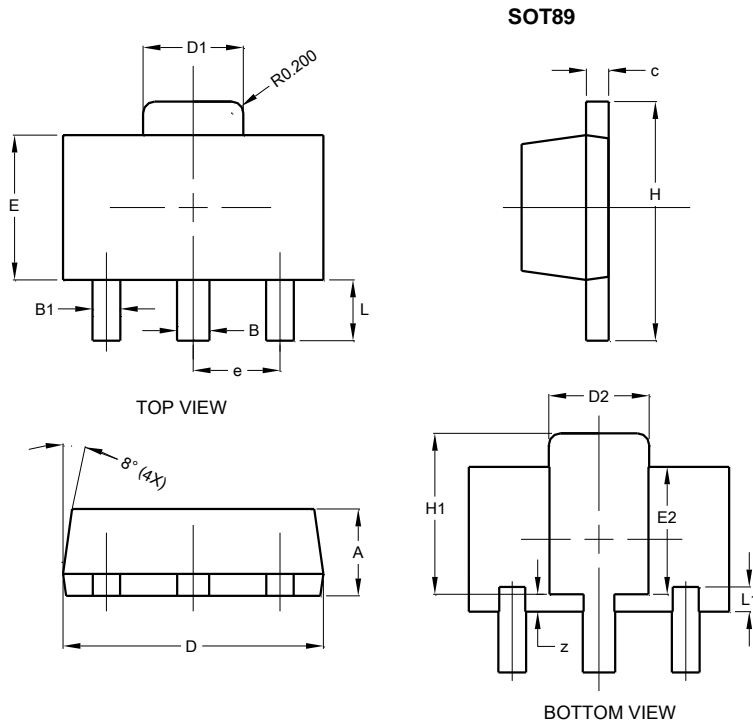


Fig 9. $V_{BE(on)}$ v I_C

Package Outline Dimensions

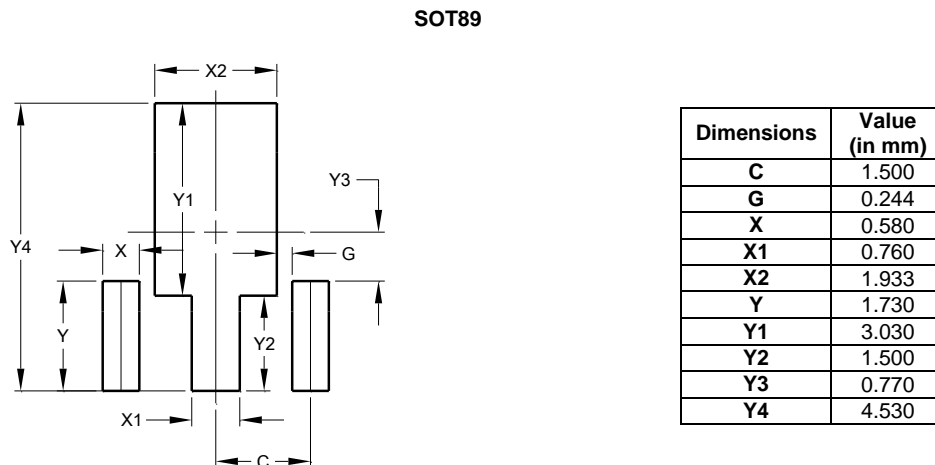
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in mm			

Suggested Pad Layout

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



Dimensions	Value (in mm)
C	1.500
G	0.244
X	0.580
X1	0.760
X2	1.933
Y	1.730
Y1	3.030
Y2	1.500
Y3	0.770
Y4	4.530

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