

## Features

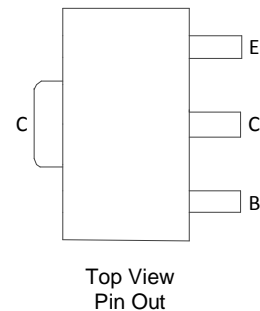
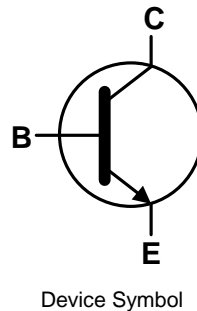
- $BV_{CE0} > 60V$
- $I_C = 5A$  High Continuous Current
- $R_{SAT} = 30m\Omega$  for a Low Equivalent On-Resistance
- Low Saturation Voltage  $V_{CE(SAT)} < 65mV @ I_C = 1A$
- $h_{FE}$  Specified Up to 10A for High Current Gain Hold Up
- Complementary PNP Type: ZXTN2012Z
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

## Mechanical Data

- Case: SOT89
- 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 208③
- Weight: 0.05 grams (Approximate)

## Application

- Emergency Lighting Circuits
- Motor Driving (Including DC Fans)
- Backlight Inverters
- Power Switches
- Gate Driving MOSFETs and IGBTs

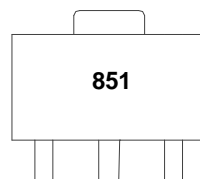


## Ordering Information (Note 5)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
ZXTN2010ZTA	AEC-Q101	851	7	12	1,000
ZXTN2010Z-13R	AEC-Q101	851	13	12	4,000
ZXTN2010ZQTA	Automotive	851	7	12	1,000

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
  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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to <https://www.diodes.com/quality/>.
  5. 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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	150	V
Collector-Emitter Voltage	V <sub>CEO</sub>	60	V
Emitter-Base Voltage	V <sub>EBO</sub>	7	V
Base Current	I <sub>B</sub>	2	A
Continuous Collector Current	I <sub>C</sub>	5	A
Peak Pulse Current	I <sub>CM</sub>	20	A

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

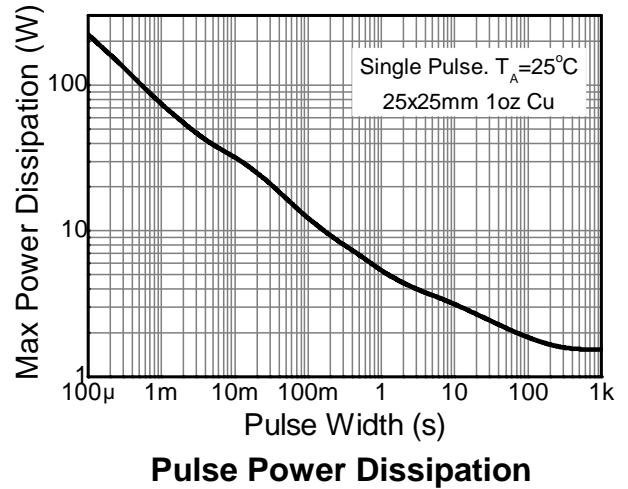
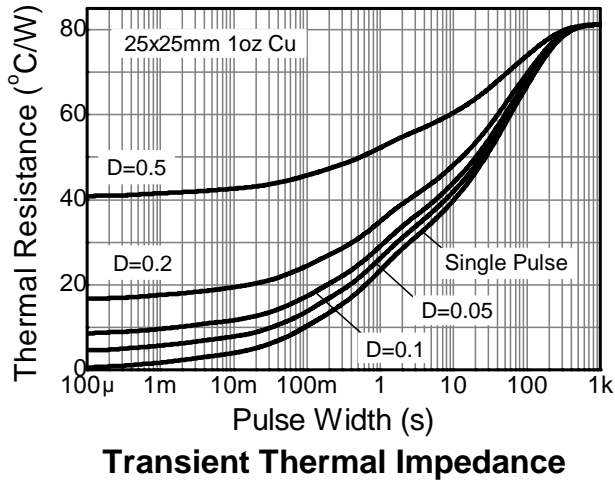
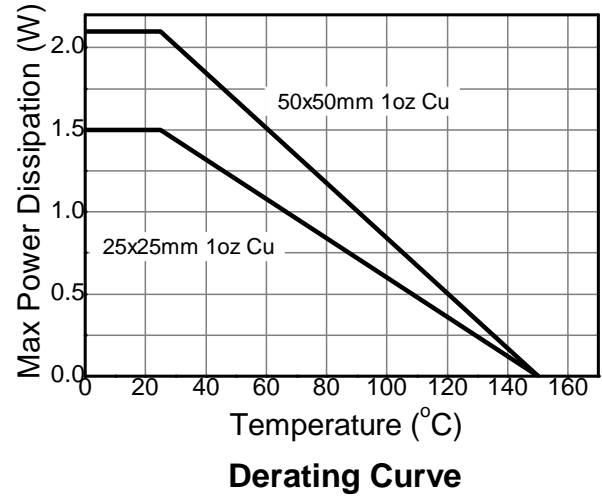
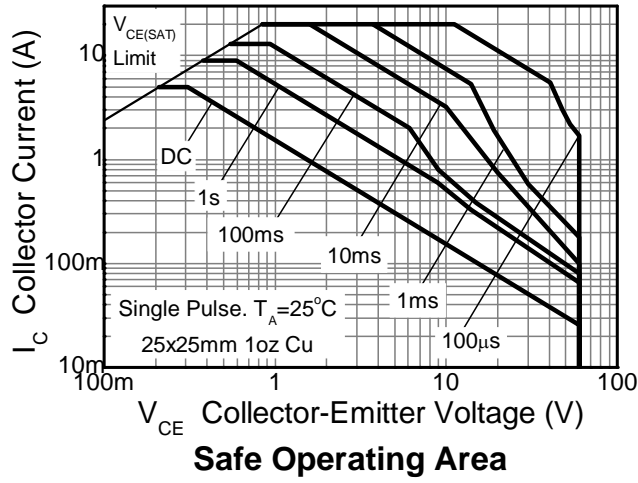
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P <sub>D</sub>	1.5	W
Linear Derating Factor		12	mW/°C
Power Dissipation (Note 7)	P <sub>D</sub>	2.1	W
Linear Derating Factor		16.8	mW/°C
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	83	°C/W
Thermal Resistance, Junction to Ambient (Note 7)	R <sub>θJA</sub>	60	°C/W
Thermal Resistance, Junction to Leads (Note 8)	R <sub>θJL</sub>	3.23	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 9)

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:
6. 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.
  7. Same as note (6), except the device is mounted on 50mm x 50mm 1oz copper.
  8. Thermal resistance from junction to solder-point (on the exposed collector pad).
  9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristics and Derating Information**

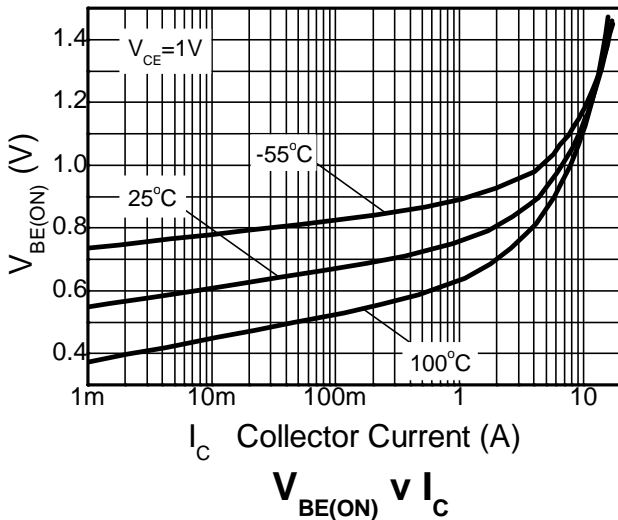
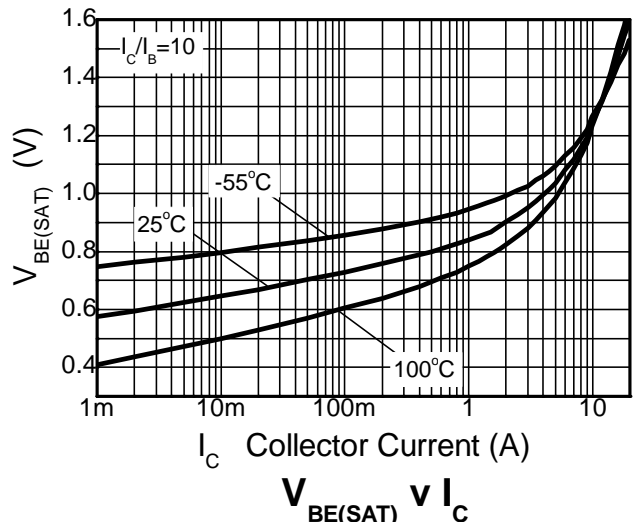
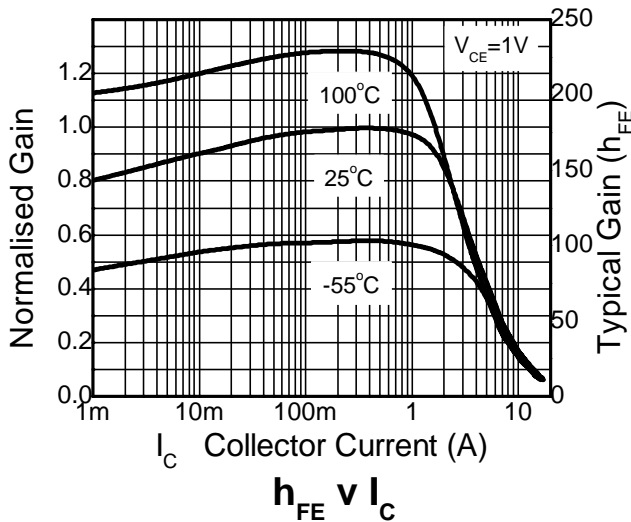
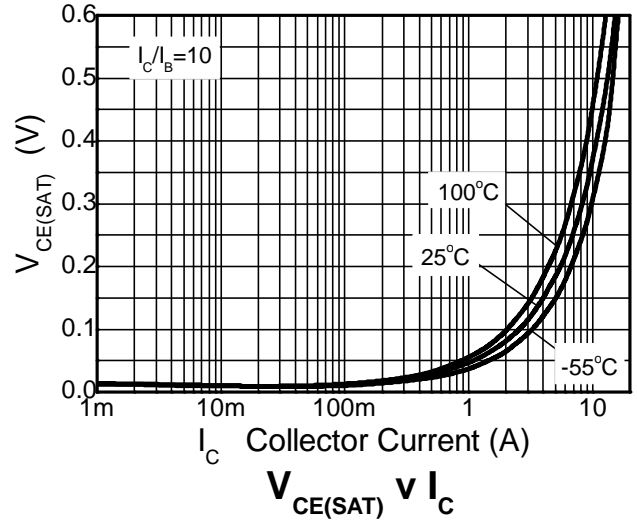
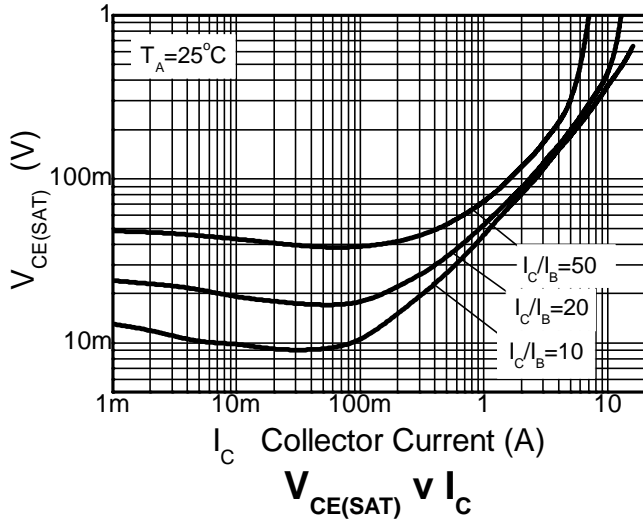


**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	150	190	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 10)	$BV_{CER}$	150	190	—	V	$I_C = 1\mu\text{A}$ , $R_B \leq 1\text{k}\Omega$
Collector-Emitter Breakdown Voltage (Note 10)	$BV_{CEO}$	60	80	—	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	7	8.1	—	V	$I_E = 100\mu\text{A}$
Collector Cutoff Current	$I_{CBO}$	—	< 1	50 500	nA nA	$V_{CB} = 120\text{V}$ $V_{CB} = 120\text{V}$ , $T_A = +100^\circ\text{C}$
Collector Cutoff Current	$I_{CER}$ $R \leq 1\text{k}\Omega$	—	< 1	100 500	nA nA	$V_{CB} = 120\text{V}$ $V_{CB} = 120\text{V}$ , $T_A = +100^\circ\text{C}$
Emitter Cutoff Current	$I_{EBO}$	—	< 1	10	nA	$V_{EB} = 6\text{V}$
DC Current Transfer Static Ratio (Note 10)	$h_{FE}$	100	200	—	—	$I_C = 10\text{mA}$ , $V_{CE} = 1\text{V}$
		100	200	300		$I_C = 2\text{A}$ , $V_{CE} = 1\text{V}$
		55	105	—		$I_C = 5\text{A}$ , $V_{CE} = 1\text{V}$
		20	40	—		$I_C = 10\text{A}$ , $V_{CE} = 1\text{V}$
Collector-Emitter Saturation Voltage (Note 10)	$V_{CE(SAT)}$	—	17	30	mV	$I_C = 100\text{mA}$ , $I_B = 5\text{mA}$
		—	35	55		$I_C = 1\text{A}$ , $I_B = 100\text{mA}$
		—	40	65		$I_C = 1\text{A}$ , $I_B = 50\text{mA}$
		—	90	125		$I_C = 2\text{A}$ , $I_B = 50\text{mA}$
		—	170	230		$I_C = 6\text{A}$ , $I_B = 300\text{mA}$
Base-Emitter Saturation Voltage (Note 10)	$V_{BE(SAT)}$	—	970	1100	mV	$I_C = 6\text{A}$ , $I_B = 300\text{mA}$
Base-Emitter Turn-on Voltage (Note 10)	$V_{BE(ON)}$	—	910	1050	mV	$I_C = 6\text{A}$ , $V_{CE} = 1\text{V}$
Transitional Frequency	$f_T$	—	130	—	MHz	$I_C = 100\text{mA}$ , $V_{CE} = 10\text{V}$ , $f = 50\text{MHz}$
Output Capacitance	$C_{OBO}$	—	31	—	pF	$V_{CB} = 10\text{V}$ , $f = 1\text{MHz}$ ,
Switching Time	$t_{ON}$	—	42	—	ns	$V_{CC} = 10\text{V}$ , $I_C = 1\text{A}$ $I_{B1} = -I_{B2} = 100\text{mA}$
	$t_{OFF}$	—	760	—		

Note: 10. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

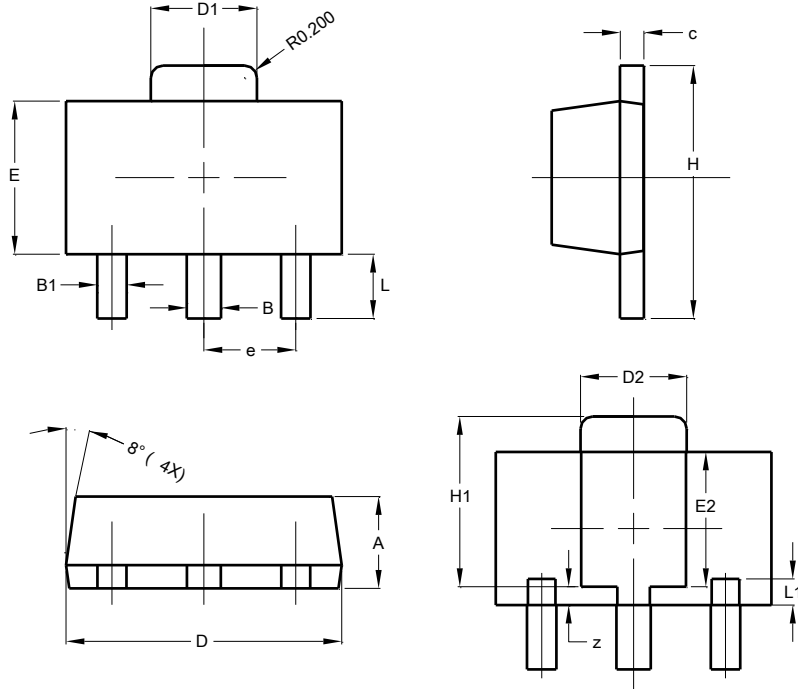
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



**Package Outline Dimensions**

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

**SOT89**

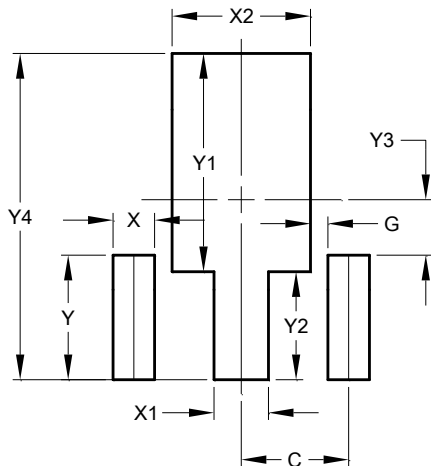


SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in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

**Suggested Pad Layout**

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

**SOT89**



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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