



A Product Line of Diodes Incorporated

ZXTN2011Z

#### 100V NPN LOW SATURATION MEDIUM POWER TRANSISTOR IN SOT89

#### Features

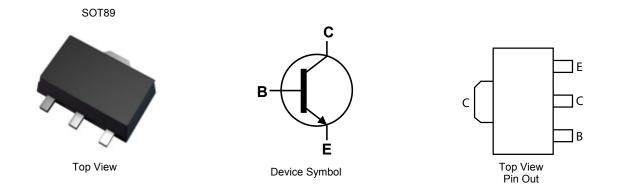
- BV<sub>CEO</sub> > 100V
- I<sub>C</sub> = 4.5A high Continuous Current
- I<sub>CM</sub> = 10A Peak Pulse Current
- $R_{CE(sat)} = 31m\Omega$  for a low equivalent On-Resistance
- Low saturation voltage V<sub>CE(sat)</sub> < 60mV @ I<sub>C</sub> = 1A
- hFE specified up to 10A for high current gain hold up
- Lead-Free Finish; RoHS compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

#### **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 208 <sup>(23)</sup>
- Weight: 0.05 grams (Approximate)

#### Applications

- Motor driving
- Line switching
- High side switches
- Subscriber line interface cards (SLIC)



#### Ordering Information (Note 4)

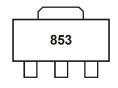
Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN2011ZTA	853	7	12	1,000

Notes: 1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.

See http://www.diodes.com for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.</li>

4. For packaging details, go to our website at http://www.diodes.com.

### **Marking Information**



853 = 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>	200	V
Collector-Emitter Voltage	V <sub>CEO</sub>	100	V
Emitter-Base Voltage	V <sub>EBO</sub>	7	V
Continuous Collector Current	Ι <sub>C</sub>	4.5	A
Peak Pulse Current	I <sub>CM</sub>	10	A

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

Characteristic	Symbol	Value	Unit	
Power Dissipation (Note 5)	B-	1.5	W	
Linear derating factor	PD	12	mW/°C	
Power Dissipation (Note 6)	B-	2.1	W	
Linear derating factor	PD	16.8	mW/°C	
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>0JA</sub>	83	°C/W	
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>0JA</sub>	60	°C/W	
Thermal Resistance, Junction to Ambient (Note 7)	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 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	С

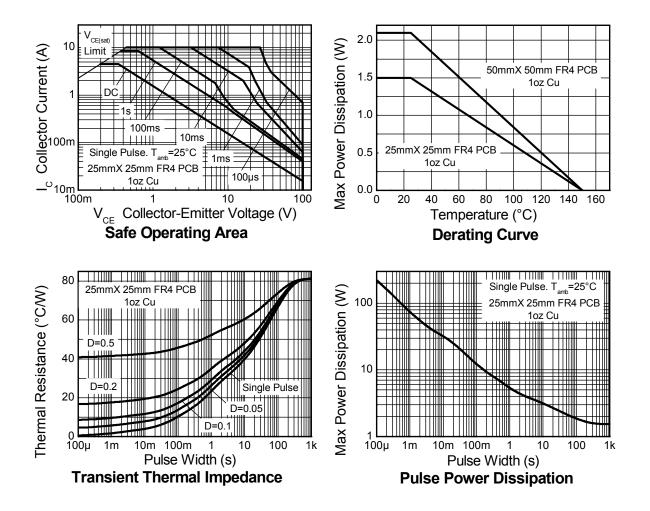
5. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; device Notes: measured when operating in steady state condition.

- Same as note (5), except the device is mounted on 50mm X 50mm single sided 1oz weight copper.
  Thermal resistance from junction to solder-point (at the end of the collector lead).
  Refer to JEDEC specification JESD22-A114 and JESD22-A115.





# Thermal Characteristics and Derating Information







Characteristic	Symbol	Min	Тур.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	200	235	-	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Notes 9)	BV <sub>CER</sub>	200	235	-	V	I <sub>C</sub> = 1μA, R <sub>B</sub> ≤ 1kΩ
Collector-Emitter Breakdown Voltage (Notes 9)	BV <sub>CEO</sub>	100	115	-	V	I <sub>C</sub> = 1mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7	8.1	-	V	I <sub>E</sub> = 100μA
Collector Cutoff Current	I <sub>CBO</sub>	-	<1 -	50 500	nA nA	V <sub>CB</sub> = 150V V <sub>CB</sub> = 150V, T <sub>A</sub> = +100°0
Collector Cutoff Current	I <sub>CER</sub> R≤1kΩ	-	<1 -	100 500	nA nA	V <sub>CB</sub> = 150V V <sub>CB</sub> = 150V, T <sub>A</sub> = +100°
Emitter Cutoff Current	I <sub>EBO</sub>	-	<1	10	nA	V <sub>EB</sub> = 6V
		100	230	-		I <sub>C</sub> = 10mA, V <sub>CE</sub> = 2V
DC Current Transfer Statis Datis (Natas O)	h <sub>FE</sub>	100	200	300		I <sub>C</sub> = 2A, V <sub>CE</sub> = 2V
DC Current Transfer Static Ratio (Notes 9)		30	60	-	-	I <sub>C</sub> = 5A, V <sub>CE</sub> = 2V
		10	20	-		I <sub>C</sub> = 10A, V <sub>CE</sub> = 2V
	V <sub>CE(sat)</sub>	-	20	30		I <sub>C</sub> = 100mA, I <sub>B</sub> = 5mA
Collector-Emitter Saturation Voltage (Notes 9)		-	45	60	mV	I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA
		-	85	115	111V	I <sub>C</sub> = 2A, I <sub>B</sub> = 100mA
		-	155	195		I <sub>C</sub> = 5A, I <sub>B</sub> = 500mA
Base-Emitter Saturation Voltage (Notes 9)	V <sub>BE(sat)</sub>	-	1000	1100	mV	I <sub>C</sub> = 5A, I <sub>B</sub> = 500mA
Base-Emitter Turn-on Voltage (Notes 9)	V <sub>BE(on)</sub>	-	900	1000	mV	I <sub>C</sub> = 5A, V <sub>CE</sub> = 2V
Transitional Frequency	f <sub>T</sub>	-	130	-	MHz	I <sub>C</sub> = 100mA, V <sub>CE</sub> = 10V, f = 50MHz
Output Capacitance	C <sub>obo</sub>	-	26	-	pF	V <sub>CB</sub> = 10V, f = 1MHz,
Switching Time	t <sub>on</sub>		41		ns	$V_{CC}$ = 10V, $I_{C}$ = 1A,
	t <sub>off</sub>	-	1010	-	115	I <sub>B1</sub> = I <sub>B2</sub> = 100mA

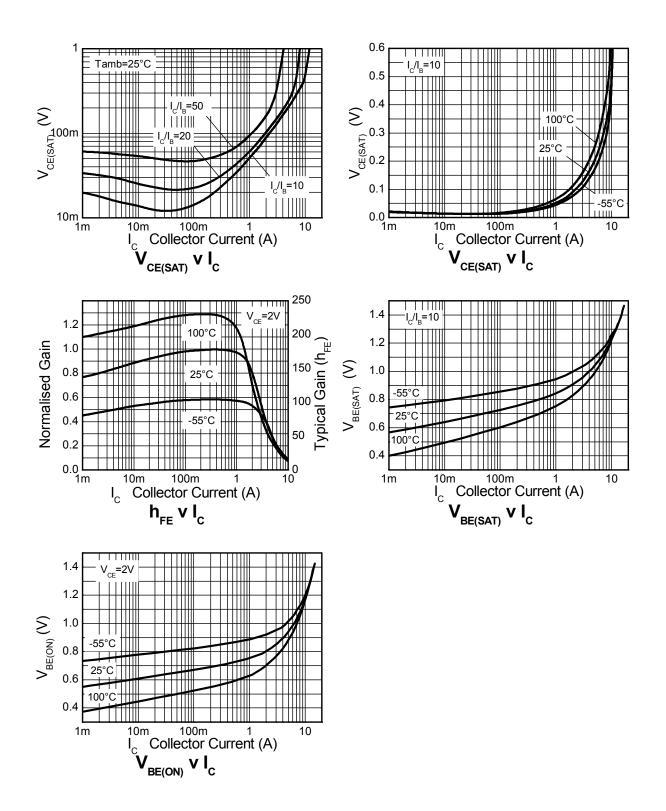
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8. Measured under pulsed conditions. Pulse width  $\leq$  300µs. Duty cycle  $\leq$  2%. Notes:





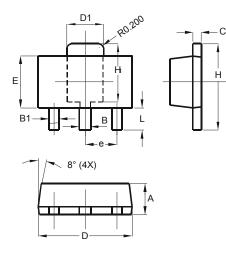
# Typical Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)





## **Package Outline Dimensions**

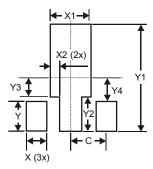
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SOT89					
Dim	Min	Max			
Α	1.40	1.60			
В	0.44	0.62			
B1	0.35	0.54			
С	0.35	0.44			
D	4.40	4.60			
D1	1.62	1.83			
E	2.29	2.60			
е	1.50 Typ				
Н	3.94	4.25			
H1	2.63	2.93			
L	0.89 1.20				
All Dimensions in mm					

## **Suggested Pad Layout**

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.



Dimensions	Value (in mm)
Х	0.900
X1	1.733
X2	0.416
Y	1.300
Y1	4.600
Y2	1.475
Y3	0.950
Y4	1.125
С	1.500





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