

60V NPN LOW SATURATION MEDIUM POWER TRANSISTOR IN SOT89
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
- **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

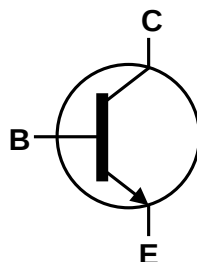
- Case: SOT89
- Case Material: Molded Plastic. "Green" Molding Compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 
- Weight: 0.05 grams (Approximate)

Application

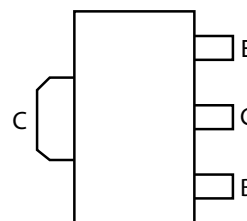
- Emergency Lighting Circuits
- Motor Driving (including DC Fans)
- Backlight Inverters
- Power Switches
- Gate Driving MOSFETs and IGBTs



Top View



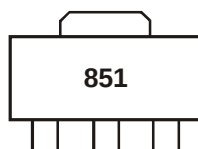
Device Symbol


 Top View
 Pin Out

Ordering Information (Note 5)

Product	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) compliant. All applicable RoHS exemptions applied.
 2. See http://www.diodes.com/quality/lead_free.html 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 http://www.diodes.com/quality/product_compliance_definitions/.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

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
Continuous Collector Current	I _C	5	A
Peak Pulse Current	I _{CM}	20	A

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

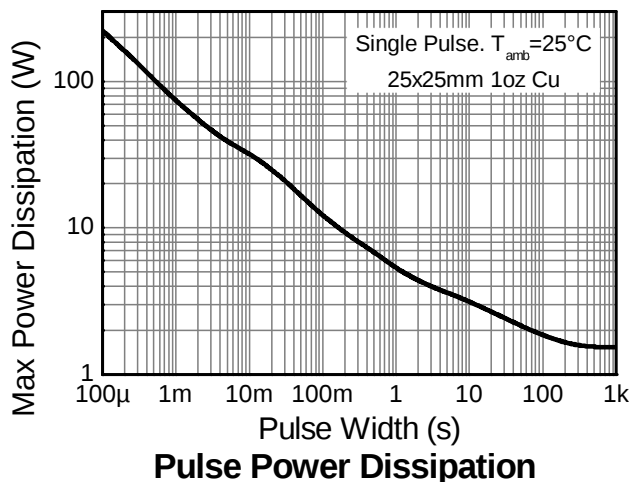
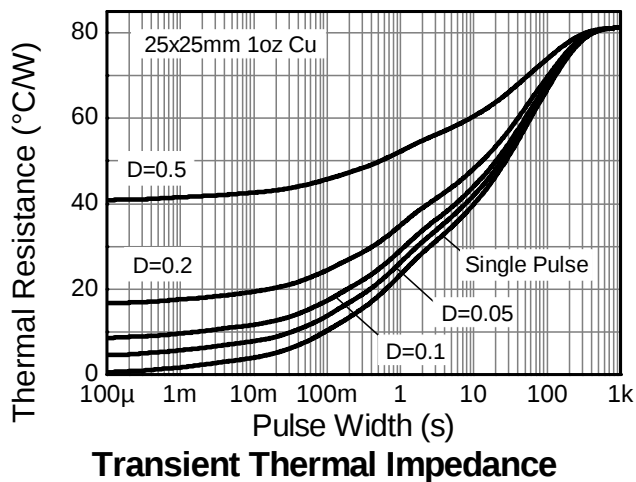
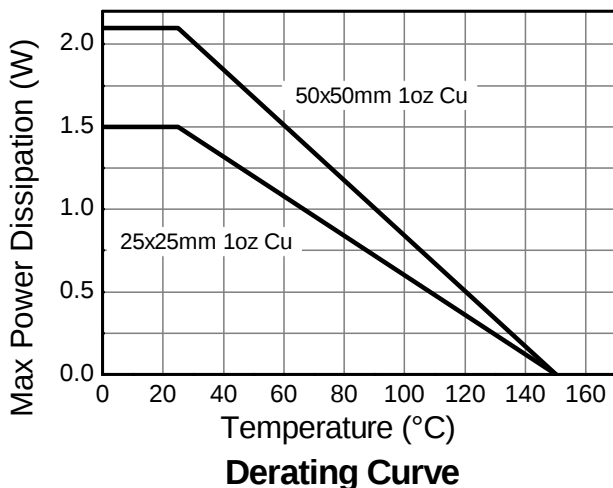
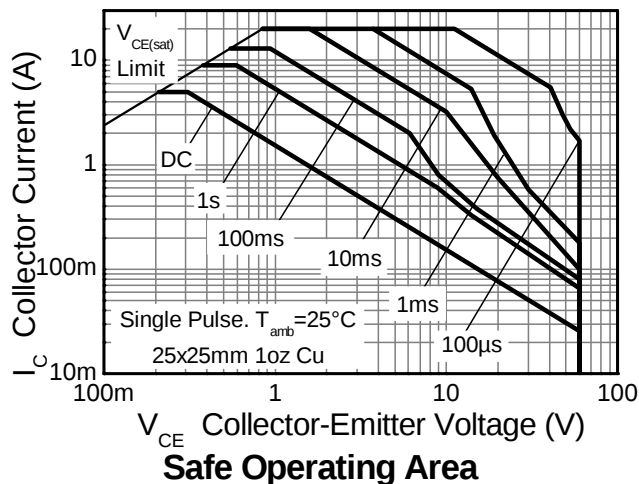
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P _D	1.5	W
Linear derating factor		12	mW/°C
Power Dissipation (Note 7)	P _D	2.1	W
Linear derating factor		16.8	mW/°C
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	83	°C/W
Thermal Resistance, Junction to Ambient (Note 7)	R _{θJA}	60	°C/W
Thermal Resistance, Junction to Leads (Note 8)	R _{θJL}	3.23	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-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:
- For a device mounted with the exposed collector pad on 25mm x 25mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 - Same as note (6), except the device is mounted on 50mm x 50mm 1oz copper.
 - Thermal resistance from junction to solder-point (on the exposed collector pad).
 - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

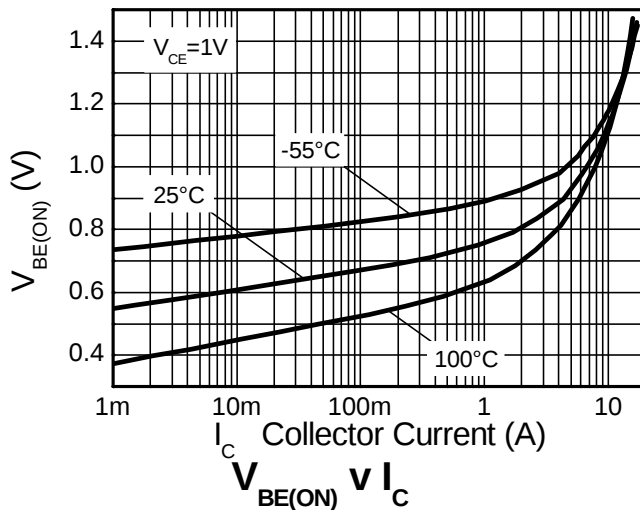
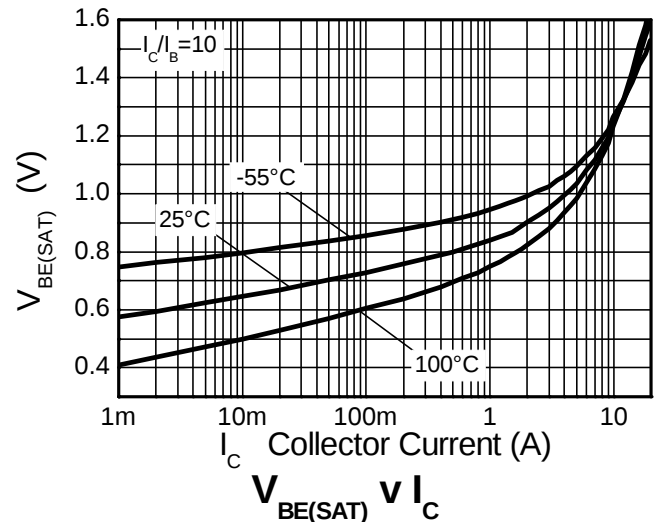
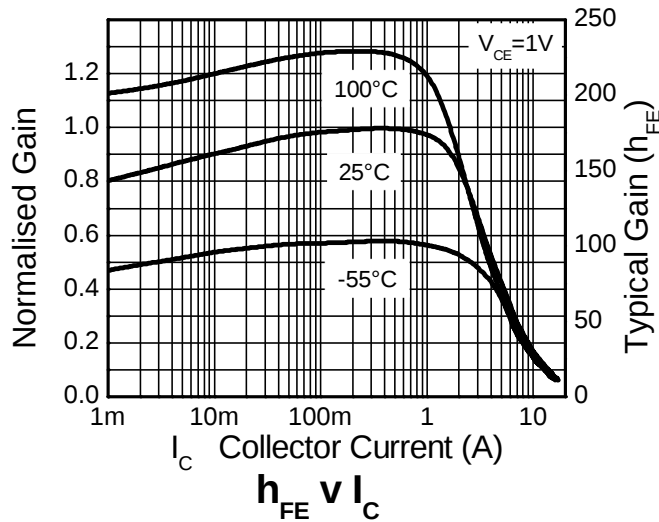
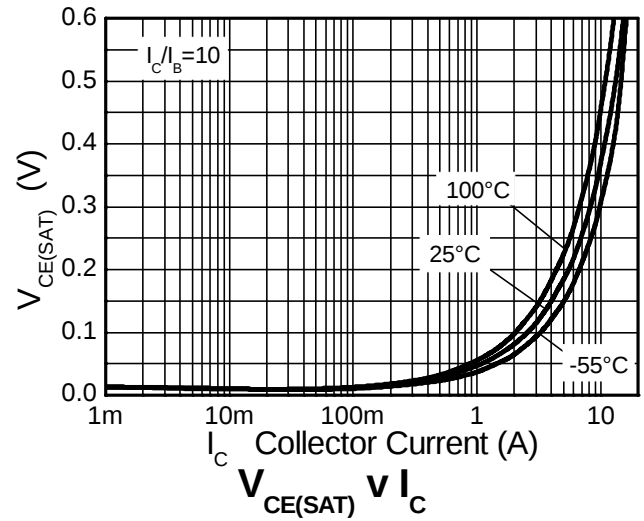
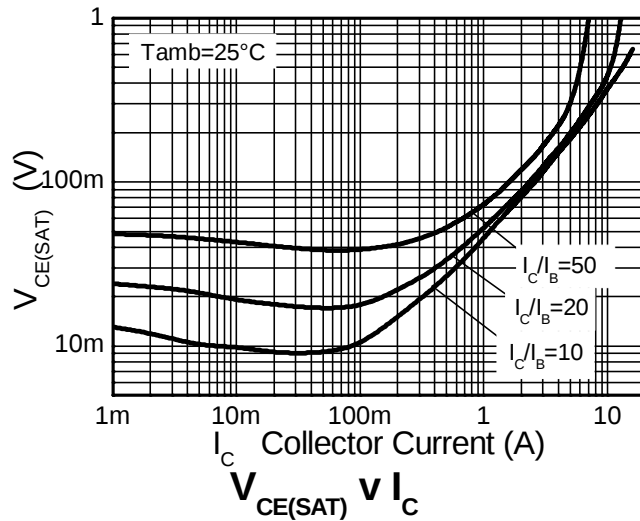


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

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 10)	BV _{CER}	150	190	—	V	I _C = 1μA, R _B ≤ 1kΩ
Collector-Emitter Breakdown Voltage (Note 10)	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 10)	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 10)	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 10)	V _{BE(SAT)}	—	970	1100	mV	I _C = 6A, I _B = 300mA
Base-Emitter Turn-on Voltage (Note 10)	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			

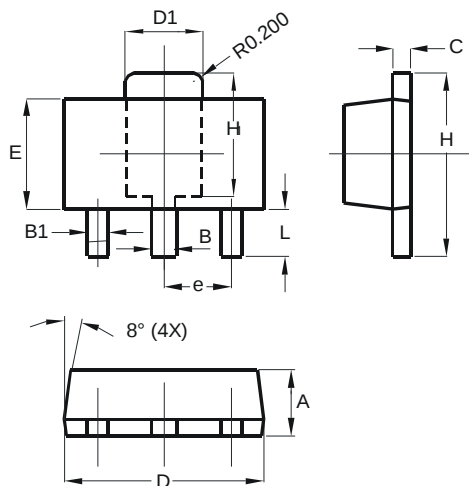
Note: 10. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



Package Outline Dimensions

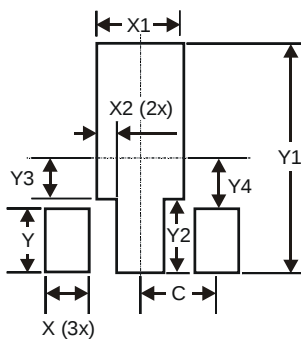
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT89		
Dim	Min	Max
A	1.40	1.60
B	0.44	0.62
B1	0.35	0.54
C	0.35	0.44
D	4.40	4.60
D1	1.62	1.83
E	2.29	2.60
e	1.50 Typ	
H	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)
X	0.900
X1	1.733
X2	0.416
Y	1.300
Y1	4.600
Y2	1.475
Y3	0.950
Y4	1.125
C	1.500

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