

**60V PNP LOW SATURATION MEDIUM POWER TRANSISTOR IN SOT89**
**Features**

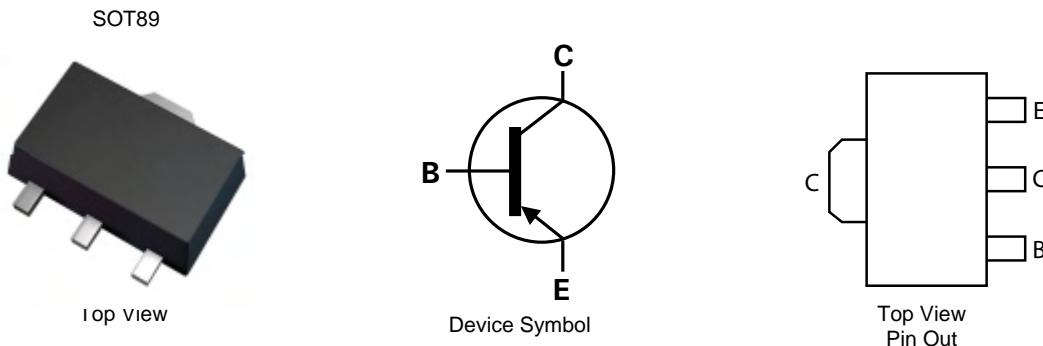
- $BV_{CEO} > -60V$
- $I_C = -4.3A$  high continuous current
- $R_{SAT} = 32m\Omega$  for a low equivalent On-Resistance
- Low saturation voltage  $V_{CE(sat)} < -65mV$  @  $I_C = -1A$
- $h_{FE}$  specified up to  $-10A$  for high current gain hold up
- Complementary NPN type: ZXTN2010Z
- **Lead-Free 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 (e3)
- Weight: 0.05 grams (Approximate)

**Application**

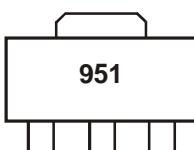
- Emergency lighting circuits
- Motor driving (including DC fans)
- Backlight inverters
- Power switches
- Gate driving MOSFETs and IGBTs


**Ordering Information** (Note 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTP2012ZTA	AEC-Q101	951	7	12	1,000
ZXTP2012Z-13R	AEC-Q101	951	13	12	4,000
ZXTP2012ZQTA	Automotive	951	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> 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.
5. For packaging details, go to our website at <http://www.diodes.com>

**Marking Information**


951 = Product Type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	-100	V
Collector-Emitter Voltage	$V_{CEO}$	-60	V
Emitter-Base Voltage	$V_{EBO}$	-7	V
Continuous Collector Current	$I_C$	-4.3	A
Peak Pulse Current	$I_{CM}$	-15	A

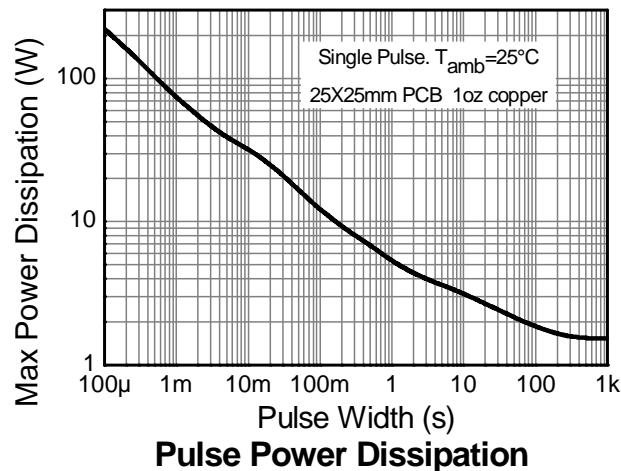
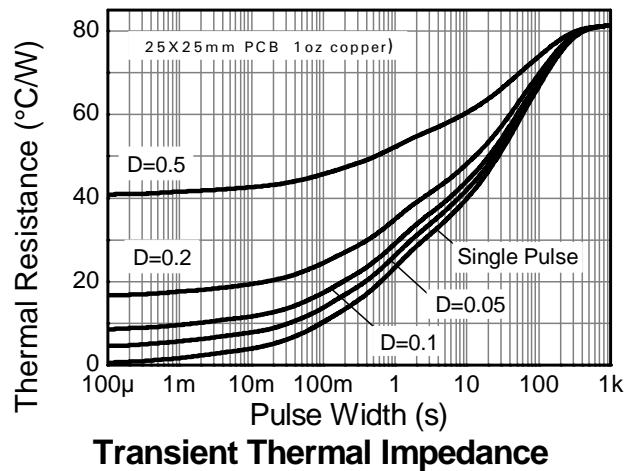
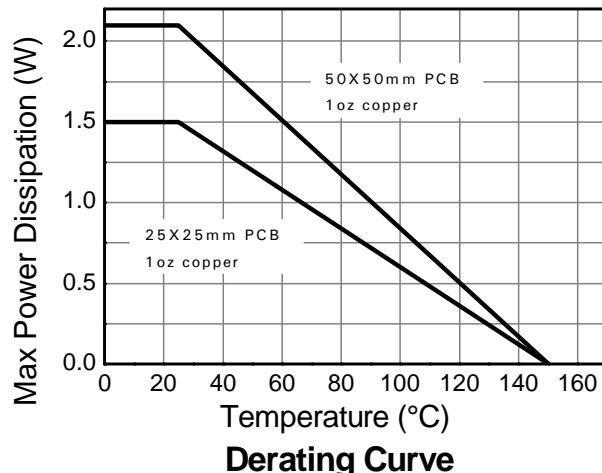
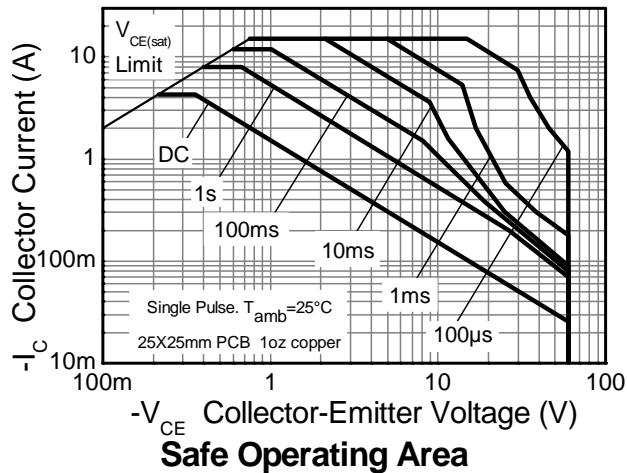
**Thermal Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	$P_D$	1.5	W
Linear derating factor		12	$\text{mW}/^\circ\text{C}$
Power Dissipation (Note 7)	$P_D$	2.1	W
Linear derating factor		16.8	$\text{mW}/^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	83	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient (Note 7)	$R_{\theta JA}$	60	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Leads (Note 8)	$R_{\theta JL}$	3.23	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

Notes:

- 6. 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 measured when operating in steady state condition.
- 7. Same as note (6), except the device is mounted on 50mm X 50mm single sided 1oz weight copper.
- 8. Thermal resistance from junction to solder-point (on the exposed collector pad).

## Thermal Characteristics and Derating Information

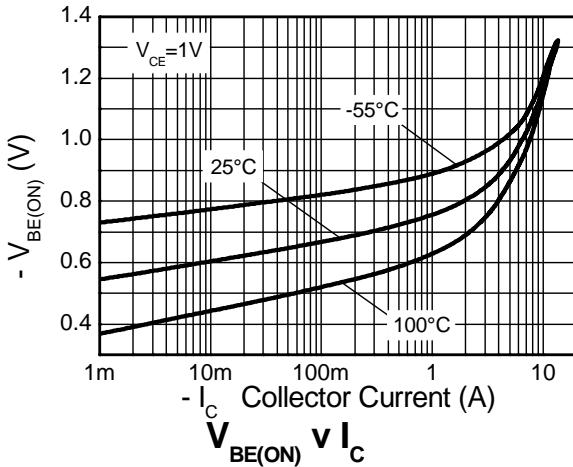
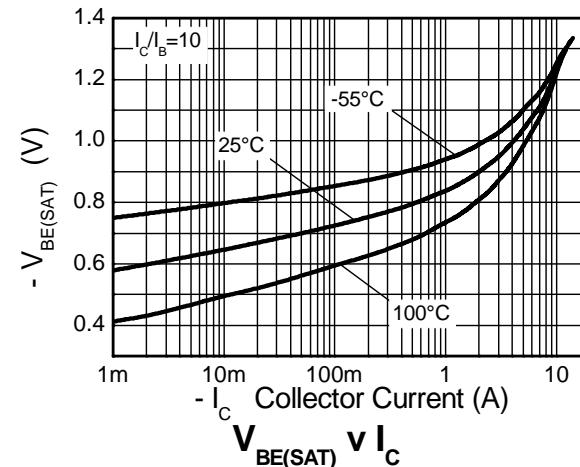
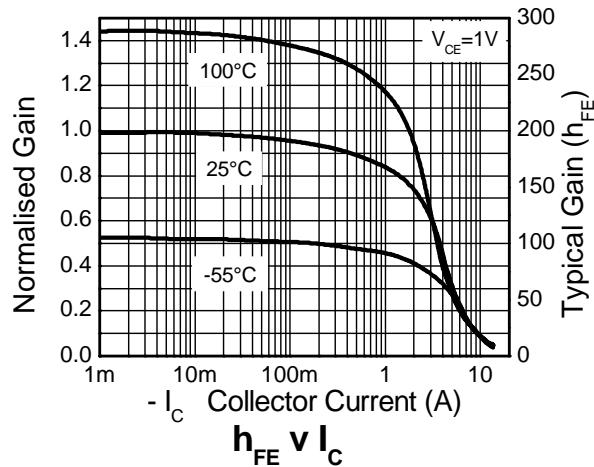
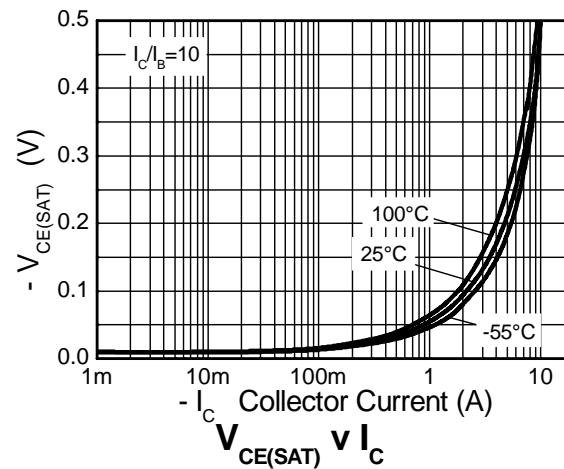
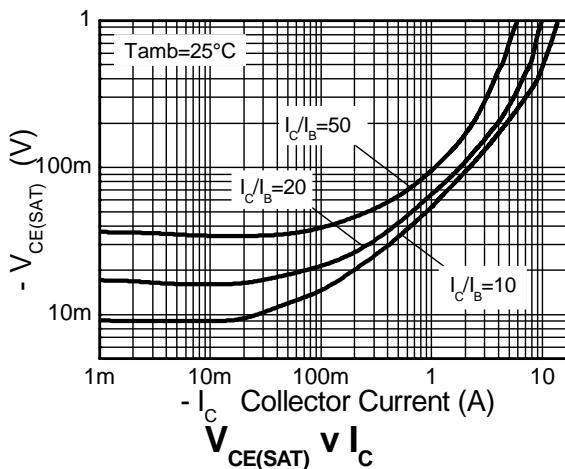


## Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-100	-120	-	V	I <sub>C</sub> = -100µA
Collector-Emitter Breakdown Voltage (Notes 9)	BV <sub>CER</sub>	-100	-120	-	V	I <sub>C</sub> = -1µA, R <sub>B</sub> ≤ 1kΩ
Collector-Emitter Breakdown Voltage (Notes 9)	BV <sub>CEO</sub>	-60	-80	-	V	I <sub>C</sub> = -10mA
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	-20 -500	nA nA	V <sub>CB</sub> = -80V V <sub>CB</sub> = -80V, T <sub>A</sub> = +100°C
Collector Cutoff Current	I <sub>CER</sub> R ≤ 1kΩ	-	< -1	-20 -500	nA nA	V <sub>CB</sub> = -80V V <sub>CB</sub> = -80V, T <sub>A</sub> = +100°C
Emitter Cutoff Current	I <sub>EBO</sub>	-	< -1	-10	nA	V <sub>EB</sub> = -6V
DC current transfer Static ratio (Notes 9)	h <sub>FE</sub>	100 100 45 10	250 200 90 25	300		I <sub>C</sub> = -10mA, V <sub>CE</sub> = -1V I <sub>C</sub> = -2A, V <sub>CE</sub> = -1V I <sub>C</sub> = -5A, V <sub>CE</sub> = -1V I <sub>C</sub> = -10A, V <sub>CE</sub> = -1V
Collector-Emitter Saturation Voltage (Notes 9)	V <sub>CE(sat)</sub>	-	-14 -50 -75 -160	-20 -65 -110 -215	mV	I <sub>C</sub> = -100mA, I <sub>B</sub> = -10mA I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA I <sub>C</sub> = -2A, I <sub>B</sub> = -200mA I <sub>C</sub> = -5A, I <sub>B</sub> = -500mA
Base-Emitter Saturation Voltage (Notes 9)	V <sub>BE(sat)</sub>	-	-950	-1050	mV	I <sub>C</sub> = -5A, I <sub>B</sub> = -500mA
Base-Emitter Turn-on Voltage (Notes 9)	V <sub>BE(on)</sub>	-	-840	-950	mV	I <sub>C</sub> = -5A, V <sub>CE</sub> = -1V
Transitional Frequency (Notes 9)	f <sub>T</sub>	-	120	-	MHz	I <sub>C</sub> = -100mA, V <sub>CE</sub> = -10V, f = 50MHz
Output capacitance	C <sub>obo</sub>	-	48	-	pF	V <sub>CB</sub> = -10V, f = 1MHz,
Switching Time	t <sub>ON</sub>	-	39	-	ns	V <sub>CC</sub> = -10V, I <sub>C</sub> = -1A, I <sub>B1</sub> = I <sub>B2</sub> = -100mA
	t <sub>OFF</sub>		370			

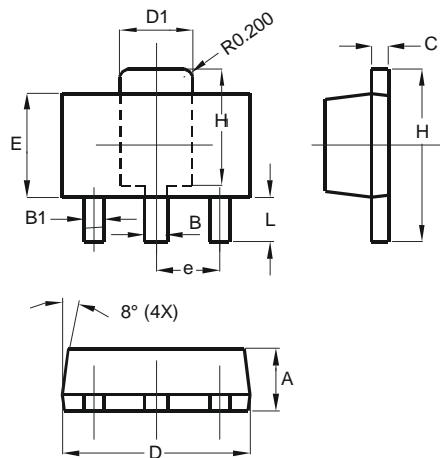
Notes: 9. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

**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.

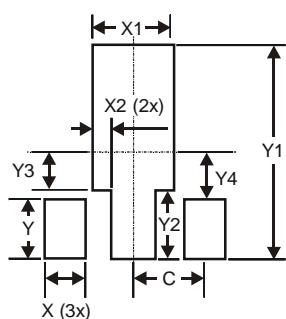


SOT89		
Dim	Min	Max
A	1.40	1.60
B	0.44	0.62
B1	0.35	0.54
C	0.35	0.44
D	4.40	4.60
D1	1.62	1.83
E	2.29	2.60
e	1.50 Typ	
H	3.94	4.25
H1	2.63	2.93
L	0.89	1.20

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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