

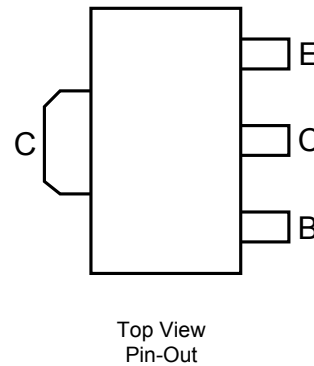
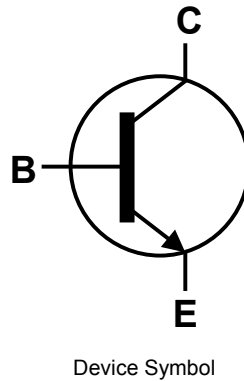
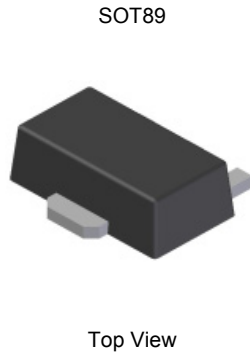
**350V NPN HIGH VOLTAGE TRANSISTOR IN SOT89**

**Features**

- $BV_{CEO} > 350V$
- $I_C = 0.5A$  High Continuous Current
- $I_{CM} = 1A$  Peak Pulse Current
- High  $H_{FE}$  Hold Up
- **Totally Lead-Free & Fully 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  $\text{e3}$
- Weight: 0.072 grams (Approximate)

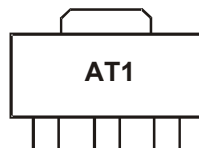


**Ordering Information** (Note 4)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
BST39TA	AT1	7	12	1,000
BST39-13R	AT1	13	12	4,000

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**



AT1 = Product Type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	400	V
Collector-Emitter Voltage	V <sub>CEO</sub>	350	V
Emitter-Base Voltage	V <sub>EBO</sub>	7	V
Continuous Collector Current	I <sub>C</sub>	500	mA
Peak Pulse Current	I <sub>CM</sub>	1	A

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

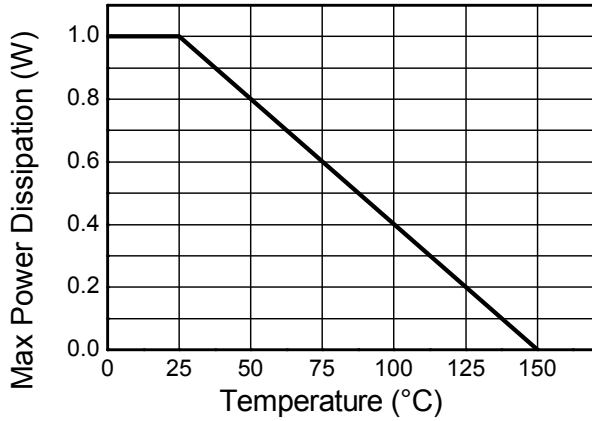
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	(Note 5)	1
		(Note 6)	1.5
		(Note 7)	2.0
Thermal Resistance, Junction to Ambient Air	R <sub>θJA</sub>	(Note 5)	125
		(Note 6)	83
		(Note 7)	60
Thermal Resistance, Junction to Lead	R <sub>θJL</sub>	22	°C/W
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	16	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 10)

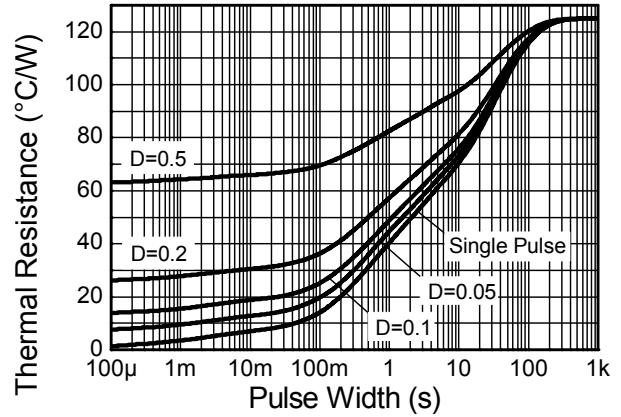
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
- For a device mounted with the exposed collector pad on 15mm x 15mm 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 5, except the device is mounted on 25mm x 25mm 1oz copper.
  - Same as Note 5, except the device is mounted on 50mm x 50mm 1oz copper.
  - Thermal resistance from junction to solder-point (on the exposed collector pad).
  - Thermal resistance from junction to the top of the case.
  - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

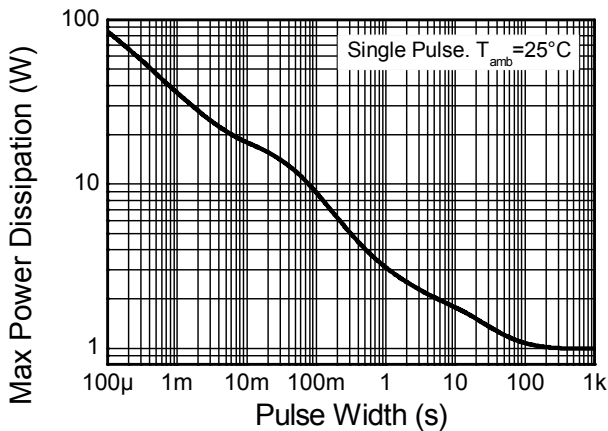
**Thermal Characteristics and Derating Information**



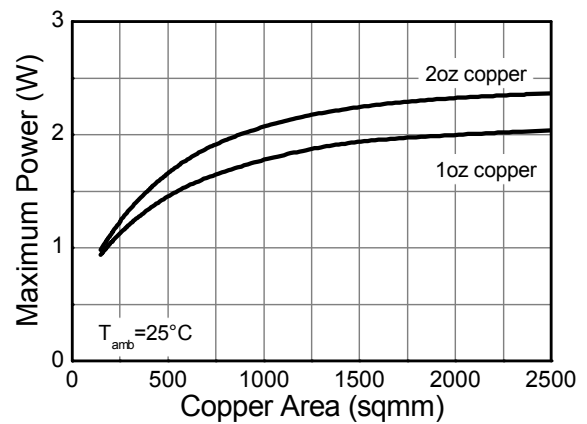
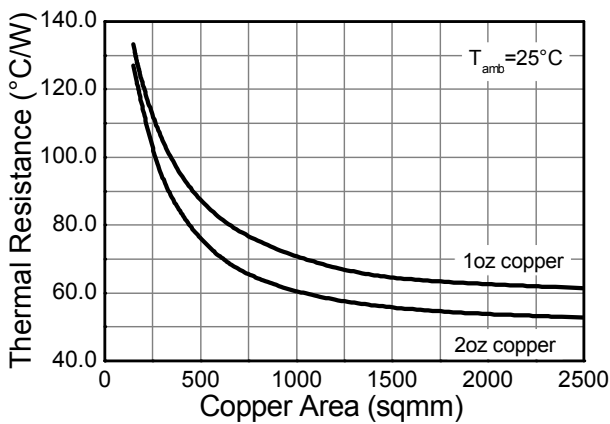
**Derating Curve**



**Transient Thermal Impedance**



**Pulse Power Dissipation**

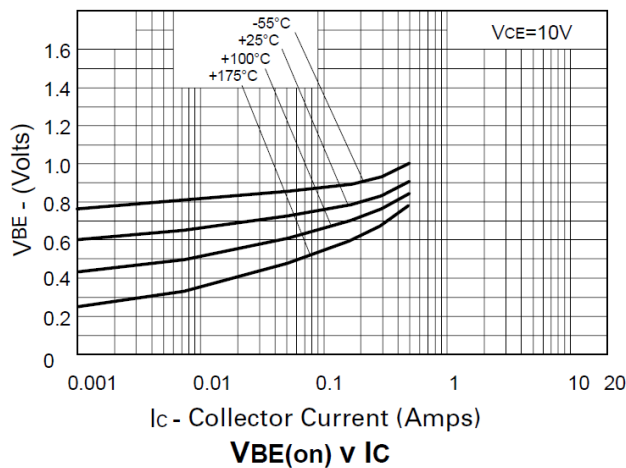
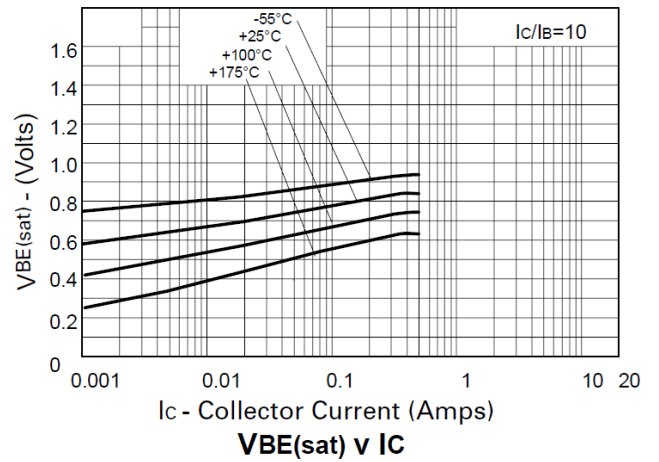
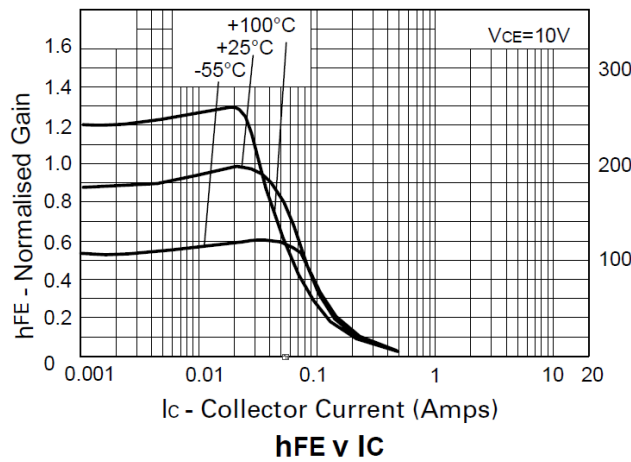
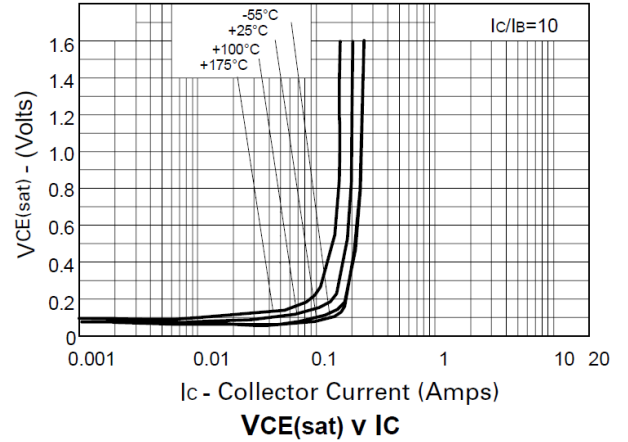
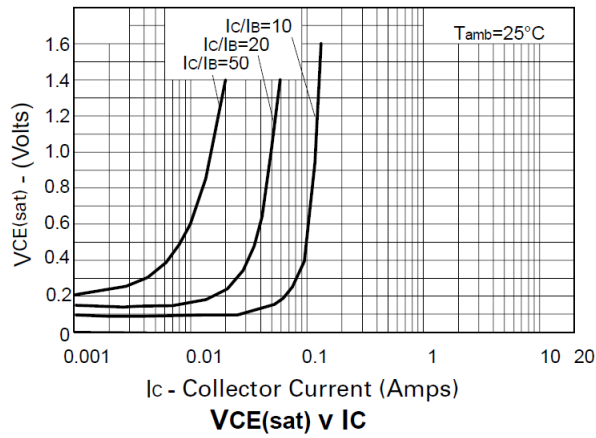


**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	400	—	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Notes 11)	$BV_{CEO}$	350	—	—	V	$I_C = 1\text{mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	7	—	—	V	$I_E = 100\mu\text{A}$
Collector Cutoff Current	$I_{CBO}$	—	—	20	nA	$V_{CB} = 300\text{V}$
DC Current transfer Static Ratio (Notes 11)	$h_{FE}$	40	—	-	—	$I_C = 20\text{mA}$ , $V_{CE} = 10\text{V}$
Collector-Emitter Saturation Voltage (Notes 11)	$V_{CE(sat)}$	—	—	0.5	V	$I_C = 50\text{mA}$ , $I_B = 4\text{mA}$
Base-Emitter Saturation Voltage (Notes 11)	$V_{BE(sat)}$	—	—	1.3	V	$I_C = 50\text{mA}$ , $I_B = 4\text{mA}$
Transitional Frequency (Notes 11)	$f_T$	70	—	—	MHz	$I_C = 10\text{mA}$ , $V_{CE} = 10\text{V}$ , $f = 5\text{MHz}$
Output Capacitance	$C_{obo}$	—	—	2	pF	$V_{CB} = 10\text{V}$ , $f = 1\text{MHz}$ ,
Input Capacitance	$C_{ibo}$	—	—	20	pF	$V_{EB} = 10\text{V}$ , $f = 1\text{MHz}$ ,

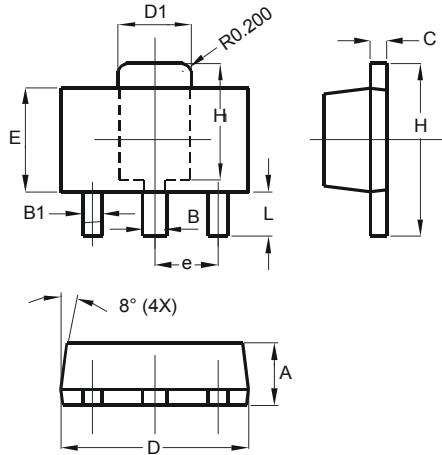
Note: 11. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

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



## Package Outline Dimensions

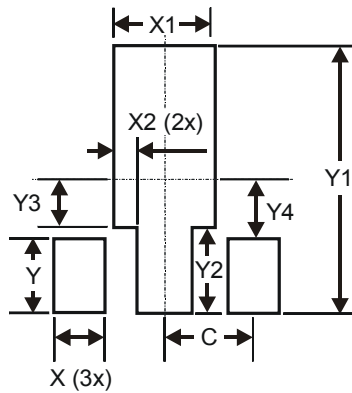
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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
<b>All Dimensions in mm</b>		

## 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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