

## Features

- $BV_{CEO} > -30V$
- $I_C = -5.5A$  Continuous Collector Current
- $I_{CM} = -20A$  Peak Pulse Current
- Low Saturation Voltage  $V_{CE(SAT)} < -60mV$  max @ -1A
- $R_{SAT} = 24m\Omega$  @ -5.5A for Low Equivalent On-Resistance
- Exceptional Gain Linearity Down to -10mA
- $h_{FE}$  Specified up to -20A for High 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

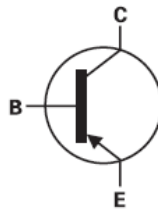
- Case: SOT89
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208  $\text{\textcircled{E3}}$
- Weight: 0.05 grams (Approximate)

## Applications

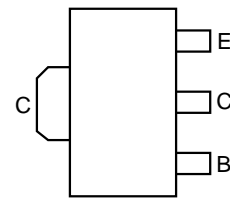
- DC-DC Converters
- MOSFET Gate Drivers
- Charging Circuits
- Power Switches
- Motor Control

**SOT89**


Top View



Device Schematic



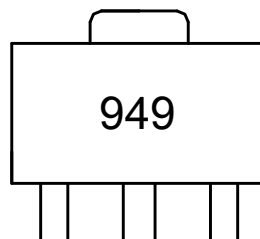
Pin-Out Top View

## Ordering Information (Note 4)

Part Number	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
ZXTP2008ZTA	949	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](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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information

**SOT89**


949 = 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>CB0</sub>	-50	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-30	V
Emitter-Base Voltage	V <sub>EBO</sub>	-7	V
Continuous Collector Current	I <sub>C</sub>	-5.5	A
Peak Pulse Current	I <sub>CM</sub>	-20	A

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

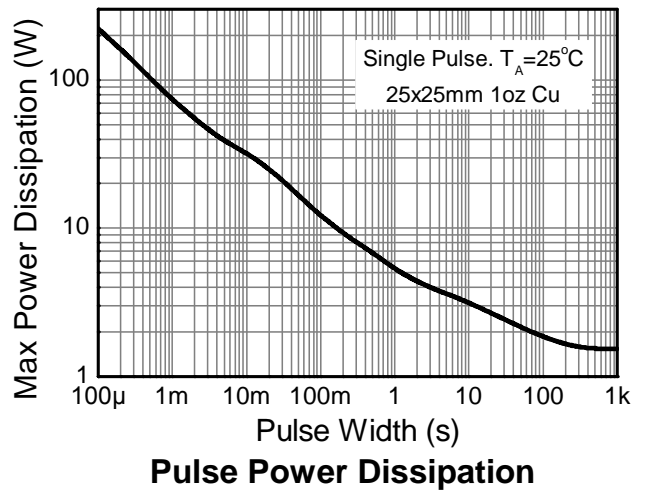
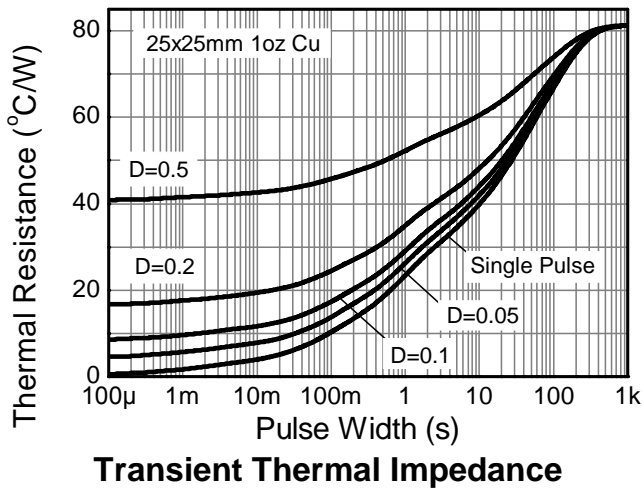
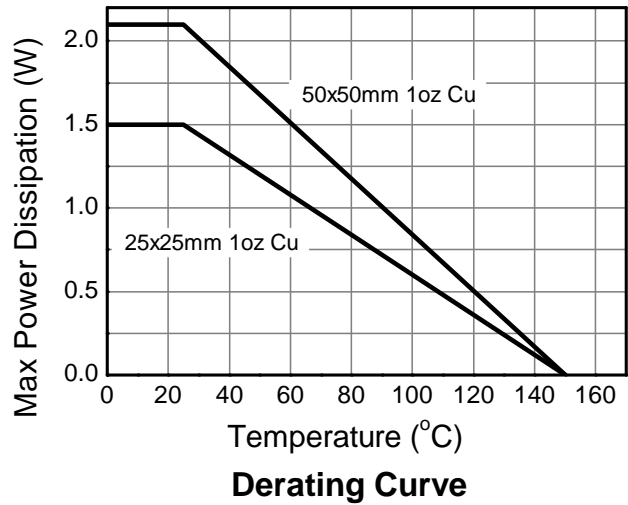
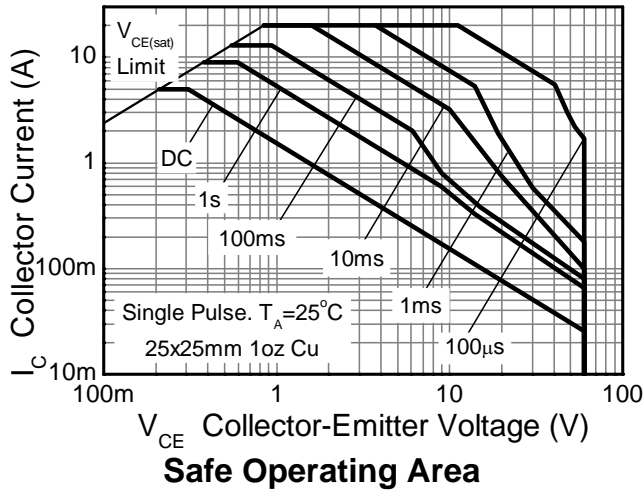
Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	P <sub>D</sub>	1.5	W
		12	
		2.1	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	16.8	°C/W
		83	
		60	
Thermal Resistance, Junction to Lead	R <sub>θJL</sub>	3.23	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , 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	C

- Notes:
5. For a device mounted with the collector lead 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 steady-state.
  6. Same as Note 5, except the device is mounted on 50mm x 50mm 1oz copper.
  7. Thermal resistance from junction to solder-point (at the end of the collector lead).
  8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristics and Derating Information**

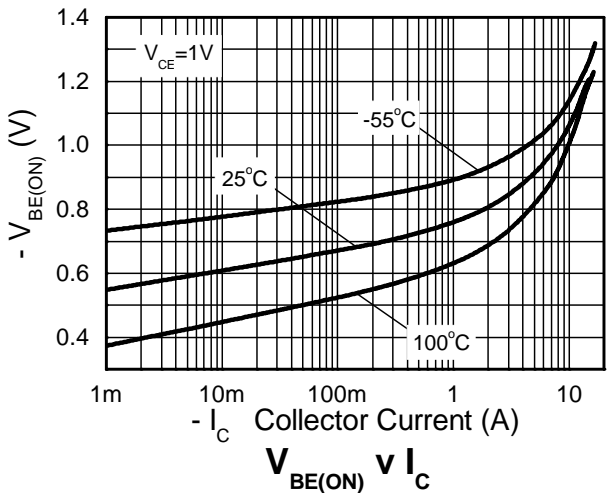
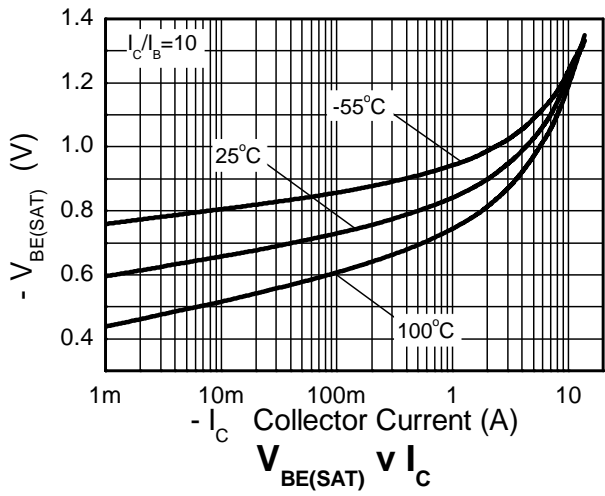
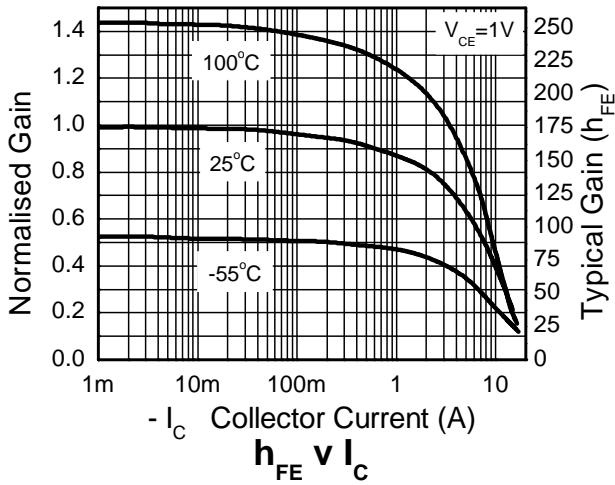
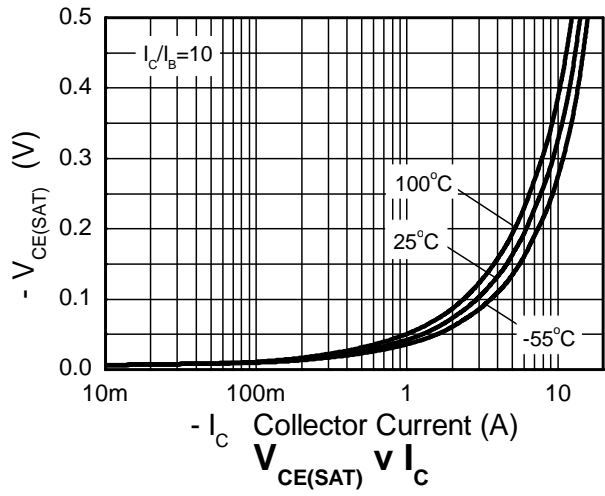
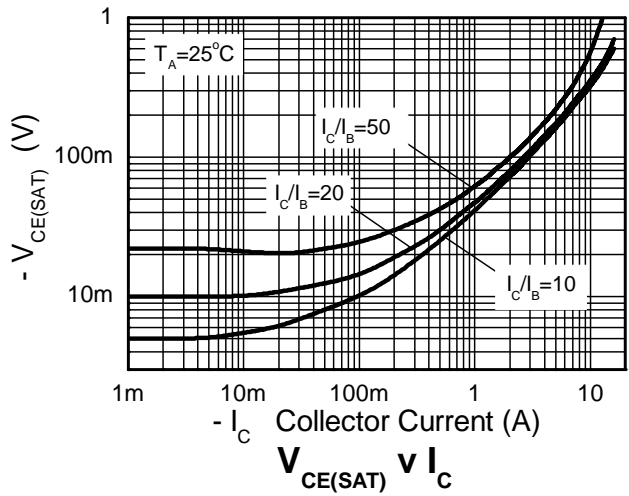


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-50	-70	—	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage	BV <sub>CER</sub>	-50	-70	—	V	I <sub>C</sub> = -1μA, R <sub>B</sub> ≤ 1kΩ
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	-30	-40	—	V	I <sub>C</sub> = -10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-7	-8	—	V	I <sub>E</sub> = -100μA
Collector Cutoff Current	I <sub>CBO</sub>	—	< -1	-20	nA	V <sub>CB</sub> = -40V
		—	—	-0.5	μA	V <sub>CB</sub> = -40V, T <sub>A</sub> = +100°C
Collector Cutoff Current	I <sub>CER</sub>	—	< -1	-20	nA	V <sub>CB</sub> = -40V, R <sub>B</sub> ≤ 1kΩ
		—	—	-0.5	μA	V <sub>CB</sub> = -40V, T <sub>A</sub> = +100°C, R <sub>B</sub> ≤ 1kΩ
Emitter Cutoff Current	I <sub>EBO</sub>	—	< -1	-10	nA	V <sub>EB</sub> = -6V
Collector-Emitter Saturation Voltage (Note 9)	V <sub>CE(SAT)</sub>	—	-25 -35 -55 -55 -130	-40 -55 -80 -80 -175	mV	I <sub>C</sub> = -0.5A, I <sub>B</sub> = -20mA I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA I <sub>C</sub> = -1A, I <sub>B</sub> = -20mA I <sub>C</sub> = -2A, I <sub>B</sub> = -200mA I <sub>C</sub> = -5.5A, I <sub>B</sub> = -500mA
Base-Emitter Saturation Voltage (Note 9)	V <sub>BE(SAT)</sub>	—	-970	-1070	mV	I <sub>C</sub> = -5.5A, I <sub>B</sub> = -500mA
Base-Emitter Turn-On Voltage (Note 9)	V <sub>BE(ON)</sub>	—	-860	-960	mV	I <sub>C</sub> = -5.5A, V <sub>CE</sub> = -1V
DC Current Gain (Note 9)	h <sub>FE</sub>	100 100 70 10	225 200 145 20	300	—	I <sub>C</sub> = -10mA, V <sub>CE</sub> = -1V I <sub>C</sub> = -1A, V <sub>CE</sub> = -1V I <sub>C</sub> = -5A, V <sub>CE</sub> = -1V I <sub>C</sub> = -20A, V <sub>CE</sub> = -1V
Transition Frequency	f <sub>T</sub>	—	110	—	MHz	V <sub>CE</sub> = -10V, I <sub>C</sub> = -100mA, f = 50MHz
Output Capacitance (Note 9)	C <sub>OBO</sub>	—	83	—	pF	V <sub>CB</sub> = -10V, f = 1MHz
Switching Times	t <sub>ON</sub>	—	43	—	ns	V <sub>CC</sub> = -10V, I <sub>C</sub> = -1A, I <sub>B1</sub> = -I <sub>B2</sub> = 100mA
	t <sub>OFF</sub>	—	230	—		

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

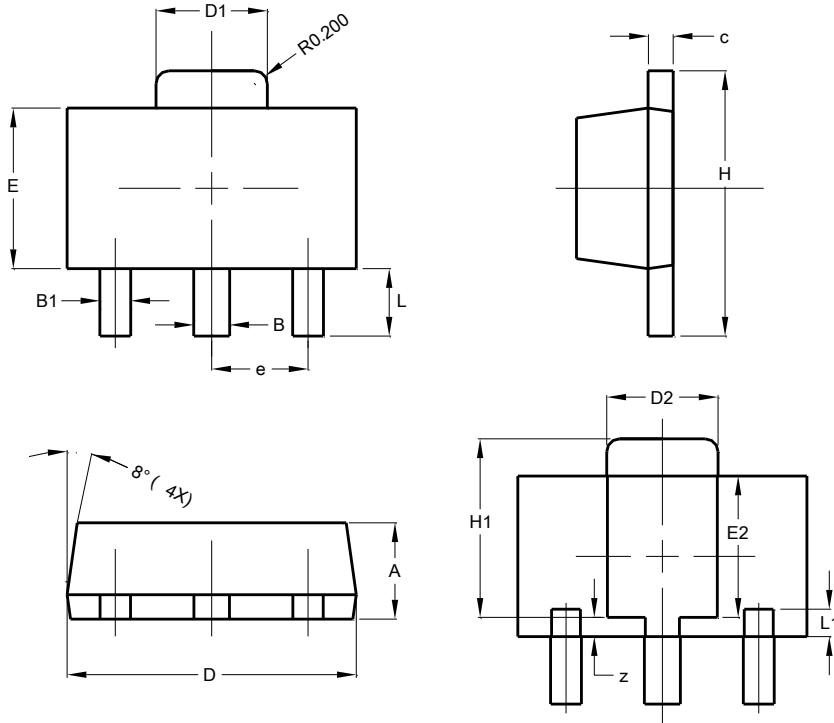
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



**Package Outline Dimensions**

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

**SOT89**

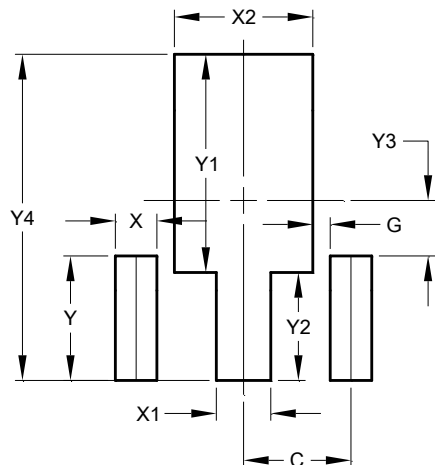


SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in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