

## Features

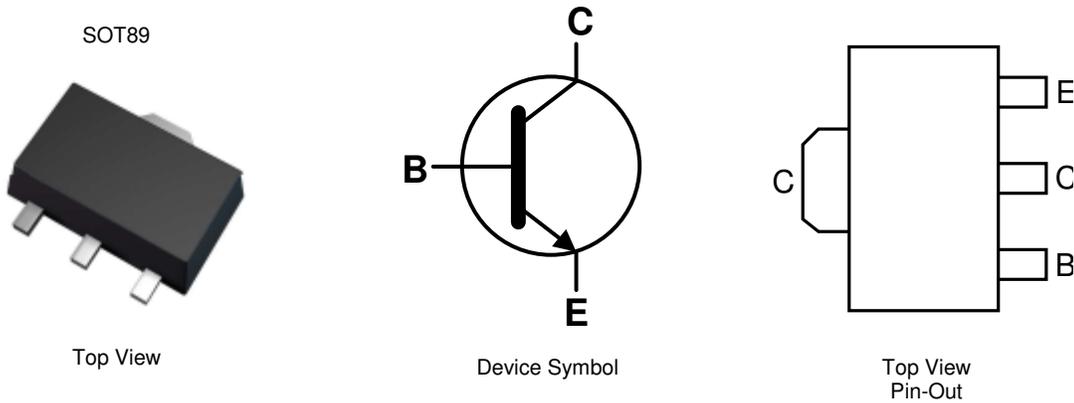
- $BV_{CEO} > 50V$
- $I_C = 3A$  High Continuous Collector Current
- $I_{CM}$  up to 6A Peak Pulse Current
- 2W Power Dissipation
- Low Saturation Voltage  $V_{CE(sat)} < 220mV @ 1A$
- $R_{CE(sat)} = 87m\Omega @ 2.75A$  for a Low Equivalent On-Resistance
- $h_{FE}$  Characterized up to 6A for High Current 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**
- **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: 0.052 grams (Approximate)

## Applications

- Load Management Functions
- Motor Control
- DC-DC / DC-AC Converters

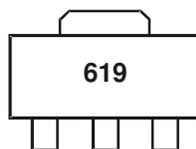


## Ordering Information (Notes 4 and 5)

Part number	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FCX619TA	AEC-Q101	619	7	12	1,000
FCX619-13R	AEC-Q101	619	13	12	4,000
FCX619QTA	Automotive	619	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. 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/product\\_compliance\\_definitions.html](http://www.diodes.com/product_compliance_definitions.html).
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



619 = 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>	50	V
Collector-Emitter Voltage	V <sub>CEO</sub>	50	V
Emitter-Base Voltage	V <sub>EBO</sub>	7	V
Continuous Collector Current	I <sub>C</sub>	3	A
Peak Pulse Current	I <sub>CM</sub>	6	A
Continuous Base Current	I <sub>B</sub>	500	mA

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

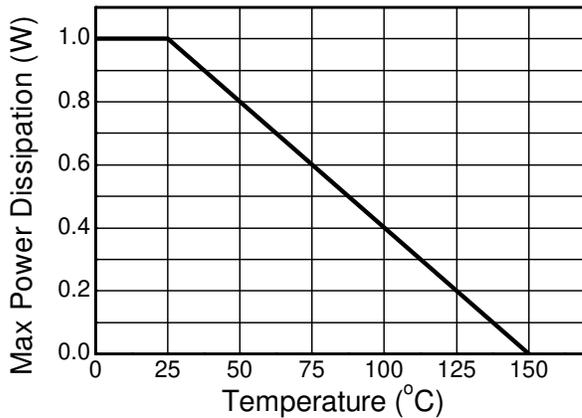
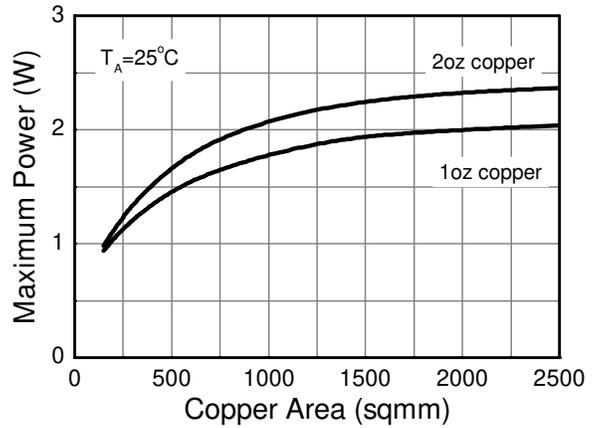
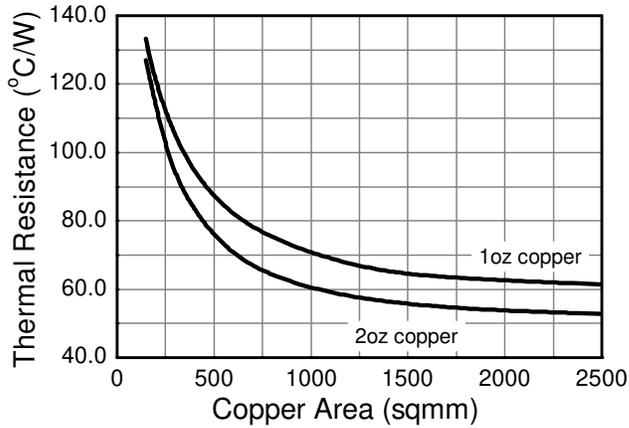
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 6)	P <sub>D</sub>	0.7	W
	(Note 7)		1.0	
	(Note 8)		1.5	
	(Note 9)		2.0	
Thermal Resistance, Junction to Ambient Air	(Note 6)	R <sub>θJA</sub>	178	°C/W
	(Note 7)		125	
	(Note 8)		83	
	(Note 9)		62.5	
Thermal Resistance, Junction to Lead	(Note 10)	R <sub>θJL</sub>	6	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

### ESD Ratings (Note 11)

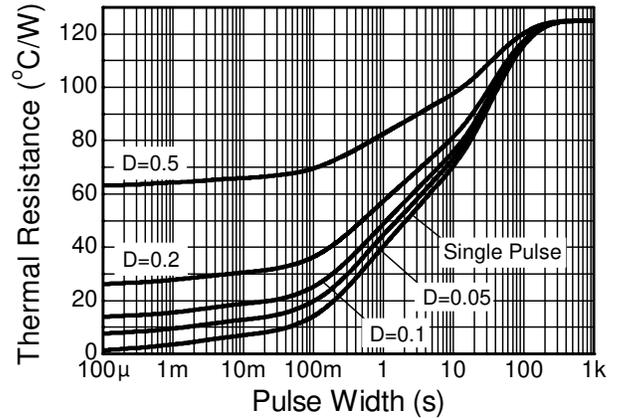
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
6. For a device mounted with the exposed collector pad on minimum recommended pad layout (MRP) 1oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  7. Same as Note 6, except the device is mounted with the exposed collector pad on 15mm x 15mm 1oz copper.
  8. Same as Note 6, except the device is mounted with the exposed collector pad on 25mm x 25mm 1oz copper.
  9. Same as Note 6, except the device is mounted with the exposed collector pad on 40mm x 40mm 1oz copper.
  10. Thermal resistance from junction to solder-point (on the exposed collector pad).
  11. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

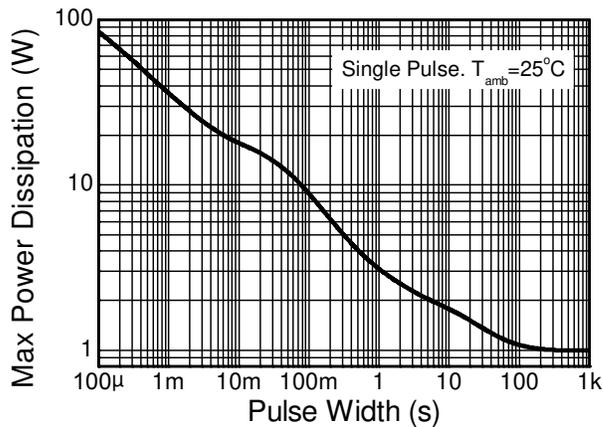
**Thermal Characteristics and Derating Information**



**Derating Curve**



**Transient Thermal Impedance**



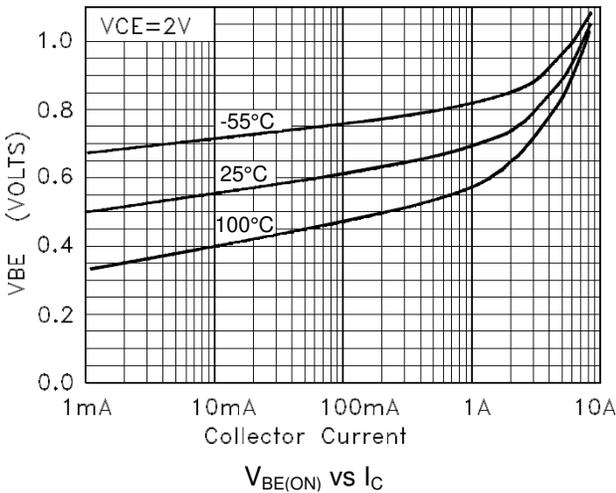
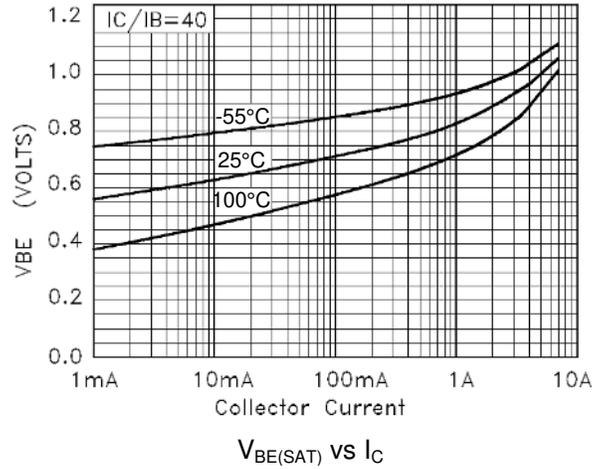
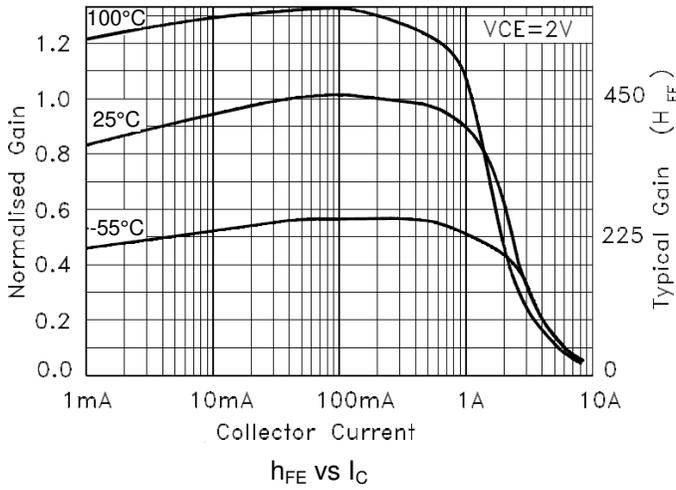
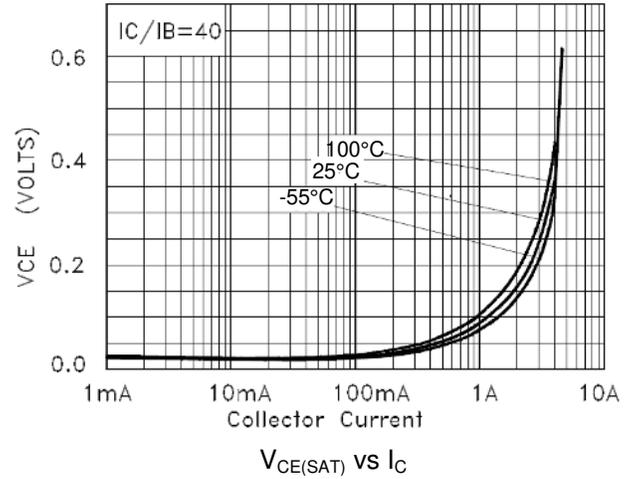
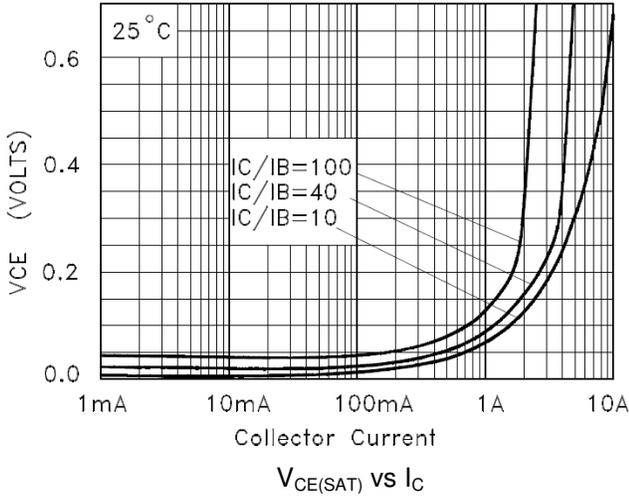
**Pulse Power Dissipation**

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

Characteristic	Symbol	Min	Typ.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CB0</sub>	50	190	—	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 12)	BV <sub>CEO</sub>	50	65	—	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7	8.3	—	V	I <sub>E</sub> = 100μA
Collector Cutoff Current	I <sub>CB0</sub>	—	—	100	nA	V <sub>CB</sub> = 40V
Emitter Cutoff Current	I <sub>EBO</sub>	—	—	100	nA	V <sub>EB</sub> = 5.6V
Emitter Cutoff Current	I <sub>CES</sub>	—	—	100	nA	V <sub>CES</sub> = 40V
DC Current Transfer Static Ratio (Note 12)	h <sub>FE</sub>	200 300 200 100 —	400 450 400 200 30	—	—	I <sub>C</sub> = 10mA, V <sub>CE</sub> = 2V I <sub>C</sub> = 200mA, V <sub>CE</sub> = 2V I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V I <sub>C</sub> = 2A, V <sub>CE</sub> = 2V I <sub>C</sub> = 6A, V <sub>CE</sub> = 2V
Collector-Emitter Saturation Voltage (Note 12)	V <sub>CE(sat)</sub>	—	13 150 190 240	25 220 260 320	mV	I <sub>C</sub> = 100mA, I <sub>B</sub> = 10mA I <sub>C</sub> = 1A, I <sub>B</sub> = 10mA I <sub>C</sub> = 2A, I <sub>B</sub> = 50mA I <sub>C</sub> = 2.75A, I <sub>B</sub> = 100mA
Base-Emitter Saturation Voltage (Note 12)	V <sub>BE(sat)</sub>	—	0.97	1.1	V	I <sub>C</sub> = 2.75A, I <sub>B</sub> = 100mA
Base-Emitter Turn-On Voltage (Note 12)	V <sub>BE(on)</sub>	—	0.89	1	V	I <sub>C</sub> = 2.75A, V <sub>CE</sub> = 2V
Transitional Frequency	f <sub>T</sub>	100	165	—	MHz	I <sub>C</sub> = 50mA, V <sub>CE</sub> = 10V f = 100MHz
Output Capacitance	C <sub>obo</sub>	—	12	20	pF	V <sub>CB</sub> = 10V, f = 1MHz,
Turn-On Time	t <sub>(on)</sub>	—	170	—	ns	V <sub>CC</sub> = 10V, I <sub>C</sub> = 1A
Turn-Off Time	t <sub>(off)</sub>	—	750	—	ns	I <sub>B1</sub> = 10mA, I <sub>B2</sub> = -10mA

Note: 12. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

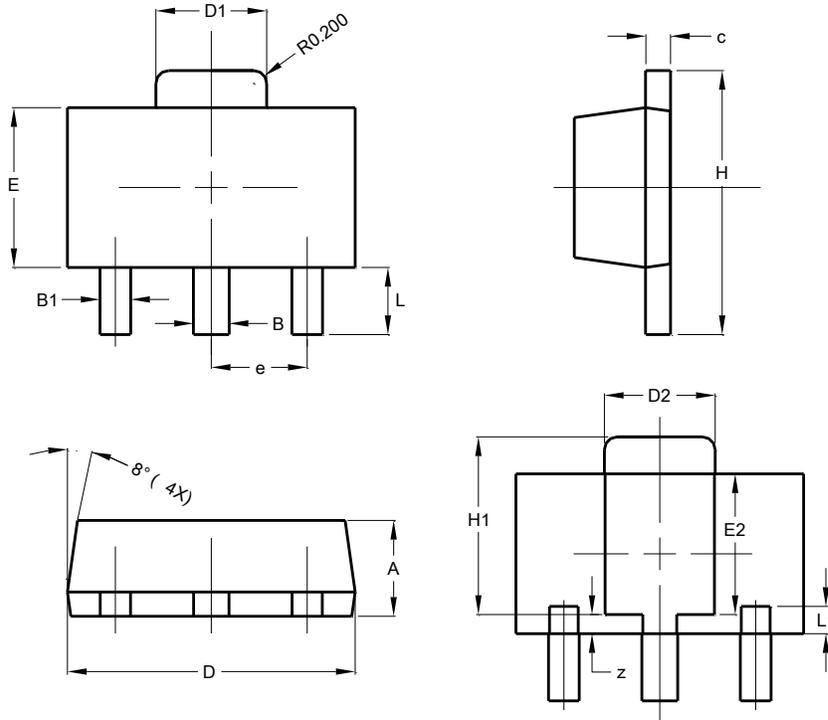
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



**Package Outline Dimensions**

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

**SOT89**

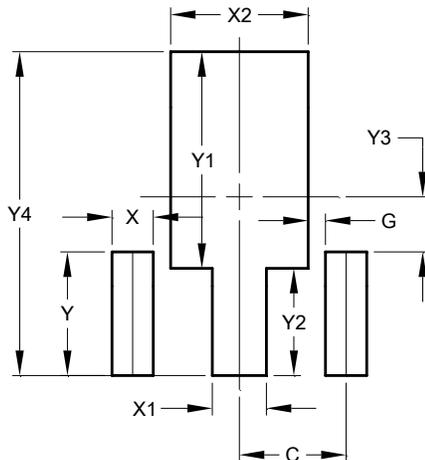


SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in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