

50V NPN LOW SATURATION POWER TRANSISTOR IN SOT89

Features

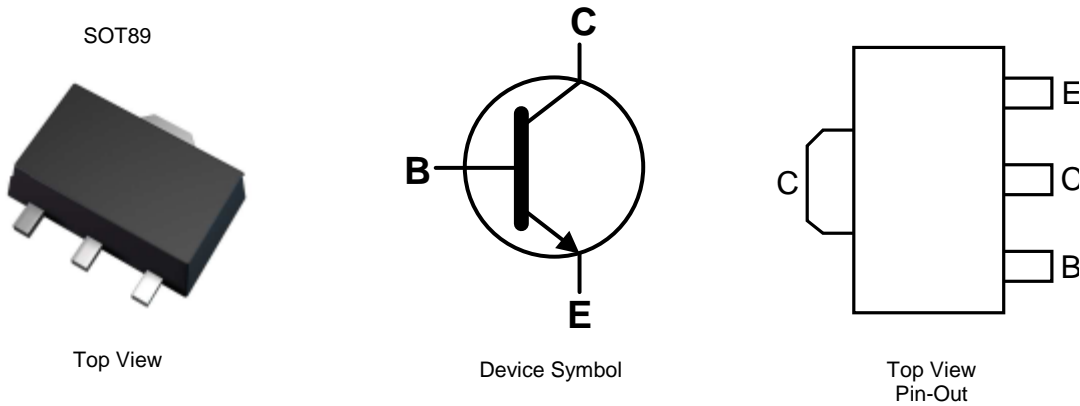
- $BV_{CEO} > 50V$
- $I_C = 3A$ High Continuous Collector Current
- I_{CM} up to 6A Peak Pulse Current
- 2W Power Dissipation
- Low Saturation Voltage $V_{CE(sat)} < 220mV @ 1A$
- $R_{CE(sat)} = 87m\Omega @ 2.75A$ for a Low Equivalent On-Resistance
- h_{FE} Characterized up to 6A for High Current Gain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

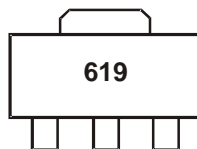


Ordering Information (Notes 4 and 5)

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 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.
 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_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	7	V
Continuous Collector Current	I _C	3	A
Peak Pulse Current	I _{CM}	6	A
Continuous Base Current	I _B	500	mA

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

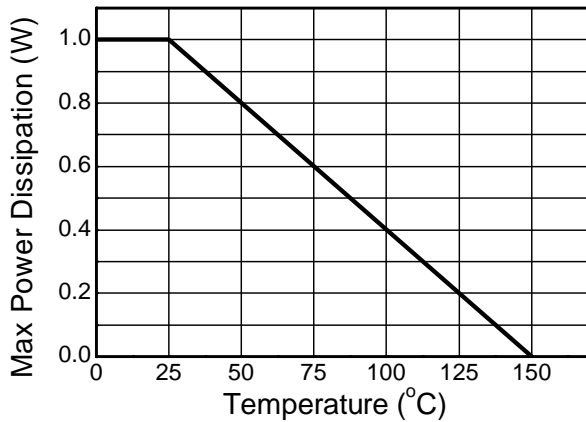
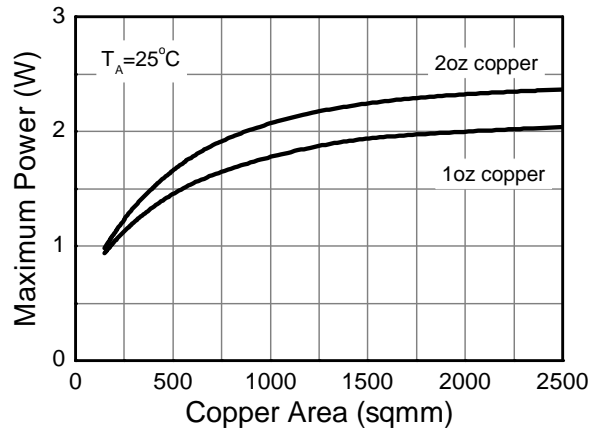
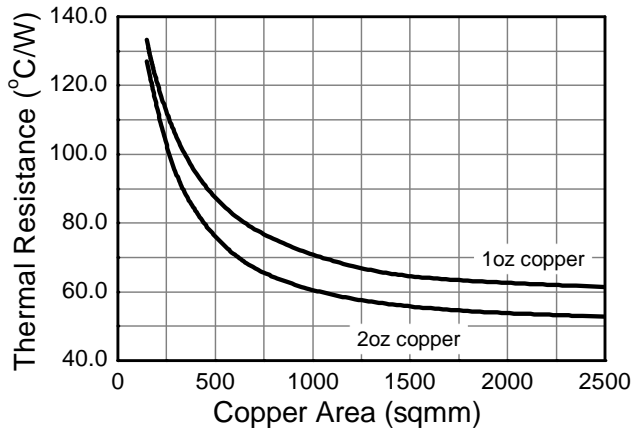
Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	(Note 6)	0.7
		(Note 7)	1.0
		(Note 8)	1.5
		(Note 9)	2.0
Thermal Resistance, Junction to Ambient Air	R _{θJA}	(Note 6)	178
		(Note 7)	125
		(Note 8)	83
		(Note 9)	62.5
Thermal Resistance, Junction to Lead	R _{θJL}	6	
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 11)

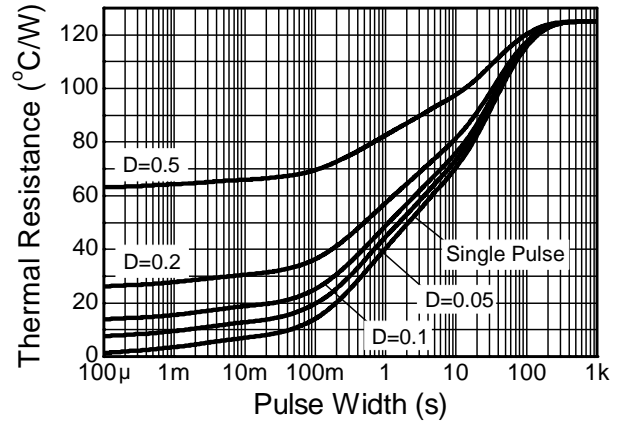
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- 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.

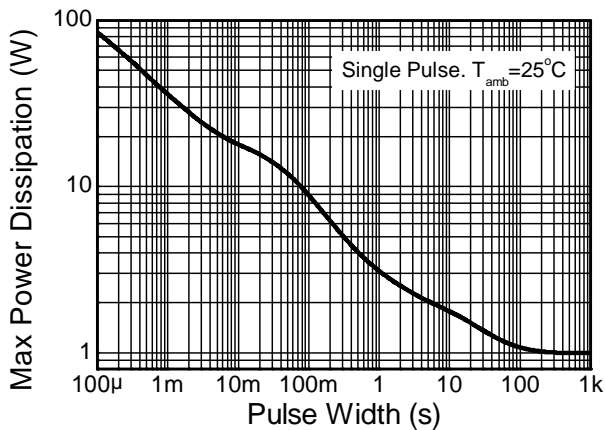
Thermal Characteristics and Derating Information



Derating Curve



Transient Thermal Impedance



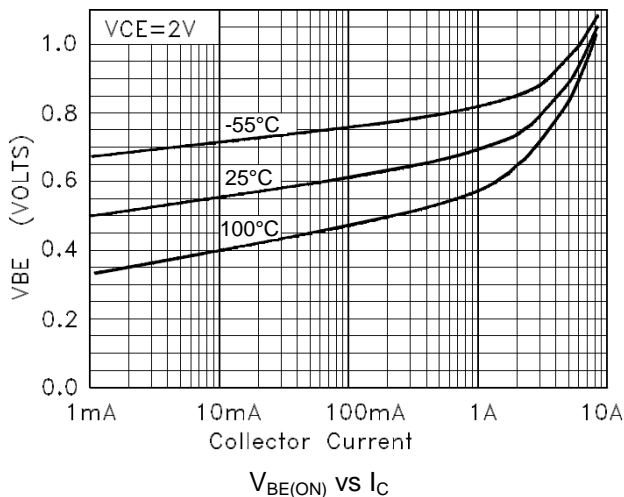
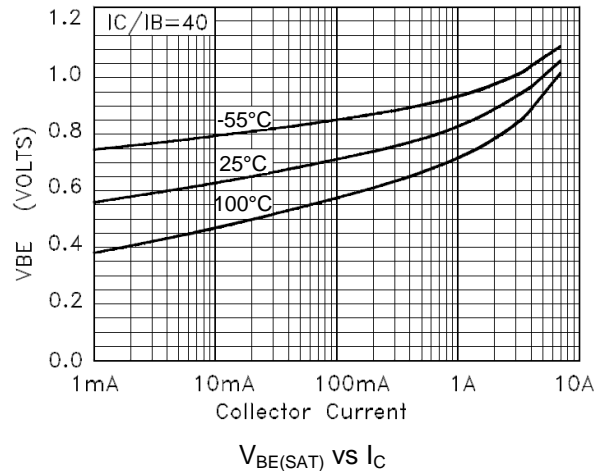
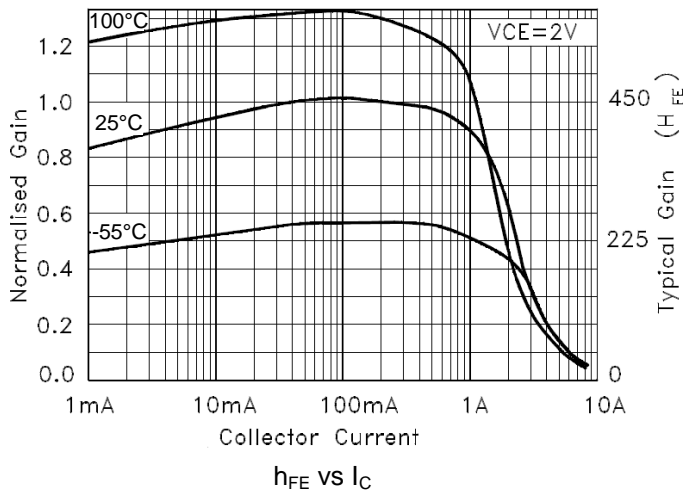
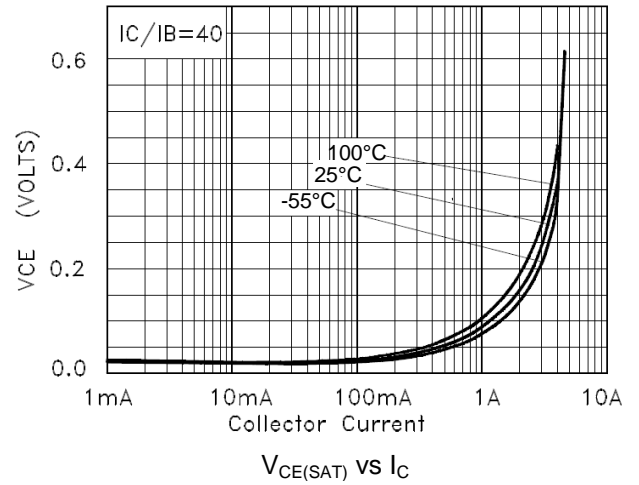
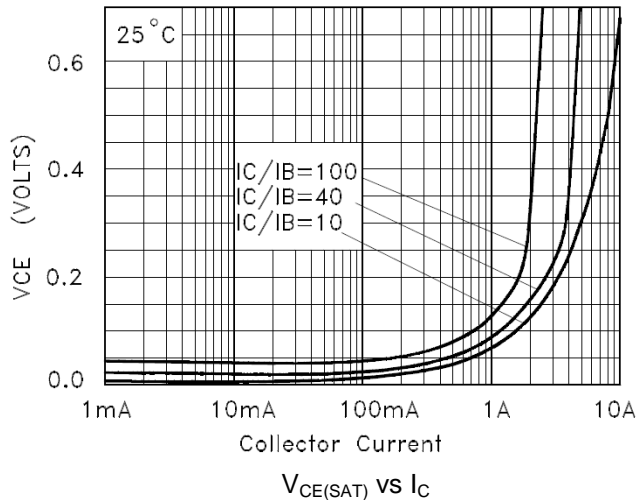
Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	50	190	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 12)	BV_{CEO}	50	65	—	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.3	—	V	$I_E = 100\mu\text{A}$
Collector Cutoff Current	I_{CBO}	—	—	100	nA	$V_{CB} = 40\text{V}$
Emitter Cutoff Current	I_{EBO}	—	—	100	nA	$V_{EB} = 5.6\text{V}$
Emitter Cutoff Current	I_{CES}	—	—	100	nA	$V_{CES} = 40\text{V}$
DC Current Transfer Static Ratio (Note 12)	h_{FE}	200 300 200 100 —	400 450 400 200 30	—	—	$I_C = 10\text{mA}, V_{CE} = 2\text{V}$ $I_C = 200\text{mA}, V_{CE} = 2\text{V}$ $I_C = 1\text{A}, V_{CE} = 2\text{V}$ $I_C = 2\text{A}, V_{CE} = 2\text{V}$ $I_C = 6\text{A}, V_{CE} = 2\text{V}$
Collector-Emitter Saturation Voltage (Note 12)	$V_{CE(sat)}$	—	13 150 190 240	25 220 260 320	mV	$I_C = 100\text{mA}, I_B = 10\text{mA}$ $I_C = 1\text{A}, I_B = 10\text{mA}$ $I_C = 2\text{A}, I_B = 50\text{mA}$ $I_C = 2.75\text{A}, I_B = 100\text{mA}$
Base-Emitter Saturation Voltage (Note 12)	$V_{BE(sat)}$	—	0.97	1.1	V	$I_C = 2.75\text{A}, I_B = 100\text{mA}$
Base-Emitter Turn-On Voltage (Note 12)	$V_{BE(on)}$	—	0.89	1	V	$I_C = 2.75\text{A}, V_{CE} = 2\text{V}$
Transitional Frequency	f_T	100	165	—	MHz	$I_C = 50\text{mA}, V_{CE} = 10\text{V}$ $f = 100\text{MHz}$
Output Capacitance	C_{obo}	—	12	20	pF	$V_{CB} = 10\text{V}, f = 1\text{MHz}$,
Turn-On Time	$t_{(on)}$	—	170	—	ns	$V_{CC} = 10\text{V}, I_C = 1\text{A}$
Turn-Off Time	$t_{(off)}$	—	750	—	ns	$I_{B1} = 10\text{mA}$, $I_{B2} = -10\text{mA}$

Note: 12. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

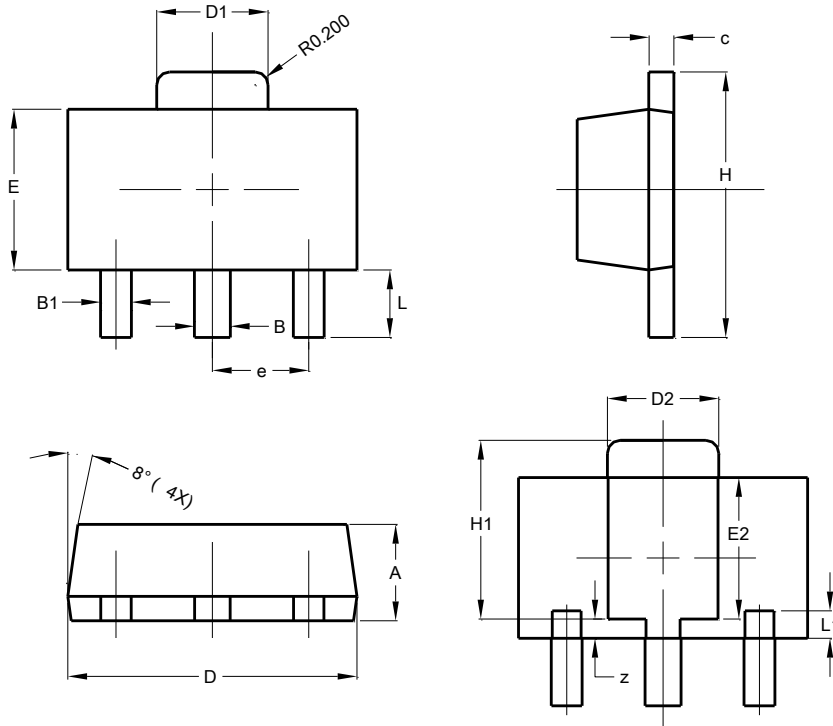
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

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

SOT89

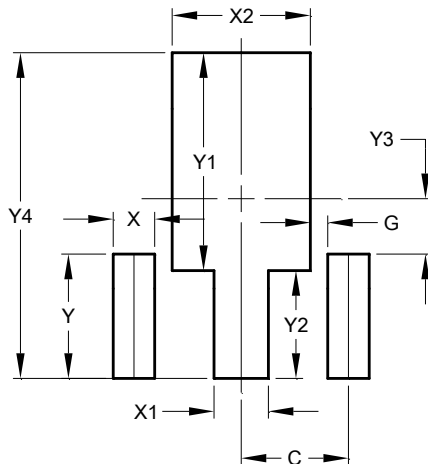


SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in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