

100V NPN MEDIUM POWER TRANSISTOR IN SOT89


Features

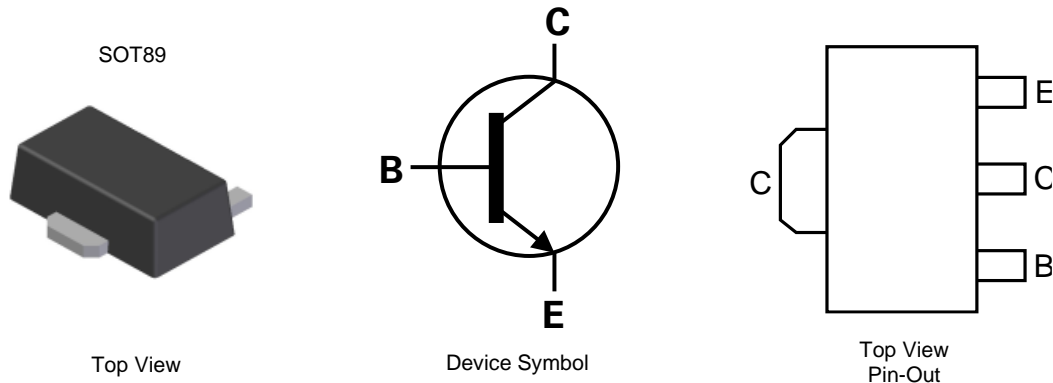
- $BV_{CEO} > 100V$
- $I_C = 1A$ High Continuous Current
- Low Saturation Voltage $V_{CE(sat)} < 300mV$ @ 250mA
- Complementary PNP Type: FCX593
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **An automotive-compliant part is available under separate datasheet ([FCX493Q](#))**

Application

- Load management functions
- Solenoids, relays and actuator drivers
- DC - DC modules

Mechanical Data

- Package: SOT89
- Package Material: Molded Plastic, "Green" Molding Compound.
UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish, Solderable per MIL-STD-202,
Method 208 
- Weight: 0.052 grams (Approximate)

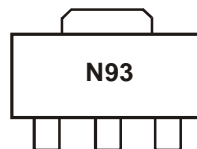


Ordering Information (Note 4)

Part Number	Package	Marking Code	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
FCX493TA	SOT89	N93	7	12	1000	Reel
FCX493-13R	SOT89	N93	13	12	4000	Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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



N93 = Product Type Marking Code

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	120	V
Collector-Emitter Voltage	V _{CEO}	100	V
Emitter-Base Voltage	V _{EB0}	7	V
Continuous Collector Current	I _C	1	A
Peak Pulse Current	I _{CM}	2	A
Continuous Base Current	I _B	200	mA

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

Characteristic	Symbol	Value	Unit
Collector Power Dissipation (Note 5)	P _D	1	W
Thermal Resistance, Junction to Ambient Air (Note 5)	R _{θJA}	125	°C/W
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	16	°C/W
Thermal Resistance, Junction to Leads (Note 7)	R _{θJL}	10.01	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-65 to +150	°C

Notes: 5. For the device mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
6. Thermal resistance from junction to the top of the case.
7. Thermal resistance from junction to solder-point (on the exposed collector pad).

Thermal Characteristics and Derating Information

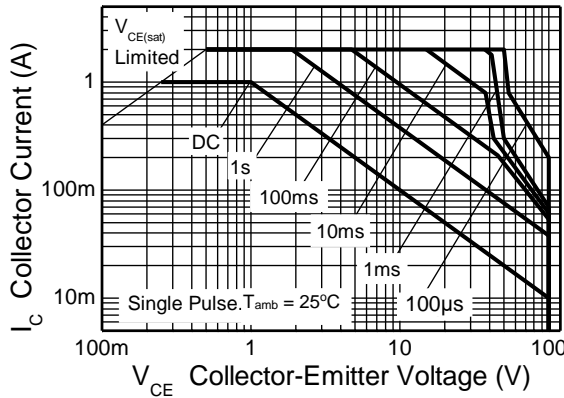


Figure 1. Safe Operating Area

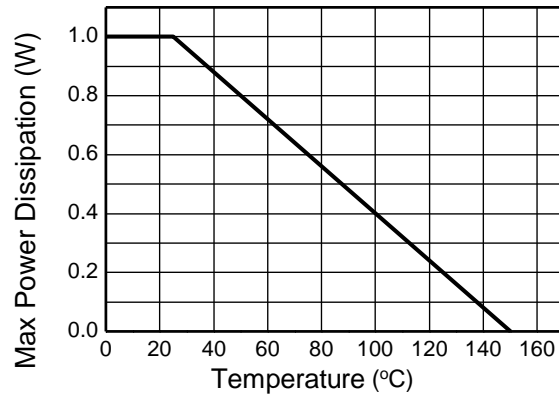


Figure 2. Derating Curve

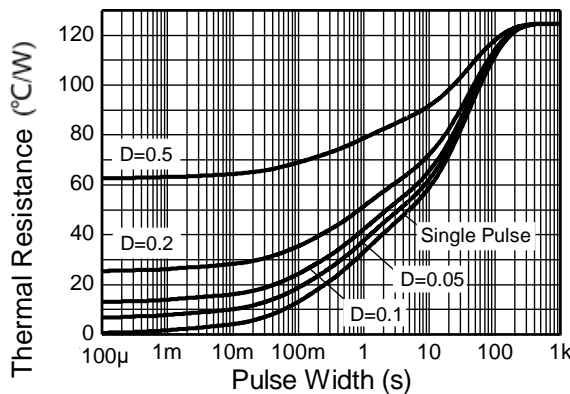


Figure 3. Transient Thermal Impedance

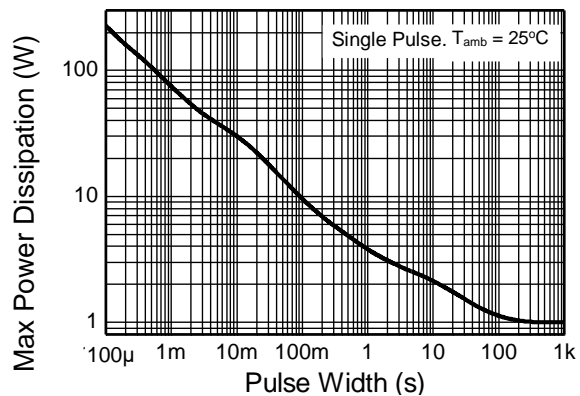


Figure 4. Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	120	—	—	V	I _C = 100μA
Collector-Emitter Breakdown Voltage (Note 8)	BV _{CEO}	100	—	—	V	I _C = 1mA
Emitter-Base Breakdown Voltage	BV _{EBO}	7	—	—	V	I _E = 100μA
Collector Cutoff Current	I _{CBO}	—	—	100	nA	V _{CB} = 100V
Emitter Cutoff Current	I _{EBO}	—	—	100	nA	V _{EB} = 5V
Emitter Cutoff Current	I _{CES}	—	—	100	nA	V _{CES} = 100V
DC Current Transfer Static Ratio (Note 8)	h _{FE}	100 100 60 20	— — — —	— 300 — —	—	I _C = 1mA, V _{CE} = 10V I _C = 250mA, V _{CE} = 10V I _C = 500mA, V _{CE} = 10V I _C = 1A, V _{CE} = 10V
Collector-Emitter Saturation Voltage (Note 8)	V _{CE(sat)}	— —	— —	0.3 0.6	V	I _C = 500mA, I _B = 50mA I _C = 1A, I _B = 100mA
Base-Emitter Saturation Voltage (Note 8)	V _{BE(sat)}	—	—	1.15	V	I _C = 1A, I _B = 100mA
Base-Emitter Turn-On Voltage (Note 8)	V _{BE(on)}	—	—	1.0	V	I _C = 1A, V _{CE} = 10V
Transitional Frequency	f _T	150	—	—	MHz	I _C = 50mA, V _{CE} = 10V f = 100MHz
Output Capacitance	C _{obo}	—	—	10	pF	V _{CB} = 10V, f = 1MHz

Note: 8. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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

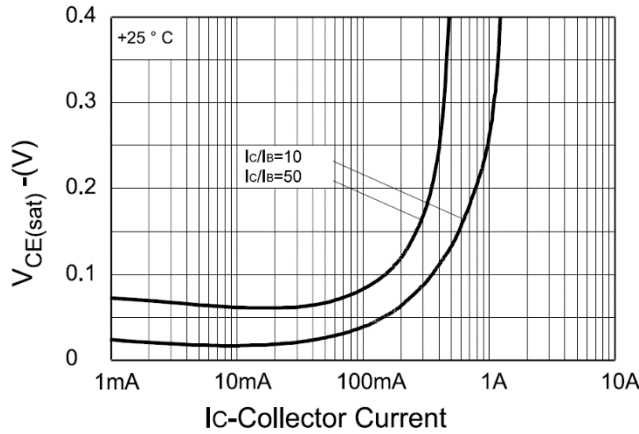


Figure 5. $V_{CE(sat)} \text{ v } I_C$

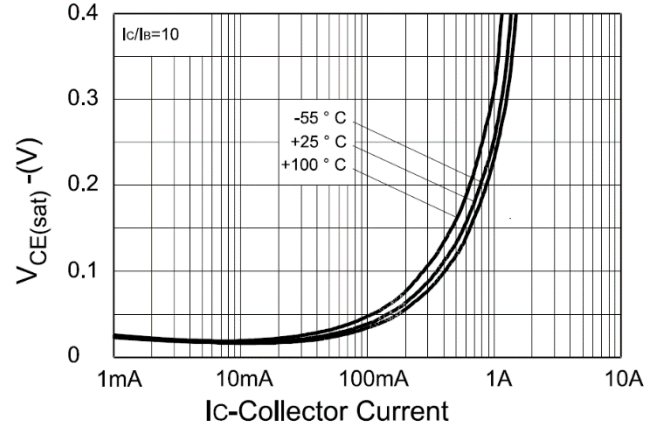


Figure 6. $V_{CE(sat)} \text{ v } I_C$

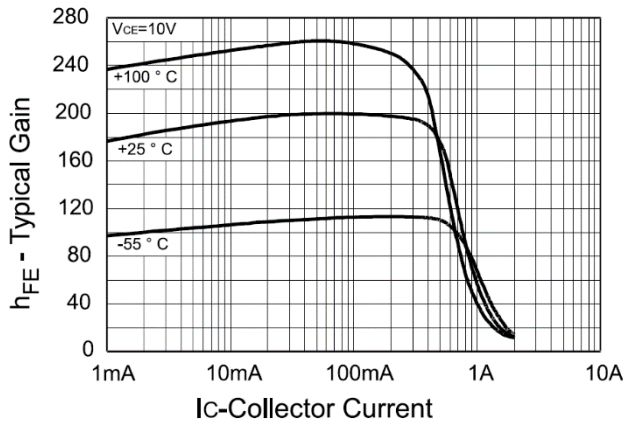


Figure 7. $h_{FE} \text{ v } I_C$

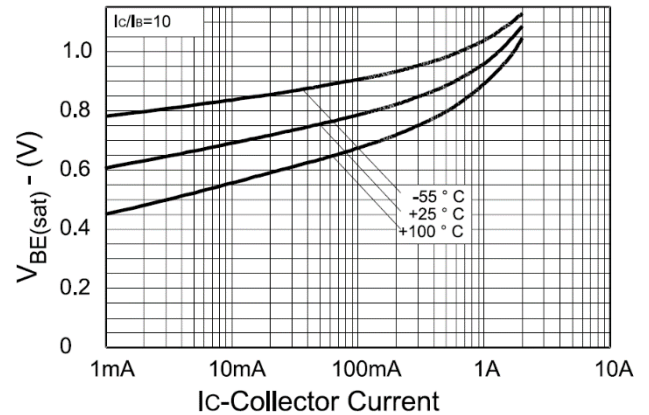


Figure 8. $V_{BE(sat)} \text{ v } I_C$

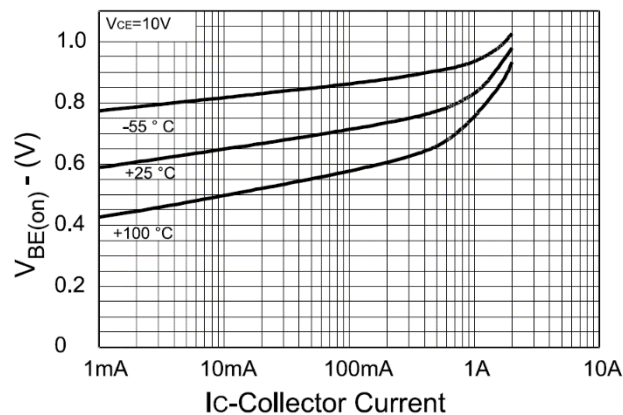
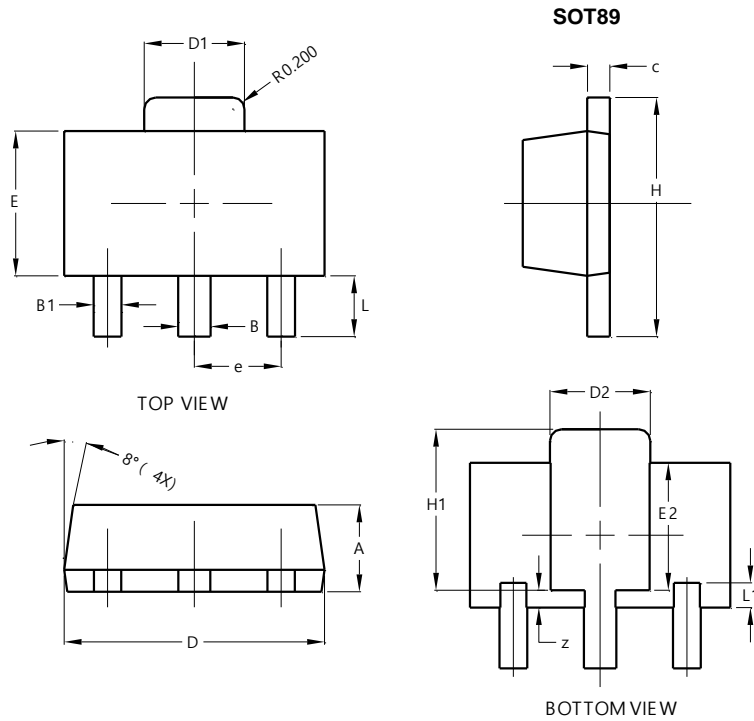


Figure 9. $V_{BE(on)} \text{ v } I_C$

Package Outline Dimensions

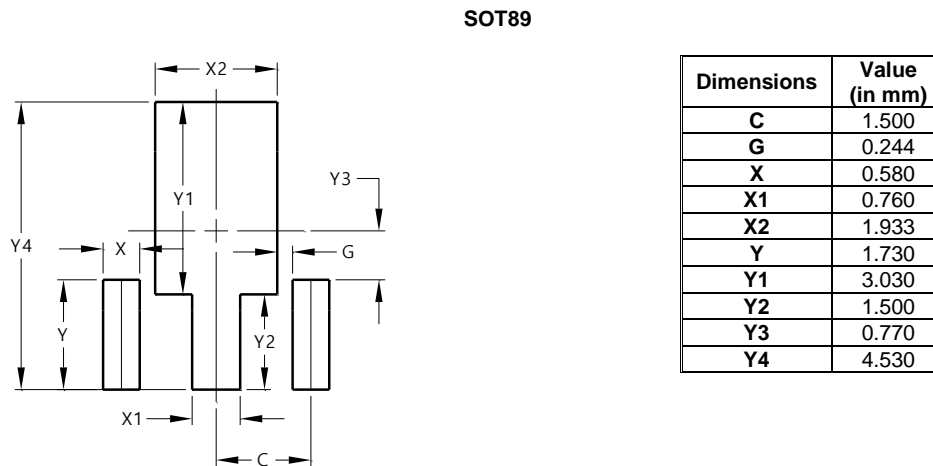
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



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.



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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