





#### 100V NPN SILICON PLANAR MEDIUM POWER TRANSISTOR IN SOT89

#### **Features**

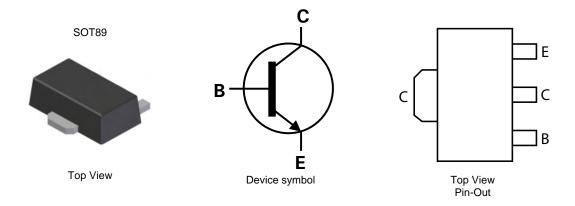
- BV<sub>CEO</sub> > 100V
- I<sub>C</sub> = 1A high Continuous Current
- Low saturation voltage V<sub>CE(sat)</sub> < 300mV @ 250mA</li>
- Complementary PNP type: FCX593
- Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

# Application

- · Load management functions
- · Solenoid, relay and actuator drivers
- DC DC modules

#### **Mechanical Data**

- Case: SOT89
- Case Material: Molded Plastic, "Green" Molding Compound
- Moisture Sensitivity: Level 1 per J-STD-020
- UL Flammability Rating 94V-0
- Terminals: Matte Tin Finish, Solderable per MIL-STD-202, Method 208 <a href="#e3">63</a>
- Weight: 0.052 grams (Approximate)



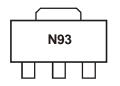
### **Ordering Information** (Note 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FCX493TA	N93	7	12	1000
FCX493-13R	N93	13	12	4000

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 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.

### **Marking Information**



N93 = Product Type Marking Code



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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	120	V
Collector-Emitter Voltage	V <sub>CEO</sub>	100	V
Emitter-Base Voltage	$V_{EBO}$	7	V
Continuous Collector Current	Ic	1	Α
Peak Pulse Current	Ісм	2	Α
Continuous Base Current	Ι <sub>Β</sub>	200	mA

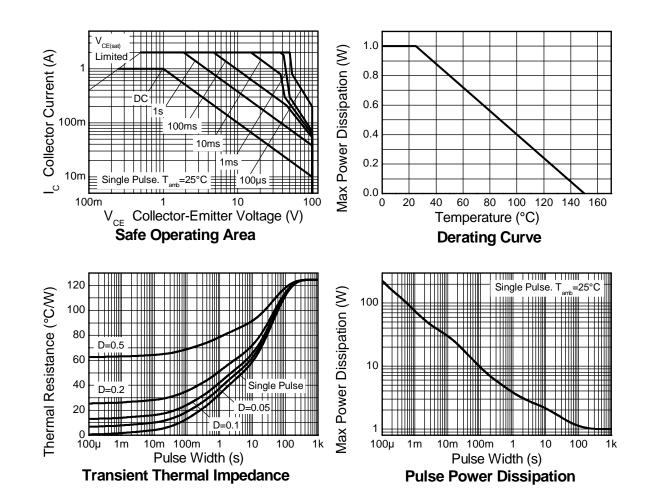
### Thermal Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector Power Dissipation (Note 5)	$P_{D}$	1	W
Thermal Resistance, Junction to Ambient Air (Note 5)	$R_{\theta JA}$	125	°C/W
Thermal Resistance, Junction to Leads (Note 6)	$R_{ heta JL}$	10.01	°C/W
Operating and Storage Temperature Range	$T_{J,}T_{STG}$	-65 to +150	°C

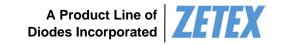
Notes: 5. For the device mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

6. Thermal resistance from junction to solder-point (on the exposed collector pad).

### Thermal Characteristics and Derating Information







October 2012

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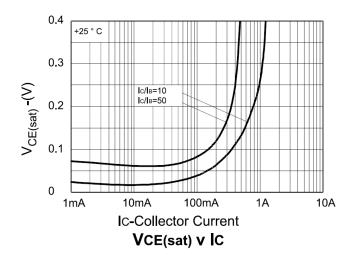
# Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

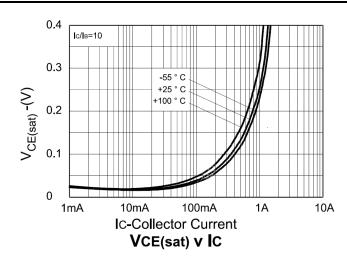
Characteristic	Symbol	Min	Тур.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	120	-	-	V	$I_C = 100\mu A$
Collector-Emitter Breakdown Voltage (Note 7)	BV <sub>CEO</sub>	100	-	-	V	$I_C = 1mA$
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7	-	-	V	$I_E = 100\mu A$
Collector Cutoff Current	I <sub>CBO</sub>	-	-	100	nA	V <sub>CB</sub> = 100V
Emitter Cutoff Current	I <sub>EBO</sub>	=	-	100	nA	$V_{EB} = 5V$
Emitter Cutoff Current	I <sub>CES</sub>	-	-	100	nA	V <sub>CES</sub> = 100V
DC current transfer Static ratio (Note 7)	h <sub>FE</sub>	100 100 60 20	- - - -	300 - -	-	$\begin{split} I_{C} &= 1 \text{mA}, \ V_{CE} = 10 \text{V} \\ I_{C} &= 250 \text{mA}, \ V_{CE} = 10 \text{V} \\ I_{C} &= 500 \text{mA}, \ V_{CE} = 10 \text{V} \\ I_{C} &= 1A, \ V_{CE} = 10 \text{V} \end{split}$
Collector-Emitter Saturation Voltage (Note 7)	V <sub>CE(sat)</sub>	-	-	0.3 0.6	V	$I_C = 500 \text{mA}, I_B = 50 \text{mA}$ $I_C = 1A, I_B = 100 \text{mA}$
Base-Emitter Saturation Voltage (Note 7)	V <sub>BE(sat)</sub>	-	-	1.15	V	$I_C = 1A$ , $I_B = 100mA$
Base-Emitter Turn-on Voltage (Note 7)	$V_{BE(on)}$	-	-	1.0	V	I <sub>C</sub> = 1A, V <sub>CE</sub> = 10V
Transitional Frequency	f <sub>T</sub>	150	-	-	MHz	I <sub>C</sub> = 50mA, V <sub>CE</sub> = 10V f = 100MHz
Output capacitance	C <sub>obo</sub>	-	-	10	pF	$V_{CB} = 10V$ , $f = 1MHz$ ,

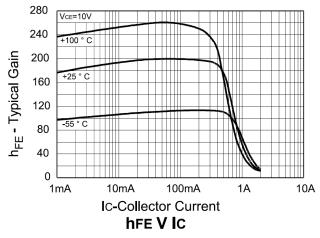
Notes: 7. Measured under pulsed conditions. Pulse width  $\leq$  300 $\mu$ s. Duty cycle  $\leq$  2%.

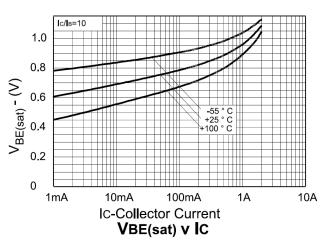


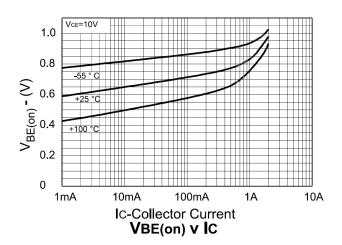
# Typical Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)







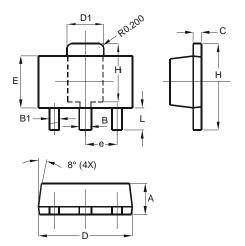






## **Package Outline Dimensions**

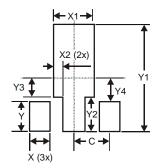
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SOT89				
Dim	Min	Max		
Α	1.40	1.60		
В	0.44	0.62		
B1	0.35	0.54		
С	0.35	0.44		
D	4.40	4.60		
D1	1.62	1.83		
Е	2.29	2.60		
е	1.50 Typ			
Н	3.94	4.25		
H1	2.63	2.93		
L	0.89	1.20		
All Dimensions in mm				

# **Suggested Pad Layout**

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.



Dimensions	Value (in mm)
Х	0.900
X1	1.733
X2	0.416
Υ	1.300
Y1	4.600
Y2	1.475
Y3	0.950
Y4	1.125
С	1.500





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