

**FCX591A**

**40V PNP SILICON PLANAR MEDIUM POWER TRANSISTOR IN SOT89**

**Features**

- $BV_{CEO} > -40V$
- $I_C = -1A$  Continuous Collector Current
- Low saturation voltage  $V_{CE(sat)} < -500mV @ -1A$
- Complementary NPN type: FCX491A
- **Lead-Free, RoHS Compliant (Note 1)**
- **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 (Note 3)
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish
- Weight: 0.052 grams (Approximate)

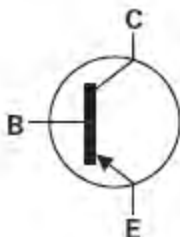
**Application**

- Power MOSFET & IGBT gate driving
- Low loss power switching

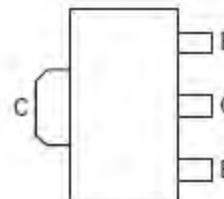
SOT89



Top View



Device symbol



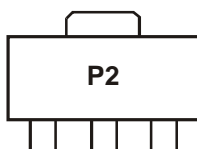
Pin-out Top

**Ordering Information** (Note 2)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FCX591ATA	P2	7	12	1000
FCX591A-7 (Note 3)	P2	7	12	1000

- Notes:
1. No purposefully added lead.
  2. For packaging details, go to our website at <http://www.diodes.com>.
  3. FCX591A-7 are Halogen and Antimony Free. Diodes Inc's "Green" Policy can be found on our website at <http://www.diodes.com>

**Marking Information**



P2 = Product Type Marking Code

**Maximum Ratings** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

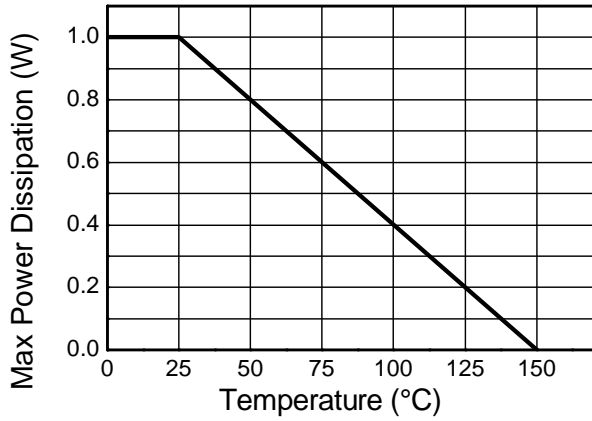
Characteristic	Symbol	Limit	Unit
Collector-Base Voltage	$V_{CB0}$	-40	V
Collector-Emitter Voltage	$V_{CEO}$	-40	V
Emitter-Base Voltage	$V_{EBO}$	-5	V
Continuous Collector Current	$I_C$	-1	A
Peak Pulse Current	$I_{CM}$	-2	A
Peak Base Current	$I_B$	-200	mA

**Thermal Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

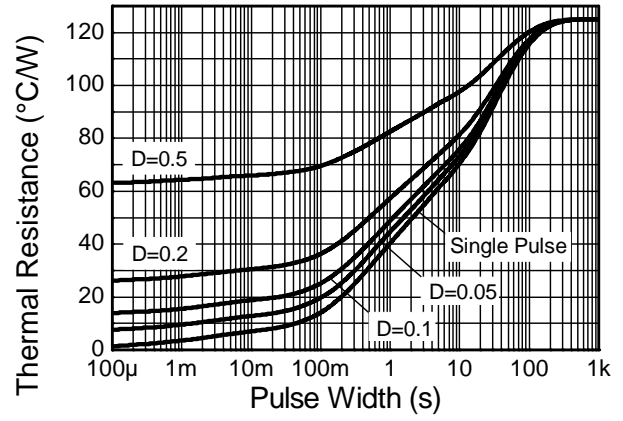
Characteristic	Symbol	Value	Unit
Power Dissipation	$P_D$	1	W
Linear Derating Factor		8	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	125	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Lead	$R_{\theta JL}$	10	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-65 to +150	$^\circ\text{C}$

- Notes:
- 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; the device is measured when operating in a steady-state condition.
  - Thermal resistance from junction to solder-point (at the end of the collector lead).

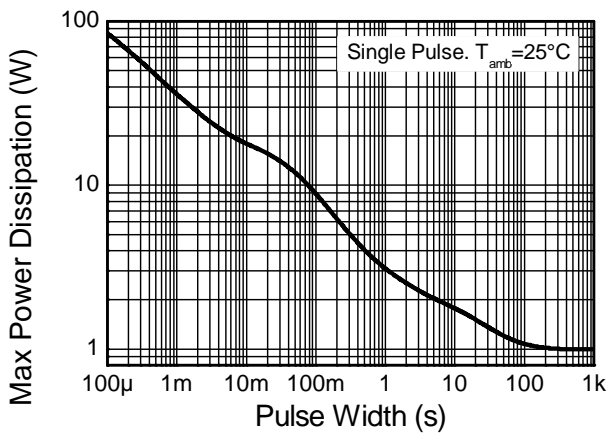
**Thermal Characteristics**



**Derating Curve**



**Transient Thermal Impedance**



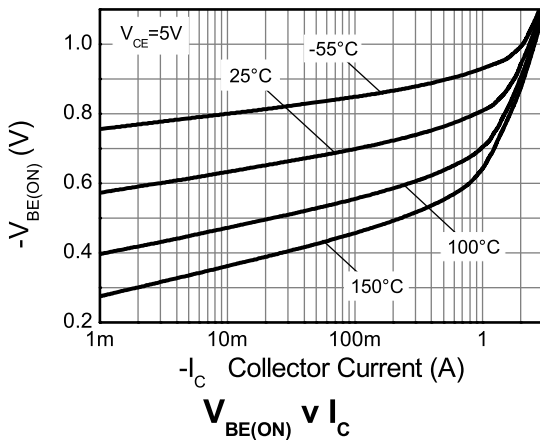
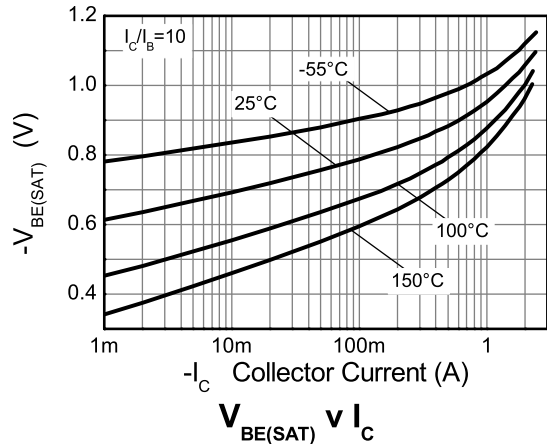
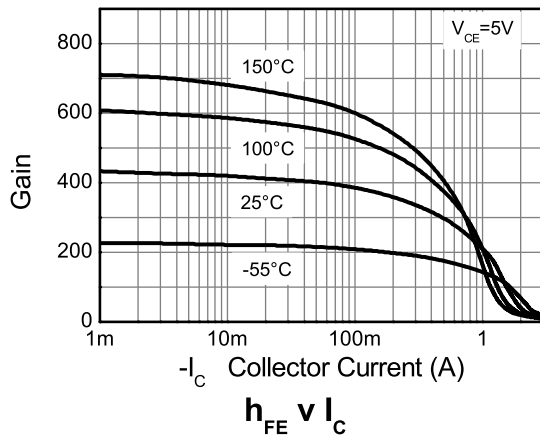
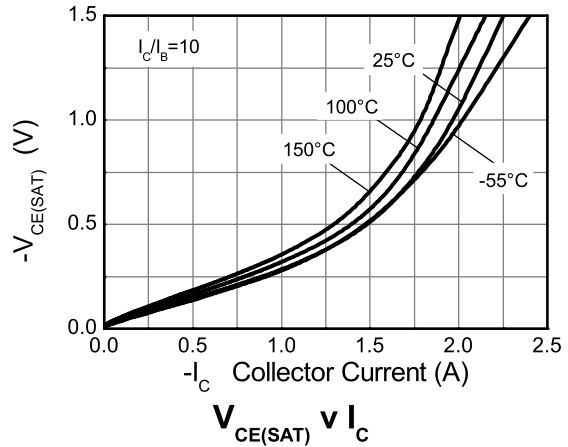
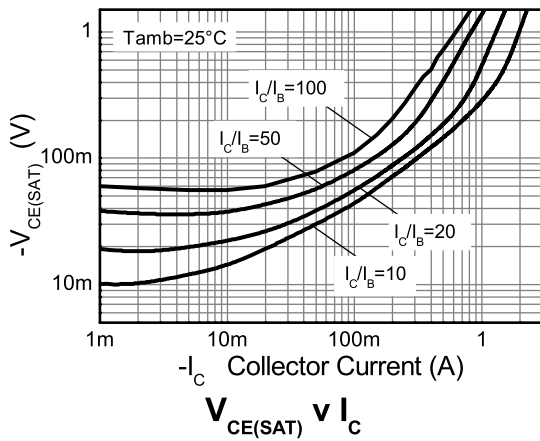
**Pulse Power Dissipation**

**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

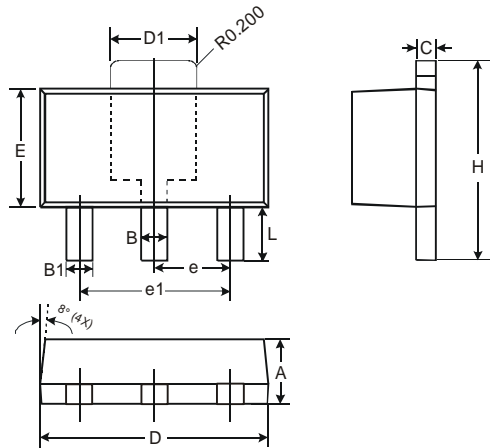
Characteristic	Symbol	Min	Typ.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CB0</sub>	-40	-	-	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 6)	BV <sub>CEO</sub>	-40	-	-	V	I <sub>C</sub> = -10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-5	-	-	V	I <sub>E</sub> = -100μA
Collector Cutoff Current	I <sub>CB0</sub>	-	-	-100	nA	V <sub>CB</sub> = -30V
Emitter Cutoff Current	I <sub>EBO</sub>	-	-	-100	nA	V <sub>EB</sub> = -4V
Emitter Cutoff Current	I <sub>CES</sub>	-	-	-100	nA	V <sub>CES</sub> = -30V
DC current transfer Static ratio (Note 6)	h <sub>FE</sub>	300	-	-	-	I <sub>C</sub> = -1mA, V <sub>CE</sub> = -5V
		300	-	800		I <sub>C</sub> = -100mA, V <sub>CE</sub> = -5V
		250	-	-		I <sub>C</sub> = -500mA, V <sub>CE</sub> = -5V
		160	-	-		I <sub>C</sub> = -1A, V <sub>CE</sub> = -5V
		30	-	-		I <sub>C</sub> = -2A, V <sub>CE</sub> = -5V
Collector-Emitter Saturation Voltage (Note 6)	V <sub>CE(sat)</sub>	-	-	-0.2	V	I <sub>C</sub> = -100mA, I <sub>B</sub> = -1mA
		-	-	-0.35		I <sub>C</sub> = -500mA, I <sub>B</sub> = -20mA
		-	-	-0.5		I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA
Base-Emitter Saturation Voltage (Note 6)	V <sub>BE(sat)</sub>	-	-	-1.1	V	I <sub>C</sub> = -1A, I <sub>B</sub> = -50mA
Base-Emitter Turn-on Voltage (Note 6)	V <sub>BE(on)</sub>	-	-	-1.0	V	I <sub>C</sub> = -1A, V <sub>CE</sub> = -5V
Transitional Frequency	f <sub>T</sub>	150	-	-	MHz	I <sub>E</sub> = -50mA, V <sub>CE</sub> = -10V f = 100MHz
Output capacitance	C <sub>obo</sub>	-	-	10	pF	V <sub>CB</sub> = -10V, f = 1MHz,

Notes: 6. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

**Typical Electrical Characteristics**

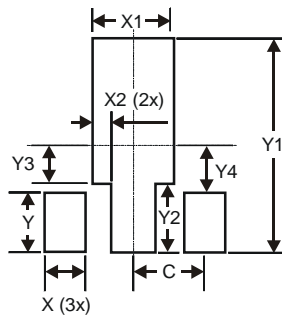


## Package Outline Dimensions



SOT89		
Dim	Min	Max
A	1.40	1.60
B	0.44	0.62
B1	0.35	0.54
C	0.35	0.43
D	4.40	4.60
D1	1.52	1.83
E	2.29	2.60
e	1.50 Typ	
e1	3.00 Typ	
H	3.94	4.25
L	0.89	1.20
All Dimensions in mm		

## Suggested Pad Layout



Dimensions	Value (in mm)
X	0.900
X1	1.733
X2	0.416
Y	1.300
Y1	4.600
Y2	1.475
Y3	0.950
Y4	1.125
C	1.500

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