

**FCX591A**

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

**Features**

- $V_{(BR)CEO} > -40V$
- High current capability  $I_C = -1A$
- Low saturation voltage  $V_{CE(sat)} < -500mV @ -1A$
- Complementary NPN type: FCX491A
- "Lead Free", RoHS Compliant (Note 1)

**Application**

- Power MOSFET gate driving
- Low loss power switching

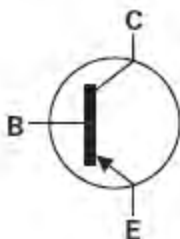
**Mechanical Data**

- Case: SOT89
- Moisture Sensitivity: Level 1 per J-STD-020
- UL Flammability Rating 94V-0
- Terminals: Matte Tin Finish
- Weight: 0.052 grams (Approximate)

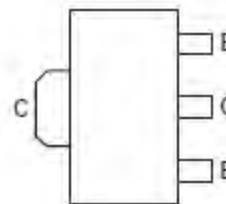
SOT89



Top View



Device symbol



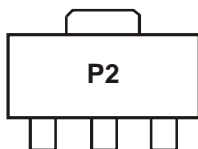
Pin-out Top

**Ordering Information** (Note 2)

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

- Notes:
1. No purposefully added lead.
  2. For packaging details, go to our website at <http://www.diodes.com>.
  3. Halogen and Antimony Free. "Green" devices, 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

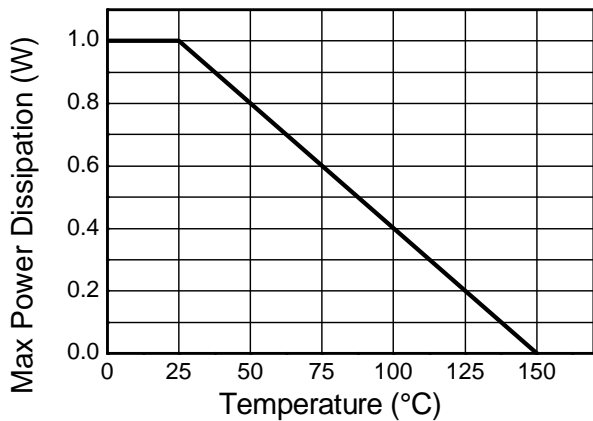
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CB0}$	-40	V
Collector-Emitter Voltage	$V_{CEO}$	-40	V
Emitter-Base Voltage	$V_{EBO}$	-5	V
Continuous Collector Current	$I_C$	-1	A
Peak Pulse Current	$I_{CM}$	-2	A
Peak Base Current	$I_B$	-200	mA

**Thermal Characteristics**

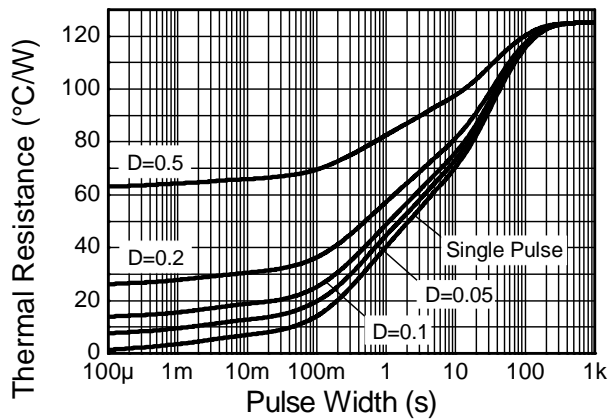
Characteristic	Symbol	Value	Unit
Collector Power Dissipation	$P_D$	1	W
Thermal Resistance, Junction to Ambient Air (Note 4) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	125	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-65 to +150	$^\circ\text{C}$

Notes: 4. 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.

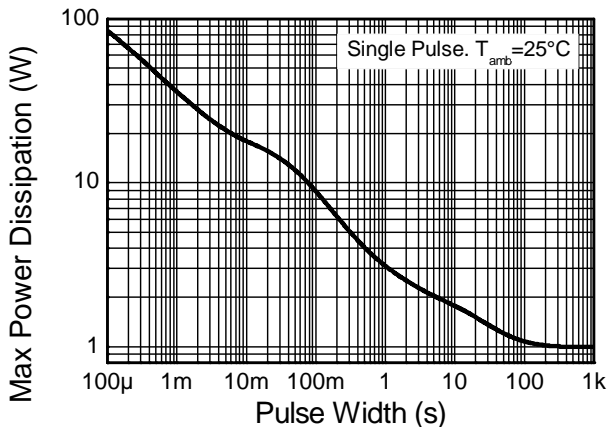
**Thermal Characteristics**



**Derating Curve**



**Transient Thermal Impedance**



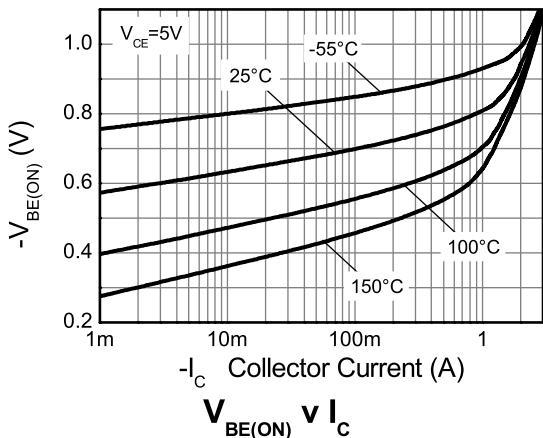
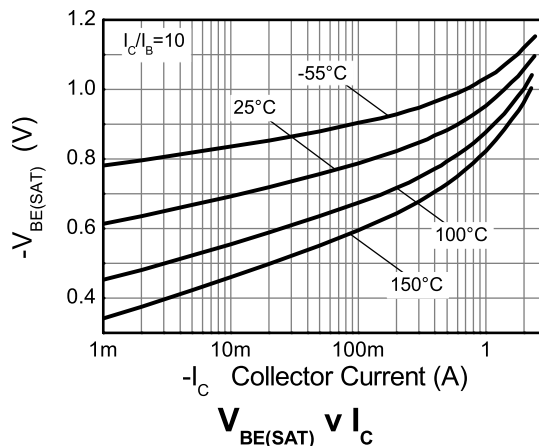
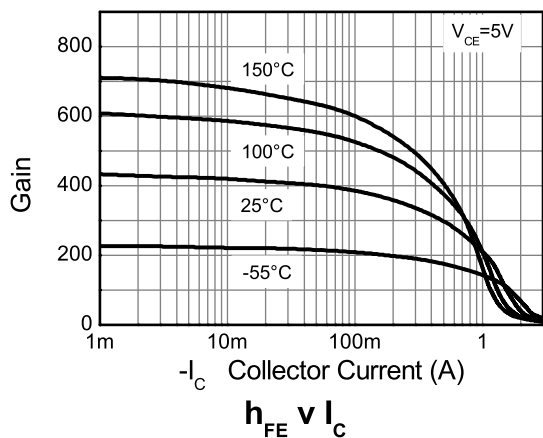
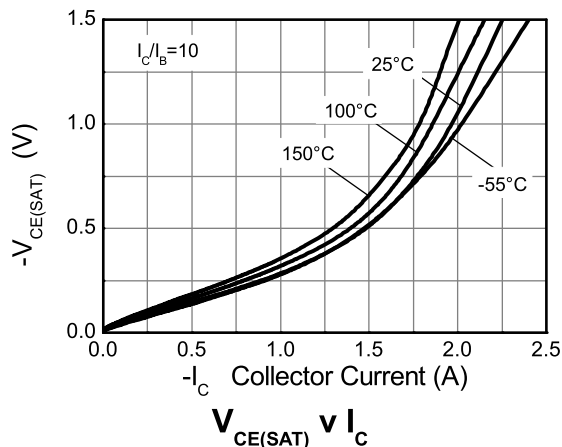
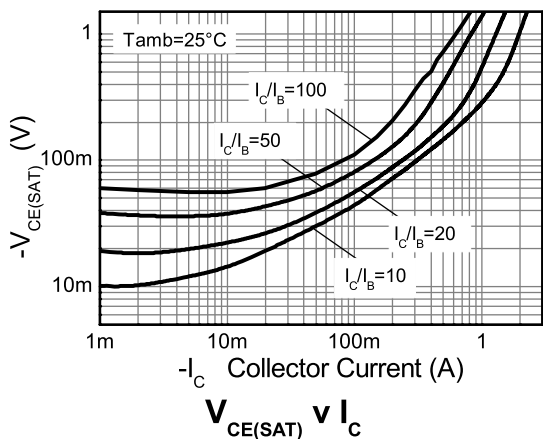
**Pulse Power Dissipation**

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

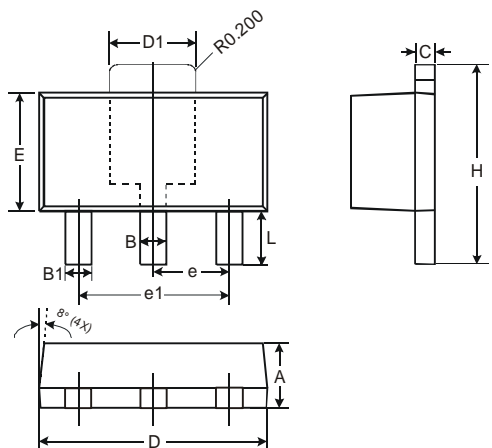
Characteristic	Symbol	Min	Typ.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-40	-	-	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 5)	$V_{(BR)CEO}$	-40	-	-	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-5	-	-	V	$I_E = -100\mu\text{A}$
Collector Cutoff Current	$I_{CBO}$	-	-	-100	nA	$V_{CB} = -30\text{V}$
Emitter Cutoff Current	$I_{EBO}$	-	-	-100	nA	$V_{EB} = -4\text{V}$
Emitter Cutoff Current	$I_{CES}$	-	-	-100	nA	$V_{CES} = -30\text{V}$
DC current transfer Static ratio (Note 5)	$h_{FE}$	300	-	-	-	$I_C = -1\text{mA}$
		300	-	800		$I_C = -100\text{mA}$
		250	-	-		$I_C = -500\text{mA}, V_{CE} = -5\text{V}$
		160	-	-		$I_C = -1\text{A}$
		30	-	-		$I_C = -2\text{A}$
Collector-Emitter Saturation Voltage (Note 5)	$V_{CE(sat)}$	-	-	-0.2	V	$I_C = -100\text{mA}, I_B = -1\text{mA}$
		-	-	-0.35		$I_C = -500\text{mA}, I_B = -20\text{mA}$
		-	-	-0.5		$I_C = -1\text{A}, I_B = -100\text{mA}$
Base-Emitter Saturation Voltage (Note 5)	$V_{BE(sat)}$	-	-	-1.1	V	$I_C = -1\text{A}, I_B = -50\text{mA}$
Base-Emitter Turn-on Voltage (Note 5)	$V_{BE(on)}$	-	-	-1.0	V	$I_C = -1\text{A}, V_{CE} = -5\text{V}$
Transitional Frequency	$f_T$	150	-	-	MHz	$I_E = -50\text{mA}, V_{CE} = -10\text{V}$ $f = 100\text{MHz}$
Output capacitance	$C_{obo}$	-	-	10	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$

Notes: 5. Measured under pulsed conditions. Pulse width = 300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

**Typical Characteristics**

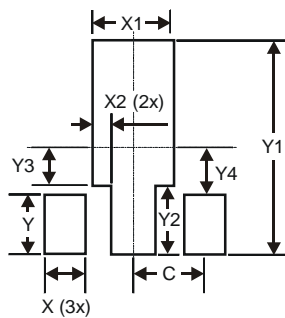


**Package Outline Dimensions**



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
<b>All Dimensions in mm</b>		

**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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