FCX493A

60V NPN MEDIUM POWER HIGH GAIN TRANSISTOR IN SOT89

Features

- BV_{CEO} > 60V
- I_C = 1A high Continuous Collector Current
- I_{CM} = 2A Peak Pulse Current
- High Gain device > 500 at I_C =150mA
- **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**

Mechanical Data

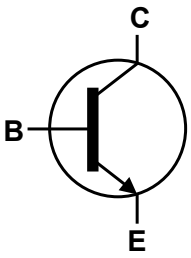
- Case: SOT89
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.055 grams (Approximate)

Applications

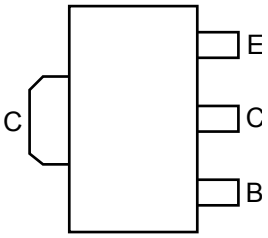
- Voltage Regulator Transistors
- Startup Switches
- Darlington Replacement
- DC Fans
- Relays and Solenoid Driving

SOT89

Top View



Equivalent Circuit



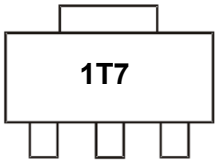
Top View
Pin-Out

Ordering Information (Note 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FCX493ATA	1T7	7	12mm	1,000
FCX493ATC	1T7	13	12mm	4,000

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/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. For packaging details, go to our website at http://www.diodes.com/products/packages.html

Marking Information



1T7= Product Type Marking Code

Absolute 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}	60	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	1	A
Peak Pulse Current	I_{CM}	2	A

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

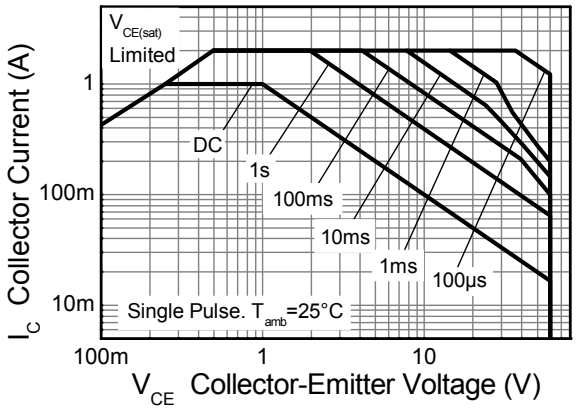
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 4)	P_D	1	W
	(Note 5)		1.5	
	(Note 6)		2.0	
Thermal Resistance, Junction to Ambient Air	(Note 4)	$R_{\theta JA}$	125	°C/W
	(Note 5)		83	
	(Note 6)		60	
Thermal Resistance, Junction to Lead	(Note 7)	$R_{\theta JL}$	22	
Thermal Resistance, Junction to Case	(Note 8)	$R_{\theta JC}$	16	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 9)

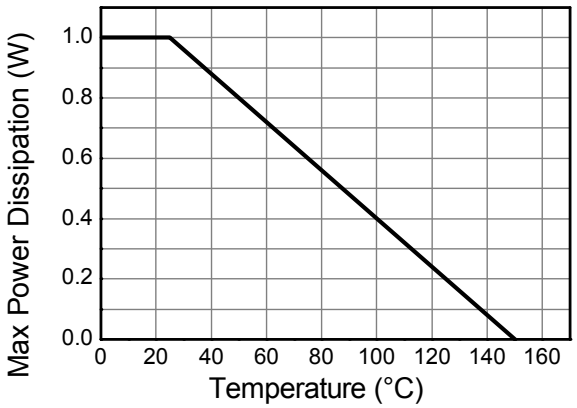
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Notes:
4. For a device mounted with the exposed collector pad on 15mm x 15mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
5. Same as note (4), except the device is mounted on 25mm x 25mm 1oz copper.
6. Same as note (4), except the device is mounted on 50mm x 50mm 1oz copper.
7. Thermal resistance from junction to solder-point (on the exposed collector pad).
8. Thermal resistance from junction to the top of the case.
9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

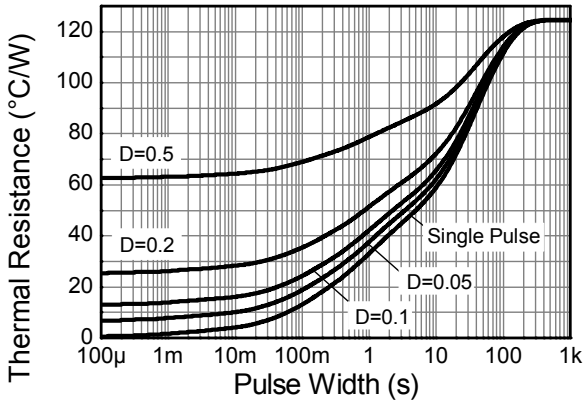
Thermal Characteristics and Derating Information



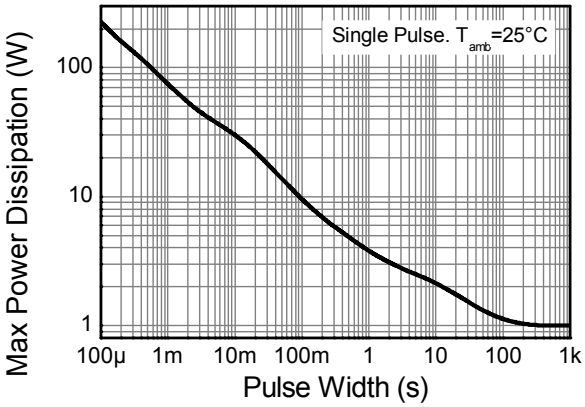
Safe Operating Area



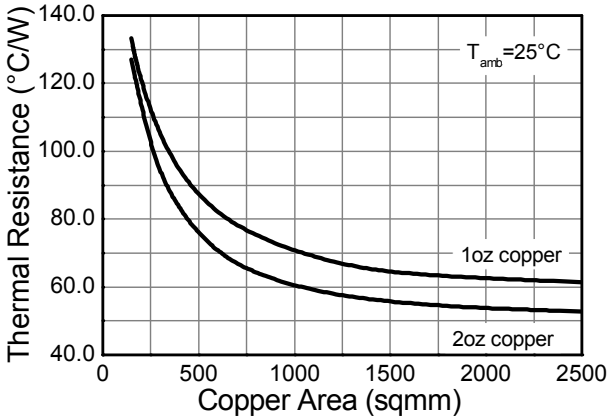
Derating Curve

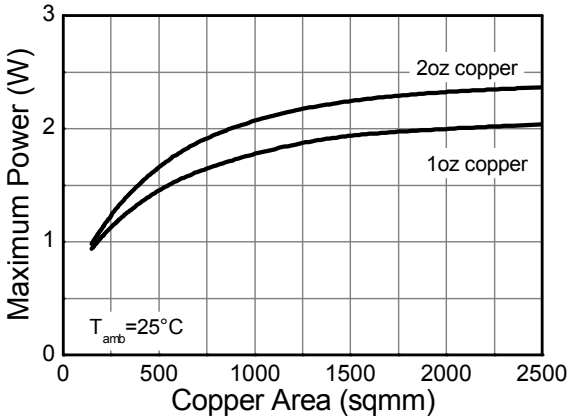


Transient Thermal Impedance



Pulse Power Dissipation



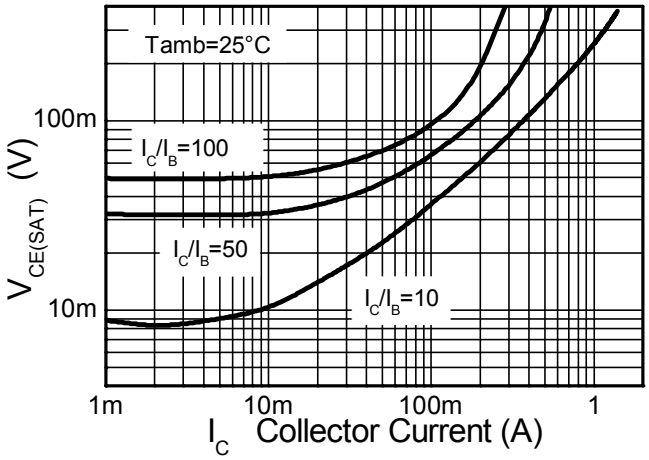


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

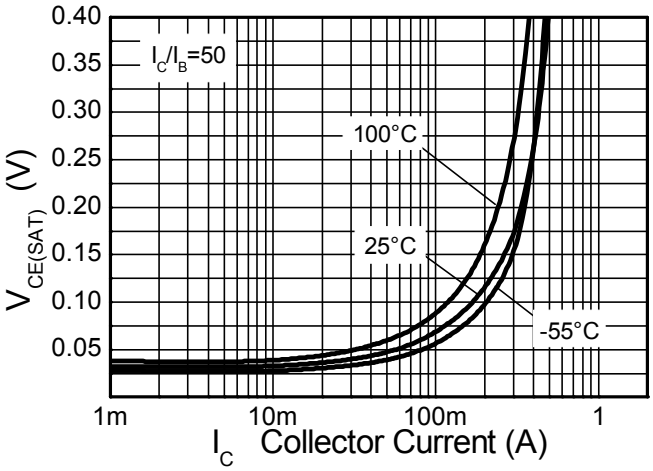
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	120			V	I_C = 100 µA
Collector-Emitter Breakdown Voltage (Note 10)	BV_{CEO}	60			V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7			V	I_E = 100 µA
Collector-Base Cutoff Current	I_{CBO}			100	nA	V_{CB} = 45V
Collector Cutoff Current	I_{CES}			100	nA	V_{CES} = 45V
Emitter Cutoff Current	I_{EBO}			100	nA	V_{EB} = 5V
Collector-Emitter Saturation Voltage (Note 10)	$V_{CE(sat)}$			250 500	mV	I_C = 500mA, I_B = 50mA I_C = 1A, I_B = 100mA
Base-Emitter Saturation Voltage (Note 10)	$V_{BE(sat)}$			1.15	V	I_C = 1A, I_B = 100mA
Base-Emitter Turn-On Voltage (Note 10)	$V_{BE(on)}$			1.0	V	I_C = 1A, V_{CE} = 10V
DC Current Gain (Note 10)	h_{FE}	300 500 300 100 20		1200		I_C = 1mA, V_{CE} = 10V I_C = 150mA, V_{CE} = 10V I_C = 250mA, V_{CE} = 10V I_C = 500mA, V_{CE} = 10V 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

Notes: 10. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%

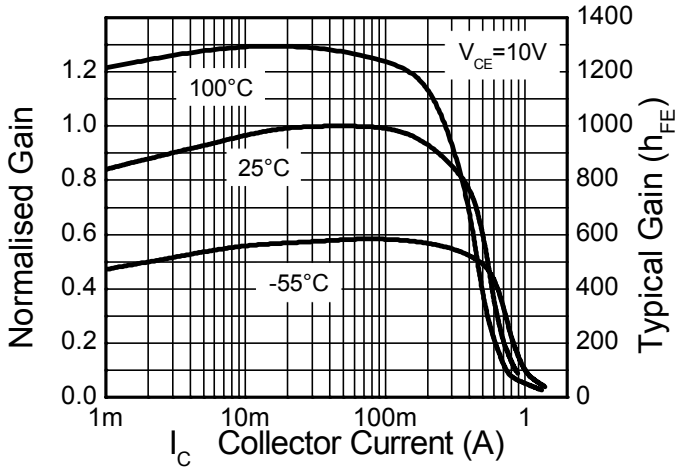
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



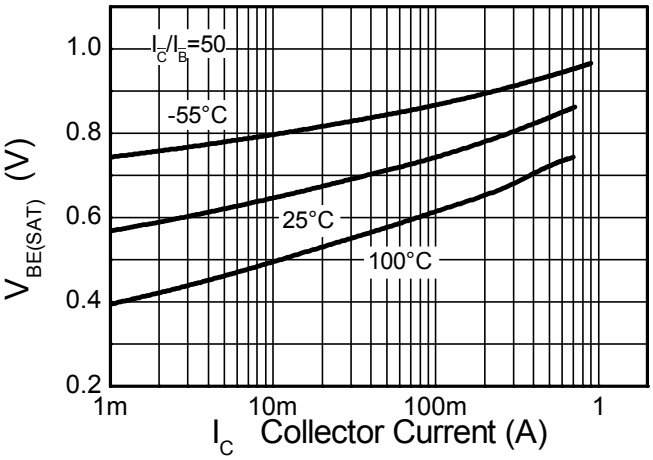
$V_{CE(SAT)}$ v I_C



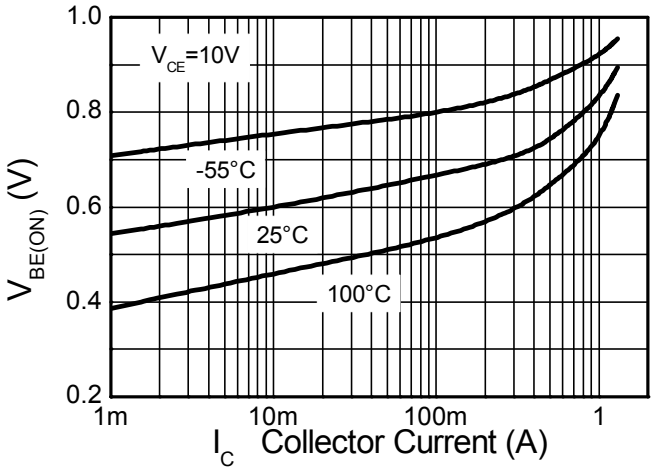
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



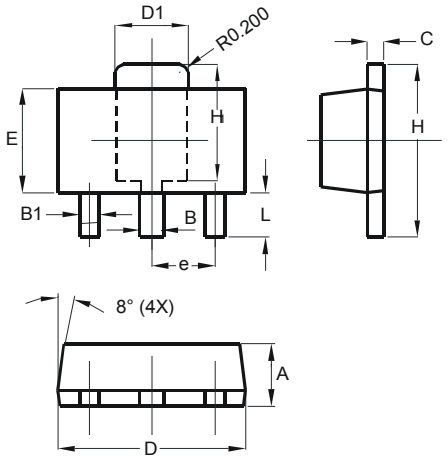
$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

Package Outline Dimensions

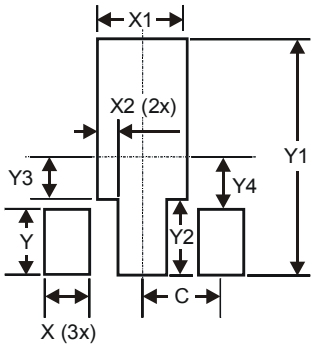
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SOT89		
Dim	**Min**	**Max**
A	1.40	1.60
B	0.44	0.62
B1	0.35	0.54
C	0.35	0.44
D	4.40	4.60
D1	1.62	1.83
E	2.29	2.60
e	1.50 Typ	
H	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)
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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