





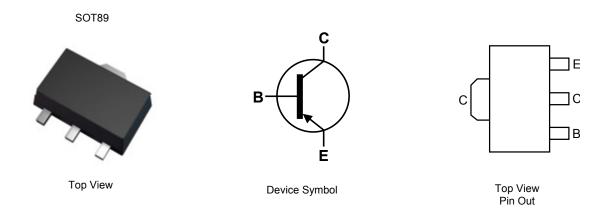
60V PNP MEDIUM POWER TRANSISTOR IN SOT89

Features

- BV_{CEO} > -60V
- I_C = -1A high Continuous Collector Current
- I_{CM} = -2A Peak Collector Current
- $R_{CE(SAT)} = 295m\Omega$ for a Low Equivalent On-Resistance
- hFE characterized up to 2A for high current gain hold up
- Complementary NPN type: FCX491
- 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 @3
- Weight: 0.05 grams (Approximate)



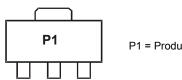
Ordering Information (Note 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FCX591TA	P1	7	12	1,000

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



P1 = Product Type Marking Code



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

Characteristic	Symbol	Limit	Unit
Collector-Base Voltage	V _{CBO}	-80	V
Collector-Emitter Voltage	V _{CEO}	-60	V
Emitter-Base Voltage	V _{EBO}	-7	V
Continuous Collector Current	Ic	-1	Α
Peak Pulse Current	I _{CM}	-2	Α
Base Current	I _B	-200	mA

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

Characteristic	Symbol	Value	Unit		
	(Note 5)		1		
Power Dissipation	(Note 6)	P_{D}	1.5	W	
	(Note 7)		2.0		
	(Note 5)		125	°C/W	
Thermal Resistance, Junction to Ambient Air	(Note 6)	$R_{ heta JA}$	83		
	(Note 7)		60		
Thermal Resistance, Junction to Lead (Note 8)		R _{θJL}	22		
Thermal Resistance, Junction to Case (Note 9)		$R_{ heta JC}$	16		
Operating and Storage Temperature Range	$T_{J_i}T_{STG}$	-65 to +150	°C		

ESD Ratings (Note 10)

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	С

Notes:

- 5. 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.

- order still all conductors whist operating in a steady-state.

 Same as Note 5, except the device is mounted on 25mm x 25mm 1oz copper.

 Same as Note 5, except the device is mounted on 50mm x 50mm 1oz copper.

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

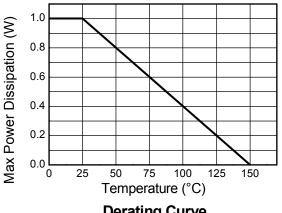
 Thermal resistance from junction to the top of the case.

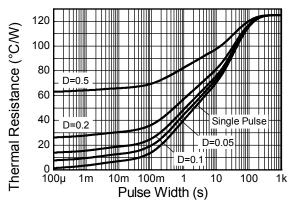
 Refer to JEDEC specification JESD22-A114 and JESD22-A115.





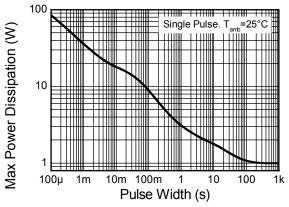
Thermal Characteristics and Derating Information



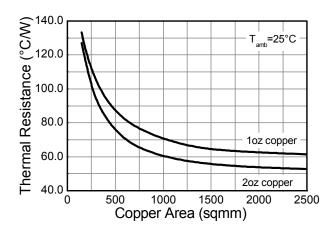


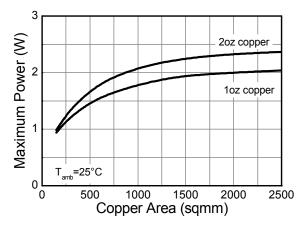
Derating Curve

Transient Thermal Impedance



Pulse Power Dissipation





February 2014

© Diodes Incorporated





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

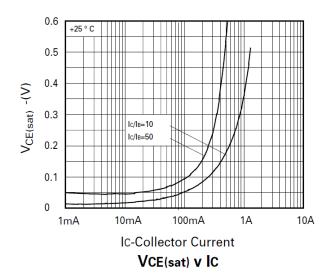
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	-80	_	_	V	$I_C = -100\mu A$, $I_E = 0$
Collector-Emitter Breakdown Voltage (Note 11)	BV _{CEO}	-60	_	_	V	$I_C = -10 \text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	BV _{EBO}	-7	-8.1	_	V	$I_E = -100\mu A$, $I_C = 0$
Collector Cutoff Current	I _{CBO}	_	<1	-100	nA	V _{CB} = -60V
Emitter Cutoff Current	I _{EBO}	_	<1	-100	nA	V _{EB} = -5.6V, I _C = 0
Emitter Cutoff Current	I _{CES}	_	<1	-100	nA	V _{CES} = -60V
DC current transfer Static ratio (Note 11)	h _{FE}	100 100 80 15	220 175 155 40	— 300 —	_	I_{C} = -1mA, V_{CE} = -5V I_{C} = -500mA, V_{CE} = -5V I_{C} = -1A, V_{CE} = -5V I_{C} = -2A, V_{CE} = -5V
Collector-Emitter Saturation Voltage (Note 11)	V _{CE(sat)}	_	-155 -295	-300 -600	mV	$I_C = -500$ mA, $I_B = -50$ mA $I_C = -1$ A, $I_B = -100$ mA
Base-Emitter Saturation Voltage (Note 11)	V _{BE(sat)}	_	-965	-1200	mV	$I_C = -1A$, $I_B = -100$ mA
Base-Emitter Turn-on Voltage (Note 11)	V _{BE(on)}	_	-830	-1000	mV	I _C = -1A, V _{CE} = -5V
Transitional Frequency	f _T	150	_	_	MHz	I _E = -50mA, V _{CE} = -10V f = 100MHz
Output capacitance	C _{obo}	_	_	10	pF	V _{CB} = -10V, f = 1MHz,

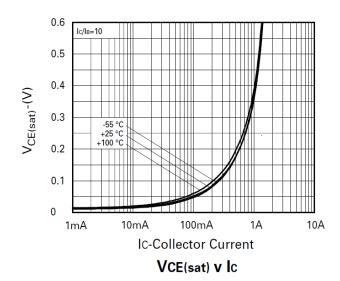
Note: 11. Measured under pulsed conditions. Pulse width \leq 300 μ s. Duty cycle \leq 2%.

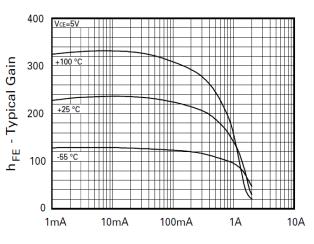


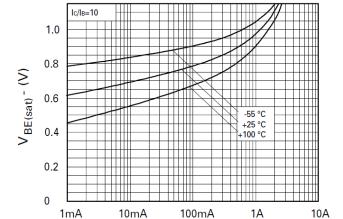


Typical Electrical Characteristics (@TA = +25°C, unless otherwise specified.)



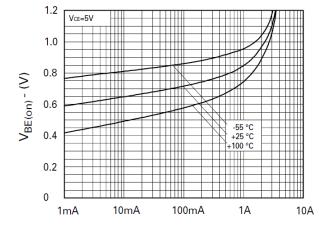






Ic-Collector Current hFE V IC

Ic-Collector Current VBE(sat) v Ic



IC-Collector Current VBE(on) v IC

10A



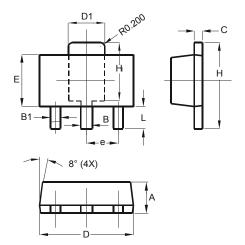


February 2014

© Diodes Incorporated

Package Outline Dimensions

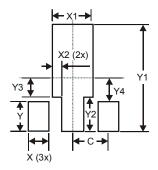
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



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





IMPORTANT NOTICE

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes Incorporated.

LIFE SUPPORT

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

- A. Life support devices or systems are devices or systems which:
 - 1. are intended to implant into the body, or
 - 2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.
- B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2014, Diodes Incorporated

www.diodes.com