

Description

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirements of automotive applications.

Features

- $BV_{CE0} > 40V$
- $I_C = 1A$ high Continuous Current
- Low saturation voltage $V_{CE(sat)} < 500mV @ 1A$
- Complementary PNP type: FCX591AQ
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The FCX491AQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

Mechanical Data

- Package: SOT89
- Package 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 Ⓔ
- Weight: 0.05 grams (Approximate)

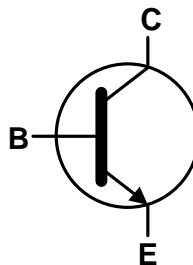
Applications

- Power MOSFET gate driving
- Low loss power switching

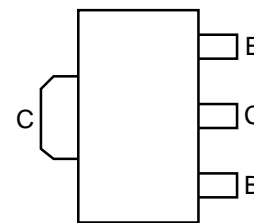
SOT89



Top View



Device Symbol



Top View
Pin Out

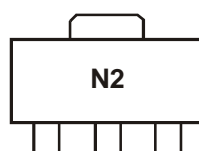
Ordering Information (Note 4)

Product	Package	Marking	Reel size (inches)	Tape width (mm)	Packing	
					Qty	Carrier
FCX491AQTA	SOT89	N2	7	12	1,000	Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>

Marking Information

SOT89



N2 = Product Type Marking Code

Absolute Maximum Ratings (@T_A = +25°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 _{EB0}	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 5)	P _D	1	W
Thermal Resistance, Junction to Ambient Air (Note 5)	R _{θJA}	125	°C/W
Thermal Resistance, Junction to Leads (Note 6)	R _{θJL}	10.01	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-65 to +150	°C

ESD Ratings (Note 7)

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:
5. For a device surface mounted on 15mm x 15mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions; device measured when operating in steady state condition.
 6. Thermal resistance from junction to solder-point (on the exposed collector pad).
 7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

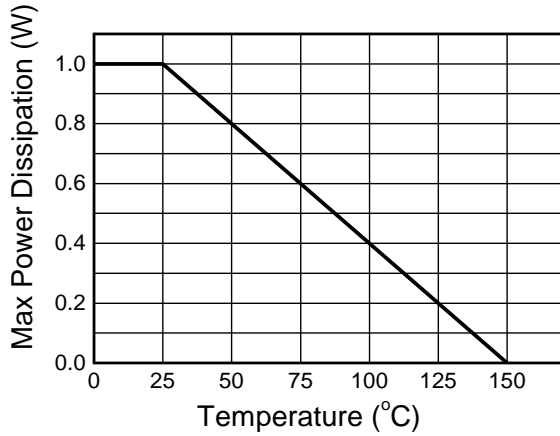


Fig. 1 Derating Curve

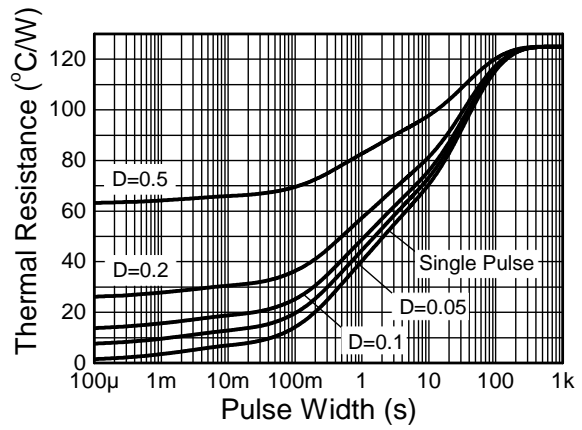


Fig. 2 Transient Thermal Impedance

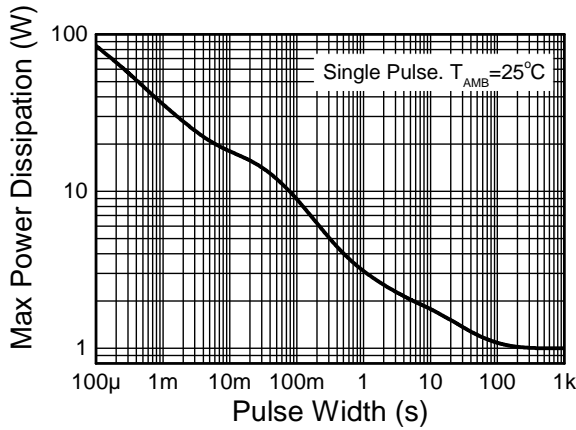


Fig. 3 Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CB0}	40	-	-	V	I _C = 100μA
Collector-Emitter Breakdown Voltage (Note 8)	BV _{CEO}	40	-	-	V	I _C = 10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	7	-	-	V	I _E = 100μA
Collector Cutoff Current	I _{CB0}	-	-	100	nA	V _{CB} = 30V
Emitter Cutoff Current	I _{EBO}	-	-	100	nA	V _{EB} = 4V
Emitter Cutoff Current	I _{CES}	-	-	100	nA	V _{CE} = 30V
DC current transfer Static ratio (Note 8)	h _{FE}	300	-	-	-	I _C = 1mA, V _{CE} = 5V
		300	-	900		I _C = 500mA, V _{CE} = 5V
		200	-	-		I _C = 1A, V _{CE} = 5V
		35	-	-		I _C = 2A, V _{CE} = 5V
Collector-Emitter Saturation Voltage (Note 8)	V _{CE(sat)}	-	-	0.3	V	I _C = 500mA, I _B = 50mA
		-	-	0.5		I _C = 1A, I _B = 100mA
Base-Emitter Saturation Voltage (Note 8)	V _{BE(sat)}	-	-	1.1	V	I _C = 1A, I _B = 100mA
Base-Emitter Turn-on Voltage (Note 8)	V _{BE(on)}	-	-	1.0	V	I _C = 1A, V _{CE} = 5V
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,

Note: 8. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

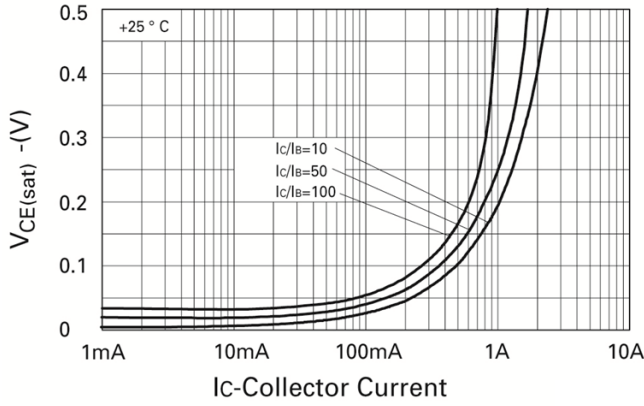


Fig. 4 $V_{CE(sat)}$ v I_C

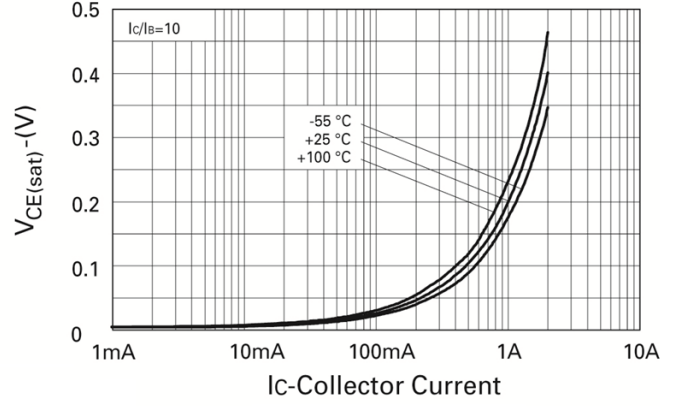


Fig. 5 $V_{CE(sat)}$ v I_C

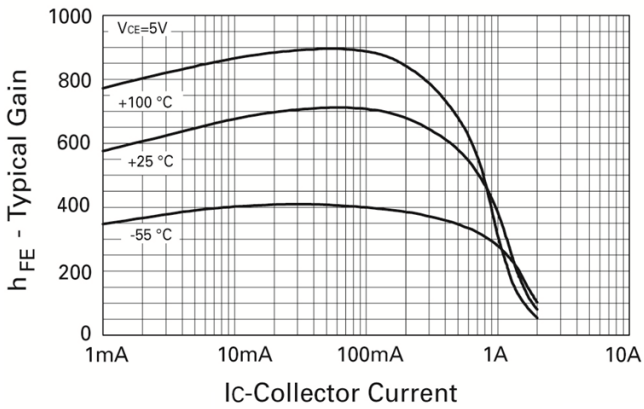


Fig. 6 h_{FE} v I_C

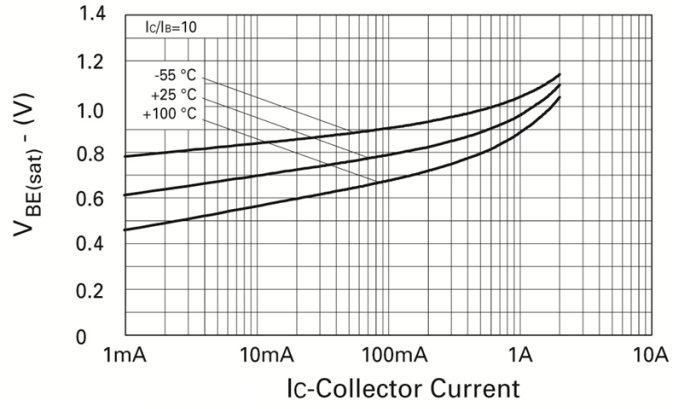


Fig. 7 $V_{BE(sat)}$ v I_C

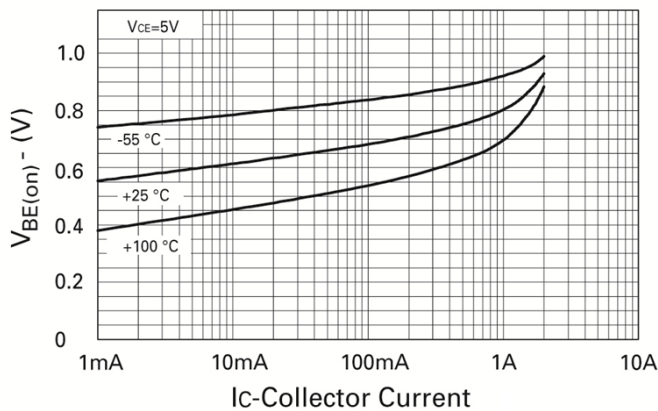
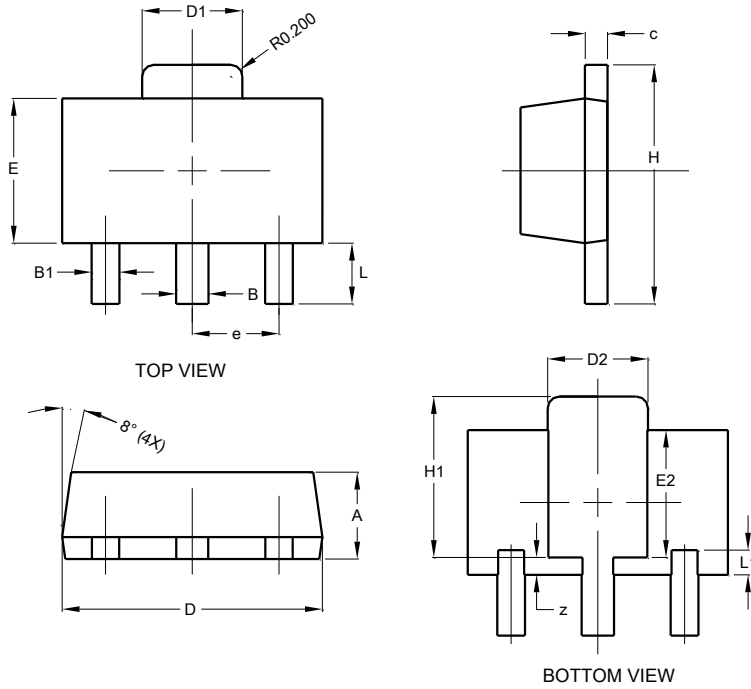


Fig. 8 $V_{BE(on)}$ v I_C

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT89

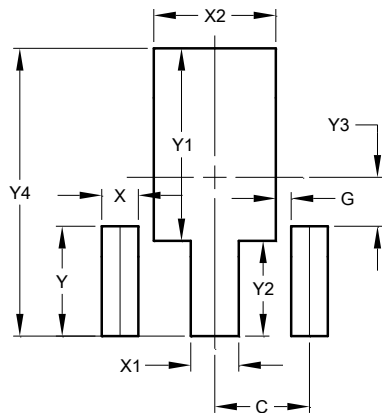


SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT89



Dimensions	Value (in mm)
C	1.500
G	0.244
X	0.580
X1	0.760
X2	1.933
Y	1.730
Y1	3.030
Y2	1.500
Y3	0.770
Y4	4.530

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