

## Features

- $BV_{CEO} > -40V$
- $I_C = -1A$  High Continuous Current
- Low Saturation Voltage  $V_{CE(SAT)} < -500mV @ -1A$
- Complementary NPN Type: FZT491A
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

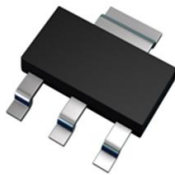
## Mechanical Data

- Case: SOT223
- 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: 0.112 grams (Approximate)

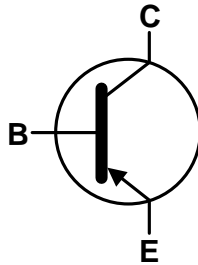
## Applications

- Power MOSFET & IGBT Gate Driving
- Low Loss Power Switching

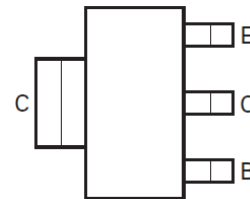
SOT223 (Type DN)



Top View



Device Symbol



Top View  
Pin-Out

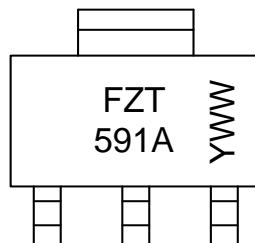
## Ordering Information (Notes 4 & 5)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
FZT591ATA	AEC-Q101	FZT591A	7	12	1,000
FZT591AQTA	Automotive	FZT591A	7	12	1,000

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
  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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to <https://www.diodes.com/quality/>.
  5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information

SOT223 (Type DN)



FZT 591A = Product Type Marking Code  
 YWW = Date Code Marking  
 Y or  $\bar{Y}$  = Last Digit of Year (ex: 9 = 2019)  
 WW or  $\bar{W}W$  = Week Code (01 to 53)

**Absolute Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	-40	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-40	V
Emitter-Base Voltage	V <sub>EBO</sub>	-7	V
Continuous Collector Current	I <sub>C</sub>	-1	A
Base Current	I <sub>B</sub>	-200	mA
Peak Pulse Current	I <sub>CM</sub>	-2	A

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

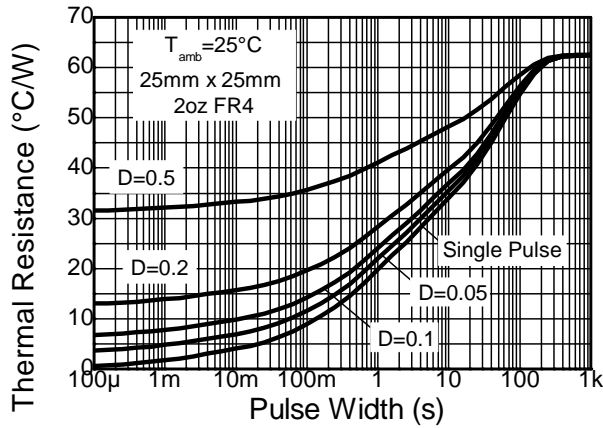
Characteristic	Symbol	Value	Unit	
Power Dissipation	P <sub>D</sub>	(Note 6)	2	W
		(Note 7)	3	W
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Note 6)	62.5	°C/W
		(Note 7)	41.7	°C/W
Thermal Resistance, Junction to Leads (Note 8)	R <sub>θJL</sub>	19.4	°C/W	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C	

**ESD Ratings** (Note 9)

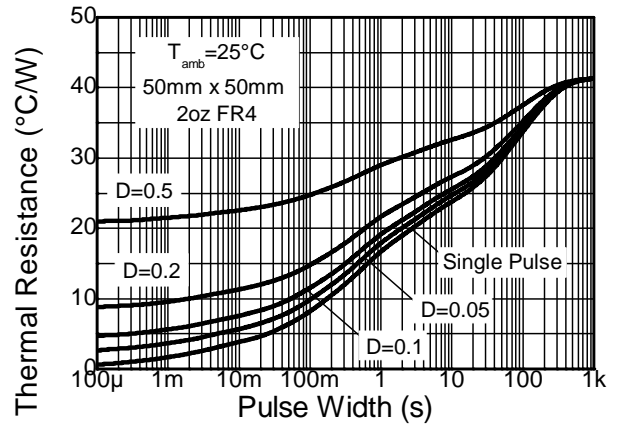
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	8,000	V	3B
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
6. For a device mounted with the collector lead on 25mm x 25mm 2oz copper that is on a single sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  7. Same as Note 6, except mounted on 50mm x 50mm 2oz copper.
  8. Thermal resistance from junction to solder-point (at the end of the collector lead).
  9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

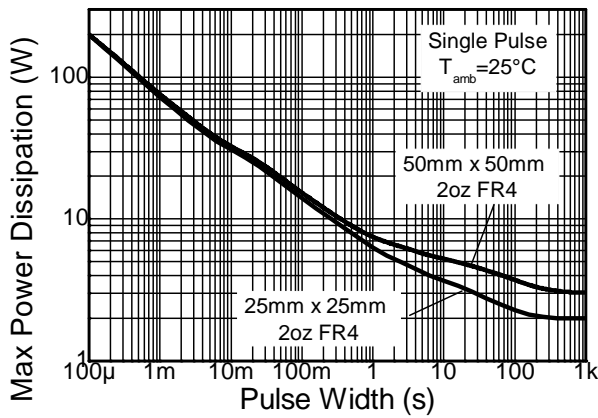
**Thermal Characteristics and Derating Information**



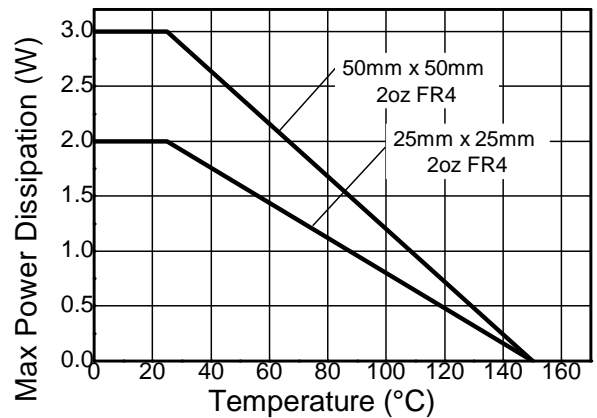
**Transient Thermal Impedance**



**Transient Thermal Impedance**



**Pulse Power Dissipation**



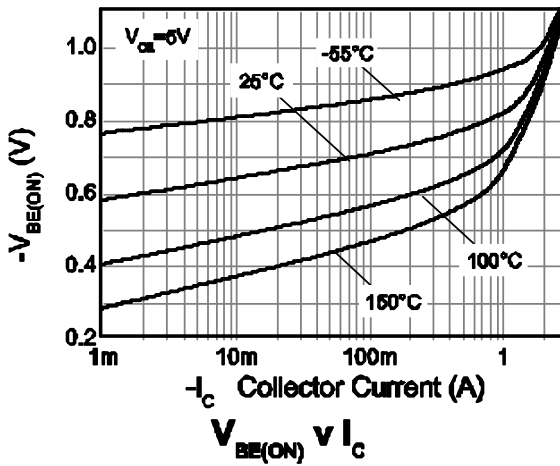
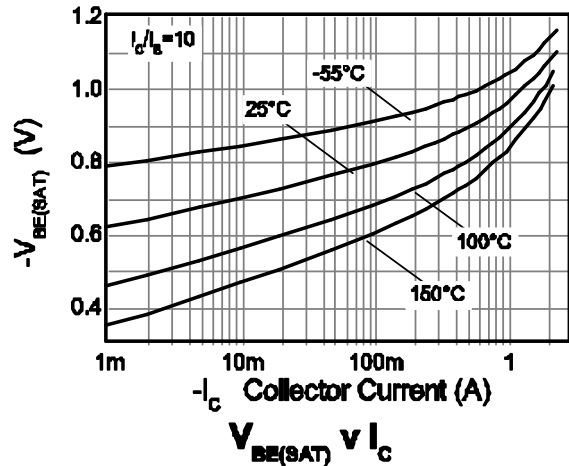
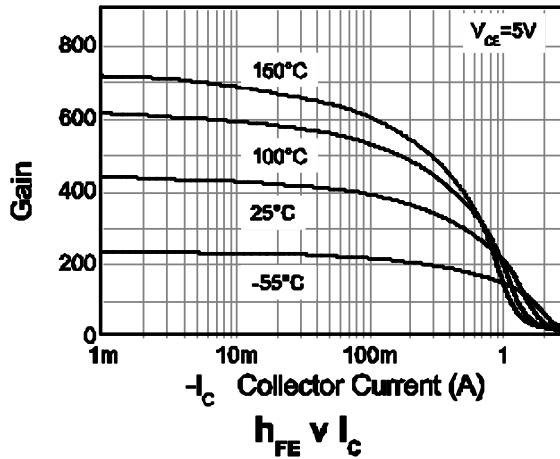
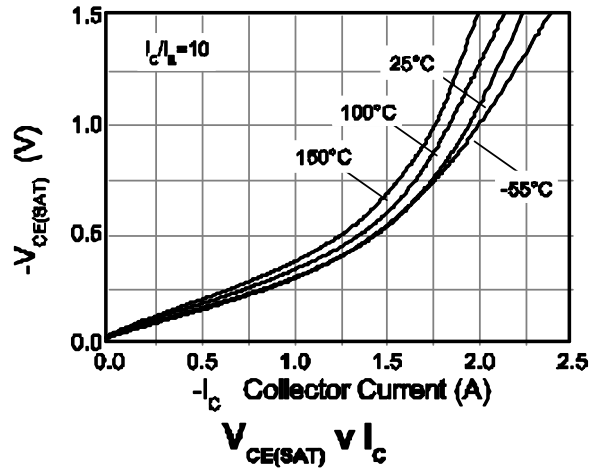
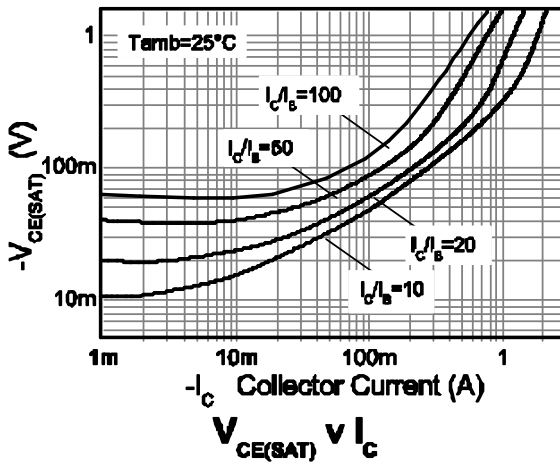
**Derating Curve**

**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>CBO</sub>	-40	–	–	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 10)	BV <sub>CEO</sub>	-40	–	–	V	I <sub>C</sub> = -10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-7	–	–	V	I <sub>E</sub> = -100μA
Collector Cut-Off Current	I <sub>CBO</sub>	–	–	-100	nA	V <sub>CB</sub> = -30V
Collector Cut-Off Current	I <sub>CES</sub>	–	–	-100	nA	V <sub>CES</sub> = -30V
Emitter Cut-Off Current	I <sub>EBO</sub>	–	–	-100	nA	V <sub>EB</sub> = -4V
Collector-Emitter Saturation Voltage (Note 10)	V <sub>CE(SAT)</sub>	–	–	-0.2 -0.35 -0.5	V	I <sub>C</sub> = -100mA, I <sub>B</sub> = -1mA I <sub>C</sub> = -500mA, I <sub>B</sub> = -20mA I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA
Base-Emitter Saturation Voltage (Note 10)	V <sub>BE(SAT)</sub>	–	–	-1.1	V	I <sub>C</sub> = -1A, I <sub>B</sub> = -50mA
Base-Emitter Turn-On Voltage (Note 10)	V <sub>BE(ON)</sub>	–	–	-1.0	V	I <sub>C</sub> = -1A, V <sub>CE</sub> = -5V
DC Current Transfer Static Ratio (Note 10)	h <sub>FE</sub>	300 300 250 160 30	– – – – –	– 800 – – –	–	I <sub>C</sub> = -1mA, V <sub>CE</sub> = -5V I <sub>C</sub> = -100mA, V <sub>CE</sub> = -5V I <sub>C</sub> = -500mA, V <sub>CE</sub> = -5V I <sub>C</sub> = -1A, V <sub>CE</sub> = -5V I <sub>C</sub> = -2A, V <sub>CE</sub> = -5V
Transitional Frequency (Note 10)	f <sub>T</sub>	150	–	–	MHz	V <sub>CE</sub> = -10V, I <sub>C</sub> = -50mA f = 100MHz
Output Capacitance (Note 10)	C <sub>obo</sub>	–	–	10	pF	V <sub>CB</sub> = -10V, f = 1MHz

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

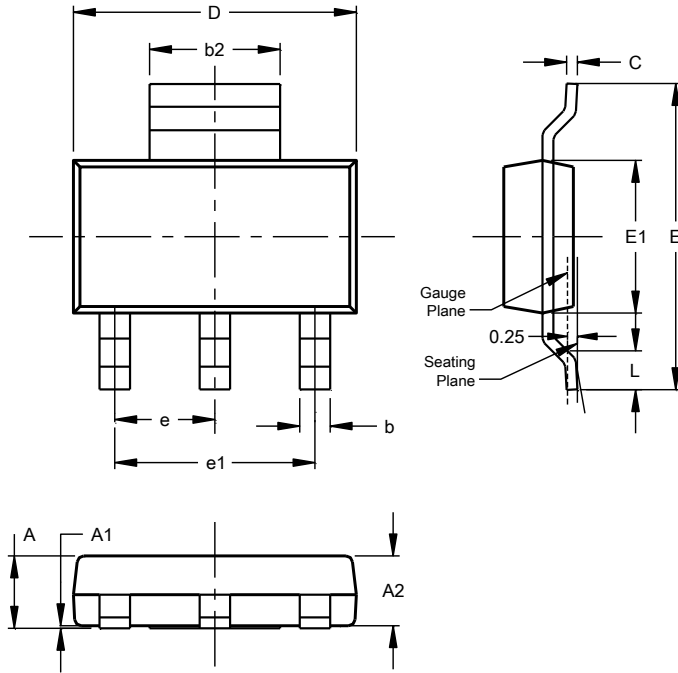
Typical Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)



## Package Outline Dimensions

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

### SOT223 (Type DN)

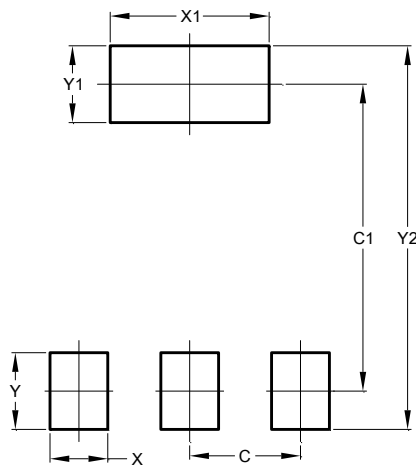


SOT223 (Type DN)			
Dim	Min	Max	Typ
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

## Suggested Pad Layout

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

### SOT223 (Type DN)



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00

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