



**THE DATASHEET OF  
FZT690BTA**



## Features

- $BV_{CEO} > 45V$
- $BV_{CBO} > 45V$
- $I_C = 3.0A$  High Continuous Current
- $hFE > 400$  @ 1A and Low Saturation Voltage
- $R_{CE(SAT)} = 125m\Omega$  @ 2A for Low Equivalent On-Resistance
- Very Low-Saturation Voltage
- **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)**

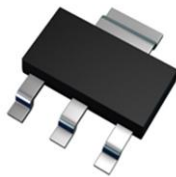
## Mechanical Data

- 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)

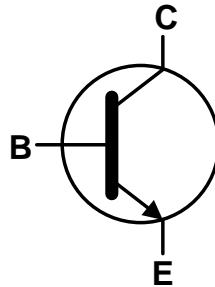
## Applications

- Darlington Replacement
- Flash-Gun Convertors and Battery-Powered Circuits
- Siren Drivers, DC-DC Converters

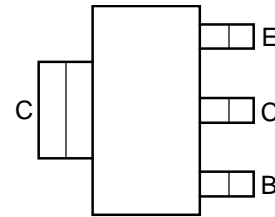
SOT223 (Type DN)



Top View



Device Symbol



Top View  
Pin-Out

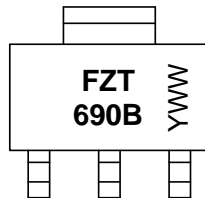
## Ordering Information (Notes 4 and 5)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
FZT690BTA	AEC-Q101	FZT690B	7	12	1,000
FZT690BQTA	Automotive	FZT690B	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 [http://www.diodes.com/quality/lead\\_free/](http://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)



FZT690B = Product Type Marking Code  
 YWW = Date Code Marking  
 Y or  $\bar{Y}$  = Last Digit of Year (ex: 8= 2018)  
 WW or  $\bar{WW}$  = 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>	45	V
Collector-Emitter Voltage	V <sub>CEO</sub>	45	V
Emitter-Base Voltage	V <sub>EBO</sub>	7	V
Continuous Collector Current	I <sub>C</sub>	3	A
Peak Pulse Current	I <sub>CM</sub>	6	A

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

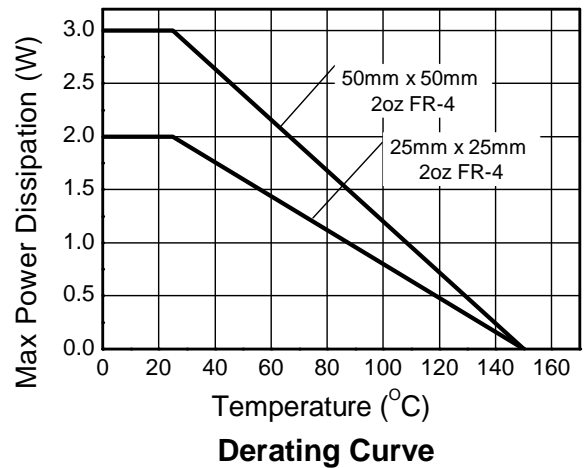
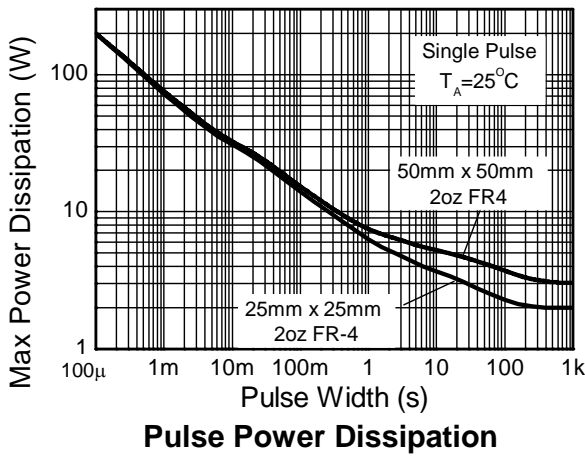
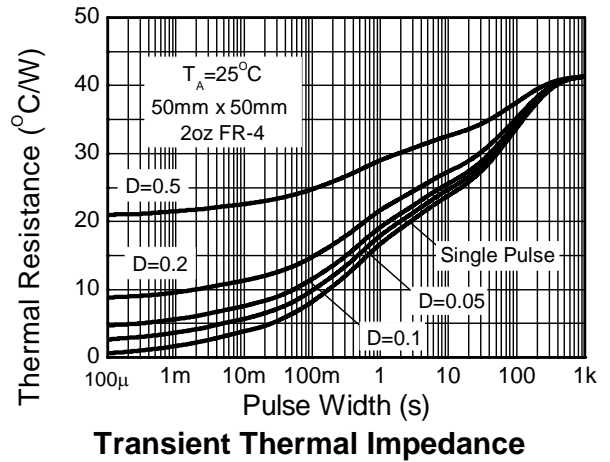
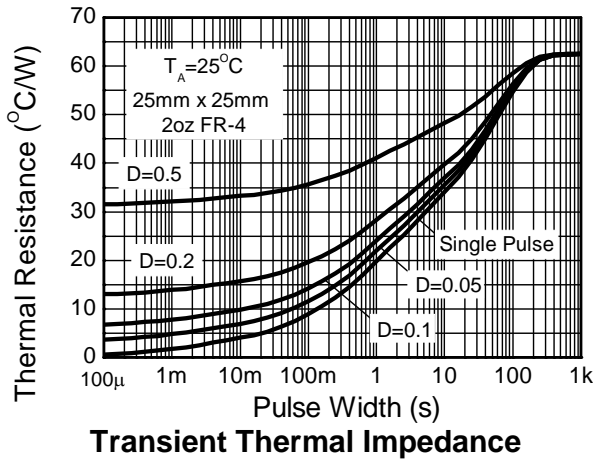
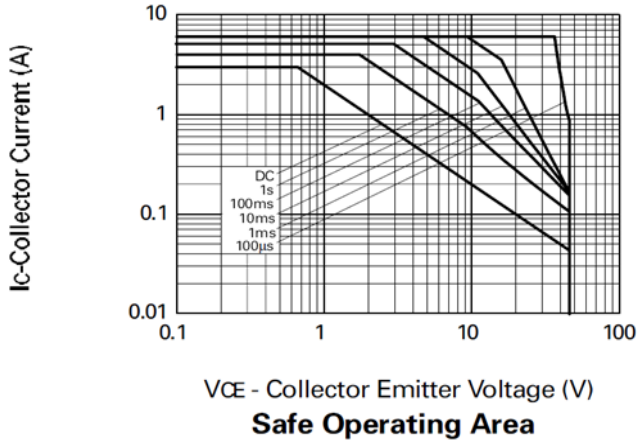
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	(Note 6)	3.0
		(Note 7)	2.0
		(Note 8)	1.6
		(Note 9)	1.2
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Note 6)	41.7
		(Note 7)	62.5
		(Note 8)	78.1
		(Note 9)	104
Thermal Resistance Junction to Lead	R <sub>θJL</sub>	12.9	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 11)

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:
6. For a device mounted with the collector lead on 50mm x 50mm 2oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  7. Same as Note 6, except the device is mounted on 25mm x 25mm 2oz copper.
  8. Same as Note 6, except the device is mounted on 25mm x 25mm 1oz copper.
  9. Same as Note 6, except the device is mounted on minimum recommended pad layout.
  10. Thermal resistance from junction to solder-point (at the end of the collector lead).
  11. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristics and Derating Information**

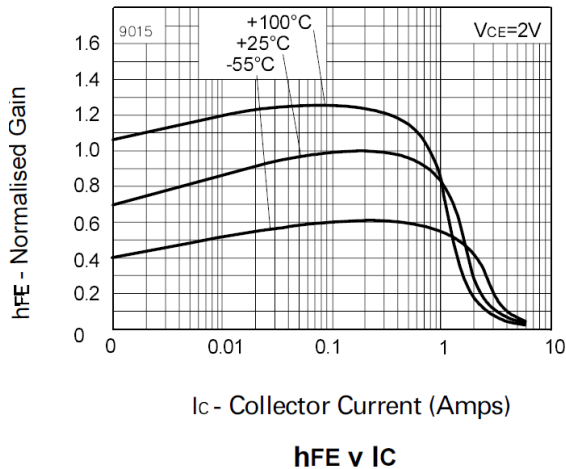
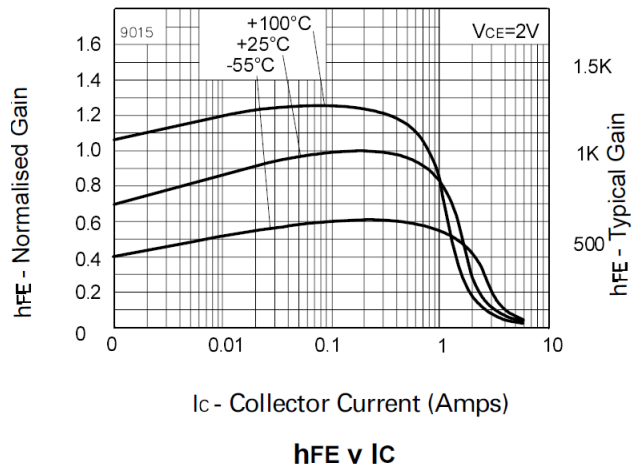
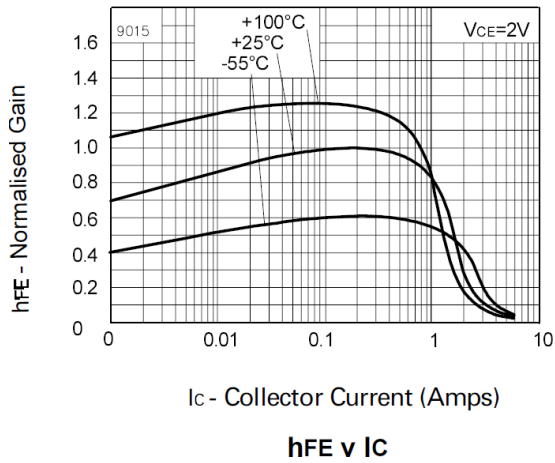
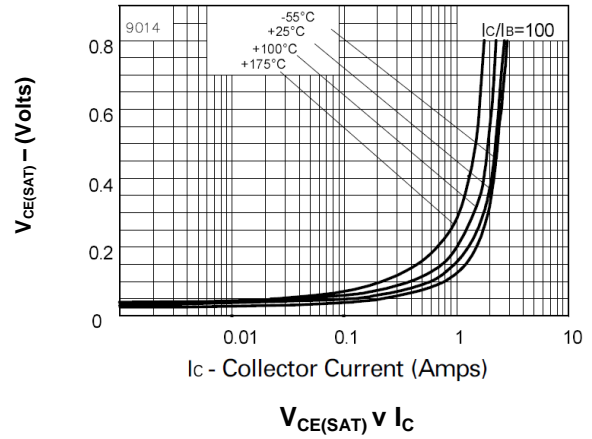
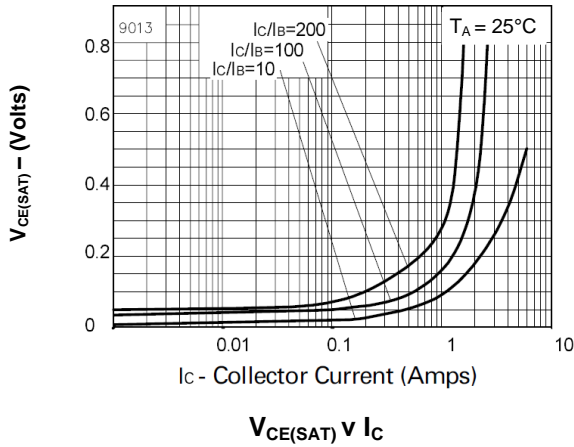


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	45	—	—	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 12)	BV <sub>CEO</sub>	45	—	—	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7	—	—	V	I <sub>E</sub> = 100μA
Collector-Base Cut-Off Current	I <sub>CBO</sub>	—	—	0.1	μA	V <sub>CB</sub> = 35V
Emitter Cut-Off Current	I <sub>EBO</sub>	—	—	0.1	μA	V <sub>EB</sub> = 4V
DC Current Gain (Note 12)	h <sub>FE</sub>	500	—	—	—	I <sub>C</sub> = 0.1A, V <sub>CE</sub> = 2V
		400	—	—		I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V
		150	—	—		I <sub>C</sub> = 2A, V <sub>CE</sub> = 2V
		50	—	—		I <sub>C</sub> = 3A, V <sub>CE</sub> = 2V
Collector-Emitter Saturation Voltage (Note 12)	V <sub>CE(SAT)</sub>	—	—	0.10	V	I <sub>C</sub> = 0.1A, I <sub>B</sub> = 0.5mA
		—	—	0.50		I <sub>C</sub> = 1A, I <sub>B</sub> = 5mA
Base-Emitter Saturation Voltage (Note 12)	V <sub>BE(SAT)</sub>	—	—	0.9	V	I <sub>C</sub> = 1A, I <sub>B</sub> = 10mA
Base-Emitter Turn-On Voltage (Note 12)	V <sub>BE(ON)</sub>	—	—	0.9	V	I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V
Input Capacitance	C <sub>ibo</sub>	—	200	—	pF	V <sub>EB</sub> = 0.5V, f = 1MHz
Output Capacitance	C <sub>obo</sub>	—	16	—	pF	V <sub>CB</sub> = 10V, f = 1MHz
Current Gain-Bandwidth Product	f <sub>T</sub>	150	—	—	MHz	V <sub>CE</sub> = 5V, I <sub>C</sub> = 50mA, f=50MHz
Turn-On Time	t <sub>ON</sub>	—	33	—	ns	V <sub>CC</sub> = 10V, I <sub>C</sub> = 500mA I <sub>B1</sub> = -I <sub>B2</sub> = 50mA
Turn-Off Time	t <sub>OFF</sub>	—	1,300	—	ns	

Note: 12. Measured under pulsed conditions. Pulse width ≤ 300 μs. Duty cycle ≤ 2%.

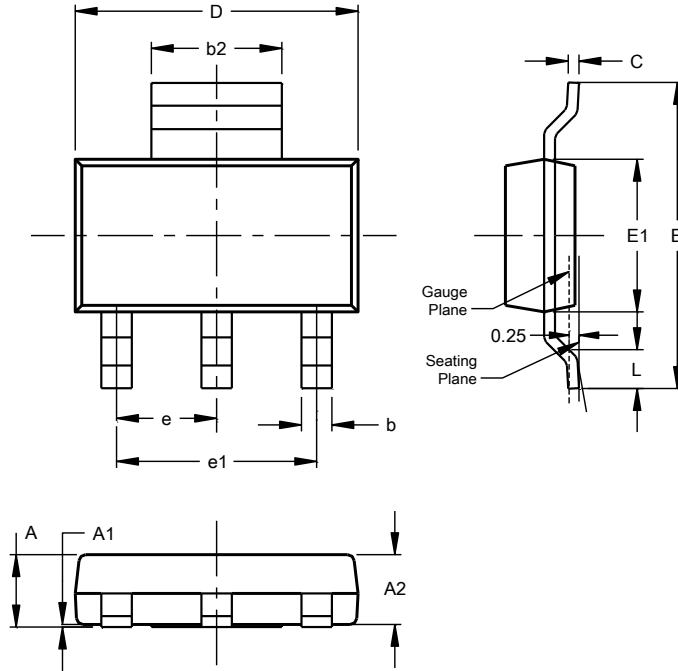
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



**Package Outline Dimensions**

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

**SOT223 (Type DN)**



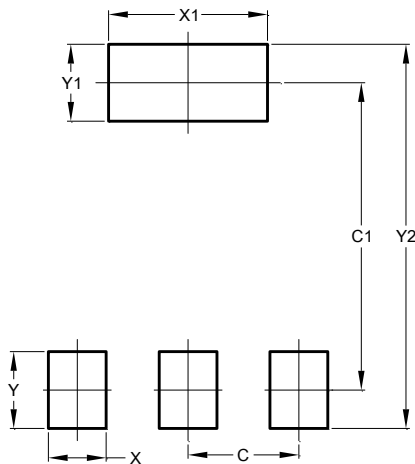
SOT223 (Type DN)			
Dim	Min	Max	Typ
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--

**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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