



# THE DATASHEET OF FZT790ATC



## Features

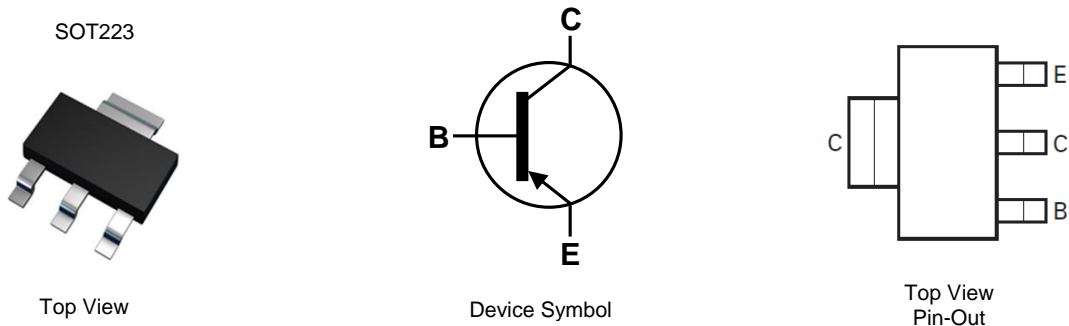
- $BV_{CEO} > -40V$
- $I_C$  Max. -3A High Continuous Current
- $I_{CM}$  Max. -6A Peak Pulse Current
- Very Low Equivalent On-Resistance;  $R_{CE(sat)}$  125m $\Omega$  at 2A
- $h_{FE}$  of 200 at  $I_C=1A$  and Very Low Saturation Voltage
- Complementary NPN Type: FZT690B
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

## Mechanical Data

- Package: SOT223 (Type DN)
- 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  $\text{E3}$
- Weight: 0.112 grams (Approximate)

## Applications

- DC-DC converters
- Siren drivers

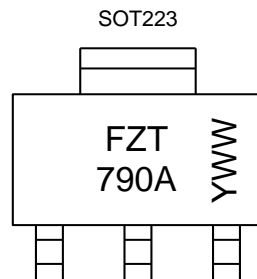


## Ordering Information (Note 4)

Orderable Part Number	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
				Quantity	Carrier
FZT790ATA	FZT790A	7	12	1,000	Reel

- 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. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



FZT 790A = Product Type Marking Code  
 YWW = Date Code Marking  
 Y or  $\bar{Y}$  = Last Digit of Year (ex: 2 = 2022)  
 WW or  $\bar{W}W$  = Week Code (01-53)

**Absolute Maximum Ratings** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	-50	V
Collector-Emitter Voltage	$V_{CEO}$	-40	V
Emitter-Base Voltage	$V_{EBO}$	-7	V
Continuous Collector Current	$I_C$	-3	A
Peak Pulse Current	$I_{CM}$	-6	A

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

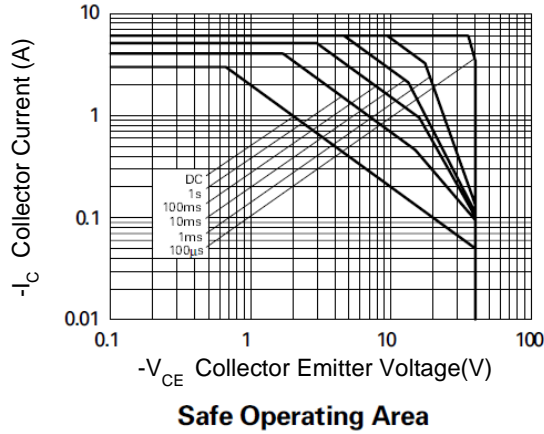
Characteristic	Symbol	Value	Unit
Power Dissipation	$P_D$	(Note 5)	3.0
		(Note 6)	2.0
		(Note 7)	1.6
		(Note 8)	1.2
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	(Note 5)	41.7
		(Note 6)	62.5
		(Note 7)	78.1
		(Note 8)	104
Thermal Resistance Junction to Lead	$R_{\theta JL}$	12.9	
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**ESD Ratings** (Note 10)

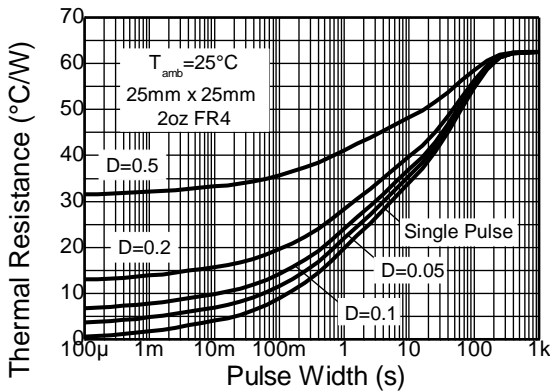
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device mounted with the collector lead on 50mm x 50mm 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.
  6. Same as Note 5, except the device is mounted on 25mm x 25mm 2oz copper.
  7. Same as Note 5, except the device is mounted on 25mm x 25mm 1oz copper.
  8. Same as Note 5, except the device is mounted on minimum recommended pad layout.
  9. Thermal resistance from junction to solder-point (at the end of the collector lead).
  10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

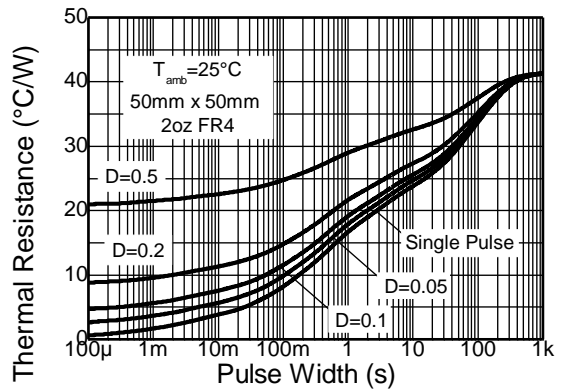
**Thermal Characteristics and Derating Information**



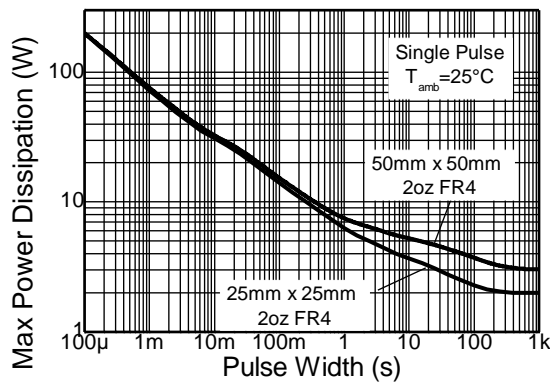
**Safe Operating Area**



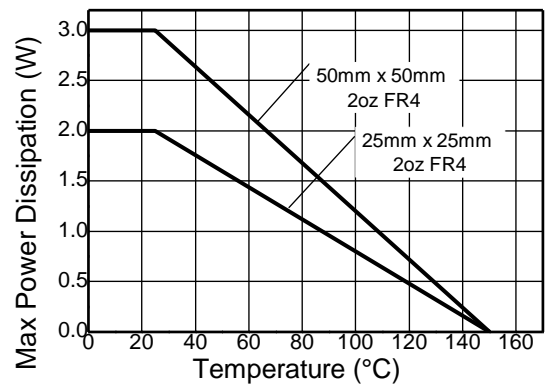
**Transient Thermal Impedance**



**Transient Thermal Impedance**



**Pulse Power Dissipation**



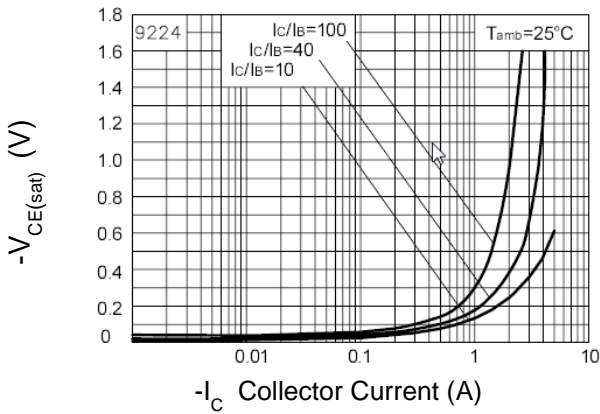
**Derating Curve**

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

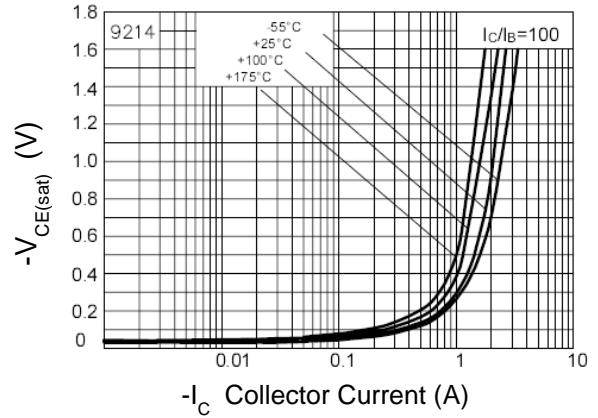
Characteristic	Symbol	Min	Typ.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	-50	-70	-	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 11)	$BV_{CEO}$	-40	-60	-	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	-7	-8.5	-	V	$I_E = -100\mu\text{A}$
Collector Cut-Off Current	$I_{CBO}$	-	-	-0.1 -10	$\mu\text{A}$	$V_{CB} = -30\text{V}$ $V_{CB} = -30\text{V}, T_A = +100^\circ\text{C}$
Emitter Cut-Off Current	$I_{EBO}$	-	-	-0.1	$\mu\text{A}$	$V_{EB} = -4\text{V}$
DC Current Transfer Static Ratio (Note 11)	$h_{FE}$	300	-	800	-	$I_C = -10\text{mA}, V_{CE} = -2\text{V}$
		250	-	-		$I_C = -500\text{mA}, V_{CE} = -2\text{V}$
		200	-	-		$I_C = -1\text{A}, V_{CE} = -2\text{V}$
		150	-	-		$I_C = -2\text{A}, V_{CE} = -2\text{V}$
Collector-Emitter Saturation Voltage (Note 11)	$V_{CE(sat)}$	-	-0.15	-0.25	V	$I_C = -500\text{mA}, I_B = -5\text{mA}$
		-	-0.30	-0.45		$I_C = -1\text{A}, I_B = -10\text{mA}$
		-	-0.40	-0.75		$I_C = -2\text{A}, I_B = -50\text{mA}$
Base-Emitter Saturation Voltage (Note 11)	$V_{BE(sat)}$	-	-0.8	-1.0	V	$I_C = -1\text{A}, I_B = -10\text{mA}$
Base-Emitter Turn-On Voltage (Note 11)	$V_{BE(on)}$	-	-0.75	-	V	$I_C = -1\text{A}, V_{CE} = -2\text{V}$
Transitional Frequency	$f_T$	100	-	-	MHz	$I_C = -50\text{mA}, V_{CE} = -5\text{V},$ $f = 50\text{MHz}$
Output Capacitance	$C_{obo}$	-	24	-	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$
Switching Time	$t_{on}$	-	35	-	ns	$V_{CC} = -10\text{V}, I_C = -500\text{mA},$ $I_{B1} = -I_{B2} = -50\text{mA}$
	$t_{off}$	-	600	-		

Note: 11. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

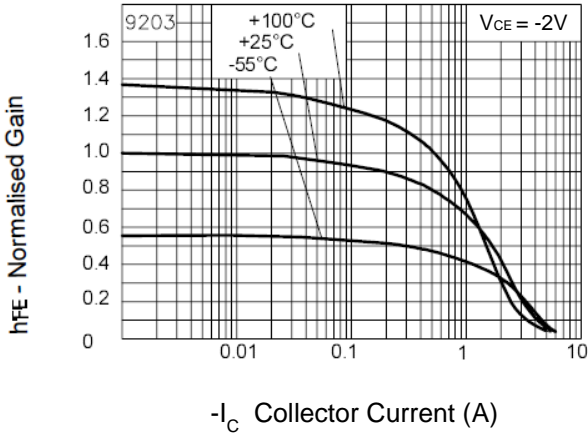
**Typical Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



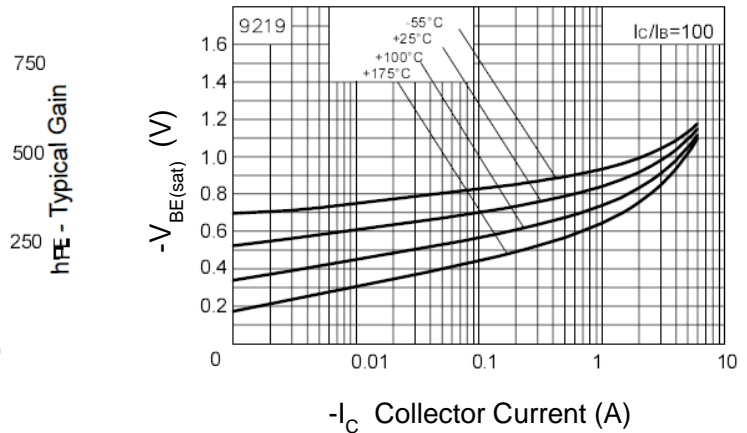
**VCE(sat) v IC**



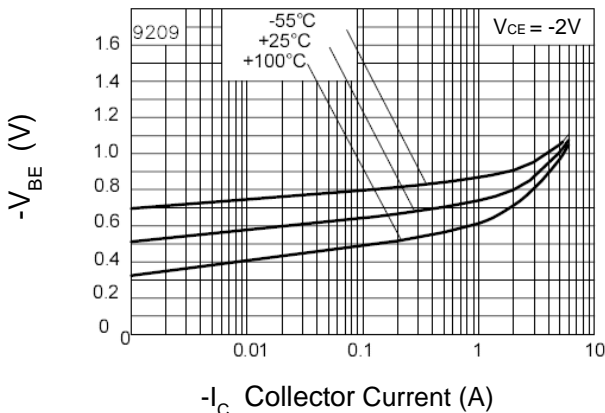
**VCE(sat) v IC**



**hFE v IC**



**VBE(sat) v IC**

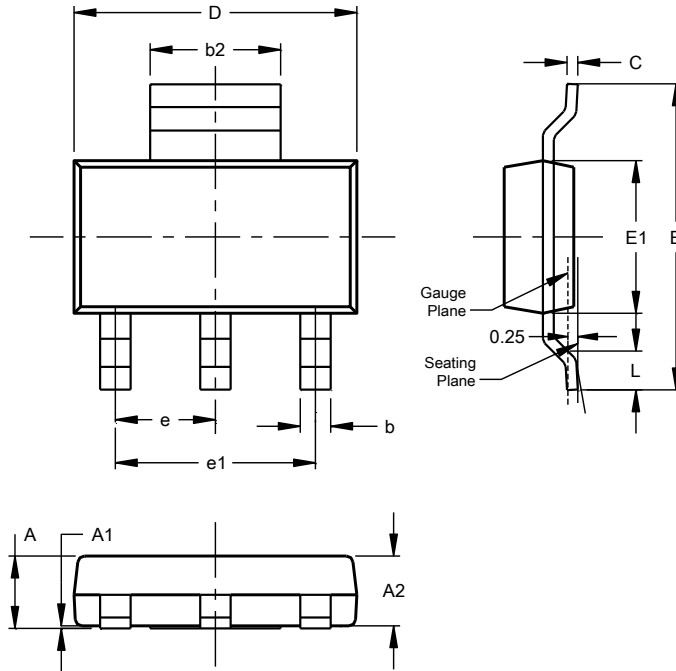


**VBE(on) v IC**

## Package Outline Dimensions

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

SOT223 (Type DN)



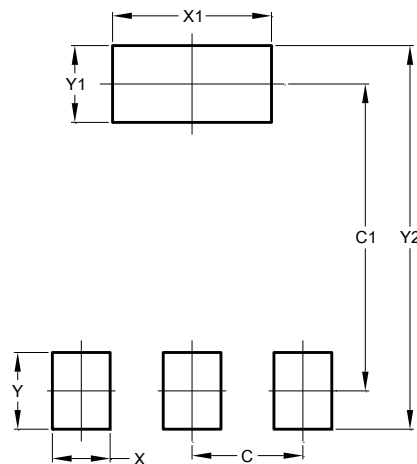
SOT223 (Type DN)			
Dim	Min	Max	Typ
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--

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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