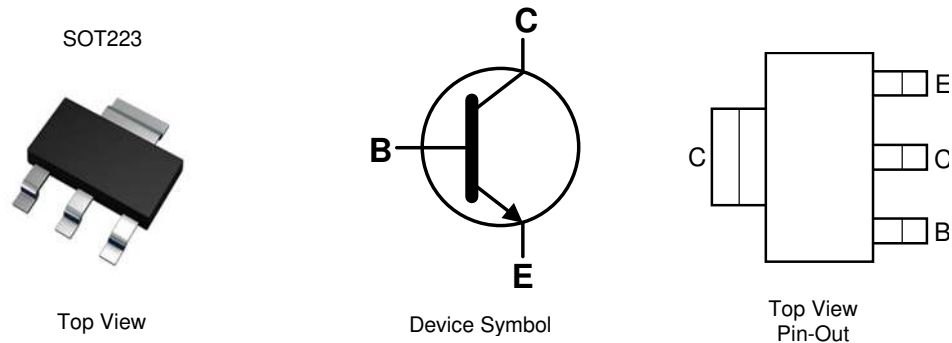


**Features**

- $BV_{CEO} > 100V$
- $I_C = 2A$  High Continuous Current
- $I_{CM} = 6A$  Peak Pulse Current
- Low Saturation Voltage  $V_{CE(SAT)} < 300mV @ 1A$
- Complementary PNP Type: FZT753
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **An Automotive-Compliant Part is Available Under Separate Datasheet (FZT653Q)**

**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 208③
- Weight: 0.112 grams (Approximate)

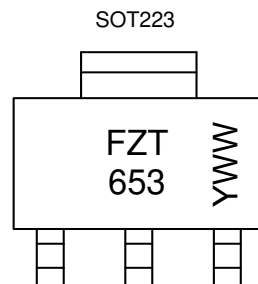


**Ordering Information** (Note 4)

Product	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Peel
FZT653TA	AEC-Q101	FZT653	7	12	1,000
FZT653TC	AEC-Q101	FZT653	13	12	4,000

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

**Marking Information**



FZT 653 = Product Type Marking Code  
 YWW = Date Code Marking  
 Y or  $\bar{Y}$  = Last Digit of Year (ex: 8 = 2018)  
 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>	120	V
Collector-Emitter Voltage	V <sub>CEO</sub>	100	V
Emitter-Base Voltage	V <sub>EBO</sub>	7	V
Continuous Collector Current	I <sub>C</sub>	2	A
Peak Pulse Current	I <sub>CM</sub>	6	A

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

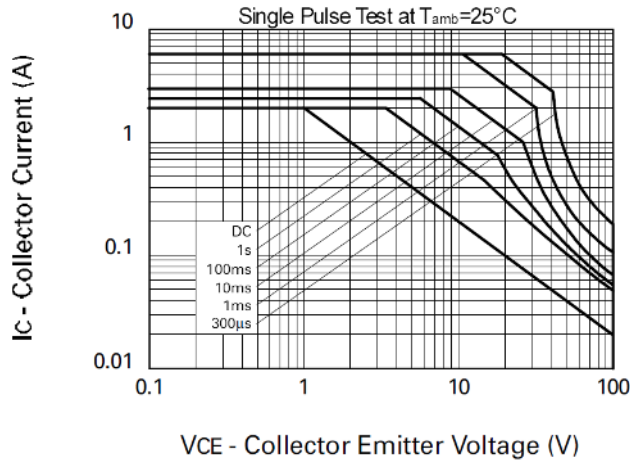
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	(Note 5)	3
		(Note 6)	2
		(Note 7)	1.6
		(Note 8)	1.2
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Note 5)	41.7
		(Note 6)	62.5
		(Note 7)	78.1
		(Note 8)	104
Thermal Resistance Junction to Lead	R <sub>θJL</sub>	12.9	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 10)

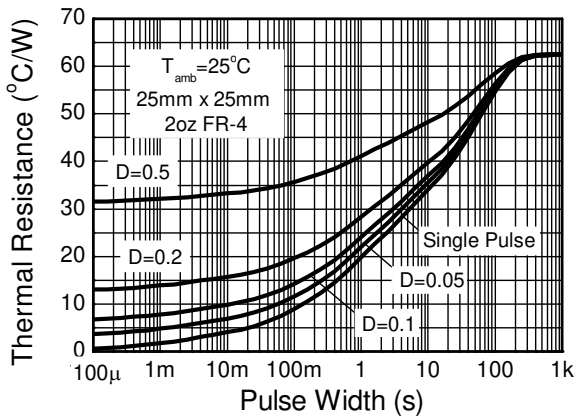
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device mounted with the collector lead on 50mm x 50mm 2oz copper that is on a single-sided 1.6mm FR-4 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.

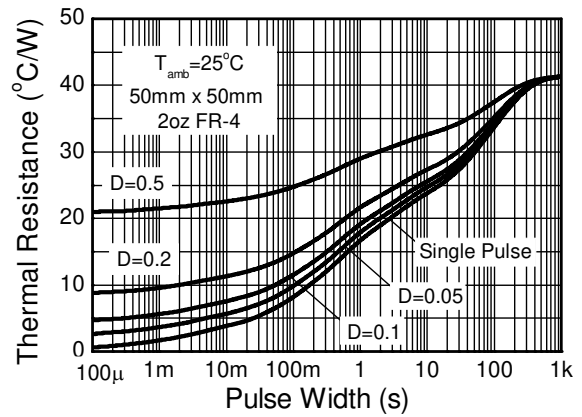
**Thermal Characteristics and Derating Information**



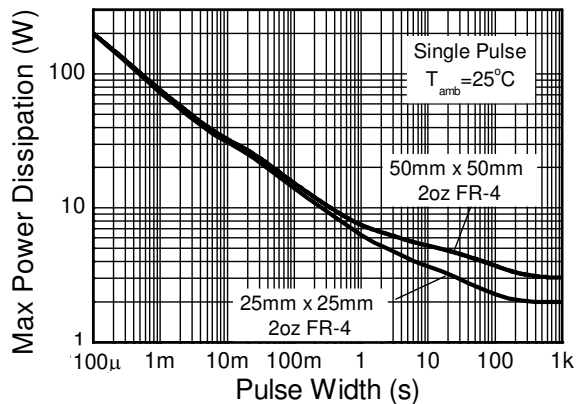
**Safe Operating Area**



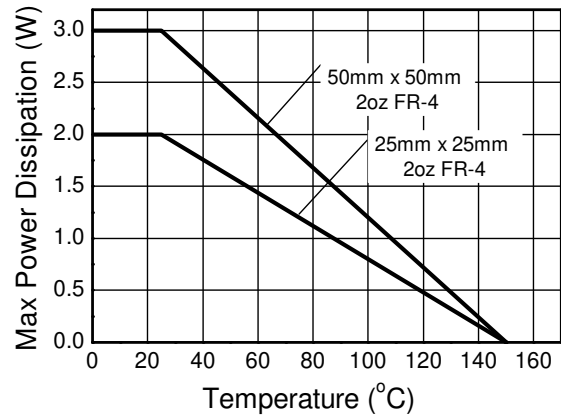
**Transient Thermal Impedance**



**Transient Thermal Impedance**



**Pulse Power Dissipation**



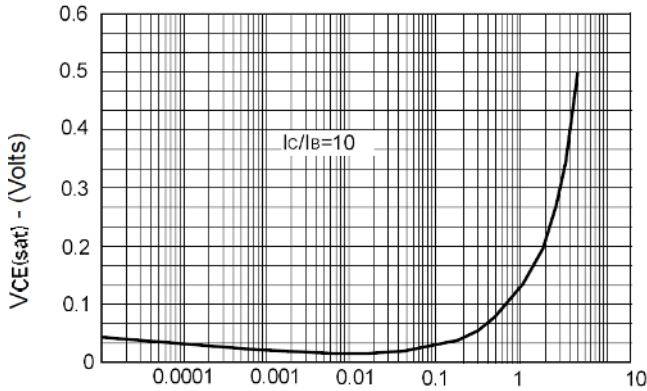
**Derating Curve**

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	120	–	–	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 11)	BV <sub>CEO</sub>	100	–	–	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>	–	< 1	100	nA	V <sub>CB</sub> = 100V
		–	–	10	μA	V <sub>CB</sub> = 100V, T <sub>A</sub> = +125°C
Emitter Cut-Off Current	I <sub>EBO</sub>	–	< 1	100	nA	V <sub>EB</sub> = 5.6V
Collector-Emitter Saturation Voltage (Note 11)	V <sub>CE(SAT)</sub>	–	0.13	0.3	V	I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA
		–	0.23	0.5		I <sub>C</sub> = 2A, I <sub>B</sub> = 200mA
Base-Emitter Saturation Voltage (Note 11)	V <sub>BE(SAT)</sub>	–	0.9	1.25	V	I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA
Base-Emitter Turn-On Voltage (Note 11)	V <sub>BE(ON)</sub>	–	0.8	1.0	V	I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V
DC Current Gain (Note 11)	h <sub>FE</sub>	70	200	–	–	I <sub>C</sub> = 50mA, V <sub>CE</sub> = 2V
		100	200	300		I <sub>C</sub> = 500mA, V <sub>CE</sub> = 2V
		55	110	–		I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V
		25	55	–		I <sub>C</sub> = 2A, V <sub>CE</sub> = 2V
Current Gain-Bandwidth Product	f <sub>T</sub>	140	175	–	MHz	V <sub>CE</sub> = 5V, I <sub>C</sub> = 100mA, f = 100MHz
Switching Times	t <sub>ON</sub>	–	80	–	ns	I <sub>C</sub> = 500mA, V <sub>CC</sub> = 10V, I <sub>B1</sub> = -I <sub>B2</sub> = 50mA
	t <sub>OFF</sub>	–	1200	–		
Output Capacitance	C <sub>OBO</sub>	–	–	30	pF	V <sub>CB</sub> = 10V, f = 1MHz

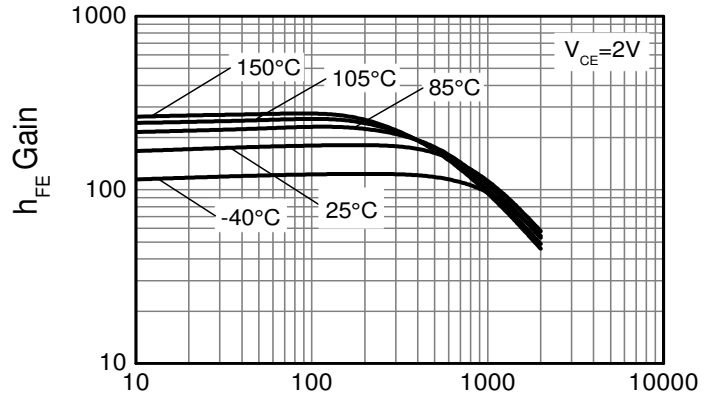
Note: 11. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



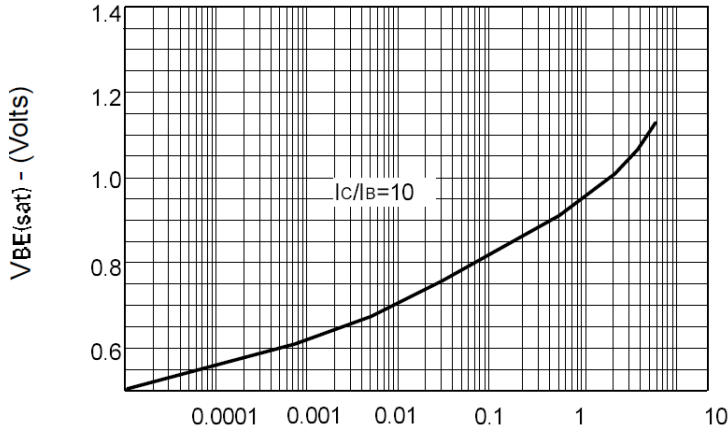
$I_C$  - Collector Current (Amps)

**$V_{CE(sat)}$  v  $I_C$**



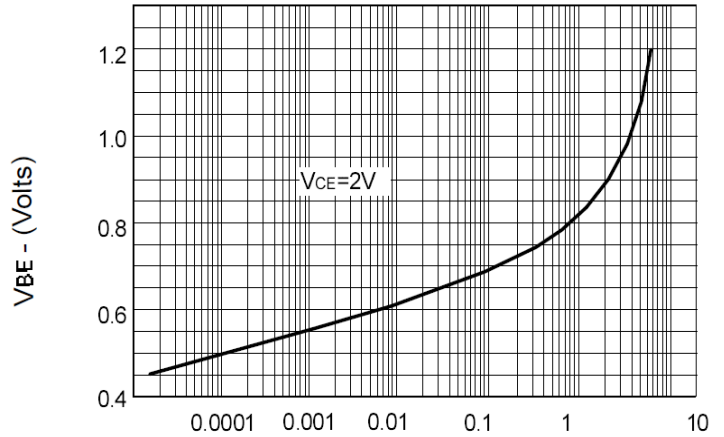
$I_C$  - Collector Current (mA)

**$h_{FE}$  v  $I_C$**



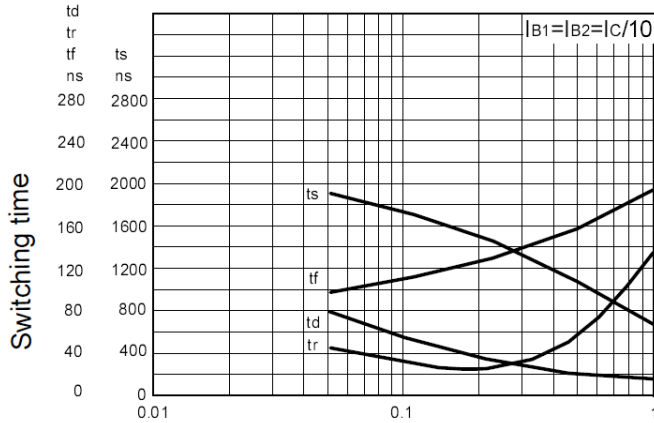
$I_C$  - Collector Current (Amps)

**$V_{BE(sat)}$  v  $I_C$**



$I_C$  - Collector Current (Amps)

**$V_{BE(on)}$  v  $I_C$**

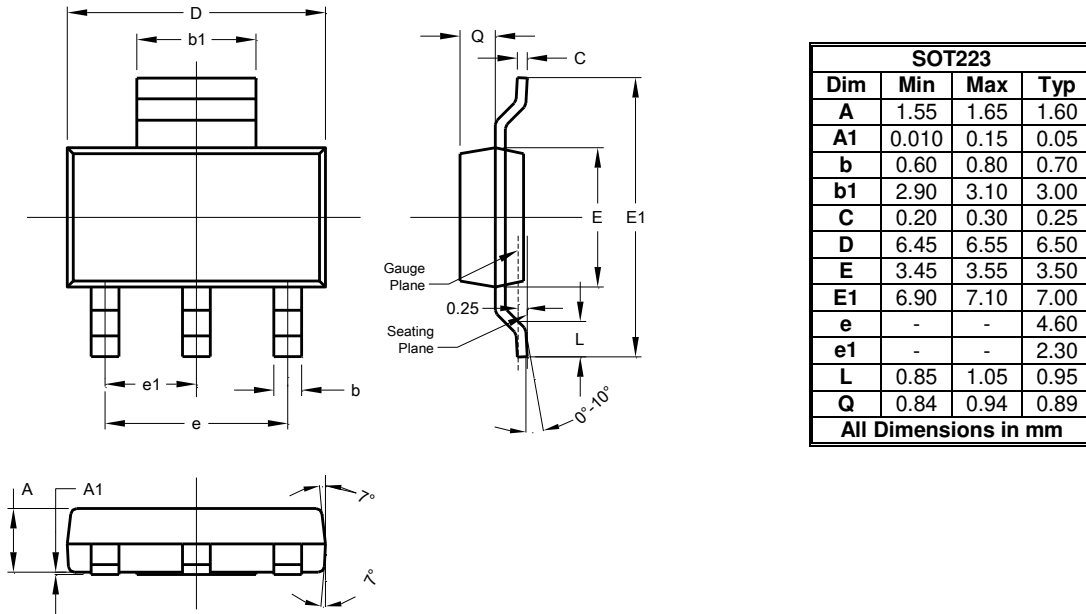


$I_C$  - Collector Current (Amps)

**Switching Speeds**

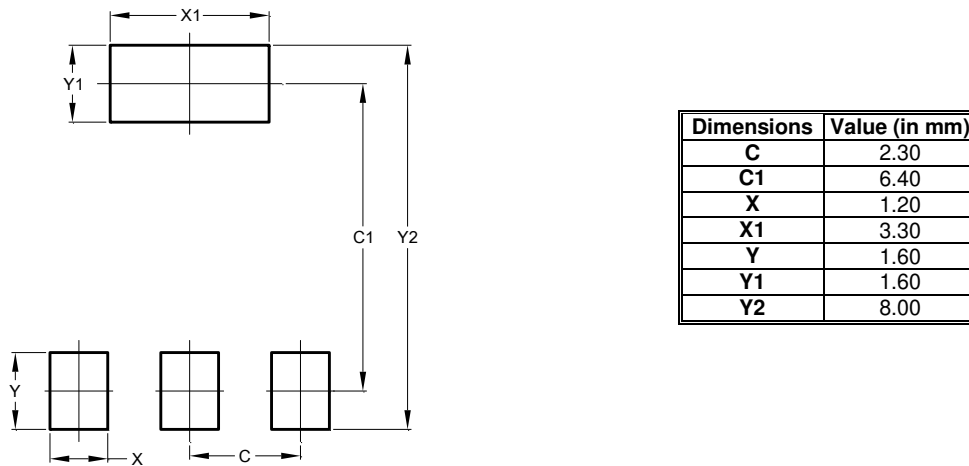
**Package Outline Dimensions**

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



**Suggested Pad Layout**

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



Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to voltage spacing between terminals.

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