



FZT653

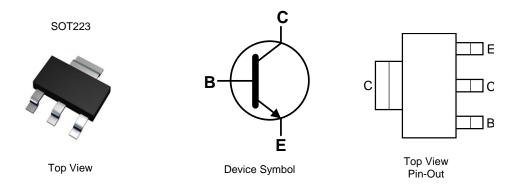
100V NPN HIGH PERFORMANCE TRANSISTOR IN SOT223

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 208@3
- Weight: 0.112 grams (Approximate)



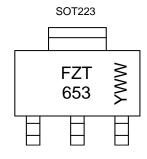
Ordering Information (Note 4)

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 \overline{Y} = Last Digit of Year (ex: 8 = 2018) WW or $\overline{W}W = Week Code (01 to 53)$



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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	120	V
Collector-Emitter Voltage	V _{CEO}	100	V
Emitter-Base Voltage	V _{EBO}	7	V
Continuous Collector Current	Ic	2	Α
Peak Pulse Current	I _{CM}	6	Α

Thermal Characteristics (@TA = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit		
	(Note 5)		3	W	
Power Dissipation	(Note 6)	D	2		
Power Dissipation	(Note 7)	P _D	1.6	VV	
	(Note 8)		1.2]	
	(Note 5)		41.7		
Thermal Resistance, Junction to Ambient	(Note 6)	Б	62.5		
Thermal Resistance, Junction to Ambient	(Note 7)	$R_{ hetaJA}$	78.1	°C/W	
	(Note 8)		104		
Thermal Resistance Junction to Lead (Note 9)		$R_{ hetaJL}$	12.9		
Operating and Storage Temperature Range	$T_{J,}T_{STG}$	-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	С

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.

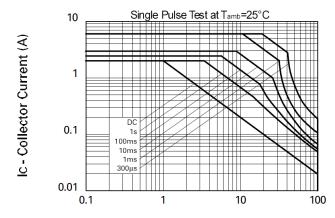
- 7. Same as Note 5, except the device is mounted on 25mm x 25mm 1oz copper.

 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.

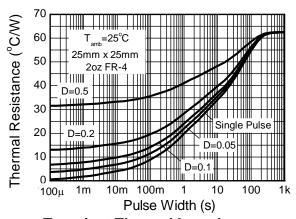


Thermal Characteristics and Derating Information

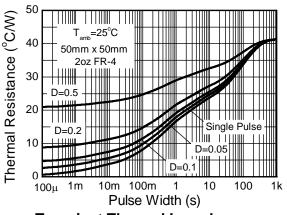


VCE - Collector Emitter Voltage (V)

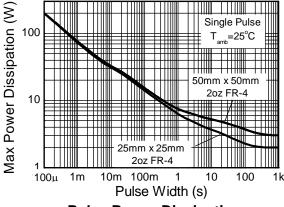
Safe Operating Area



Transient Thermal Impedance

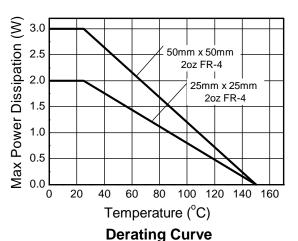


Transient Thermal Impedance



Pulse Power Dissipation

FZT653





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

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_CBO	120	-	_	V	$I_C = 100\mu A$
Collector-Emitter Breakdown Voltage (Note 11)	BV _{CEO}	100	_	_	V	$I_C = 10mA$
Emitter-Base Breakdown Voltage	BV _{EBO}	7	-	_	V	$I_E = 100 \mu A$
Collector Cut-Off Current	I _{CBO}	_	< 1	100	nA	V _{CB} = 100V
Collector Cut-On Current		_	_	10	μΑ	V _{CB} = 100V, T _A = +125°C
Emitter Cut-Off Current	I _{EBO}	_	< 1	100	nA	V _{EB} = 5.6V
Collector Emitter Seturation Voltage (Note 11)		_	0.13	0.3	V	$I_C = 1A$, $I_B = 100mA$
Collector-Emitter Saturation Voltage (Note 11)	$V_{CE(SAT)}$	_	0.23	0.5	V	$I_C = 2A$, $I_B = 200mA$
Base-Emitter Saturation Voltage (Note 11)	V _{BE(SAT)}	_	0.9	1.25	V	I _C = 1A, I _B = 100mA
Base-Emitter Turn-On Voltage (Note 11)	V _{BE(ON)}	_	0.8	1.0	V	$I_C = 1A$, $V_{CE} = 2V$
		70	200	_		I _C = 50mA, V _{CE} = 2V
DC Current Cain (Note 11)	h _{FE}	100	200	300		I _C = 500mA, V _{CE} = 2V
DC Current Gain (Note 11)		55	110	_	_	I _C = 1A, V _{CE} = 2V
		25	55	_		$I_C = 2A$, $V_{CE} = 2V$
Current Gain-Bandwidth Product	f _T	140	175	-	MHz	V _{CE} = 5V, I _C = 100mA, f = 100MHz
Cuitakina Timos	t _{ON}	_	80	_		$I_C = 500 \text{mA}, V_{CC} = 10 \text{V},$
Switching Times	t _{OFF}	_	1200	_	ns	$I_{B1} = -I_{B2} = 50 \text{mA}$
Output Capacitance	Сово	_	_	30	pF	V _{CB} = 10V, f = 1MHz

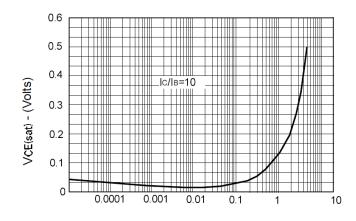
Note:

11. Measured under pulsed conditions. Pulse width \leq 300µs. Duty cycle \leq 2%.

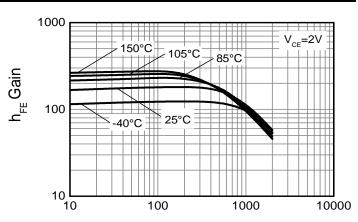


VBE(sat) - (Volts)

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

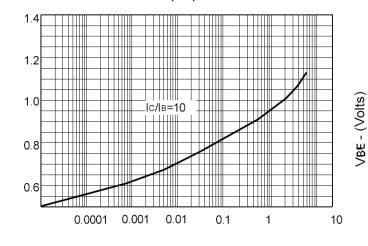




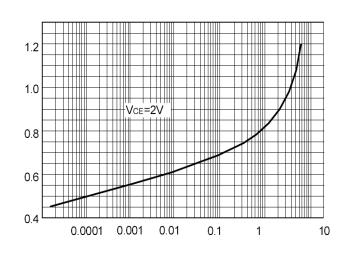


I_c - Collector Current (mA) **hFE v Ic**





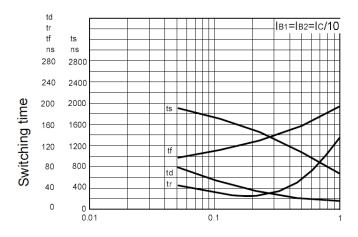
Ic - Collector Current (Amps)



Ic - Collector Current (Amps)

VBE(on) v IC

VBE(sat) v IC



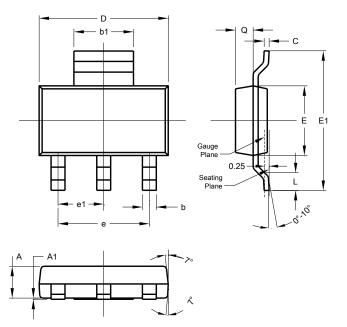
Ic - Collector Current (Amps)

Switching Speeds



Package Outline Dimensions

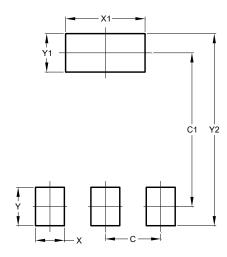
Please see http://www.diodes.com/package-outlines.html for the latest version.



SOT223					
Dim	Min	Max	Тур		
Α	1.55	1.65	1.60		
A1	0.010	0.15	0.05		
b	0.60	0.80	0.70		
b1	2.90	3.10	3.00		
С	0.20	0.30	0.25		
D	6.45	6.55	6.50		
Е	3.45	3.55	3.50		
E1	6.90	7.10	7.00		
е	-	-	4.60		
e1	-	-	2.30		
L	0.85	1.05	0.95		
Q	0.84	0.94	0.89		
All Dimensions in mm					

Suggested Pad Layout

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



Dimensions	Value (in mm)
С	2.30
C1	6.40
Х	1.20
X1	3.30
Υ	1.60
Y1	1.60
Y2	8.00

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

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