



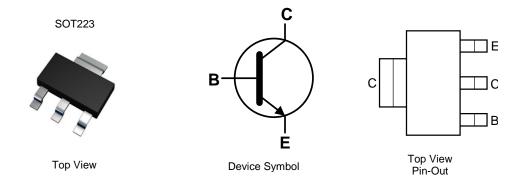
100V NPN HIGH PERFORMANCE TRANSISTOR IN SOT223

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
- 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)



Ordering Information (Notes 4 & 5)

Product	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Peel
FZT653TA	AEC-Q101	FZT653	7	12	1,000
FZT653QTA	Automotive	FZT653	7	12	1,000
FZT653TC	AEC-Q101	FZT653	13	12	4,000

1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.

 See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.

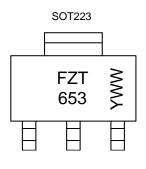
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

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 http://www.diodes.com/product_compliance_definitions.html.

5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information

Notes:



FZT 653 = Product Type Marking Code YWW = Date Code Marking Y or \overline{Y} = Last Digit of Year (ex: 6 = 2016) 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	lc	2	А
Peak Pulse Current	I _{CM}	6	А

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

Characteristic	Symbol	Value	Unit		
	(Note 6)		3		
Dower Dissinction	(Note 7)		2	w	
Power Dissipation	(Note 8)	PD	1.6	vv	
	(Note 9)		1.2		
	(Note 6)		41.7		
Thermal Resistance, Junction to Ambient	(Note 7)		62.5		
Thermal Resistance, Junction to Ambient	(Note 8)	R _{θJA}	78.1	°C/W	
	(Note 9)		104		
Thermal Resistance Junction to Lead	(Note 10)	$R_{ ext{ heta}JL}$	12.9		
Operating and Storage Temperature Range	T _{J,} T _{STG}	-55 to +150	°C		

ESD Ratings (Note 11)

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

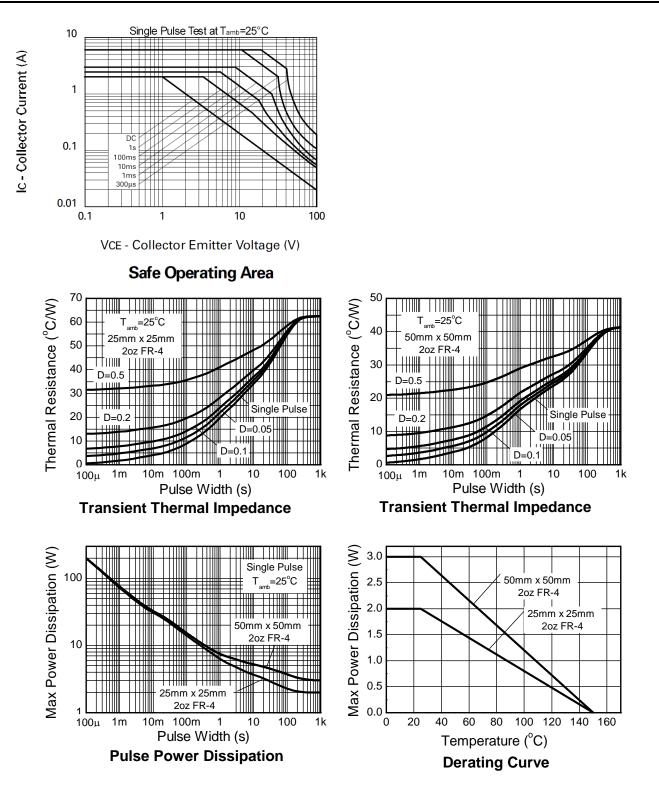
Notes: 6. For a device mounted with the collector lead on 50mm x 50mm 2oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state. 7. Same as Note 6, except the device is mounted on 25mm x 25mm 2oz copper.

Same as Note 6, except the device is mounted on 25mm x 25mm 1oz copper.
Same as Note 6, except the device is mounted on a 5mm recommended pad layout.

Thermal resistance from junction to solder-point (at the end of the collector lead).
Refer to JEDEC specification JESD22-A114 and JESD22-A115.



Thermal Characteristics and Derating Information





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

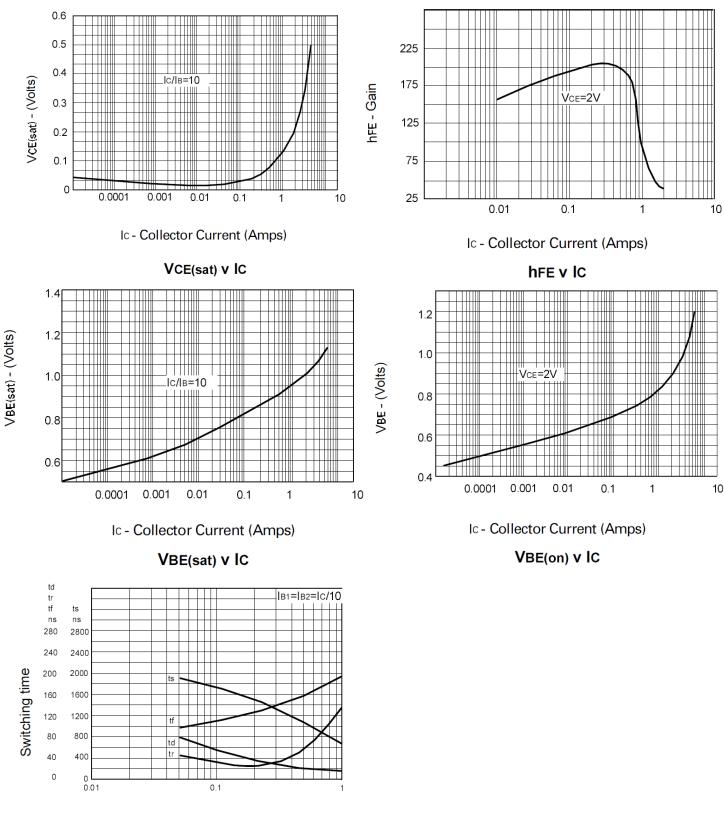
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	120	-	-	V	I _C = 100μA
Collector-Emitter Breakdown Voltage (Note 12)	BV _{CEO}	100	-	-	V	$I_{C} = 10 \text{mA}$
Emitter-Base Breakdown Voltage	BV _{EBO}	7	-	-	V	$I_E = 100 \mu A$
Collector Cut-Off Current	1	-	< 1	100	nA	V _{CB} = 100V
	I _{CBO}	-	-	10	μA	V _{CB} = 100V, T _A = +125°C
Emitter Cut-Off Current	I _{EBO}	-	< 1	100	nA	$V_{EB} = 5.6V$
Collector-Emitter Saturation Voltage (Note 12)	14	-	0.13	0.3	V	$I_{\rm C} = 1$ A, $I_{\rm B} = 100$ mA
Collector-Enlitter Saturation Voltage (Note 12)	V _{CE(SAT)}	-	0.23	0.5	v	$I_{\rm C} = 2A, I_{\rm B} = 200 {\rm mA}$
Base-Emitter Saturation Voltage (Note 12)	V _{BE(SAT)}	-	0.9	1.25	V	$I_{C} = 1A, I_{B} = 100mA$
Base-Emitter Turn-On Voltage (Note 12)	V _{BE(ON)}	-	0.8	1.0	V	$I_C = 1A, V_{CE} = 2V$
	h _{FE}	70	200	-		$I_{C} = 50 \text{mA}, V_{CE} = 2 \text{V}$
DC Current Gain (Note 12)		100	200	300		$I_{C} = 500 \text{mA}, V_{CE} = 2 \text{V}$
DC Current Gain (Note 12)		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	$V_{CE} = 5V$, $I_C = 100$ mA, f = 100MHz
Switching Timos	t _{ON}	-	80	_	20	$I_{\rm C} = 500 {\rm mA}, V_{\rm CC} = 10 {\rm V},$
Switching Times	t _{OFF}	-	1200	-	ns	$I_{B1} = -I_{B2} = 50 \text{mA}$
Output Capacitance	Сово	-	-	30	pF	$V_{CB} = 10V$, f = 1MHz

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



FZT653

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



Ic - Collector Current (Amps)

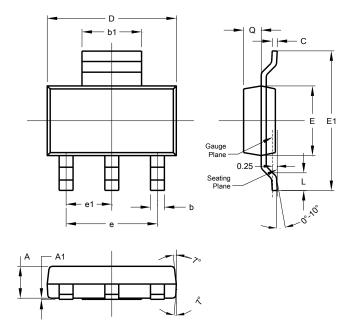
Switching Speeds



FZT653

Package Outline Dimensions

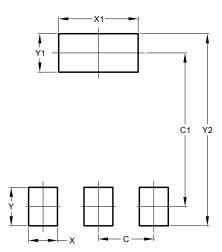
Please see http://www.diodes.com/package-outlines.html for the latest version.



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 [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
Y	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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