

FZT696BTA Datasheet

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DiGi Electronics Part Number	FZT696BTA-DG
Manufacturer	Diodes Incorporated
Manufacturer Product Number	FZT696BTA
Description	TRANS NPN 180V 0.5A SOT223-3
Detailed Description	Bipolar (BJT) Transistor NPN 180 V 500 mA 70MHz 2 W Surface Mount SOT-223-3



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

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Purchase and inquiry

Manufacturer Product Number:

FZT696BTA

Series:

-

Transistor Type:

NPN

Voltage - Collector Emitter Breakdown (Max):

180 V

Current - Collector Cutoff (Max):

100nA (ICBO)

Power - Max:

2 W

Operating Temperature:

-55°C ~ 150°C (TJ)

Package / Case:

TO-261-4, TO-261AA

Base Product Number:

FZT696

Manufacturer:

Diodes Incorporated

Product Status:

Active

Current - Collector (Ic) (Max):

500 mA

Vce Saturation (Max) @ Ib, Ic:

250mV @ 5mA, 200mA

DC Current Gain (hFE) (Min) @ Ic, Vce:

150 @ 200mA, 5V

Frequency - Transition:

70MHz

Mounting Type:

Surface Mount

Supplier Device Package:

SOT-223-3

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.29.0075

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99



FZT696B

180V NPN HIGH VOLTAGE TRANSISTOR IN SOT223

Features

- $BV_{CEO} > 180V$
- $I_C = 0.5A$ Continuous Current
- $h_{FE} > 500$ for High Gain @ 0.1A
- Very Low Saturation Voltage
- Complementary PNP Type: DIODES™ FZT795A
- **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](https://www.diodes.com/quality/product-definitions/) or your local Diodes representative.**
<https://www.diodes.com/quality/product-definitions/>

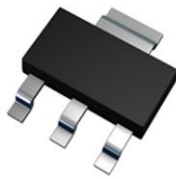
Mechanical Data

- Package: SOT223
- 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 (3)
- Weight: 0.112 grams (Approximate)

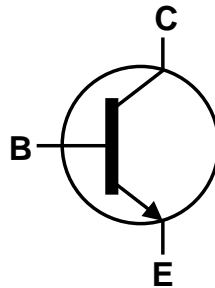
Applications

- Darlington replacements
- Relay and solenoid drivers

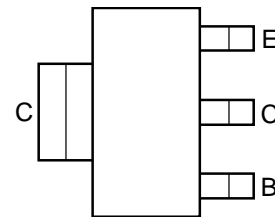
SOT223 (Type DN)



Top View



Device Symbol

Top View
Pin-Out

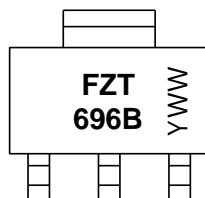
Ordering Information (Note 4)

Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
FZT696BTA	SOT223 (Type DN)	FZT696B	7	12	1,000	Reel
FZT696BTC	SOT223 (Type DN)	FZT696B	13	12	4,000	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

SOT223 (Type DN)



FZT696B = Product Type Marking Code
 YWW = Date Code Marking
 Y or \bar{Y} = Last Digit of Year (ex: 3 = 2023)
 WW or $\bar{W}W$ = Week Code (01 to 53)



FZT696B

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CB0}	180	V
Collector-Emitter Voltage	V _{CEO}	180	V
Emitter-Base Voltage	V _{EB0}	7	V
Continuous Collector Current	I _C	0.5	A
Peak Pulse Current	I _{CM}	1	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation	(Note 5)	3	W
	(Note 6)	2	
	(Note 7)	1.6	
	(Note 8)	1.2	
Thermal Resistance, Junction to Ambient	(Note 5)	41.7	°C/W
	(Note 6)	62.5	
	(Note 7)	78.1	
	(Note 8)	104	
Thermal Resistance Junction to Lead	R _{θJL}	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	C

- Notes:
- For a device mounted with the collector lead on 50mm × 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.
 - Same as Note 5, except the device is mounted on 25mm × 25mm 2oz copper.
 - Same as Note 5, except the device is mounted on 25mm × 25mm 1oz copper.
 - Same as Note 5, except the device is mounted on minimum 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

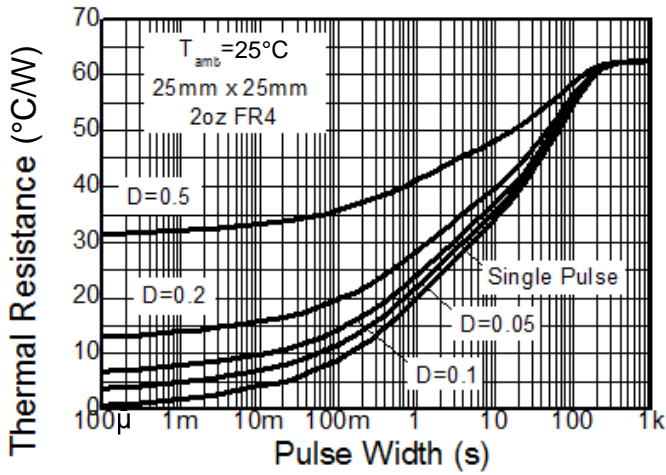


Figure 1. Transient Thermal Impedance

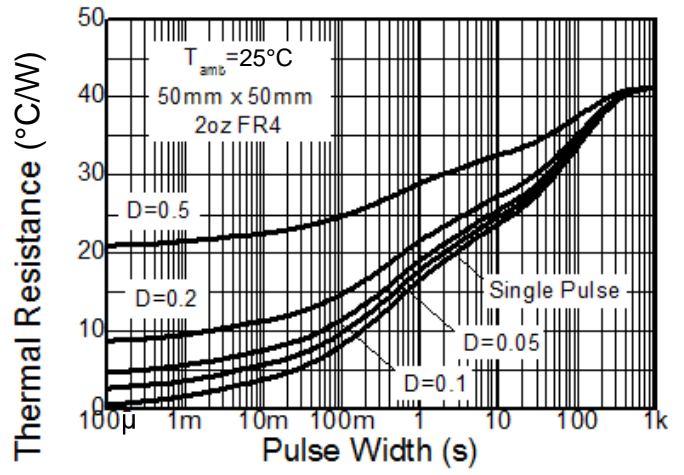


Figure 2. Transient Thermal Impedance

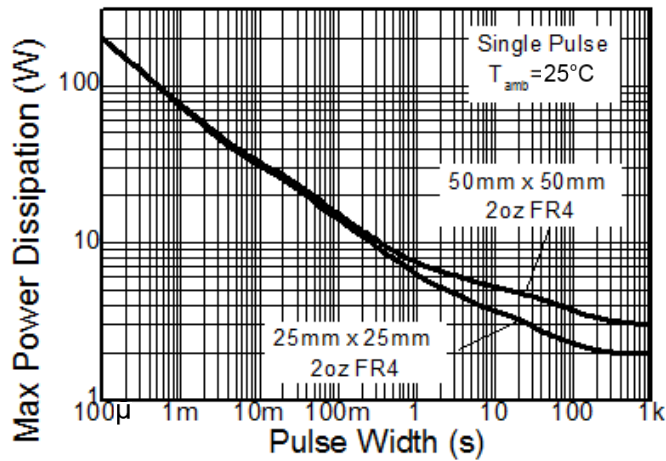


Figure 3. Pulse Power Dissipation

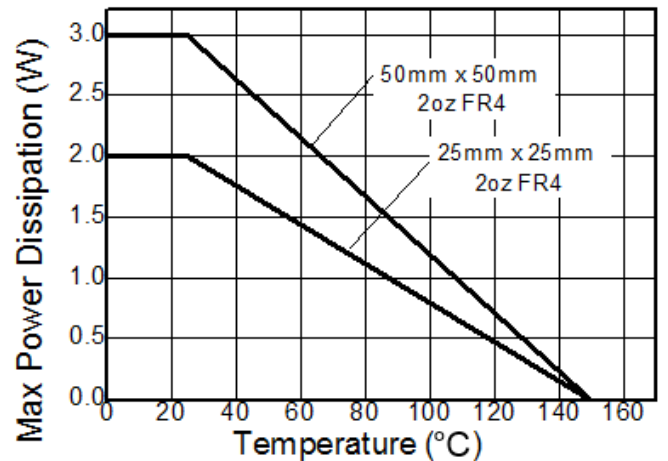


Figure 4. Derating Curve


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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CB0}	180	—	—	V	I _C = 100μA
Collector-Emitter Breakdown Voltage (Note 11)	BV _{CEO}	180	—	—	V	I _C = 10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	7	—	—	V	I _E = 100μA
Collector-Base Cut-Off Current	I _{CB0}	—	—	100	nA	V _{CB} = 140V
Emitter Cut-Off Current	I _{EBO}	—	—	50	nA	V _{EB} = 6V
DC Current Gain (Note 11)	h _{FE}	500 150	— —	— —	— —	I _C = 100mA, V _{CE} = 5V I _C = 200mA, V _{CE} = 5V
Collector-Emitter Saturation Voltage (Note 11)	V _{CE(sat)}	— — —	— — —	200 200 250	mV	I _C = 50mA, I _B = 0.5mA I _C = 100mA, I _B = 2mA I _C = 200mA, I _B = 5mA
Base-Emitter Saturation Voltage (Note 11)	V _{BE(sat)}	—	—	0.9	V	I _C = 200mA, I _B = 50mA
Base-Emitter Turn-On Voltage (Note 11)	V _{BE(on)}	—	—	0.9	V	I _C = 200mA, V _{CE} = 5V
Input Capacitance	C _{ibo}	—	200	—	pF	V _{EB} = 0.5V, f = 1MHz
Output Capacitance	C _{obo}	—	6	—	pF	V _{CB} = 10V, f = 1MHz
Current Gain-Bandwidth Product	f _T	130	—	—	MHz	V _{CE} = 5V, I _C = 50mA, f = 50MHz
Turn-On Time	t _{on}	—	80	—	ns	V _{CC} = 50V, I _C = 100mA,
Turn-Off Time	t _{off}	—	4400	—	ns	I _{B1} = -I _{B2} = 10mA

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



FZT696B

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

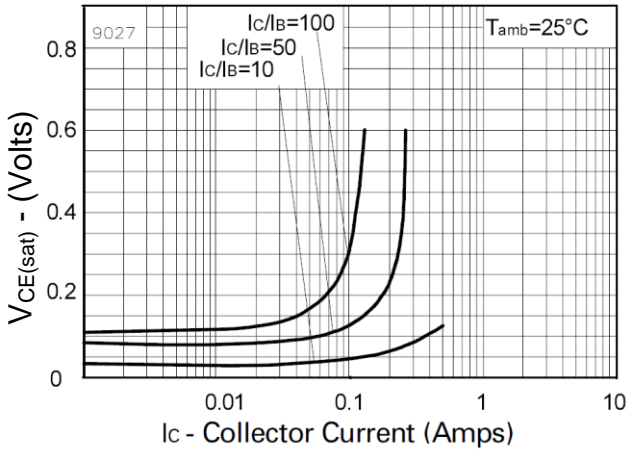


Figure 5. V_{CE(sat)} vs. I_c

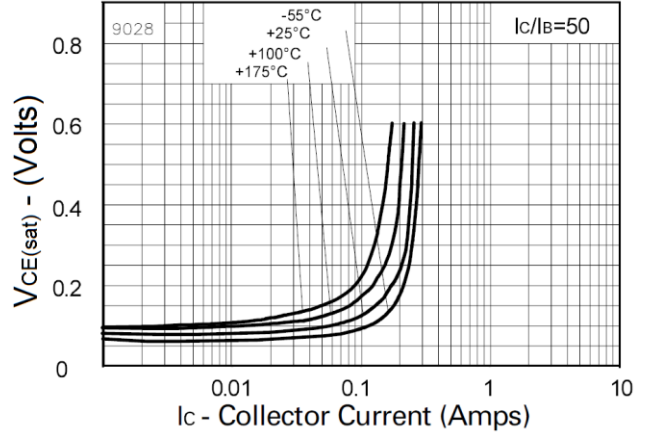


Figure 6. V_{CE(sat)} vs. I_c

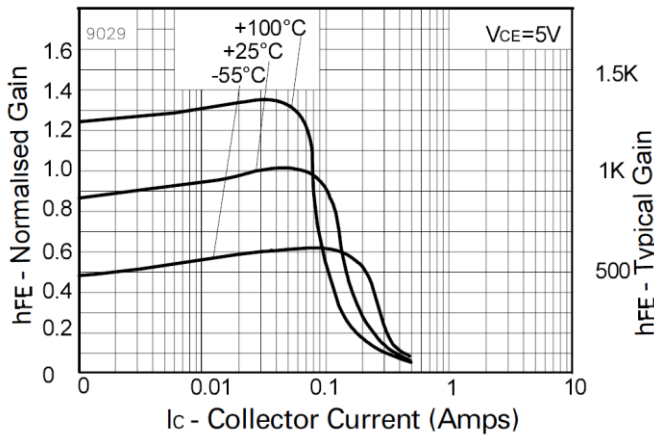


Figure 7. h_{FE} vs. I_c

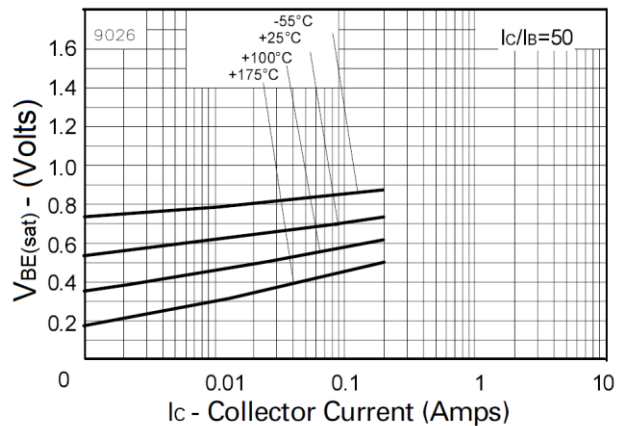


Figure 8. V_{BE(sat)} vs. I_c

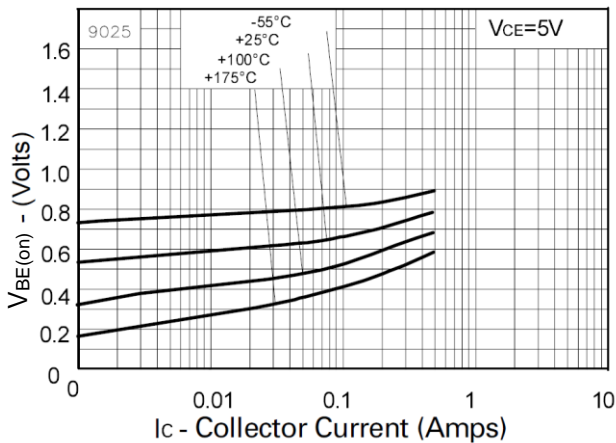
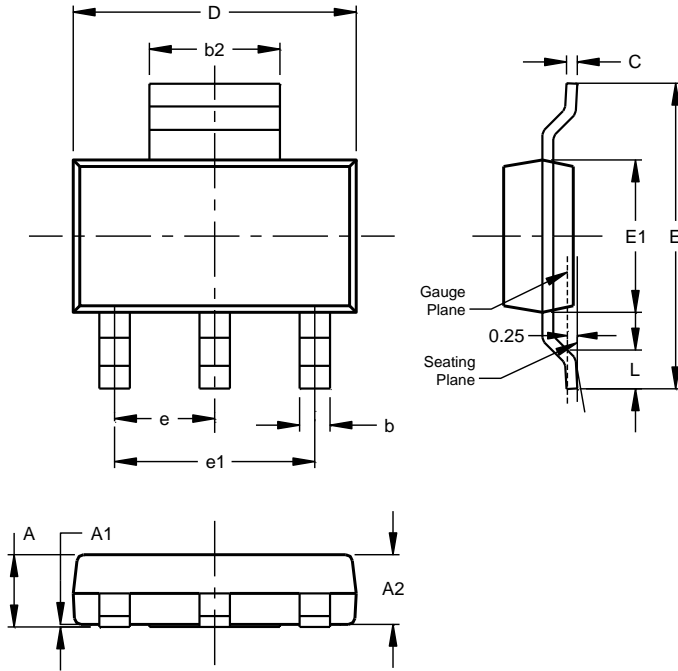


Figure 9. V_{BE(on)} vs. I_c

Package Outline Dimensions

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

SOT223 (Type DN)

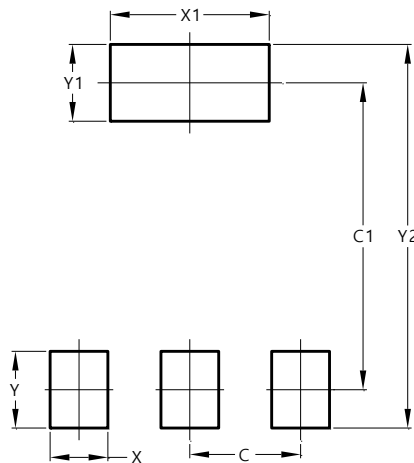


SOT223 (Type DN)			
Dim	Min	Max	Typ
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

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

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

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