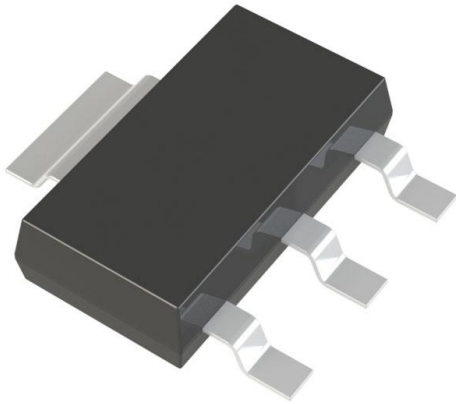


# FZT651TC Datasheet

[www.digi-electronics.com](http://www.digi-electronics.com)



<https://www.DiGi-Electronics.com>

DiGi Electronics Part Number	FZT651TC-DG
Manufacturer	<a href="#">Diodes Incorporated</a>
Manufacturer Product Number	FZT651TC
Description	TRANS NPN 60V 3A SOT223-3
Detailed Description	Bipolar (BJT) Transistor NPN 60 V 3 A 175MHz 2 W S urface Mount SOT-223-3



Tel: +00 852-30501935

RFQ Email: [Info@DiGi-Electronics.com](mailto:Info@DiGi-Electronics.com)

DiGi is a global authorized distributor of electronic components.

## Purchase and inquiry

Manufacturer Product Number:

FZT651TC

Series:

-

Transistor Type:

NPN

Voltage - Collector Emitter Breakdown (Max):

60 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:

FZT651

Manufacturer:

Diodes Incorporated

Product Status:

Active

Current - Collector (Ic) (Max):

3 A

Vce Saturation (Max) @ Ib, Ic:

600mV @ 300mA, 3A

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

100 @ 500mA, 2V

Frequency - Transition:

175MHz

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

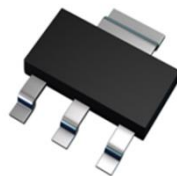
## Features

- $BV_{CEO} > 60V$
- $I_C = 3A$  High Continuous Current
- $I_{CM} = 6A$  Peak Pulse Current
- Low Saturation Voltage  $V_{CE(sat)} < 300mV @ 1A$
- Complementary PNP Type: FZT751
- **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/>**
- **An Automotive-Compliant Part is Available Under Separate Datasheet (FZT651Q)**

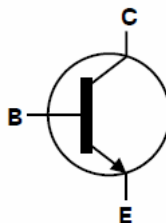
## Mechanical Data

- 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
- Weight: 0.112 grams (Approximate)

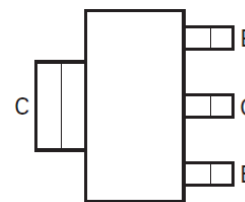
SOT223 (Type DN)



Top View



Device Symbol

Top View  
Pin-Out

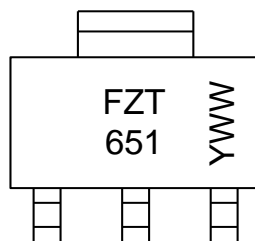
## Ordering Information (Note 4)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FZT651TA	Standard	FZT651	7	12	1,000
FZT651TC	Standard	FZT651	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

SOT223 (Type DN)



FZT 651 = 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)



FZT651

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	80	V
Collector-Emitter Voltage	$V_{CEO}$	60	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	$P_D$	2	W
		3	W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
		41.7	$^\circ\text{C/W}$
Thermal Resistance, Junction to Leads (Note 7)	$R_{\theta JL}$	12.9	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

### ESD Ratings (Note 8)

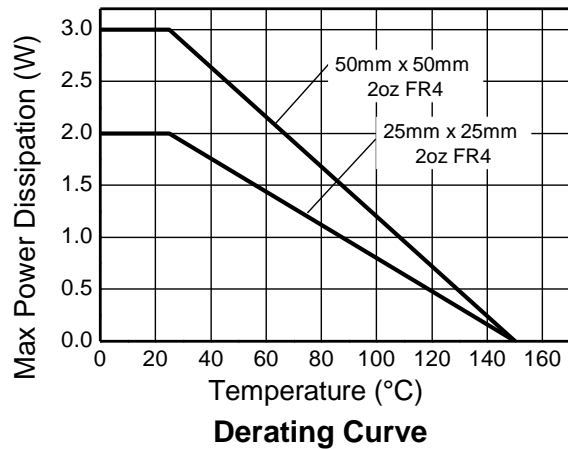
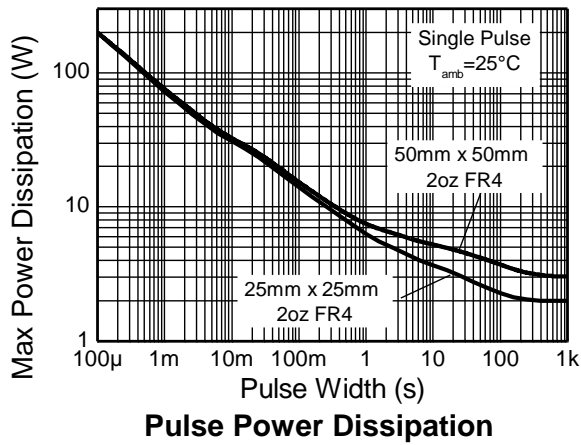
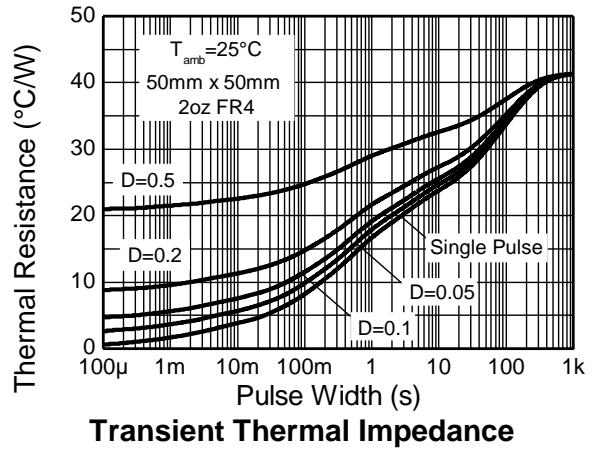
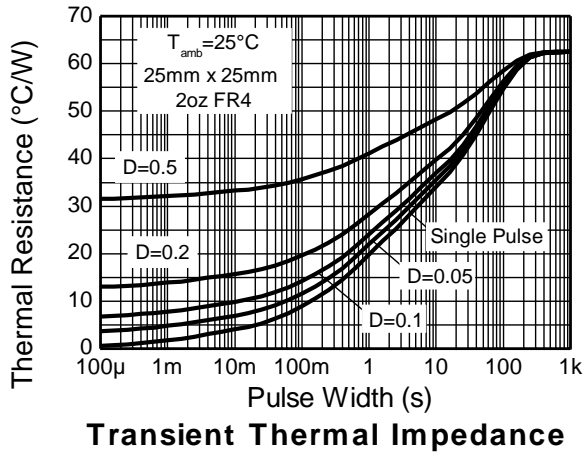
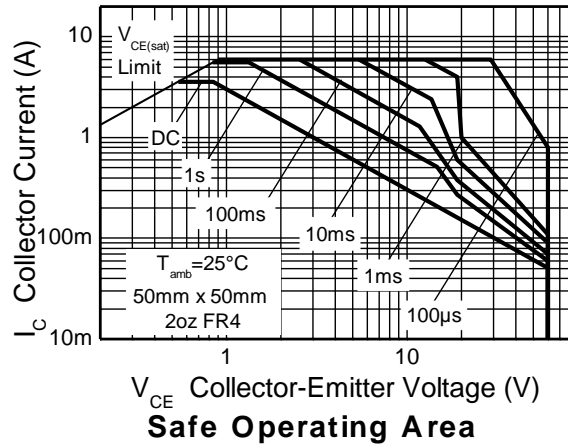
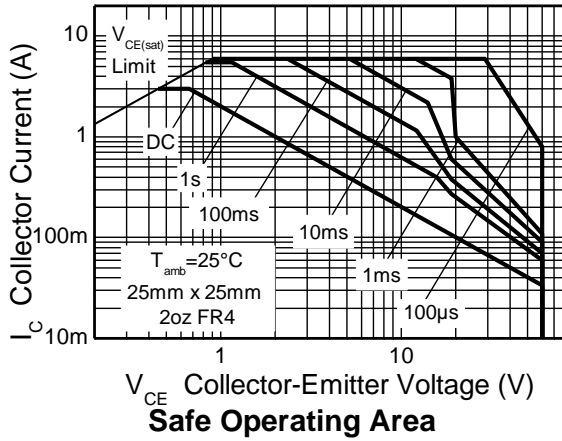
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
- For a device mounted with the collector lead on 25mm x 25mm 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady-state.
  - Same as Note 5, except the device is mounted on 50mm x 50mm 2oz copper.
  - Thermal resistance from junction to solder-point (at the end of the collector lead).
  - Refer to JEDEC specification JESD22-A114 and JESD22-A115.



FZT651

**Thermal Characteristics and Derating Information**





FZT651

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

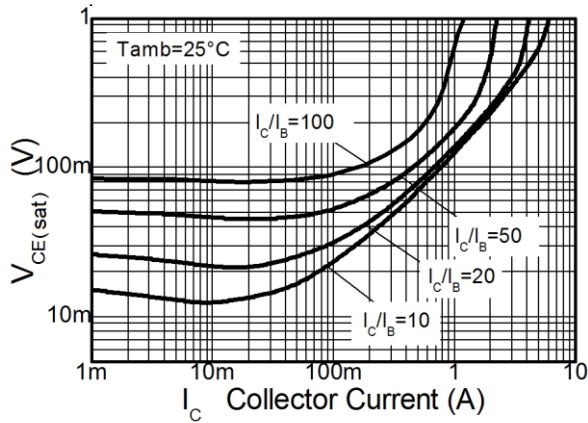
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	80	–	–	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	60	–	–	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7	–	–	V	I <sub>E</sub> = 100μA
Collector Cut-Off Current	I <sub>CBO</sub>	–	–	0.1	μA	V <sub>CB</sub> = 60V
		–	–	10		V <sub>CB</sub> = 60V, T <sub>A</sub> = +125°C
Emitter Cut-Off Current	I <sub>EBO</sub>	–	–	20	nA	V <sub>EB</sub> = 6V
Collector-Emitter Saturation Voltage (Note 9)	V <sub>CE(sat)</sub>	–	0.12	0.3	V	I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA
		–	0.43	0.6		I <sub>C</sub> = 3A, I <sub>B</sub> = 300mA
Base-Emitter Saturation Voltage (Note 9)	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 9)	V <sub>BE(on)</sub>	–	0.8	1.0	V	I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V
DC Current Gain (Note 9)	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
		80	170	–		I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V
		40	80	–		I <sub>C</sub> = 2A, V <sub>CE</sub> = 2V
Current Gain-Bandwidth Product (Note 9)	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>	–	45	–	ns	I <sub>C</sub> = 500mA, V <sub>CC</sub> = 10V, I <sub>B1</sub> = -I <sub>B2</sub> = 50mA
	t <sub>off</sub>	–	800	–		
Output Capacitance (Note 9)	C <sub>obo</sub>	–	–	30	pF	V <sub>CB</sub> = 10V, f = 1MHz

Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

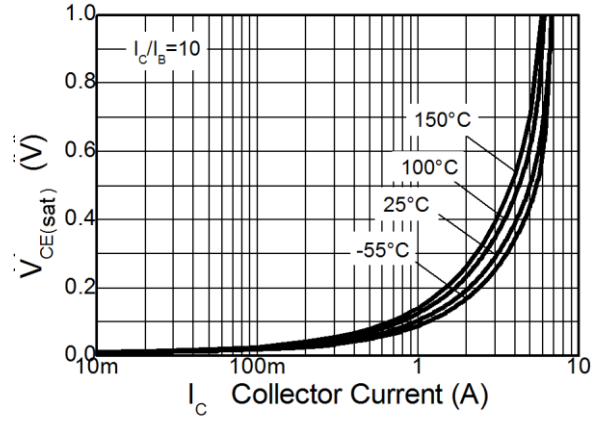


FZT651

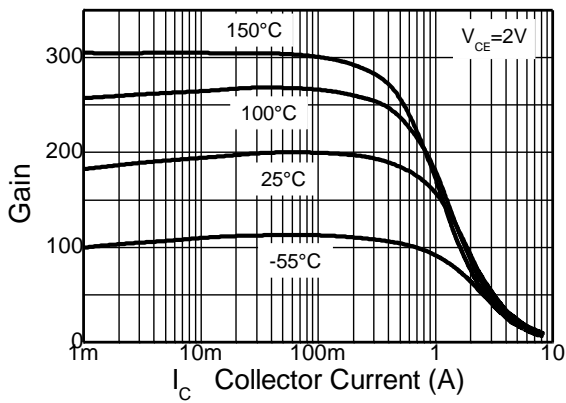
**Typical Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)



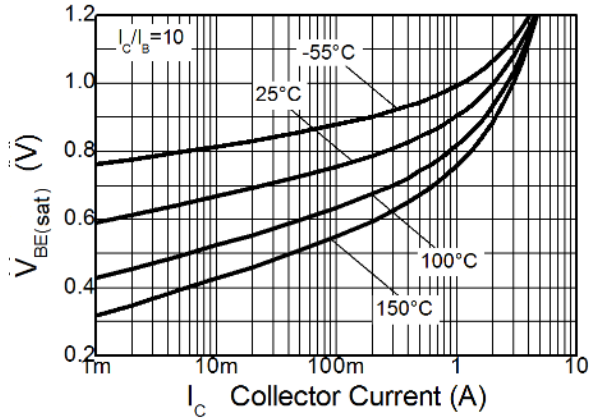
V<sub>CE(sat)</sub> v I<sub>C</sub>



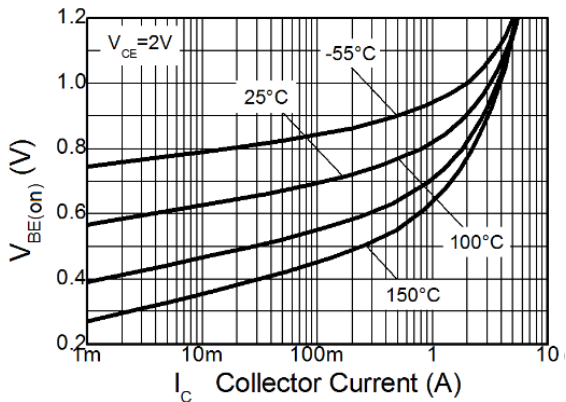
V<sub>CE(sat)</sub> v I<sub>C</sub>



h<sub>FE</sub> v I<sub>C</sub>



V<sub>BE(sat)</sub> v I<sub>C</sub>

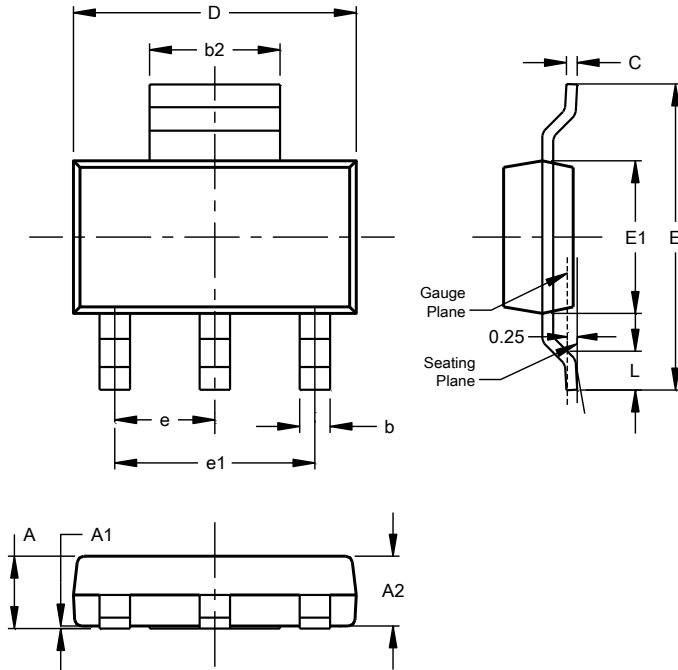


V<sub>BE(on)</sub> v I<sub>C</sub>

## Package Outline Dimensions

Please see <https://www.diodes.com/design/support/packaging/> for the latest version.

### SOT223 (Type DN)

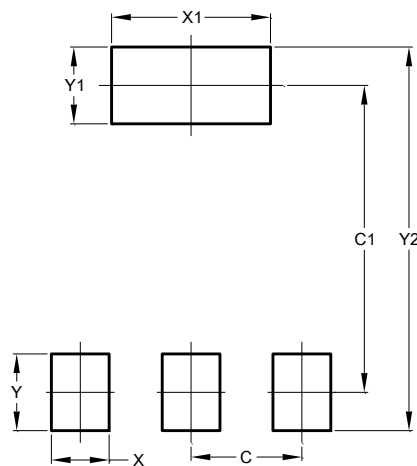


SOT223 (Type DN)			
Dim	Min	Max	Typ
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

## Suggested Pad Layout

Please see <https://www.diodes.com/design/support/packaging/> 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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