80V NPN DARLINGTON TRANSISTOR IN SOT223

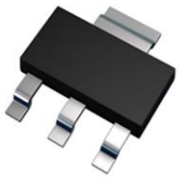
Features

- BV_{CEO} > 80V
- BV_{CBO} > 100V
- I_C = 2A High Continuous Current
- Useful h_{FE} up to 6A
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. https://www.diodes.com/quality/product-definitions/**
- **An automotive-compliant part is available under separate datasheet (FZT603Q)**

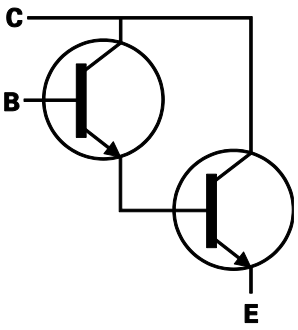
Mechanical Data

- 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 e3
- Weight: 0.112 grams (Approximate)

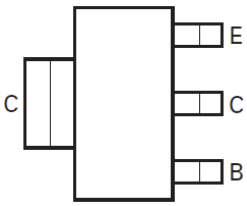
SOT223 (Type DN)



Top View



Device Symbol



Top View
Pinout

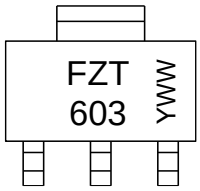
Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
FZT603TA	SOT223 (Type DN)	FZT603	7	12	1,000	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)



FZT603 = Product Type Marking Code
YWW = Date Code Marking
Y or $\overline{Y}$ = Last Digit of Year (ex: 5 = 2025)
WW or $\overline{WW}$ = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	100	V
Collector-Emitter Voltage	V_{CEO}	80	V
Emitter-Base Voltage	V_{EBO}	10	V
Continuous Collector Current	I_C	2	A
Peak Pulse Current	I_{CM}	6	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	3.0	W
	(Note 6)		2.0	
	(Note 7)		1.6	
	(Note 8)		1.2	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	41.7	°C/W
	(Note 6)		62.5	
	(Note 7)		78.1	
	(Note 8)		104	
Thermal Resistance, Junction to Lead	(Note 9)	$R_{\theta JL}$	12.9	
Thermal Resistance, Junction to Case	(Note 6)	$R_{\theta JC}$	1.1	
	(Note 7)		4.7	
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	2,000	V	2
Electrostatic Discharge - Machine Model	ESD MM	200	V	B

Notes:
5. For a device mounted with the collector lead on 50mm x 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.
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.

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Thermal Characteristics and Derating Information

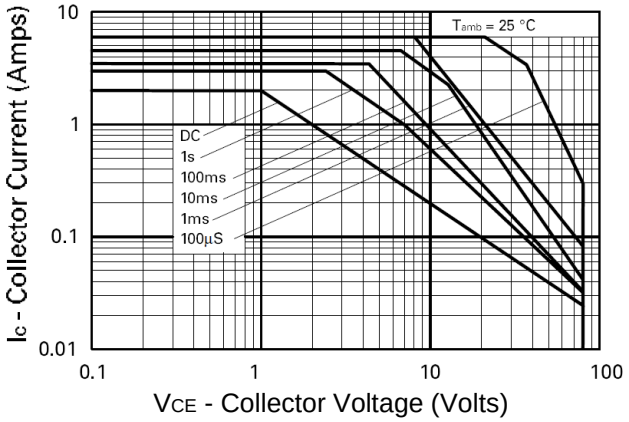


Figure 1. Safe Operating Area

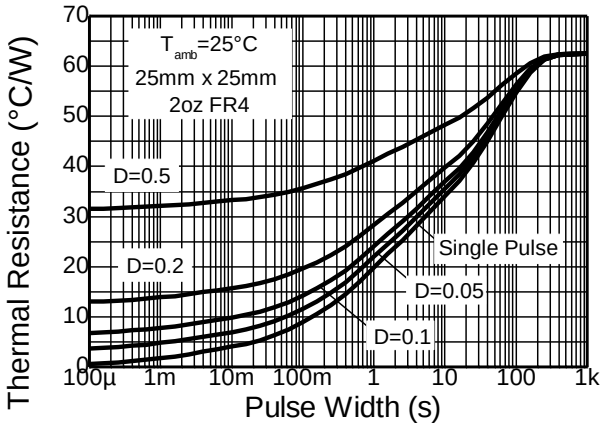


Figure 2. Transient Thermal Impedance

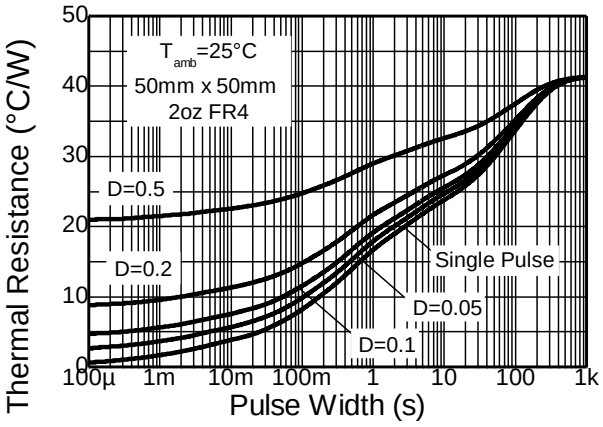


Figure 3. Transient Thermal Impedance

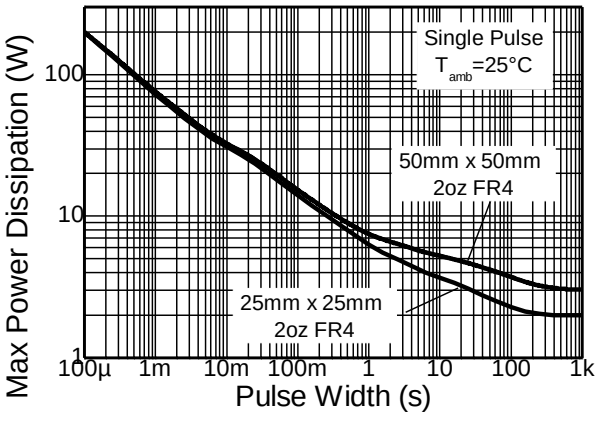


Figure 4. Pulse Power Dissipation

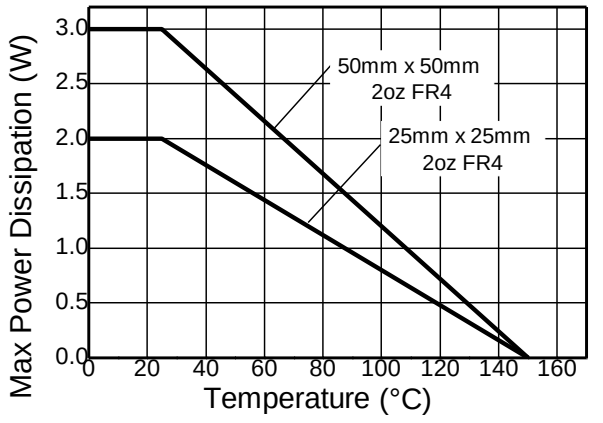


Figure 5. Derating Curve

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	100	240	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 11)	BV_{CEO}	80	110	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	10	16	—	V	I_E = 100µA
Collector-Base Cutoff Current	I_{CBO}	— —	— —	10 10	nA µA	V_{CB} = 80V V_{CB} = 80V, T_A = +100°C
Collector-Emitter Cutoff Current	I_{CES}	—	—	10	µA	V_{CES} = 80V
Emitter Cutoff Current	I_{EBO}	—	—	100	nA	V_{EB} = 8V
DC Current Gain (Note 11)	h_{FE}	3,000 5,000 3,000 2,000 — —	14,000 15,000 14,000 10,000 2,000 750	— 100,000 — — — —	—	I_C = 50mA, V_{CE} = 5V I_C = 500mA, V_{CE} = 5V I_C = 1A, V_{CE} = 5V I_C = 2A, V_{CE} = 5V I_C = 5A, V_{CE} = 5V I_C = 6A, V_{CE} = 5V
Collector-Emitter Saturation Voltage (Note 11)	$V_{CE(sat)}$	— — — — —	0.79 0.80 0.88 0.99 0.86	0.88 0.90 1.00 1.13 —	V	I_C = 250mA, I_B = 0.25mA I_C = 0.4A, I_B = 0.4mA I_C = 1A, I_B = 1mA I_C = 2A, I_B = 20mA I_C = 2A, I_B = 20mA, T_J = +150°C
Base-Emitter Saturation Voltage (Note 11)	$V_{BE(sat)}$	—	1.70	1.95	V	I_C = 2A, I_B = 20mA
Base-Emitter Turn-On Voltage (Note 11)	$V_{BE(on)}$	—	1.50	1.75	V	I_C = 2A, V_{CE} = 5V
Input Capacitance (Note 11)	C_{ibo}	—	90	—	pF	V_{EB} = 0.5V, f = 1MHz
Output Capacitance (Note 11)	C_{obo}	—	15	—	pF	V_{CB} = 10V, f = 1MHz
Current Gain-Bandwidth Product (Note 11)	f_T	150	—	—	MHz	V_{CE} = 10V, I_C = 100mA f = 20MHz
Turn-On Time	t_{on}	—	0.5	—	µs	V_{CC} = 10V, I_C = 500mA I_{B1} = -I_{B2} = 0.5mA
Turn-Off Time	t_{off}	—	1.6	—	µs	

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

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

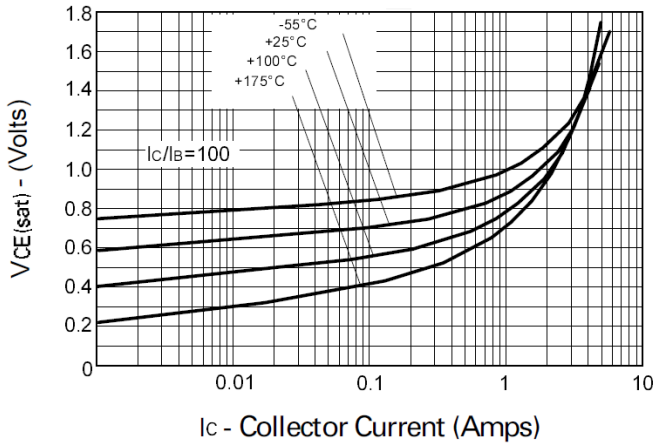


Figure 6. $V_{CE(sat)}$ vs. I_C

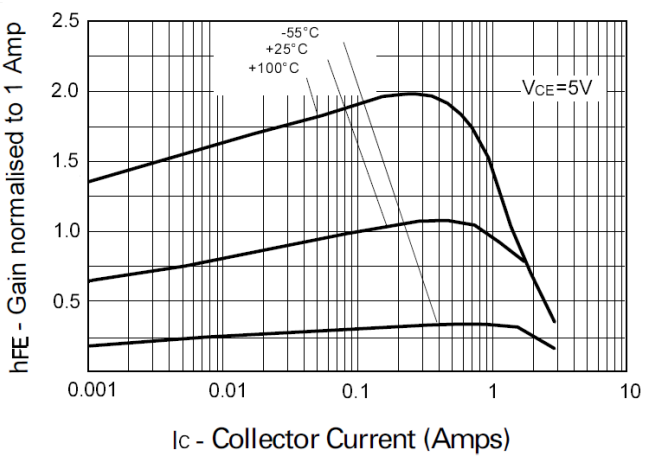


Figure 7. h_{FE} vs. I_C

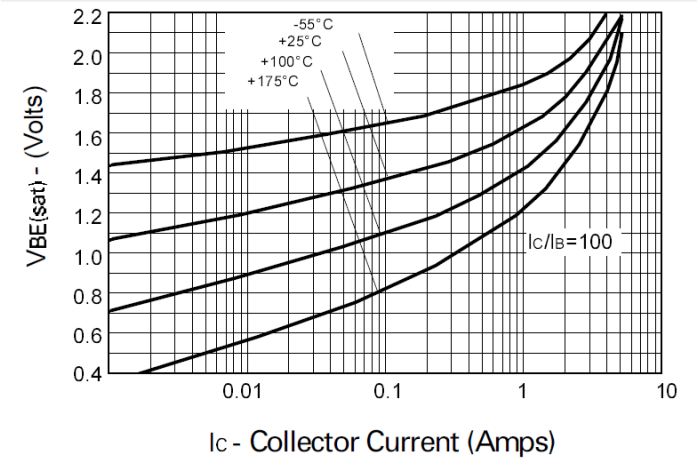


Figure 8. $V_{BE(sat)}$ vs. I_C

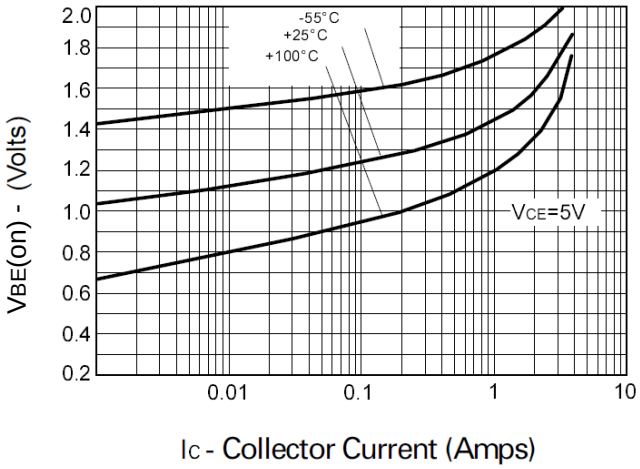
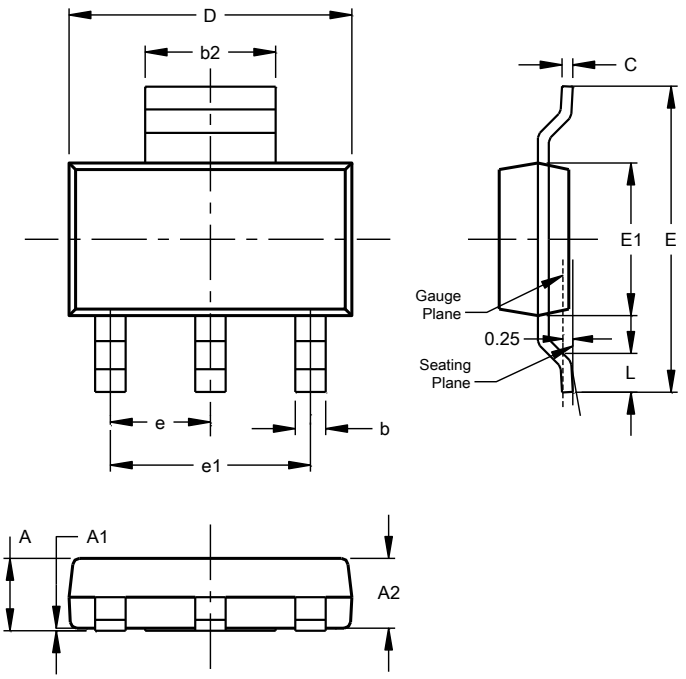


Figure 9. $V_{BE(on)}$ vs. I_C

Package Outline Dimensions

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

SOT223 (Type DN)

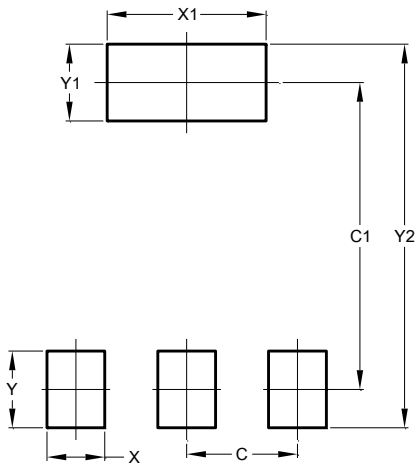


SOT223 (Type DN)			
Dim	**Min**	**Max**	**Typ**
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

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

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