

120V NPN DARLINGTON TRANSISTOR IN SOT223

Features

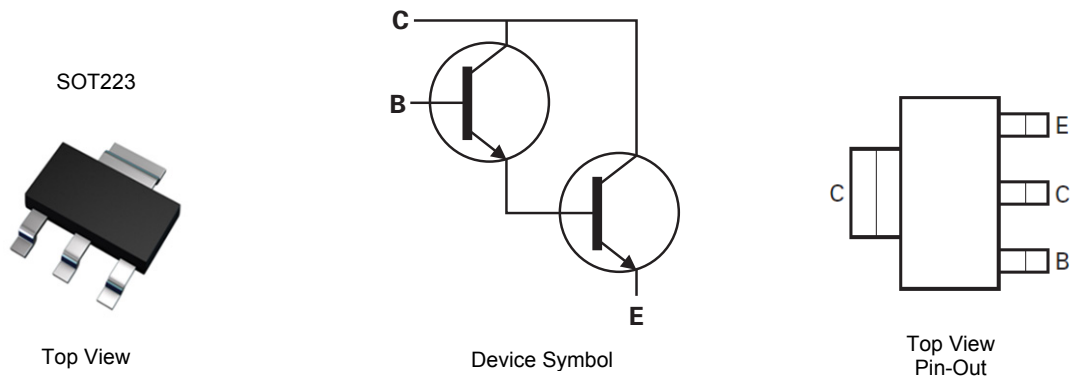
- $BV_{CEO} > 120V$
- $BV_{CBO} > 140V$
- $I_C = 1.5A$ High Continuous current
- $hFE > 2k$ for High Gain @ 1A
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

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)

Applications

- Lamp
- Relay
- Solenoid Driving

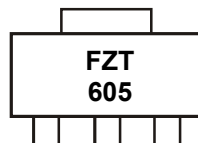


Ordering Information (Note 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FZT605TA	FZT605	7	12	1,000
FZT605TC	FZT605	13	12	4,000

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
 2. 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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



FZT605= Product Type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	140	V
Collector-Emitter Voltage	V _{CEO}	120	V
Emitter-Base Voltage	V _{EBO}	14	V
Continuous Collector Current	I _C	1.5	A
Peak Pulse Current	I _{CM}	4	A

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

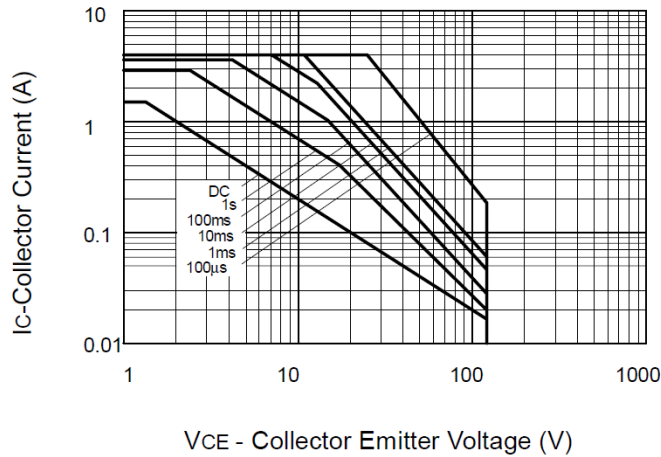
Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	2	W
		3	W
Thermal Resistance, Junction to Ambient	R _{θJA}	62.5	°C/W
		41.7	°C/W
Thermal Resistance, Junction to Leads	R _{θJL}	12.93	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 8)

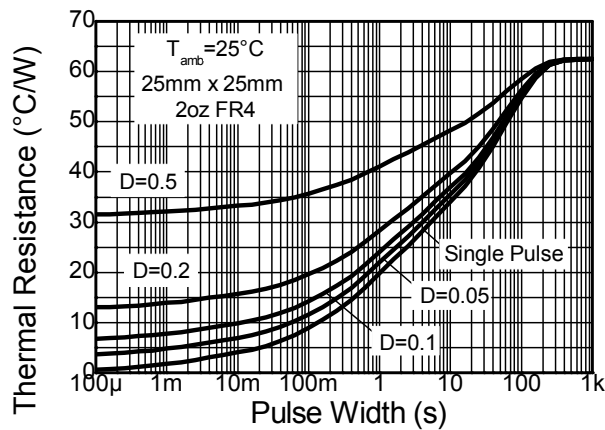
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	≥ 400	V	C

- Notes:
- For a device mounted on 25mm X 25mm 1oz weight copper that is on a single-sided 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 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.

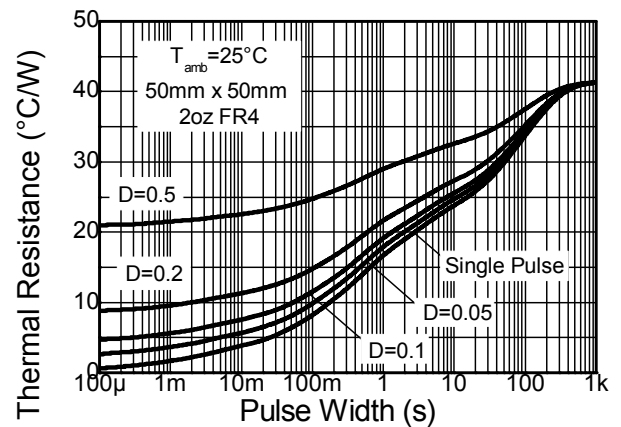
Thermal Characteristics and Derating Information



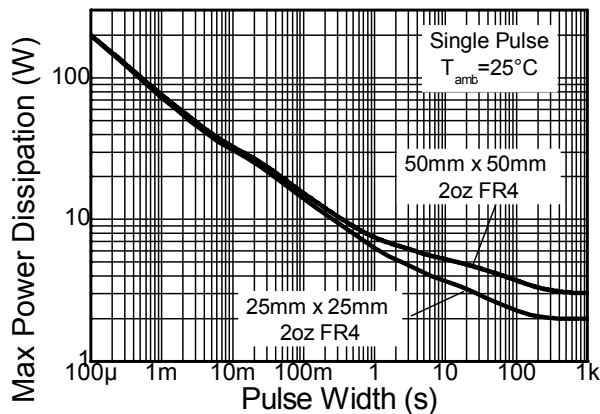
FZT605 Safe Operating Area



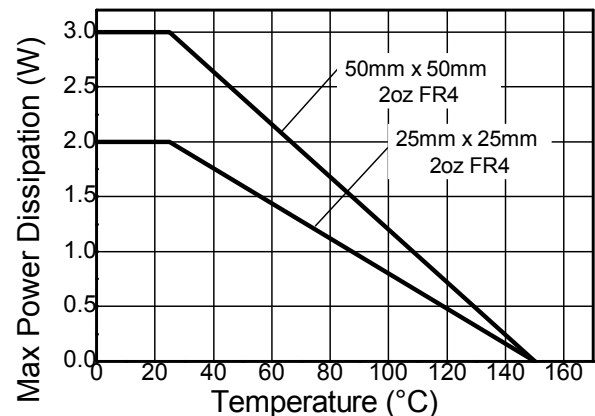
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



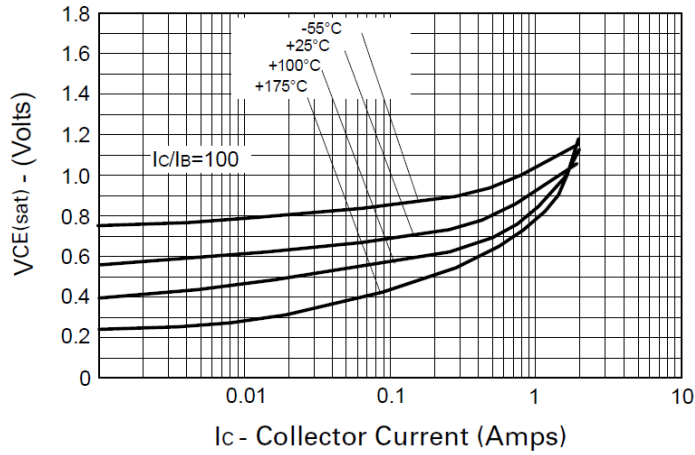
Derating Curve

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

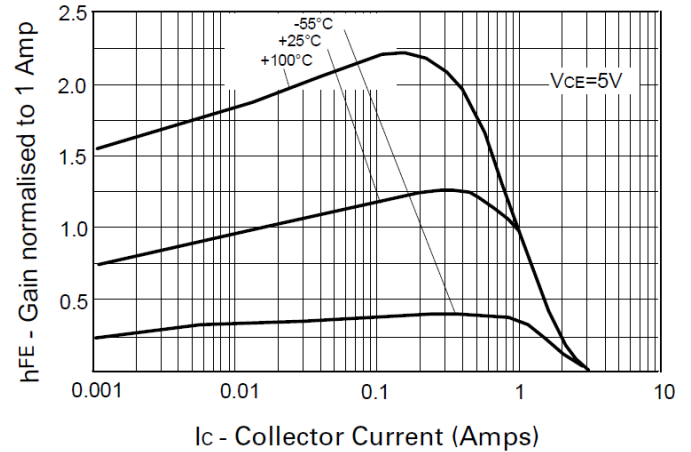
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	140	—	—	V	I _C = 100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV _{CEO}	120	—	—	V	I _C = 1mA
Emitter-Base Breakdown Voltage	BV _{EBO}	14	—	—	V	I _E = 100μA
Collector-Base Cutoff Current	I _{CBO}	-	—	100 10	nA μA	V _{CB} = 120V V _{CB} = 120V, T _A = +120°C
Collector-Emitter Cutoff Current	I _{CES}	-	—	100	nA	V _{CE} = 120V
Emitter Cutoff Current	I _{EBO}	-	—	100	nA	V _{EB} = 8V
DC Current Gain (Note 9)	h _{FE}	2,000 5,000 2,000 500	— — — —	— — 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
Collector-Emitter Saturation Voltage (Note 9)	V _{CE(sat)}	— —	— —	1 1.5	V	I _C = 250mA, I _B = 0.25mA I _C = 1A, I _B = 1mA
Base-Emitter Saturation Voltage (Note 9)	V _{BE(sat)}	—	—	1.8	V	I _C = 1A, I _B = 1mA
Base-Emitter Turn-On Voltage (Note 9)	V _{BE(on)}	—	—	1.7	V	I _C = 1A, V _{CE} = 5V
Input Capacitance (Note 9)	C _{ibo}	—	90	—	pF	V _{EB} = 0.5V, f = 1MHz
Output Capacitance (Note 9)	C _{obo}	—	15	—	pF	V _{CB} = 10V, f = 1MHz
Current Gain-Bandwidth Product (Note 9)	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
Turn-Off Time	t _{off}	—	1.6	—	μs	I _{B1} = -I _{B2} = 0.5mA

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

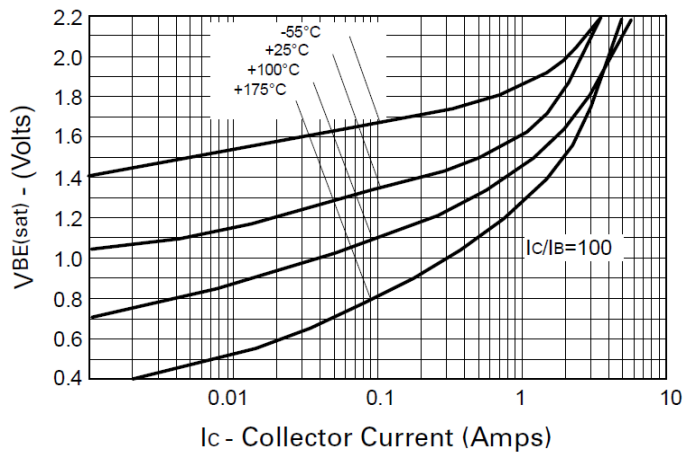
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



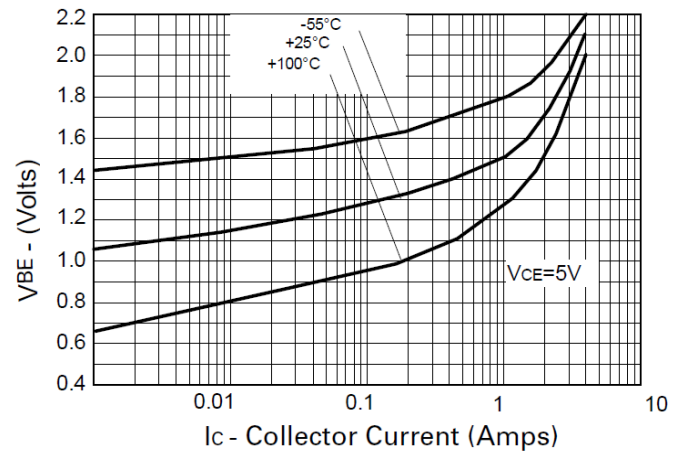
V_{CE(sat)} v I_C



hFE v I_C



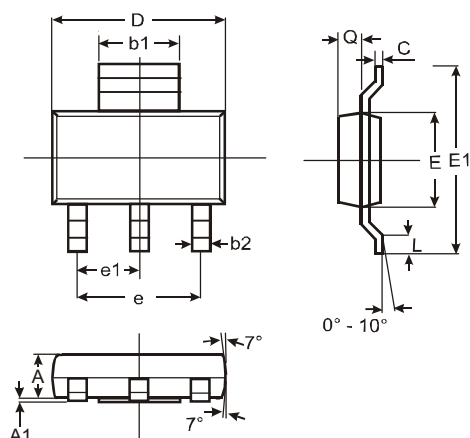
V_{BE(sat)} v I_C



V_{BE(on)} v I_C

Package Outline Dimensions

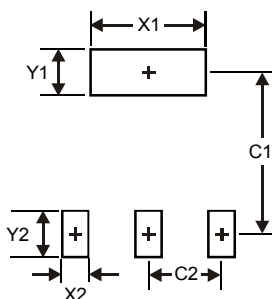
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b1	2.90	3.10	3.00
b2	0.60	0.80	0.70
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	—	—	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 AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
X1	3.3
X2	1.2
Y1	1.6
Y2	1.6
C1	6.4
C2	2.3

For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device terminals and PCB tracking.

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