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**

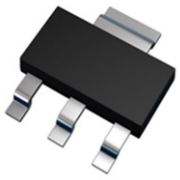
Mechanical Data

- 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 e3
- Weight: 0.112 grams (approximate)

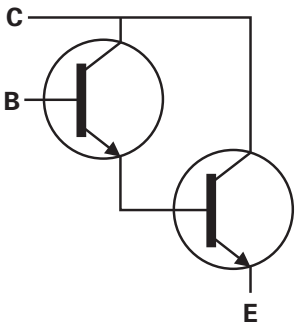
Applications

- Lamp
- Relay
- Solenoid Driving

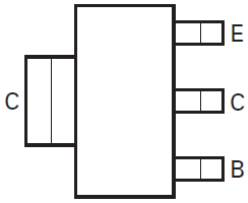
SOT223



Top View



Device Symbol



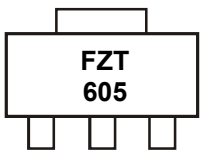
Top View
Pin-Out

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.)

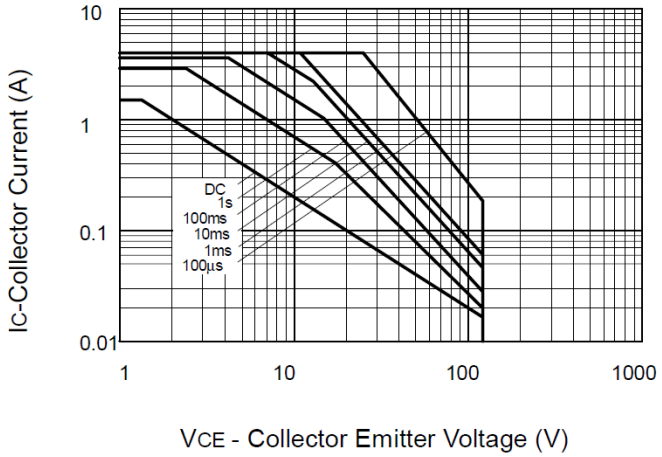
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	2	W
	(Note 6)		3	W
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	62.5	°C/W
	(Note 6)		41.7	°C/W
Thermal Resistance, Junction to Leads	(Note 7)	$R_{\theta JL}$	12.93	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 8)

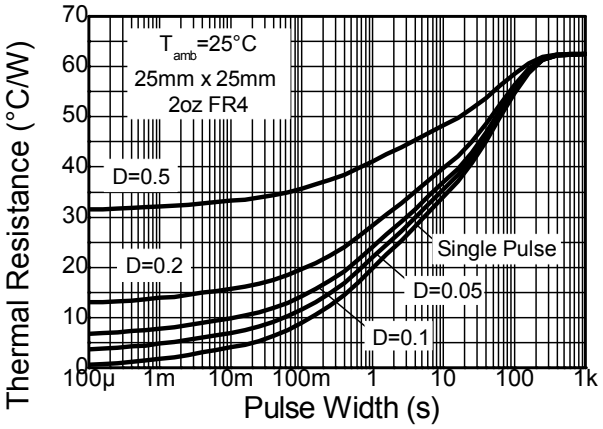
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	≥ 400	V	C

Notes:
5. 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.
6. Same as note (5), except the device is mounted on 50mm X 50mm 2oz copper.
7. Thermal resistance from junction to solder-point (at the end of the collector lead).
8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

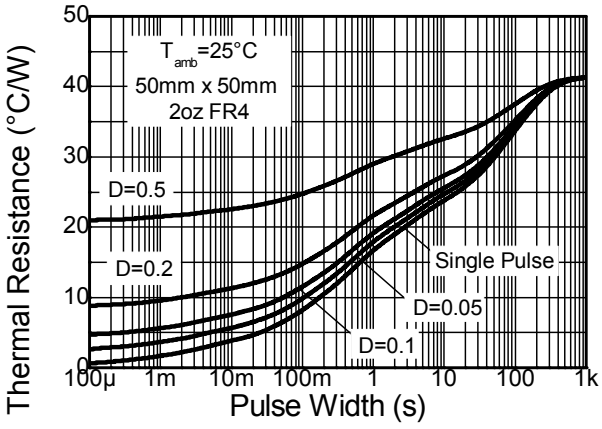
Thermal Characteristics and Derating Information



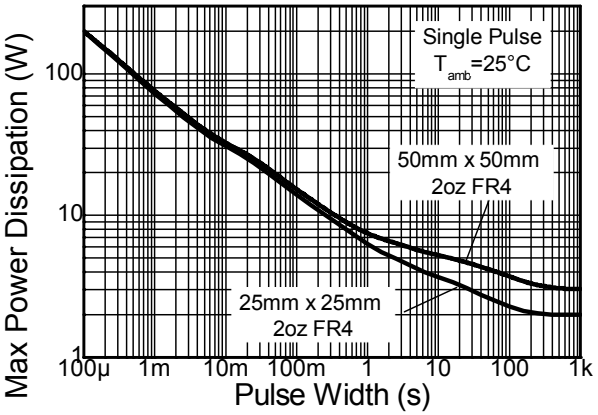
FZT605 Safe Operating Area



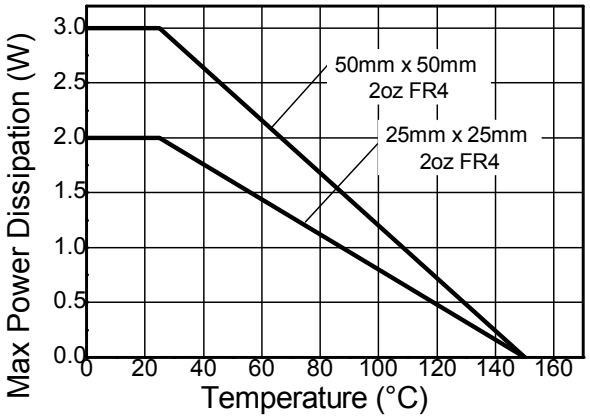
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



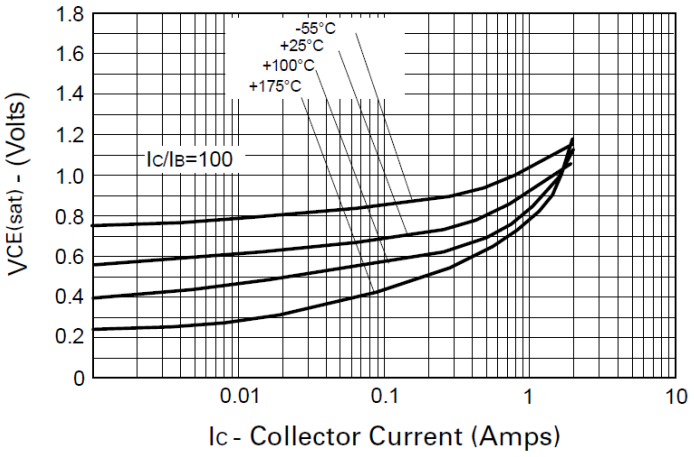
Derating Curve

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

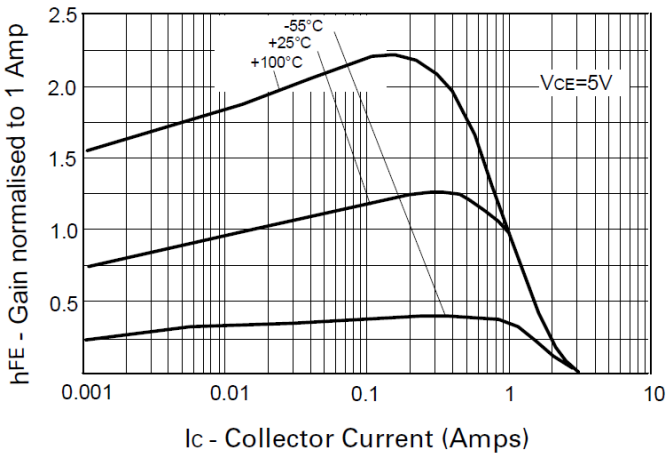
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	140	—	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	120	—	—	V	I_C = 1mA
Emitter-Base Breakdown Voltage	BV_{EBO}	14	—	—	V	I_E = 100µA
Collector-Base Cutoff Current	I_{CBO}	- -	—	100 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%.

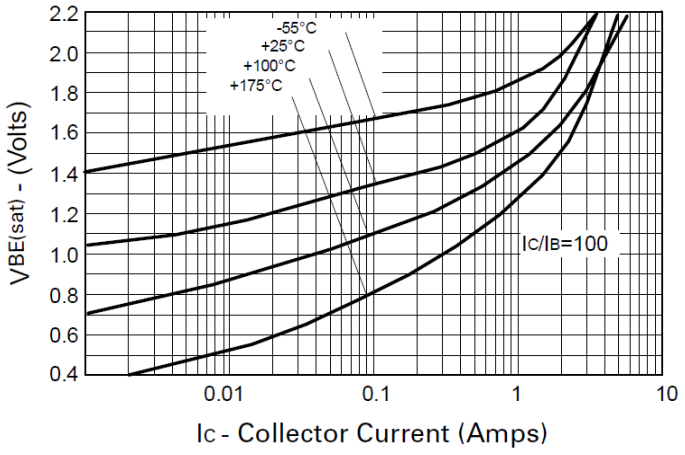
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



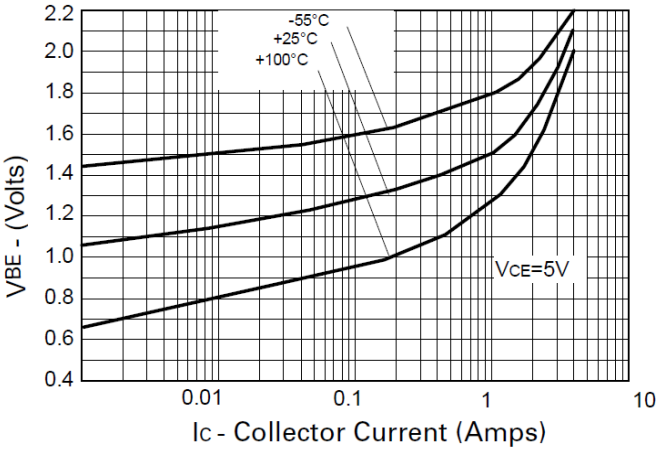
VCE(sat) v IC



hFE v IC



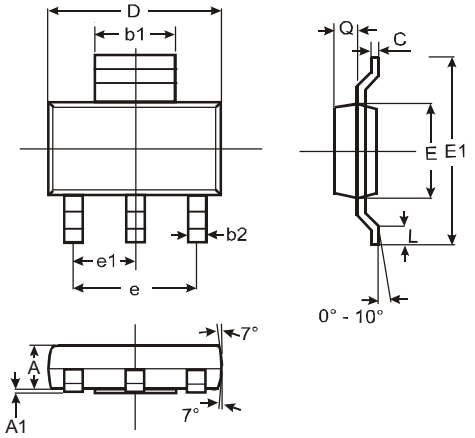
VBE(sat) v IC



VBE(on) v IC

Package Outline Dimensions

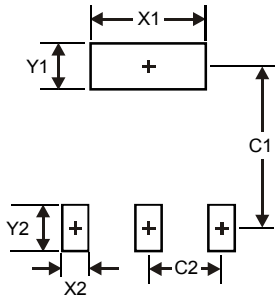
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



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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