

40V PNP SILICON PLANAR MEDIUM POWER TRANSISTOR IN SOT223

Features

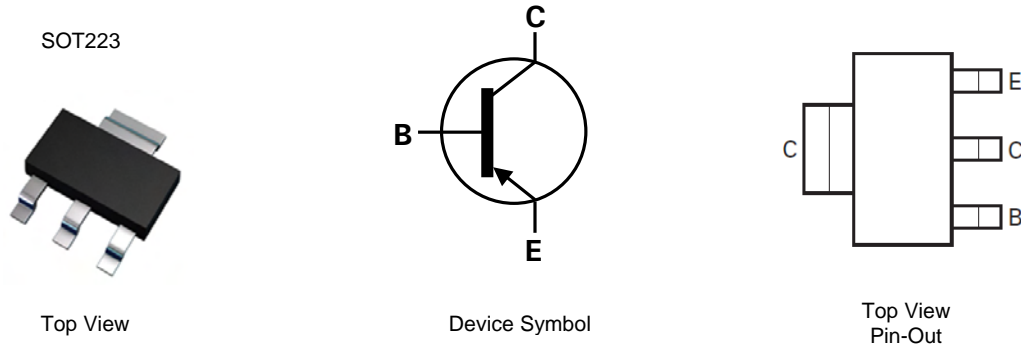
- $BV_{CEO} > -40V$
- $I_C = -1A$ high Continuous Current
- Low saturation voltage $V_{CE(sat)} < -500mV @ -1A$
- Complementary PNP Type: FZT591A
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP capable (Note 4)**

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
- Weight: 0.112 grams (approximate)

Applications

- Power MOSFET & IGBT gate driving
- Low loss power switching

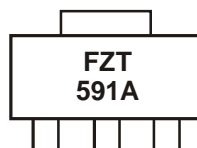


Ordering Information (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FZT591ATA	AEC-Q101	FZT591A	7	12	1,000
FZT591AQTA	Automotive	FZT591A	7	12	1,000

- 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> 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified.
 5. For packaging details, go to our website at <http://www.diodes.com>

Marking Information



FZT591A = Product Type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	-40	V
Collector-Emitter Voltage	V _{CEO}	-40	V
Emitter-Base Voltage	V _{EBO}	-7	V
Continuous Collector Current	I _C	-1	A
Base Current	I _B	-200	mA
Peak Pulse Current	I _{CM}	-2	A

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

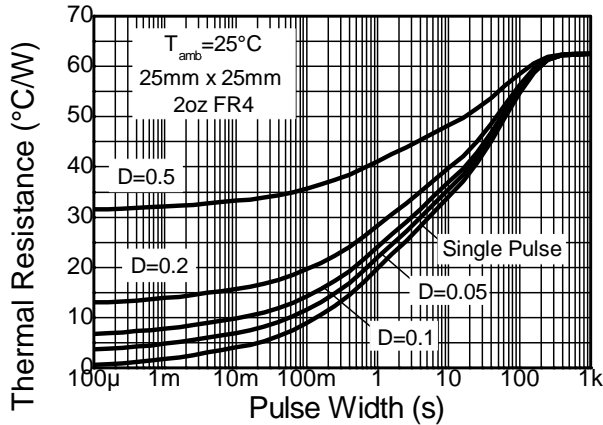
Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	2	W
		3	W
Thermal Resistance, Junction to Ambient	R _{θJA}	62.5	°C/W
		41.7	°C/W
Thermal Resistance, Junction to Leads (Note 8)	R _{θJL}	19.41	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 9)

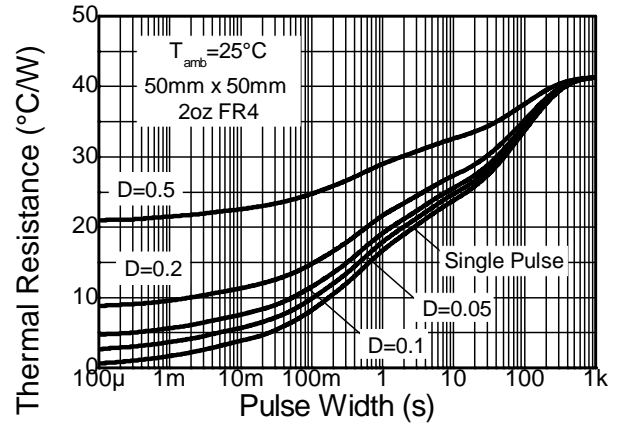
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	≥ 8,000	V	3B
Electrostatic Discharge - Machine Model	ESD MM	≥ 400	V	C

- Notes:
6. For a device surface mounted on 25mm X 25mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions; device measured when operating in steady state condition.
 7. Same as note (6), except the device is mounted on 50mm X 50mm single sided 2oz weight copper.
 8. Thermal resistance from junction to solder-point (at the end of the collector lead).
 9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

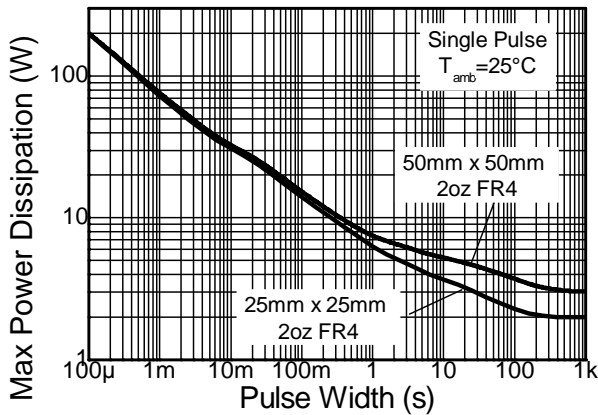
Thermal Characteristics and Derating Information



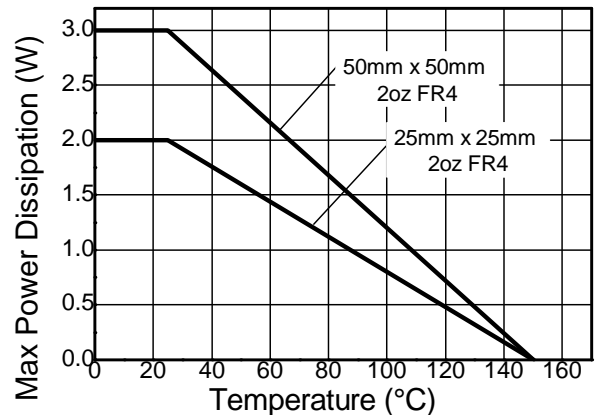
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



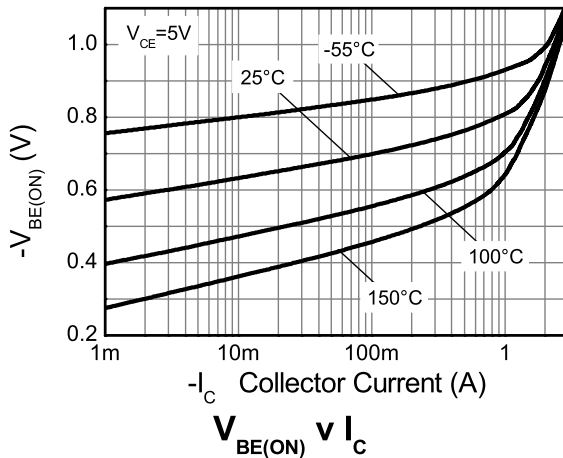
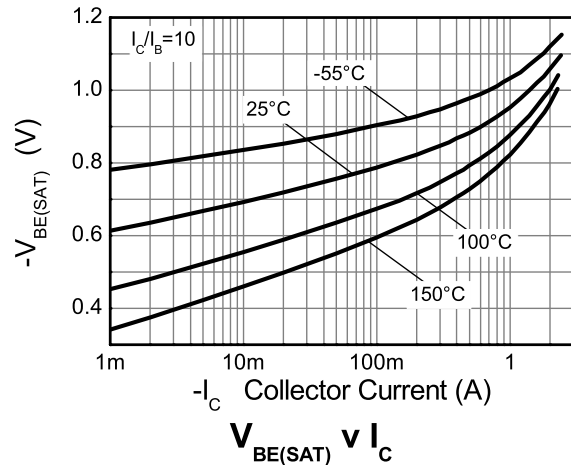
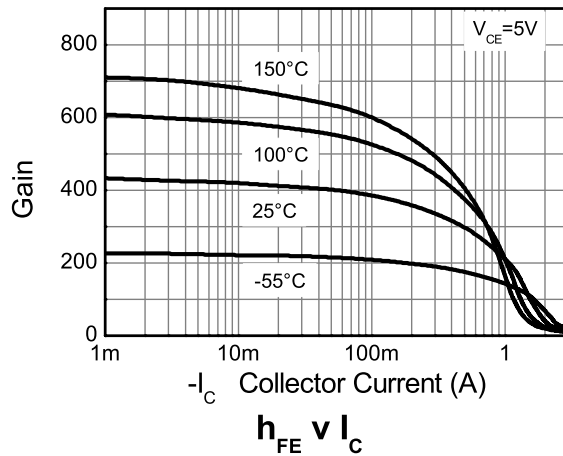
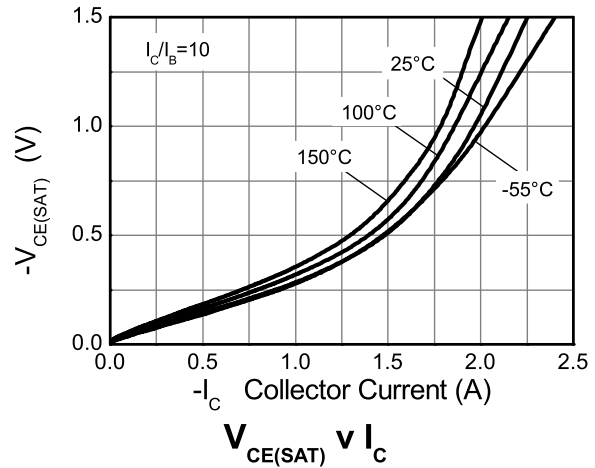
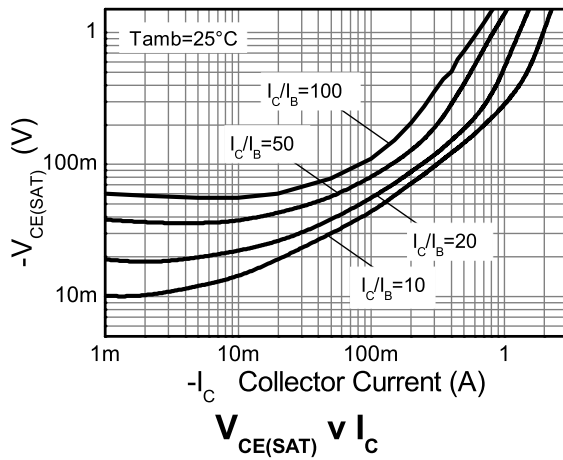
Derating Curve

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	-40	-	-	V	I _C = -100μA
Collector-Emitter Breakdown Voltage (Note 10)	BV _{CEO}	-40	-	-	V	I _C = -10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	-7	-	-	V	I _E = -100μA
Collector Cut-off Current	I _{CBO}	-	-	-100	nA	V _{CB} = -30V
Collector Cut-off Current	I _{CES}	-	-	-100	nA	V _{CES} = -30V
Emitter Cut-off Current	I _{EBO}	-	-	-100	nA	V _{EB} = -4V
Collector-Emitter Saturation Voltage (Note 10)	V _{CE(sat)}	-	-	-0.2 -0.35 -0.5	V	I _C = -100mA, I _B = -1mA I _C = -500mA, I _B = -20mA I _C = -1A, I _B = -100mA
Base-Emitter Saturation Voltage (Note 10)	V _{BE(sat)}	-	-	-1.1	V	I _C = -1A, I _B = -50mA
Base-Emitter Turn-On Voltage (Note 10)	V _{BE(on)}	-	-	-1.0	V	I _C = -1A, V _{CE} = -5V
DC current transfer Static ratio (Note 10)	h _{FE}	300 300 250 160 30	- - - - -	- 800 - - -		I _C = -1mA, V _{CE} = -5V I _C = -100mA, V _{CE} = -5V I _C = -500mA, V _{CE} = -5V I _C = -1A, V _{CE} = -5V I _C = -2A, V _{CE} = -5V
Transitional Frequency (Note 10)	f _T	150	-	-	MHz	V _{CE} = -10V, I _C = -50mA f = 100MHz
Output Capacitance (Note 10)	C _{obo}	-	-	10	pF	V _{CB} = -10V, f = 1MHz

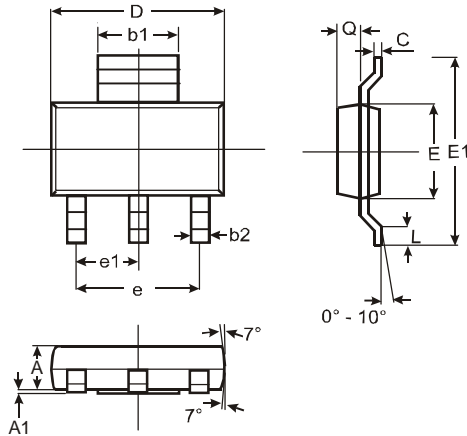
Notes: 10. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

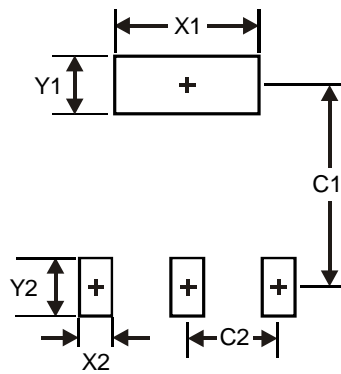
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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

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