

**25V PNP MEDIUM POWER TRANSISTOR IN SOT223**

**Features**

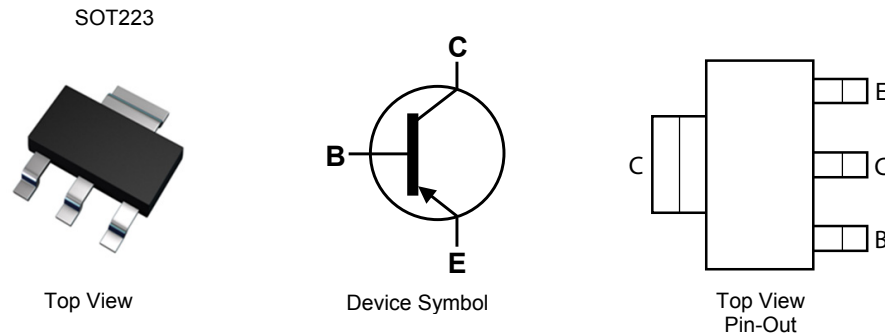
- $BV_{CEO} > -25V$
- $I_C = -3A$  high Continuous Current
- Low saturation voltage  $V_{CE(sat)} < -250mV @ -1A$
- $R_{CE(sat)} = 93m\Omega$  for a low equivalent On-Resistance
- $h_{FE}$  specified up to -6A for a high gain hold up
- Complementary NPN Type: FZT689B
- **Lead-Free Finish; RoHS compliant (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 (E3)
- Weight: 0.112 grams (approximate)

**Applications**

- Power MOSFET & IGBT gate driving
- Battery powered circuits
- Fast charge converters
- Low loss power switching

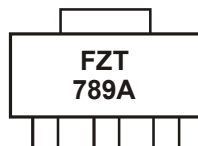


**Ordering Information** (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FZT789ATA	AEC-Q101	FZT789A	7	12	1,000
FZT789AQTA	Automotive	FZT789A	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**



FZT789A = Product Type Marking

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	-30	V
Collector-Emitter Voltage	$V_{CEO}$	-25	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.)

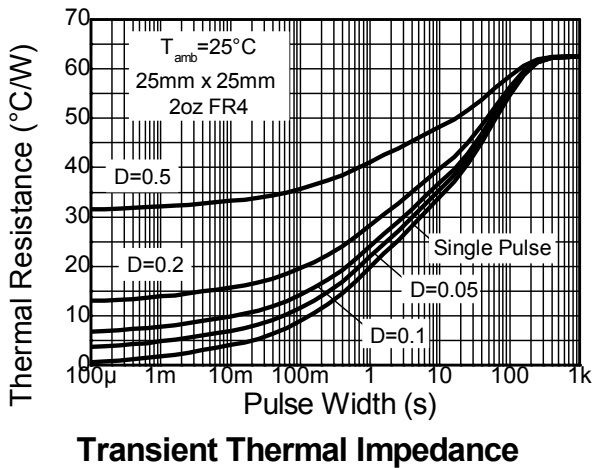
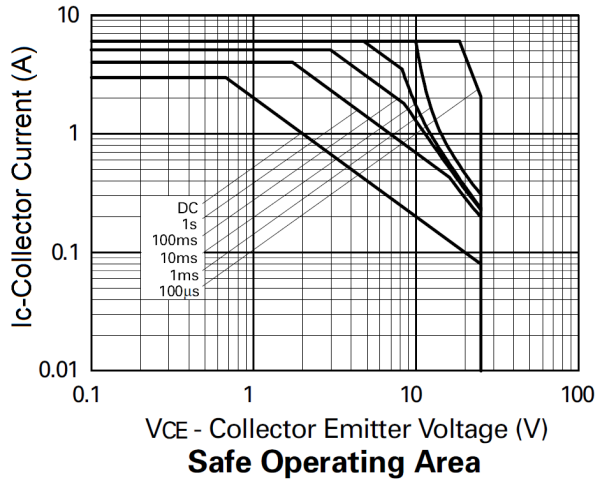
Characteristic	Symbol	Value	Unit
Power Dissipation	$P_D$	2	W
		3	W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
		41.7	$^\circ\text{C/W}$
Thermal Resistance, Junction to Leads	$R_{\theta JL}$	12.93	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$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

**ESD Ratings** (Note 9)

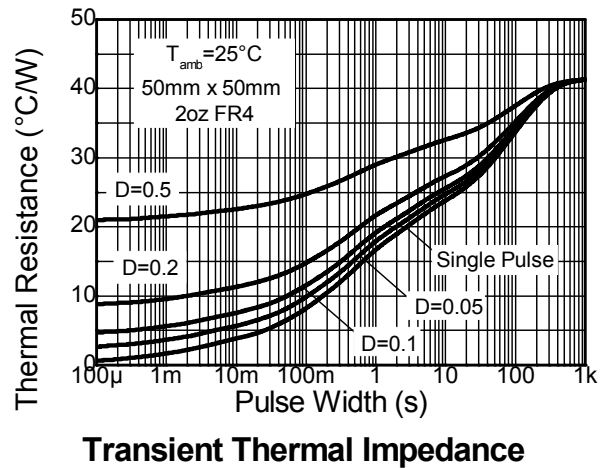
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	$\geq 400$	V	C

- 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.

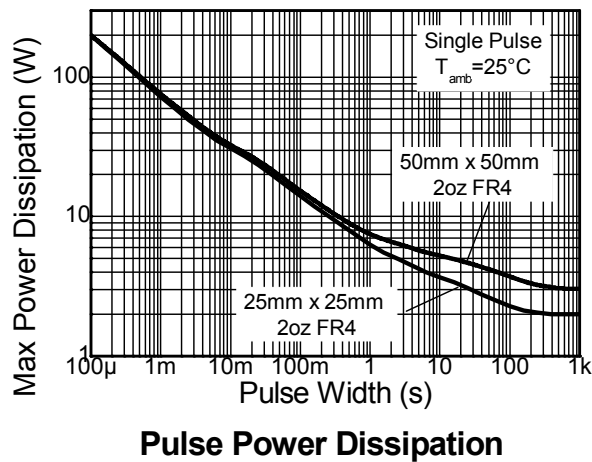
**Thermal Characteristics and Derating Information**



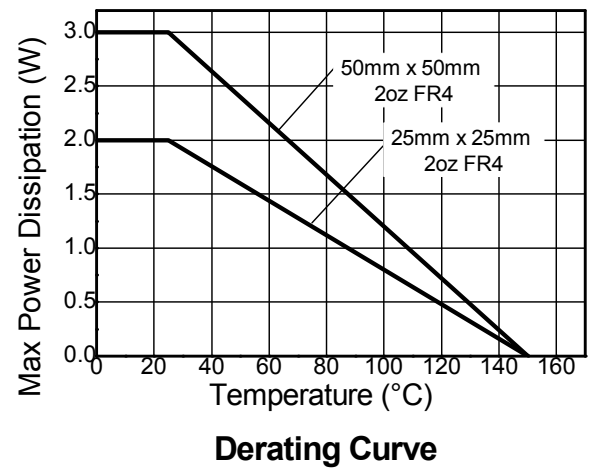
**Transient Thermal Impedance**



**Transient Thermal Impedance**



**Pulse Power Dissipation**



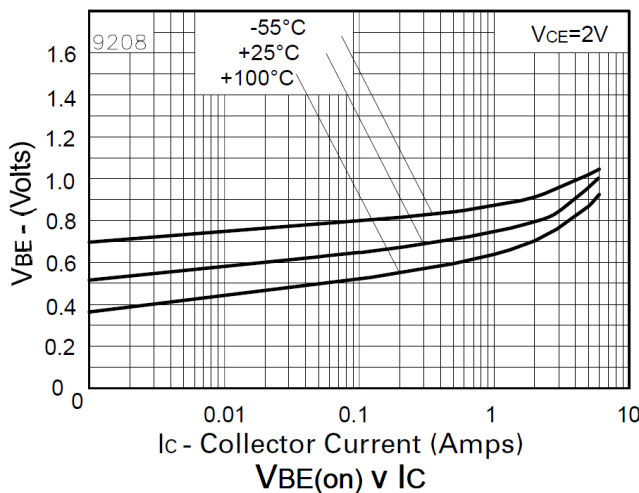
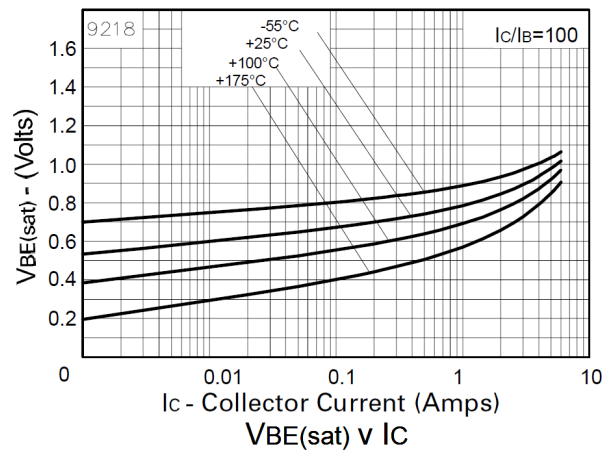
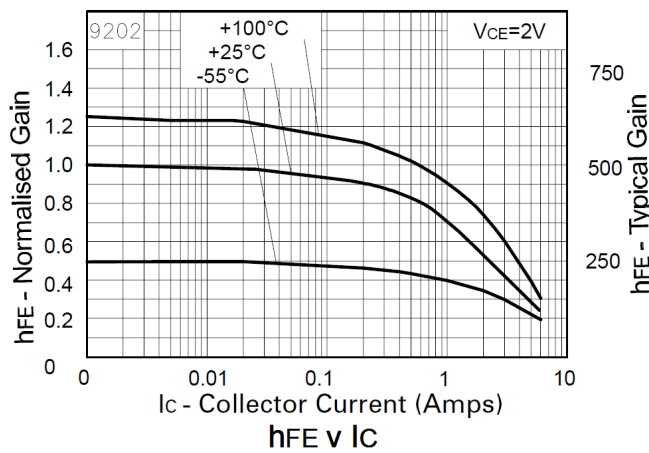
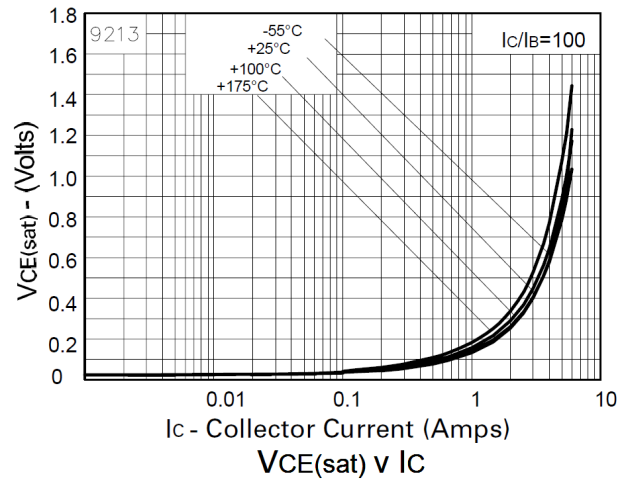
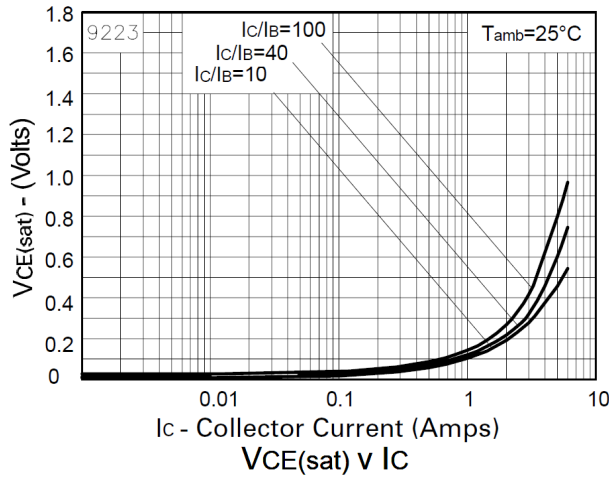
**Derating Curve**

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-30	-40	-	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 8)	BV <sub>CEO</sub>	-25	-35	-	V	I <sub>C</sub> = -10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-7	-8.5	-	V	I <sub>E</sub> = -100μA
Collector Cut-off Current	I <sub>CBO</sub>	-	<1	-100	nA	V <sub>CB</sub> = -15V
		-	-	-10	μA	V <sub>CB</sub> = -15V, T <sub>amb</sub> = 100°C
Collector Cut-off Current	I <sub>CES</sub>	-	<1	-100	nA	V <sub>CE</sub> = -15V
Emitter Cut-off Current	I <sub>EBO</sub>	-	<1	-100	nA	V <sub>EB</sub> = -5.6V
Collector-Emitter Saturation Voltage (Note 8)	V <sub>CE(sat)</sub>	-	-0.15	-0.25	V	I <sub>C</sub> = -1A, I <sub>B</sub> = -10mA
		-	-0.30	-0.45		I <sub>C</sub> = -2A, I <sub>B</sub> = -20mA
		-	-0.30	-0.50		I <sub>C</sub> = -3A, I <sub>B</sub> = -100mA
Base-Emitter Saturation Voltage (Note 8)	V <sub>BE(sat)</sub>	-	-0.80	-1.0	V	I <sub>C</sub> = -1A, I <sub>B</sub> = -10mA
Base-Emitter Turn-On Voltage (Note 8)	V <sub>BE(on)</sub>	-	-0.75	-1.1	V	I <sub>C</sub> = -1A, V <sub>CE</sub> = -2V
DC Current Gain (Note 8)	h <sub>FE</sub>	300	-	800	-	I <sub>C</sub> = -10mA, V <sub>CE</sub> = -2V
		250	-	-		I <sub>C</sub> = -1A, V <sub>CE</sub> = -2V
		200	-	-		I <sub>C</sub> = -2A, V <sub>CE</sub> = -2V
		100	-	-		I <sub>C</sub> = -6A, V <sub>CE</sub> = -2V
Current Gain-Bandwidth Product (Note 8)	f <sub>T</sub>	100	-	-	MHz	V <sub>CE</sub> = -5V, I <sub>C</sub> = -50mA f = 50MHz
Turn-On Time	t <sub>on</sub>	-	35	-	ns	V <sub>CC</sub> = -10V, I <sub>C</sub> = -500mA
Turn-Off Time	t <sub>off</sub>	-	400	-	ns	I <sub>B1</sub> = I <sub>B2</sub> = -50mA
Input Capacitance (Note 8)	C <sub>ibo</sub>	-	225	-	pF	V <sub>EB</sub> = -0.5V, f = 1MHz
Output Capacitance (Note 8)	C <sub>obo</sub>	-	25	-	pF	V <sub>CB</sub> = -10V, f = 1MHz

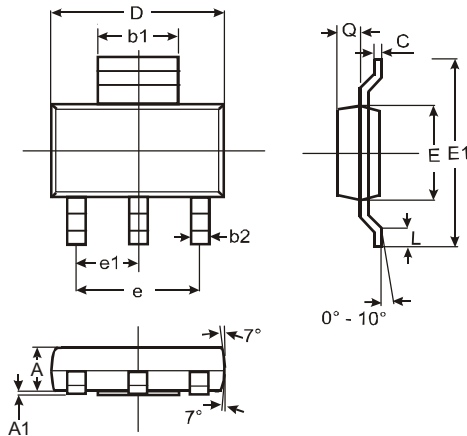
Notes: 8. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

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



## Package Outline Dimensions

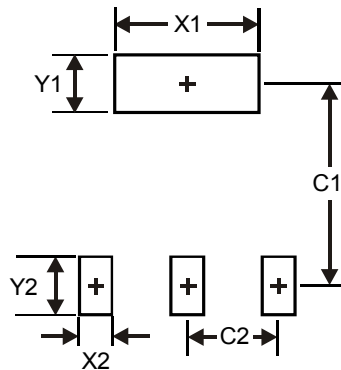
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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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