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## 30V NPN MEDIUM POWER TRANSISTOR IN SOT223

## Features

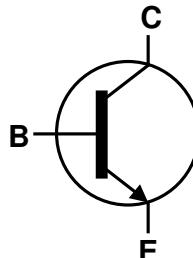
- $BV_{CEO} > 30V$
- $I_C = 1A$  High Continuous Current
- $I_{CM} = 4A$  Peak Pulse Current
- Low Saturation Voltage
- Complementary PNP Type: FZT589
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability
- PPAP Capable (Note 4)

## Mechanical Data

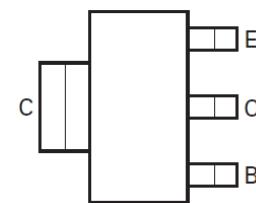
- Case: SOT223
- Case material: Molded Plastic. "Green" Molding Compound; UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208<sup>(e)</sup>
- Weight: 0.112 grams (Approximate)



Top View



Device Symbol


Top View  
Pin-Out

## Ordering Information (Notes 4 & 5)

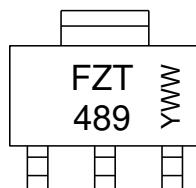
Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FZT489TA	AEC-Q101	FZT489	7	12	1,000
FZT489QTA	Automotive	FZT489	7	12	1,000

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/quality/lead\\_free.html](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. 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/products/packages.html>.

## Marking Information

SOT223



FZT 489 = Product Type Marking Code  
YWW = Date Code Marking  
Y or  $\bar{Y}$  = Last Digit of Year (ex: 5= 2015)  
WW or  $\bar{WW}$  = Week Code (01~53)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	50	V
Collector-Emitter Voltage	$V_{CEO}$	30	V
Emitter-Base Voltage	$V_{EBO}$	7	V
Continuous Collector Current	$I_C$	1	A
Base Current	$I_B$	200	mA
Peak Pulse Current	$I_{CM}$	4	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation	$P_D$	3.0	W
		2.0	
		1.6	
		1.2	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	41.7	°C/W
		62.5	
		78.1	
		104	
Thermal Resistance Junction to Lead	$R_{\theta JL}$	19.4	
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	°C

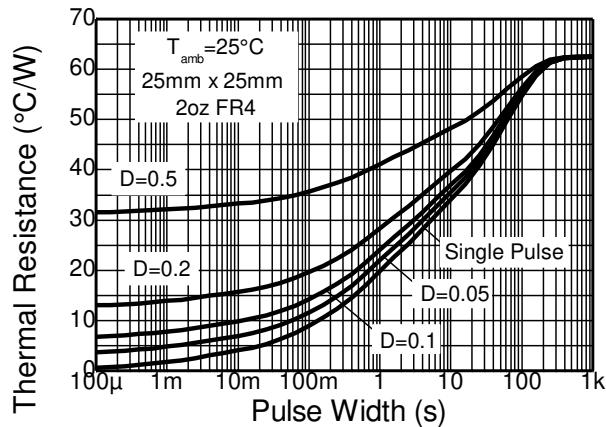
**ESD Ratings** (Note 11)

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

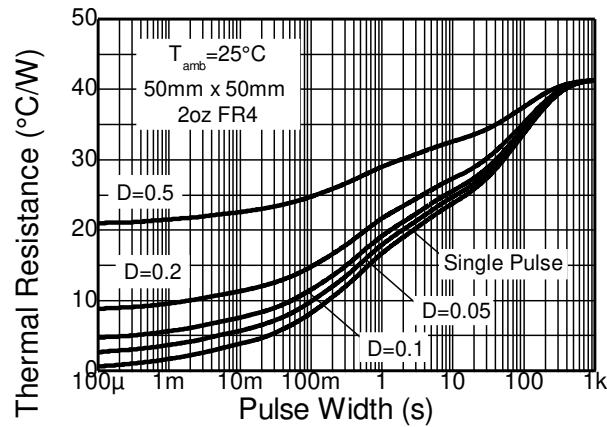
Notes:

6. For a device 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.
7. Same as Note 6, except the device is mounted on 25mm x 25mm 2oz copper.
8. Same as Note 6, except the device is mounted on 25mm x 25mm 1oz copper.
9. Same as Note 6, except the device is mounted on minimum recommended pad layout.
10. Thermal resistance from junction to solder-point (at the end of the collector lead).
11. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

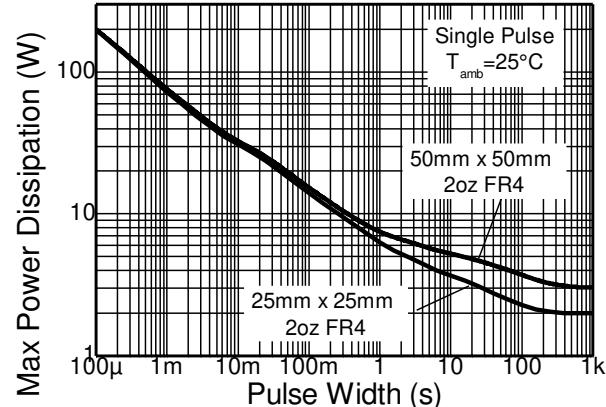
## Thermal Characteristics and Derating Characteristics



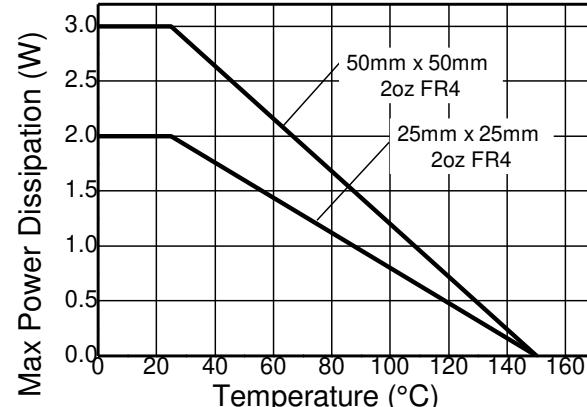
**Transient Thermal Impedance**



**Transient Thermal Impedance**



**Pulse Power Dissipation**



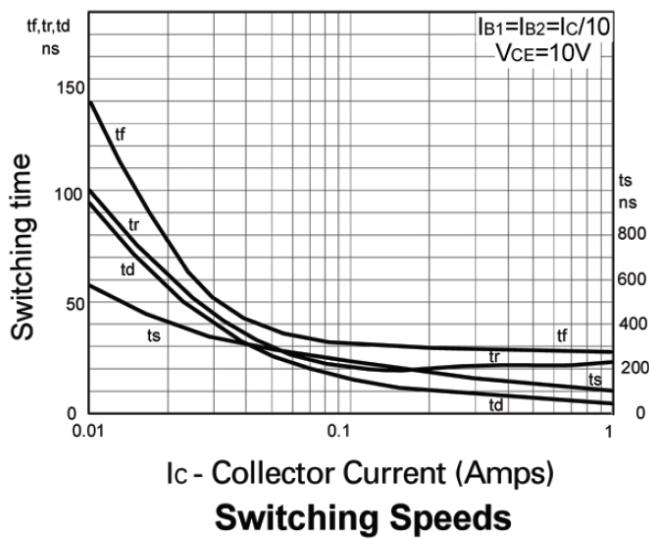
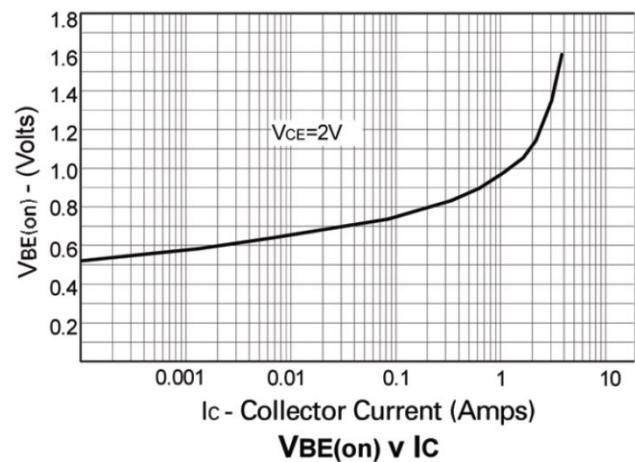
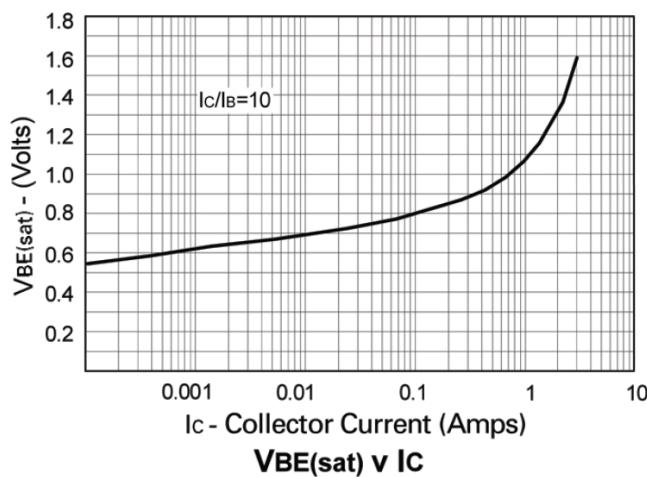
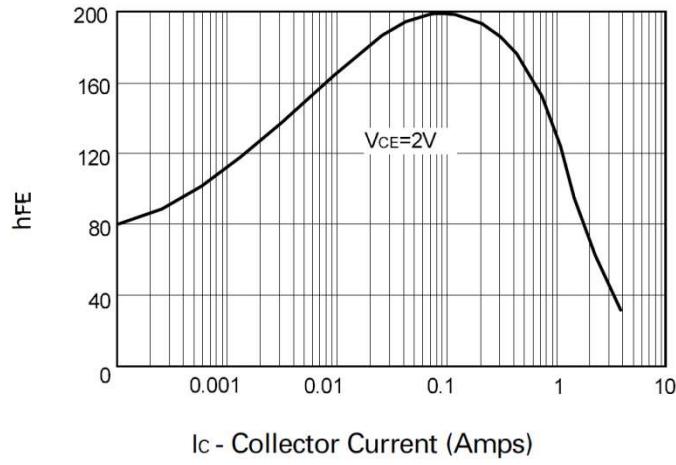
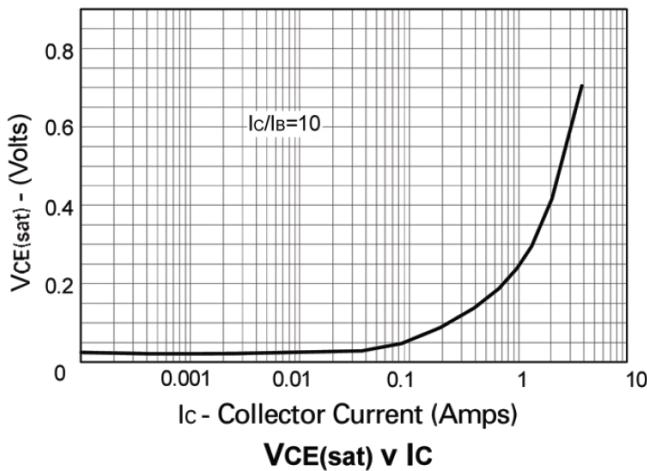
**Derating Curve**

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$\text{BV}_{\text{CBO}}$	50	—	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 12)	$\text{BV}_{\text{CEO}}$	30	—	—	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	$\text{BV}_{\text{EBO}}$	7	—	—	V	$I_E = 100\mu\text{A}$
Collector Cut-Off Current	$I_{\text{CBO}}$	—	—	100	nA	$V_{\text{CB}} = 30\text{V}$
Collector Cut-Off Current	$I_{\text{CES}}$	—	—	100	nA	$V_{\text{CE}} = 30\text{V}$
Emitter Cut-Off Current	$I_{\text{EBO}}$	—	—	100	nA	$V_{\text{EB}} = 4\text{V}$
Collector-Emitter Saturation Voltage (Note 12)	$V_{\text{CE}(\text{sat})}$	—	—	0.3 0.6	V	$I_C = 1\text{A}, I_B = 100\text{mA}$ $I_C = 2\text{A}, I_B = 200\text{mA}$
Base-Emitter Saturation Voltage (Note 12)	$V_{\text{BE}(\text{sat})}$	—	—	1.1	V	$I_C = 1\text{A}, I_B = 100\text{mA}$
Base-Emitter Turn-On Voltage (Note 12)	$V_{\text{BE}(\text{on})}$	—	—	1.0	V	$I_C = 1\text{A}, V_{\text{CE}} = 2\text{V}$
DC Current Gain (Note 12)	$h_{\text{FE}}$	100 100 60 20	— — — —	300	—	$I_C = 1\text{mA}, V_{\text{CE}} = 2\text{V}$ $I_C = 1\text{A}, V_{\text{CE}} = 2\text{V}$ $I_C = 2\text{A}, V_{\text{CE}} = 2\text{V}$ $I_C = 4\text{A}, V_{\text{CE}} = 2\text{V}$
Current Gain-Bandwidth Product	$f_T$	150	—	—	MHz	$V_{\text{CE}} = 10\text{V}, I_C = 50\text{mA}$ $f = 100\text{MHz}$
Output Capacitance	$C_{\text{obo}}$	—	—	10	pF	$V_{\text{CB}} = 10\text{V}, f = 1\text{MHz}$

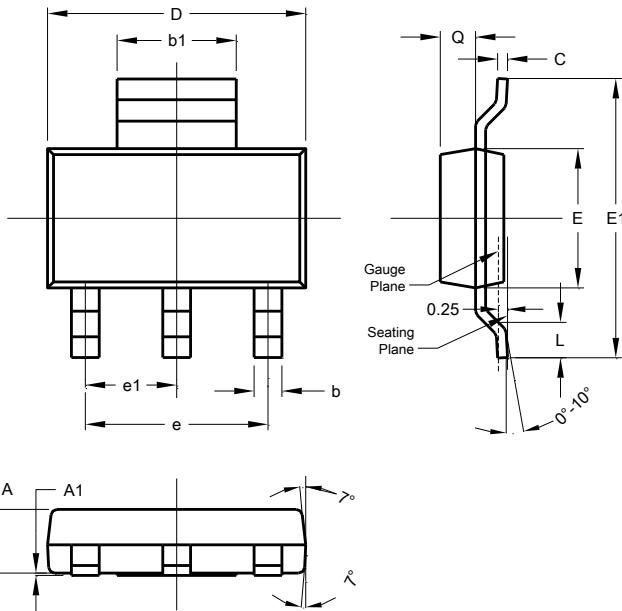
Note: 12. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

**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 the latest version.

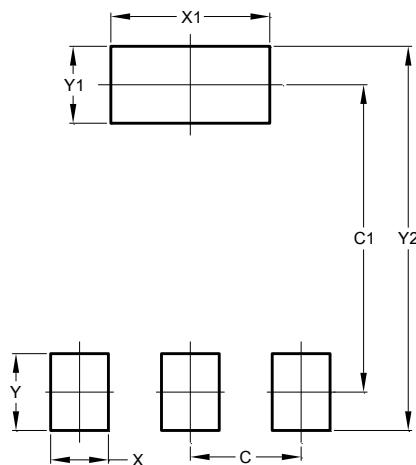


SOT223			
Dim	Min	Max	Typ
<b>A</b>	1.55	1.65	1.60
<b>A1</b>	0.010	0.15	0.05
<b>b</b>	0.60	0.80	0.70
<b>b1</b>	2.90	3.10	3.00
<b>C</b>	0.20	0.30	0.25
<b>D</b>	6.45	6.55	6.50
<b>E</b>	3.45	3.55	3.50
<b>E1</b>	6.90	7.10	7.00
<b>e</b>	-	-	4.60
<b>e1</b>	-	-	2.30
<b>L</b>	0.85	1.05	0.95
<b>Q</b>	0.84	0.94	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)
<b>C</b>	2.30
<b>C1</b>	6.40
<b>X</b>	1.20
<b>X1</b>	3.30
<b>Y</b>	1.60
<b>Y1</b>	1.60
<b>Y2</b>	8.00

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