

## Description

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirements of Automotive Applications.

## Features

- $BV_{CEO} > 160V$
- $BV_{EBO} > 6V$
- $I_C = 600mA$  Continuous Collector Current
- Low Saturation Voltage (150mV max @10mA)
- $h_{FE}$  specified up to 50mA for a high gain hold up
- Complementary PNP Type: DZT5401
- **Totally Lead-Free & Fully 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)**

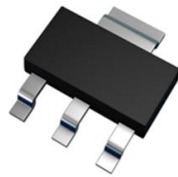
## Mechanical Data

- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound.  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin.  
Solderable per MIL-STD-202, Method 208
- Weight: 0.112 grams (Approximate)

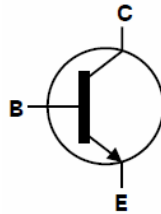
## Applications

- High Voltage Amplification Applications
- High Voltage Switching

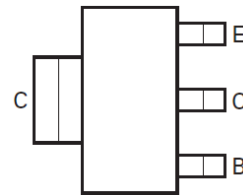
SOT223



Top View



Device Schematic



Pin-Out Top View

## Ordering Information (Note 5)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DZT5551Q-13	K4N	13	12	2,500

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  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. Refer to [http://www.diodes.com/quality/product\\_grade\\_definitions/](http://www.diodes.com/quality/product_grade_definitions/).
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information

SOT223



K4N = Product Type Marking Code  
 DII = Manufacturer's Code Marking  
 YWW = Date Code Marking  
 Y = Last Digit of Year ex: 5 = 2015  
 WW = Week Code 01 ~ 53

### Absolute Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	180	V
Collector-Emitter Voltage	V <sub>CEO</sub>	160	V
Emitter-Base Voltage	V <sub>EBO</sub>	6	V
Continuous Collector Current	I <sub>C</sub>	600	mA
Peak Collector Current	I <sub>CM</sub>	1	A

### Thermal Characteristics

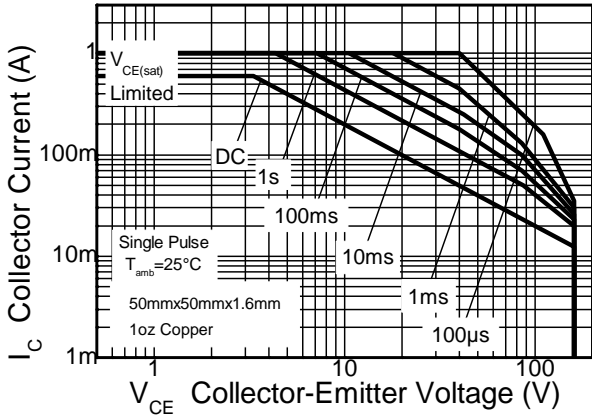
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P <sub>D</sub>	2	W
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	62.5	°C/W
Thermal Resistance, Junction to Leads (Note 7)	R <sub>θJL</sub>	34.05	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

### ESD Ratings (Note 8)

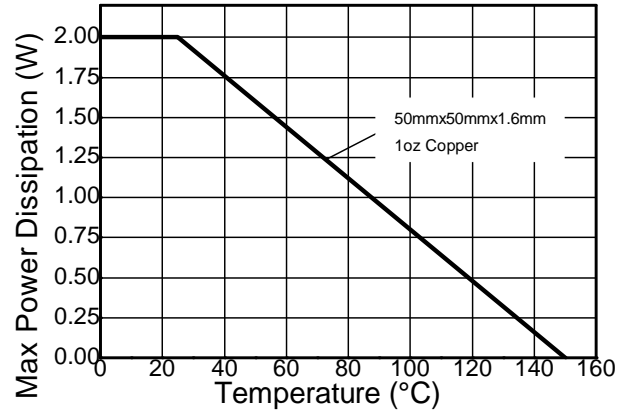
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
6. Device mounted on 50mm X 50mm X 1.6mm FR-4 PCB with high coverage of single sided 1 oz. copper, in still air condition.
  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.

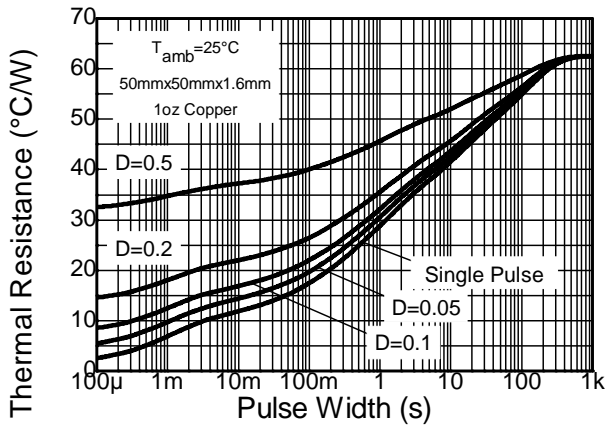
**Thermal Characteristics and Derating Information**



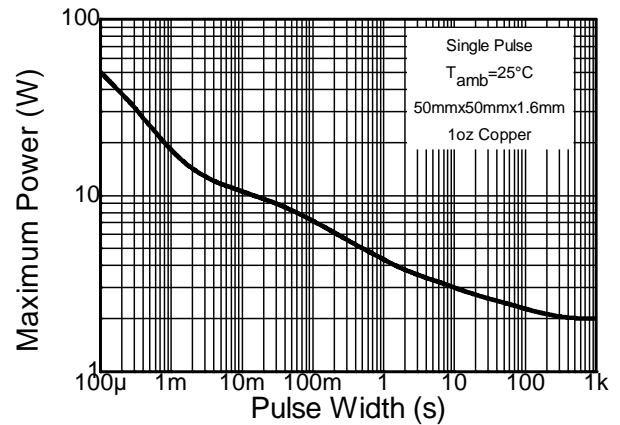
**Safe Operating Area**



**Derating Curve**



**Transient Thermal Impedance**



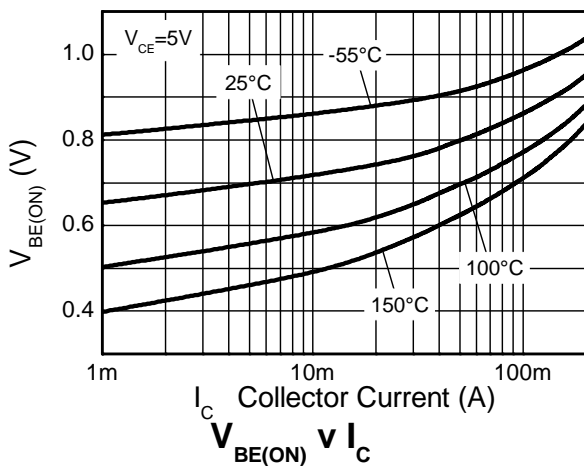
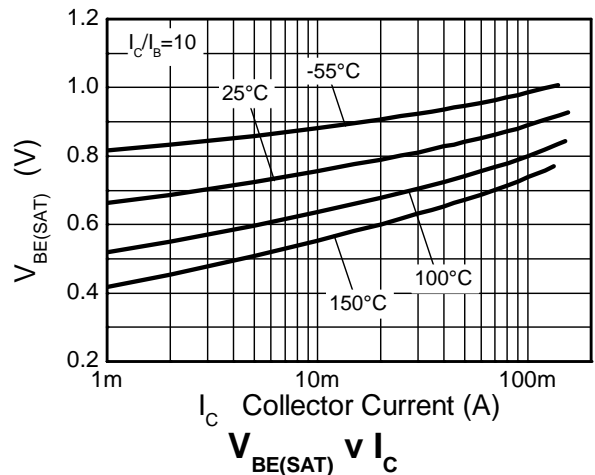
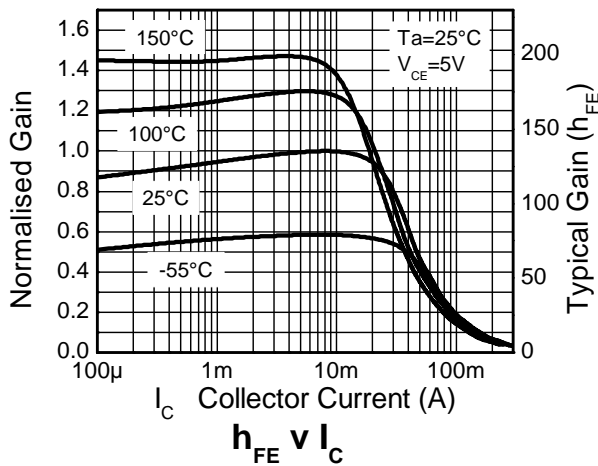
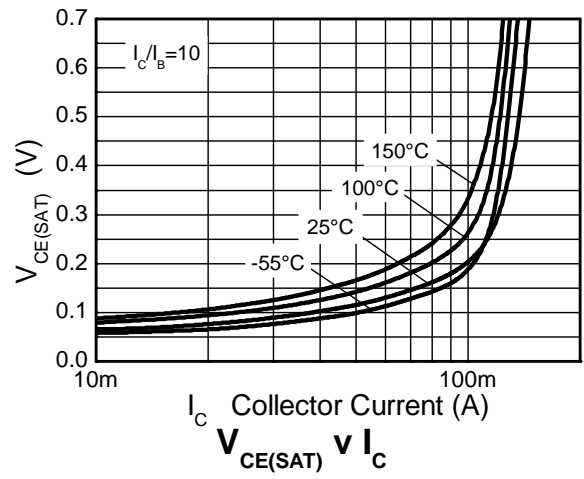
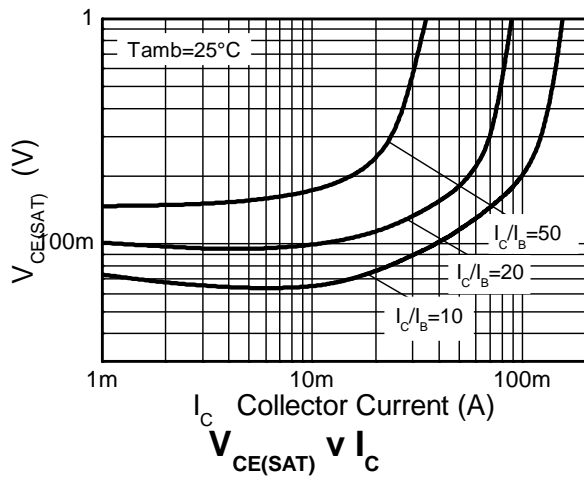
**Pulse Power Dissipation**

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	BV <sub>CB0</sub>	180	270	—	V	I <sub>C</sub> = 100μA, I <sub>E</sub> = 0
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	160	200	—	V	I <sub>C</sub> = 1mA, I <sub>B</sub> = 0
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	6.0	7.85	—	V	I <sub>E</sub> = 100μA, I <sub>C</sub> = 0
Collector Cutoff Current	I <sub>CBO</sub>	—	<1	50	nA	V <sub>CB</sub> = 120V, I <sub>E</sub> = 0
Emitter Cutoff Current	I <sub>EBO</sub>	—	<1	50	nA	V <sub>CB</sub> = 120V, I <sub>E</sub> = 0, T <sub>A</sub> = +100°C
						V <sub>EB</sub> = 4V, I <sub>C</sub> = 0
<b>ON CHARACTERISTICS (Note 9)</b>						
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	65	150	mV	I <sub>C</sub> = 10mA, I <sub>B</sub> = 1mA
		—	115	200	mV	I <sub>C</sub> = 50mA, I <sub>B</sub> = 5mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	—	760	1,000	mV	I <sub>C</sub> = 10mA, I <sub>B</sub> = 1mA
		—	840	1,200	mV	I <sub>C</sub> = 50mA, I <sub>B</sub> = 5mA
DC Current Gain	h <sub>FE</sub>	80	130	—	—	I <sub>C</sub> = 1mA, V <sub>CE</sub> = 5V
		80	145	250	—	I <sub>C</sub> = 10mA, V <sub>CE</sub> = 5V
		30	65	—	—	I <sub>C</sub> = 50mA, V <sub>CE</sub> = 5V
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Transition Frequency	f <sub>T</sub>	100	130	300	MHz	V <sub>CE</sub> = 10V, I <sub>C</sub> = 10mA, f = 100MHz
Small Signal Current Gain	h <sub>fe</sub>	50	—	260	—	V <sub>CE</sub> = 10V, I <sub>C</sub> = 10mA, f = 1kHz
Output Capacitance	C <sub>obo</sub>	—	—	6	pF	V <sub>CB</sub> = 10V, f = 1MHz
Noise Figure	NF	—	—	8	dB	V <sub>CE</sub> = 5.0V, I <sub>C</sub> = 200μA, R <sub>S</sub> = 1.0kΩ, f = 1.0kHz
Delay Time	t <sub>d</sub>	—	95	—	ns	V <sub>CC</sub> = 10V, I <sub>C</sub> = 10mA, I <sub>B1</sub> = -I <sub>B2</sub> = 1mA
Rise Time	t <sub>r</sub>	—	64	—	ns	
Storage Time	t <sub>s</sub>	—	1,256	—	ns	
Delay Time	t <sub>f</sub>	—	140	—	ns	

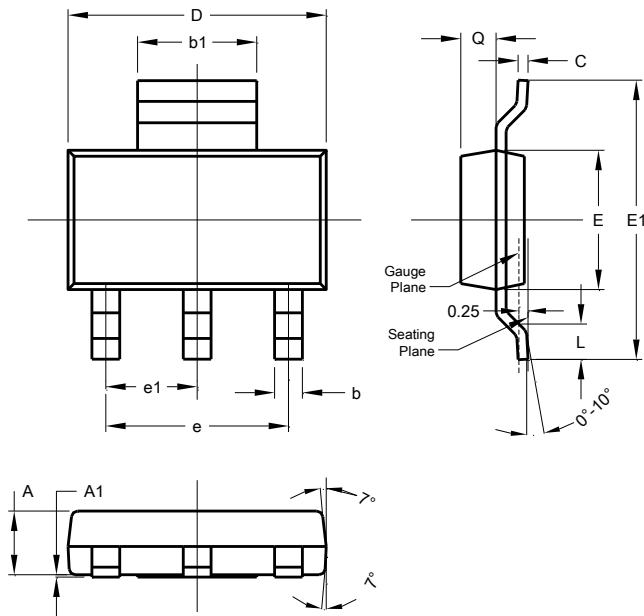
Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



**Package Outline Dimensions**

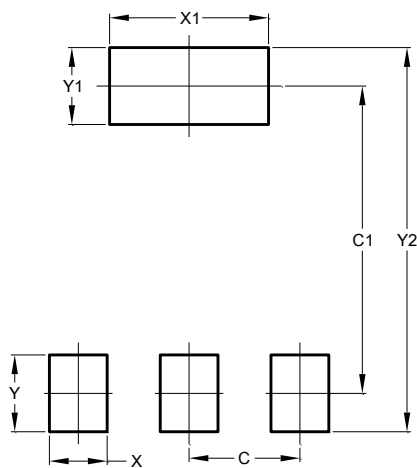
Please see AP02001 at [http://www.diodes.com/\\_files/datasheets/ap02001.pdf](http://www.diodes.com/_files/datasheets/ap02001.pdf) for the latest version.



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/\\_files/datasheets/ap02001.pdf](http://www.diodes.com/_files/datasheets/ap02001.pdf) for the latest version.



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00

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