

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

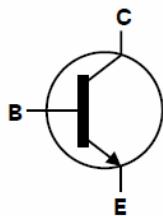
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.112 grams (Approximate)

Applications

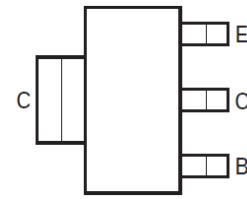
- High Voltage Amplification Applications
- High Voltage Switching



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

| Characteristic | Symbol | Value | Unit |
|------------------------------|-----------|-------|------|
| Collector-Base Voltage | V_{CBO} | 180 | V |
| Collector-Emitter Voltage | V_{CEO} | 160 | V |
| Emitter-Base Voltage | V_{EBO} | 6 | V |
| Continuous Collector Current | I_C | 600 | mA |
| Peak Collector Current | I_{CM} | 1 | A |

Thermal Characteristics

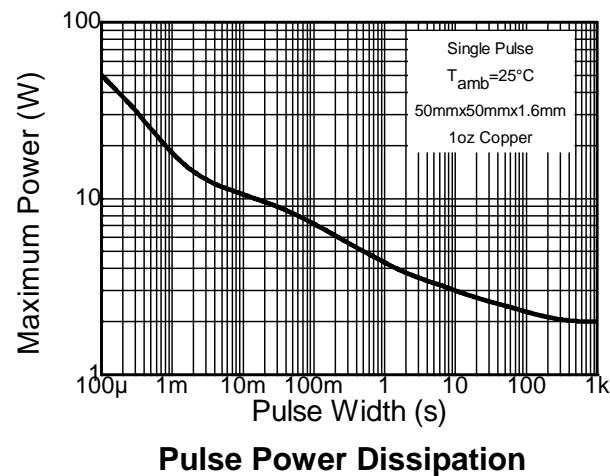
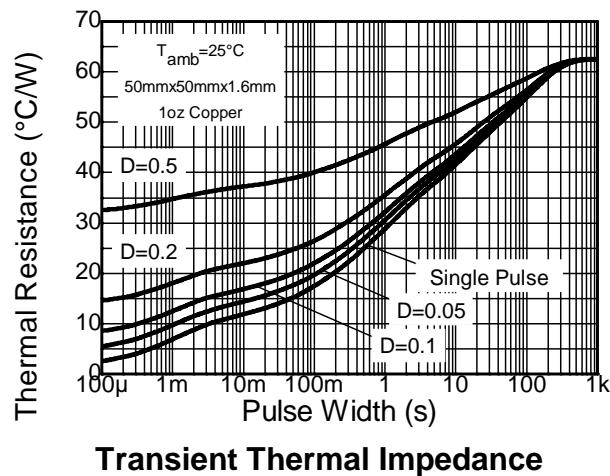
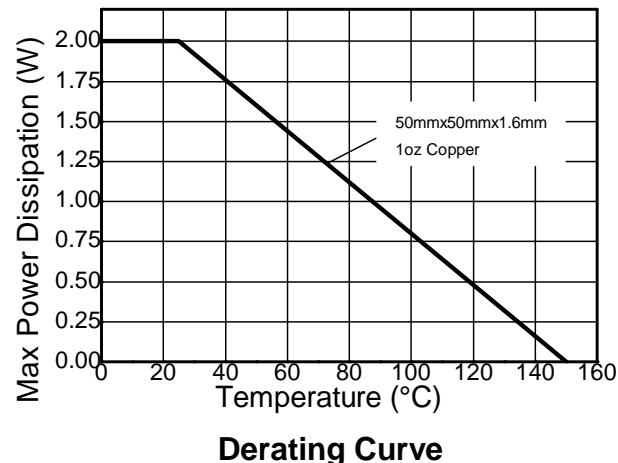
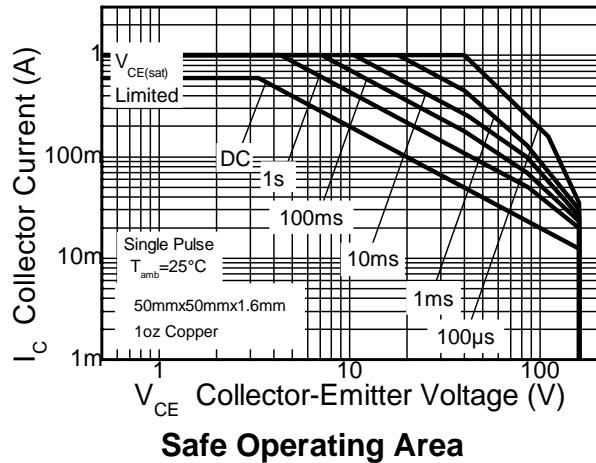
| Characteristic | Symbol | Value | Unit |
|--|-----------------|-------------|------|
| Power Dissipation (Note 6) | P_D | 2 | W |
| Thermal Resistance, Junction to Ambient (Note 6) | $R_{\theta JA}$ | 62.5 | °C/W |
| Thermal Resistance, Junction to Leads (Note 7) | $R_{\theta JL}$ | 34.05 | °C/W |
| 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: 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

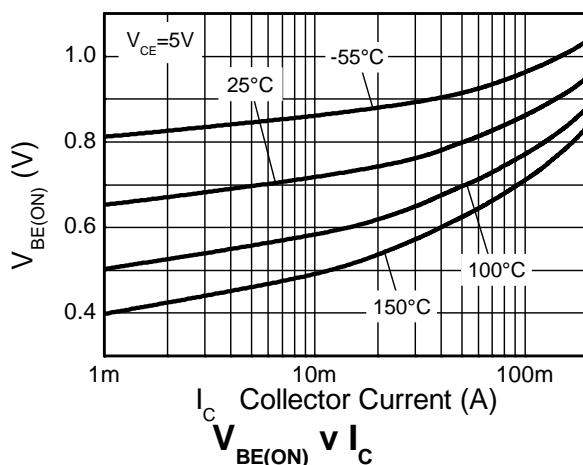
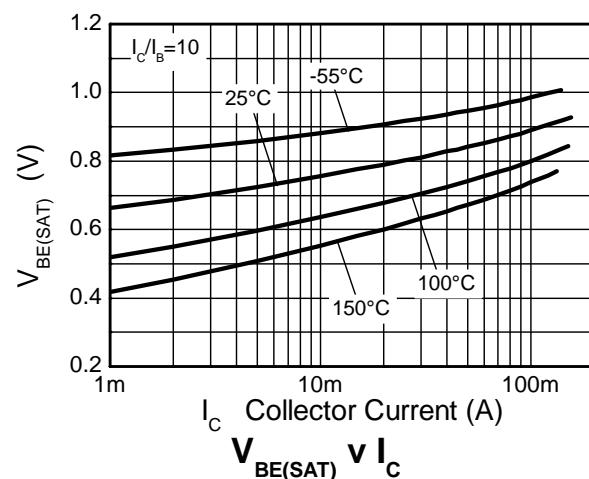
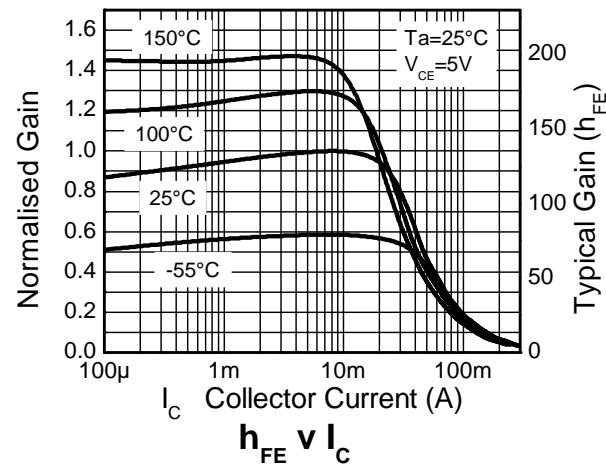
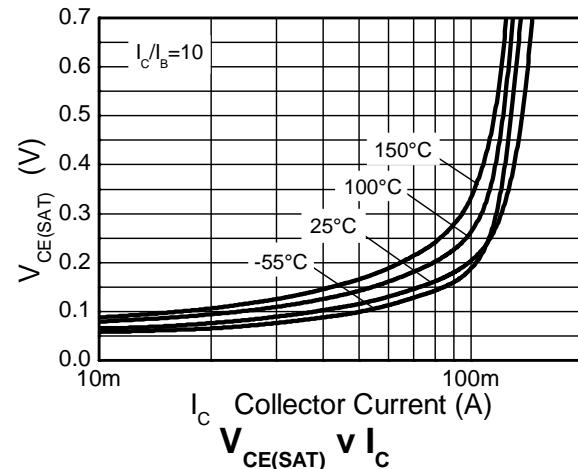
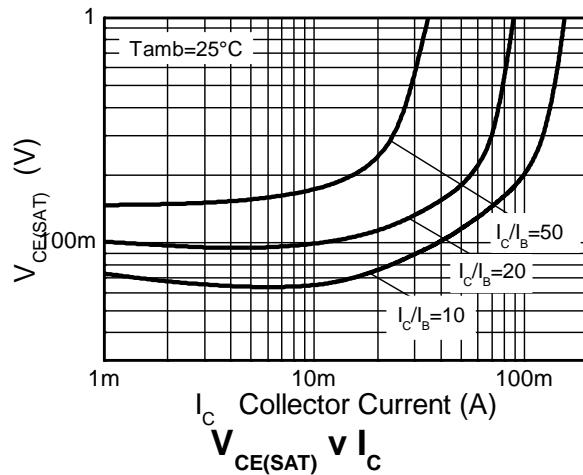


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|-----------------------------|----------------|------------------|----------------|---------------------|---|
| OFF CHARACTERISTICS | | | | | | |
| Collector-Base Breakdown Voltage | BV_{CBO} | 180 | 270 | — | V | $I_C = 100\mu\text{A}, I_E = 0$ |
| Collector-Emitter Breakdown Voltage (Note 9) | BV_{CEO} | 160 | 200 | — | V | $I_C = 1\text{mA}, I_B = 0$ |
| Emitter-Base Breakdown Voltage | BV_{EBO} | 6.0 | 7.85 | — | V | $I_E = 100\mu\text{A}, I_C = 0$ |
| Collector Cutoff Current | I_{CBO} | — | <1 | 50 | nA μA | $V_{\text{CB}} = 120\text{V}, I_E = 0$ $V_{\text{CB}} = 120\text{V}, I_E = 0, T_A = +100^\circ\text{C}$ |
| Emitter Cutoff Current | I_{EBO} | — | <1 | 50 | nA | $V_{\text{EB}} = 4\text{V}, I_C = 0$ |
| ON CHARACTERISTICS (Note 9) | | | | | | |
| Collector-Emitter Saturation Voltage | $V_{\text{CE}(\text{sat})}$ | — — | 65 115 | 150 200 | mV mV | $I_C = 10\text{mA}, I_B = 1\text{mA}$ $I_C = 50\text{mA}, I_B = 5\text{mA}$ |
| Base-Emitter Saturation Voltage | $V_{\text{BE}(\text{sat})}$ | — — | 760 840 | 1,000 1,200 | mV mV | $I_C = 10\text{mA}, I_B = 1\text{mA}$ $I_C = 50\text{mA}, I_B = 5\text{mA}$ |
| DC Current Gain | h_{FE} | 80 80 30 | 130 145 65 | — 250 — | — | $I_C = 1\text{mA}, V_{\text{CE}} = 5\text{V}$ $I_C = 10\text{mA}, V_{\text{CE}} = 5\text{V}$ $I_C = 50\text{mA}, V_{\text{CE}} = 5\text{V}$ |
| SMALL SIGNAL CHARACTERISTICS | | | | | | |
| Transition Frequency | f_T | 100 | 130 | 300 | MHz | $V_{\text{CE}} = 10\text{V}, I_C = 10\text{mA}, f = 100\text{MHz}$ |
| Small Signal Current Gain | h_{fe} | 50 | — | 260 | — | $V_{\text{CE}} = 10\text{V}, I_C = 10\text{mA}, f = 1\text{kHz}$ |
| Output Capacitance | C_{obo} | — | — | 6 | pF | $V_{\text{CB}} = 10\text{V}, f = 1\text{MHz}$ |
| Noise Figure | NF | — | — | 8 | dB | $V_{\text{CE}} = 5.0\text{V}, I_C = 200\mu\text{A}, R_S = 1.0\text{k}\Omega, f = 1.0\text{kHz}$ |
| Delay Time | t_d | — | 95 | — | ns | $V_{\text{CC}} = 10\text{V}, I_C = 10\text{mA}, I_{B1} = -I_{B2} = 1\text{mA}$ |
| Rise Time | t_r | — | 64 | — | ns | |
| Storage Time | t_s | — | 1,256 | — | ns | |
| Delay Time | t_f | — | 140 | — | ns | |

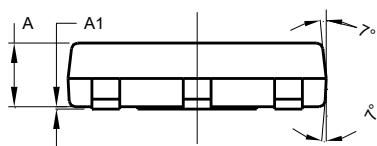
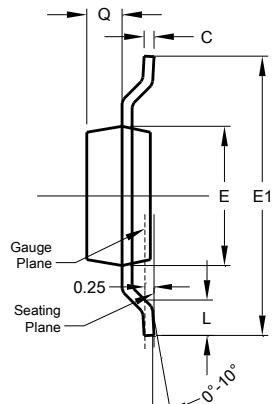
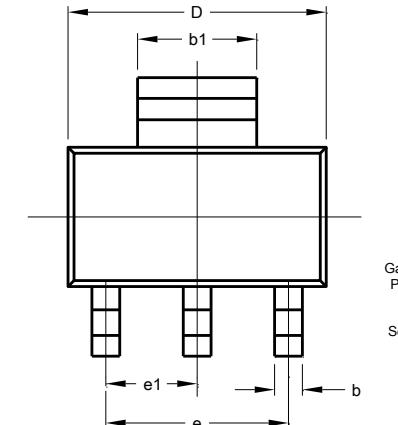
Note: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

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



Package Outline Dimensions

Please see AP02001 at http://www.diodes.com/_files/datasheets/ap02001.pdf for the latest version.

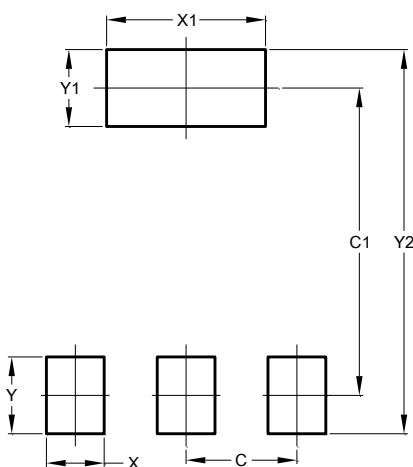


| SOT223 | | | |
|-----------|-------|------|------|
| Dim | Min | Max | Typ |
| A | 1.55 | 1.65 | 1.60 |
| A1 | 0.010 | 0.15 | 0.05 |
| b1 | 2.90 | 3.10 | 3.00 |
| b2 | 0.60 | 0.80 | 0.70 |
| C | 0.20 | 0.30 | 0.25 |
| D | 6.45 | 6.55 | 6.50 |
| E | 3.45 | 3.55 | 3.50 |
| E1 | 6.90 | 7.10 | 7.00 |
| 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 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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