



**THE DATASHEET OF
ZX5T3ZTA**



40V PNP HIGH GAIN LOW SATURATION MEDIUM POWER TRANSISTOR IN SOT89

Features

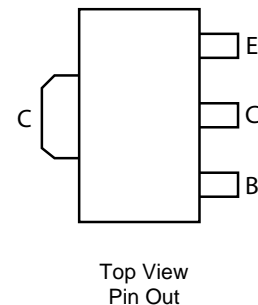
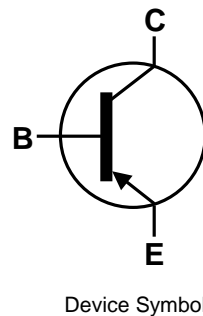
- $BV_{CEO} > -40V$
- $I_C = -5.5A$ High Continuous Current
- $I_{CM} = -15A$ Peak Pulse Current
- $R_{CE(SAT)} = 29m\Omega$ for a low equivalent On-Resistance
- Low Saturation Voltage $V_{CE(SAT)} < -60mV @ -1A$
- h_{FE} Specified Up to -10A for High Current Gain Hold Up
- **Lead-Free Finish; RoHS Compliant (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: SOT89
- 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: 0.05 grams (Approximate)

Applications

- Charging Circuits
- DC-DC Converters
- MOSFET and IGBT Gate Driving
- Power Switches
- Motor Control

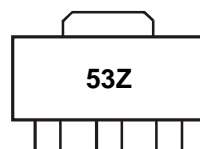


Ordering Information (Note 5)

| Product | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|-----------|------------|---------|--------------------|-----------------|-------------------|
| ZX5T3ZTA | AEC-Q101 | 53Z | 7 | 12 | 1,000 |
| ZX5T3ZQTA | Automotive | 53Z | 7 | 12 | 1,000 |
| ZX5T3ZTC | AEC-Q101 | 53Z | 13 | 12 | 4,000 |
| ZX5T3ZQTC | Automotive | 53Z | 13 | 12 | 4,000 |

- 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 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



53Z = Product Type Marking Code

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

| Characteristic | Symbol | Limit | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CB0} | -50 | V |
| Collector-Base Voltage | V _{CB5} | -50 | V |
| Collector-Emitter Voltage | V _{CEO} | -40 | V |
| Emitter-Base Voltage | V _{EBO} | -7.5 | V |
| Continuous Collector Current | I _C | -5.5 | A |
| Peak Pulse Current | I _{CM} | -15 | A |

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

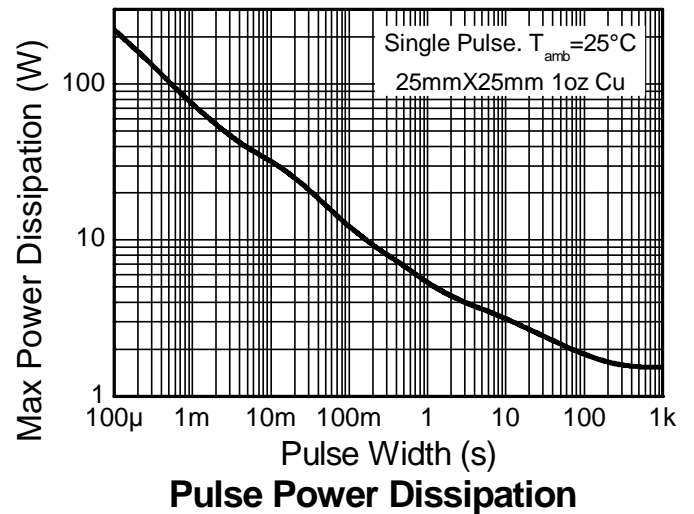
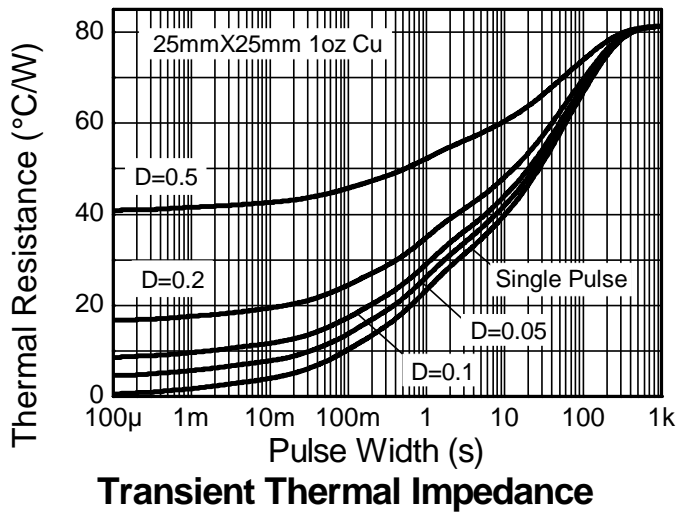
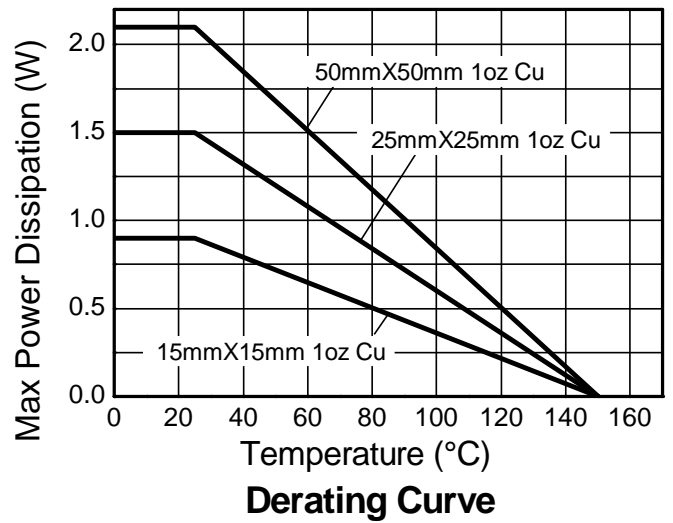
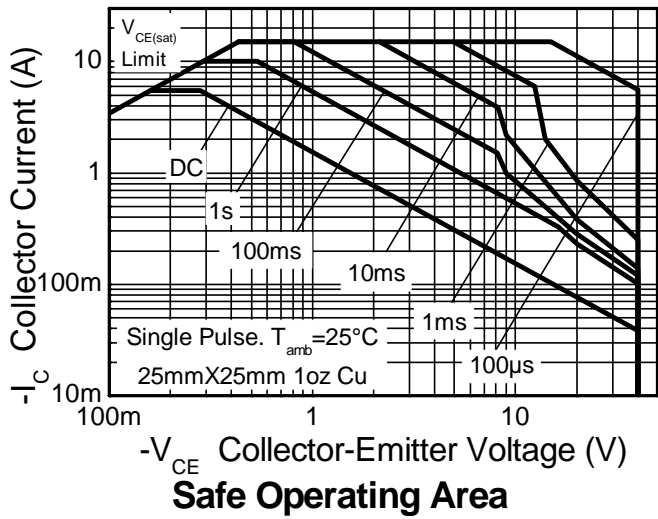
| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Power Dissipation | P _D | 0.9 | W |
| | | 1.5 | |
| | | 2.1 | |
| | | 3.0 | |
| Thermal Resistance, Junction to Ambient Air | R _{θJA} | 139 | °C/W |
| | | 83 | |
| | | 60 | |
| | | 42 | |
| Thermal Resistance, Junction to Lead | R _{θJL} | 2.81 | °C/W |
| 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 | ≥ 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | ≥ 400 | V | C |

- Notes:
6. For a device mounted with the exposed collector pad on 15mm x 15mm 1oz 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 1oz copper.
 8. Same as note (6), except the device is mounted on 50mm x 50mm 1oz copper.
 9. Same as note (6), except the device is mounted on 25mm x 25mm 1oz copper and measured at t<5secs.
 10. Thermal resistance from junction to solder-point (on the exposed collector pad).
 11. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

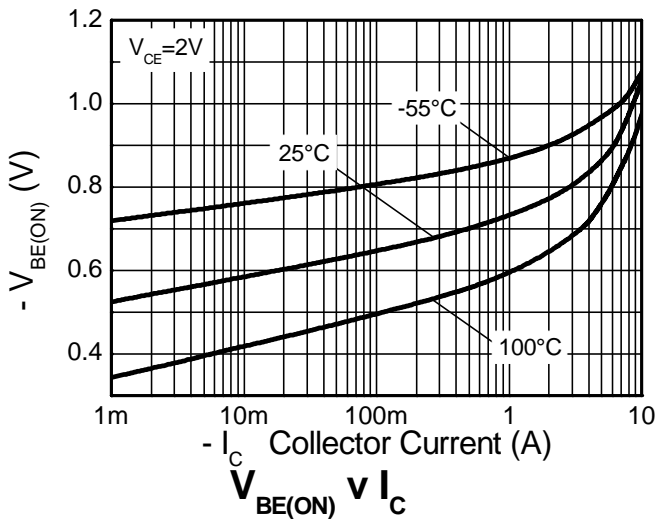
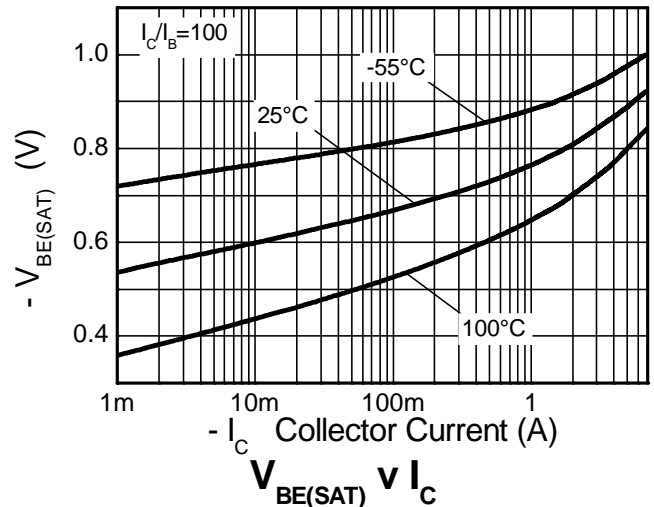
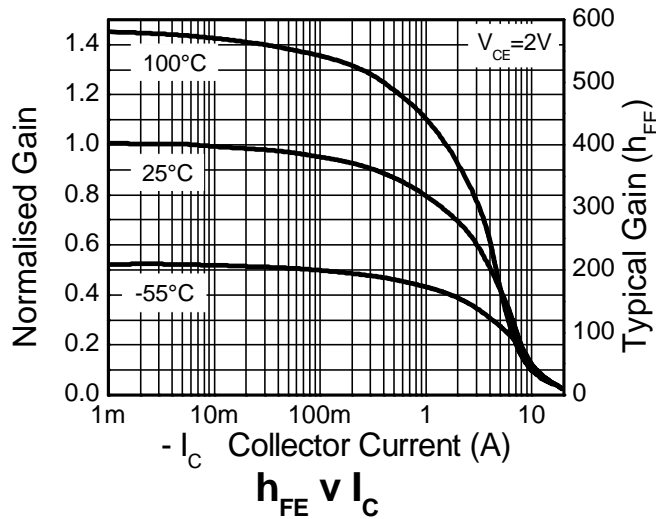
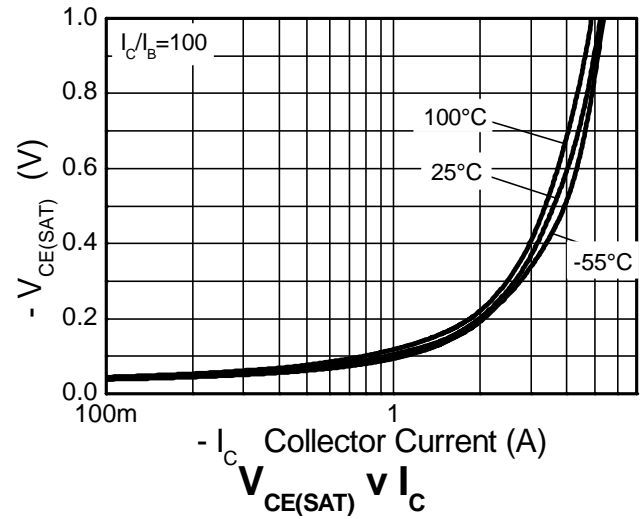
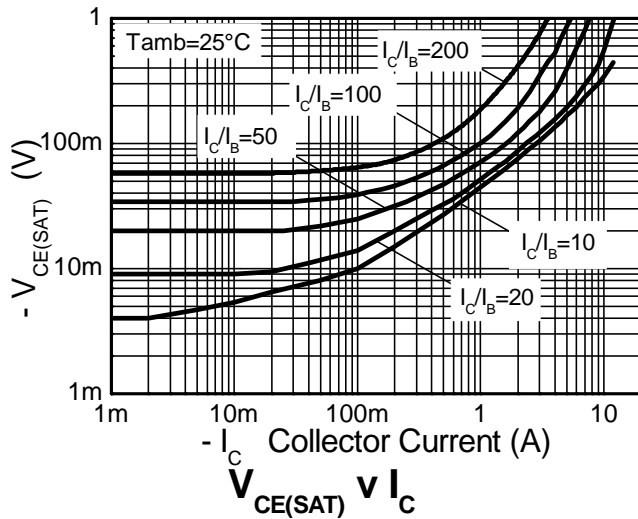


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|----------------------|--------------------------|--|--|------|--|
| Collector-Base Breakdown Voltage | BV _{CBO} | -50 | -90 | — | V | I _C = -100μA |
| Collector-Emitter Breakdown Voltage | BV _{CES} | -50 | -90 | — | V | I _C = -100μA |
| Collector-Emitter Breakdown Voltage (Note 12) | BV _{CEO} | -40 | -58 | — | V | I _C = -10mA |
| Emitter-Base Breakdown Voltage | BV _{EBO} | -7.5 | -8.3 | — | V | I _E = -100μA |
| Collector Cutoff Current | I _{CBO} | — | <1 | -20 | nA | V _{CB} = -40V |
| Collector Cutoff Current | I _{CES} | — | <1 | -20 | nA | V _{CE} = -32V |
| Emitter Cutoff Current | I _{EBO} | — | <1 | -20 | nA | V _{EB} = -6V |
| DC Current Transfer Static Ratio (Note 12) | h _{FE} | 200 200 170 110 | 390 350 290 175 | — 550 — — | — | I _C = -10mA, V _{CE} = -2V I _C = -0.5A, V _{CE} = -2V I _C = -2A, V _{CE} = -2V I _C = -5.5A, V _{CE} = -2V |
| Collector-Emitter Saturation Voltage (Note 12) | V _{CE(SAT)} | — — — | -15 -44 -50 -120 -70 -125 -130 -162 | -30 -60 -70 -165 -80 -175 -175 -185 | mV | I _C = -0.1A, I _B = -10mA I _C = -1A, I _B = -100mA I _C = -1A, I _B = -50mA I _C = -1A, I _B = -10mA I _C = -2A, I _B = -200mA I _C = -2A, I _B = -40mA I _C = -3.5A, I _B = -175mA I _C = -5.5A, I _B = -550mA |
| Base-Emitter Saturation Voltage (Note 12) | V _{BE(SAT)} | — | -820 -1000 | -900 -1075 | V | I _C = -2A, I _B = -40mA I _C = -5.5A, I _B = -550mA |
| Base-Emitter Turn-On Voltage (Note 12) | V _{BE(ON)} | — | -778 -869 | -850 -950 | V | I _C = -2A, V _{CE} = -2V I _C = -5.5A, V _{CE} = -2V |
| Transitional Frequency | f _T | — | 152 | — | MHz | I _C = -50mA, V _{CE} = -10V f = 100MHz |
| Output Capacitance | C _{obo} | — | 53 | — | pF | V _{CB} = -10V, f = 1MHz, |
| Switching Times | t _d | — | 18 | — | nS | I _C = -1A, V _{CC} = -10V I _{B1} = -I _{B2} = -100mA |
| | t _r | | 17 | | | |
| | t _s | | 325 | | | |
| | t _f | | 60 | | | |
| Switching Times | t _d | — | 55 | — | nS | I _C = -2A, V _{CC} = -30V I _{B1} = -I _{B2} = -20mA |
| | t _r | | 107 | | | |
| | t _s | | 264 | | | |
| | t _f | | 103 | | | |

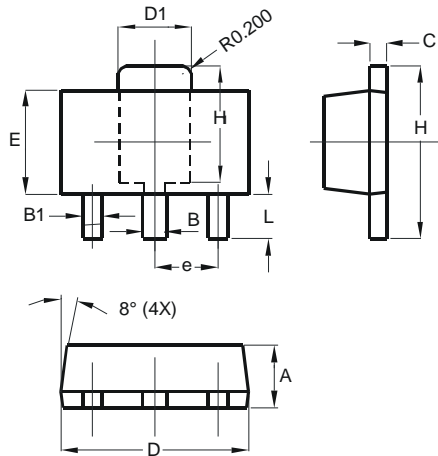
Note: 12. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



Package Outline Dimensions

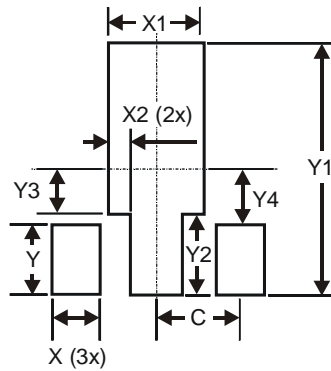
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SOT89 | | |
|----------------------|----------|------|
| Dim | Min | Max |
| A | 1.40 | 1.60 |
| B | 0.44 | 0.62 |
| B1 | 0.35 | 0.54 |
| C | 0.35 | 0.44 |
| D | 4.40 | 4.60 |
| D1 | 1.62 | 1.83 |
| E | 2.29 | 2.60 |
| e | 1.50 Typ | |
| H | 3.94 | 4.25 |
| H1 | 2.63 | 2.93 |
| L | 0.89 | 1.20 |
| 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) |
|------------|---------------|
| X | 0.900 |
| X1 | 1.733 |
| X2 | 0.416 |
| Y | 1.300 |
| Y1 | 4.600 |
| Y2 | 1.475 |
| Y3 | 0.950 |
| Y4 | 1.125 |
| C | 1.500 |

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