

ZXTN25100BFH

100V NPN LOW SATURATION TRANSISTOR IN SOT23

Features

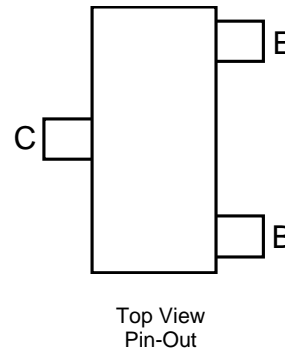
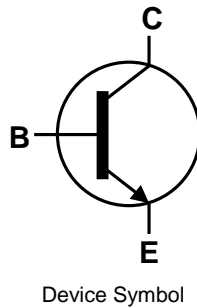
- $BV_{CEO} > 100V$
- $BV_{CEX} > 170V$ Forward Blocking Voltage
- $BV_{ECO} > 6V$ Reverse Blocking Voltage
- $I_C = 3A$ high Continuous Collector Current
- Low Saturation Voltage, $V_{CE(SAT)} < 80mV @ 1A$
- $R_{CE(SAT)} = 67m\Omega$ for a Low Equivalent On-Resistance
- 1.25W Power Dissipation
- h_{FE} Specified up to 3A for High Current Gain Hold Up
- Complementary PNP Type: ZXTP25100BFH
- **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**

Mechanical Data

- Case: SOT23
- 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 Plated Leads, Solderable per MIL-STD-202, Method 208(Ⓢ)
- Weight 0.008 grams (Approximate)

Applications

- Lamp Relay and Solenoid Drivers
- General Switching in Automotive and Industrial Applications
- Motor Drive and Control

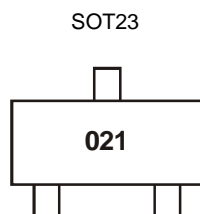


Ordering Information (Note 4)

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|----------------|---------|--------------------|-----------------|-------------------|
| ZXTN25100BFHTA | 021 | 7 | 8 | 3,000 |

- 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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



021 = Product Type Marking Code

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

| Characteristic | Symbol | Value | Unit |
|----------------------------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CB0} | 170 | V |
| Collector-Emitter Voltage (Forward Blocking) | V _{CEx} | 170 | V |
| Collector-Emitter Voltage | V _{CE0} | 100 | V |
| Emitter-Base Voltage (Reverse Blocking) | V _{ECO} | 6 | V |
| Emitter-Base Voltage | V _{EBO} | 7 | V |
| Continuous Collector Current | I _C | 3 | A |
| Peak Pulse Current | I _{CM} | 9 | A |

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

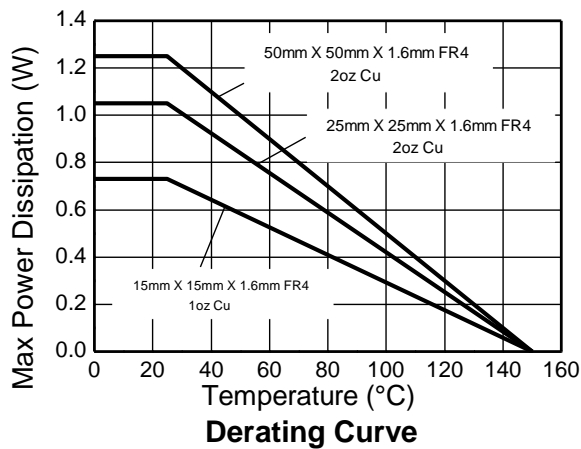
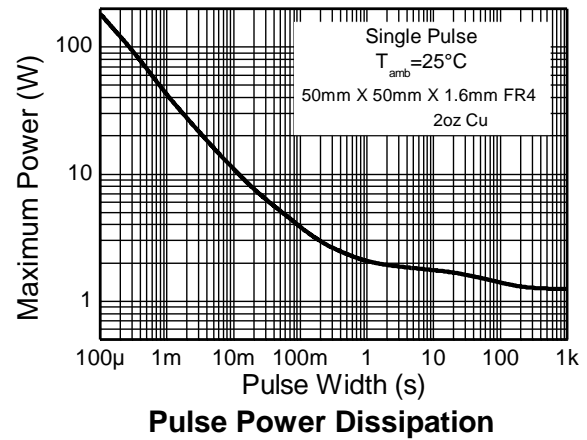
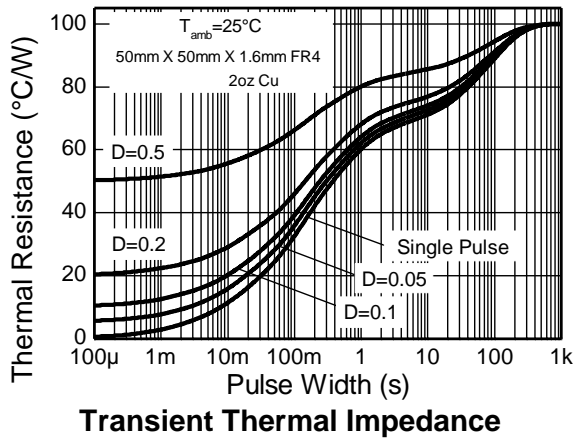
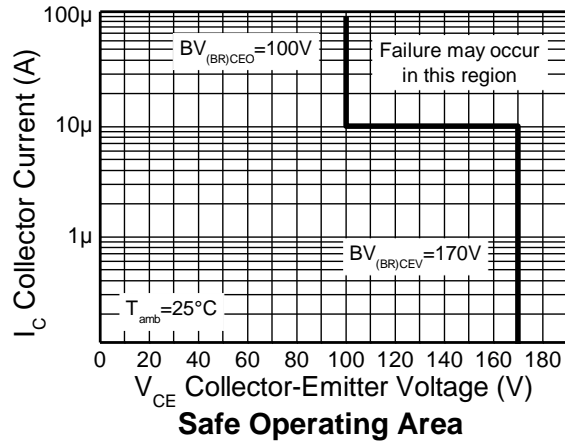
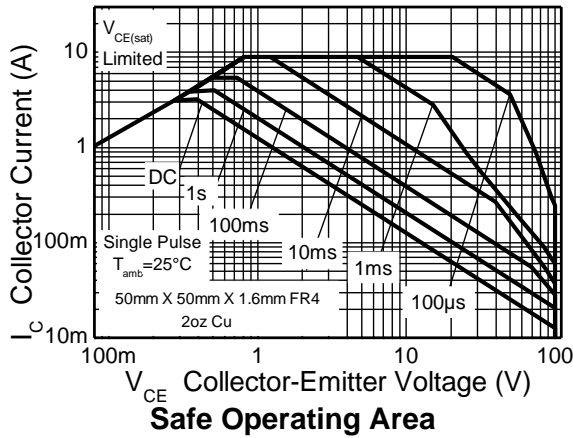
| Characteristic | Symbol | Value | Unit |
|---------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation Linear Derating Factor | P _D | 0.60 | W |
| | | 4.80 | |
| | | 0.73 | |
| | | 5.84 | |
| | | 1.05 | |
| | | 8.4 | |
| Thermal Resistance, Junction to Ambient | R _{θJA} | 1.25 | °C/W |
| | | 9.6 | |
| | | 1.81 | |
| | | 14.5 | |
| | | 209 | |
| | | 171 | |
| Thermal Resistance, Junction to Leads | R _{θJL} | 119 | °C/W |
| | | 100 | |
| | | 69 | |
| | | 75 | |
| 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:
- For a device mounted on minimum recommended pad layout with 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady-state.
 - Same as Note 5, except mounted with the collector lead on 15mm x 15mm 1oz copper.
 - Same as Note 5, except mounted with the collector lead on 25mm x 25mm 2oz copper.
 - Same as Note 5, except mounted with the collector lead on 50mm x 50mm 2 oz copper.
 - Same as Note 8, except measured at t < 5 seconds.
 - Thermal resistance from junction to solder-point (at the end of collector lead).
 - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating information

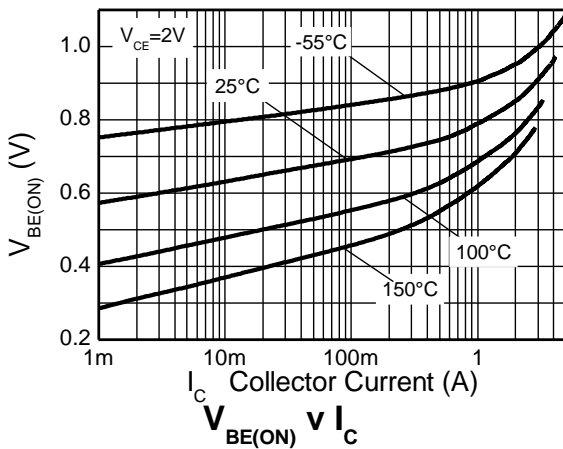
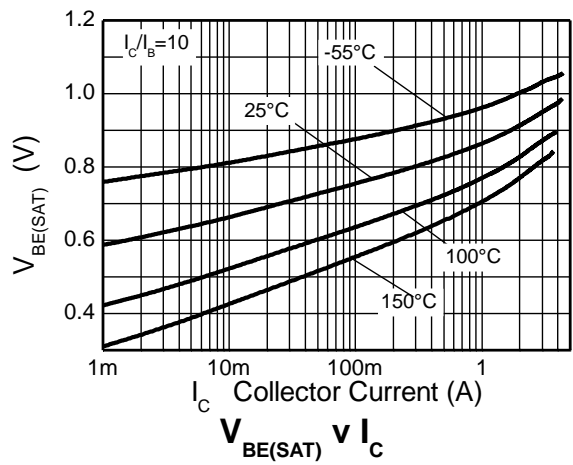
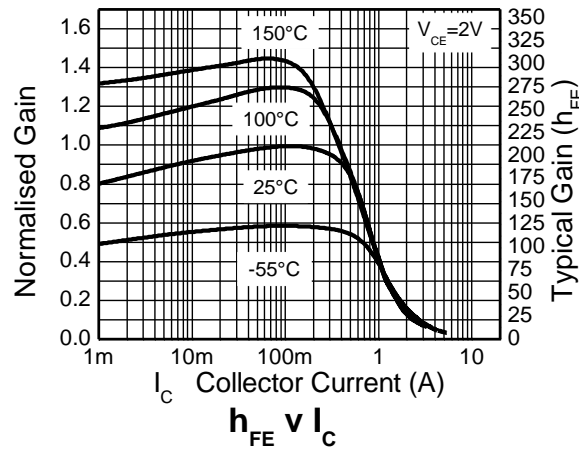
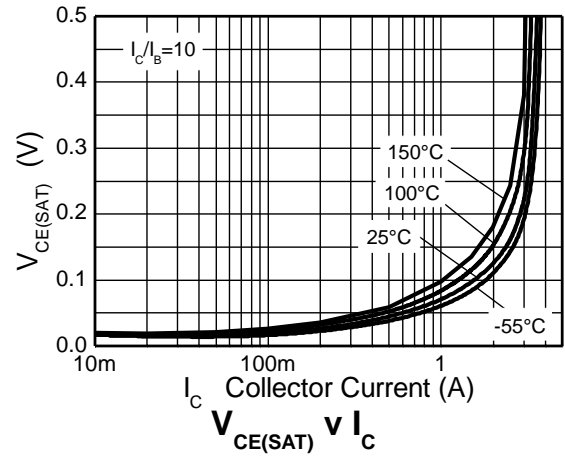
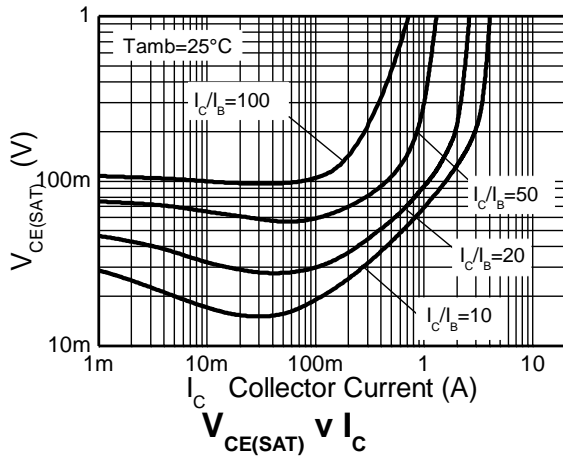


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|------------------------------------------------------------------|---------------|------------------|------------------------|------------------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage | BV_{CBO} | 170 | 220 | - | V | $I_C = 100\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage (Forward Blocking) (Note 12) | BV_{CEX} | 170 | 210 | - | V | $I_C = 100\mu\text{A}$, $R_{BE} < 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$ |
| Collector-Emitter Breakdown Voltage (Note 12) | BV_{CEO} | 100 | 120 | - | V | $I_C = 1\text{mA}$ |
| Emitter-Collector Breakdown Voltage (Reverse Blocking) (Note 12) | BV_{ECX} | 6 | 7 | - | V | $I_E = 100\mu\text{A}$, $R_{BC} < 1\text{k}\Omega$ or $0.25\text{V} > V_{BC} > -0.25\text{V}$ |
| Emitter-Collector Breakdown Voltage | BV_{ECO} | 6 | 8.4 | - | V | $I_E = 100\mu\text{A}$ |
| Emitter-Base Breakdown Voltage | BV_{EBO} | 7 | 8 | - | V | $I_E = 100\mu\text{A}$ |
| Collector Cut-Off Current | I_{CBO} | - | <1 | 50 20 | nA | $V_{CB} = 136\text{V}$ $V_{CB} = 136\text{V}$, $T_A = +100^\circ\text{C}$ |
| Collector Emitter Cut-Off Current | I_{CEX} | - | - | 100 | nA | $V_{CE} = 136\text{V}$, $R_{BE} < 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$ |
| Emitter Cut-Off Current | I_{EBO} | - | <1 | 50 | nA | $V_{EB} = 5.6\text{V}$ |
| Static Forward Current Transfer Ratio (Note 12) | h_{FE} | 100 50 - | 200 85 20 | 300 - | - | $I_C = 10\text{mA}$, $V_{CE} = 2\text{V}$ $I_C = 1\text{A}$, $V_{CE} = 2\text{V}$ $I_C = 3\text{A}$, $V_{CE} = 2\text{V}$ |
| Collector-Emitter Saturation Voltage (Note 12) | $V_{CE(sat)}$ | - - - - | 40 100 70 200 | 55 135 80 250 | mV | $I_C = 0.5\text{A}$, $I_B = 50\text{mA}$ $I_C = 0.5\text{A}$, $I_B = 10\text{mA}$ $I_C = 1\text{A}$, $I_B = 100\text{mA}$ $I_C = 3\text{A}$, $I_B = 300\text{mA}$ |
| Base-Emitter Saturation Voltage (Note 12) | $V_{BE(sat)}$ | - | 940 | 1050 | mV | $I_C = 3\text{A}$, $I_B = 300\text{mA}$ |
| Base-Emitter Saturation Voltage (Note 12) | $V_{BE(on)}$ | - | 890 | 1000 | mV | $I_C = 3\text{A}$, $V_{CE} = 2\text{V}$ |
| Transition Frequency | f_T | - | 160 | - | MHz | $I_C = 100\text{mA}$, $V_{CE} = 5\text{V}$, $f = 100\text{MHz}$ |
| Collector Output Capacitance | C_{obo} | - | 9.4 | 20 | pF | $V_{CB} = 10\text{V}$, $f = 1\text{MHz}$ |
| Delay Time | $t_{(d)}$ | - | 16 | - | ns | $V_{CC} = 10\text{V}$, $I_C = 0.5\text{A}$, $I_{B1} = -I_{B2} = 50\text{mA}$ |
| Rise Time | $t_{(r)}$ | - | 55 | - | ns | |
| Storage Time | $t_{(s)}$ | - | 677 | - | ns | |
| Fall Time | $t_{(f)}$ | - | 95 | - | ns | |

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

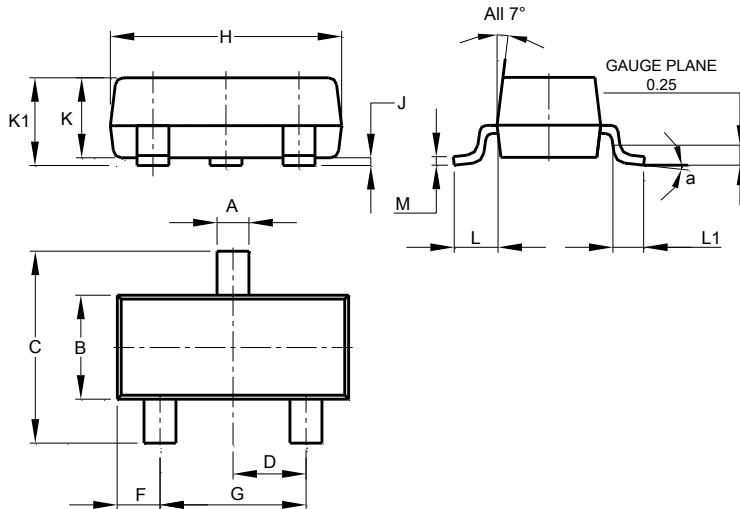
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



ZXTN25100BFH

Package Outline Dimensions

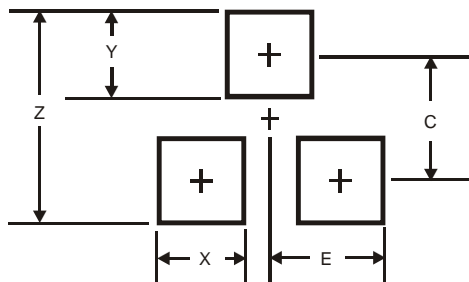
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| SOT23 | | | |
|----------------------|-------|-------|-------|
| Dim | Min | Max | Typ |
| A | 0.37 | 0.51 | 0.40 |
| B | 1.20 | 1.40 | 1.30 |
| C | 2.30 | 2.50 | 2.40 |
| D | 0.89 | 1.03 | 0.915 |
| F | 0.45 | 0.60 | 0.535 |
| G | 1.78 | 2.05 | 1.83 |
| H | 2.80 | 3.00 | 2.90 |
| J | 0.013 | 0.10 | 0.05 |
| K | 0.890 | 1.00 | 0.975 |
| K1 | 0.903 | 1.10 | 1.025 |
| L | 0.45 | 0.61 | 0.55 |
| L1 | 0.25 | 0.55 | 0.40 |
| M | 0.085 | 0.150 | 0.110 |
| a | 8° | | |
| 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) |
|------------|---------------|
| Z | 2.9 |
| X | 0.8 |
| Y | 0.9 |
| C | 2.0 |
| E | 1.35 |

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device terminals and PCB tracking.

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