

**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**

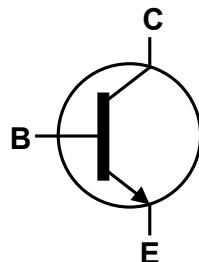
- Case: SOT23
- Case Material: molded plastic, "Green" molding compound
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (E3)
- Weight 0.008 grams (approximate)

**Applications**

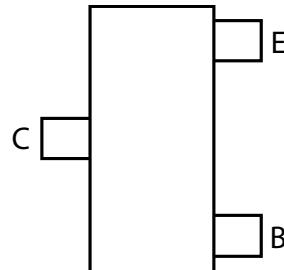
- Lamp relay and solenoid drivers
- General switching in automotive and industrial applications
- Motor drive and control



Top View



Device Symbol

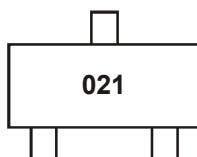

 Top View  
 Pin-Out

**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> 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>.

**Marking Information**


021 = Product Type Marking Code

ZXTN25100BFH

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	170	V
Collector-Emitter Voltage (Forward Blocking)	V <sub>CEx</sub>	170	V
Collector-Emitter Voltage	V <sub>CEO</sub>	100	V
Emitter-Base Voltage (Reverse Blocking)	V <sub>ECO</sub>	6	V
Emitter-Base Voltage	V <sub>EBO</sub>	7	V
Continuous Collector Current	I <sub>C</sub>	3	A
Peak Pulse Current (Note 5)	I <sub>CM</sub>	9	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	0.73	mW
Linear Derating Factor	(Note 5)	5.84	
Power Dissipation	P <sub>D</sub>	1.05	mW
Linear Derating Factor	(Note 6)	8.4	
Power Dissipation	P <sub>D</sub>	1.25	mW
Linear Derating Factor	(Note 7)	9.6	
Power Dissipation	P <sub>D</sub>	1.81	mW
Linear Derating Factor	(Note 8)	14.5	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	171	°C/W
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	119	°C/W
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	100	°C/W
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	69	°C/W
Thermal Resistance, Junction to Leads	R <sub>θJL</sub>	74.96	°C/W
Operating and Storage Temperature Range	T <sub>J, T<sub>STG</sub></sub>	-55 to +150	°C

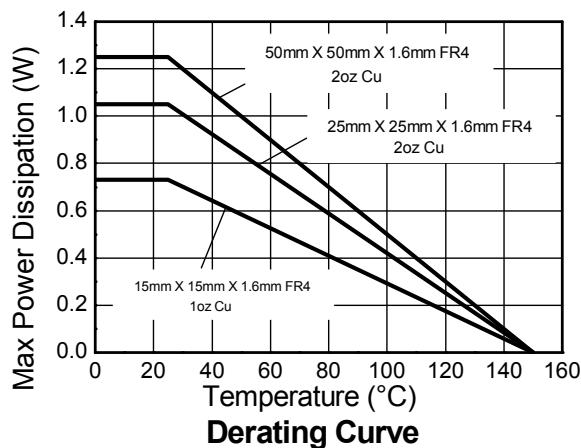
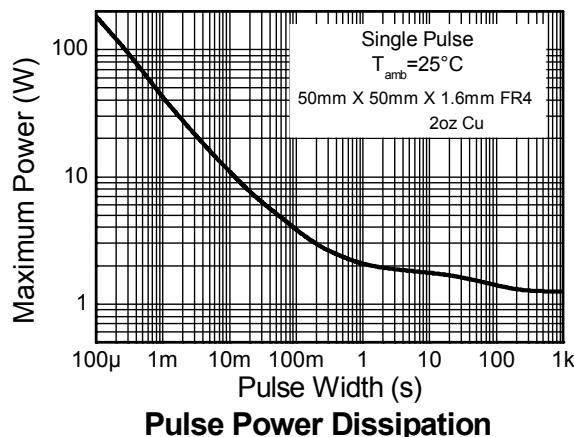
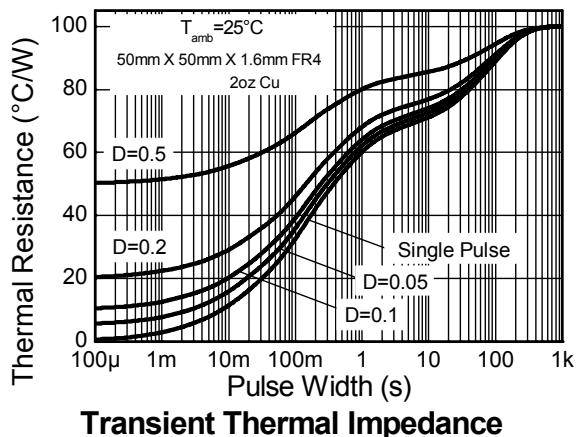
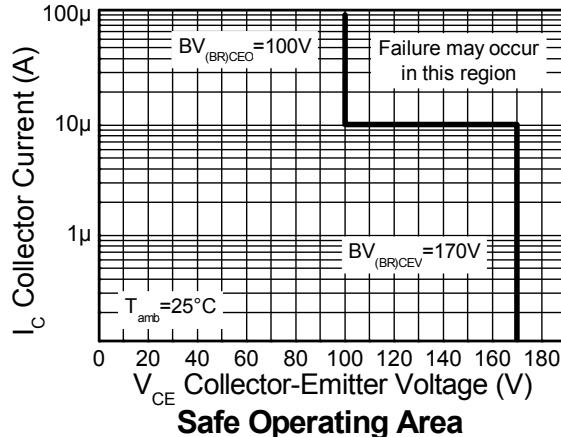
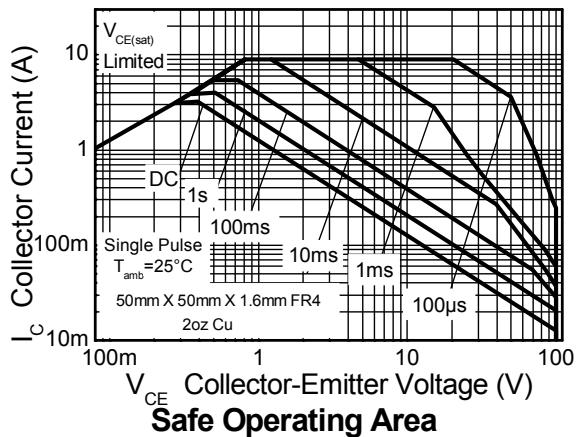
**ESD Ratings** (Note 10)

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:

- 5. For a device surface mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
- 6. Same as note (5), except mounted on 25mm x 25mm x 1.6mm FR4 PCB with 2 oz copper.
- 7. Same as note (5), except mounted on 50mm x 50mm x 1.6mm FR4 PCB with 2 oz copper.
- 8. Same as note (7), except measured at t < 5secs.
- 9. Thermal resistance from junction to solder-point (at the end of collector lead).
- 10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

## Thermal Characteristics and Derating information

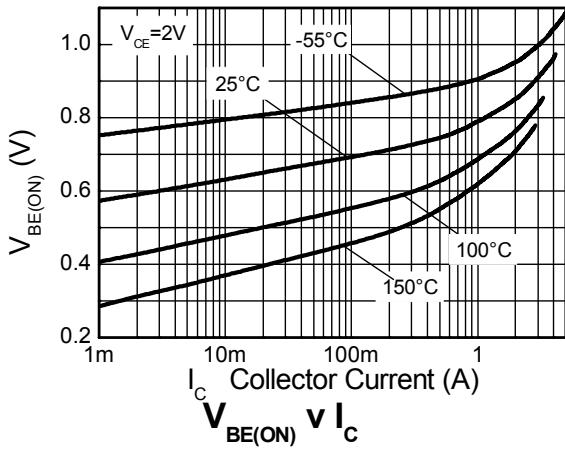
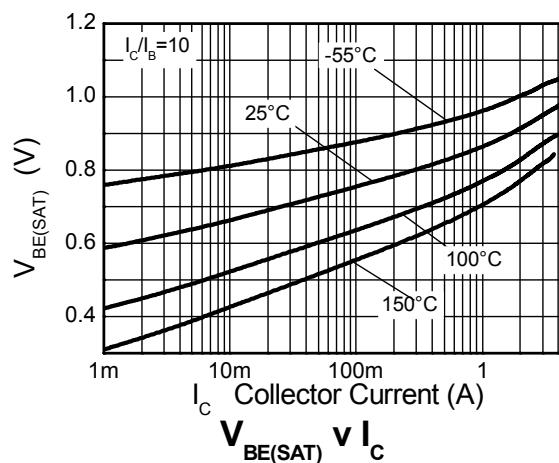
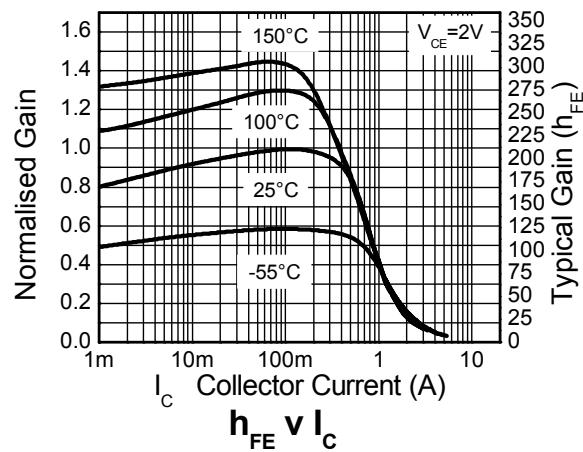
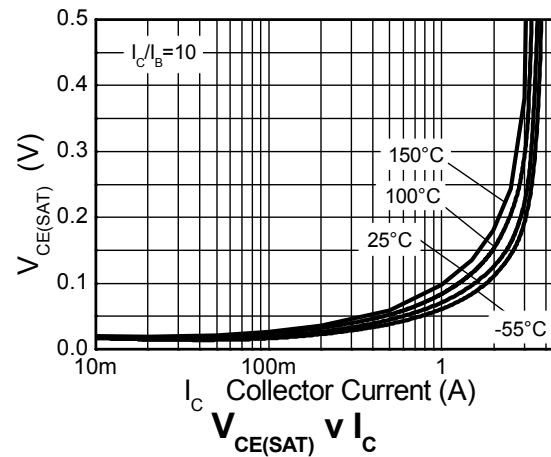
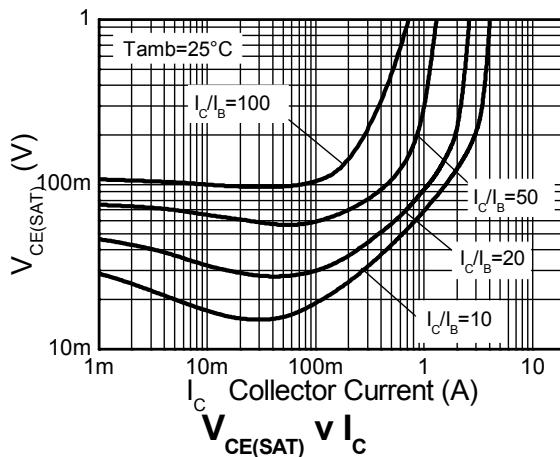


## Electrical Characteristics (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$\text{BV}_{\text{CBO}}$	170	220	-	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Forward Blocking) (Note 11)	$\text{BV}_{\text{CEX}}$	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 11)	$\text{BV}_{\text{CEO}}$	100	120	-	V	$I_C = 1\text{mA}$
Emitter-Collector Breakdown Voltage (Reverse Blocking) (Note 11)	$\text{BV}_{\text{ECX}}$	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	$\text{BV}_{\text{ECO}}$	6	8.4	-	V	$I_E = 100\mu\text{A}$
Emitter-Base Breakdown Voltage	$\text{BV}_{\text{EBO}}$	7	8	-	V	$I_E = 100\mu\text{A}$
Collector Cut-off Current	$I_{\text{CBO}}$	-	<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	$I_{\text{CEX}}$	-	-	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	$I_{\text{EBO}}$	-	<1	50	nA	$V_{EB} = 5.6\text{V}$
Static Forward Current Transfer Ratio (Note 11)	$h_{\text{FE}}$	100 50 - 20	200 85 - -	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 11)	$V_{\text{CE}(\text{sat})}$	- - - -	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 11)	$V_{\text{BE}(\text{sat})}$	-	940	1050	mV	$I_C = 3\text{A}, I_B = 300\text{mA}$
Base-Emitter Saturation Voltage (Note 11)	$V_{\text{BE}(\text{on})}$	-	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	$C_{\text{obo}}$	-	9.4	20	pF	$V_{CB} = 10\text{V}, f = 1\text{MHz}$
Delay Time	$t_{(d)}$	-	16	-	ns	
Rise Time	$t_{(r)}$	-	55	-	ns	
Storage Time	$t_{(s)}$	-	677	-	ns	$V_{CC} = 10\text{V}, I_C = 0.5\text{A},$ $I_{B1} = -I_{B2} = 50\text{mA}$
Fall Time	$t_{(f)}$	-	95	-	ns	

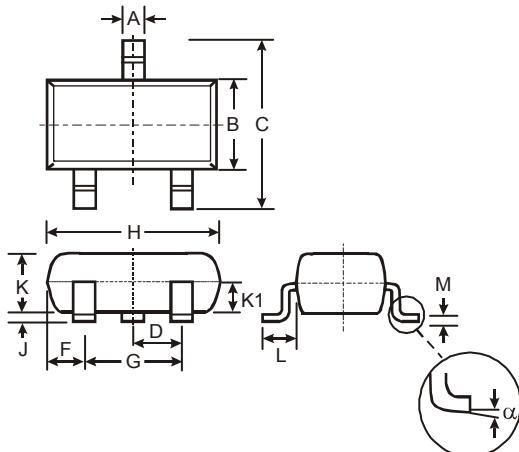
Notes: 11. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$

**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 latest version.

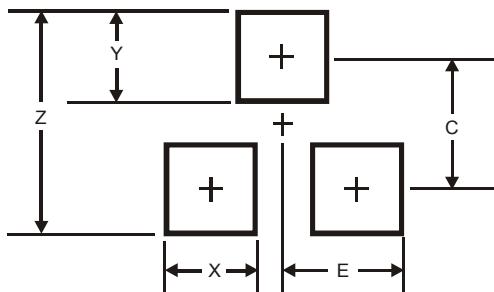


SOT23			
Dim	Min	Max	Typ
<b>A</b>	0.37	0.51	0.40
<b>B</b>	1.20	1.40	1.30
<b>C</b>	2.30	2.50	2.40
<b>D</b>	0.89	1.03	0.915
<b>F</b>	0.45	0.60	0.535
<b>G</b>	1.78	2.05	1.83
<b>H</b>	2.80	3.00	2.90
<b>J</b>	0.013	0.10	0.05
<b>K</b>	0.903	1.10	1.00
<b>K1</b>	-	-	0.400
<b>L</b>	0.45	0.61	0.55
<b>M</b>	0.085	0.18	0.11
$\alpha$	0°	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)
<b>Z</b>	2.9
<b>X</b>	0.8
<b>Y</b>	0.9
<b>C</b>	2.0
<b>E</b>	1.35

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