

**ZXTN25100BFH**

**100V NPN LOW SATURATION TRANSISTOR IN SOT23**

**Features**

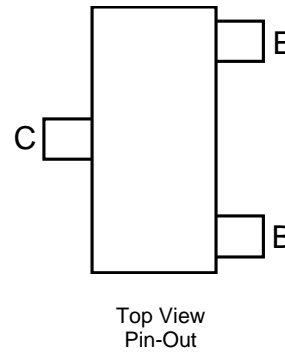
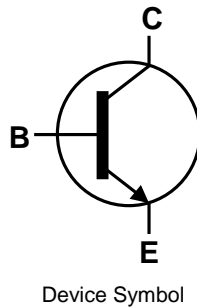
- $BV_{CEO} > 100V$
- $BV_{CEX} > 170V$  Forward Blocking Voltage
- $BV_{ECO} > 6V$  Reverse Blocking Voltage
- $I_C = 3A$  high Continuous Collector Current
- Low Saturation Voltage,  $V_{CE(SAT)} < 80mV @ 1A$
- $R_{CE(SAT)} = 67m\Omega$  for a Low Equivalent On-Resistance
- 1.25W Power Dissipation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

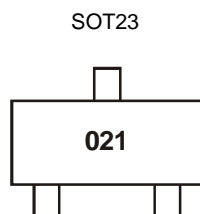


**Ordering Information (Note 4)**

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](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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</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	I <sub>CM</sub>	9	A

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

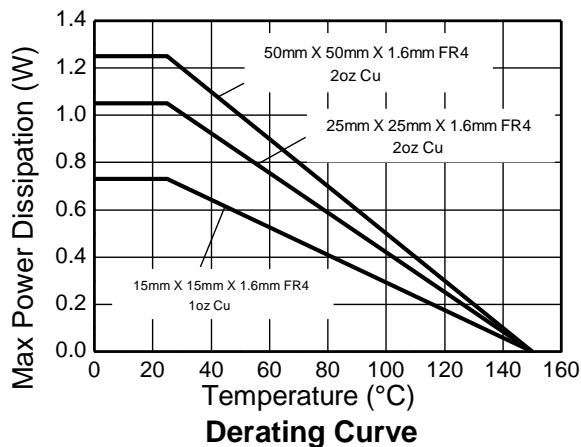
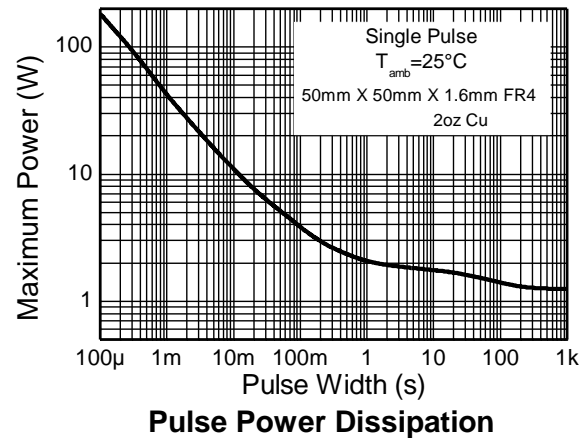
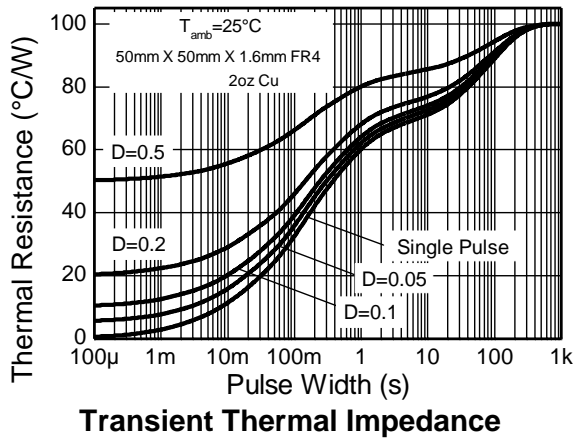
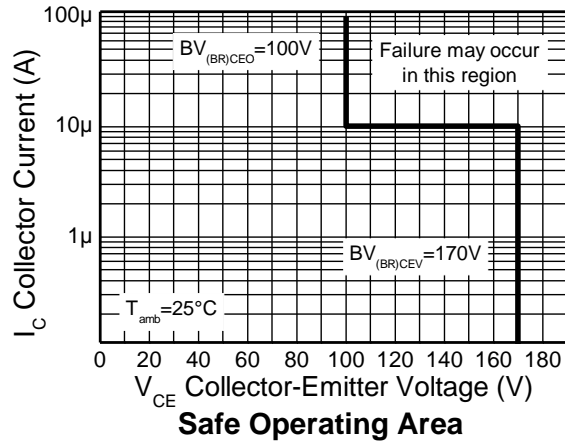
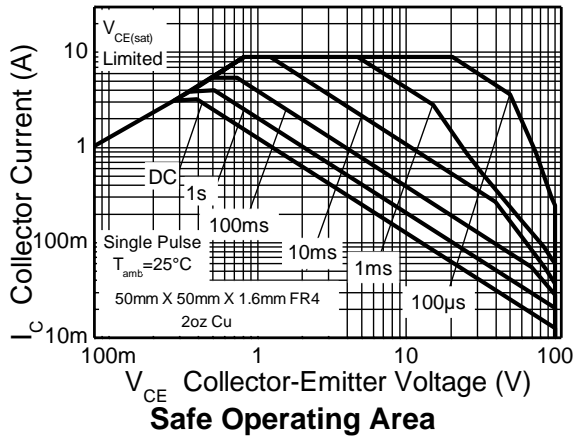
Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	P <sub>D</sub>	0.60	W mW
		4.80	
		0.73	
		5.84	
		1.05	
		8.4	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	1.25	°C/W
		9.6	
		1.81	
		14.5	
		209	
		171	
Thermal Resistance, Junction to Leads	R <sub>θJL</sub>	119	°C/W
		100	
		69	
		75	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-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**

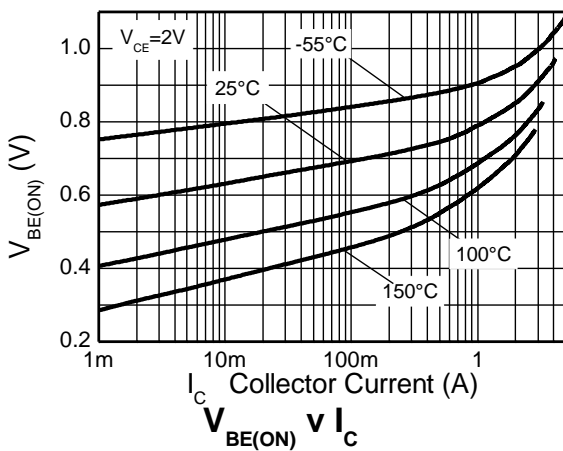
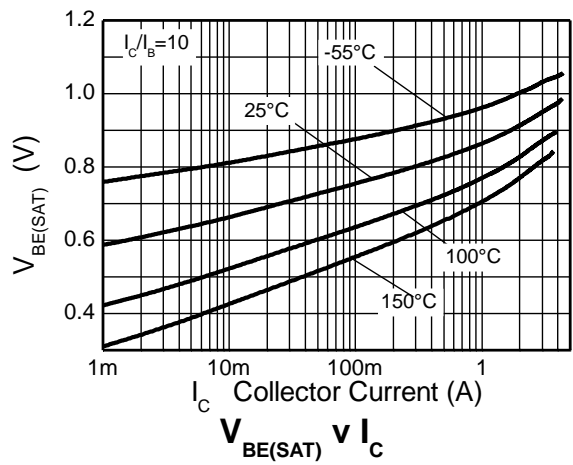
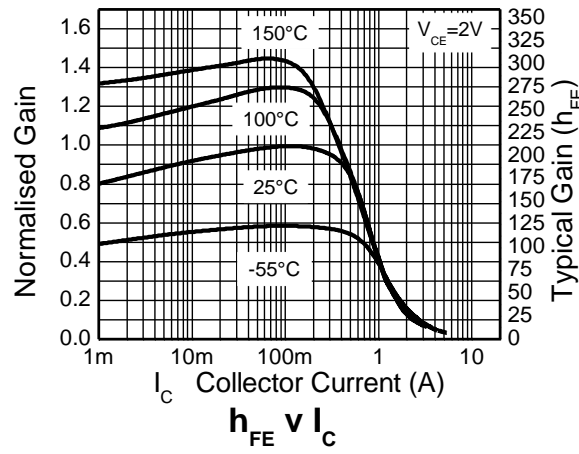
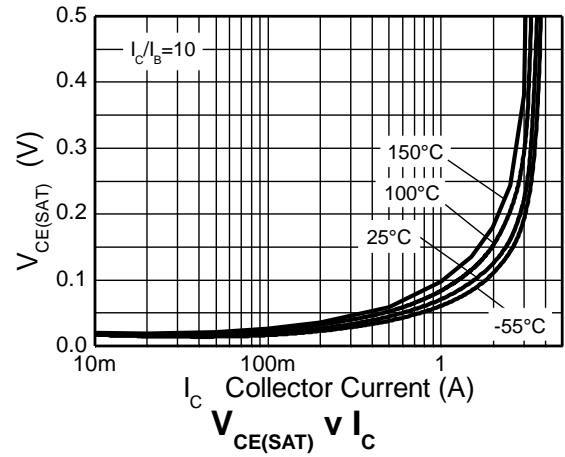
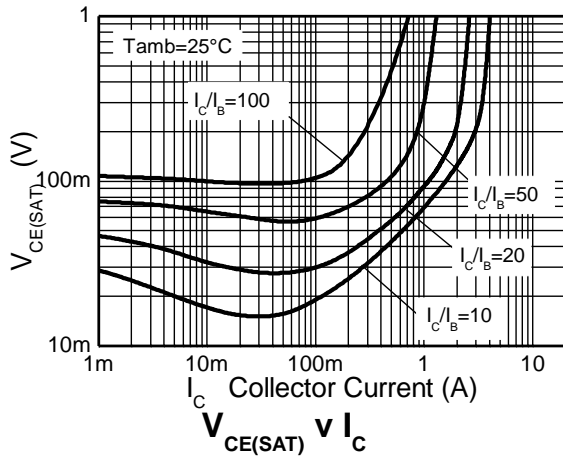


**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

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  $\leq 2\%$

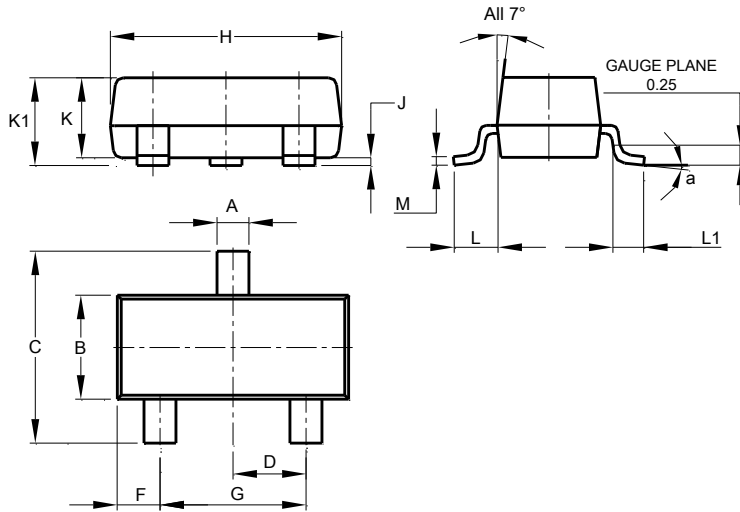
**Typical Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)



**ZXTN25100BFH**

**Package Outline Dimensions**

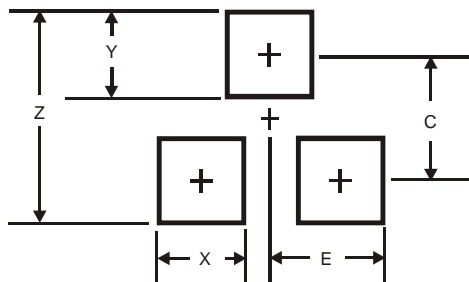
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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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