

**ZXTN25100BFH**

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

**Features**

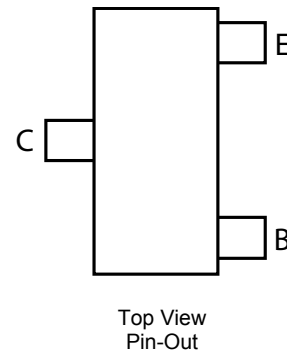
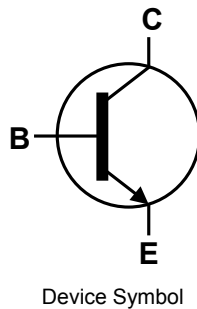
- $BV_{CEO} > 100V$
- $BV_{CEX} > 170V$  forward blocking voltage
- $BV_{ECO} > 6V$  reverse blocking voltage
- $I_C = 3A$  high Continuous Collector Current
- Low saturation voltage,  $V_{CE(SAT)} < 80mV @ 1A$
- $R_{CE(SAT)} = 67m\Omega$  for a low equivalent On-Resistance
- 1.25W Power dissipation
- $h_{FE}$  specified up to 3A for high current gain hold up
- Complementary PNP Type: ZXP25100BFH
- **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

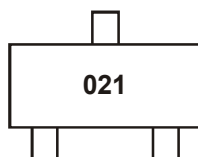


**Ordering Information** (Note 4)

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

**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , 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	$V_{CEO}$	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 (Note 5)	$I_{CM}$	9	A

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

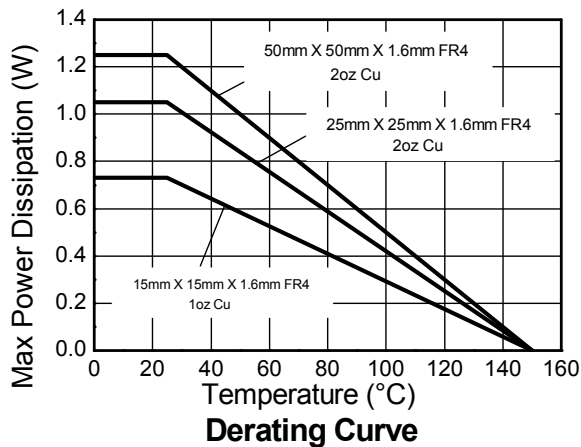
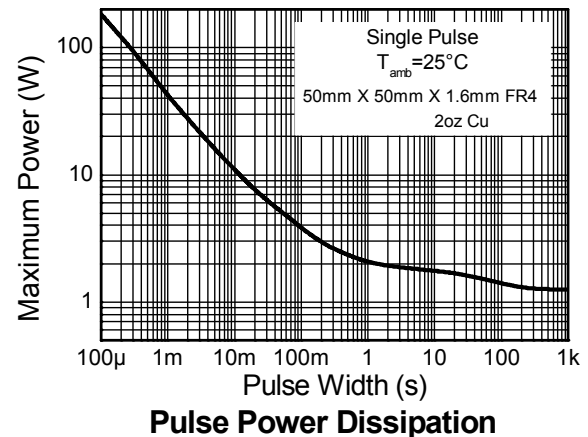
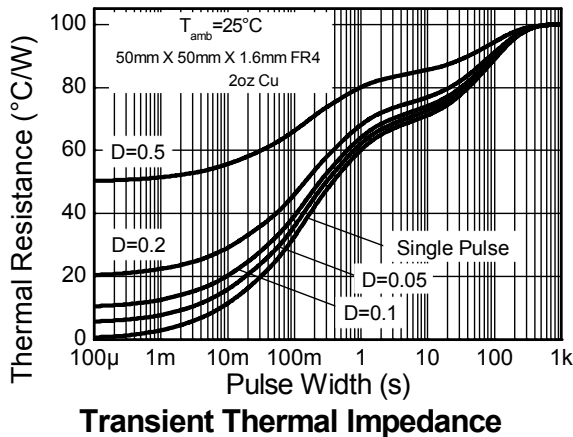
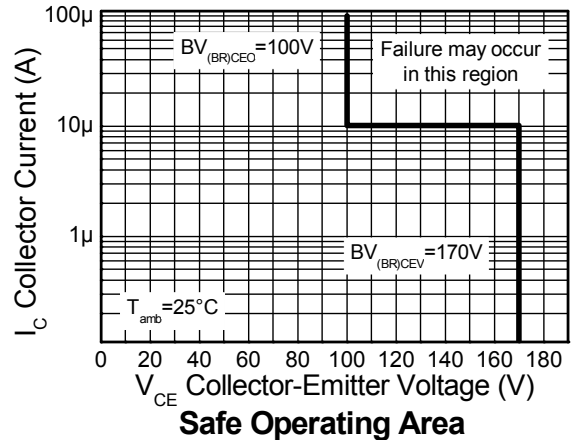
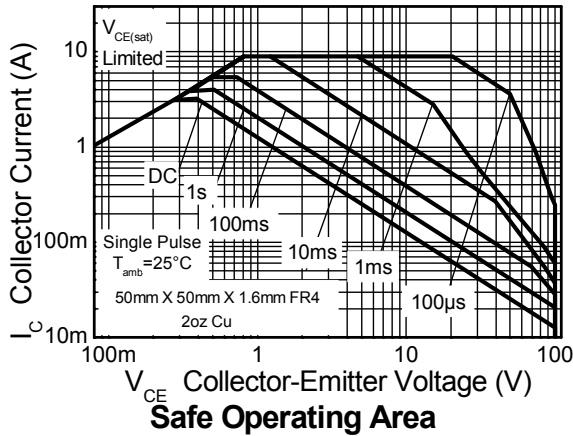
Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 5) $P_D$	0.73 5.84	mW
Power Dissipation Linear Derating Factor	(Note 6) $P_D$	1.05 8.4	mW
Power Dissipation Linear Derating Factor	(Note 7) $P_D$	1.25 9.6	mW
Power Dissipation Linear Derating Factor	(Note 8) $P_D$	1.81 14.5	mW
Thermal Resistance, Junction to Ambient	(Note 5) $R_{\theta JA}$	171	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient	(Note 6) $R_{\theta JA}$	119	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient	(Note 7) $R_{\theta JA}$	100	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient	(Note 8) $R_{\theta JA}$	69	$^\circ\text{C/W}$
Thermal Resistance, Junction to Leads	(Note 9) $R_{\theta JL}$	74.96	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**ESD Ratings** (Note 10)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	$\geq 8,000$	V	3B
Electrostatic Discharge - Machine Model	ESD MM	$\geq 400$	V	C

- Notes:
- 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.
  - Same as note (5), except mounted on 25mm x 25mm x 1.6mm FR4 PCB with 2 oz copper.
  - Same as note (5), except mounted on 50mm x 50mm x 1.6mm FR4 PCB with 2 oz copper.
  - Same as note (7), except measured at  $t < 5\text{secs}$ .
  - 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**

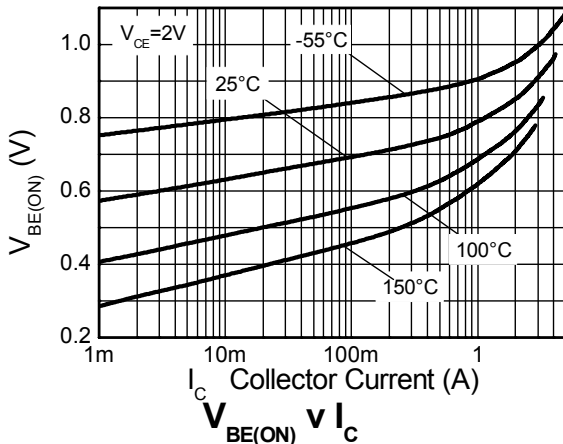
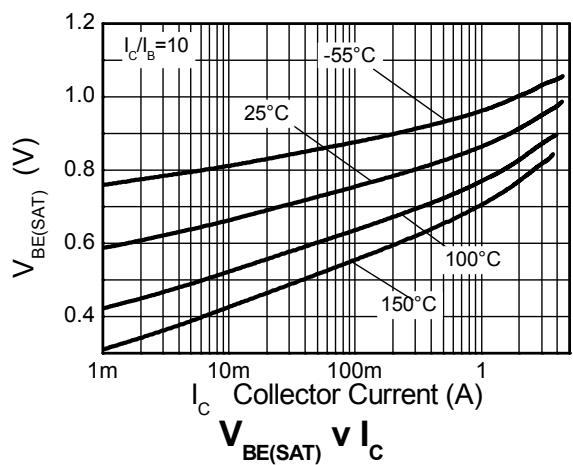
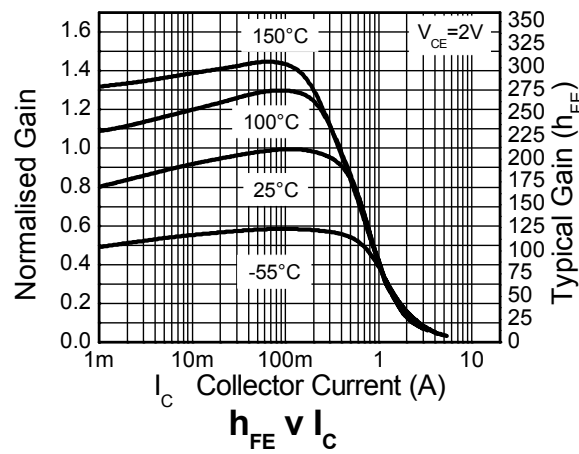
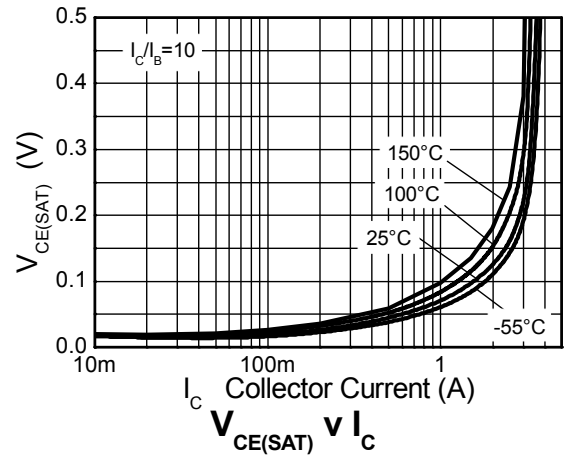
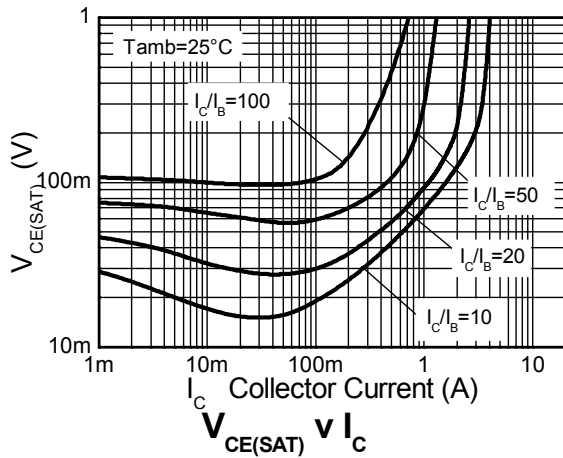


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	170	220	-	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Forward Blocking) (Note 11)	BV <sub>CEX</sub>	170	210	-	V	I <sub>C</sub> = 100μA, R <sub>BE</sub> < 1kΩ or -1V < V <sub>BE</sub> < 0.25V
Collector-Emitter Breakdown Voltage (Note 11)	BV <sub>CEO</sub>	100	120	-	V	I <sub>C</sub> = 1mA
Emitter-Collector Breakdown Voltage (Reverse Blocking) (Note 11)	BV <sub>ECX</sub>	6	7	-	V	I <sub>E</sub> = 100μA, R <sub>BC</sub> < 1kΩ or 0.25V > V <sub>BC</sub> > -0.25V
Emitter-Collector Breakdown Voltage	BV <sub>ECO</sub>	6	8.4	-	V	I <sub>E</sub> = 100μA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7	8	-	V	I <sub>E</sub> = 100μA
Collector Cut-off Current	I <sub>CBO</sub>	-	<1	50 20	nA	V <sub>CB</sub> = 136V V <sub>CB</sub> = 136V, T <sub>A</sub> = +100°C
Collector Emitter Cut-off Current	I <sub>CEX</sub>	-	-	100	nA	V <sub>CE</sub> = 136V, R <sub>BE</sub> < 1kΩ or -1V < V <sub>BE</sub> < 0.25V
Emitter Cut-off Current	I <sub>EBO</sub>	-	<1	50	nA	V <sub>EB</sub> = 5.6V
Static Forward Current Transfer Ratio (Note 11)	h <sub>FE</sub>	100 50 -	200 85 20	300 -	-	I <sub>C</sub> = 10mA, V <sub>CE</sub> = 2V I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V I <sub>C</sub> = 3A, V <sub>CE</sub> = 2V
Collector-Emitter Saturation Voltage (Note 11)	V <sub>CE(sat)</sub>	- - - -	40 100 70 200	55 135 80 250	mV	I <sub>C</sub> = 0.5A, I <sub>B</sub> = 50mA I <sub>C</sub> = 0.5A, I <sub>B</sub> = 10mA I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA I <sub>C</sub> = 3A, I <sub>B</sub> = 300mA
Base-Emitter Saturation Voltage (Note 11)	V <sub>BE(sat)</sub>	-	940	1050	mV	I <sub>C</sub> = 3A, I <sub>B</sub> = 300mA
Base-Emitter Saturation Voltage (Note 11)	V <sub>BE(on)</sub>	-	890	1000	mV	I <sub>C</sub> = 3A, V <sub>CE</sub> = 2V
Transition Frequency	f <sub>T</sub>	-	160	-	MHz	I <sub>C</sub> = 100mA, V <sub>CE</sub> = 5V, f = 100MHz
Collector Output Capacitance	C <sub>obo</sub>	-	9.4	20	pF	V <sub>CB</sub> = 10V, f = 1MHz
Delay Time	t <sub>(d)</sub>	-	16	-	ns	V <sub>CC</sub> = 10V, I <sub>C</sub> = 0.5A, I <sub>B1</sub> = -I <sub>B2</sub> = 50mA
Rise Time	t <sub>(r)</sub>	-	55	-	ns	
Storage Time	t <sub>(s)</sub>	-	677	-	ns	
Fall Time	t <sub>(f)</sub>	-	95	-	ns	

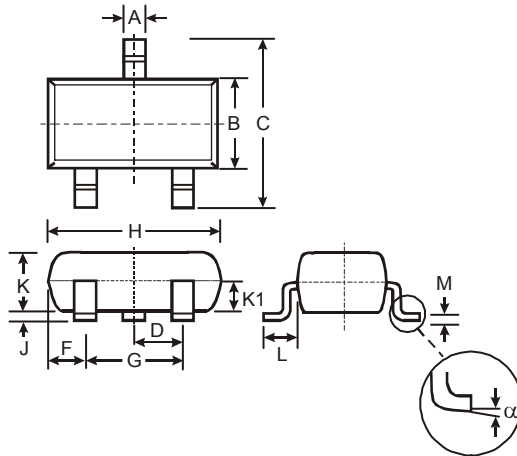
Notes: 11. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

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



## Package Outline Dimensions

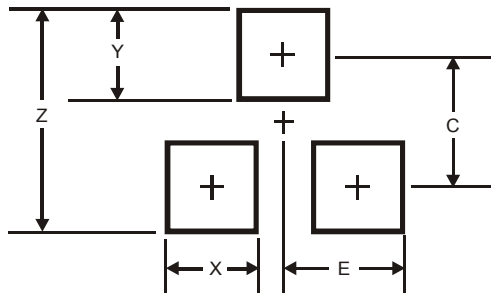
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	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)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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