

## **Excellent Integrated System Limited**

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[Diodes Incorporated](#)

[ZXTN2031FTA](#)

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## Features

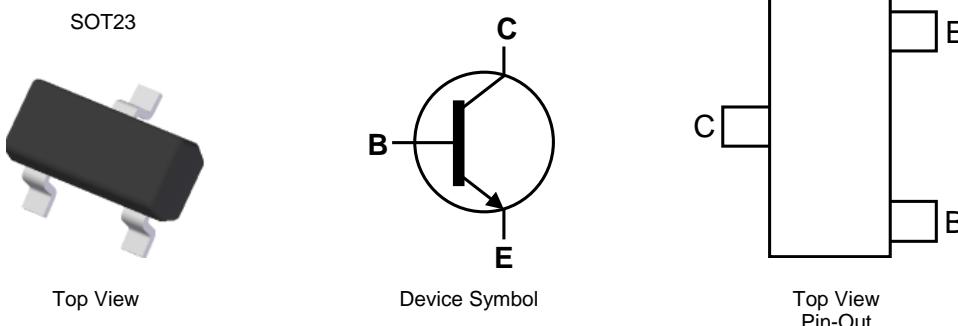
- $BV_{CEO} > 50V$
- $BV_{CEV} > 80V$  Forward Blocking Voltage
- $I_C = 5A$  high Continuous Collector Current
- $I_{CM} = 12A$  Peak Collector Current
- Low Saturation Voltage,  $V_{CE(SAT)} < 40mV @1A$
- $R_{CE(SAT)} = 24m\Omega$  for a Low Equivalent On-Resistance
- Complementary PNP Type: ZXTP2025F
- **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

- MOSFET and IGBT Gate Driving
- Motor Drive
- Relay Lamp and Solenoid Drive
- DC-DC Converters



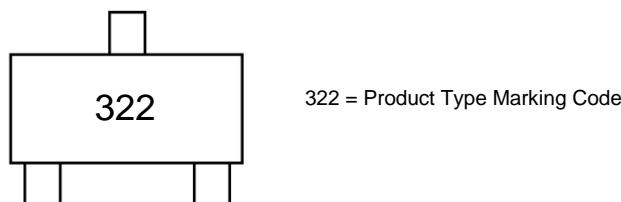
## Ordering Information (Note 4)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN2031FTA	AEC-Q101	322	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



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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	80	V
Collector-Emitter Voltage	V <sub>CEV</sub>	80	V
Collector-Emitter Voltage	V <sub>CEO</sub>	50	V
Emitter-Base Voltage	V <sub>EBO</sub>	7	V
Continuous Collector Current	I <sub>C</sub>	5	A
Peak Pulse Current	I <sub>CM</sub>	12	A
Base Current	I <sub>B</sub>	1.2	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>	1.0	W mW/°C
		8.0	
		1.2	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	9.6	°C/W
		1.56	
		12.5	
Thermal Resistance, Junction to Lead	R <sub>θJL</sub>	125	°C/W
		104	
		80	
Operating and Storage Temperature Range	T <sub>J, T<sub>STG</sub></sub>	-55 to +150	°C

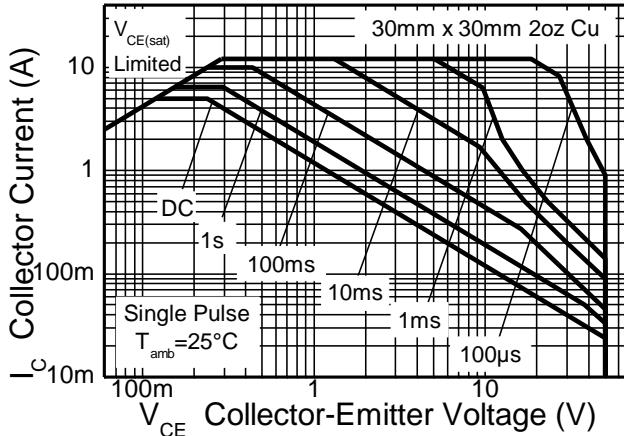
### ESD Ratings (Note 9)

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

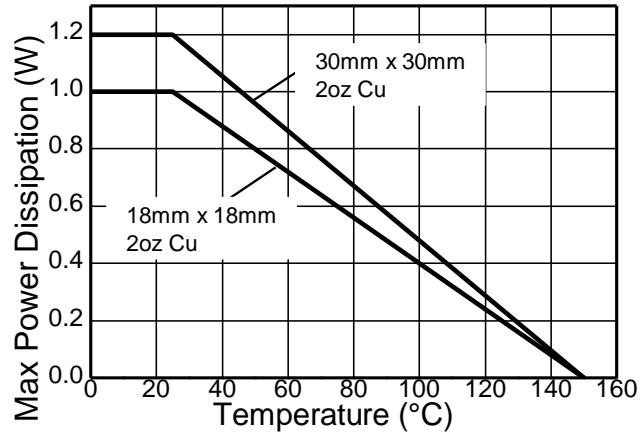
Notes:

5. For a device mounted with the collector lead on 18mm x 18mm 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady-state.
6. Same as note (5), except the device is mounted on 30mm x 30mm 2oz copper.
7. Same as note (6), except measured at t < 5 seconds.
8. Thermal resistance from junction to solder-point (at the end of the collector lead).
9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

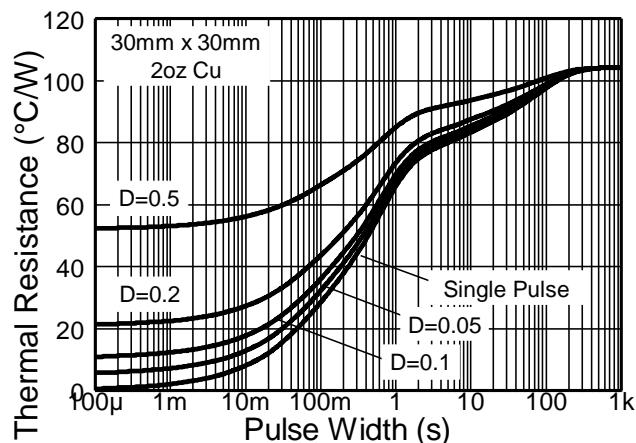
## Thermal Characteristics and Derating information



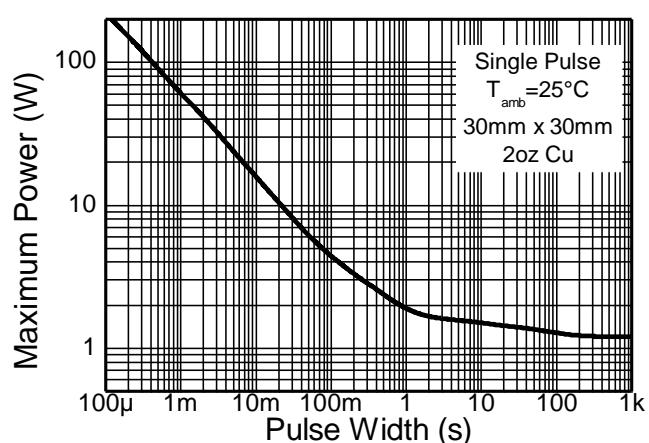
**Safe Operating Area**



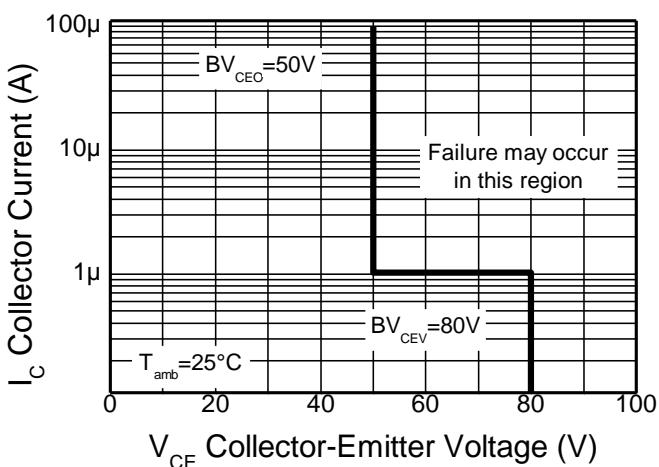
**Derating Curve**



**Transient Thermal Impedance**



**Pulse Power Dissipation**



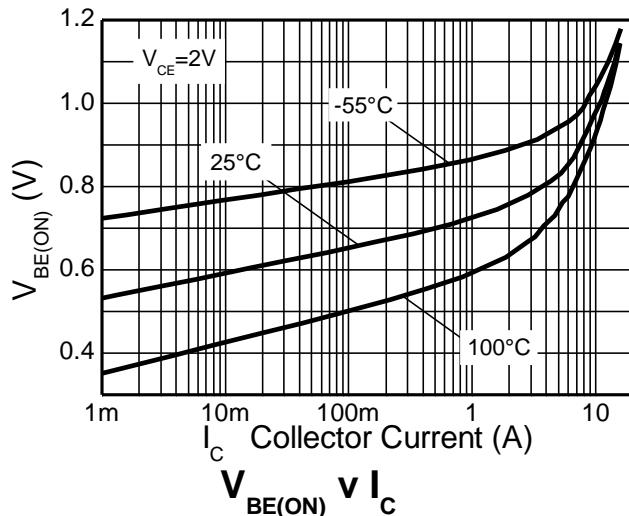
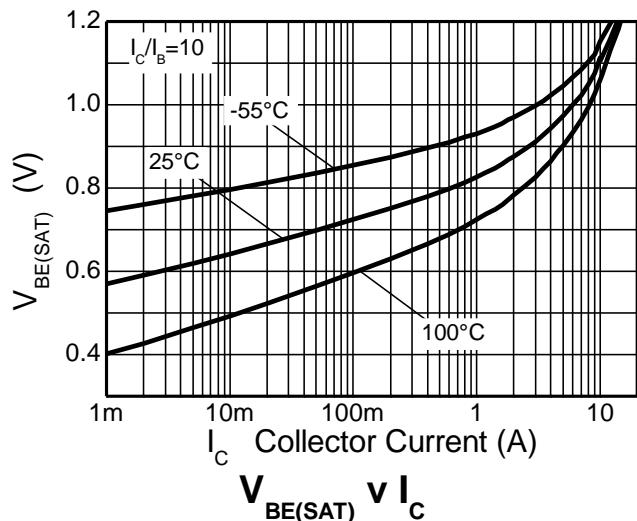
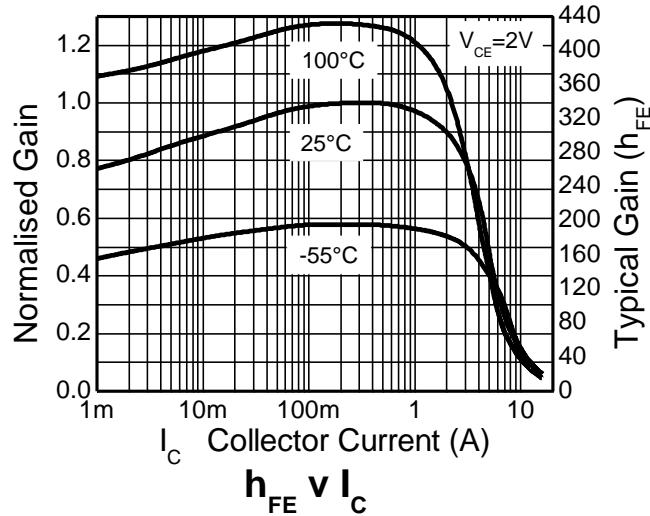
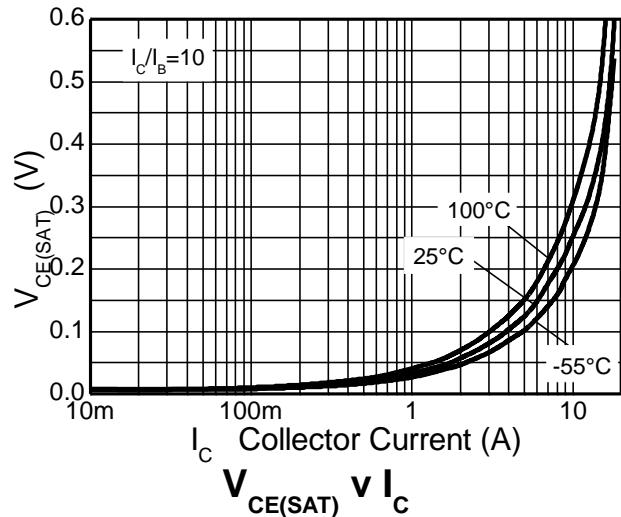
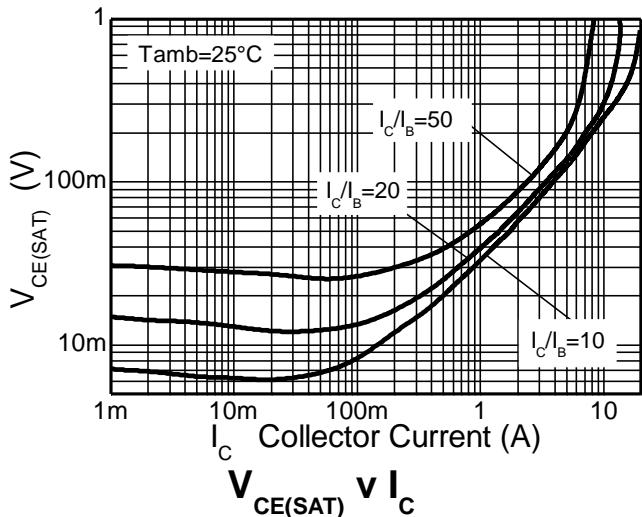
**Safe Operating Area**

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$\text{BV}_{\text{CBO}}$	80	175	-	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$\text{BV}_{\text{CEV}}$	80	175	-	V	$I_C = 1\mu\text{A}, -1\text{V} < V_{\text{BE}} < +0.3\text{V}$
Collector-Emitter Breakdown Voltage (Note 10)	$\text{BV}_{\text{CEO}}$	50	75	-	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	$\text{BV}_{\text{EBO}}$	7	8.3	-	V	$I_E = 100\mu\text{A}$
Collector – Emitter Cut-Off Current	$I_{\text{CEV}}$	-	<1	20	nA	$V_{\text{CE}} = 60\text{V}, V_{\text{BE}} = -1\text{V}$
Collector - Base Cut-Off Current	$I_{\text{CBO}}$	-	<1	20	nA	$V_{\text{CB}} = 60\text{V}$
Emitter Cut-off Current	$I_{\text{EBO}}$	-	<1	10	nA	$V_{\text{EB}} = 6\text{V}$
Static Forward Current Transfer Ratio (Note 10)	$\text{h}_{\text{FE}}$	190 200 200 80	300 350 340 125	560	-	$I_C = 10\text{mA}, V_{\text{CE}} = 2\text{V}$ $I_C = 500\text{mA}, V_{\text{CE}} = 2\text{V}$ $I_C = 2\text{A}, V_{\text{CE}} = 2\text{V}$ $I_C = 5\text{A}, V_{\text{CE}} = 2\text{V}$
Collector-Emitter Saturation Voltage (Note 10)	$V_{\text{CE}(\text{sat})}$	- - - -	13 30 80 135	18 40 110 170	mV	$I_C = 100\text{mA}, I_B = 5\text{mA}$ $I_C = 1\text{A}, I_B = 100\text{mA}$ $I_C = 2\text{A}, I_B = 40\text{mA}$ $I_C = 5\text{A}, I_B = 250\text{mA}$
Base-Emitter Saturation Voltage (Note 10)	$V_{\text{BE}(\text{sat})}$	- -	800 920	900 1000	mV	$I_C = 2\text{A}, I_B = 40\text{mA}$ $I_C = 5\text{A}, I_B = 250\text{mA}$
Base-Emitter Turn-On Voltage (Note 10)	$V_{\text{BE}(\text{on})}$	-	830	930	mV	$I_C = 5\text{A}, V_{\text{CE}} = 2\text{V}$
Transition Frequency	$f_T$	-	125	-	MHz	$I_C = 500\text{mA}, V_{\text{CE}} = 10\text{V}, f=50\text{MHz}$
Output Capacitance	$C_{\text{obo}}$	-	29	-	pF	$V_{\text{CB}} = 10\text{V}, f=1\text{MHz}$
Delay Time	$t_{(\text{d})}$	-	16	-	ns	$V_{\text{CC}} = 12\text{V}, I_C = 2.5\text{A}, I_{\text{B1}} = - I_{\text{B1}} = 125\text{mA}$
Rise Time	$t_{(\text{r})}$	-	27	-	ns	
Storage Time	$t_{(\text{sig})}$	-	468	-	ns	
Fall Time	$t_{(\text{f})}$	-	44	-	ns	

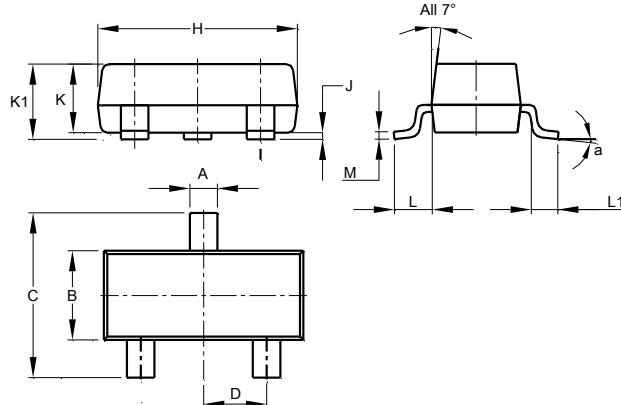
Note: 10. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$

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



## Package Outline Dimensions

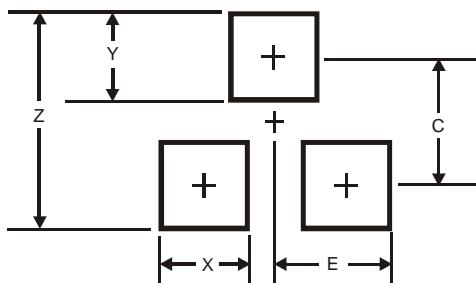
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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>	0.890	1.00	0.975
<b>K1</b>	0.903	1.10	1.025
<b>L</b>	0.45	0.61	0.55
<b>L1</b>	0.25	0.55	0.40
<b>M</b>	0.085	0.150	0.110
<b>a</b>	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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