ZXTN2031F

50V NPN MEDIUM POWER TRANSISTOR IN SOT23

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
- $R_{CE(SAT)}$ = 24mΩ 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**

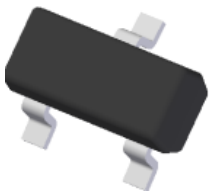
Mechanical Data

- 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)

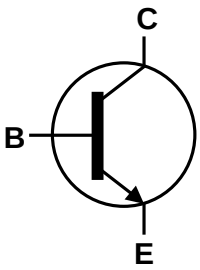
Applications

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

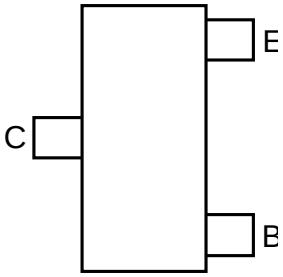
SOT23



Top View



Device Symbol



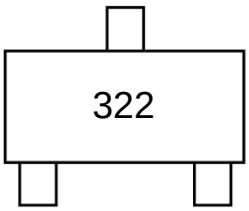
Top View
Pin-Out

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 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



322 = Product Type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	80	V
Collector-Emitter Voltage	V_{CEV}	80	V
Collector-Emitter Voltage	V_{CEO}	50	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	5	A
Peak Pulse Current	I_{CM}	12	A
Base Current	I_B	1.2	A

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

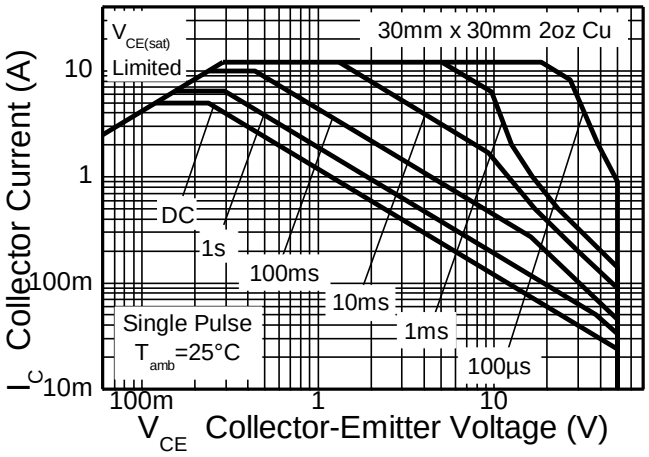
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 5)	P_D	1.0 8.0	W mW/°C
	(Note 6)		1.2 9.6	
	(Note 7)		1.56 12.5	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	125	°C/W
	(Note 6)		104	
	(Note 7)		80	
Thermal Resistance, Junction to Lead	(Note 8)	$R_{\theta JL}$	57	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 9)

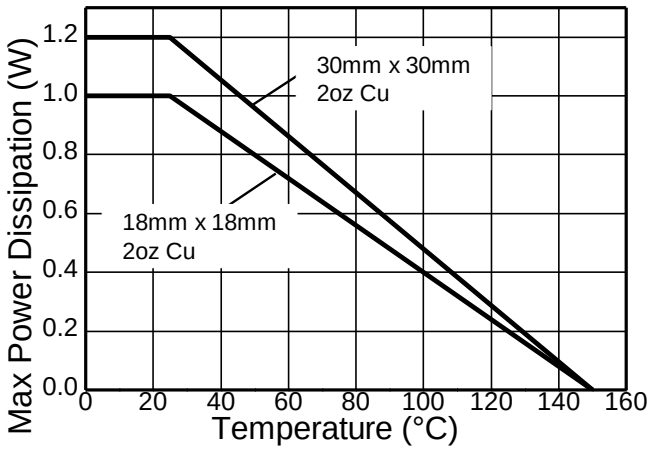
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

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.

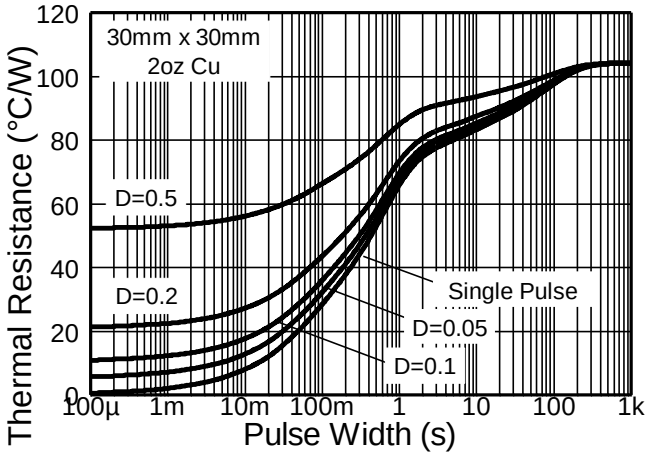
Thermal Characteristics and Derating information



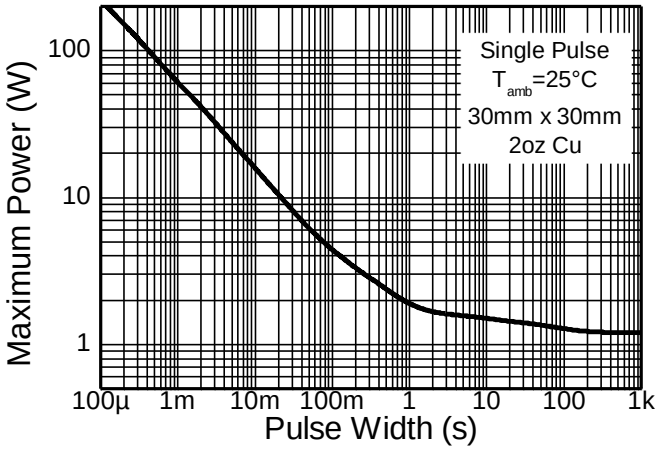
Safe Operating Area



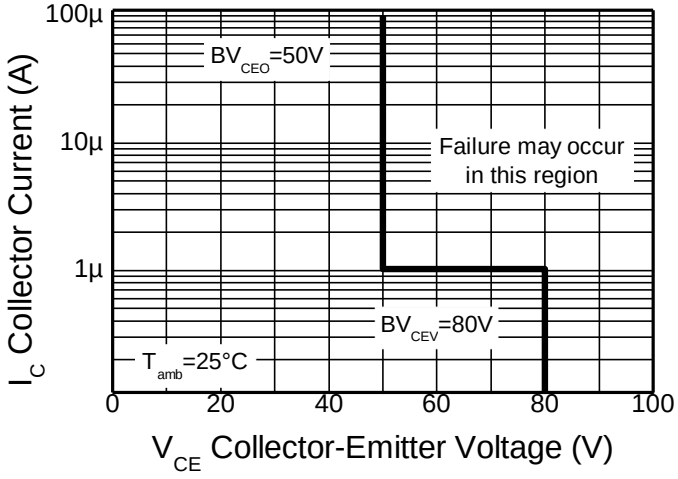
Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation



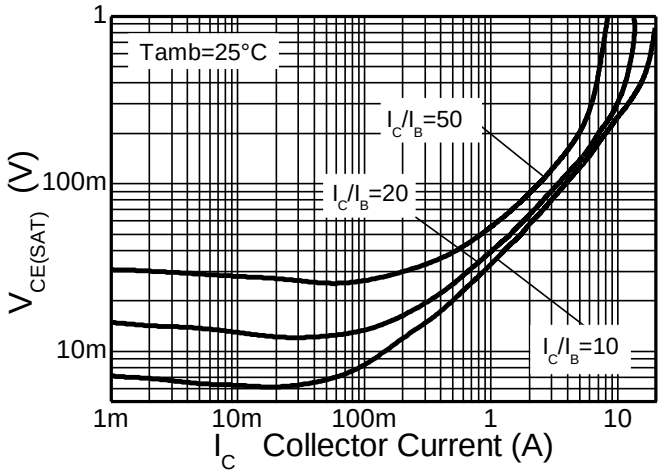
Safe Operating Area

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

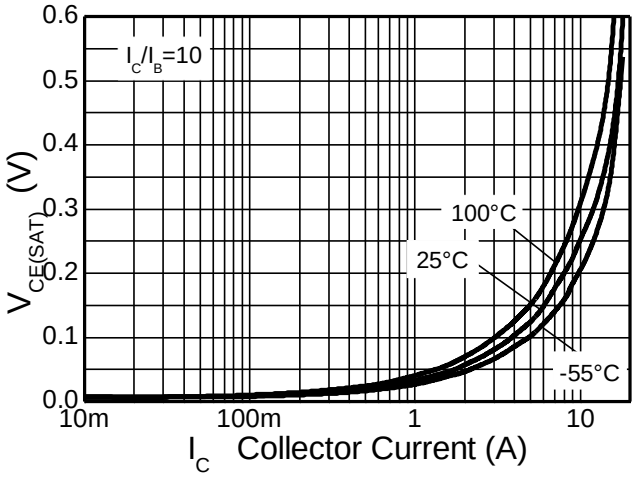
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	80	175	-	V	I_C = 100µA
Collector-Emitter Breakdown Voltage	BV_{CEV}	80	175	-	V	I_C = 1µA, -1V < V_{BE} < +0.3V
Collector-Emitter Breakdown Voltage (Note 10)	BV_{CEO}	50	75	-	V	I_C = 10mA
Emitter-Base Breakdown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

Note: 10. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%

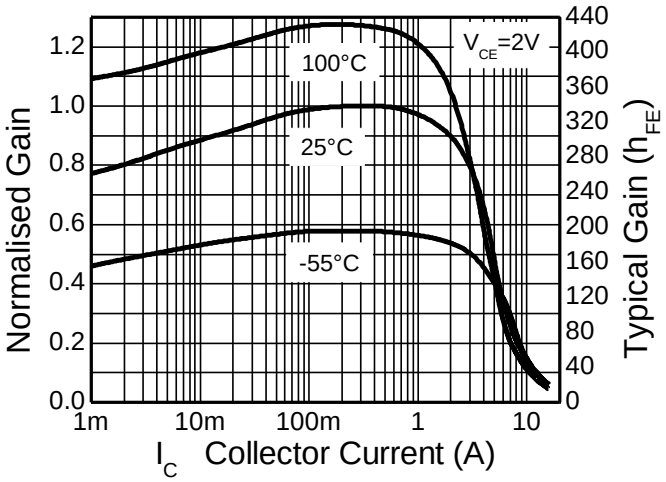
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



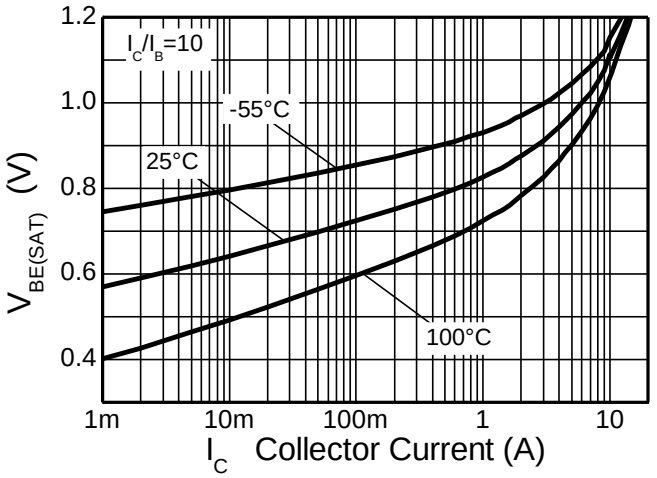
$V_{CE(SAT)}$ v I_C



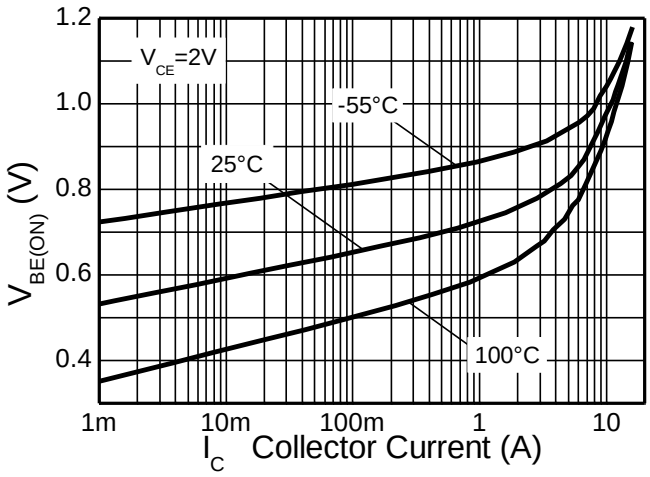
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



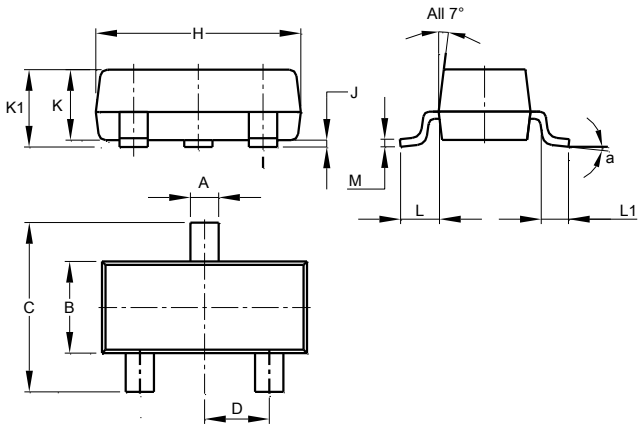
$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

Package Outline Dimensions

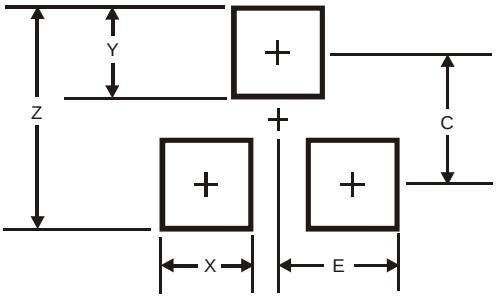
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



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

IMPORTANT NOTICE

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes Incorporated.

LIFE SUPPORT

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body, or

2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

www.diodes.com