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**

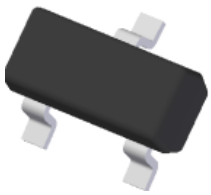
Mechanical Data

- 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)

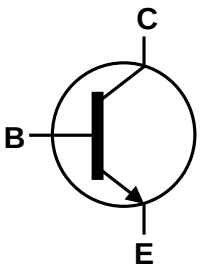
Applications

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

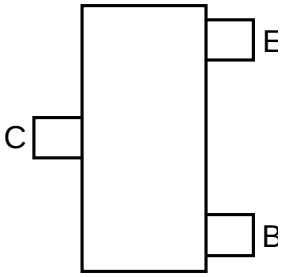
SOT23



Top View



Device Symbol



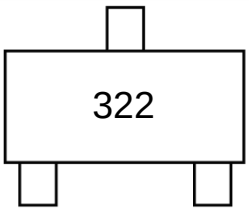
Top View
Pin-Out

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.)

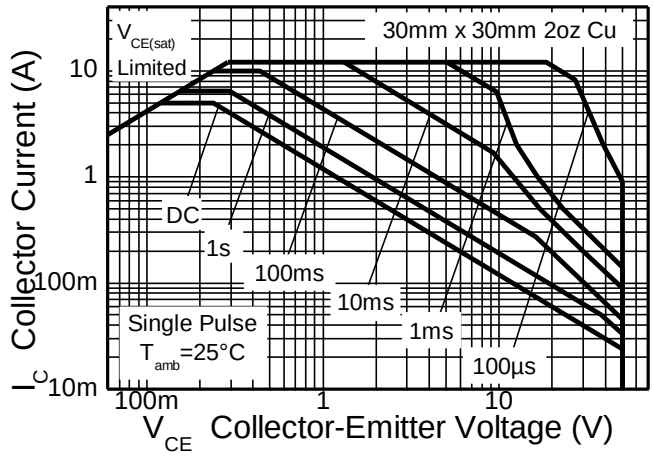
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 5)	P_D	1.0 8.0	W mW/°C
	(Note 6)		1.2 9.6	
	(Note 7)		1.56 12.5	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	125	°C/W
	(Note 6)		104	
	(Note 7)		80	
Thermal Resistance, Junction to Lead	(Note 8)	$R_{\theta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

ESD Ratings (Note 9)

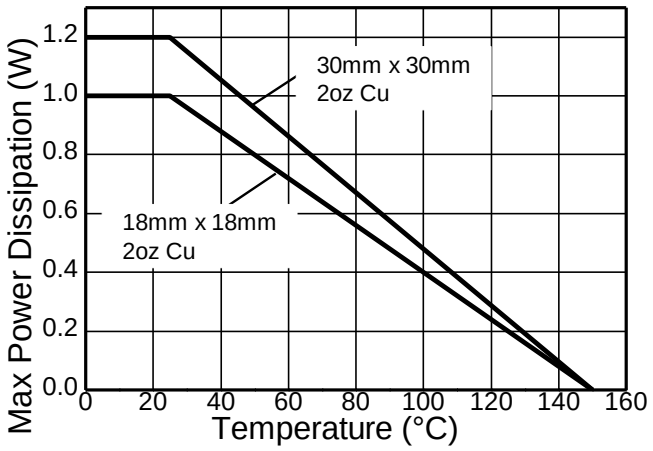
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

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.

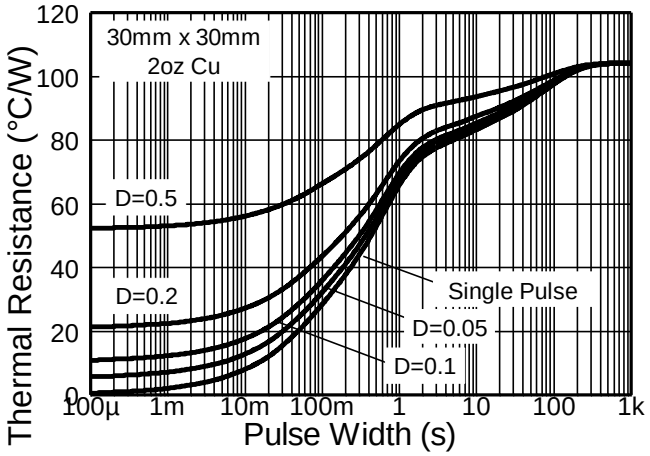
Thermal Characteristics and Derating information



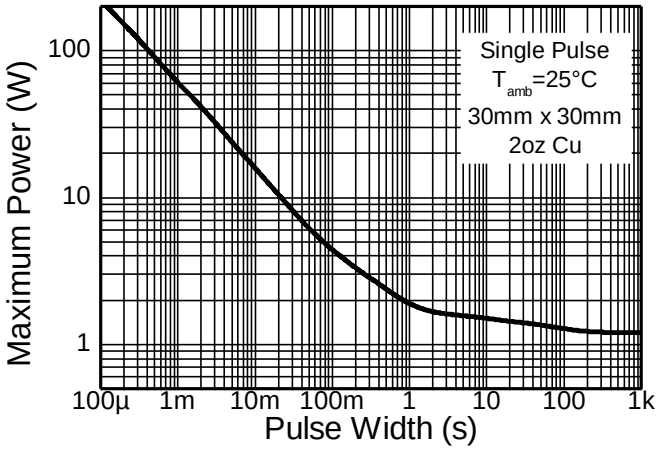
Safe Operating Area



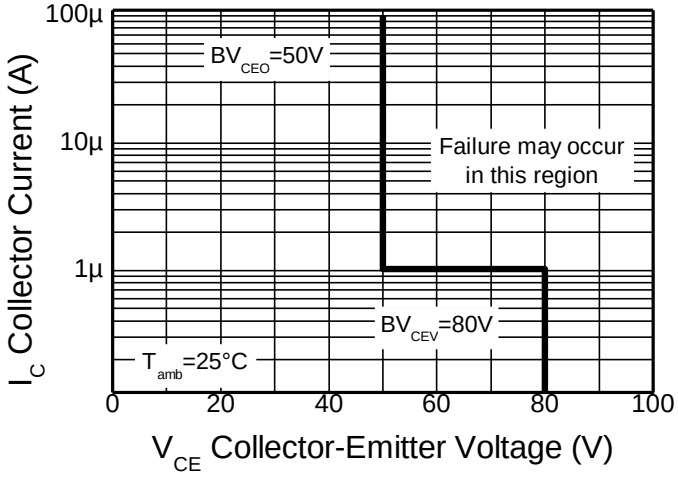
Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation



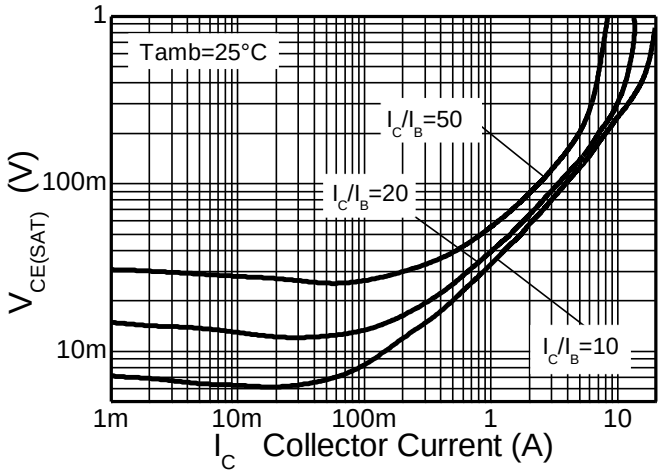
Safe Operating Area

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

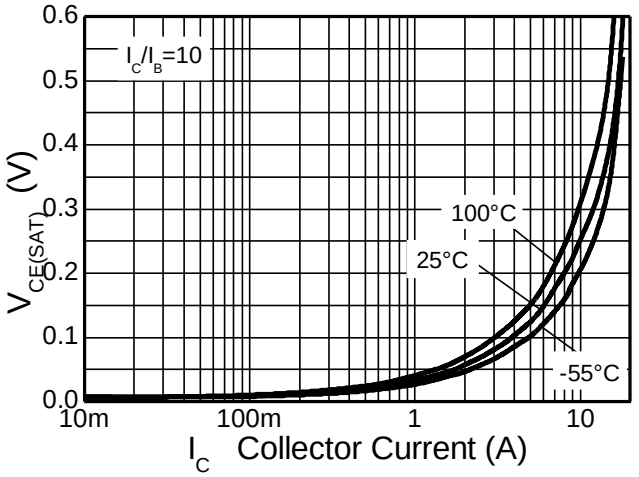
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	80	175	-	V	I_C = 100µA
Collector-Emitter Breakdown Voltage	BV_{CEV}	80	175	-	V	I_C = 1µA, -1V < V_{BE} < +0.3V
Collector-Emitter Breakdown Voltage (Note 10)	BV_{CEO}	50	75	-	V	I_C = 10mA
Emitter-Base Breakdown 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%

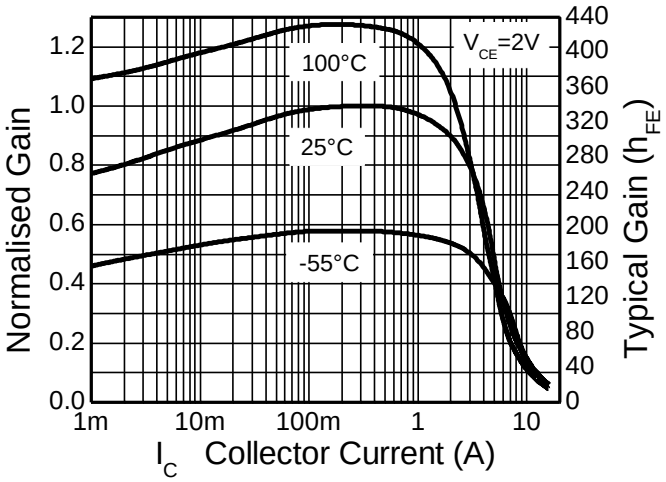
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



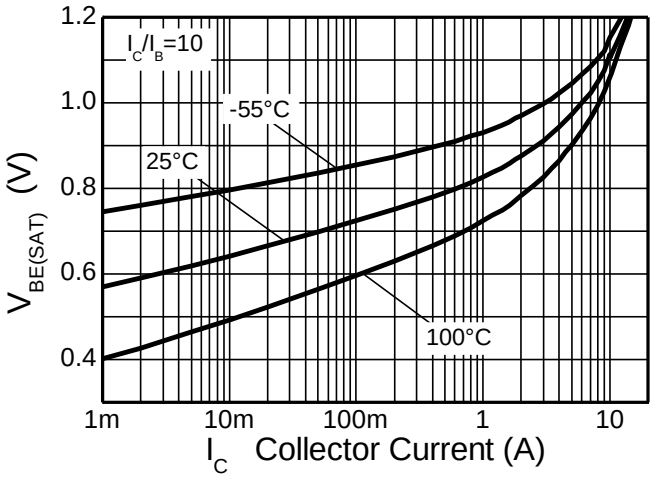
$V_{CE(SAT)}$ v I_C



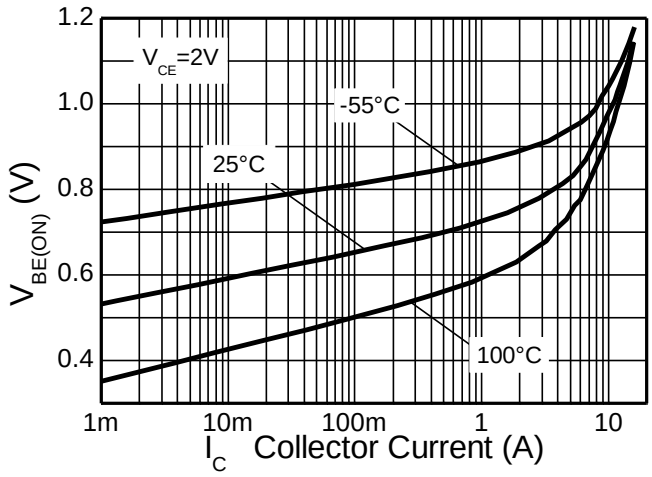
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



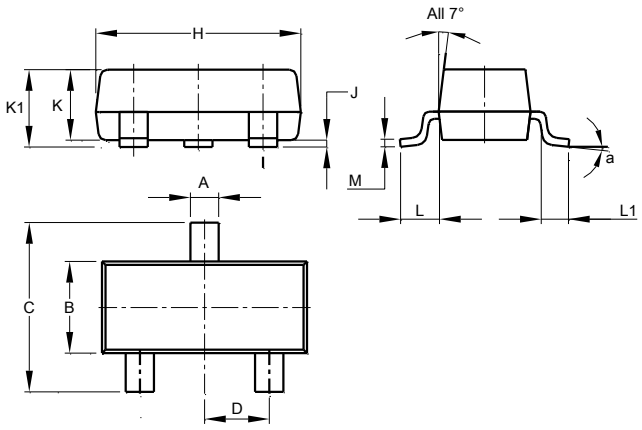
$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

Package Outline Dimensions

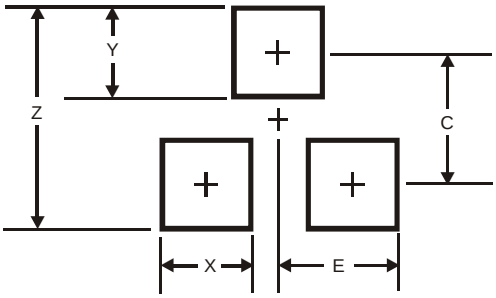
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



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

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  Email amall@ameya360.com

  QQ 800077892

  Skype ameyasales1 ameyasales2

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  Email service@ameya360.com

- ### Partnership :

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  Email mkt@ameya360.com