

ZXTN2031F

50V, SOT23, NPN medium power transistor

Summary

$V_{(BR)CEV} > 80V$, $V_{(BR)CEO} > 50V$

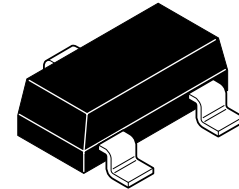
$I_{C(cont)} = 5A$

$R_{CE(sat)} = 24m\Omega$ typical

$V_{CE(sat)} < 40mV @ 1A$

$P_D = 1.2W$

Complementary part number: ZXTP2025F



Description

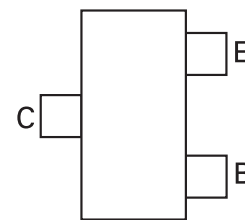
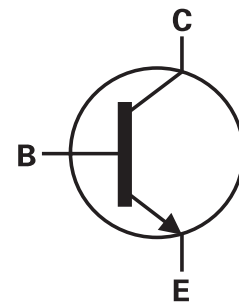
Advanced process capability and package design have been used to maximize the power handling and performance of this small outline transistor. The compact size and ratings of this device make it ideally suited to applications where space is at a premium.

Feature

- Higher power dissipation SOT23 Package
- High peak current
- Low saturation voltage
- High gain
- 80V forward blocking voltage

Applications

- MOSFET and IGBT gate driving
- Motor drive
- Relay, lamp and solenoid drive
- DC-DC converters



Pinout - top view

Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN2031FTA	7	8	3,000

Device marking

322

ZXTN2031F

Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	V_{CBO}	80	V
Collector-emitter voltage	$V_{(BR)CEV}$	80	V
Collector-emitter voltage	V_{CEO}	50	V
Emitter-base voltage	V_{EBO}	7.0	V
Peak pulse current	I_{CM}	12	A
Continuous collector current ^(a)	I_C	5	A
Base current	I_B	1.2	A
Power dissipation @ $T_A=25^{\circ}C$ ^(a) Linear derating factor	P_D	1.0 8.0	W mW/°C
Power dissipation @ $T_A=25^{\circ}C$ ^(b) Linear derating factor	P_D	1.2 9.6	W mW/°C
Power dissipation @ $T_A=25^{\circ}C$ ^(c) Linear derating factor	P_D	1.56 12.5	W mW/°C
Operating and storage temperature	$T_j; T_{stg}$	-55 to +150	°C

Thermal resistance

Parameter	Symbol	Value	Unit
Junction to ambient ^(a)	$R\theta_{JA}$	125	°C/W
Junction to ambient ^(b)	$R\theta_{JA}$	104	°C/W
Junction to ambient ^(c)	$R\theta_{JA}$	80	°C/W

NOTES:

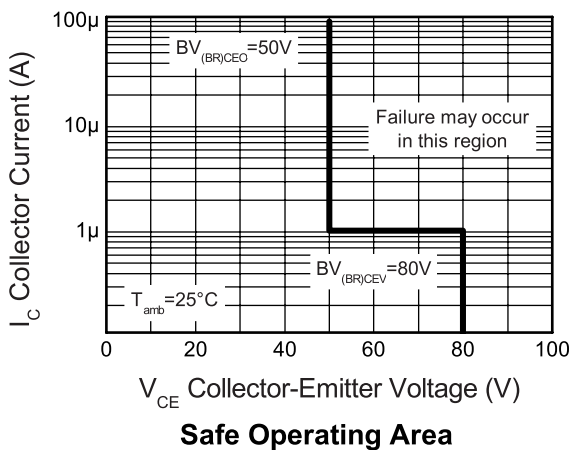
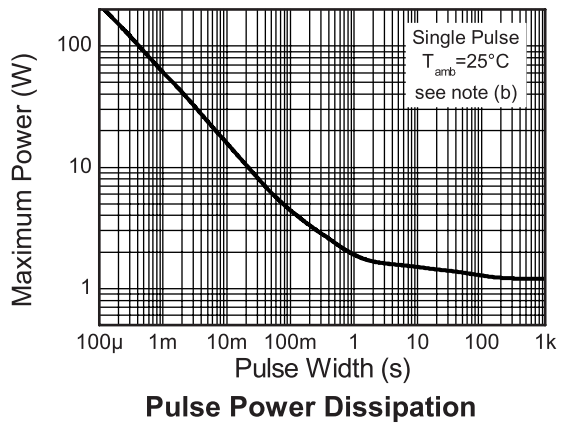
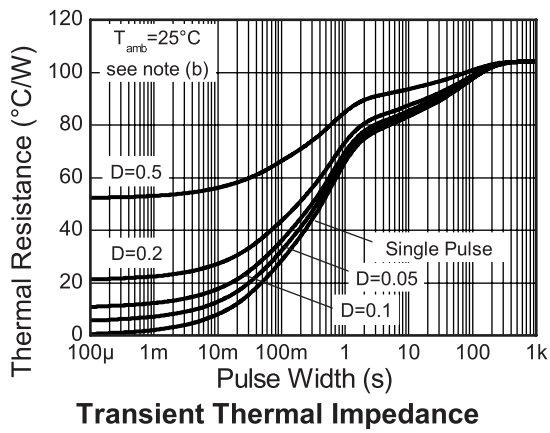
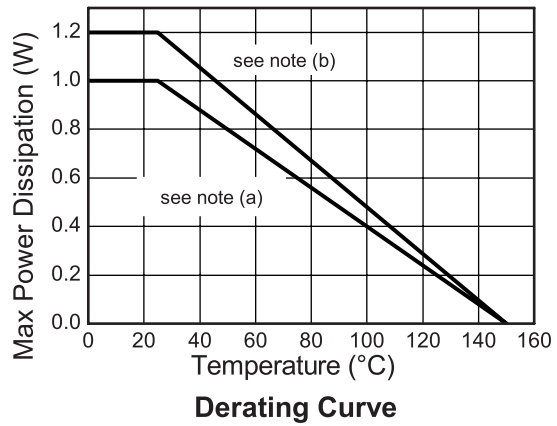
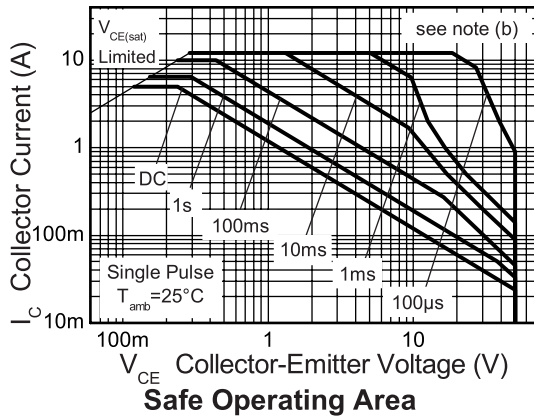
(a) Mounted on 18mm x 18mm x 1.6mm FR4 PCB with a very high coverage of 2 oz weight copper in still air conditions.

(b) Mounted on 30mm x 30mm x 1.6mm FR4 PCB with a very high coverage of 2 oz weight copper in still air conditions.

(c) As (b) above measured at $t < 5$ secs.

ZXTN2031F

Characteristics



ZXTN2031F

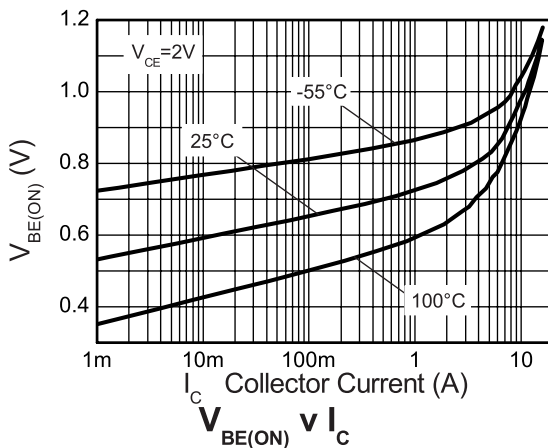
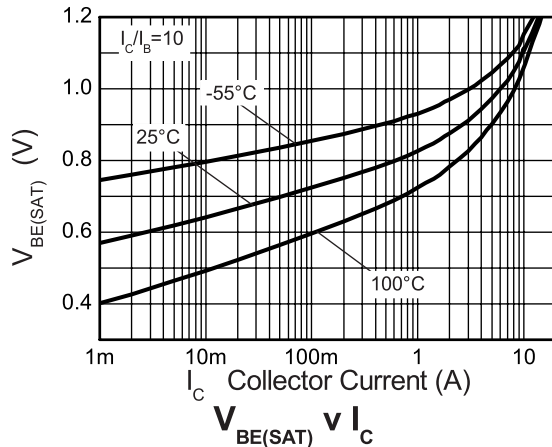
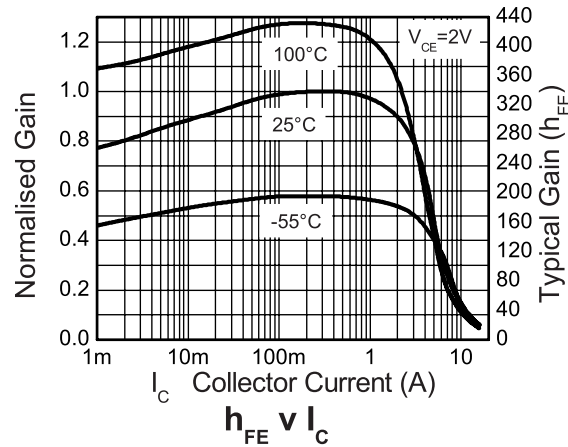
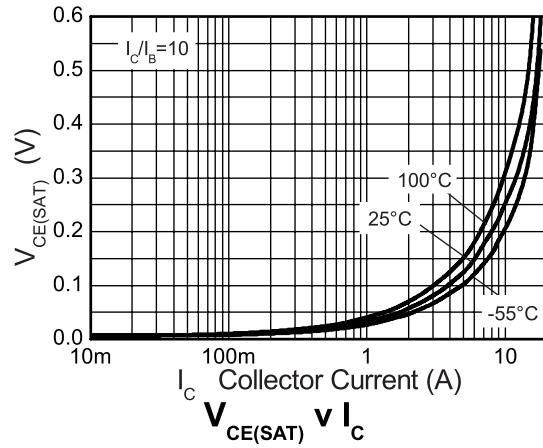
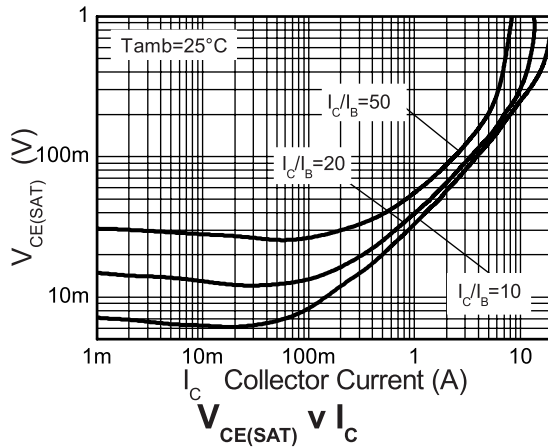
Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$V_{(BR)CBO}$	80	175		V	$I_C = 100\mu\text{A}$
Collector-emitter breakdown voltage	$V_{(BR)CEV}$	80	175		V	$I_C = 1\mu\text{A}$, $-1\text{V} < V_{BE} < +0.3\text{V}$
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	50	75		V	$I_C = 10\text{mA}^{(a)}$
Emitter-base breakdown voltage	$V_{(BR)EBO}$	7.0	8.3		V	$I_E = 100\mu\text{A}$
Collector-emitter cut-off current	I_{CEV}		<1	20	nA	$V_{CE} = 60\text{V}$, $V_{BE} = -1\text{V}$
Collector-base cut-off current	I_{CBO}		<1	20	nA	$V_{CB} = 60\text{V}$
Emitter-base cut-off current	I_{EBO}		<1	10	nA	$V_{EB} = 6\text{V}$
Static forward current transfer ratio	H_{FE}	190 200 200 80	300 350 340 125	560		$I_C = 10\text{mA}$, $V_{CE} = 2\text{V}^{(a)}$ $I_C = 500\text{mA}$, $V_{CE} = 2\text{V}^{(a)}$ $I_C = 2\text{A}$, $V_{CE} = 2\text{V}^{(a)}$ $I_C = 5\text{A}$, $V_{CE} = 2\text{V}^{(a)}$
Collector-emitter saturation voltage	$V_{CE(sat)}$		13 30 80 135	18 40 110 170	mV mV mV mV	$I_C = 0.1\text{A}$, $I_B = 5\text{mA}^{(a)}$ $I_C = 1\text{A}$, $I_B = 100\text{mA}^{(a)}$ $I_C = 2\text{A}$, $I_B = 40\text{mA}^{(a)}$ $I_C = 5\text{A}$, $I_B = 250\text{mA}^{(a)}$
Base-emitter saturation voltage	$V_{BE(sat)}$		0.80 0.92	0.90 1.00	V V	$I_C = 2\text{A}$, $I_B = 40\text{mA}^{(a)}$ $I_C = 5\text{A}$, $I_B = 250\text{mA}^{(a)}$
Base-emitter turn-on voltage	$V_{BE(on)}$		0.83	0.93	V	$I_C = 5\text{A}$, $V_{CE} = 2\text{V}^{(a)}$
Transition frequency	f_T		125		MHz	$I_C = 500\text{mA}$, $V_{CE} = 10\text{V}$, $f = 50\text{MHz}$
Output capacitance	C_{obo}		29		pF	$V_{CB} = 10\text{V}$, $f = 1\text{MHz}$
Delay time	$t_{(d)}$		16		ns	$V_{CC} = 12\text{V}$, $I_C = 2.5\text{A}$, $I_{B1} = I_{B2} = 125\text{mA}$
Rise time	$t_{(r)}$		27		ns	
Storage time	$t_{(stg)}$		468		ns	
Fall time	$t_{(f)}$		44		ns	

NOTES:

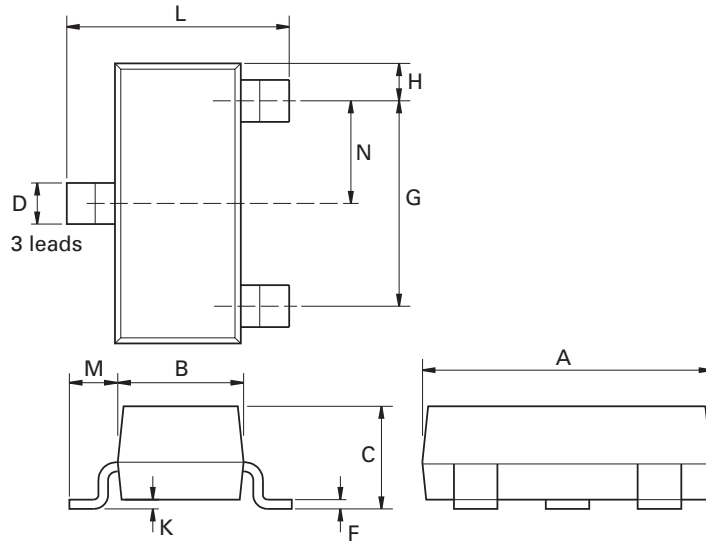
(a) Measured under pulsed conditions. Pulse width=300 μs . Duty cycle $\leq 2\%$.

Typical characteristics



ZXTN2031F

Packaging details - SOT23



Dim.	Millimeters		Inches		Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Max.	Max.
A	2.67	3.05	0.105	0.120	H	0.33	0.51	0.013	0.020
B	1.20	1.40	0.047	0.055	K	0.01	0.10	0.0004	0.004
C	-	1.10	-	0.043	L	2.10	2.50	0.083	0.0985
D	0.37	0.53	0.015	0.021	M	0.45	0.64	0.018	0.025
F	0.085	0.15	0.0034	0.0059	N	0.95 NOM		0.0375 NOM	
G	1.90 NOM		0.075 NOM		-	-	-	-	-

Note: Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

Europe	Americas	Asia Pacific	Corporate Headquarters
Zetex GmbH Streitfeldstraße 19 D-81673 München Germany	Zetex Inc 700 Veterans Memorial Highway Hauppauge, NY 11788 USA	Zetex (Asia Ltd) 3701-04 Metroplaza Tower 1 Hing Fong Road, Kwai Fong Hong Kong	Zetex Semiconductors plc Zetex Technology Park, Chadderton Oldham, OL9 9LL United Kingdom
Telefon: (49) 89 45 49 49 0 Fax: (49) 89 45 49 49 49 europe.sales@zetex.com	Telephone: (1) 631 360 2222 Fax: (1) 631 360 8222 usa.sales@zetex.com	Telephone: (852) 26100 611 Fax: (852) 24250 494 asia.sales@zetex.com	Telephone: (44) 161 622 4444 Fax: (44) 161 622 4446 hq@zetex.com

For international sales offices visit www.zetex.com/offices

Zetex products are distributed worldwide. For details, see www.zetex.com/salesnetwork

This publication is issued to provide outline information only which (unless agreed by the company in writing) may not be used, applied or reproduced for any purpose or form part of any order or contract or be regarded as a representation relating to the products or services concerned. The company reserves the right to alter without notice the specification, design, price or conditions of supply of any product or service.