

ZXTN2031F

50V, SOT23, NPN medium power transistor

Summary

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

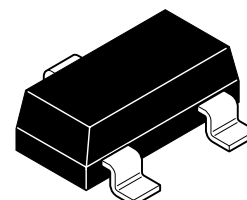
$I_{C(cont)} = 5A$

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

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

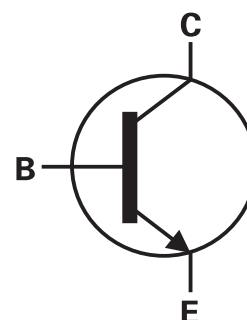
$P_D = 1.2W$

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.

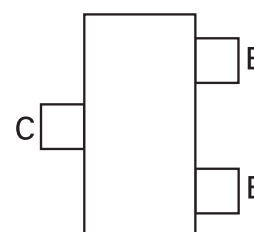


Feature

- 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

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/ $^{\circ}C$
Power dissipation @ $T_A=25^{\circ}C$ ^(b) Linear derating factor	P_D	1.2 9.6	W mW/ $^{\circ}C$
Power dissipation @ $T_A=25^{\circ}C$ ^(c) Linear derating factor	P_D	1.56 12.5	W mW/ $^{\circ}C$
Operating and storage temperature	$T_j:T_{stg}$	-55 to +150	$^{\circ}C$

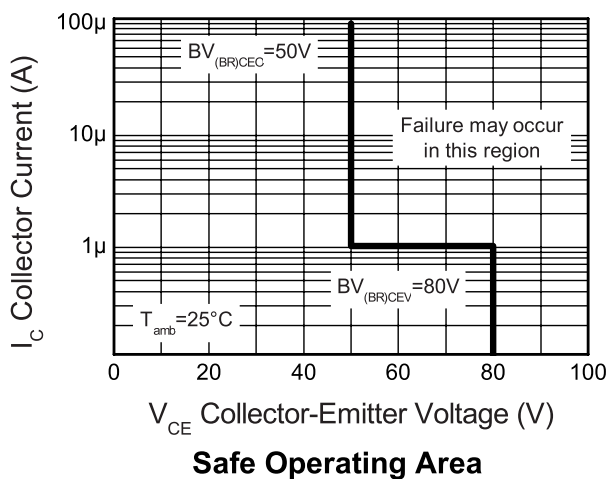
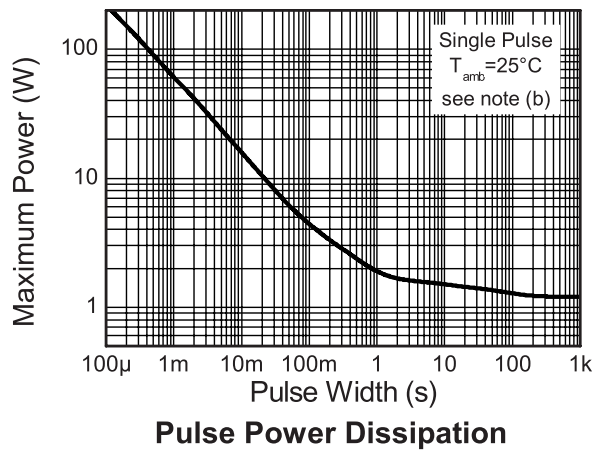
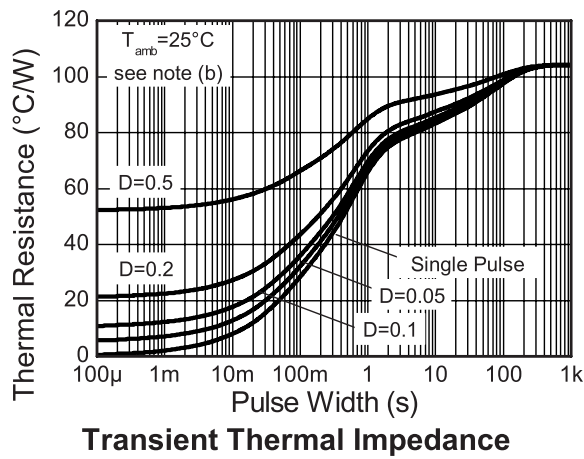
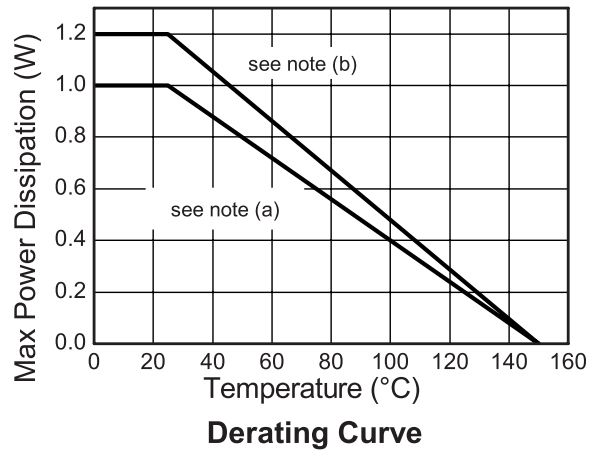
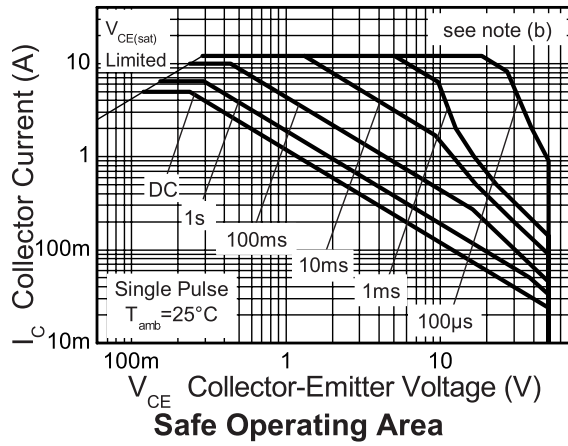
Thermal resistance

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

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.

Characteristics



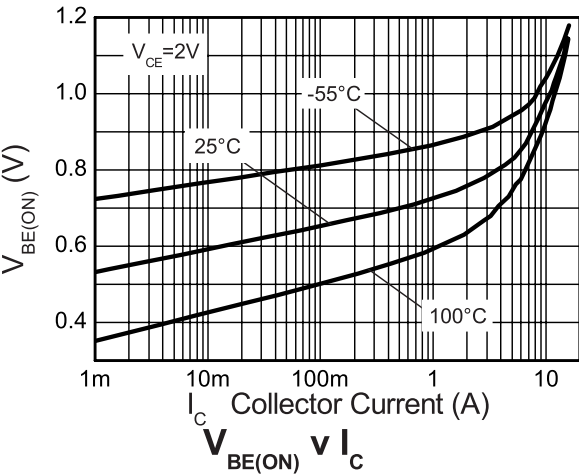
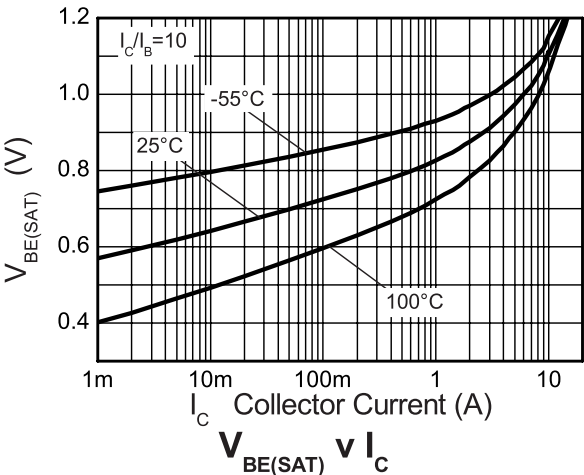
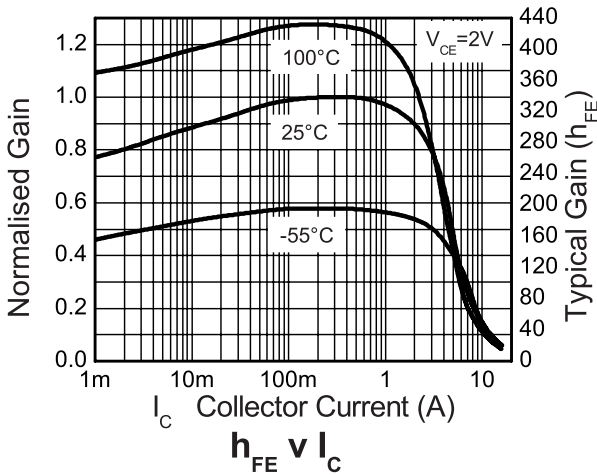
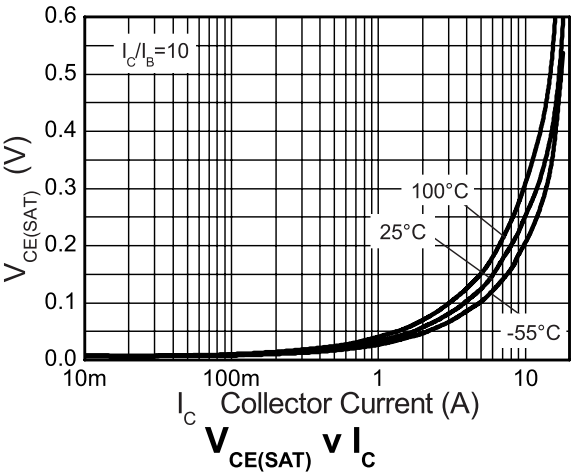
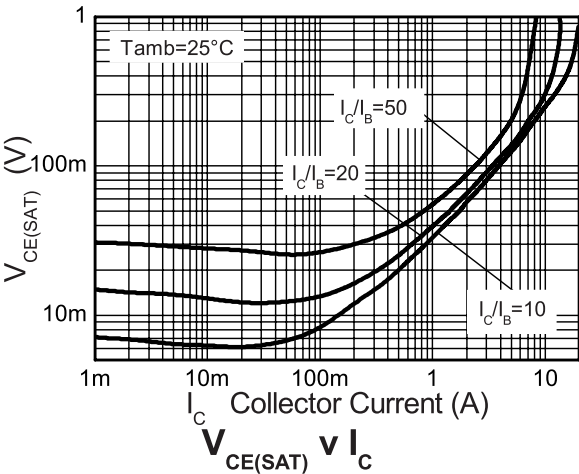
Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

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:

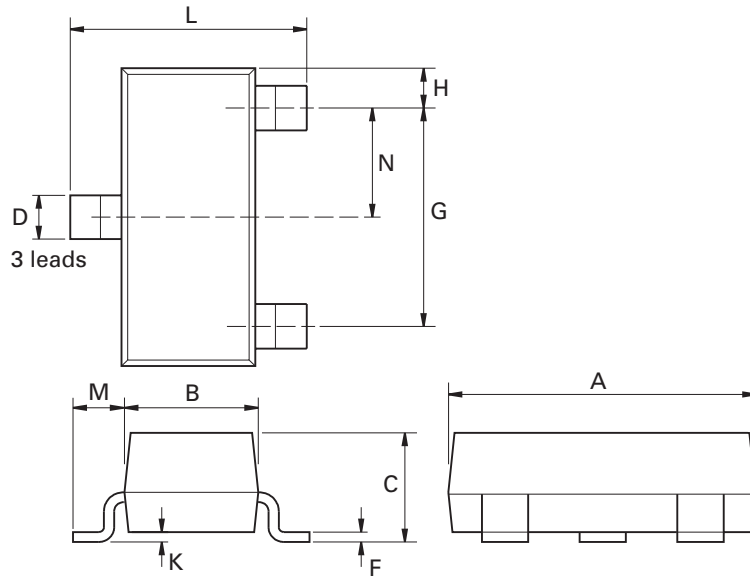
(a) Measured under pulsed conditions. Pulse width=300 μs . Duty cycle $\leq 2\%$.

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

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