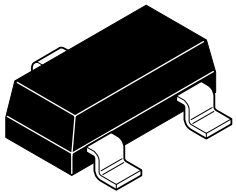
ZXTN2031F
50V, SOT23, NPN medium power transistor

Summary



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

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

$R_{CE(sat)}$ = 24mΩ typical

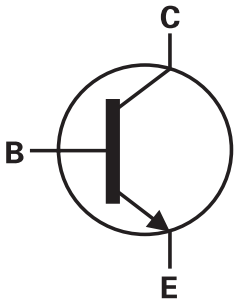
$V_{CE(sat)}$ < 40mV @ 1A

P_D = 1.2W

Complementary part number: ZXTP2025F

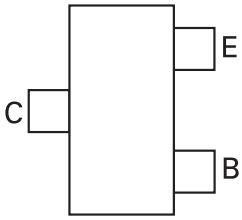
Description

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



Pinout - top view

Applications

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

Ordering information

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

Device marking

322

Absolute maximum ratings

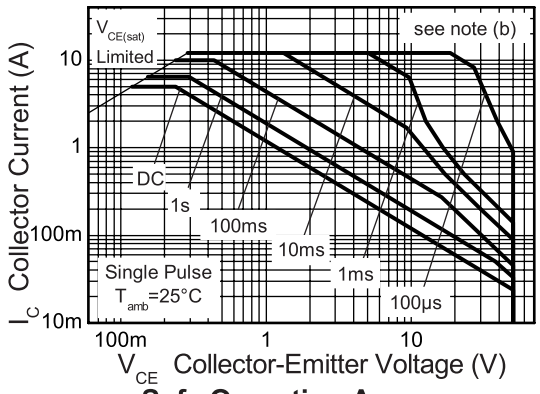
Parameter	Symbol	Limit	Unit
Collector-base voltage	V_{CBO}	80	V
Collector-emitter voltage	$V_{(BR)CEV}$	80	V
Collector-emitter voltage	V_{CEO}	50	V
Emitter-base voltage	V_{EBO}	7.0	V
Peak pulse current	I_{CM}	12	A
Continuous collector current (a)	I_C	5	A
Base current	I_B	1.2	A
Power dissipation @ T_A=25°C (a) Linear derating factor	P_D	1.0 8.0	W mW/°C
Power dissipation @ T_A=25°C (b) Linear derating factor	P_D	1.2 9.6	W mW/°C
Power dissipation @ T_A=25°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

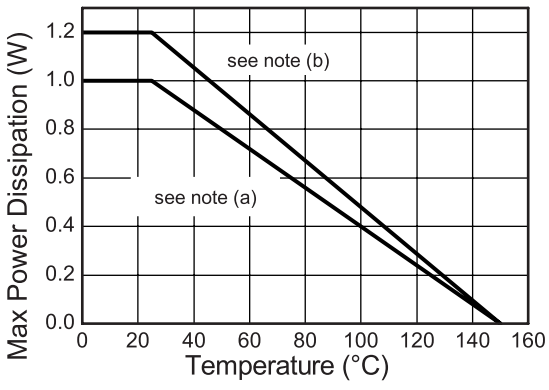
Parameter	Symbol	Value	Unit
Junction to ambient (a)	$R\theta_{JA}$	125	°C/W
Junction to ambient (b)	$R\theta_{JA}$	104	°C/W
Junction to ambient (c)	$R\theta_{JA}$	80	°C/W

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<5secs.

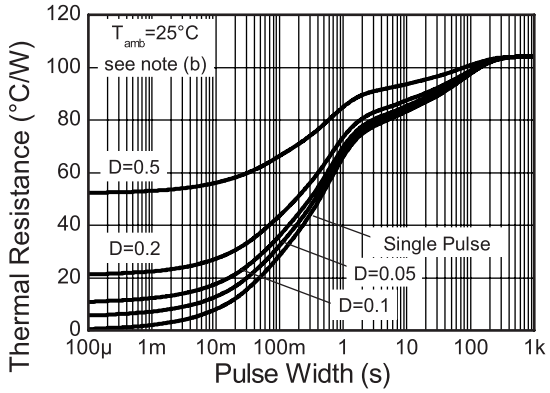
Characteristics



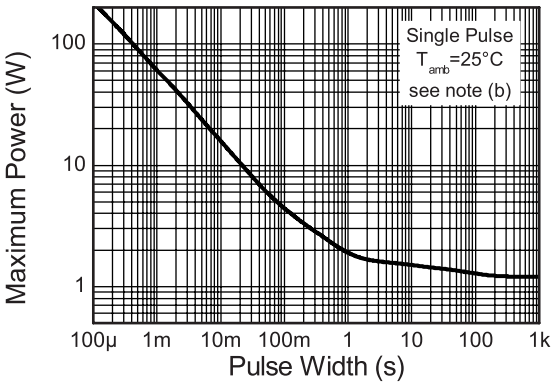
Safe Operating Area



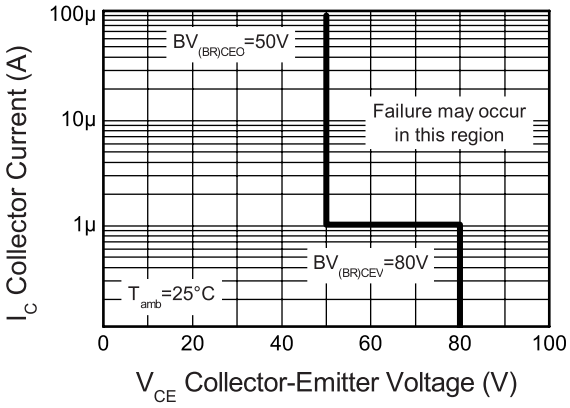
Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation



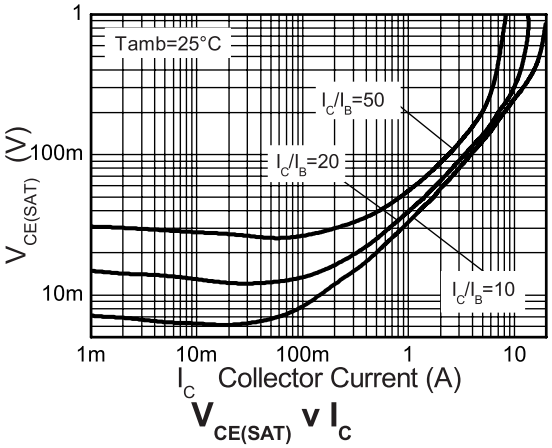
Safe Operating Area

Electrical characteristics (at T_{amb} = 25°C unless otherwise stated)

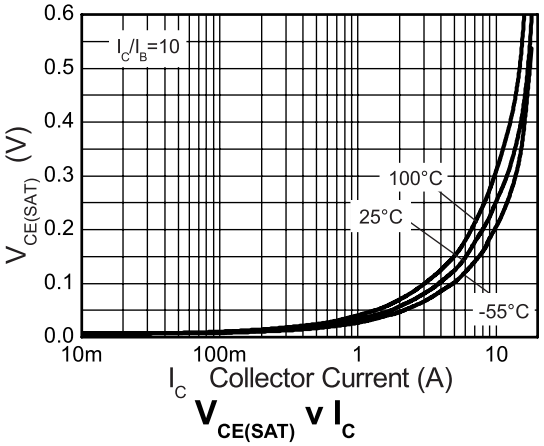
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$V_{(BR)CBO}$	80	175		V	I_C=100μA
Collector-emitter breakdown voltage	$V_{(BR)CEV}$	80	175		V	I_C =1μA, -1V< V_{BE}<+0.3V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	50	75		V	I_C=10mA [(a)]
Emitter-base breakdown voltage	$V_{(BR)EBO}$	7.0	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-base cut-off current	I_{EBO}		<1	10	nA	V_{EB}=6V
Static forward current transfer ratio	H_{FE}	190 200 200 80	300 350 340 125	560		I_C=10mA, V_{CE}=2V[(a)] I_C=500mA, V_{CE}=2V[(a)] I_C=2A, V_{CE}=2V[(a)] I_C=5A, V_{CE}=2V[(a)]
Collector-emitter saturation voltage	$V_{CE(sat)}$		13 30 80 135	18 40 110 170	mV mV mV mV	I_C=0.1A, I_B=5mA[(a)] I_C=1A, I_B=100mA[(a)] I_C=2A, I_B=40mA[(a)] I_C=5A, I_B=250mA[(a)]
Base-emitter saturation voltage	$V_{BE(sat)}$		0.80 0.92	0.90 1.00	V V	I_C=2A, I_B=40mA[(a)] I_C=5A, I_B=250mA[(a)]
Base-emitter turn-on voltage	$V_{BE(on)}$		0.83	0.93	V	I_C=5A, V_{CE}=2V[(a)]
Transition frequency	f_T		125		MHz	Ic=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_{B2}=125mA
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=300μS. Duty cycle ≤2%.

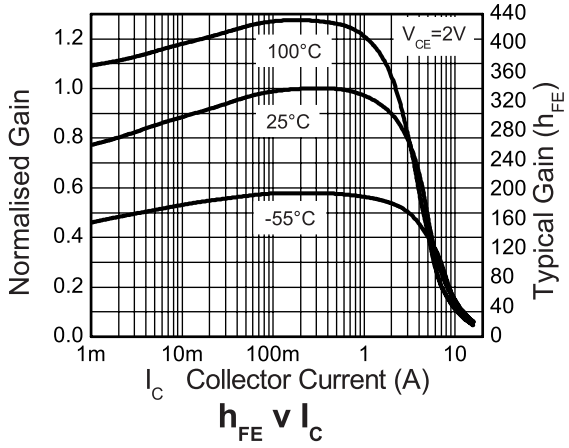
Typical characteristics



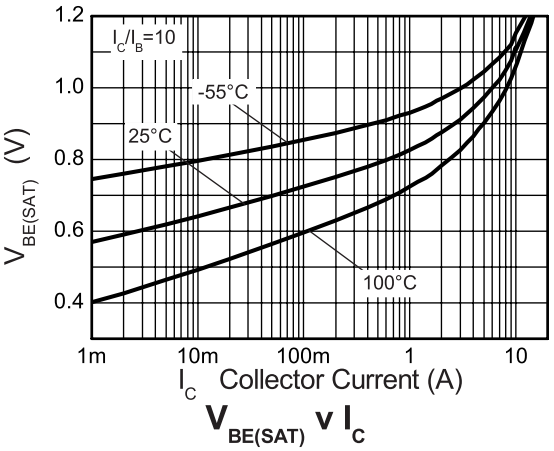
$V_{CE(SAT)}$ v I_C



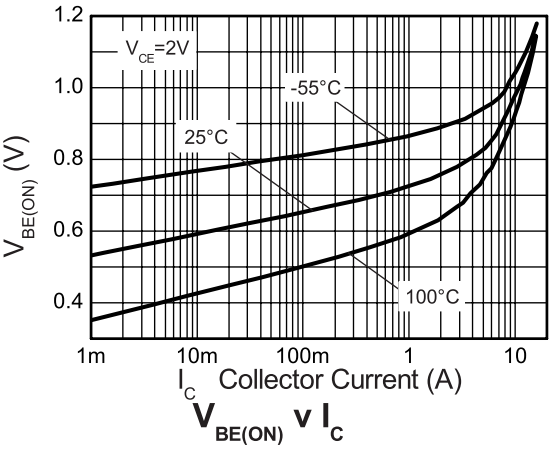
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

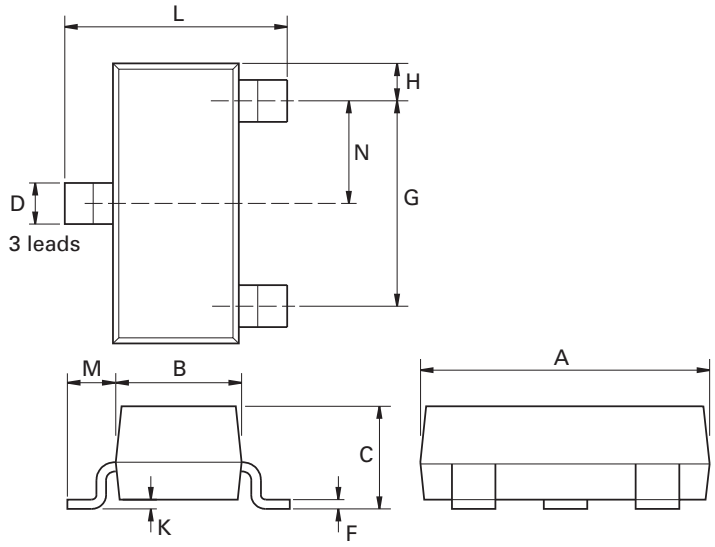


$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

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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