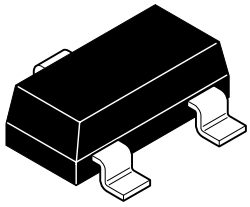
ZXTN2020F
100V, SOT23, NPN medium power transistor

Summary



$V_{(BR)CEV}$ > 160V, $V_{(BR)CEO}$ > 100V

$I_{C(cont)}$ = 4A

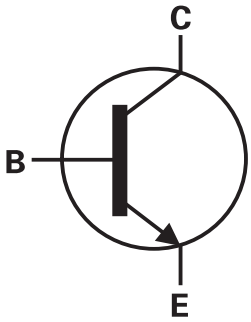
$R_{CE(sat)}$ = 30mΩ typical

$V_{CE(sat)}$ < 50mV @ 1A

P_D = 1.2W

Complementary part number: ZXTP2029F

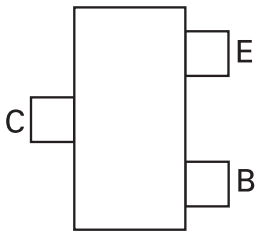
Description



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.

Features

- Higher power dissipation SOT23 package
- High peak current
- Low saturation voltage
- 160V forward blocking voltage



Pinout - top view

Applications

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

Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN2020FTA	7	8	3,000

Device marking

853

Absolute maximum ratings

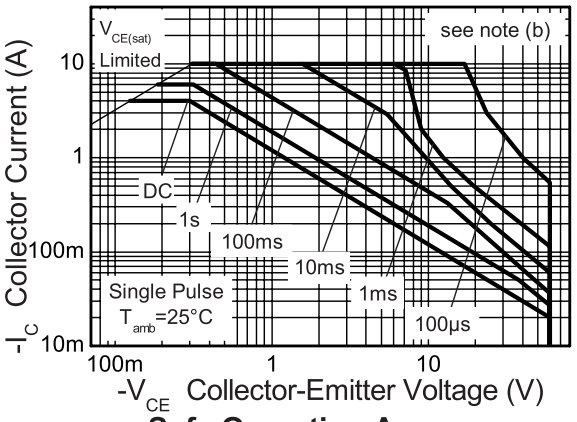
Parameter	Symbol	Limit	Unit
Collector-base voltage	V_{CBO}	160	V
Collector-emitter voltage	$V_{(BR)CEV}$	160	V
Collector-emitter voltage	V_{CEO}	100	V
Emitter-base voltage	V_{EBO}	7	V
Peak pulse current	I_{CM}	12	A
Continuous collector current[a]	I_C	4	A
Base current	I_B	1	A
Power dissipation @ T_A=25°C[a] Linear derating factor	P_D	1.0 8	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

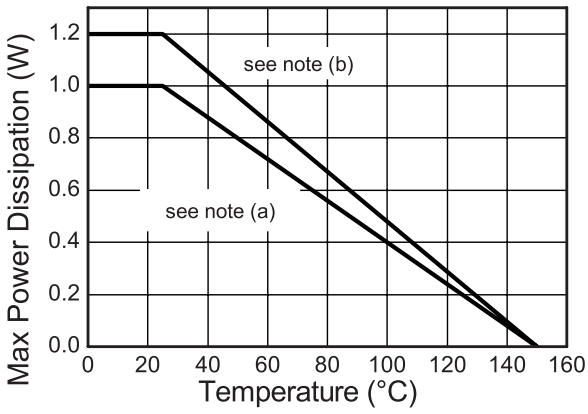
Parameter	Symbol	Value	Unit
Junction to ambient [a]	$R\theta_{JA}$	125	°C/W
Junction to ambient [b]	$R\theta_{JA}$	104	°C/W
Junction to ambient [c]	$R\theta_{JA}$	80	°C/W

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.

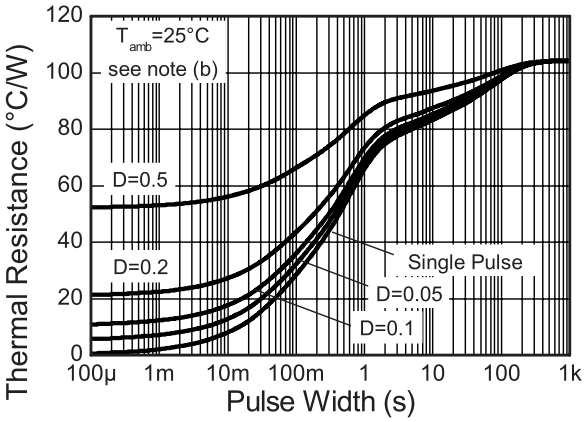
Characteristics



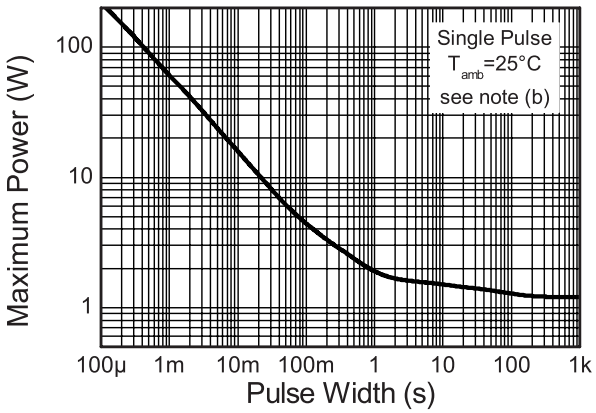
Safe Operating Area



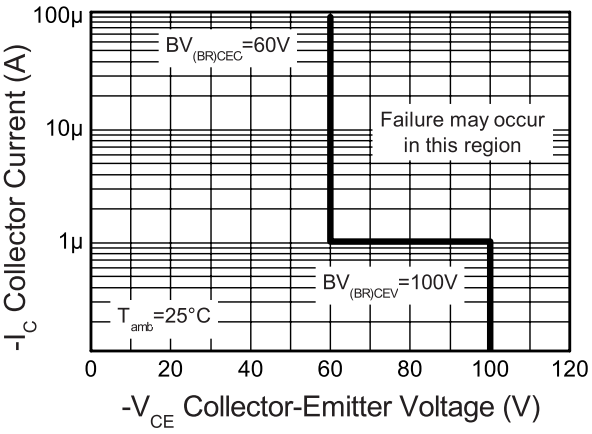
Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation



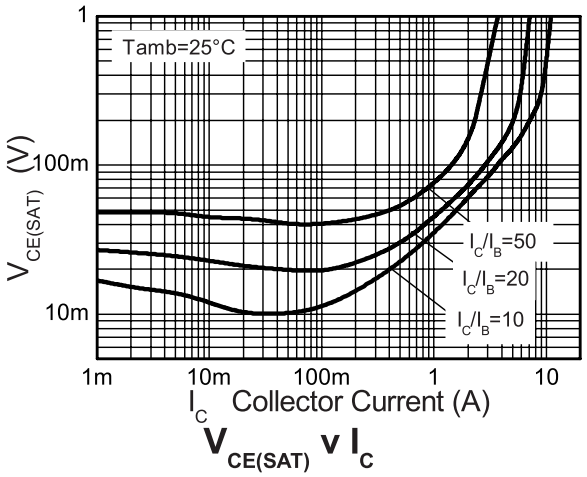
Safe Operating Area

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

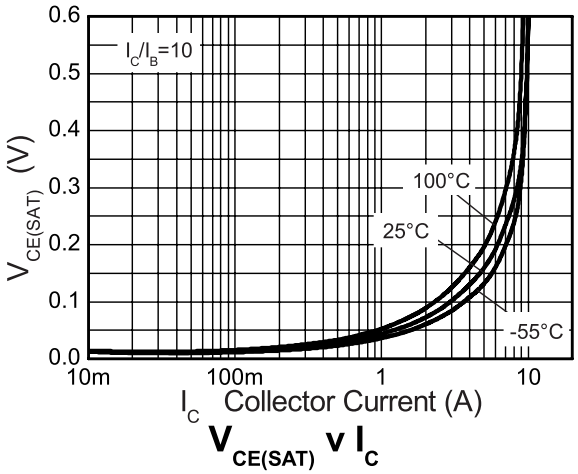
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$V_{(BR)CBO}$	160	200		V	I_C=100μA
Collector-emitter breakdown voltage	$V_{(BR)CEV}$	160	200		V	I_C =1μA, -1V< V_{BE}<+0.3V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	100	115		V	I_C=10mA [(a)]
Emitter-base breakdown voltage	$V_{(BR)EBO}$	7	8		V	I_E=100μA
Collector-emitter cut-off current	I_{CEV}		<1	20	nA	V_{CES}=128V, V_{BE} = -1V
Collector-base cut-off current	I_{CBO}		<1	20	nA	V_{CB}=128V
Emitter-base cut-off current	I_{EBO}		<1	10	nA	V_{EB}=6V
Static forward current transfer ratio	H_{FE}	100 100 35	220 200 60 13	300		I_C=10mA, V_{CE}=2V[(a)] I_C=1A, V_{CE}=2V[(a)] I_C=4A, V_{CE}=2V[(a)] I_C=10A, V_{CE}=2V[(a)]
Collector-emitter saturation voltage	$V_{CE(sat)}$		20 40 85 120	30 50 105 150	mV mV mV mV	I_C=0.1A, I_B=5mA[(a)] I_C=1A, I_B=100mA[(a)] I_C=2A, I_B=100mA[(a)] I_C=4A, I_B=400mA[(a)]
Base-emitter saturation voltage	$V_{BE(sat)}$		0.94	1.05	V	I_C=4A, I_B=400mA[(a)]
Base-emitter turn-on voltage	$V_{BE(on)}$		0.84	0.94	V	I_C=4A, V_{CE}=2V[(a)]
Transition frequency	f_T		130		MHz	Ic=100mA, V_{CE}=10V, f=50MHz
Output capacitance	C_{obo}		22		pF	V_{CB}=10V, f=1MHz
Turn–on time	$t_{(on)}$		37		ns	V_{CC}=10V, I_C=1A, I_{B1}=I_{B2}=100mA
Turn-off time	$t_{(off)}$		910		ns	

NOTES:
(a) Measured under pulsed conditions. Pulse width=300μS. Duty cycle ≤2%.

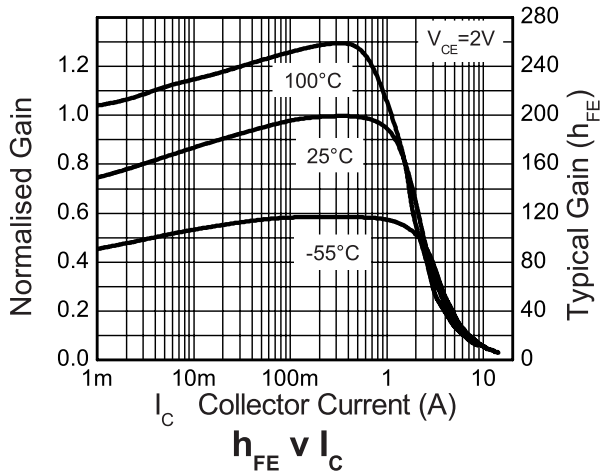
Typical characteristics



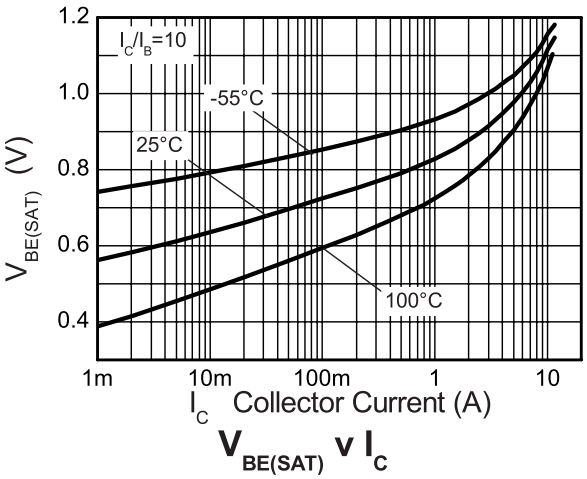
$V_{CE(SAT)}$ v I_C



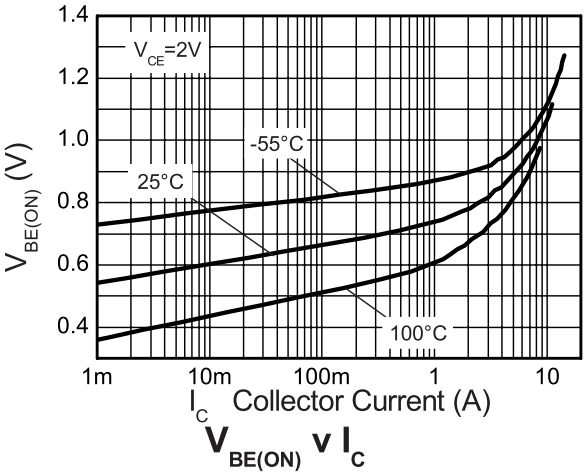
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

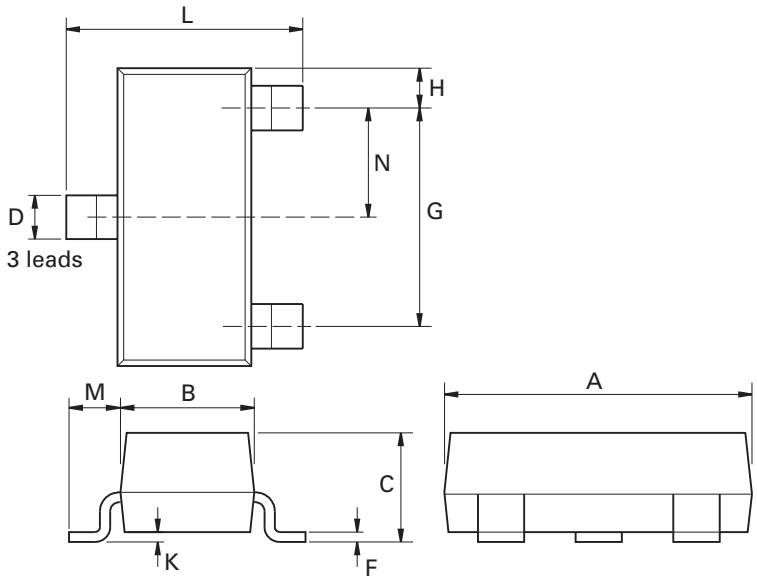


$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ 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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