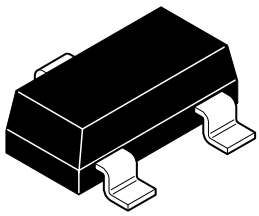
ZXTN25020CFH
20V, SOT23, NPN medium power transistor

Summary



BV_{CEX} > 70V

BV_{CEO} > 20V

BV_{ECO} > 5V

$I_{C(cont)}$ = 4.5A

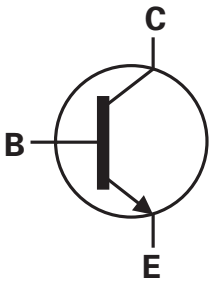
$V_{CE(sat)}$ < 45 mV @ 1A

$R_{CE(sat)}$ = 28 mΩ

P_D = 1.25W

Complementary part number ZXTP25020CFH

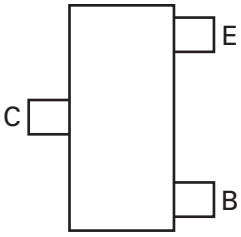
Description



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

- High power dissipation SOT23 package
- High peak current
- High gain
- Low saturation voltage
- 70V forward blocking voltage
- 5V reverse blocking voltage



Pinout - top view

Applications

- MOSFET gate drivers
- Power switches
- Motor control
- DC fans
- DC-DC converters

Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN25020CFHTA	7	8	3,000

Device marking

1B3

Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	V_{CBO}	70	V
Collector-emitter voltage (forward blocking)	V_{CEX}	70	V
Collector-emitter voltage	V_{CEO}	20	V
Emitter-collector voltage (reverse blocking)	V_{ECO}	5	V
Emitter-base voltage	V_{EBO}	7	V
Continuous collector current[c]	I_C	4.5	A
Base current	I_B	1	A
Peak pulse current	I_{CM}	10	A
Power dissipation at T_{amb} =25°C[a]	P_D	0.73	W
Linear derating factor		5.84	mW/°C
Power dissipation at T_{amb} =25°C[b]	P_D	1.05	W
Linear derating factor		8.4	mW/°C
Power dissipation at T_{amb} =25°C[c]	P_D	1.25	W
Linear derating factor		9.6	mW/°C
Power dissipation at T_{amb} =25°C[d]	P_D	1.81	W
Linear derating factor		14.5	mW/°C
Operating and storage temperature range	T_j, T_{stg}	- 55 to 150	°C

Thermal resistance

Parameter	Symbol	Limit	Unit
Junction to ambient[a]	$R_{\Theta JA}$	171	°C/W
Junction to ambient[b]	$R_{\Theta JA}$	119	°C/W
Junction to ambient[c]	$R_{\Theta JA}$	100	°C/W
Junction to ambient[d]	$R_{\Theta JA}$	69	°C/W

NOTES:

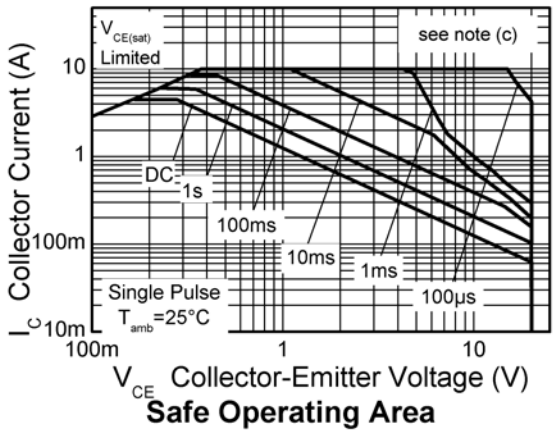
(a) For a device surface mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(b) Mounted on 25mm x 25mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

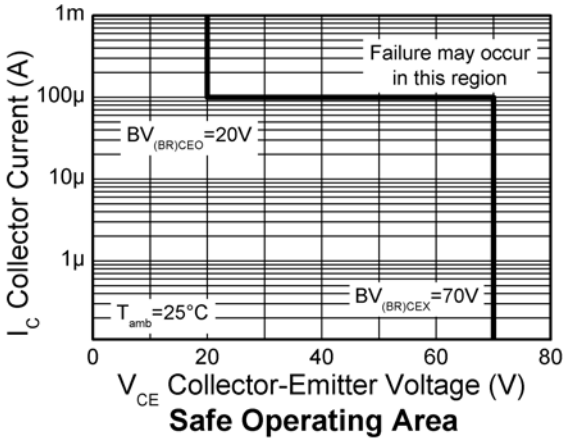
(c) Mounted on 50mm x 50mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

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

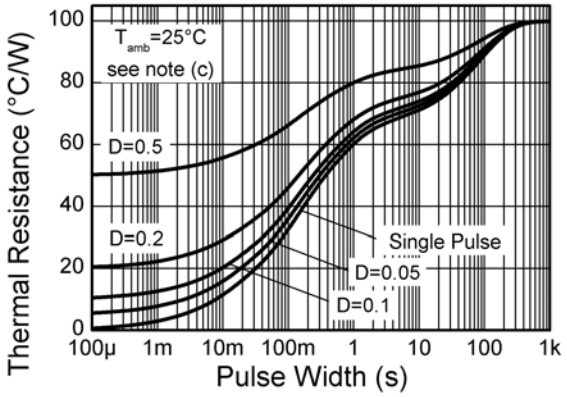
Characteristics



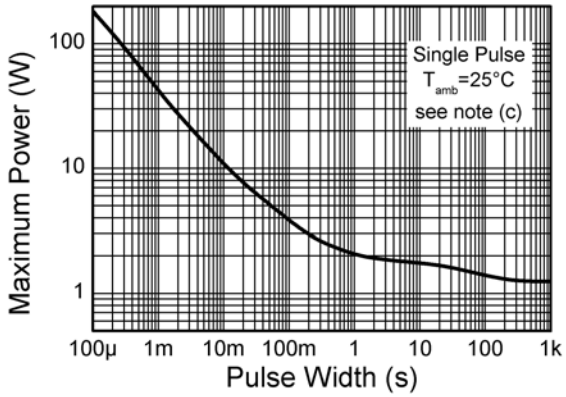
Safe Operating Area



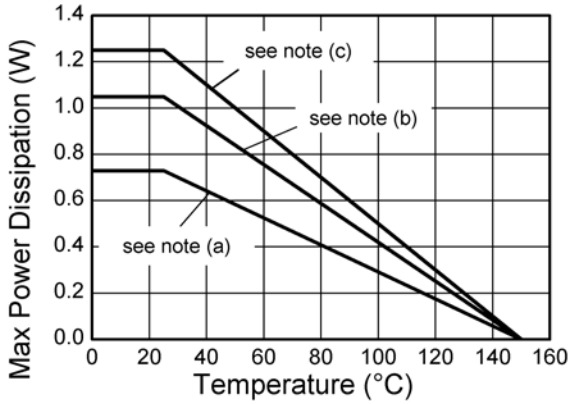
Safe Operating Area



Transient Thermal Impedance



Pulse Power Dissipation



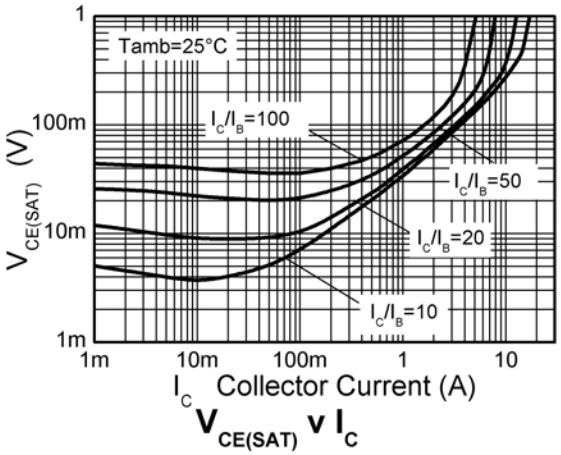
Derating Curve

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

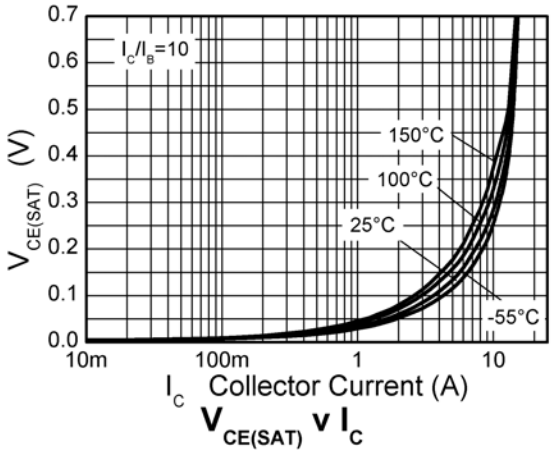
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	70	100		V	I_C = 100μA
Collector-emitter breakdown voltage (forward blocking)	BV_{CEX}	70	100			I_C = 100μA, $R_{BE} \leq 1k\Omega$ or -1V < V_{BE} < 0.25V
Collector-emitter breakdown voltage (base open)	BV_{CEO}	20	35		V	I_C = 10mA (*)
Emitter-base breakdown voltage	BV_{EBO}	7	8.3		V	I_E = 100μA
Emitter-collector breakdown voltage (reverse blocking)	BV_{ECX}	6	8.0		V	I_E = 100μA, $R_{BC} \leq 1k\Omega$ or 0.25V > V_{BC} > -0.25V
Emitter-collector breakdown voltage (base open)	BV_{ECO}	5	6.6		V	I_E = 100μA,
Collector-base cut-off current	I_{CBO}		<1	50 20	nA μA	V_{CB} = 56V V_{CB} = 56V, T_{amb}= 100°C
Collector-emitter cut-off current	I_{CEX}		-	100	nA	V_{CE} = 56V; $R_{BE} \leq 1k\Omega$ or -1V < V_{BE} < 0.25V
Emitter-base cut-off current	I_{EBO}		<1	50	nA	V_{EB} = 5.6V
Collector-emitter saturation voltage	$V_{CE(sat)}$		35	45	mV	I_C = 1A, I_B = 100mA(*)
			53	65	mV	I_C = 1A, I_B = 20mA(*)
			85	100	mV	I_C = 2A, I_B = 40mA(*)
			175	220	mV	I_C = 4.5A, I_B = 90mA(*)
			125	140	mV	I_C = 4.5A, I_B = 450mA(*)
Base-emitter saturation voltage	$V_{BE(sat)}$		905	1000	mV	I_C = 4.5A, I_B = 90mA(*)
Base-emitter turn-on voltage	$V_{BE(on)}$		815	900	mV	I_C = 4.5A, V_{CE} = 2V(*)
Static forward current transfer ratio	h_{FE}	200	350	500		I_C = 10mA, V_{CE} = 2V(*)
		180	320			I_C = 1A, V_{CE} = 2V(*)
		90	145			I_C = 4.5A, V_{CE} = 2V(*)
		25	40			I_C = 10A, V_{CE} = 2V(*)
Transition frequency	f_T		185		MHz	I_C = 50mA, V_{CE} = 10V f = 100MHz
Output capacitance	C_{OBO}		16.8	25	pF	V_{CB} = 10V, f = 1MHz(*)
Delay time	t_d		70.5		ns	V_{CC} = 10V. I_C = 1A, I_{B1} = I_{B2}= 10mA.
Rise time	t_r		88		ns	
Storage time	t_s		266		ns	
Fall time	t_f		65		ns	

NOTES:
(*) Measured under pulsed conditions. Pulse width ≤300μs; duty cycle ≤2%.

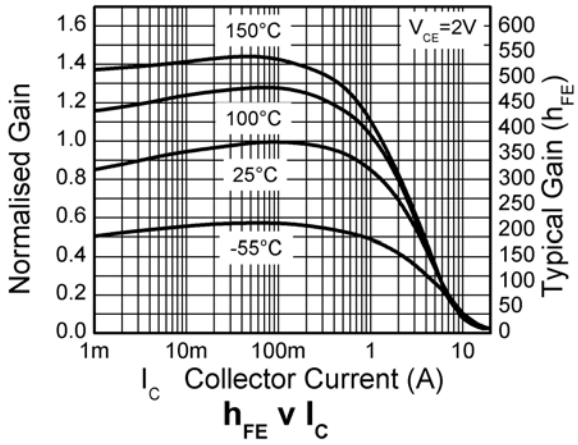
Typical characteristics



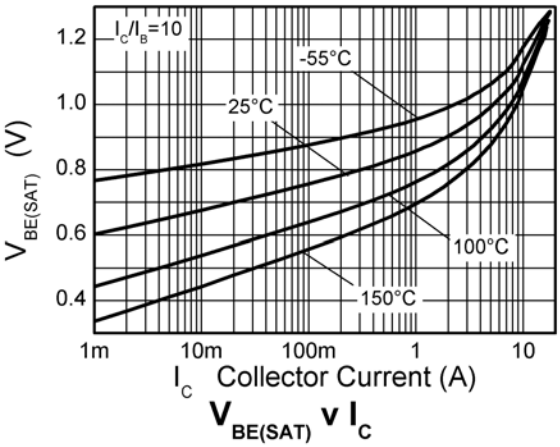
$V_{CE(SAT)}$ v I_C



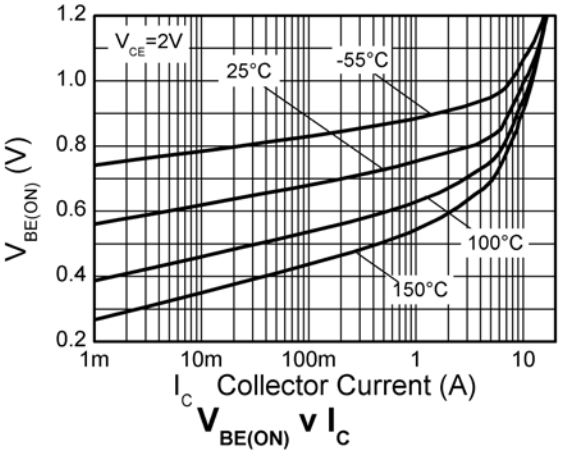
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

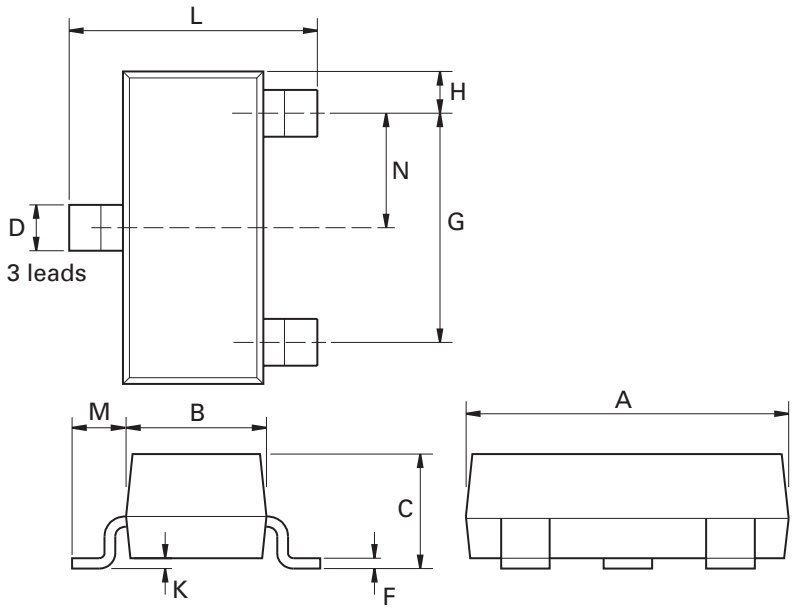


$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

Package outline - 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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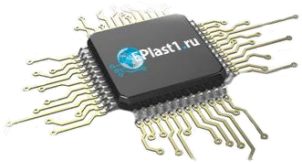

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