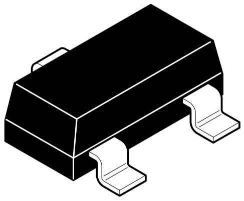
ZXTN25020BFH
20V, SOT23, NPN medium power transistor

Summary



$BV_{CEX} > 50V$

$BV_{CEO} > 20V$

$BV_{ECO} > 3V$

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

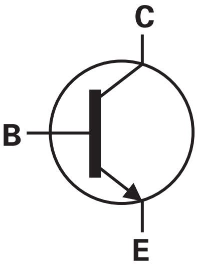
$V_{CE(sat)} < 45$ mV @ 1A

$R_{CE(sat)} = 27$ mΩ

$P_D = 1.25W$

Complementary part number ZXTP25020BFH

Description



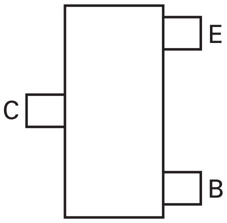
Advanced process capability and package design have been used to maximize the power handling and performance of this small outline transistor. The compact size and ratings of this device make it ideally suited to applications where space is at a premium.

Features

- High power dissipation SOT23 package
- High peak current
- Low saturation voltage
- 50V forward blocking voltage
- 3V reverse blocking voltage

Applications

- MOSFET gate drivers
- Motor control
- DC-DC converters



Pinout - top view

Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN25020BFHTA	7	8	3,000

Device marking

1B1

Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	V_{CBO}	50	V
Collector-emitter voltage (forward blocking)	V_{CEX}	50	V
Collector-emitter voltage	V_{CEO}	20	V
Emitter-collector voltage (reverse blocking)	V_{ECO}	3	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) Linear derating factor	P_D	0.73 5.84	W mW/°C
Power dissipation at T_{amb} =25°C(b) Linear derating factor	P_D	1.05 8.4	W mW/°C
Power dissipation at T_{amb} =25°C(c) Linear derating factor	P_D	1.25 9.6	W mW/°C
Power dissipation at T_{amb} =25°C(d) Linear derating factor	P_D	1.81 14.5	W mW/°C
Operating and storage temperature range	T_j, T_{stg}	- 55 to 150	°C

Thermal graphs

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:

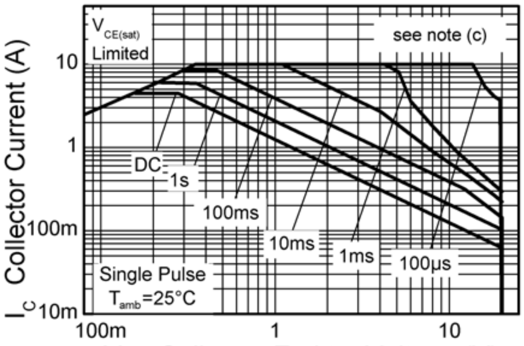
(a) For a device surface mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(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.

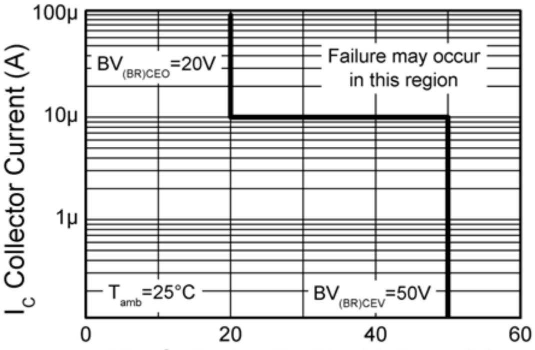
(c) Mounted on 50mm x 50mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

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

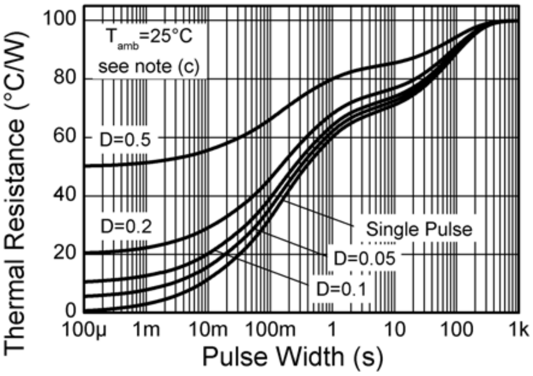
Characteristics



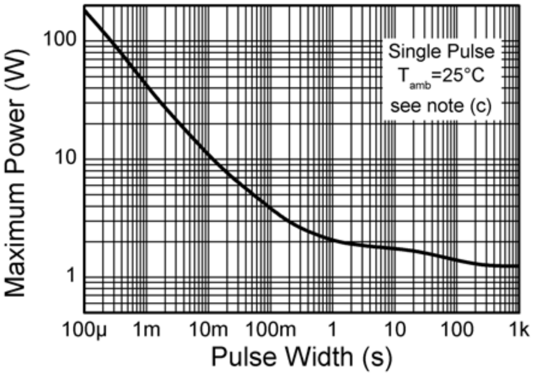
Safe Operating Area



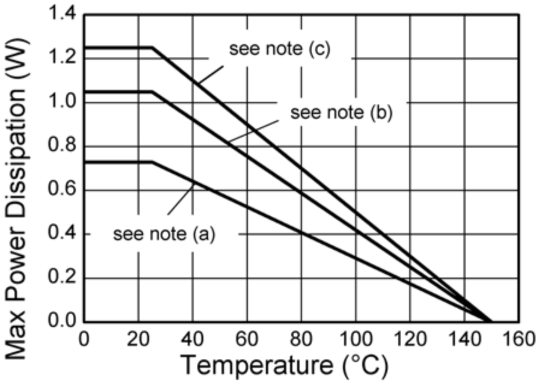
Safe Operating Area



Transient Thermal Impedance



Pulse Power Dissipation



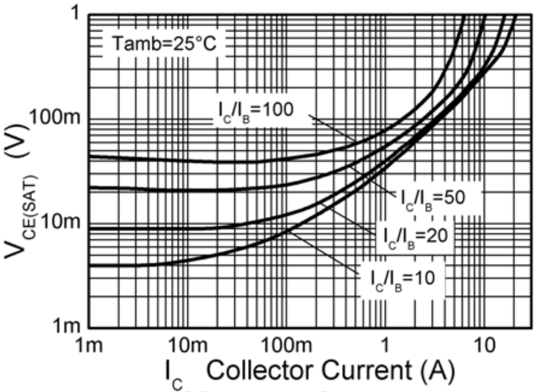
Derating Curve

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

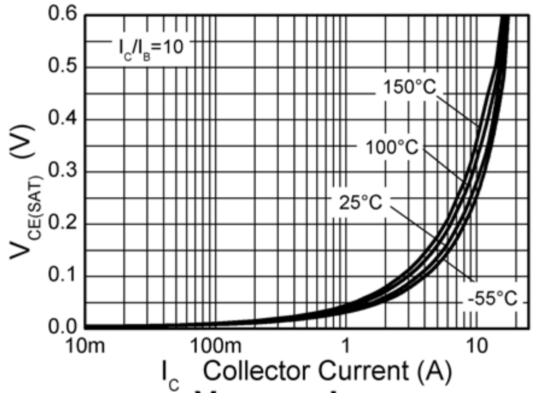
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	50	90		V	$I_C = 100\mu A$
Collector-emitter breakdown voltage (forward blocking)	BV_{CEX}	50	90			$I_C = 100\mu A$, $R_{BE} < 1k\Omega$ or $-1V < V_{BE} < 0.25V$
Collector-emitter breakdown voltage (base open)	BV_{CEO}	20	27		V	$I_C = 10mA$ (*)
Emitter-base breakdown voltage	BV_{EBO}	7	8		V	$I_E = 100\mu A$
Emitter-collector breakdown voltage (reverse blocking)	BV_{ECX}	6	7		V	$I_E = 100\mu A$, $R_{BC} < 1k\Omega$ or $0.25V > V_{BC} > -0.25V$
Emitter-collector breakdown voltage (base open)	BV_{ECO}	3	4.7		V	$I_E = 100\mu A$,
Collector-base cut-off current	I_{CBO}		<1	50 20	nA µA	$V_{CB} = 40V$ $V_{CB} = 40V$, $T_{amb} = 100°C$
Collector-emitter cut-off current	I_{CEX}		-	100	nA	$V_{CE} = 40V$; $R_{BE} < 1k\Omega$ 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 55 90 175 120	45 80 115 240 145	mV mV mV mV mV	$I_C = 1A$, $I_B = 100mA$(*) $I_C = 1A$, $I_B = 20mA$(*) $I_C = 2A$, $I_B = 40mA$(*) $I_C = 4.5A$, $I_B = 90mA$(*) $I_C = 4.5A$, $I_B = 450mA$(*)
Base-emitter saturation voltage	$V_{BE(sat)}$		910	1000	mV	$I_C = 4.5A$, $I_B = 90mA$(*)
Base-emitter turn-on voltage	$V_{BE(on)}$		825	900	mV	$I_C = 4.5A$, $V_{CE} = 2V$(*)
Static forward current transfer ratio	h_{FE}	100 100 75 30	200 210 160 70	300		$I_C = 10mA$, $V_{CE} = 2V$(*) $I_C = 1A$, $V_{CE} = 2V$(*) $I_C = 4.5A$, $V_{CE} = 2V$(*) $I_C = 10A$, $V_{CE} = 2V$(*)
Transition frequency	f_T		185		MHz	$I_C = 50mA$, $V_{CE} = 10V$ $f = 100MHz$
Output capacitance	C_{OBO}		22.7	30	pF	$V_{CB} = 10V$, $f = 1MHz$(*)
Delay time	t_d		87		ns	$V_{CC} = 10V$. $I_C = 1A$, $I_{B1} = I_{B2} = 10mA$.
Rise time	t_r		119		ns	
Storage time	t_s		146		ns	
Fall time	t_f		61		ns	

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

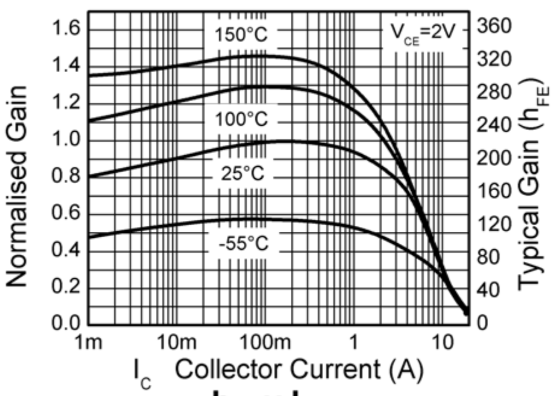
Typical characteristics



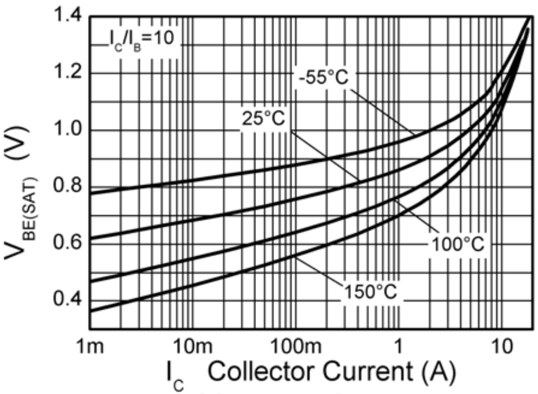
$V_{CE(SAT)}$ v I_C



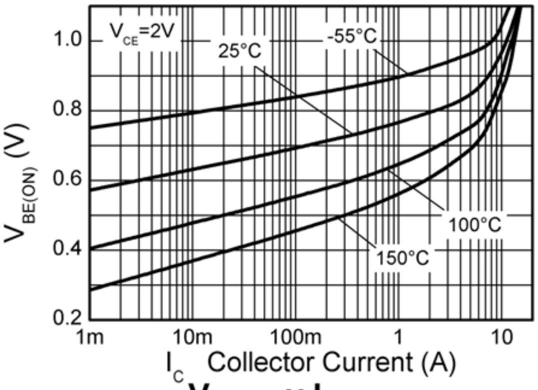
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

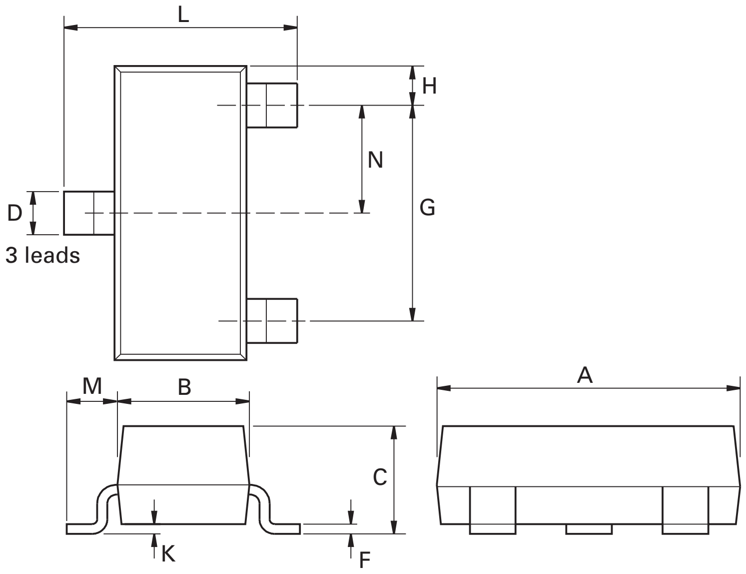


$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ 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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