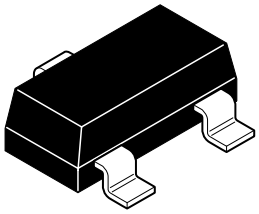
ZXTN25020DFH
20V SOT23 NPN medium power transistor

Summary



BV_{CEX} > 100V; $BV_{(BR)CEO}$ > 20V

BV_{ECO} > 5V;

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

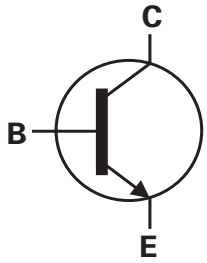
$R_{CE(sat)}$ = 28 mΩ typical

$V_{CE(sat)}$ < 43 mV @ 1A;

P_D = 1.25W

Complementary part number ZXTP25020DFH

Description



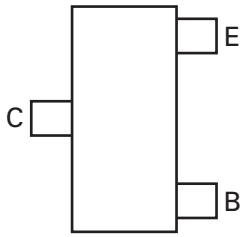
Advanced process capability and package design have been used to maximize the power handling and performance of this small outline transistor. The compact size and ratings of this device make it ideally suited to applications where space is at a premium.

Features

- Higher power dissipation SOT23 package
- High peak current
- Low saturation voltage
- 100V forward blocking voltage
- 5V reverse blocking voltage

Applications

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



Pinout - top view

Ordering information

Device	Reel size (inches)	Tape width	Quantity per reel
ZXTN25020DFHTA	7	8mm	3000

Device marking

016

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Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	V_{CBO}	100	V
Collector-emitter voltage (forward blocking)	V_{CEX}	100	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}	15	A
Power dissipation at T_A =25°C [(a)] Linear derating factor	P_D	0.73 5.84	W mW/°C
Power dissipation at T_A =25°C [(b)] Linear derating factor	P_D	1.05 8.4	W mW/°C
Power dissipation at T_A =25°C [(c)] Linear derating factor	P_D	1.25 9.6	W mW/°C
Power dissipation at T_A =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 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.

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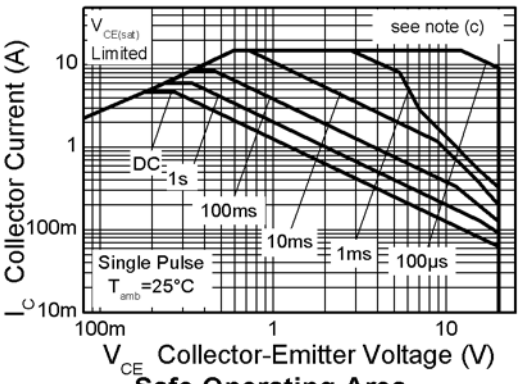
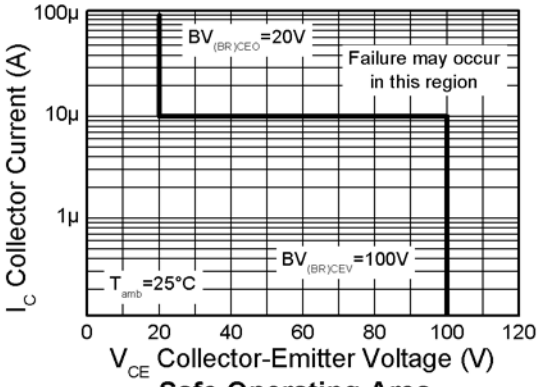
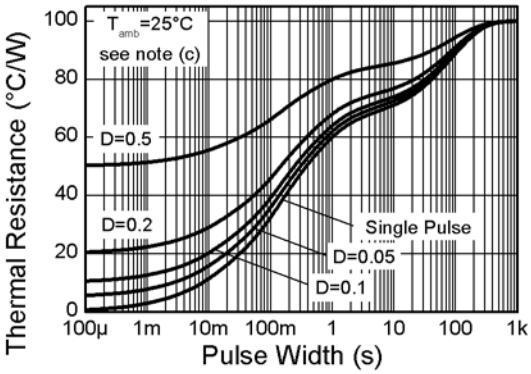
Characteristics



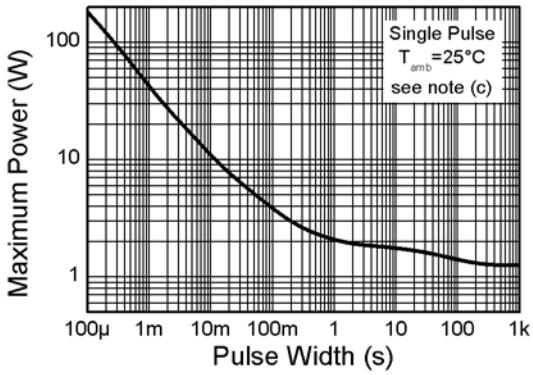
Safe Operating Area



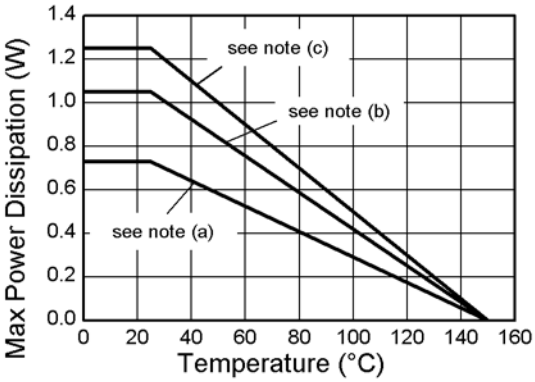
Safe Operating Area



Transient Thermal Impedance



Pulse Power Dissipation



Derating Curve

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector emitter breakdown voltage (base open)	BV_{CEO}	20	35		V	I_C = 10mA (*)
Emitter-collector breakdown voltage (reverse blocking)	BV_{ECX}	6	8		V	I_E = 100μA, $R_{BC} \leq$ 1kΩ or 0.25V > V_{BC} > -0.25V
Emitter-collector breakdown voltage (base open)	BV_{ECO}	5	6		V	I_E = 100mA,
Emitter base breakdown voltage	BV_{EBO}	7	8.3		V	I_E = 100mA
Collector cut-off current	I_{CBO}		<1	50 20	nA μA	V_{CB} = 100V V_{CB} = 100V, T_{AMB}= 100°C
Collector emitter cut-off current	I_{CEX}		-	100	nA	V_{CE} = 100V; $R_{BE} \leq$ 1kΩ or -1V < V_{BE} < 0.25V
Emitter cut-off current	I_{EBO}		<1	50	nA	V_{EB} = 5.6V
Collector emitter saturation voltage	$V_{CE(sat)}$		35 55 90 125 125 205	43 70 110 170 150 265	mV 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 = 2A, I_B = 20mA(*) I_C = 4,5A, I_B = 450mA (*) I_C = 4.5A, I_B = 90mA(*)
Base emitter saturation voltage	$V_{BE(sat)}$		900	1000	mV	I_C = 4.5A, I_B = 90mA(*)
Base emitter turn-on voltage	$V_{BE(on)}$		820	900	mV	I_C = 4.5A, V_{CE} = 2V(*)
Static forward current transfer ratio	h_{FE}	300 250 120	450 380 170 15	900		I_C = 10mA, V_{CE} = 2V(*) I_C = 2A, V_{CE} = 2V(*) I_C = 4.5A, V_{CE} = 2V(*) I_C = 15A, V_{CE} = 2V(*)
Transition frequency	f_T		215		MHz	I_C = 50mA, V_{CE} = 10V f = 100MHz
Output capacitance	C_{OBO}		16.5	25	pF	V_{CB} = 10V, f = 1MHz(*)
Delay time	$t_{(d)}$		68		ns	V_{CC} = 10V. I_C = 1A, I_{B1} = I_{B2}= 10mA.
Rise time	$t_{(r)}$		72		ns	
Storage time	$t_{(s)}$		361		ns	
Fall time	$t_{(f)}$		64		ns	

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

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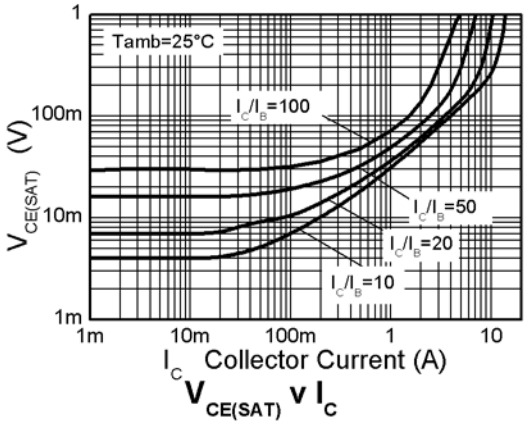
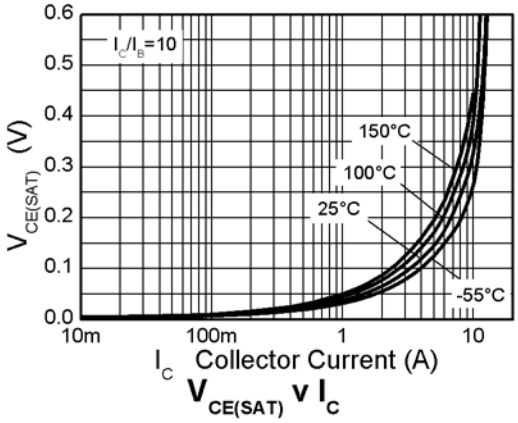
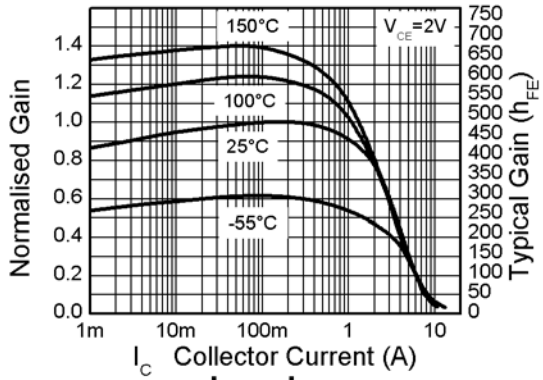
Characteristics



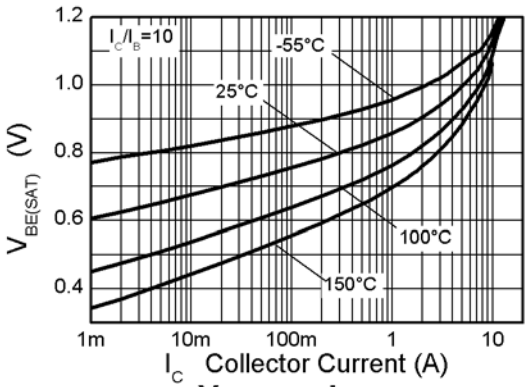
$V_{CE(SAT)}$ v I_C



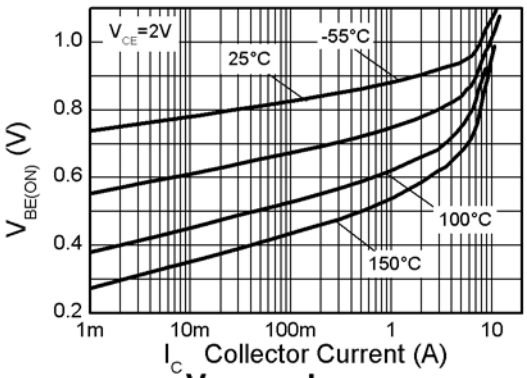
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

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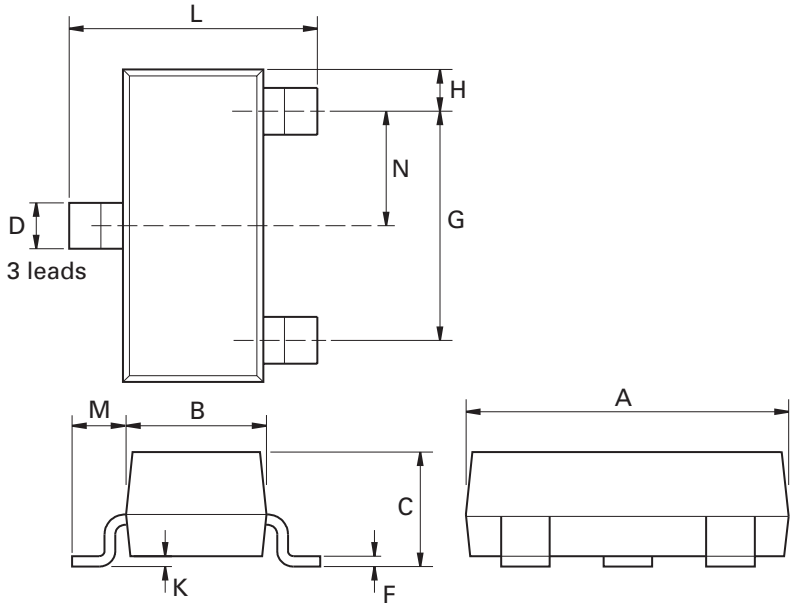
Package outline - SOT23



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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