ZXTN19020DFF
20V, SOT23F, NPN high gain power transistor

Summary

BV_{CEX} > 70V

BV_{CEO} > 20V

BV_{ECO} > 4.5V

$I_{C(cont)}$ = 6.5A

$V_{CE(sat)}$ = < 30mV @ 1A

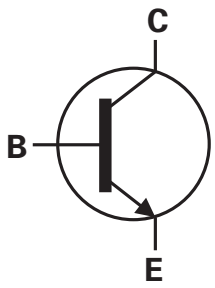
$R_{CE(sat)}$ = 18mΩ

P_D = 1.5W

Complementary part number ZXTP19020DFF

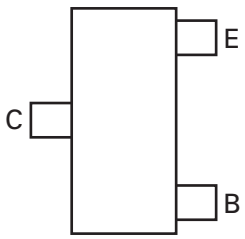
Description

Advanced process capability has been used to maximize the performance of this transistor. The SOT23F package is compatible with the industry standard SOT23 footprint but offers lower profile and higher dissipation for applications where power density is of utmost importance.



Features

- Very low saturation voltage
- High gain
- High forward blocking voltage
- Low profile high dissipation package



Pinout - top view

Applications

- MOSFET and IGBT gate driving
- LED driving
- Strobe flash
- Motor drive
- Micro buffers

Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN19020DFFTA	7	8	3000

Device marking

1E3

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 (base open)	V_{CEO}	20	V
Emitter-collector voltage (reverse blocking)	V_{ECO}	4.5	V
Emitter-base voltage	V_{EBO}	7	V
Continuous collector current[c]	I_C	6.5	A
Base current	I_B	1	A
Peak pulse current	I_{CM}	20	A
Power dissipation at T_{amb} =25°C[a]	P_D	0.84	W
Linear derating factor		6.72	mW/°C
Power dissipation at T_{amb} =25°C[b]	P_D	1.34	W
Linear derating factor		10.72	mW/°C
Power dissipation at T_{amb} =25°C[c]	P_D	1.5	W
Linear derating factor		12.0	mW/°C
Power dissipation at T_{amb} =25°C[d]	P_D	2.0	W
Linear derating factor		16.0	mW/°C
Operating and storage temperature range	T_j, T_{stg}	- 55 to 150	°C

Thermal resistance

Parameter	Symbol	Value	Unit
Junction to ambient[a]	$R_{\Theta JA}$	149.3	°C/W
Junction to ambient[b]	$R_{\Theta JA}$	93.4	°C/W
Junction to ambient[c]	$R_{\Theta JA}$	83.3	°C/W
Junction to ambient[d]	$R_{\Theta JA}$	60	°C/W

NOTES:

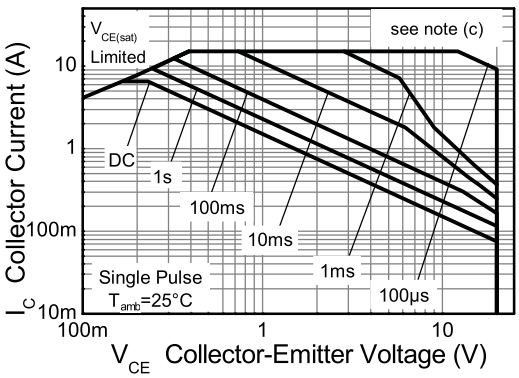
(a) For a device surface mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(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.

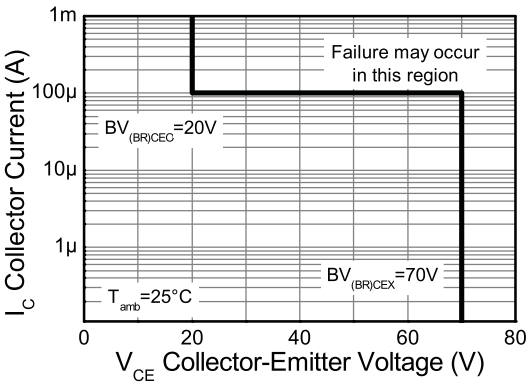
(c) Mounted on 50mm x 50mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

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

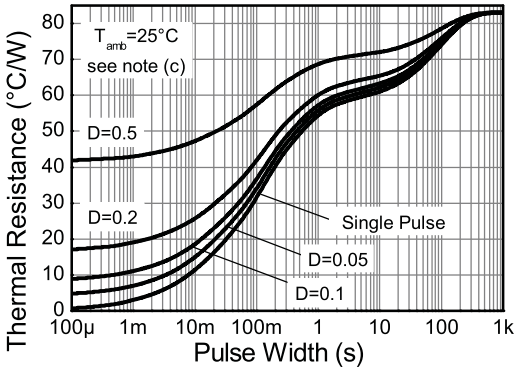
Characteristics



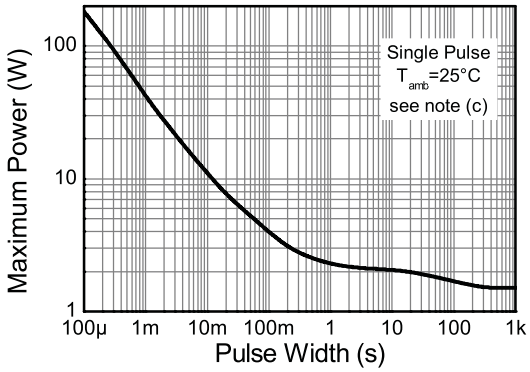
Safe Operating Area



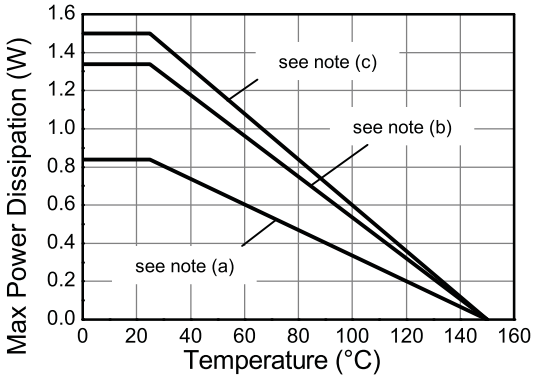
Safe Operating Area



Transient Thermal Impedance



Pulse Power Dissipation



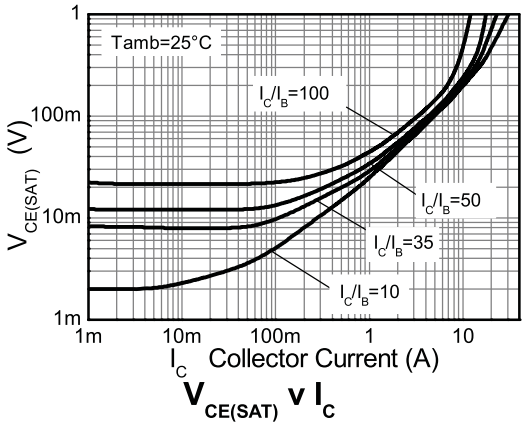
Derating Curve

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

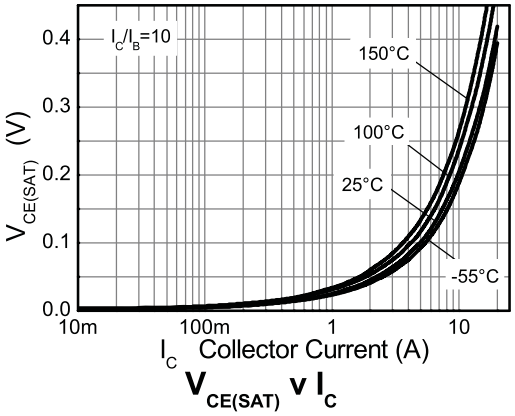
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	70	100		V	I_C = 100μA
Collector-emitter breakdown voltage (forward blocking)	BV_{CEX}	70	100		V	I_C = 100μA, $R_{BE} \leq 1k\Omega$ or -1V < V_{BE} < 0.25V
Collector-emitter breakdown voltage (base open)	BV_{CEO}	20	30		V	I_C = 10mA (*)
Emitter-base breakdown voltage	BV_{EBO}	7	8.4		V	I_E = 100μA
Emitter-collector breakdown voltage (reverse blocking)	BV_{ECX}	6	8.4		V	I_E = 100μA, $R_{BC} \leq 1k\Omega$ or 0.25V > V_{BC} > -0.25V
Emitter-collector breakdown voltage (base open)	BV_{ECO}	4.5	5.7		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	$V_{CE(sat)}$		25	30	mV	I_C = 1A, I_B = 100mA(*)
			45	65	mV	I_C = 1A, I_B = 10mA(*)
			70	95	mV	I_C = 2A, I_B = 20mA(*)
			55	75	mV	I_C = 2A, I_B = 40mA(*)
			140	190	mV	I_C = 6.5A, I_B = 180mA(*)
Base-emitter saturation voltage	$V_{BE(sat)}$		940	1050	mV	I_C = 6.5A, I_B = 180mA(*)
Base-emitter turn-on voltage	$V_{BE(on)}$		830	950	mV	I_C = 6.5A, V_{CE} = 2V(*)
Static forward current transfer ratio	h_{FE}	300	450	900		I_C = 0.1A, V_{CE} = 2V(*)
		260	420			I_C = 2A, V_{CE} = 2V(*)
		160	270			I_C = 6.5A, V_{CE} = 2V(*)
		50	80			I_C = 15A, V_{CE} = 2V(*)
Transition frequency	f_T		160		MHz	I_C = 50mA, V_{CE} = 10V f = 50MHz
Input capacitance	C_{ibo}		297		pF	V_{EB} = 0.5V, f = 1MHz(*)
Output capacitance	C_{obo}		32.6	40	pF	V_{CB} = 10V, f = 1MHz(*)
Delay time	t_d		129		ns	V_{CC} = 10V. I_C = 1A, I_{B1} = -I_{B2}= 10mA.
Rise time	t_r		96		ns	
Storage time	t_s		398		ns	
Fall time	t_f		90		ns	

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

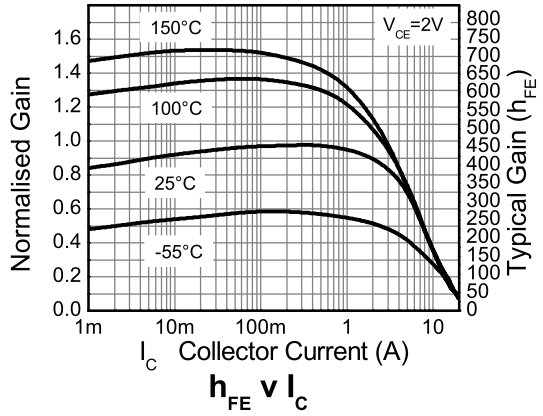
Typical characteristics



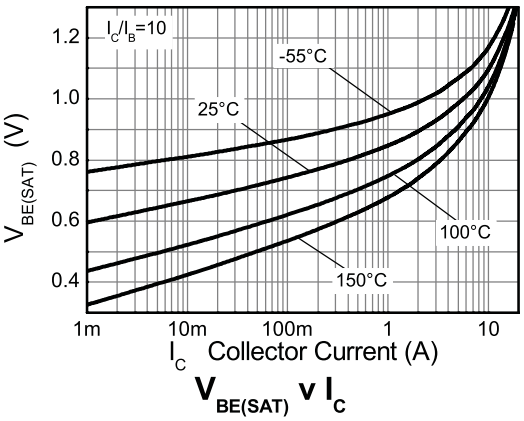
$V_{CE(SAT)}$ v I_C



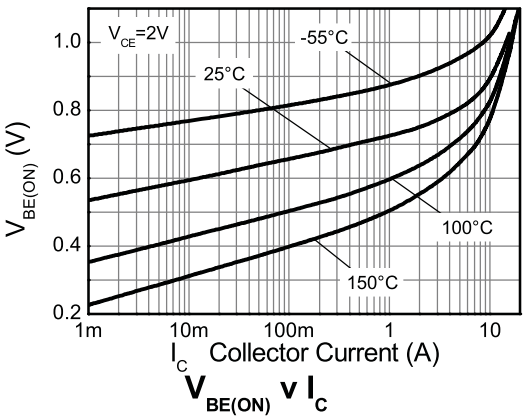
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

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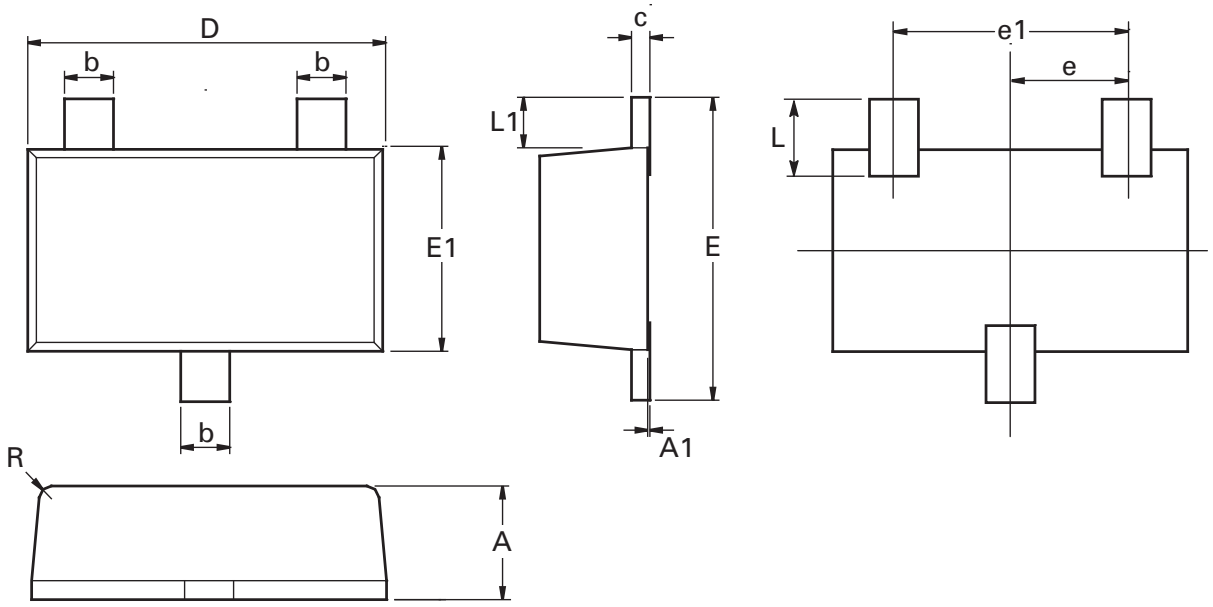
Package outline - SOT23F



Dim.	Millimeters		Inches		Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Max.	Max.
A	0.80	1.00	0.0315	0.0394	E	2.30	2.50	0.0906	0.0984
A1	0.00	0.10	0.00	0.0043	E1	1.50	1.70	0.0590	0.0669
b	0.35	0.45	0.0153	0.0161	E2	1.10	1.26	0.0433	0.0496
c	0.10	0.20	0.0043	0.0079	L	0.48	0.68	0.0189	0.0268
D	2.80	3.00	0.1102	0.1181	L1	0.30	0.50	0.0153	0.0161
e	0.95 ref		0.0374 ref		R	0.05	0.15	0.0019	0.0059
e1	1.80	2.00	0.0709	0.0787	O	0°	12°	0°	12°

Note: Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

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