

ZXTN19020DFF

20V, SOT23F, NPN high gain power transistor

Summary

$BV_{CEX} > 70V$

$BV_{CEO} > 20V$

$BV_{ECO} > 4.5V$

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

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

$R_{CE(sat)} = 18m\Omega$

$P_D = 1.5W$

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

Applications

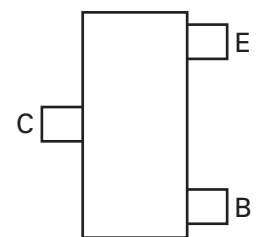
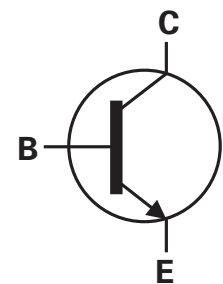
- MOSFET and IGBT gate driving
- LED driving
- Strobe flash
- Motor drive
- Micro buffers

Ordering information

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

Device marking

1E3



Pinout - top view

ZXTN19020DFF

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 $T_{amb} = 25^\circ\text{C}^{(a)}$	P_D	0.84	W
Linear derating factor		6.72	mW/°C
Power dissipation at $T_{amb} = 25^\circ\text{C}^{(b)}$	P_D	1.34	W
Linear derating factor		10.72	mW/°C
Power dissipation at $T_{amb} = 25^\circ\text{C}^{(c)}$	P_D	1.5	W
Linear derating factor		12.0	mW/°C
Power dissipation at $T_{amb} = 25^\circ\text{C}^{(d)}$	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

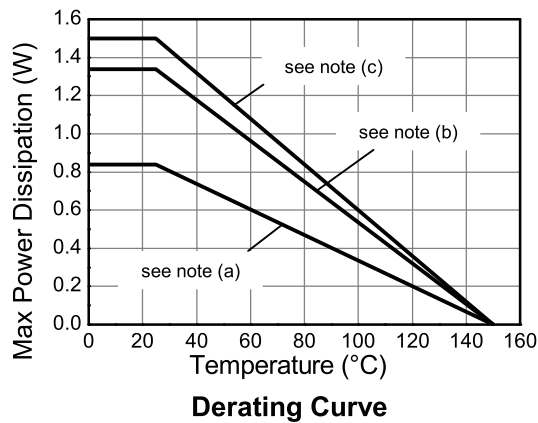
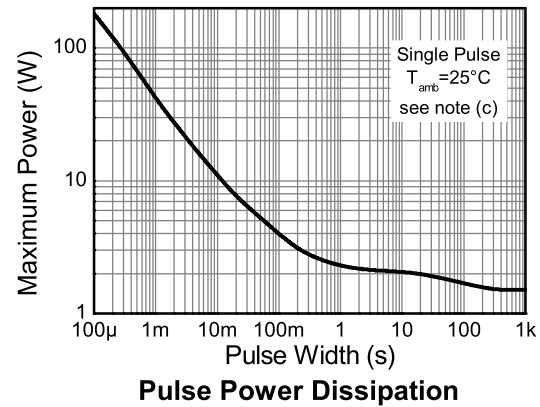
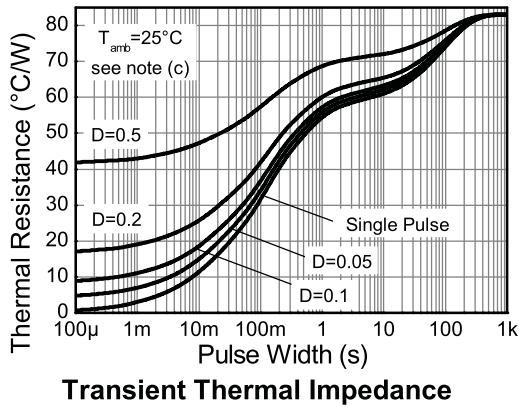
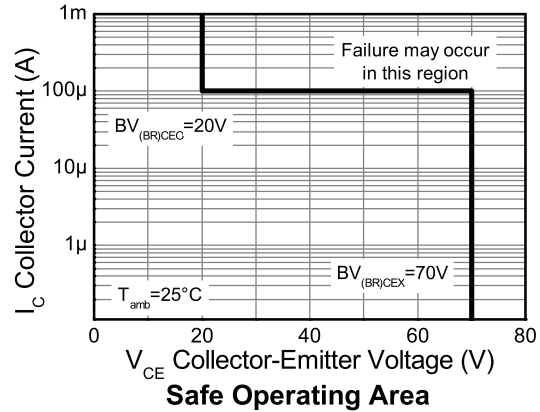
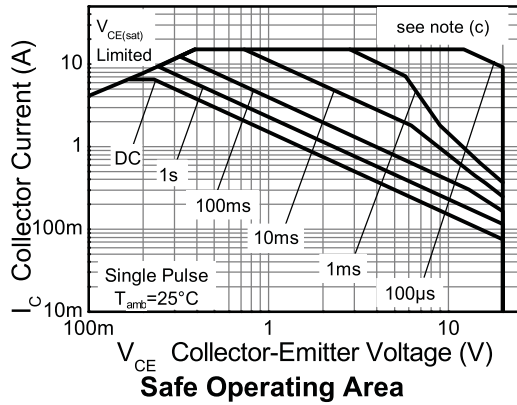
Thermal resistance

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 $t < 5$ secs.

Characteristics



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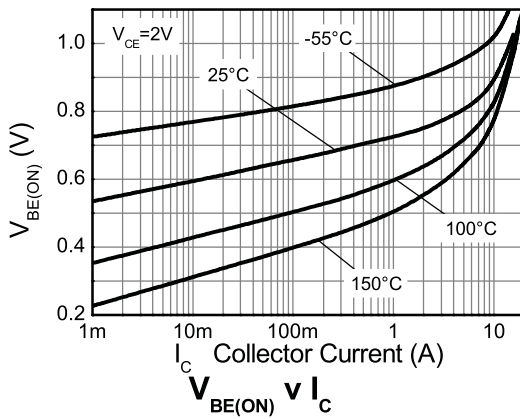
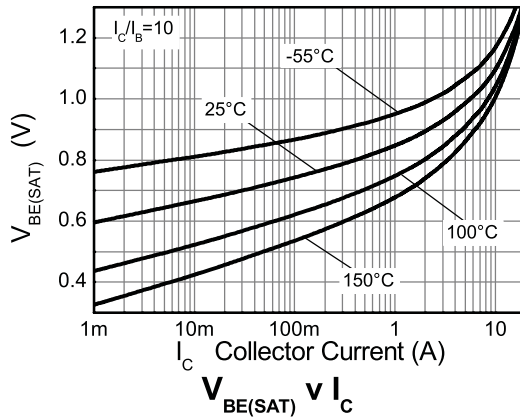
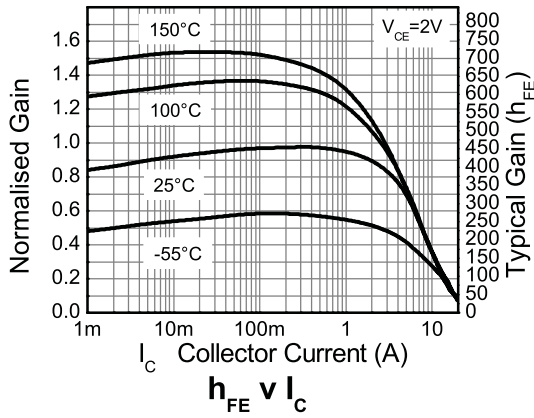
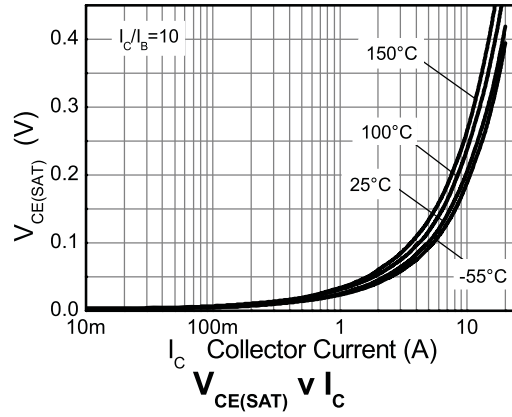
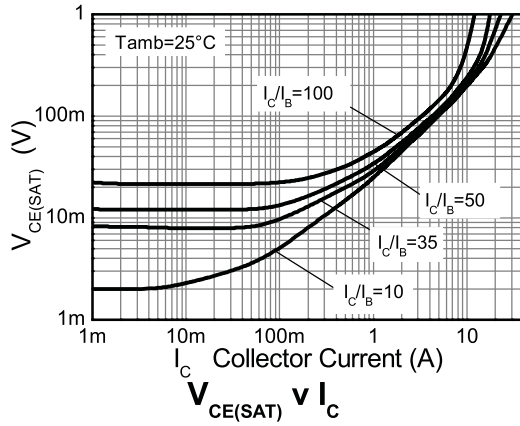
Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	70	100		V	$I_C = 100\mu\text{A}$
Collector-emitter breakdown voltage (forward blocking)	BV_{CEX}	70	100		V	$I_C = 100\mu\text{A}$, $R_{BE} \leq 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$
Collector-emitter breakdown voltage (base open)	BV_{CEO}	20	30		V	$I_C = 10\text{mA}^{(*)}$
Emitter-base breakdown voltage	BV_{EBO}	7	8.4		V	$I_E = 100\mu\text{A}$
Emitter-collector breakdown voltage (reverse blocking)	BV_{ECX}	6	8.4		V	$I_E = 100\mu\text{A}$, $R_{BC} \leq 1\text{k}\Omega$ or $0.25\text{V} > V_{BC} > -0.25\text{V}$
Emitter-collector breakdown voltage (base open)	BV_{ECO}	4.5	5.7		V	$I_E = 100\mu\text{A}$,
Collector-base cut-off current	I_{CBO}		<1	50 20	nA μA	$V_{CB} = 56\text{V}$ $V_{CB} = 56\text{V}$, $T_{amb} = 100^{\circ}\text{C}$
Collector-emitter cut-off current	I_{CEX}		-	100	nA	$V_{CE} = 56\text{V}$, $R_{BE} \leq 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$
Emitter-base cut-off current	I_{EBO}		<1	50	nA	$V_{EB} = 5.6\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$		25 45 70 55 140	30 65 95 75 190	mV mV mV mV mV	$I_C = 1\text{A}$, $I_B = 100\text{mA}^{(*)}$ $I_C = 1\text{A}$, $I_B = 10\text{mA}^{(*)}$ $I_C = 2\text{A}$, $I_B = 20\text{mA}^{(*)}$ $I_C = 2\text{A}$, $I_B = 40\text{mA}^{(*)}$ $I_C = 6.5\text{A}$, $I_B = 180\text{mA}^{(*)}$
Base-emitter saturation voltage	$V_{BE(sat)}$		940	1050	mV	$I_C = 6.5\text{A}$, $I_B = 180\text{mA}^{(*)}$
Base-emitter turn-on voltage	$V_{BE(on)}$		830	950	mV	$I_C = 6.5\text{A}$, $V_{CE} = 2\text{V}^{(*)}$
Static forward current transfer ratio	h_{FE}	300 260 160 50	450 420 270 80	900		$I_C = 0.1\text{A}$, $V_{CE} = 2\text{V}^{(*)}$ $I_C = 2\text{A}$, $V_{CE} = 2\text{V}^{(*)}$ $I_C = 6.5\text{A}$, $V_{CE} = 2\text{V}^{(*)}$ $I_C = 15\text{A}$, $V_{CE} = 2\text{V}^{(*)}$
Transition frequency	f_T		160		MHz	$I_C = 50\text{mA}$, $V_{CE} = 10\text{V}$ $f = 50\text{MHz}$
Input capacitance	C_{ibo}		297		pF	$V_{EB} = 0.5\text{V}$, $f = 1\text{MHz}^{(*)}$
Output capacitance	C_{obo}		32.6	40	pF	$V_{CB} = 10\text{V}$, $f = 1\text{MHz}^{(*)}$
Delay time	t_d		129		ns	$V_{CC} = 10\text{V}$.
Rise time	t_r		96		ns	$I_C = 1\text{A}$,
Storage time	t_s		398		ns	$I_{B1} = -I_{B2} = 10\text{mA}$.
Fall time	t_f		90		ns	

NOTES:

(*) Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

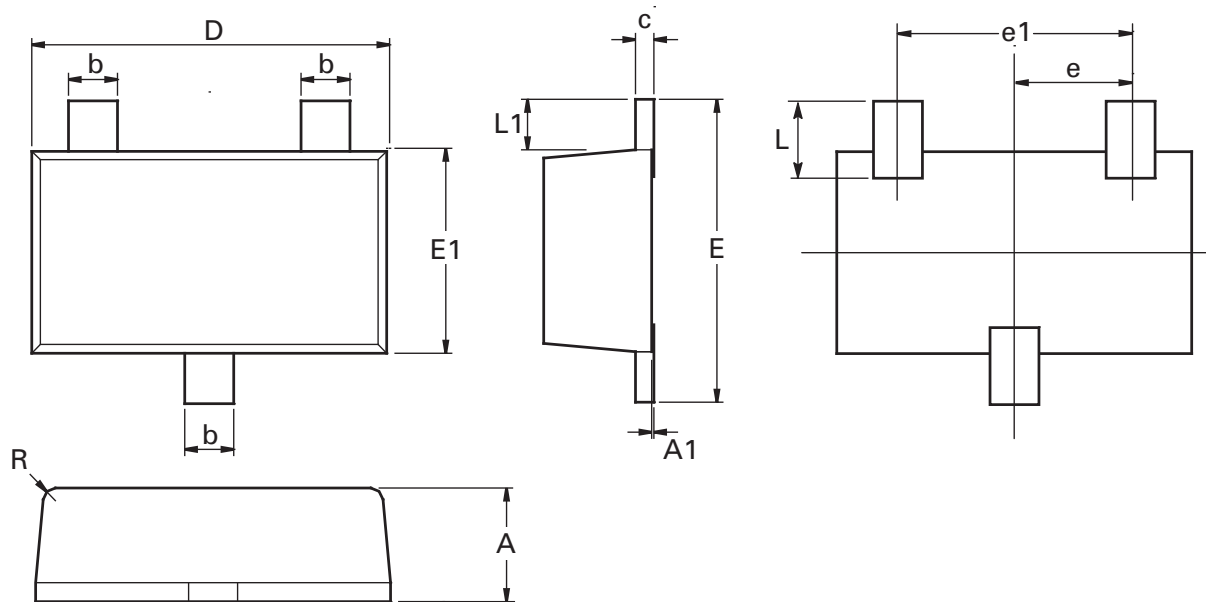
Typical characteristics



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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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