

# ZXTP19020DFF

## 20V, SOT23F, PNP medium power transistor

### Summary

$BV_{CEO} > -20V$

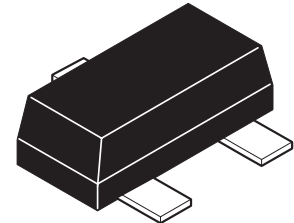
$BV_{ECO} > -4V$

$I_{C(cont)} = 5.5A$

$V_{CE(sat)} < 44mV @ 1A$

$R_{CE(sat)} = 26m\Omega$

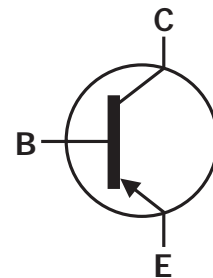
$P_D = 1.5W$



Complementary part number: ZXTN19020DFF

### 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
- 15A peak current
- Guaranteed gain at a collector current of 10A
- Very low saturation voltage

### Applications

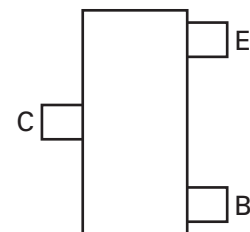
- MOSFET and IGBT gate driving
- Power switches
- Motor control

### Ordering information

Device	Reel size (inches)	Tape width	Quantity per reel
ZXTP19020DFFTA	7	8	3000

### Device marking

1D8



Pinout - top view

# ZXTP19020DFF

## Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	$V_{CBO}$	-25	V
Collector-emitter voltage	$V_{CEO}$	-20	V
Emitter-collector voltage (reverse blocking)	$V_{ECO}$	-4	V
Emitter-base voltage	$V_{EBO}$	-7	V
Continuous collector current <sup>(c)</sup>	$I_C$	-5.5	A
Peak pulse current	$I_{CM}$	-15	A
Base current	$I_B$	-1	A
Power dissipation at $T_{amb} = 25^{\circ}C^{(a)}$	$P_D$	0.84	W
Linear derating factor		6.72	mW/ $^{\circ}C$
Power dissipation at $T_{amb} = 25^{\circ}C^{(b)}$	$P_D$	1.34	W
Linear derating factor		10.72	mW/ $^{\circ}C$
Power dissipation at $T_{amb} = 25^{\circ}C^{(c)}$	$P_D$	1.5	W
Linear derating factor		12	mW/ $^{\circ}C$
Power dissipation at $T_{amb} = 25^{\circ}C^{(d)}$	$P_D$	2	W
linear derating factor		16	mW/ $^{\circ}C$
Operating and storage temperature range	$T_j, T_{stg}$	-55 to 150	$^{\circ}C$

## Thermal resistance

Parameter	Symbol	Value	Unit
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	149.3	$^{\circ}C/W$
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	93.4	$^{\circ}C/W$
Junction to ambient <sup>(c)</sup>	$R_{\theta JA}$	83.3	$^{\circ}C/W$
Junction to ambient <sup>(d)</sup>	$R_{\theta JA}$	60	$^{\circ}C/W$
Junction to case <sup>(e)</sup>	$R_{\theta JC}$	38	$^{\circ}C/W$

### 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.

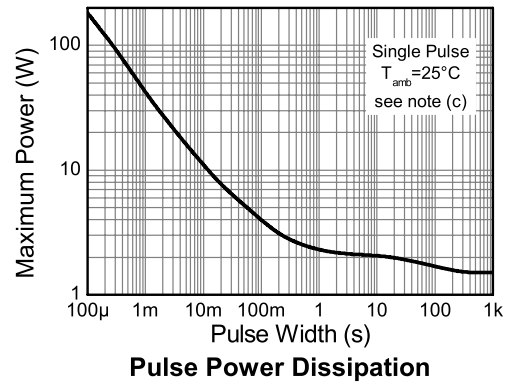
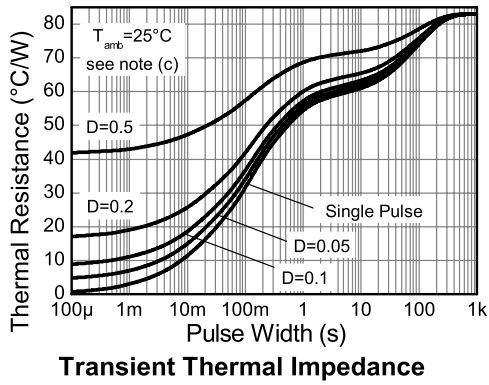
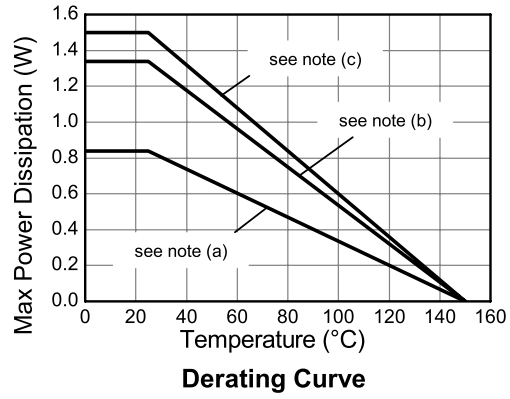
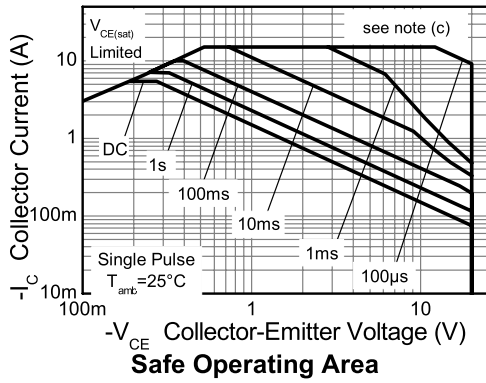
(c) Mounted on 50mm x 50mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

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

(e) Junction to case from collector tab

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## Characteristics



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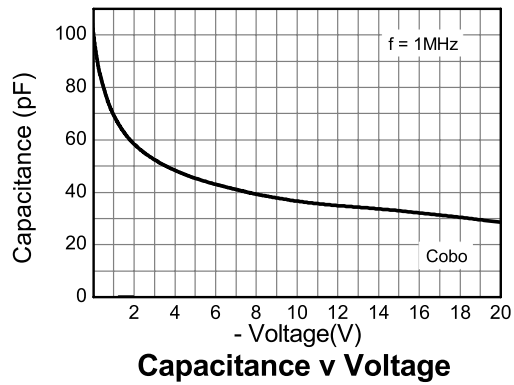
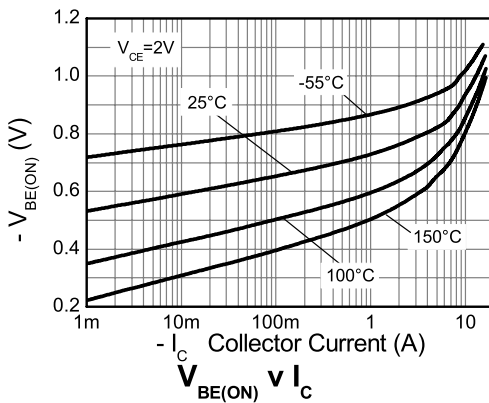
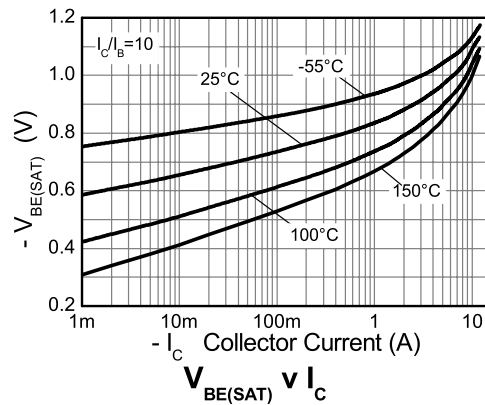
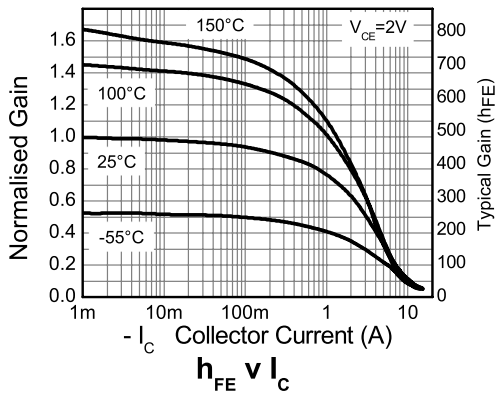
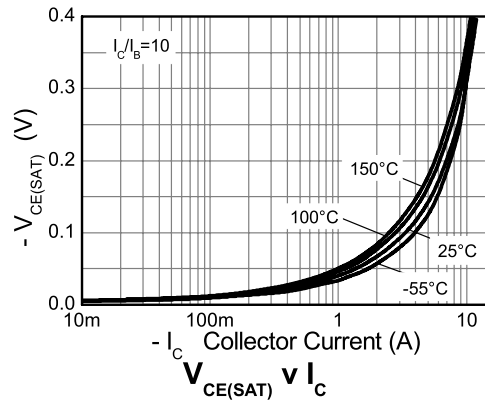
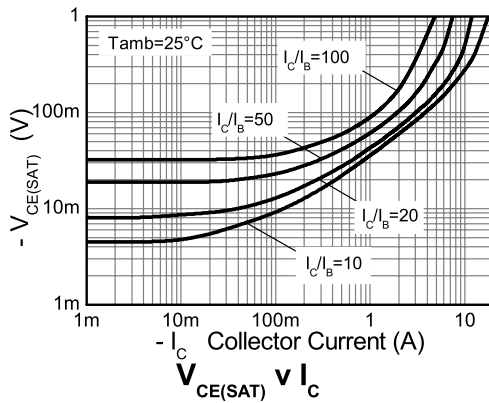
Electrical characteristics (at  $T_{amb} = 25^{\circ}\text{C}$  unless otherwise stated).

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CBO}$	-25	-55		V	$I_C = -100\mu\text{A}$
Collector-emitter breakdown voltage (base open)	$BV_{CEO}$	-20	-50		V	$I_C = -10\text{mA}^{(*)}$
Emitter-collector breakdown voltage (reverse blocking)	$BV_{ECX}$	-4	-8.6		V	$I_E = -100\mu\text{A}$ , $R_{BC} < 1\text{k}\Omega$ or $0.25\text{V} > V_{BC} > -0.25\text{V}$
Emitter-collector breakdown voltage (base open)	$BV_{ECO}$	-4	-8.6		V	$I_E = -100\mu\text{A}$
Emitter-base breakdown voltage	$BV_{EBO}$	-7	-8.2		V	$I_E = -100\mu\text{A}$
Collector-base cut-off current	$I_{CBO}$		<-1	-50 -0.5	nA $\mu\text{A}$	$V_{CB} = -25\text{V}$ $V_{CB} = -25\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$
Emitter-base cut-off current	$I_{EBO}$		<-1	-50	nA	$V_{EB} = -5.6\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$		-37	-44	mV	$I_C = -1\text{A}$ , $I_B = -100\text{mA}^{(*)}$
			-90	-125	mV	$I_C = -1\text{A}$ , $I_B = -10\text{mA}^{(*)}$
			-105	-140	mV	$I_C = -2\text{A}$ , $I_B = -40\text{mA}^{(*)}$
			-160	-210	mV	$I_C = -5\text{A}$ , $I_B = -250\text{mA}^{(*)}$
			-145	-175	mV	$I_C = -5.5\text{A}$ , $I_B = -550\text{mA}^{(*)}$
Base-emitter saturation voltage	$V_{BE(sat)}$		-975	-1050	mV	$I_C = -5.5\text{A}$ , $I_B = -550\text{mA}^{(*)}$
Base-emitter turn-on voltage	$V_{BE(on)}$		-830	-900	mV	$I_C = -5.5\text{A}$ , $V_{CE} = -2\text{V}^{(*)}$
Static forward current transfer ratio	$h_{FE}$	300	450	900		$I_C = -100\text{mA}$ , $V_{CE} = -2\text{V}^{(*)}$
		200	310			$I_C = -2\text{A}$ , $V_{CE} = -2\text{V}^{(*)}$
		85	130			$I_C = -5.5\text{A}$ , $V_{CE} = -2\text{V}^{(*)}$
		25	50			$I_C = -10\text{A}$ , $V_{CE} = -2\text{V}^{(*)}$
			20			$I_C = -15\text{A}$ , $V_{CE} = -2\text{V}^{(*)}$
Transition frequency	$f_T$		176		MHz	$I_C = -50\text{mA}$ , $V_{CE} = -10\text{V}$ $f = 50\text{MHz}$
Input capacitance	$C_{ibo}$			400	pF	$V_{EB} = -0.5\text{V}$ , $f = 1\text{MHz}^{(*)}$
Output capacitance	$C_{obo}$		36	45	pF	$V_{CB} = -10\text{V}$ , $f = 1\text{MHz}^{(*)}$
Delay time	$t_d$		23		ns	$I_C = -1\text{A}$ , $V_{CC} = -10\text{V}$ $I_{B1} = -I_{B2} = -50\text{mA}$ .
Rise time	$t_r$		18.4		ns	
Storage time	$t_s$		266		ns	
Fall time	$t_f$		49.6		ns	

**NOTES:**

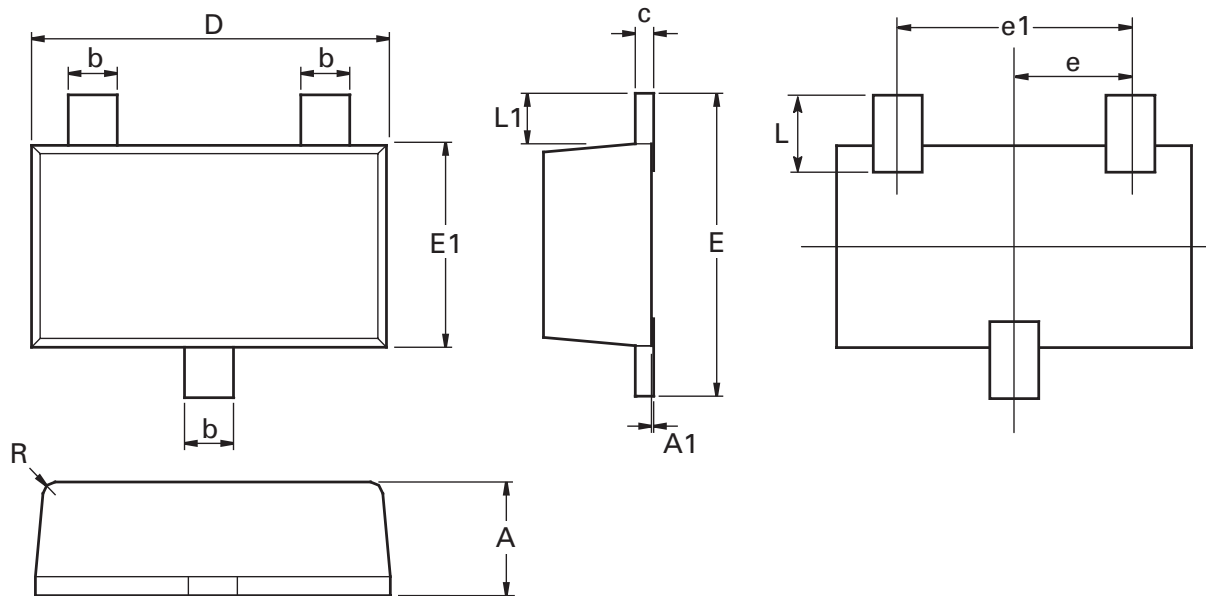
(\*) Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

## Typical characteristics



# ZXTP19020DFF

## SOT23F Package outline



Dim.	Millimeters		Inches		Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	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	L	0.48	0.68	0.0189	0.0268
c	0.10	0.20	0.0043	0.0079	L1	0.30	0.50	0.0153	0.0161
D	2.80	3.00	0.1102	0.1181	R	0.05	0.15	0.0019	0.0059
e	0.95 ref		0.0374 ref		O	0°	12°	0°	12°
e1	1.80	2.00	0.0709	0.0787	-	-	-	-	-

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

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# ZXTP19020DFF

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