

# ZXTP25020CFF

## 20V, SOT23F, PNP medium power transistor

### Summary

$BV_{CEO} > -20V$

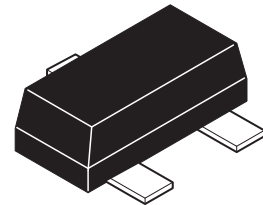
$BV_{ECO} > -7V$

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

$R_{CE(sat)} = 41m\Omega$

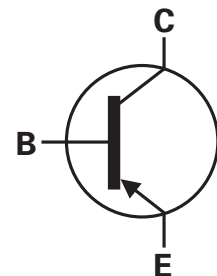
$V_{CE(sat)} < -65mV @ 1A$

$P_D = 1.5W$



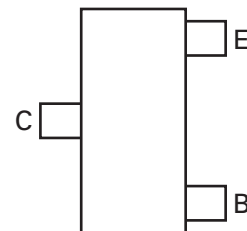
### Description

Advanced process capability and packaging maximise the power handling and performance of this small outline transistor. The reverse blocking capability of the transistor can often result in the elimination of a series connected Schottky diode commonly required with either bipolar transistors or MOSFETs when used in battery charging applications.



### Features

- 20V PNP
- Very low saturation voltage
- 7V reverse blocking capability
- High pulse current
- Low profile SOT23F package



Pinout - top view

### Applications

- Mobile phone charging circuits
- Disconnect switch in portable products
- High side driving
- Motor control
- DC-DC convertors
- MOSFET and IGBT gate driving

### Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTP25020CFFTA	7	8	3000

### Device marking

1F4

# ZXTP25020CFF

## 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)	$V_{ECO}$	-7	V
Emitter-base voltage	$V_{EBO}$	-7	V
Continuous collector current <sup>(c)</sup>	$I_C$	-4.5	A
Peak pulse current	$I_{CM}$	-10	A
Base current	$I_B$	-1	A
Power dissipation at $T_{amb} = 25^{\circ}C^{(a)}$	$P_D$	0.79	W
Linear derating factor		6.3	mW/°C
Power dissipation at $T_{amb} = 25^{\circ}C^{(b)}$	$P_D$	1.13	W
Linear derating factor		9	mW/°C
Power dissipation at $T_{amb} = 25^{\circ}C^{(c)}$	$P_D$	1.50	W
Linear derating factor		12.0	mW/°C
Power dissipation at $T_{amb} = 25^{\circ}C^{(d)}$	$P_D$	1.96	W
Linear derating factor		15.7	mW/°C
Operating and storage temperature range	$T_j, T_{stg}$	-55 to 150	°C

## Thermal resistance

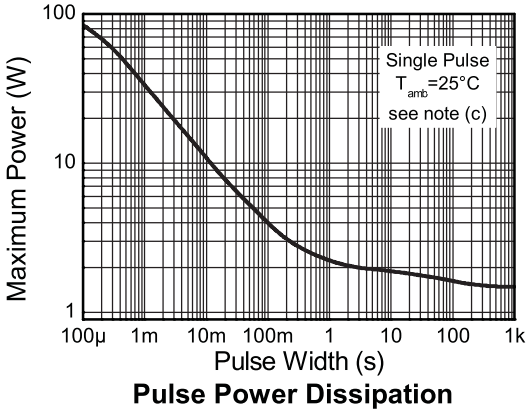
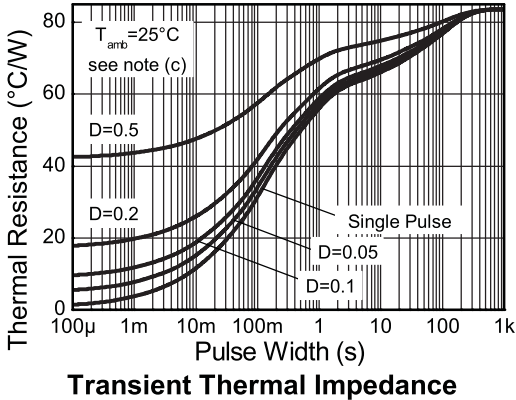
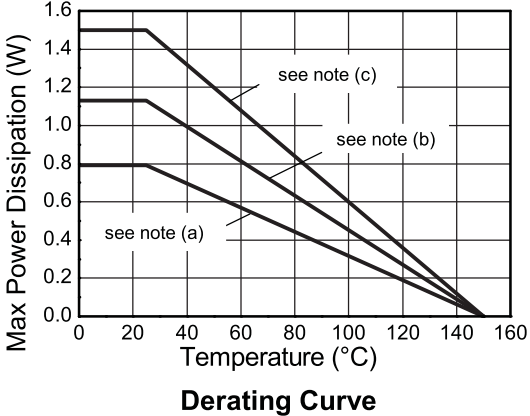
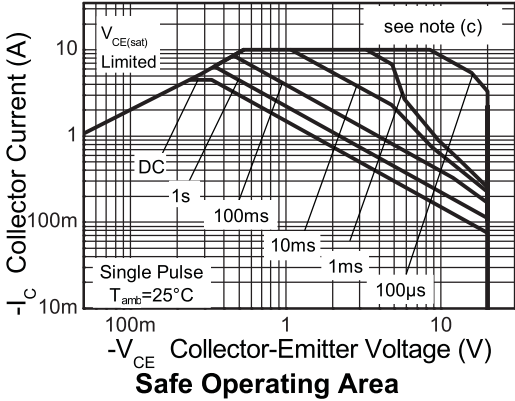
Parameter	Symbol	Value	Unit
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	158.7	°C/W
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	110.4	°C/W
Junction to ambient <sup>(c)</sup>	$R_{\theta JA}$	83.3	°C/W
Junction to ambient <sup>(d)</sup>	$R_{\theta JA}$	63.7	°C/W

### 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.

# ZXTP25020CFF

## Characteristics



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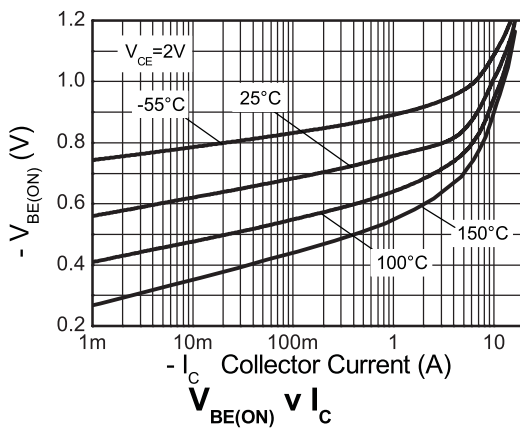
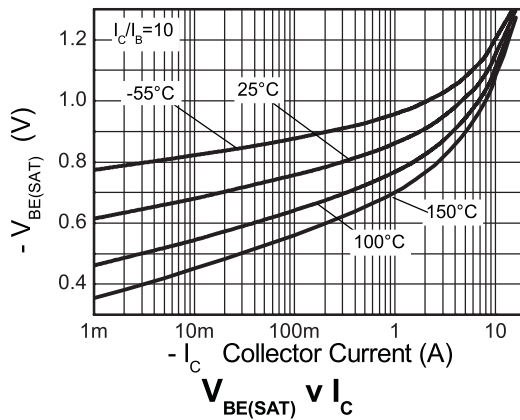
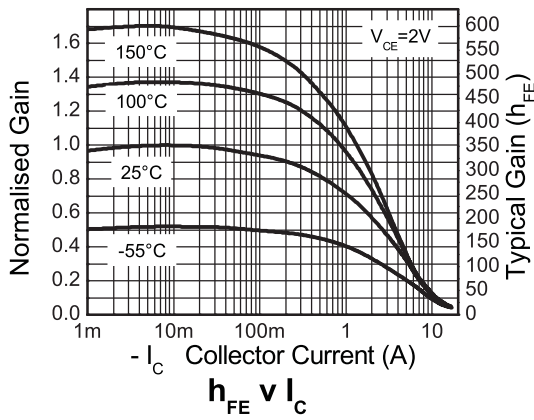
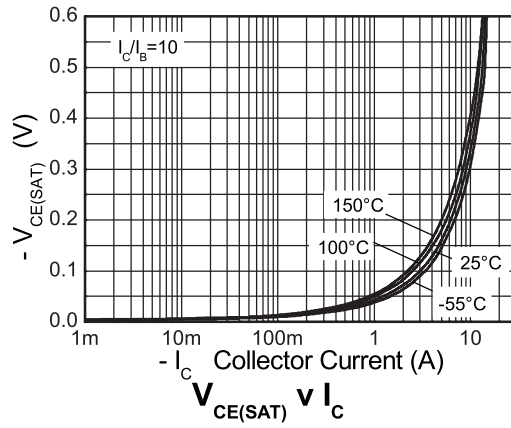
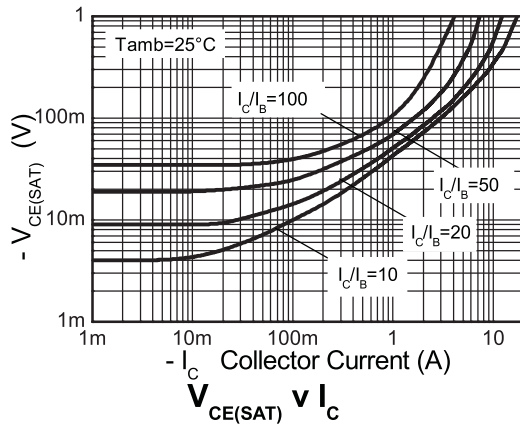
## Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CBO}$	-25	-50		V	$I_C = -100\mu\text{A}$
Collector-emitter breakdown voltage (base open)	$BV_{CEO}$	-20	-35		V	$I_C = -10\text{mA}^{(*)}$
Emitter-base breakdown voltage	$BV_{EBO}$	-7	-8.2		V	$I_E = -100\mu\text{A}$
Emitter-collector breakdown voltage (reverse blocking)	$BV_{ECX}$	-7	-8.0		V	$I_E = -100\mu\text{A}^{(*)}$ $R_{BC} < 10\text{k}\Omega$ or $-0.25 < V_{BC} < 0.25\text{V}$
Emitter-collector breakdown voltage (base open)	$BV_{ECO}$	-7	-8.8		V	$I_E = -100\mu\text{A}^{(*)}$
Collector-base cut-off current	$I_{CBO}$		<-1	-50 -20	nA $\mu\text{A}$	$V_{CB} = -20\text{V}$ $V_{CB} = -20\text{V}, T_{amb} = 100^{\circ}\text{C}$
Emitter-base cut-off current	$I_{EBO}$		<-1	-50	nA	$V_{EB} = -5.6\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$		-50 -80 -135 -210	-65 -110 -185 -260	mV mV mV mV	$I_C = -1\text{A}, I_B = -100\text{mA}^{(*)}$ $I_C = -1\text{A}, I_B = -20\text{mA}^{(*)}$ $I_C = -2\text{A}, I_B = -40\text{mA}^{(*)}$ $I_C = -4.5\text{A}, I_B = -225\text{mA}^{(*)}$
Base-emitter saturation voltage	$V_{BE(sat)}$		-950	-1050	mV	$I_C = -4.5\text{A}, I_B = -225\text{mA}^{(*)}$
Base-emitter turn-on voltage	$V_{BE(on)}$		-840	-950	mV	$I_C = -4.5\text{A}, V_{CE} = -2\text{V}^{(*)}$
Static forward current transfer ratio	$h_{FE}$	200 150 85	350 250 140 40	500		$I_C = -10\text{mA}, V_{CE} = -2\text{V}^{(*)}$ $I_C = -1\text{A}, V_{CE} = -2\text{V}^{(*)}$ $I_C = -4\text{A}, V_{CE} = -2\text{V}^{(*)}$ $I_C = -10\text{A}, V_{CE} = -2\text{V}^{(*)}$
Transition frequency	$f_T$		285		MHz	$I_C = -50\text{mA}, V_{CE} = -10\text{V}$ $f = 100\text{MHz}$
Output capacitance	$C_{obo}$		32.4	40	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}^{(*)}$
Delay time	$t_d$		38.4		ns	$V_{CC} = -15\text{V}.$ $I_C = -750\text{mA},$ $I_{B1} = I_{B2} = -15\text{mA}.$
Rise time	$t_r$		49.2		ns	
Storage time	$t_s$		168		ns	
Fall time	$t_f$		55		ns	

### NOTES:

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

## Typical characteristics

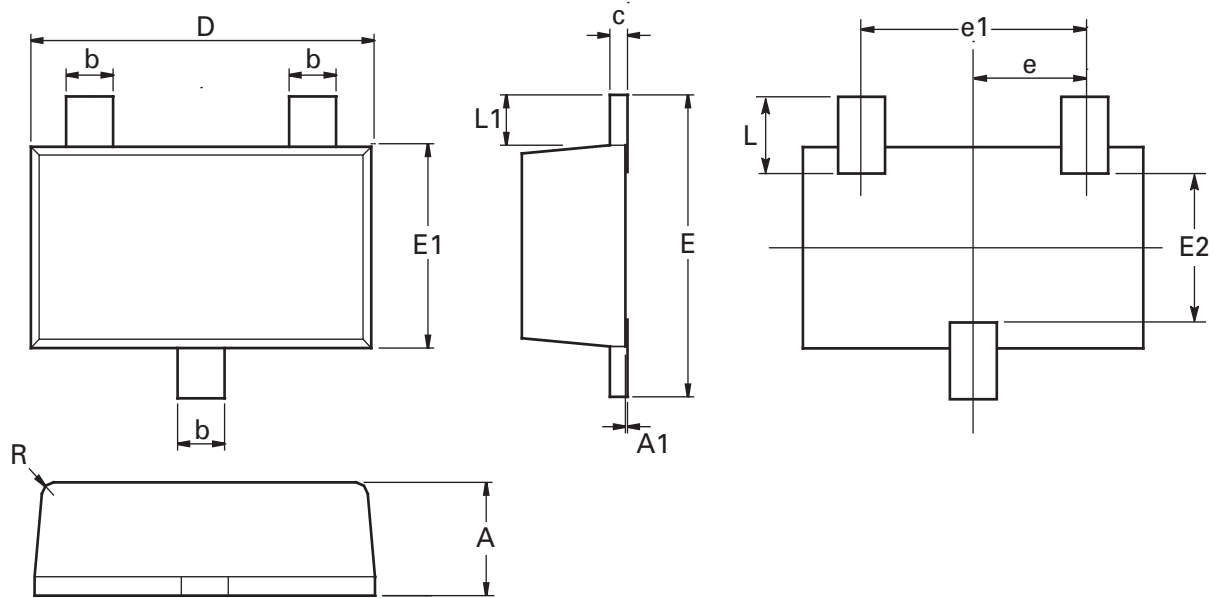


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# ZXTP25020CFF

## 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

# ZXTP25020CFF

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