

ZXTP25020CFF

20V, SOT23F, PNP medium power transistor

Summary

$BV_{CEO} > -20V$

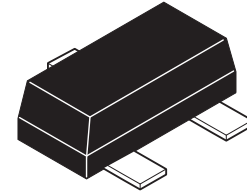
$BV_{ECO} > -7V$

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

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

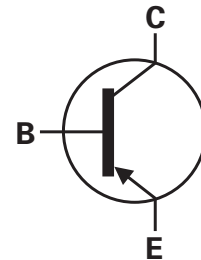
$V_{CE(sat)} < -65mV @ 1A$

$P_D = 1.5W$



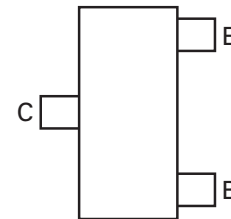
Description

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 ^(c)	I_C	-4.5	A
Peak pulse current	I_{CM}	-10	A
Base current	I_B	-1	A
Power dissipation at $T_{amb} = 25^\circ\text{C}^{(a)}$	P_D	0.79	W
Linear derating factor		6.3	mW/°C
Power dissipation at $T_{amb} = 25^\circ\text{C}^{(b)}$	P_D	1.13	W
Linear derating factor		9	mW/°C
Power dissipation at $T_{amb} = 25^\circ\text{C}^{(c)}$	P_D	1.50	W
Linear derating factor		12.0	mW/°C
Power dissipation at $T_{amb} = 25^\circ\text{C}^{(d)}$	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 ^(a)	$R_{\theta JA}$	158.7	°C/W
Junction to ambient ^(b)	$R_{\theta JA}$	110.4	°C/W
Junction to ambient ^(c)	$R_{\theta JA}$	83.3	°C/W
Junction to ambient ^(d)	$R_{\theta JA}$	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.

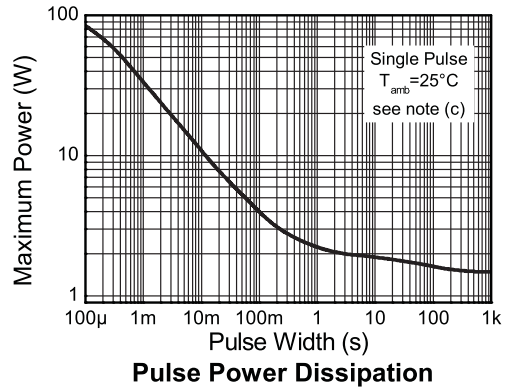
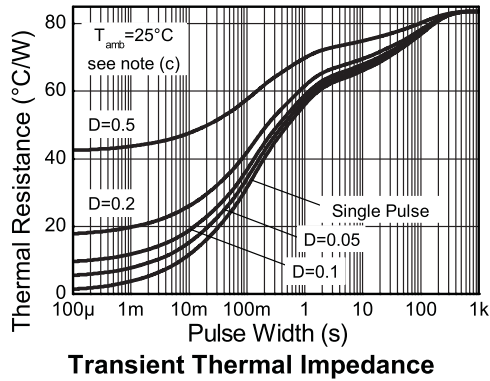
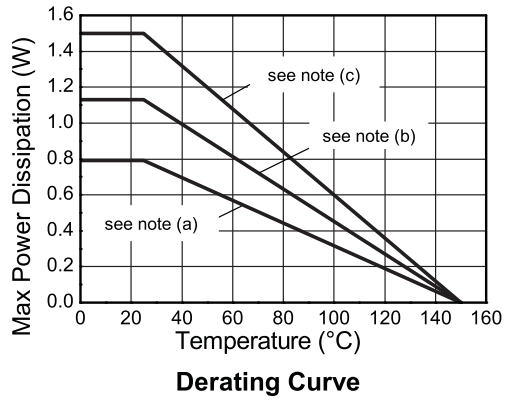
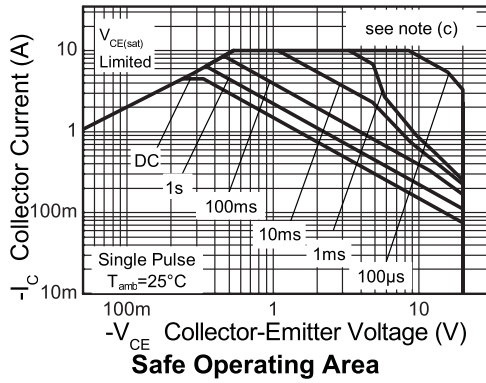
(b) Mounted on 25mm x 25mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

(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 $t < 5\text{secs}$.

ZXTP25020CFF

Characteristics



ZXTP25020CFF

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

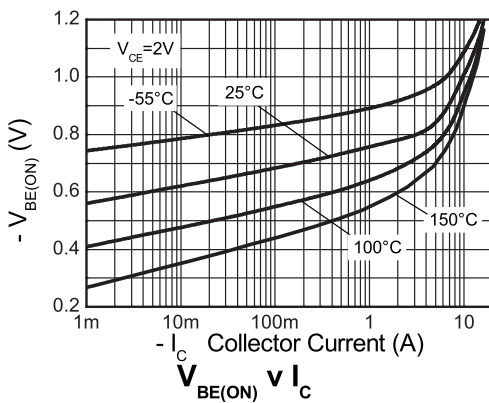
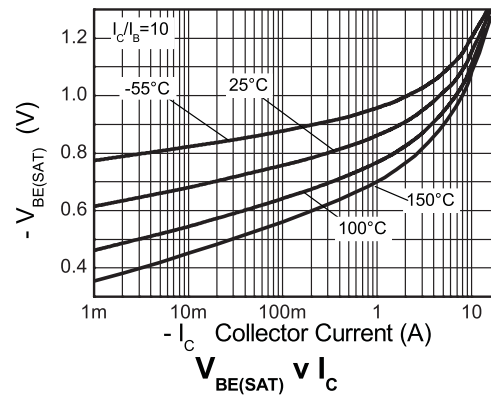
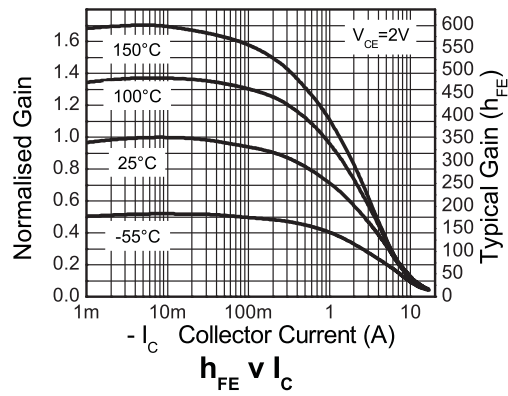
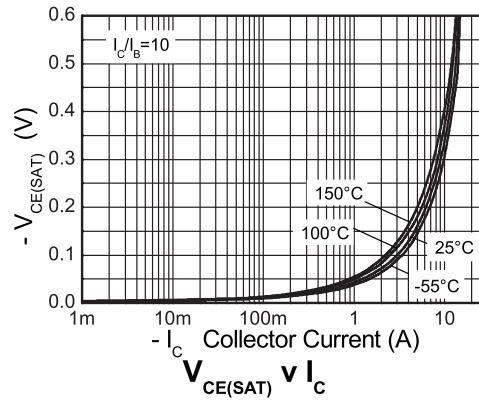
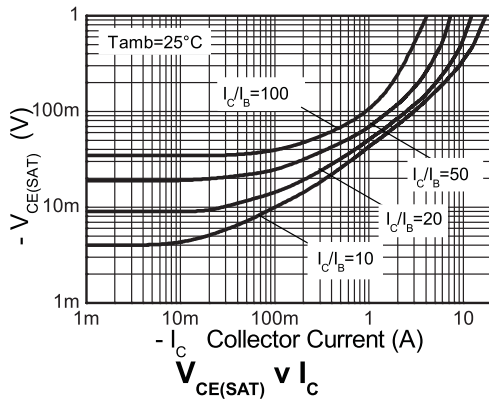
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	-25	-50		V	$I_C = -100\mu\text{A}$
Collector-emitter breakdown voltage (base open)	BV_{CEO}	-20	-35		V	$I_C = -10\text{mA}^{(*)}$
Emitter-base breakdown voltage	BV_{EBO}	-7	-8.2		V	$I_E = -100\mu\text{A}$
Emitter-collector 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	nA μA	$V_{CB} = -20\text{V}$ $V_{CB} = -20\text{V}$, $T_{amb} = 100^{\circ}\text{C}$
Emitter-base cut-off current	I_{EBO}		<-1	-50	nA	$V_{EB} = -5.6\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$		-50	-65	mV	$I_C = -1\text{A}$, $I_B = -100\text{mA}^{(*)}$
			-80	-110	mV	$I_C = -1\text{A}$, $I_B = -20\text{mA}^{(*)}$
			-135	-185	mV	$I_C = -2\text{A}$, $I_B = -40\text{mA}^{(*)}$
			-210	-260	mV	$I_C = -4.5\text{A}$, $I_B = -225\text{mA}^{(*)}$
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	350	500		$I_C = -10\text{mA}$, $V_{CE} = -2\text{V}^{(*)}$
		150	250			$I_C = -1\text{A}$, $V_{CE} = -2\text{V}^{(*)}$
		85	140			$I_C = -4\text{A}$, $V_{CE} = -2\text{V}^{(*)}$
			40			$I_C = -10\text{A}$, $V_{CE} = -2\text{V}^{(*)}$
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	$V_{CC} = -15\text{V}$.
Rise time	t_r		49.2		ns	$I_C = -750\text{mA}$,
Storage time	t_s		168		ns	$I_{B1} = I_{B2} = -15\text{mA}$.
Fall time	t_f		55		ns	

NOTES:

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

ZXTP25020CFF

Typical characteristics

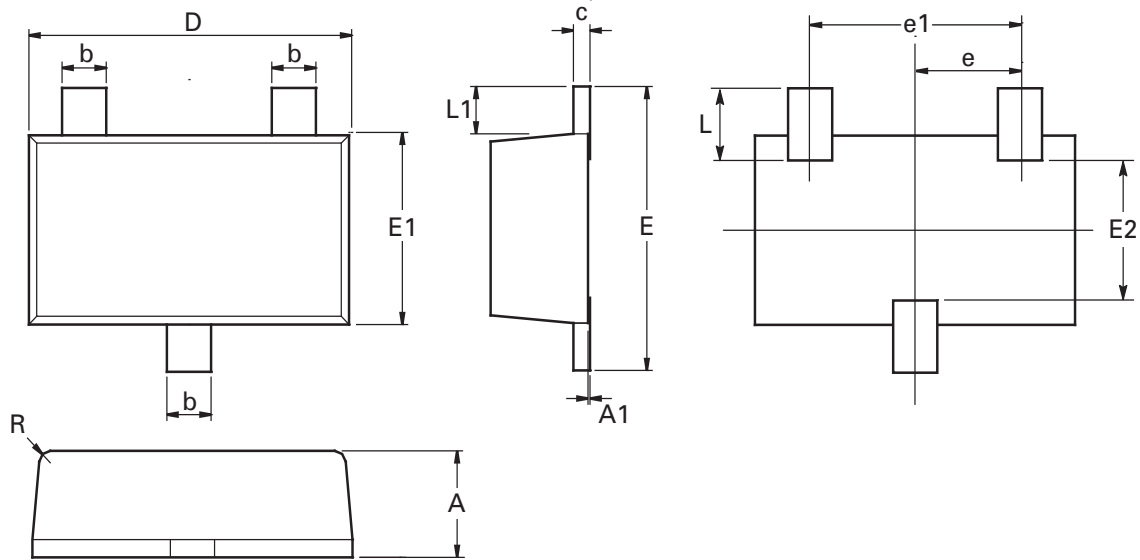


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ZXTP25020CFF

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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8

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