

# ZXTN08400BFF

## 400V, SOT23F, NPN medium power high voltage transistor

### Summary

$BV_{CEX} > 450V$

$BV_{CEO} > 400V$

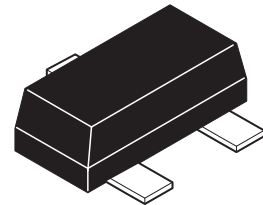
$BV_{ECO} > 6V$

$I_{C(cont)} = 0.5A$

$V_{CE(sat)} < 175mV @ 500mA$

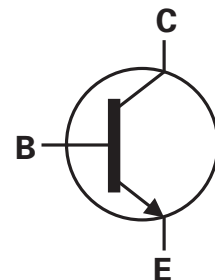
$P_D = 1.5W$

Complementary part number ZXTP08400BFF



### Description

This NPN transistor has been designed for applications requiring high voltage blocking. The SOT23F package is pin compatible with the industry standard SOT23 foot print but offers lower profile and higher dissipation for applications where power density is of utmost importance.

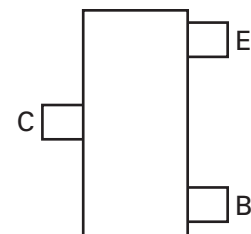


### Features

- High voltage
- Low saturation voltage
- Low profile small outline package

### Applications

- Modems
- Telecoms line switching



Pinout - top view

### Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN08400BFFTA	7	8	3000

### Device marking

1D5

# ZXTN08400BFF

## Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	$V_{CBO}$	450	V
Collector-emitter voltage (forward blocking)	$V_{CEX}$	450	V
Collector-emitter voltage	$V_{CEO}$	400	V
Emitter-collector voltage (reverse blocking)	$V_{ECO}$	6	V
Emitter-base voltage	$V_{EBO}$	7	V
Continuous collector current <sup>(c)</sup>	$I_C$	0.5	A
Peak pulse current	$I_{CM}$	1	A
Base current	$I_B$	0.2	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

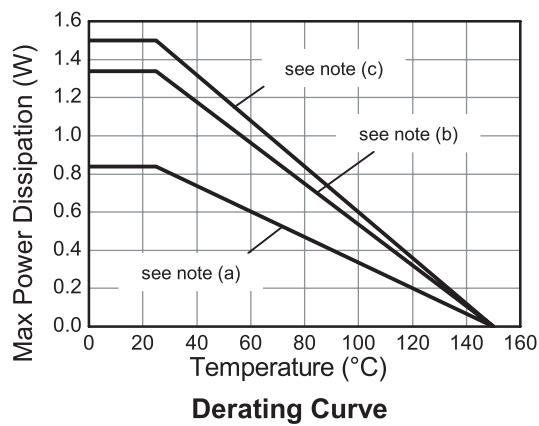
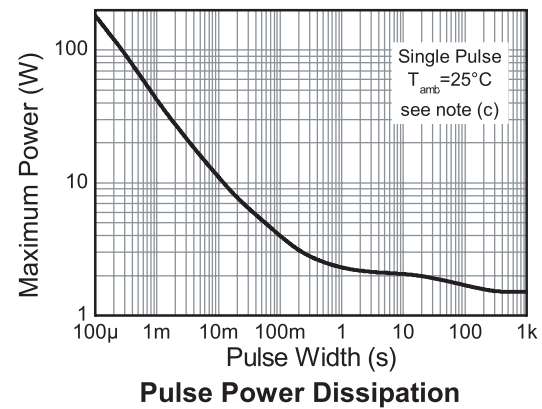
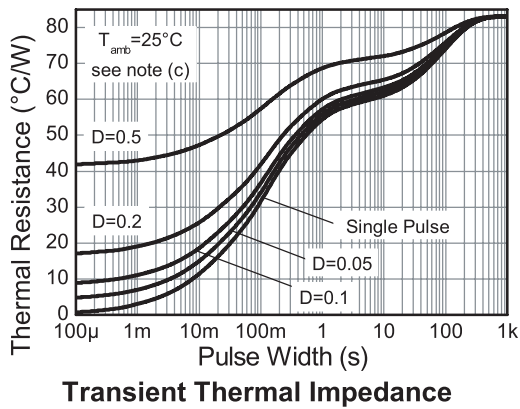
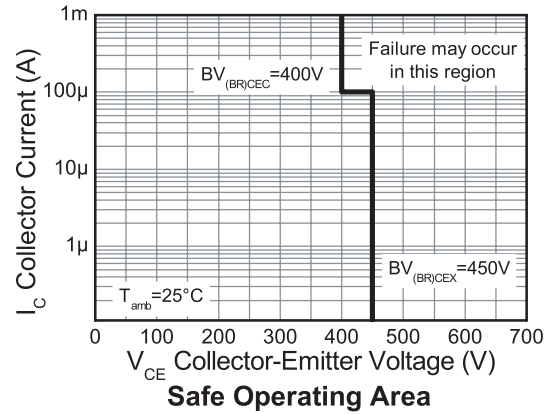
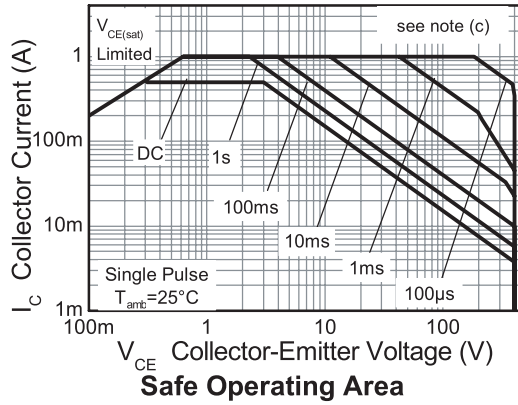
Parameter	Symbol	Limit	Unit
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	149	°C/W
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	93	°C/W
Junction to ambient <sup>(c)</sup>	$R_{\theta JA}$	83	°C/W
Junction to ambient <sup>(d)</sup>	$R_{\theta JA}$	60	°C/W

### 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.

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## Typical characteristics



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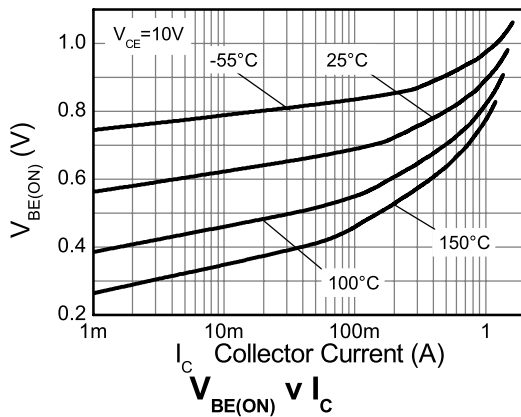
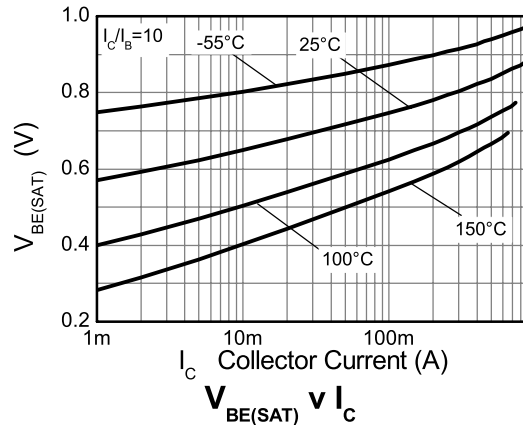
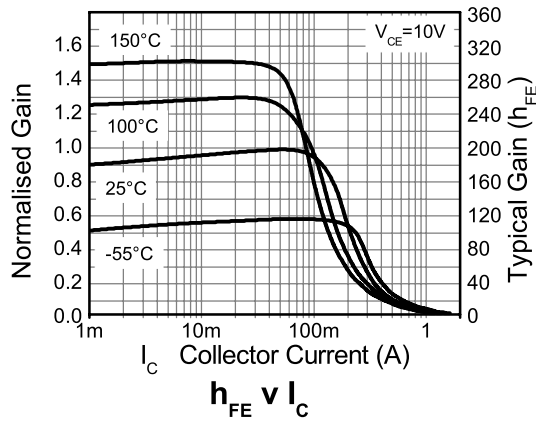
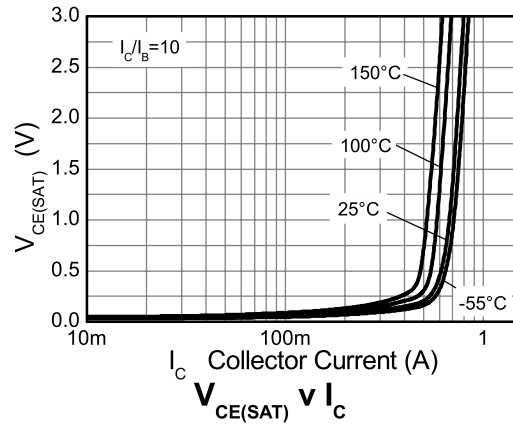
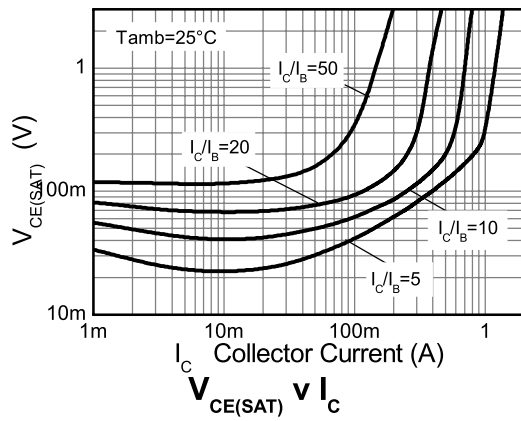
## Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CBO}$	450	550		V	$I_C = 100\mu\text{A}$
Collector-emitter breakdown voltage (forward blocking)	$BV_{CEX}$	450	550		V	$I_C = 100\mu\text{A}$ , $R_{BE} < 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$
Collector-emitter breakdown voltage (base open)	$BV_{CEO}$	400	500		V	$I_C = 10\text{mA}^{(*)}$
Emitter-collector breakdown voltage (reverse blocking)	$BV_{ECX}$	6	8.0		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)	$BV_{ECO}$	6	8.5		V	$I_E = 100\mu\text{A}$ ,
Emitter-base breakdown voltage	$BV_{EBO}$	7	8.1		V	$I_E = 100\mu\text{A}$
Collector-base cut-off current	$I_{CBO}$		<1	50 20	nA $\mu\text{A}$	$V_{CB} = 360\text{V}$ $V_{CB} = 360\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$
Collector-emitter cut-off current	$I_{CEX}$		<1	100	nA	$V_{CE} = 360\text{V}$ , $R_{BE} < 1\text{k}\Omega$ 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	$V_{CE(sat)}$		70	85	mV	$I_C = 20\text{mA}$ , $I_B = 1\text{mA}^{(*)}$
			50	70	mV	$I_C = 50\text{mA}$ , $I_B = 5\text{mA}^{(*)}$
			120	170	mV	$I_C = 300\text{mA}$ , $I_B = 30\text{mA}^{(*)}$
			125	175	mV	$I_C = 500\text{mA}$ , $I_B = 100\text{mA}^{(*)}$
Base-emitter saturation voltage	$V_{BE(sat)}$		865	950	mV	$I_C = 500\text{mA}$ , $I_B = 100\text{mA}^{(*)}$
Base-emitter turn-on voltage	$V_{BE(on)}$		800	900	mV	$I_C = 500\text{mA}$ , $V_{CE} = 10\text{V}^{(*)}$
Static forward current transfer ratio	$h_{FE}$	90	165			$I_C = 1\text{mA}$ , $V_{CE} = 5\text{V}^{(*)}$
		100	180	300		$I_C = 50\text{mA}$ , $V_{CE} = 5\text{V}^{(*)}$
		10	20			$I_C = 500\text{mA}$ , $V_{CE} = 10\text{V}^{(*)}$
Transition frequency	$f_T$		40		MHz	$I_C = 10\text{mA}$ , $V_{CE} = 20\text{V}$ $f = 20\text{MHz}$
Output capacitance	$C_{OBO}$		8	10	pF	$V_{CB} = 20\text{V}$ , $f = 1\text{MHz}^{(*)}$
Delay time	$t_d$		100		ns	$V_{CC} = 100\text{V}$ . $I_C = 100\text{mA}$ , $I_{B1} = 10\text{mA}$ , $I_{B2} = 20\text{mA}$ .
Rise time	$t_r$		52		ns	
Storage time	$t_s$		3122		ns	
Fall time	$t_f$		240		ns	

### NOTES:

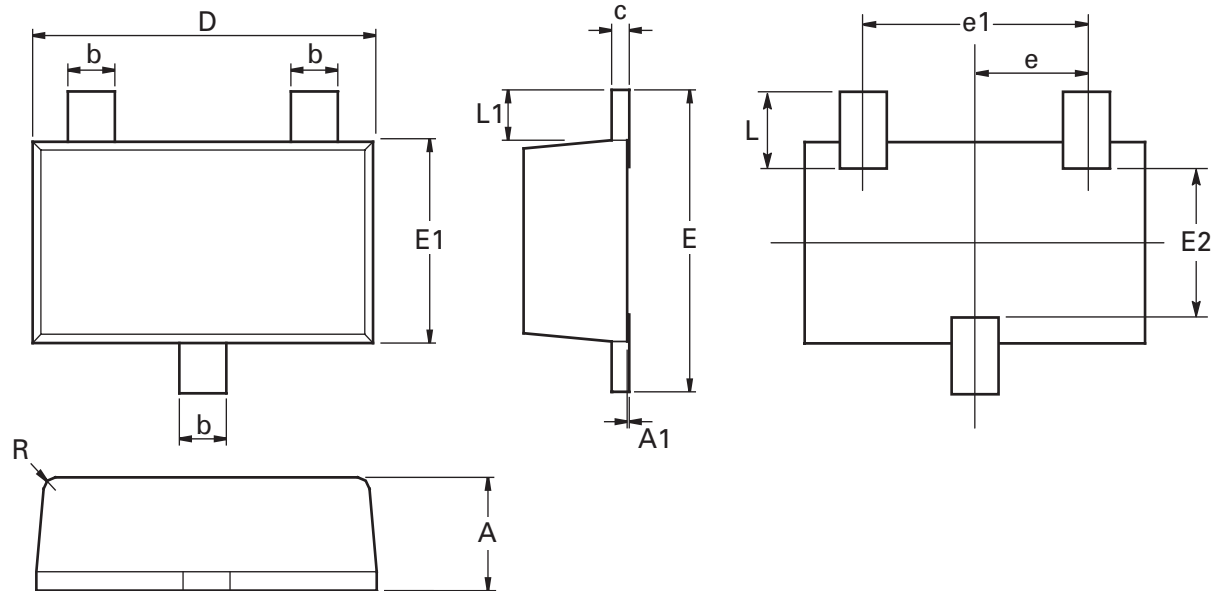
(\*) Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

## 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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