

# ZXTN19060CFF

## 60V, SOT23F, NPN high gain power transistor

### Summary

$BV_{CEX} > 160V$

$BV_{CEO} > 60V$

$BV_{ECO} > 6V$

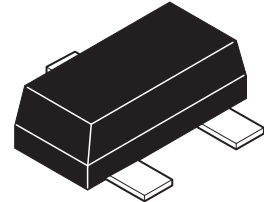
$I_{C(cont)} = 5.5A$

$V_{CE(sat)} < 45mV @ 1A$

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

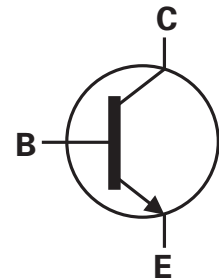
$P_D = 1.5W$

Complementary part number ZXTP19060CFF



### Description

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

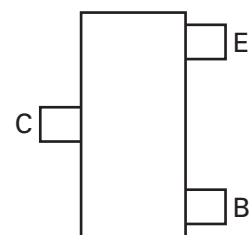


### Features

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

### Applications

- Motor drive
- Siren driver



Pinout - top view

### Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN19060CFFTA	7	8	3000

### Device marking

1E4

# ZXTN19060CFF

## Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	$V_{CBO}$	160	V
Collector-emitter voltage (forward blocking)	$V_{CEX}$	160	V
Collector-emitter voltage	$V_{CEO}$	60	V
Emitter-collector voltage (reverse blocking)	$V_{ECO}$	6	V
Emitter-base voltage	$V_{EBO}$	7	V
Continuous collector current (c)	$I_C$	5.5	A
Base current	$I_B$	1	A
Peak pulse current	$I_{CM}$	12	A
Power dissipation @ $T_{amb} = 25^\circ\text{C}$ (a)	$P_D$	0.84	W
Linear derating factor		6.72	mW/ $^\circ\text{C}$
Power dissipation @ $T_{amb} = 25^\circ\text{C}$ (b)	$P_D$	1.34	W
Linear derating factor		10.72	mW/ $^\circ\text{C}$
Power dissipation @ $T_{amb} = 25^\circ\text{C}$ (c)	$P_D$	1.50	W
Linear derating factor		12.0	mW/ $^\circ\text{C}$
Power dissipation @ $T_{amb} = 25^\circ\text{C}$ (d)	$P_D$	2.0	W
Linear derating factor		16.0	mW/ $^\circ\text{C}$
Operating and storage temperature range	$T_j, T_{stg}$	- 55 to 150	$^\circ\text{C}$

## Thermal resistance

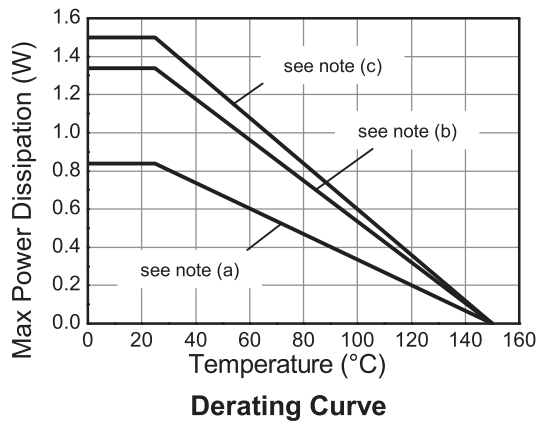
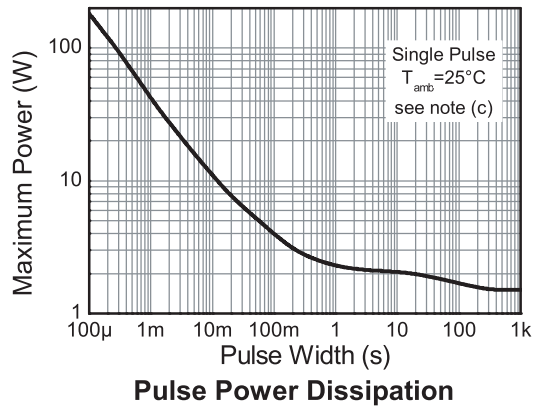
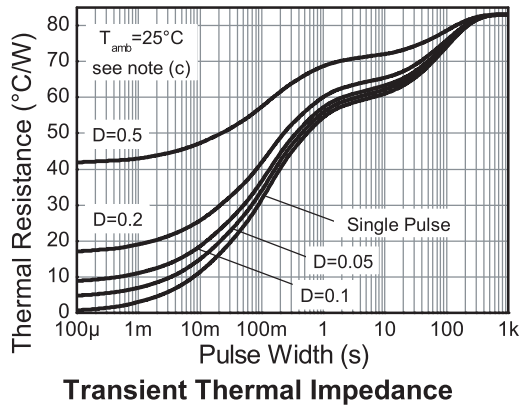
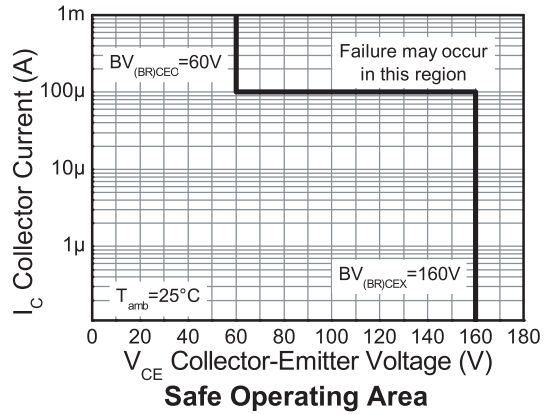
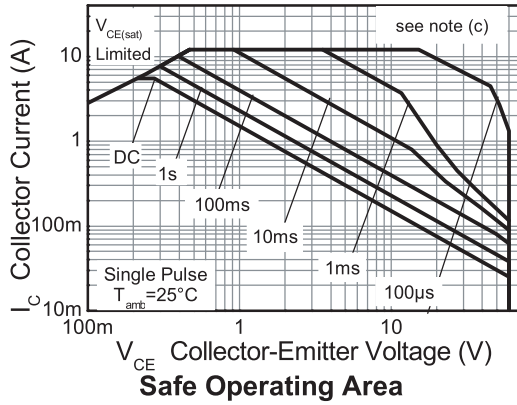
Parameter	Symbol	Limit	Unit
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	149.3	$^\circ\text{C}/\text{W}$
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	93.4	$^\circ\text{C}/\text{W}$
Junction to ambient <sup>(c)</sup>	$R_{\theta JA}$	83.3	$^\circ\text{C}/\text{W}$
Junction to ambient <sup>(d)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

### 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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## Characteristics



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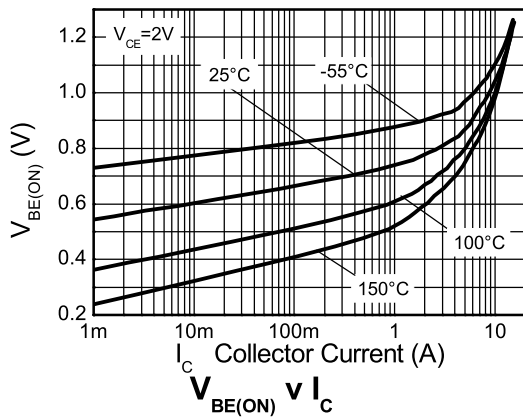
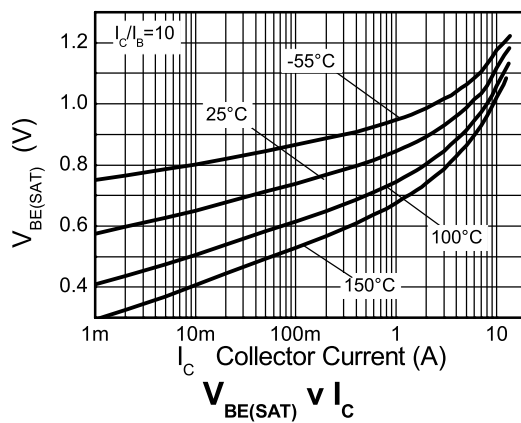
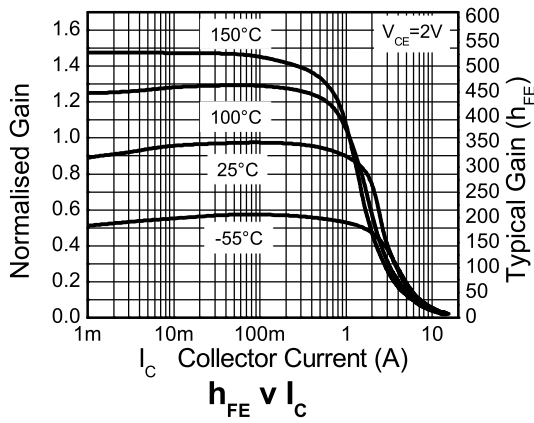
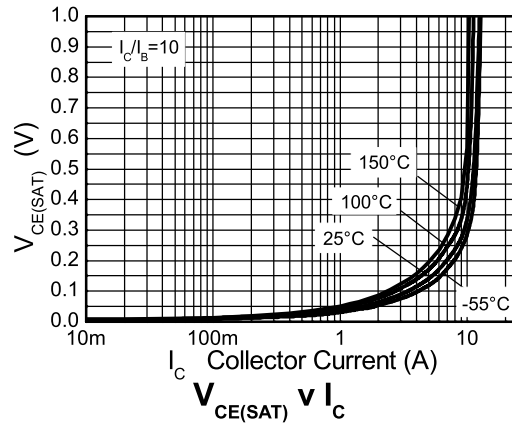
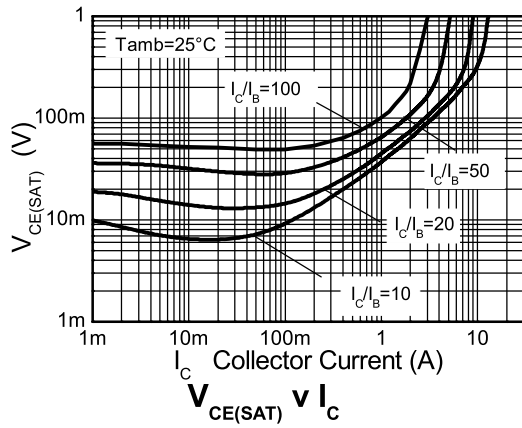
## Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CBO}$	160	200		V	$I_C = 100\mu\text{A}$
Collector-emitter breakdown voltage (forward blocking)	$BV_{CEX}$	160	200		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)	$BV_{CEO}$	60	75		V	$I_C = 10\text{mA}^{(*)}$
Emitter-base breakdown voltage	$BV_{EBO}$	7	8.3		V	$I_E = 100\mu\text{A}$
Emitter-collector breakdown voltage (reverse blocking)	$BV_{ECX}$	6	7		V	$I_E = 100\text{mA}$ , $R_{BC} \leq 1\text{k}\Omega$ or $0.25\text{V} > V_{BC} > -0.25\text{V}$
Emitter-collector breakdown voltage (base open)	$BV_{ECO}$	6	7		V	$I_E = 100\mu\text{A}$ ,
Collector-base cut-off current	$I_{CBO}$		<1	50	nA	$V_{CB} = 160\text{V}$
				0.5	$\mu\text{A}$	$V_{CB} = 160\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$
Collector-emitter cut-off current	$I_{CEX}$		<1	100	nA	$V_{CE} = 120\text{V}$ , $R_{BE} \leq 1\text{k}\Omega$ 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	$V_{CE(sat)}$		36	45	mV	$I_C = 1\text{A}$ , $I_B = 100\text{mA}^{(*)}$
			105	150	mV	$I_C = 1\text{A}$ , $I_B = 10\text{mA}^{(*)}$
			105	135	mV	$I_C = 2\text{A}$ , $I_B = 40\text{mA}^{(*)}$
			145	175	mV	$I_C = 5.5\text{A}$ , $I_B = 550\text{mA}^{(*)}$
Base-emitter saturation voltage	$V_{BE(sat)}$		1000	1100	mV	$I_C = 5.5\text{A}$ , $I_B = 550\text{mA}^{(*)}$
Base-emitter turn-on voltage	$V_{BE(on)}$		880	1000	mV	$I_C = 5.5\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$
Static forward current transfer ratio	$h_{FE}$	200	350	500		$I_C = 0.1\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$
		160	280			$I_C = 2\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$
		30	50			$I_C = 6\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$
Transition frequency	$f_T$		130		MHz	$I_C = 50\text{mA}$ , $V_{CE} = 10\text{V}$ $f = 50\text{MHz}$
Input capacitance	$C_{ibo}$		310		pF	$V_{EB} = 0.5\text{V}$ , $f = 1\text{MHz}^{(*)}$
Output capacitance	$C_{obo}$		19.3	25	pF	$V_{CB} = 10\text{V}$ , $f = 1\text{MHz}^{(*)}$
Delay time	$t_d$		27.3		ns	$V_{CC} = 10\text{V}$ .
Rise time	$t_r$		13.2		ns	$I_C = 500\text{mA}$ ,
Storage time	$t_s$		682		ns	$I_{B1} = I_{B2} = 50\text{mA}$ .
Fall time	$t_f$		90.9		ns	

### NOTES:

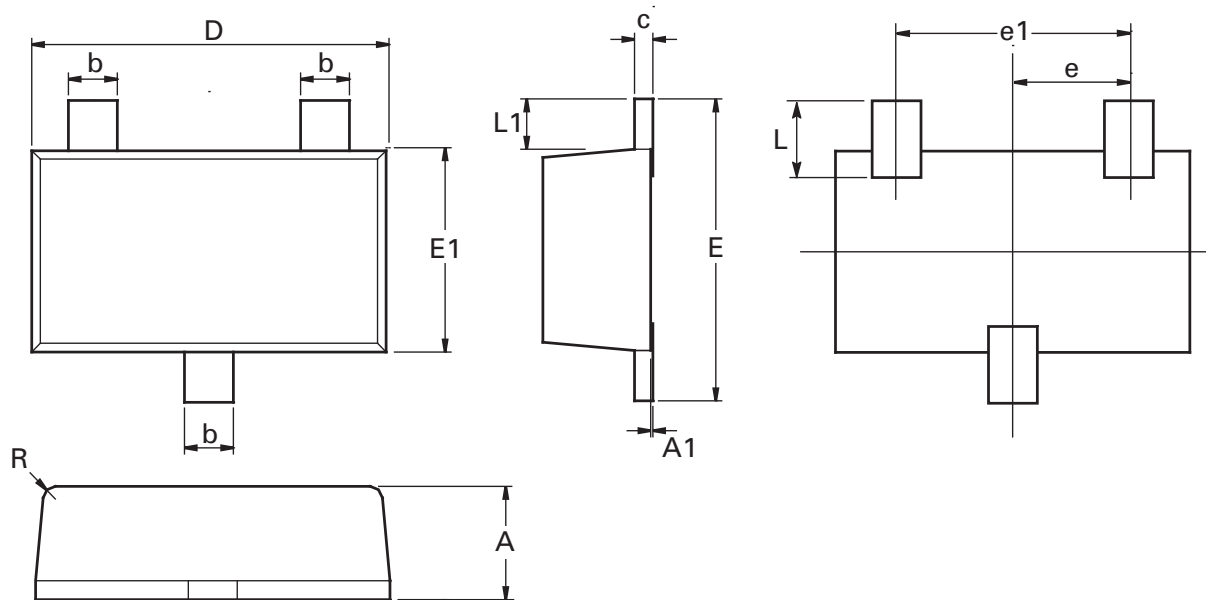
(\*) Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

## Typical characteristics



# ZXTN19060CFF

## 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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