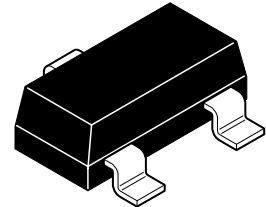


# ZXTN25060BFH

## 60V, SOT23, NPN medium power transistor

### Summary

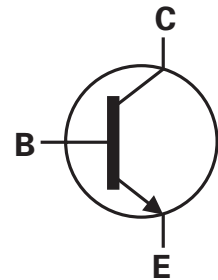
$BV_{CEX} > 150V$   
 $BV_{CEO} > 60V$   
 $BV_{ECO} > 6V$   
 $I_{C(cont)} = 3.5A$   
 $V_{CE(sat)} < 65\text{ mV @ } 1A$   
 $R_{CE(sat)} = 43\text{ m}\Omega$   
 $P_D = 1.25W$



Complementary part number ZXTP25060BFH

### 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.

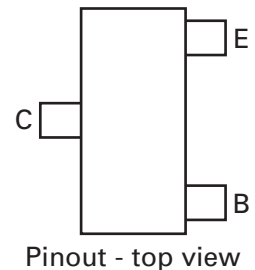


### Features

- High power dissipation SOT23 package
- High peak current
- Low saturation voltage
- 150V forward blocking voltage

### Applications

- Lamp, relay and solenoid drivers
- General switching in automotive and industrial applications
- Motor drive and control



### Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN25060BFHTA	7	8	3,000

### Device marking

019

# ZXTN25060BFH

## Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	$V_{CBO}$	150	V
Collector-emitter voltage (forward blocking)	$V_{CEX}$	150	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 <sup>(b)</sup>	$I_C$	3.5	A
Peak pulse current	$I_{CM}$	10	A
Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(a)</sup> Linear derating factor	$P_D$	0.73 5.84	W mW/°C
Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(b)</sup> Linear derating factor	$P_D$	1.05 8.4	W mW/°C
Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(c)</sup> Linear derating factor	$P_D$	1.25 9.6	W mW/°C
Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(d)</sup> Linear derating factor	$P_D$	1.81 14.5	W 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>	$R_{\theta JA}$	171	°C/W
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	119	°C/W
Junction to ambient <sup>(c)</sup>	$R_{\theta JA}$	100	°C/W
Junction to ambient <sup>(d)</sup>	$R_{\theta JA}$	69	°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.

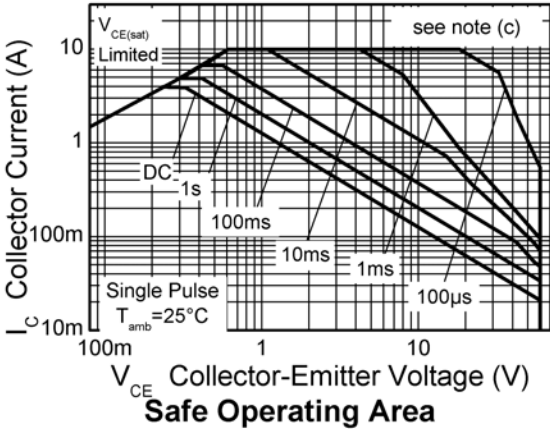
(b) Mounted on 25mm x 25mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

(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.

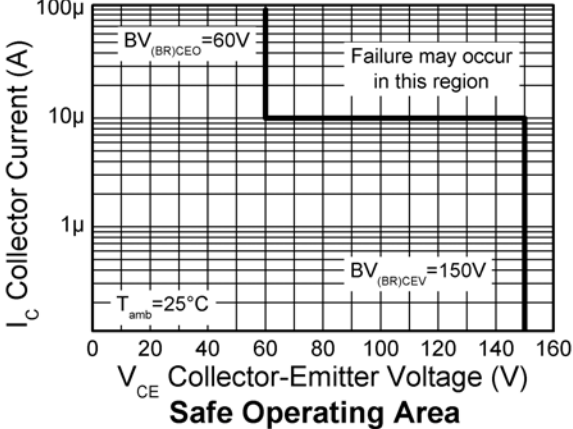
(d) As (c) above measured at  $t < 5$ secs.

# ZXTN25060BFH

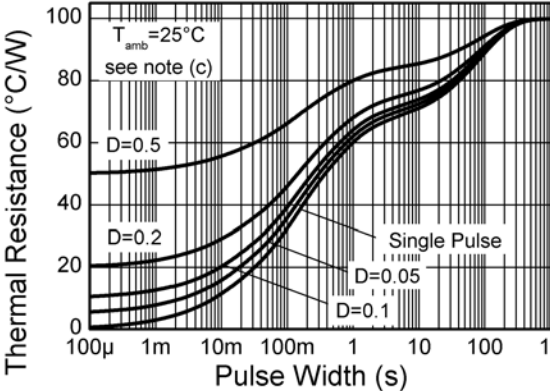
## Characteristics



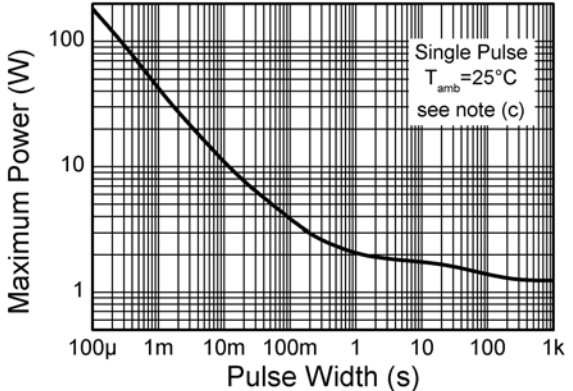
**Safe Operating Area**



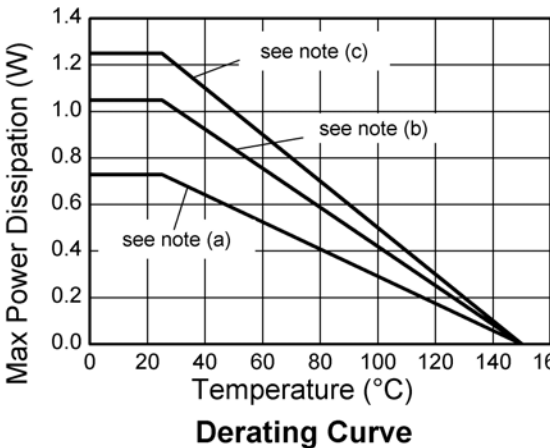
**Safe Operating Area**



**Transient Thermal Impedance**



**Pulse Power Dissipation**



**Derating Curve**

# ZXTN25060BFH

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

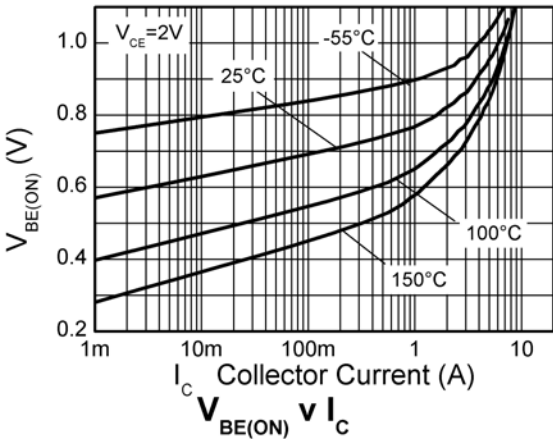
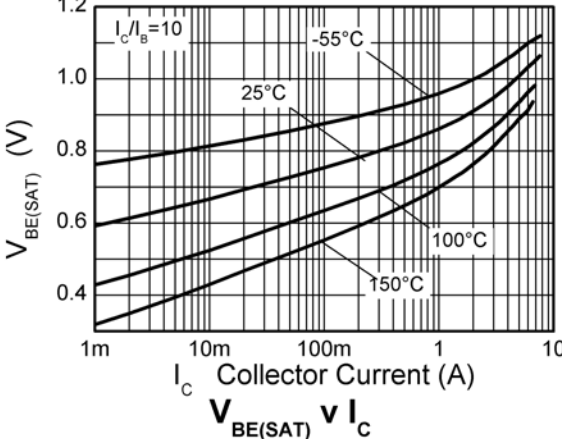
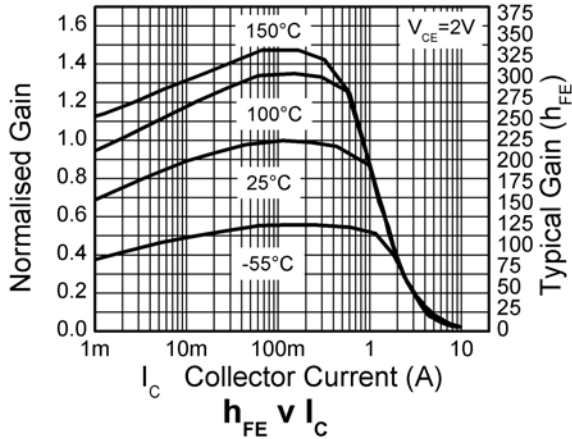
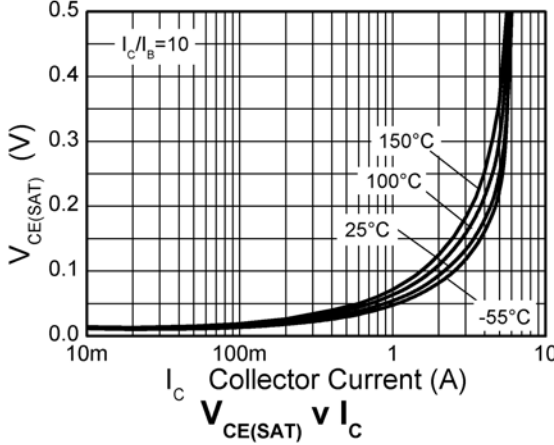
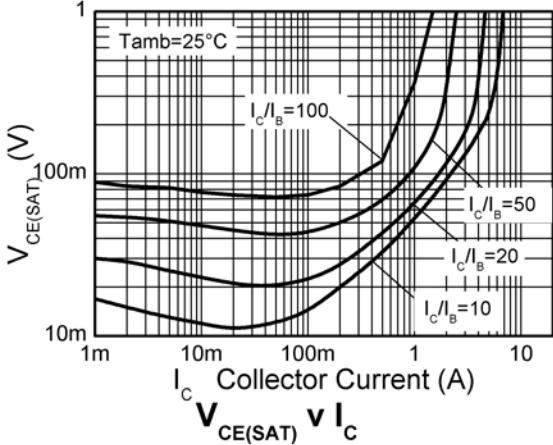
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CBO}$	150	190		V	$I_C = 100\mu\text{A}$
Collector-emitter breakdown voltage (forward blocking)	$BV_{CEX}$	150	190			$I_C = 100\mu\text{A}$ , $R_{BE} \leq 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$
Collector-emitter breakdown voltage (base open)	$BV_{CEO}$	60	80		V	$I_C = 10\text{mA}$ (*)
Emitter-collector breakdown voltage (reverse blocking)	$BV_{ECX}$	6	8		V	$I_E = 100\mu\text{A}$ , $R_{BC} \leq 1\text{k}\Omega$ or $0.25\text{V} > V_{BC} > -0.25\text{V}$
Emitter-collector breakdown voltage (base open)	$BV_{ECO}$	6	7		V	$I_E = 100\mu\text{A}$ ,
Emitter-base breakdown voltage	$BV_{EBO}$	7	8		V	$I_E = 100\mu\text{A}$
Collector cut-off current	$I_{CBO}$		<1	50 20	nA $\mu\text{A}$	$V_{CB} = 120\text{V}$ $V_{CB} = 120\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$
Collector-emitter cut-off current	$I_{CEX}$		-	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 cut-off current	$I_{EBO}$		<1	50	nA	$V_{EB} = 5.6\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$		33	40	mV	$I_C = 0,5\text{A}$ , $I_B = 50\text{mA}$ (*)
			73	95	mV	$I_C = 0,5\text{A}$ , $I_B = 10\text{mA}$ (*)
			50	65	mV	$I_C = 1\text{A}$ , $I_B = 100\text{mA}$ (*)
			150	175	mV	$I_C = 3.5\text{A}$ , $I_B = 350\text{mA}$ (*)
Base-emitter saturation voltage	$V_{BE(sat)}$		960	1050	mV	$I_C = 3.5\text{A}$ , $I_B = 350\text{mA}$ (*)
Base-emitter turn-on voltage	$V_{BE(on)}$		865	950	mV	$I_C = 3.5\text{A}$ , $V_{CE} = 2\text{V}$ (*)
Static forward current transfer ratio	$h_{FE}$	100	200	300		$I_C = 10\text{mA}$ , $V_{CE} = 2\text{V}$ (*)
		90	180			$I_C = 1\text{A}$ , $V_{CE} = 2\text{V}$ (*)
		25	40			$I_C = 3.5\text{A}$ , $V_{CE} = 2\text{V}$ (*)
Transition frequency	$f_T$		185		MHz	$I_C = 100\text{mA}$ , $V_{CE} = 5\text{V}$ $f = 100\text{MHz}$
Output capacitance	$C_{OBO}$		11.5	20	pF	$V_{CB} = 10\text{V}$ , $f = 1\text{MHz}$ (*)
Turn-on time	$t_{(on)}$		34		ns	$V_{CC} = 10\text{V}$ . $I_C = 500\text{mA}$ ,
Turn-off time	$t_{(off)}$		566		ns	$I_{B1} = I_{B2} = 50\text{mA}$ .

### NOTES:

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

# ZXTN25060BFH

## Typical characteristics



# ZXTN25060BFH

## Package outline - SOT23



Dim.	Millimeters		Inches		Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Max.	Max.
A	2.67	3.05	0.105	0.120	H	0.33	0.51	0.013	0.020
B	1.20	1.40	0.047	0.055	K	0.01	0.10	0.0004	0.004
C	-	1.10	-	0.043	L	2.10	2.50	0.083	0.0985
D	0.37	0.53	0.015	0.021	M	0.45	0.64	0.018	0.025
F	0.085	0.15	0.0034	0.0059	N	0.95 NOM		0.0375 NOM	
G	1.90 NOM		0.075 NOM		-	-	-	-	-

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

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