

# ZXTN23015CFH

## 15V, SOT23, NPN medium power transistor

### Summary

$V_{(BR)CEX} > 60V$ ,  $V_{(BR)CEO} > 15V$

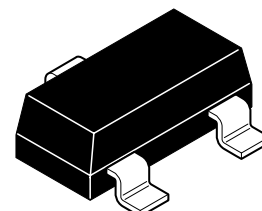
$I_{C(CONT)} = 6A$

$R_{CE(SAT)} = 19m\Omega$  typical

$V_{CE(SAT)} < 30mV$  @ 1A

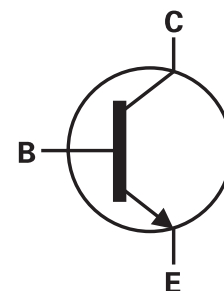
$P_D = 1.25W$

Complementary part number : ZXTP23015CFH



### 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.

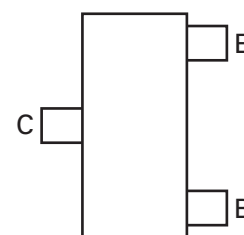


### Features

- Higher power dissipation SOT23 package
- High peak current
- Low saturation voltage
- 60V forward blocking voltage

### Applications

- DC - DC converters
- MOSFET and IGBT gate driving
- Motor drive
- Relay, lamp, and solenoid drive



Pinout - top view

### Ordering information

Device	Reel size (inches)	Tape width	Quantity per REEL
ZXTN23015CFHTA	7	8mm	3000

### Device marking

327

**Absolute maximum ratings**

Parameter	Symbol	Limit	Unit
Collector-base voltage	$V_{CBO}$	60	V
Collector-emitter voltage	$V_{(BR)CEX}$	60	V
Collector-emitter voltage	$V_{CEO}$	15	V
Emitter-base voltage	$V_{EBO}$	7.0	V
Peak pulse current	$I_{CM}$	12	A
Continuous collector current <sup>(c)</sup>	$I_C$	6	A
Base current	$I_B$	1.2	A
Power dissipation @ $T_A=25^{\circ}C^{(a)}$ Linear derating factor <sup>(a)</sup>	$P_D$	0.73 5.84	W mW/ $^{\circ}C$
Power dissipation @ $T_A=25^{\circ}C^{(b)}$ Linear derating factor <sup>(b)</sup>	$P_D$	1.05 8.4	W mW/ $^{\circ}C$
Power dissipation @ $T_A=25^{\circ}C^{(c)}$ Linear derating factor <sup>(c)</sup>	$P_D$	1.25 9.6	W mW/ $^{\circ}C$
Power dissipation @ $T_A=25^{\circ}C^{(d)}$ Linear derating factor <sup>(d)</sup>	$P_D$	1.81 14.5	W mW/ $^{\circ}C$
Operating and storage temperature	$T_j:T_{stg}$	-55 to +150	$^{\circ}C$

**Thermal resistance**

Parameter	Symbol	Value	Unit
Junction to ambient <sup>(a)</sup>	$R\theta_{JA}$	171	$^{\circ}C/W$
Junction to ambient <sup>(b)</sup>	$R\theta_{JA}$	119	$^{\circ}C/W$
Junction to ambient <sup>(c)</sup>	$R\theta_{JA}$	100	$^{\circ}C/W$
Junction to ambient <sup>(d)</sup>	$R\theta_{JA}$	69	$^{\circ}C/W$

**NOTES:**

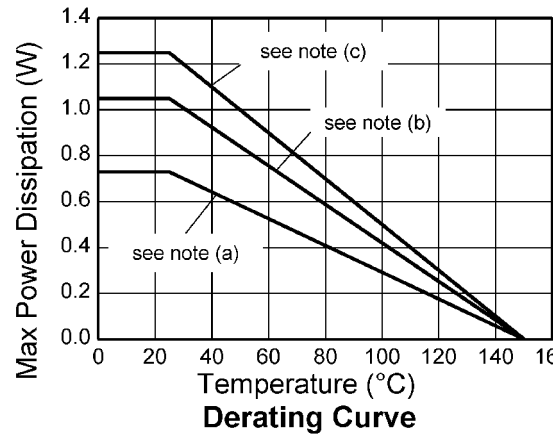
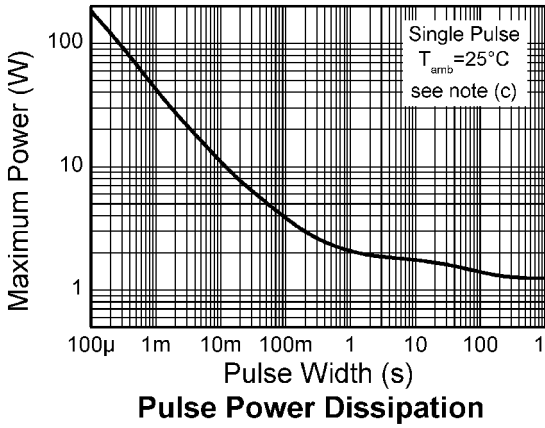
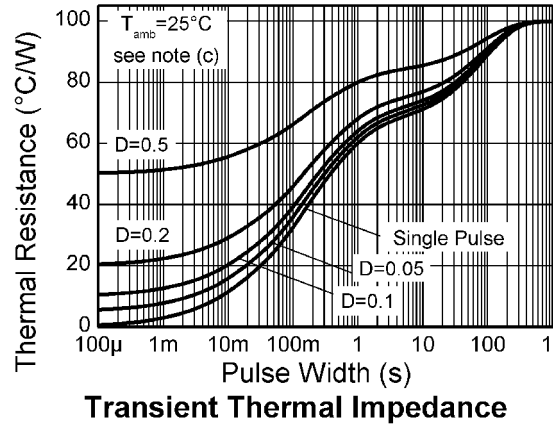
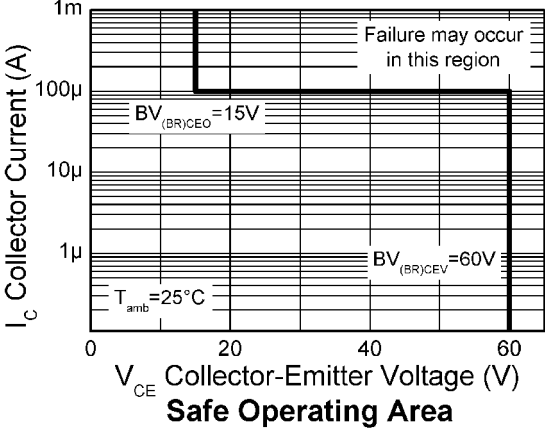
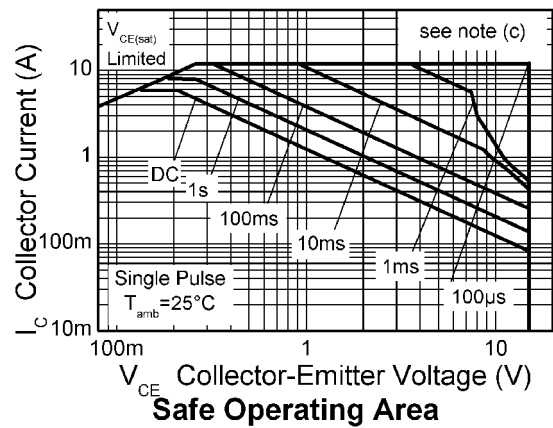
(a) For a device surface mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(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.

Characteristics



# ZXTN23015CFH

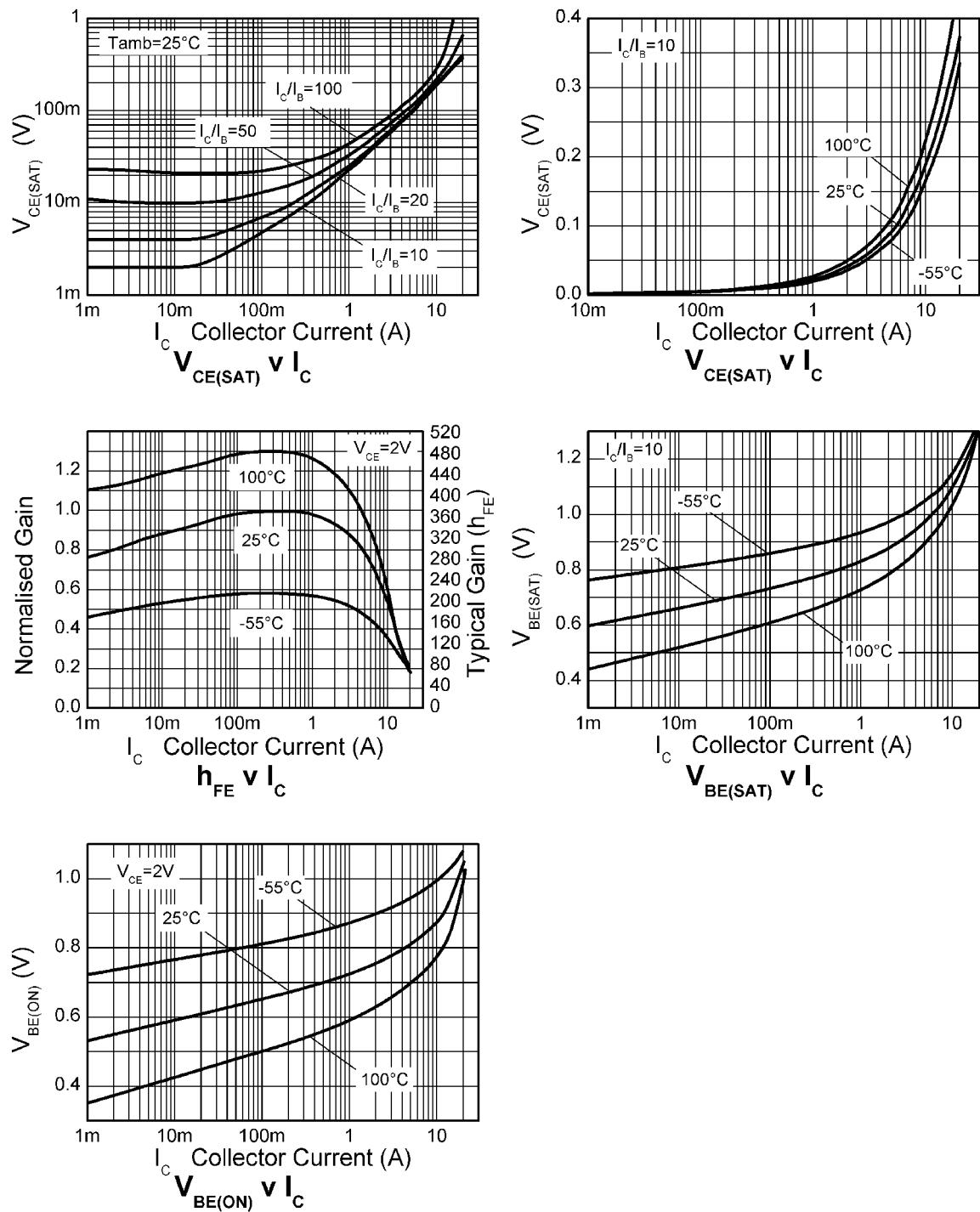
## Electrical characteristics (at $T_{AMB} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$V_{(BR)CBO}$	60	85		V	$I_C = 100\mu\text{A}$
Collector-emitter breakdown voltage	$V_{(BR)CEX}$	60	85		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	$V_{(BR)CEO}$	15	23		V	$I_C = 10\text{mA}^{(*)}$
Emitter-base breakdown voltage	$V_{(BR)EBO}$	7.0	8.3		V	$I_E = 100\mu\text{A}$
Collector-emitter cut-off current	$I_{CEX}$		-	100	nA	$V_{CE} = 48\text{V}$ , $R_{BE} \leq 1\text{k}\Omega$ OR $-1\text{V} < V_{BE} < 0.25\text{V}$
Collector-base cut-off current	$I_{CBO}$		<1	20	nA	$V_{CB} = 48\text{V}$
Emitter-base cut-off current	$I_{EBO}$		<1	10	nA	$V_{EB} = 6\text{V}$
Static forward current transfer ratio	$H_{FE}$	160 200 190 150	300 350 330 280	560		$I_C = 10\text{mA}$ , $V_{CE} = 2\text{V}^{(*)}$ $I_C = 500\text{mA}$ , $V_{CE} = 2\text{V}^{(*)}$ $I_C = 3\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$ $I_C = 6\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$
Collector-emitter saturation voltage	$V_{CE(sat)}$		7 22 70 130	15 30 90 180	mV mV mV mV	$I_C = 0.1\text{A}$ , $I_B = 5\text{mA}^{(*)}$ $I_C = 1\text{A}$ , $I_B = 100\text{mA}^{(*)}$ $I_C = 3\text{A}$ , $I_B = 60\text{mA}^{(*)}$ $I_C = 6\text{A}$ , $I_B = 120\text{mA}^{(*)}$
Base-emitter saturation voltage	$V_{BE(sat)}$		0.83 0.89	0.93 0.98	V V	$I_C = 3\text{A}$ , $I_B = 60\text{mA}^{(*)}$ $I_C = 6\text{A}$ , $I_B = 120\text{mA}^{(*)}$
Base-emitter turn-on voltage	$V_{BE(on)}$		0.81	0.91	V	$I_C = 6\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$
Transition frequency	$f_T$		235		MHz	$I_C = 500\text{mA}$ , $V_{CE} = 2\text{V}$ , $f = 50\text{MHz}$
Output capacitance	$C_{obo}$		56		pF	$V_{CB} = 10\text{V}$ , $f = 1\text{MHz}$
Delay time	$t_{(d)}$		15		ns	$V_{CC} = 5\text{V}$ , $I_C = 3\text{A}$ , $I_{B1} = I_{B2} = 150\text{mA}$
Rise time	$t_{(r)}$		38.5		ns	
Storage time	$t_{(stg)}$		213		ns	
Fall time	$t_{(f)}$		19.7		ns	

### NOTES:

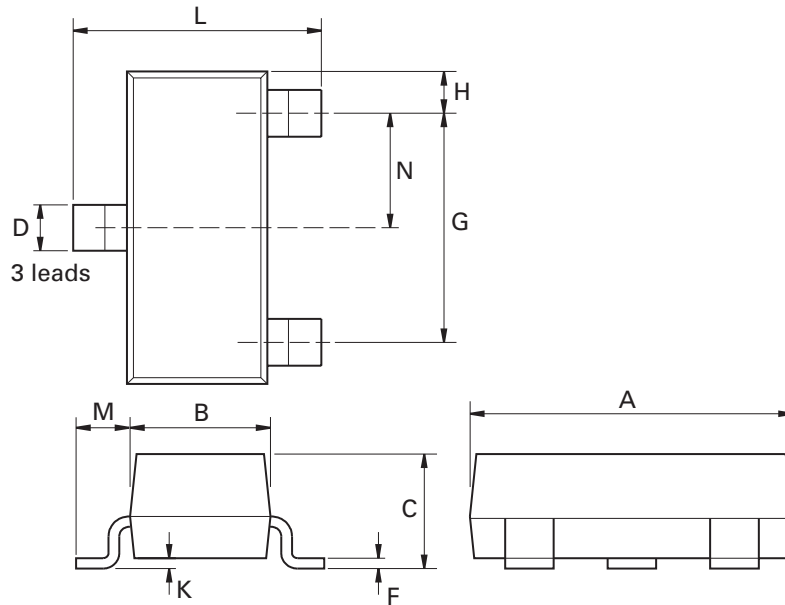
(\*) Measured under pulsed conditions. Pulse width =  $300\mu\text{S}$ . Duty cycle  $\leq 2\%$ .

Typical characteristics



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## 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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