

# ZXTN25015DFH

## 15V, SOT23, NPN medium power transistor

### Summary

$BV_{CEX} > 30V$

$BV_{CEO} > 15V$

$BV_{ECO} > 4.5V$

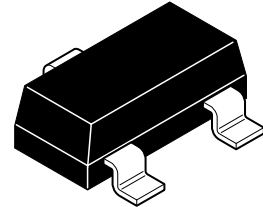
$I_{C(cont)} = 5A$

$V_{CE(sat)} < 40\text{ mV @ } 1A$

$R_{CE(sat)} = 25\text{ m}\Omega$

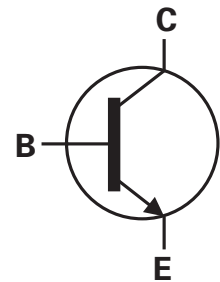
$P_D = 1.25W$

Complementary part number ZXTP25015DFH



### 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.

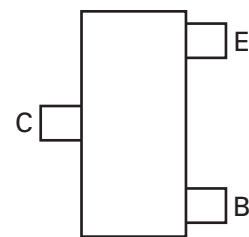


### Features

- High power dissipation SOT23 package
- High gain
- Low saturation voltage

### Applications

- LED driving
- DC-DC converters
- MOSFET and IGBT gate driving
- Motor drive



Pinout - top view

### Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN25015DFHTA	7	8	3,000

### Device marking

1A8

# ZXTN25015DFH

## Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	$V_{CBO}$	40	V
Collector-emitter voltage (forward blocking)	$V_{CEX}$	30	V
Collector-emitter voltage	$V_{CEO}$	15	V
Emitter-collector voltage (reverse blocking)	$V_{ECO}$	4.5	V
Emitter-base voltage	$V_{EBO}$	7	V
Continuous collector current <sup>(c)</sup>	$I_C$	5	A
Peak pulse current	$I_{CM}$	15	A
Power dissipation at $T_{amb} = 25^{\circ}C^{(a)}$	$P_D$	0.73	W
Linear derating factor		5.84	mW/ $^{\circ}C$
Power dissipation at $T_{amb} = 25^{\circ}C^{(b)}$	$P_D$	1.05	W
Linear derating factor		8.4	mW/ $^{\circ}C$
Power dissipation at $T_{amb} = 25^{\circ}C^{(c)}$	$P_D$	1.25	W
Linear derating factor		9.6	mW/ $^{\circ}C$
Power dissipation at $T_{amb} = 25^{\circ}C^{(d)}$	$P_D$	1.81	W
Linear derating factor		14.5	mW/ $^{\circ}C$
Operating and storage temperature range	$T_j, T_{stg}$	- 55 to 150	$^{\circ}C$

## Thermal resistance

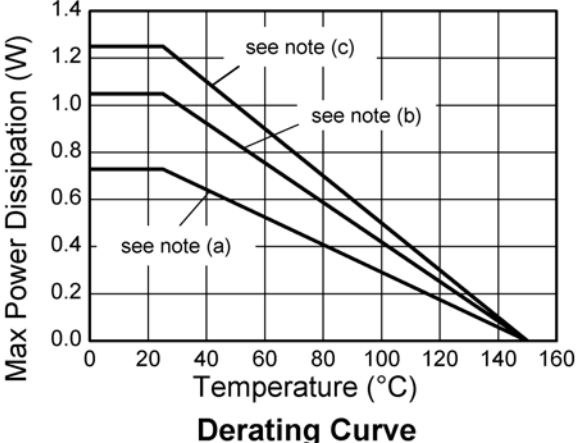
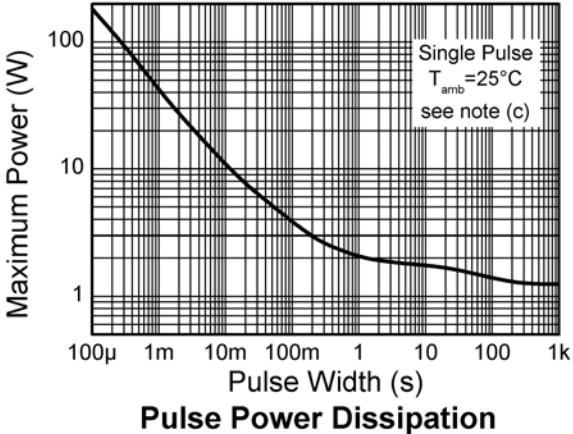
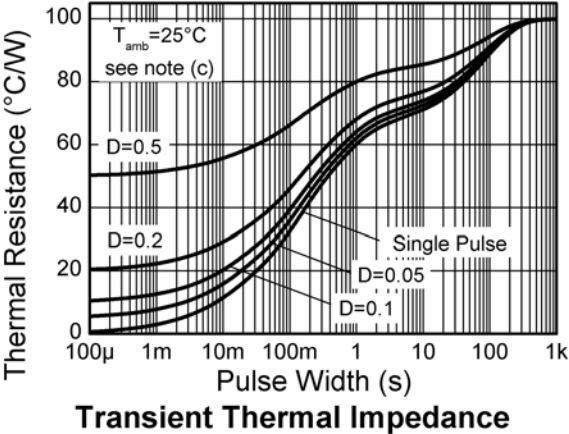
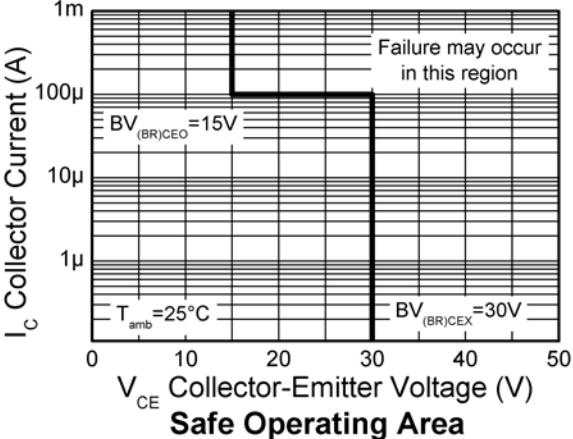
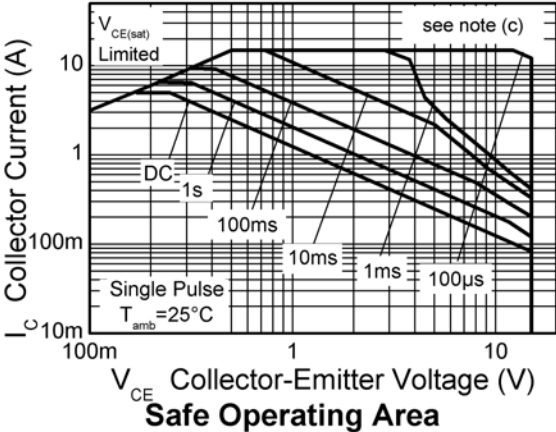
Parameter	Symbol	Limit	Unit
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	171	$^{\circ}C/W$
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	119	$^{\circ}C/W$
Junction to ambient <sup>(c)</sup>	$R_{\theta JA}$	100	$^{\circ}C/W$
Junction to ambient <sup>(d)</sup>	$R_{\theta JA}$	69	$^{\circ}C/W$

### 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.

# ZXTN25015DFH

## Characteristics



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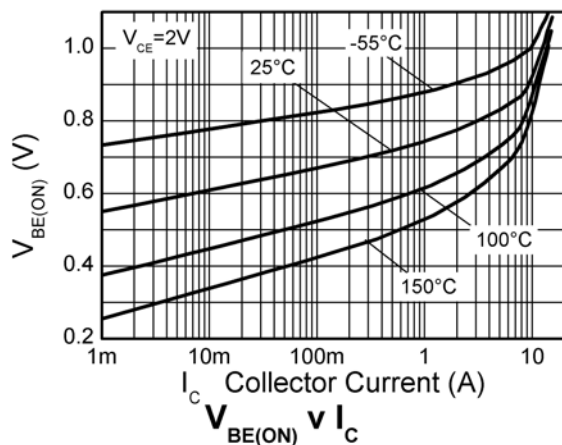
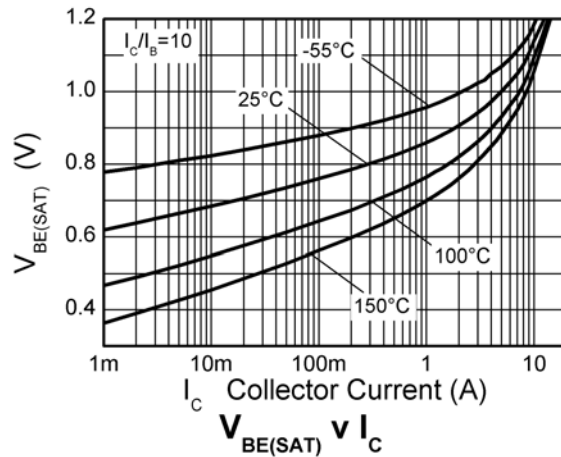
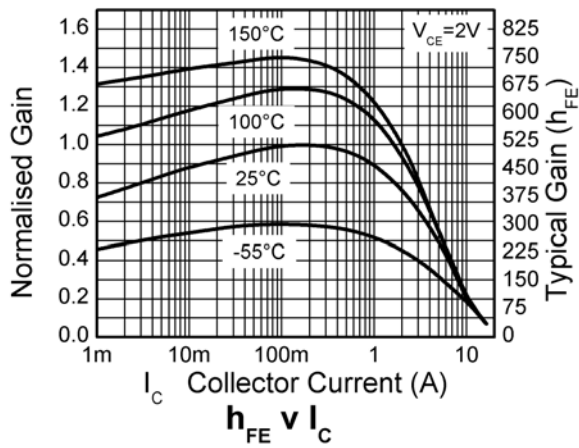
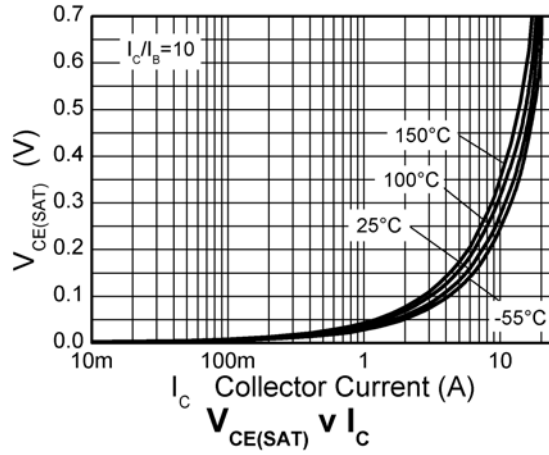
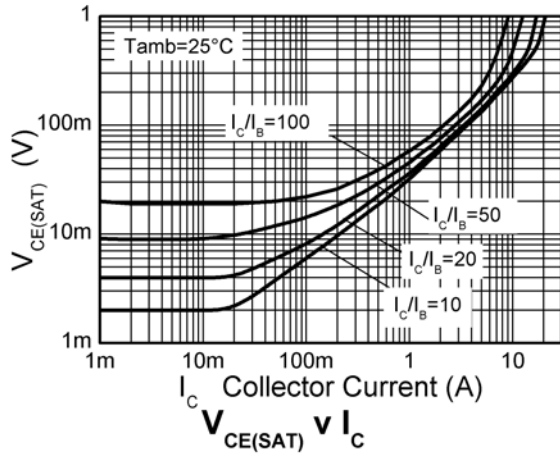
## Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-emitter breakdown voltage	$BV_{CEO}$	15	22		V	$I_C = 10\text{mA}^{(*)}$
Collector-emitter breakdown voltage (reverse blocking)	$BV_{ECX}$	6	8		V	$I_E = 100\mu\text{A}$ , $R_{BC} < 1\text{k}\Omega$ or $0.25\text{V} > V_{BC} > -0.25\text{V}$
Collector-emitter breakdown voltage (reverse blocking)	$BV_{ECO}$	4.5	5.3		V	$I_E = 100\mu\text{A}$ ,
Emitter-base breakdown voltage	$BV_{EBO}$	7	8.2		V	$I_E = 100\mu\text{A}$
Collector cut-off current	$I_{CBO}$		<1	50 20	nA $\mu\text{A}$	$V_{CB} = 40\text{V}$ $V_{CB} = 40\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$
Collector-emitter cut-off current	$I_{CEX}$		-	100	nA	$V_{CE} = 30\text{V}$ ; $R_{BE} < 1\text{k}\Omega$ 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	$V_{CE(sat)}$		30 60 90 125 160	40 80 125 155 215	mV mV mV mV mV	$I_C = 1\text{A}$ , $I_B = 100\text{mA}^{(*)}$ $I_C = 1\text{A}$ , $I_B = 10\text{mA}^{(*)}$ $I_C = 2\text{A}$ , $I_B = 20\text{mA}^{(*)}$ $I_C = 5\text{A}$ , $I_B = 500\text{mA}^{(*)}$ $I_C = 5\text{A}$ , $I_B = 100\text{mA}^{(*)}$
Base-emitter saturation voltage	$V_{BE(sat)}$		990	1090	mV	$I_C = 5\text{A}$ , $I_B = 500\text{mA}^{(*)}$
Base-emitter turn-on voltage	$V_{BE(on)}$		805	900	mV	$I_C = 5\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$
Static forward current transfer ratio	$h_{FE}$	300 300 150 25	450 400 275 40	900		$I_C = 10\text{mA}$ , $V_{CE} = 2\text{V}^{(*)}$ $I_C = 2\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$ $I_C = 5\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$ $I_C = 15\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$
Transition frequency	$f_T$	150	240		MHz	$I_C = 50\text{mA}$ , $V_{CE} = 10\text{V}$ $f = 50\text{MHz}$
Output capacitance	$C_{OBO}$		22.7	30	pF	$V_{CB} = 10\text{V}$ , $f = 1\text{MHz}^{(*)}$
Delay time	$t_{(d)}$		16		ns	$V_{CC} = 10\text{V}$ . $I_C = 3\text{A}$ , $I_{B1} = I_{B2} = 50\text{mA}$ .
Rise time	$t_{(r)}$		41		ns	
Storage time	$t_{(s)}$		148		ns	
Fall time	$t_{(f)}$		23		ns	

### NOTES:

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

## Typical characteristics



# ZXTN25015DFH

## 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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