

# ZXTN25100DFH

## 100V, SOT23, NPN medium power transistor

### Summary

$BV_{CEX} > 180V$

$BV_{CEO} > 100V$

$BV_{ECO} > 6V$

$I_{C(cont)} = 2.5A$

$V_{CE(sat)} < 95mV @ 1A$

$R_{CE(sat)} = 86m\Omega$

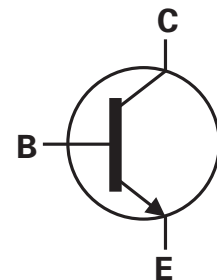
$P_D = 1.25W$

Complementary part number ZXTP25100DFH



### Description

Advanced process capability and package design have been used to maximise 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.

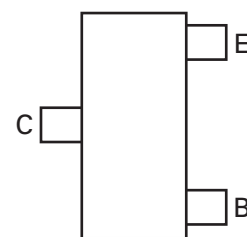


### Features

- High power dissipation SOT23 package
- High gain
- Low saturation voltage
- 180V forward blocking voltage
- 6V reverse blocking voltage

### Application

- Motor control
- DC fans
- DC-DC converters
- Lamp, relay, and solenoid driving



Pinout - top view

### Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN25100DFHTA	7	8	3,000

### Device marking

1B5

# ZXTN25100DFH

## Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	$V_{CBO}$	180	V
Collector-emitter voltage (forward blocking)	$V_{CEX}$	180	V
Collector-emitter voltage	$V_{CEO}$	100	V
Emitter-collector voltage (reverse blocking)	$V_{ECO}$	6	V
Emitter-base voltage	$V_{EBO}$	7	V
Continuous collector current <sup>(c)</sup>	$I_C$	2.5	A
Base current	$I_B$	0.5	A
Peak pulse current	$I_{CM}$	3	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.

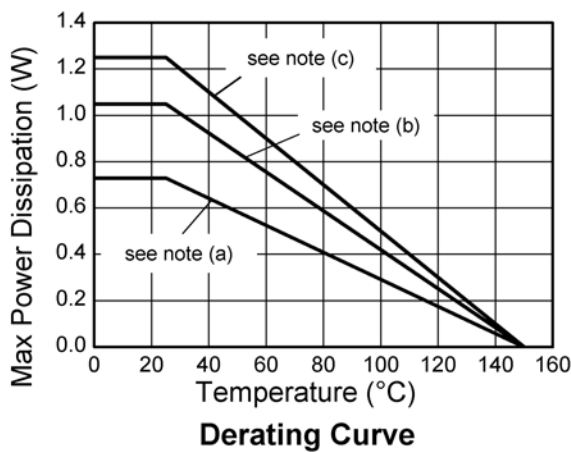
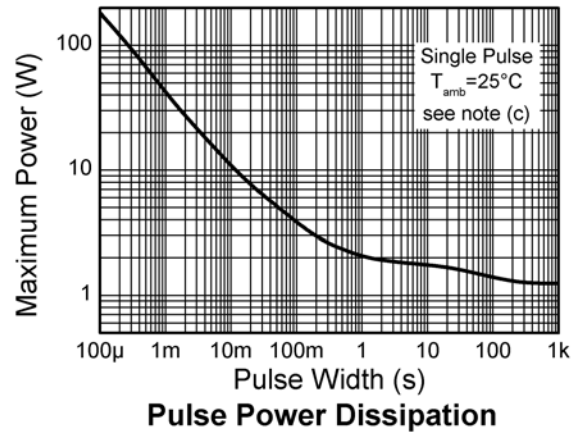
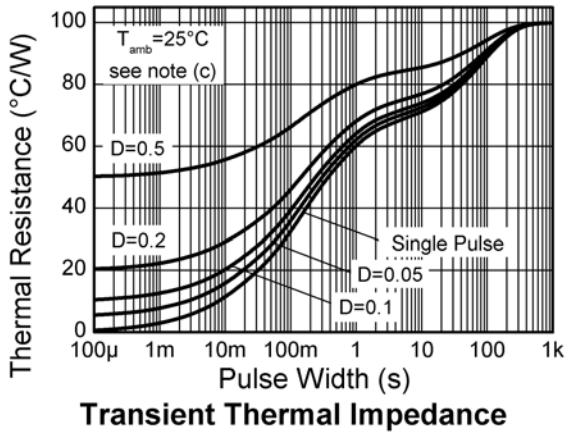
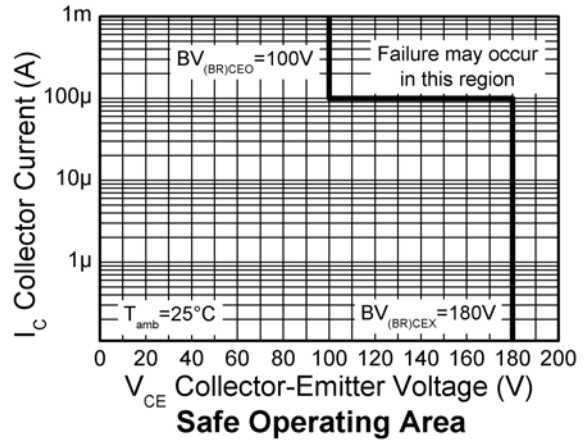
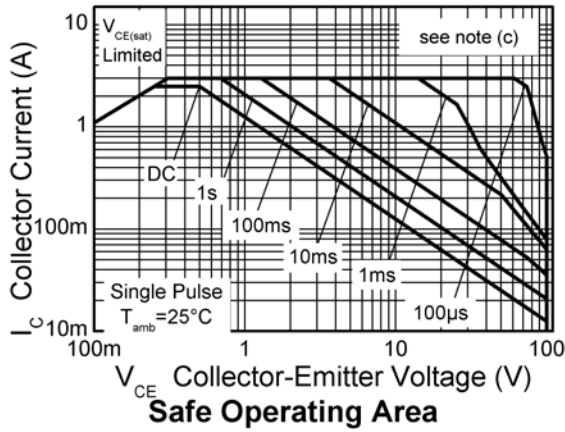
(b) Mounted on 25mm x 25mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

(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.

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## Characteristics



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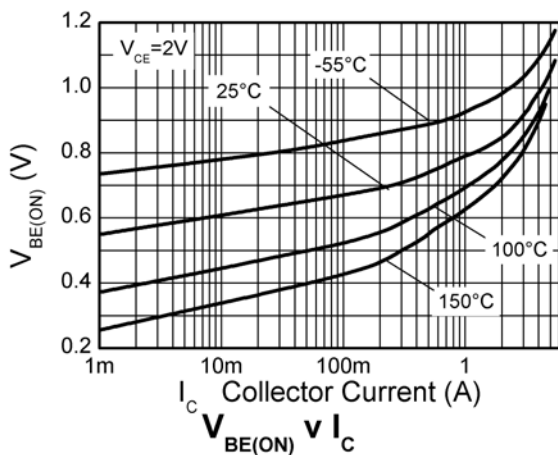
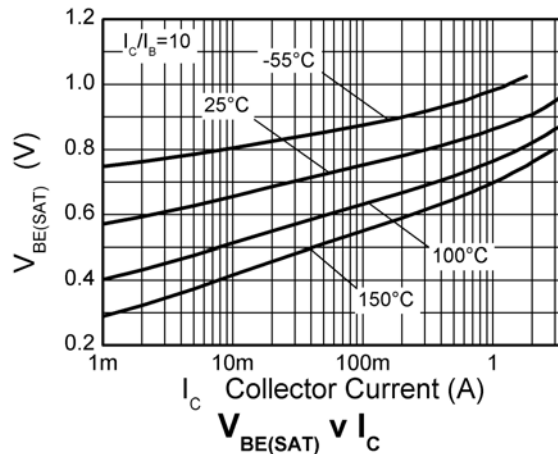
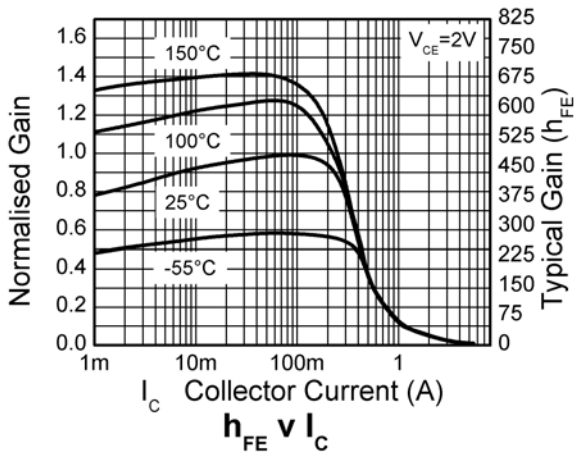
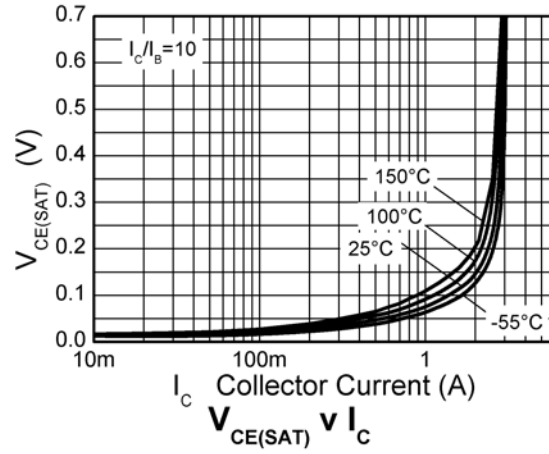
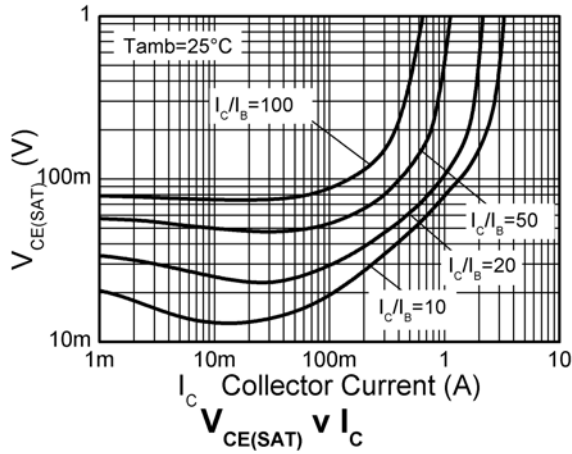
## Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CBO}$	180	220		V	$I_C = 100\mu\text{A}$
Collector-emitter breakdown voltage (forward blocking)	$BV_{CEX}$	180	220		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)	$BV_{CEO}$	100	130		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	8.2		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	8.7		V	$I_E = 100\mu\text{A}$ ,
Collector-base cut-off current	$I_{CBO}$		<1	50 0.5	nA $\mu\text{A}$	$V_{CB} = 180\text{V}$ $V_{CB} = 180\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$
Collector-emitter cut-off current	$I_{CEX}$		-	100	nA	$V_{CE} = 144\text{V}$ ; $R_{BE} \leq 1\text{k}\Omega$ 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	$V_{CE(sat)}$		120 80 215	170 95 330	mV mV mV	$I_C = 0.5\text{A}$ , $I_B = 10\text{mA}^{(*)}$ $I_C = 1\text{A}$ , $I_B = 100\text{mA}^{(*)}$ $I_C = 2.5\text{A}$ , $I_B = 250\text{mA}^{(*)}$
Base-emitter saturation voltage	$V_{BE(sat)}$		910	1000	mV	$I_C = 2.5\text{A}$ , $I_B = 250\text{mA}^{(*)}$
Base-emitter turn-on voltage	$V_{BE(on)}$		860	950	mV	$I_C = 2.5\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$
Static forward current transfer ratio	$h_{FE}$	300 120 40	450 170 60 20	900		$I_C = 10\text{mA}$ , $V_{CE} = 2\text{V}^{(*)}$ $I_C = 0.5\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$ $I_C = 1\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$ $I_C = 2.5\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$
Transition frequency	$f_T$		175		MHz	$I_C = 100\text{mA}$ , $V_{CE} = 10\text{V}$ $f = 100\text{MHz}$
Output capacitance	$C_{OBO}$		8.7	15	pF	$V_{CB} = 10\text{V}$ , $f = 1\text{MHz}^{(*)}$
Delay time	$t_d$		16.4		ns	$V_{CC} = 10\text{V}$ .
Rise time	$t_r$		115		ns	$I_C = 500\text{mA}$ ,
Storage time	$t_s$		763		ns	$I_{B1} = I_{B2} = 50\text{mA}$ .
Fall time	$t_f$		158		ns	

### NOTES:

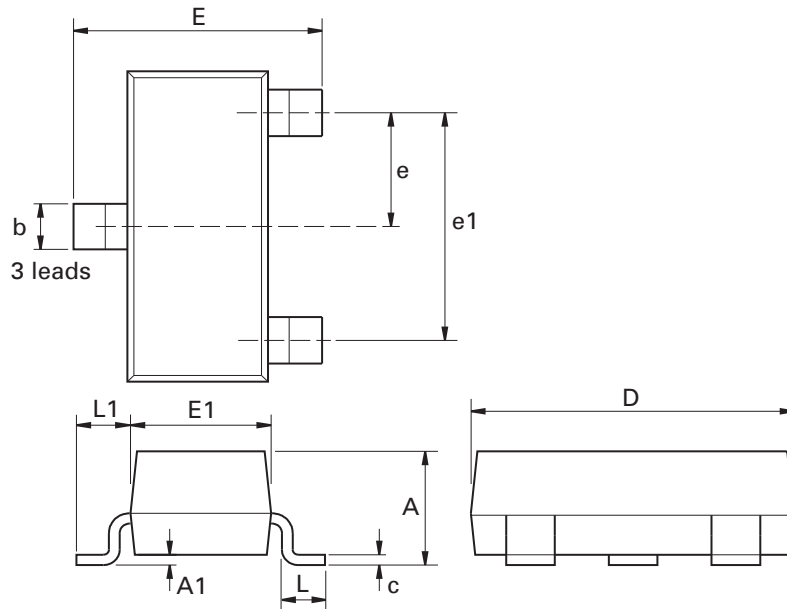
(\*) Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

## Typical characteristics



# ZXTN25100DFH

## Package outline - SOT23



Dim.	Millimeters		Inches		Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	-	1.12	-	0.044	e1	1.90 NOM		0.075 NOM	
A1	0.01	0.10	0.0004	0.004	E	2.10	2.64	0.083	0.104
b	0.30	0.50	0.012	0.020	E1	1.20	1.40	0.047	0.055
c	0.085	0.20	0.003	0.008	L	0.25	0.60	0.0098	0.0236
D	2.80	3.04	0.110	0.120	L1	0.45	0.62	0.018	0.024
e	0.95 NOM		0.037 NOM		-	-	-	-	-

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

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