

# ZXTP23140BFH

## 140V SOT23 PNP medium power transistor

### Summary

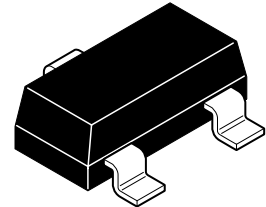
$V_{(BR)CEX} > -160V, V_{(BR)CEO} > -140V$

$I_{C(CONT)} = -2.5A$

$R_{CE(sat)} = 76m\Omega$  typical

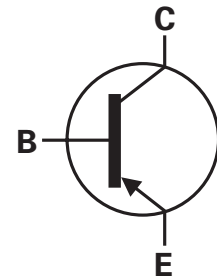
$V_{CE(sat)} < -95mV @ -1A$

$P_D = 1.25W$



### 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.

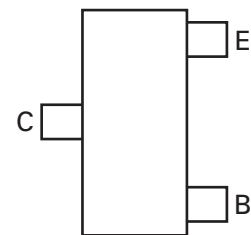


### Features

- Higher power dissipation SOT23 package
- High peak current
- Low saturation voltage
- 160V forward blocking voltage

### Applications

- DC - DC converters
- Motor drive
- High side switches



Pinout - top view

### Ordering information

Device	Reel size (inches)	Tape width	Quantity per reel
ZXTP23140BFHTA	7	8mm	3,000

### Device marking

955

# ZXTP23140BFH

## Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	$V_{CBO}$	-160	V
Collector-emitter voltage	$V_{(BR)CEX}$	-160	V
Collector-emitter voltage	$V_{CEO}$	-140	V
Emitter-base voltage	$V_{EBO}$	-7.0	V
Peak pulse current	$I_{CM}$	-5	A
Continuous collector current <sup>(b)</sup>	$I_C$	-2.5	A
Base current	$I_B$	-1	A
Power dissipation @ $T_A=25^{\circ}C$ <sup>(a)</sup> Linear derating factor <sup>(a)</sup>	$P_D$	0.73 5.84	W mW/ $^{\circ}C$
Power dissipation @ $T_A=25^{\circ}C$ <sup>(b)</sup> linear derating factor <sup>(b)</sup>	$P_D$	1.05 8.4	W mW/ $^{\circ}C$
Power dissipation @ $T_A=25^{\circ}C$ <sup>(c)</sup> linear derating factor <sup>(c)</sup>	$P_D$	1.25 9.6	W mW/ $^{\circ}C$
Power dissipation @ $T_A=25^{\circ}C$ <sup>(d)</sup> 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

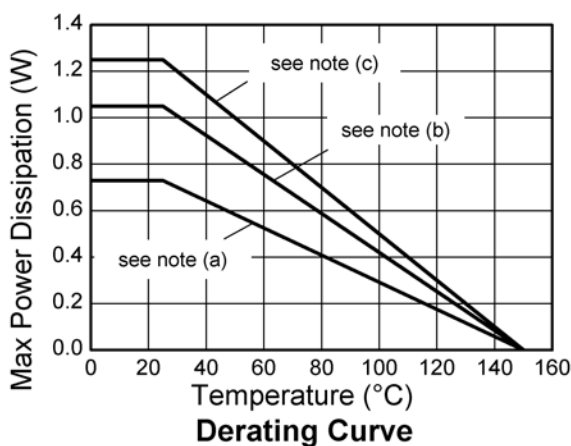
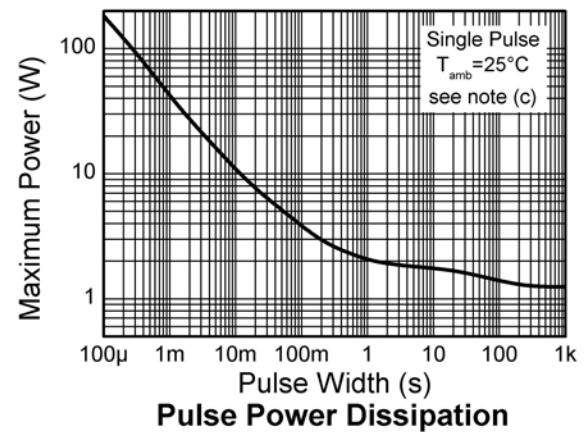
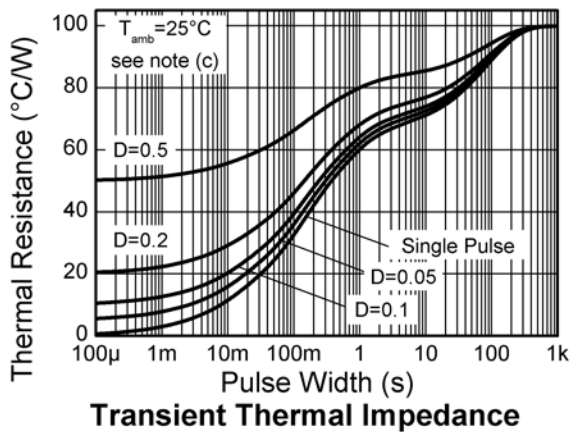
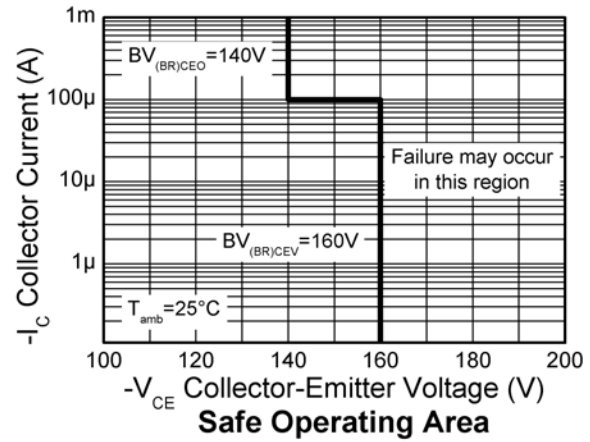
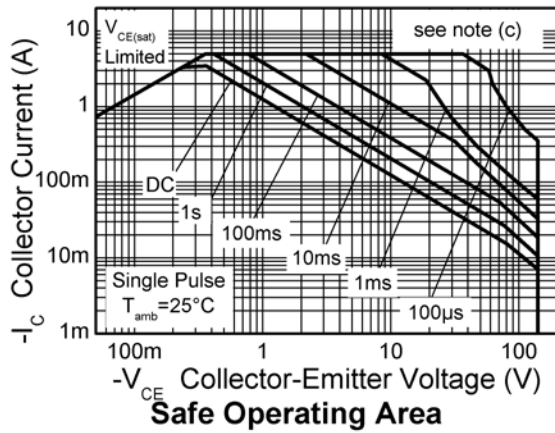
Parameter	Symbol	Limit	Unit
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	171	$^{\circ}C/W$
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	119	$^{\circ}C/W$
Junction to ambient <sup>(c)</sup>	$R_{\theta JA}$	100	$^{\circ}C/W$
Junction to ambient <sup>(d)</sup>	$R_{\theta JA}$	69	$^{\circ}C/W$

### 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  $t < 5$ sec.

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## Characteristics



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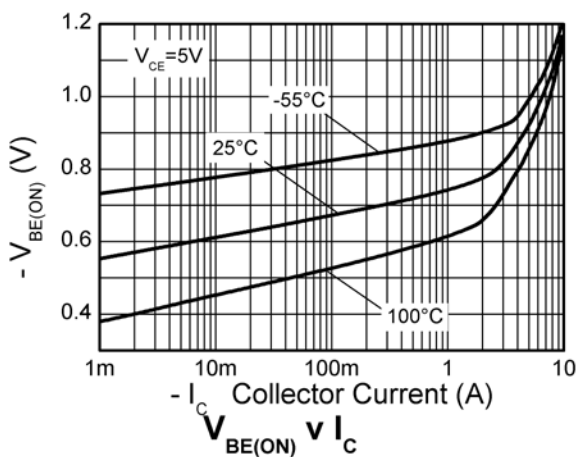
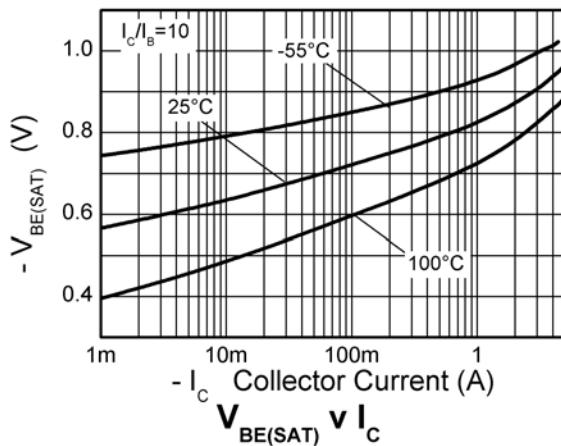
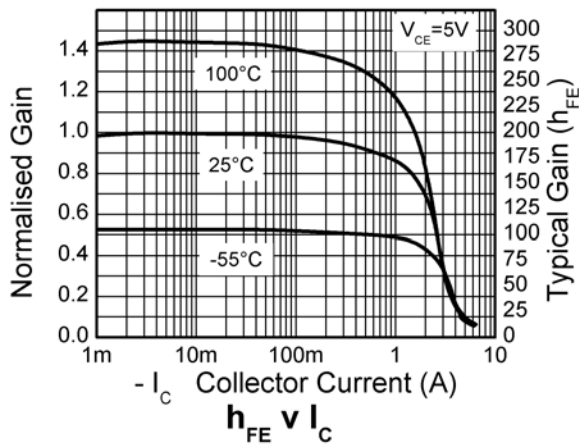
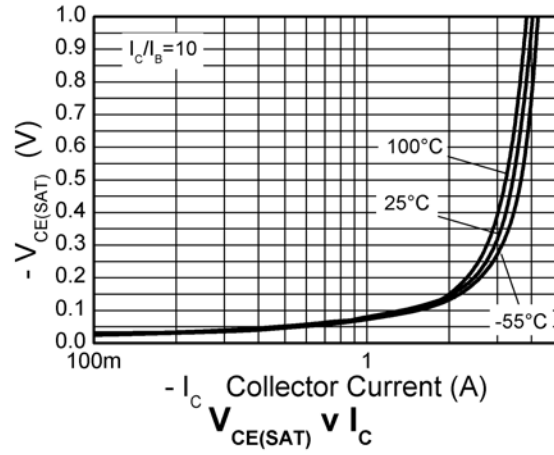
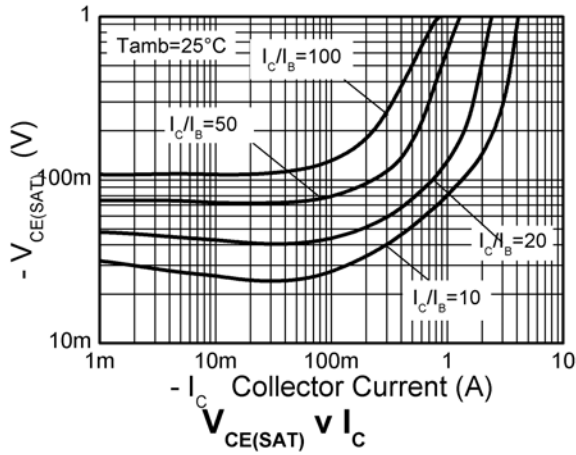
## ELECTRICAL CHARACTERISTICS (at $T_{AMB} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$V_{(BR)CBO}$	-160	-180		V	$I_C = -100\mu\text{A}$
Collector-emitter breakdown voltage	$V_{(BR)CEX}$	-160	-180		V	$I_C = -100\mu\text{A}$ , $R_{BE} \leq 1\text{k}\Omega$ OR $-0.25\text{V} < V_{BE} < 1\text{V}$
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	-140	-160		V	$I_C = -10\text{mA}$ (*)
Emitter-base breakdown voltage	$V_{(BR)EBO}$	-7.0	-8.2		V	$I_E = -100\mu\text{A}$
Collector-emitter cut-off current	$I_{CEX}$		-	-100	nA	$V_{CE} = -130\text{V}$ ; $R_{BE} \leq 1\text{k}\Omega$ OR $-0.25\text{V} < V_{BE} < 1\text{V}$
Collector-base cut-off current	$I_{CBO}$		<1	-20	nA	$V_{CB} = -130\text{V}$
Emitter-base cut-off current	$I_{EBO}$		<1	-10	nA	$V_{EB} = -6\text{V}$
Static forward current transfer ratio	$H_{FE}$	100 100 40	200 180 100	300		$I_C = -10\text{mA}$ , $V_{CE} = -5\text{V}$ (*) $I_C = -1\text{A}$ , $V_{CE} = -5\text{V}$ (*) $I_C = -2.5\text{A}$ , $V_{CE} = -5\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$		-45 -80 -190	-55 -95 -280	mV mV mV	$I_C = -100\text{mA}$ , $I_B = -5\text{mA}$ (*) $I_C = -1\text{A}$ , $I_B = -100\text{mA}$ (*) $I_C = -2.5\text{A}$ , $I_B = -250\text{mA}$ (*)
Base-emitter saturation voltage	$V_{BE(sat)}$		-0.89	-1.00	V	$I_C = -2.5\text{A}$ , $I_B = -250\text{mA}$ (*)
Base-emitter turn-on voltage	$V_{BE(on)}$		-0.78	-0.90	V	$I_C = -2.5\text{A}$ , $V_{CE} = -5\text{V}$ (*)
Transition frequency	$f_T$		130		MHz	$I_C = -100\text{mA}$ , $V_{CE} = -10\text{V}$ , $f = 50\text{MHz}$
Output capacitance	$C_{obo}$		30.9		pF	$V_{CB} = -10\text{V}$ , $f = 1\text{MHz}$
Turn-on time	$t_{(on)}$		132.4		ns	$V_{CC} = -10\text{V}$ , $I_C = -2\text{A}$ , $I_{B1} = I_{B2} = -200\text{mA}$
Turn-off time	$t_{(off)}$		345.5		ns	

### NOTES:

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

## Typical characteristics



# ZXTP23140BFH

## 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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