

## ZXTN04120HFF

### 120V, SOT23F, NPN medium power Darlington transistor

#### Summary

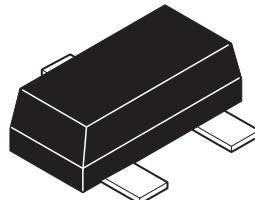
$BV_{CEO} > 120V$

$I_C(\text{cont}) = 1A$

$V_{CE(\text{sat})} < 1.5V @ 1A$

$P_D = 1.5W$

Complementary part number ZXTP05120HFF

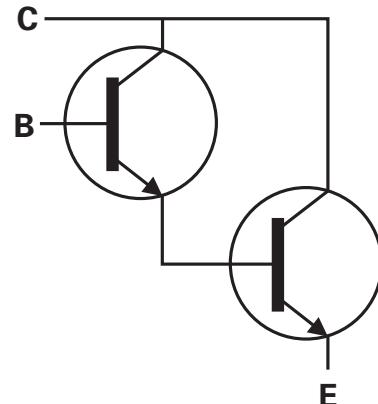


#### Description

This high performance NPN Darlington transistor is housed in the small outline SOT23 flat package for applications where space is at a premium.

#### Features

- Darlington transistor
- 120 volt
- 1 amp continuous rating
- Small outline surface mount SOT23 flat package

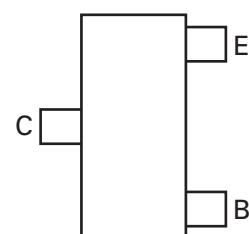


#### Applications

- Lamp, relay and solenoid drive
- Lighting

#### Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN04120HFFTA	7	8	3000



Pinout - top view

#### Device marking

1F6

# ZXTN04120HFF

## Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	$V_{CBO}$	140	V
Collector-emitter voltage	$V_{CEO}$	120	V
Emitter-base voltage	$V_{EBO}$	10	V
Continuous collector current (c)	$I_C$	1	A
Peak pulse current	$I_{CM}$	4	A
Base current	$I_B$	0.5	A
Power dissipation @ $T_{amb} = 25^\circ\text{C}$ <sup>(a)</sup>	$P_D$	0.84	W
Linear derating factor		6.72	$\text{mW}/^\circ\text{C}$
Power dissipation @ $T_{amb} = 25^\circ\text{C}$ <sup>(b)</sup>	$P_D$	1.34	W
Linear derating factor		10.72	$\text{mW}/^\circ\text{C}$
Power dissipation @ $T_{amb} = 25^\circ\text{C}$ <sup>(c)</sup>	$P_D$	1.5	W
Linear derating factor		12.0	$\text{mW}/^\circ\text{C}$
Power dissipation @ $T_{amb} = 25^\circ\text{C}$ <sup>(d)</sup>	$P_D$	2.0	W
Linear derating factor		16.0	$\text{mW}/^\circ\text{C}$
Operating and storage temperature range	$T_j, T_{stg}$	- 55 to 150	$^\circ\text{C}$

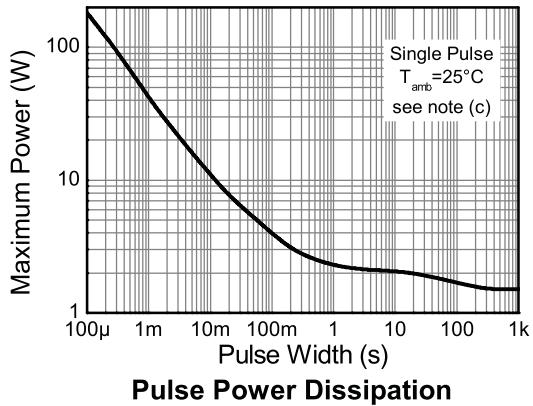
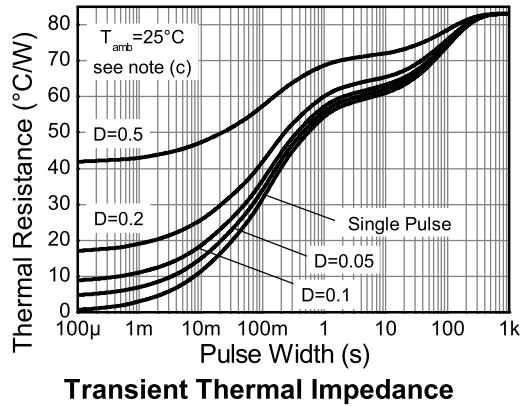
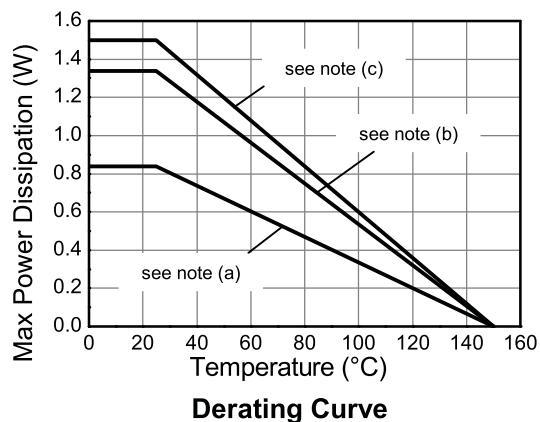
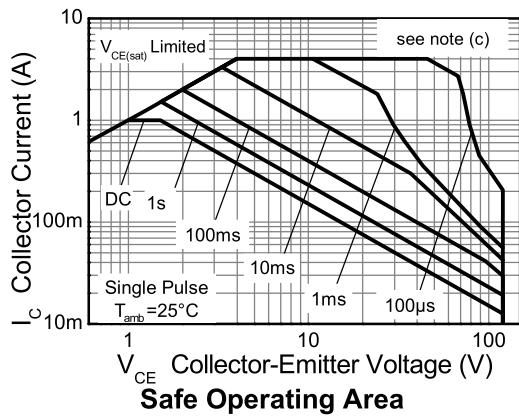
## Thermal resistance

Parameter	Symbol	Limit	Unit
Junction to ambient <sup>(a)</sup>	$R_{\Theta JA}$	149	$^\circ\text{C}/\text{W}$
Junction to ambient <sup>(b)</sup>	$R_{\Theta JA}$	93	$^\circ\text{C}/\text{W}$
Junction to ambient <sup>(c)</sup>	$R_{\Theta JA}$	83	$^\circ\text{C}/\text{W}$
Junction to ambient <sup>(d)</sup>	$R_{\Theta JA}$	60	$^\circ\text{C}/\text{W}$

### 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 2oz copper in still air conditions.
- (c) Mounted on 50mm x 50mm x 1.6mm FR4 PCB with a high coverage of single sided 2oz copper in still air conditions.
- (d) As (c) above measured at  $t < 5\text{secs}$ .

## Characteristics



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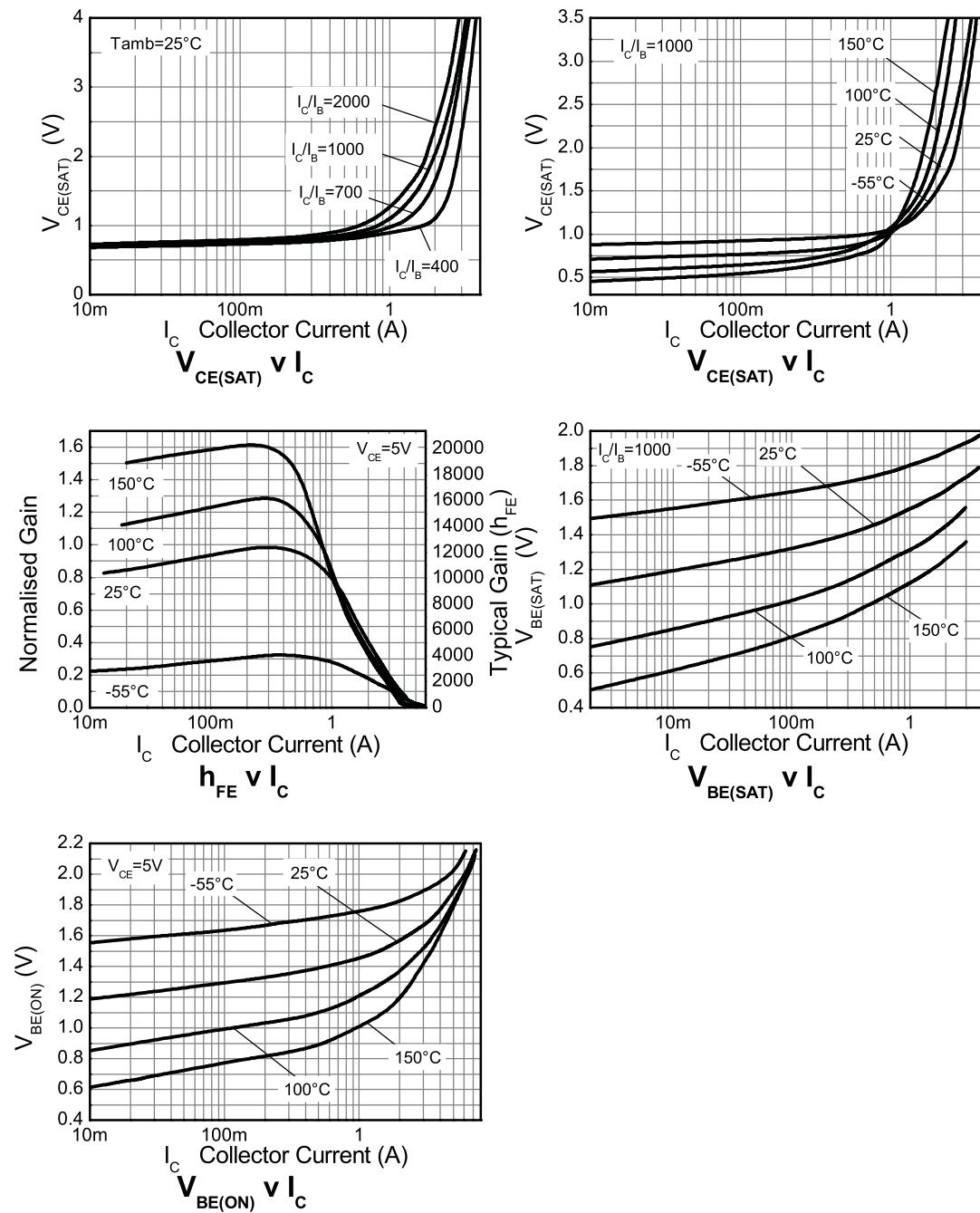
## Electrical characteristics (at $T_{amb} = 25^\circ C$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CBO}$	140	300		V	$I_C = 100\mu A$
Collector-emitter breakdown voltage (base open)	$BV_{CEO}$	120	140		V	$I_C = 10mA$ (*)
Emitter-base breakdown voltage	$BV_{EBO}$	10	16		V	$I_E = 100\mu A$
Collector-base cut-off current	$I_{CBO}$		<1	100	nA	$V_{CB} = 120V$
				10	$\mu A$	$V_{CB} = 120V, T_{amb} = 100^\circ C$
Collector-emitter cut-off current	$I_{CES}$		<0.1	10	$\mu A$	$V_{CE} = 120V$
Emitter-base cut-off current	$I_{EBO}$		<1	100	nA	$V_{EB} = 8V$
Collector-emitter saturation voltage	$V_{CE(sat)}$		0.8 1.1 1.1	0.9 1.5 1.5	V	$I_C = 250mA, I_B = 0.25mA$ (*) $I_C = 1A, I_B = 1mA$ (*) $I_C = 2A, I_B = 5mA$ (*)
Base-emitter saturation voltage	$V_{BE(sat)}$		1.55	1.70	V	$I_C = 1A, I_B = 1mA$ (*)
Base-emitter turn-on voltage	$V_{BE(on)}$		1.45	1.70	V	$I_C = 1A, V_{CE} = 5V$ (*)
Static forward current transfer ratio	$h_{FE}$	3K 3K 3K 1K	11k 12k 10k 5k	30K		$I_C = 50mA, V_{CE} = 5V$ (*) $I_C = 500mA, V_{CE} = 5V$ (*) $I_C = 1A, V_{CE} = 5V$ (*) $I_C = 2A, V_{CE} = 5V$ (*)
Transition frequency	$f_T$		120		MHz	$I_C = 100mA, V_{CE} = 10V$ $f = 20MHz$
Input capacitance	$C_{ibo}$		68	90	pF	$V_{EB} = 500mV, f = 1MHz$ (*)
Output capacitance	$C_{obo}$		12.8	25	pF	$V_{CB} = 10V, f = 1MHz$ (*)
Delay time	$t_d$		507		ns	$V_{CC} = 10V$ $I_C = 500mA$ , $I_{B1} = I_{B2} = 0.5mA$
Rise time	$t_r$		136		ns	
Storage time	$t_s$		910		ns	
Fall time	$t_f$		369		ns	

### NOTES:

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

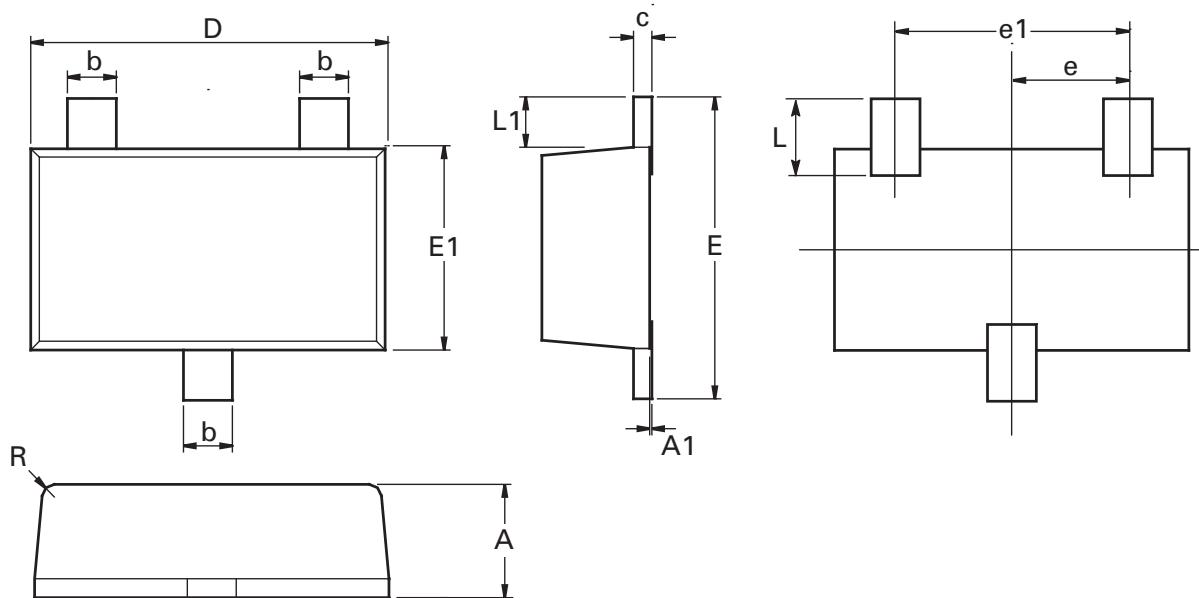
## Typical characteristics



**ZXTN04120HFF**

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## Package outline - SOT23F



Dim.	Millimeters		Inches		Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.80	1.00	0.0315	0.0394	E	2.30	2.50	0.0906	0.0984
A1	0.00	0.10	0.00	0.0043	E1	1.50	1.70	0.0590	0.0669
b	0.35	0.45	0.0153	0.0161	L	0.48	0.68	0.0189	0.0268
c	0.10	0.20	0.0043	0.0079	L1	0.30	0.50	0.0153	0.0161
D	2.80	3.00	0.1102	0.1181	R	0.05	0.15	0.0019	0.0059
e	0.95 ref		0.0374 ref		O	0°	12°	0°	12°
e1	1.80	2.00	0.0709	0.0787	-	-	-	-	-

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

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"Obsolete"	Production has been discontinued

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