

# ZXTP05120HFF

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

### Summary

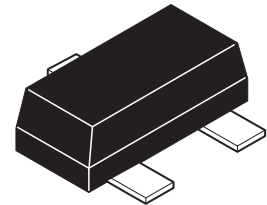
$BV_{CEO} > -120V$

$I_{C(cont)} = -1A$

$V_{CE(sat)} < 1.1V @ 1A$

$P_D = 1.5W$

Complementary part number ZXTN04120HFF



### Description

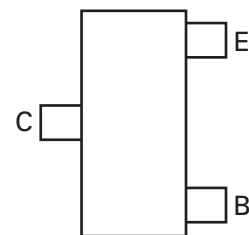
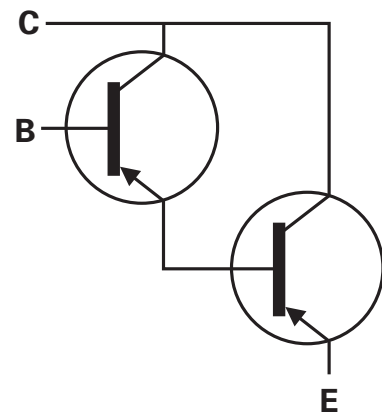
This high performance PNP Darlington transistor is housed in the small outline SOT23 flat package for applications where space is at a premium.

### Features

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

### Applications

- High side drivers



Pinout - top view

### Ordering information

DEVICE	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTP05120HFFTA	7	8	3000

### Device marking

1F7

# ZXTP05120HFF

## 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 @ $T_{amb} = 25^{\circ}C^{(a)}$	$P_D$	0.84	W
Linear derating factor		6.72	mW/ $^{\circ}C$
Power dissipation @ $T_{amb} = 25^{\circ}C^{(b)}$	$P_D$	1.34	W
Linear derating factor		10.72	mW/ $^{\circ}C$
Power dissipation @ $T_{amb} = 25^{\circ}C^{(c)}$	$P_D$	1.50	W
Linear derating factor		12.0	mW/ $^{\circ}C$
Power dissipation @ $T_{amb} = 25^{\circ}C^{(d)}$	$P_D$	2.0	W
Linear derating factor	$P_D$	16.0	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>	$R_{\theta JA}$	149	$^{\circ}C/W$
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	93	$^{\circ}C/W$
Junction to ambient <sup>(c)</sup>	$R_{\theta JA}$	83	$^{\circ}C/W$
Junction to ambient <sup>(d)</sup>	$R_{\theta JA}$	60	$^{\circ}C/W$

### 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.

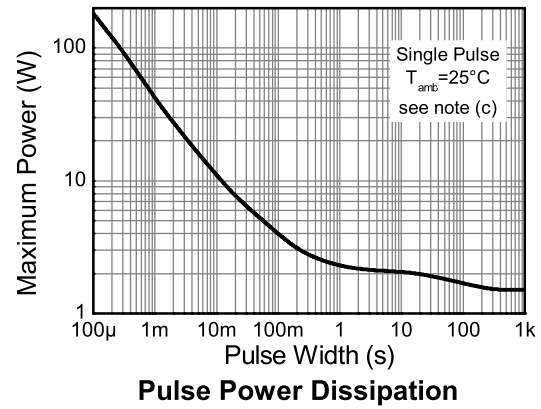
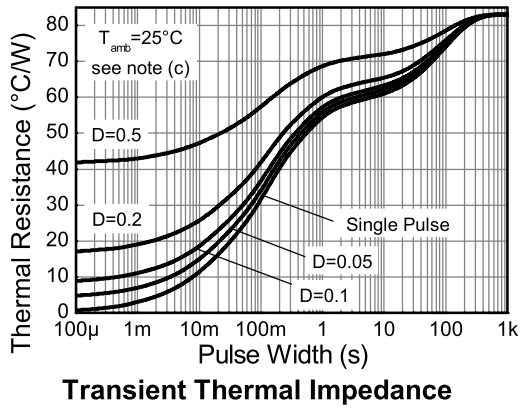
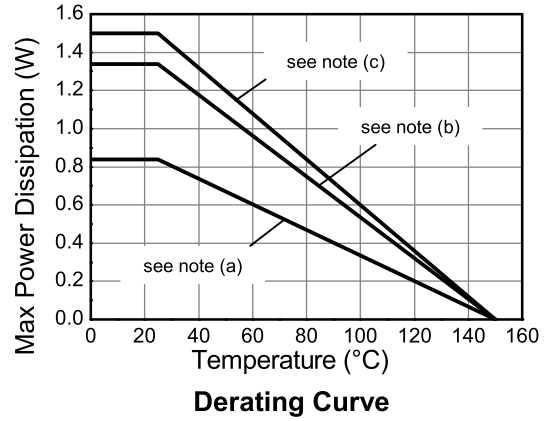
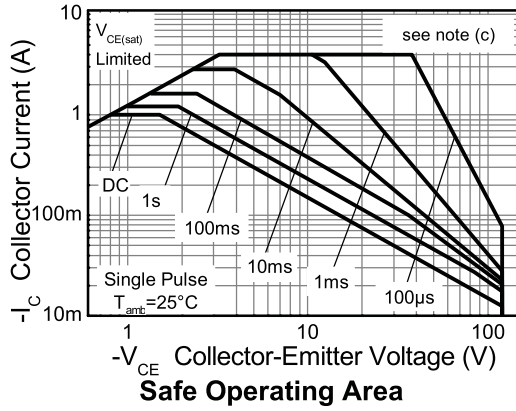
(b) Mounted on 25mm x 25mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

(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.

# ZXTP05120HFF

## Characteristics



# ZXTP05120HFF

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

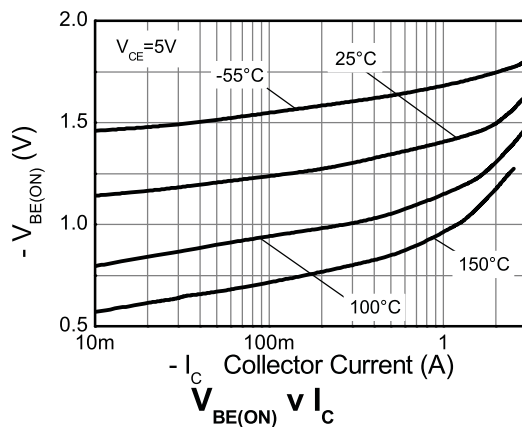
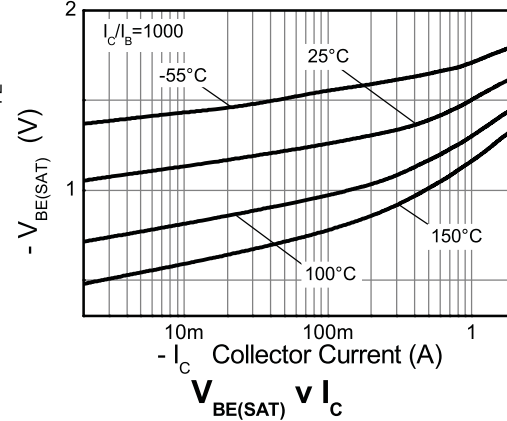
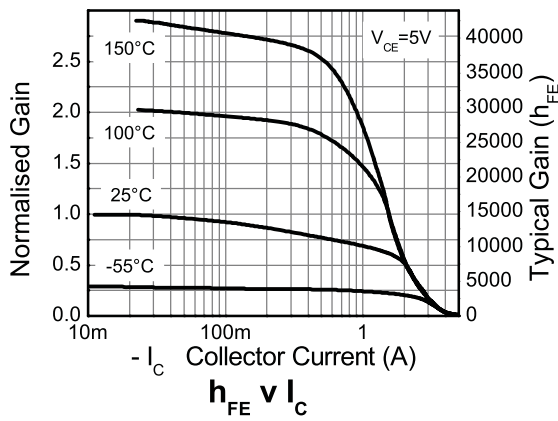
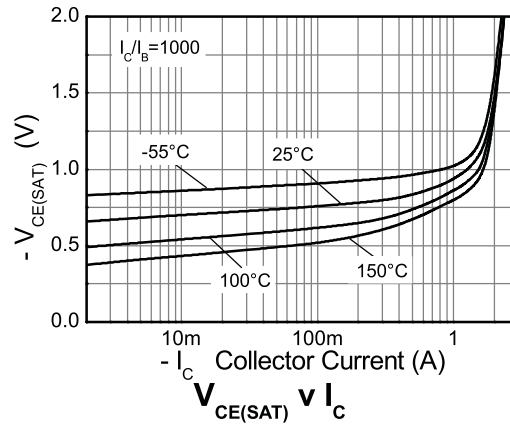
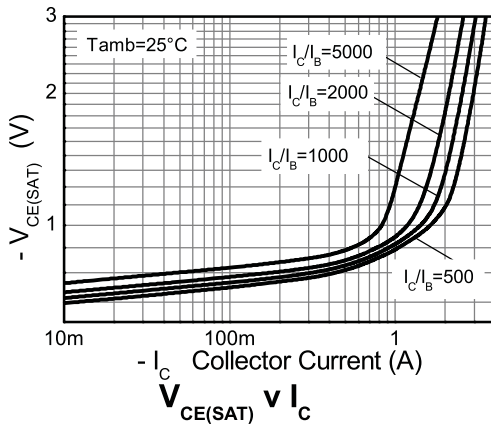
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CBO}$	-140	-170		V	$I_C = -100\mu\text{A}$
Collector-emitter breakdown voltage (base open)	$BV_{CEO}$	-120	-140		V	$I_C = -10\text{mA}^{(*)}$
Emitter-base breakdown voltage	$BV_{EBO}$	-10	-16		V	$I_E = -100\mu\text{A}$
Collector-base cut-off current	$I_{CBO}$		<-1	-100 -10	nA $\mu\text{A}$	$V_{CB} = -120\text{V}$ $V_{CB} = -120\text{V}, T_{amb} = 100^{\circ}\text{C}$
Collector-emitter cut-off current	$I_{CES}$		<-0.1	-10	$\mu\text{A}$	$V_{CB} = -120\text{V}$
Emitter-base cut-off current	$I_{EBO}$		<-1	-100	nA	$V_{EB} = -8\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$		-0.77 -0.9 -1.3	-0.9 -1.1 -2.0	V V V	$I_C = 250\text{mA}, I_B = 0.25\text{mA}^{(*)}$ $I_C = -1\text{A}, I_B = -1\text{mA}^{(*)}$ $I_C = -2\text{A}, I_B = -2\text{mA}^{(*)}$
Base-emitter saturation voltage	$V_{BE(sat)}$		-1.5	-1.7	V	$I_C = -1\text{A}, I_B = -1\text{mA}^{(*)}$
Base-emitter turn-on voltage	$V_{BE(on)}$		-1.4	-1.7	V	$I_C = -1\text{A}, V_{CE} = -5\text{V}^{(*)}$
Static forward current transfer ratio	$h_{FE}$	3K 3K 3K 2K	14k 11k 10k 8k	30K		$I_C = -50\text{mA}, V_{CE} = -5\text{V}^{(*)}$ $I_C = -500\text{mA}, V_{CE} = -5\text{V}^{(*)}$ $I_C = -1\text{A}, V_{CE} = -5\text{V}^{(*)}$ $I_C = -2\text{A}, V_{CE} = -5\text{V}^{(*)}$
Transition frequency	$f_T$		150		MHz	$I_C = -100\text{mA}, V_{CE} = -10\text{V}$ $f = 20\text{MHz}$
Output capacitance	$C_{ibo}$		67	90	pF	$V_{EB} = -0.5\text{V}, f = 1\text{MHz}^{(*)}$
Output capacitance	$C_{obo}$		22	40	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}^{(*)}$
Delay time	$t_d$		556		ns	$V_{CC} = -10\text{V}.$
Rise time	$t_r$		212		ns	$I_C = -0.5\text{A},$
Storage time	$t_s$		681		ns	$I_{B1} = I_{B2} = -0.5\text{mA}.$
Fall time	$t_f$		304		ns	

### NOTES:

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

# ZXTP05120HFF

## Typical characteristics

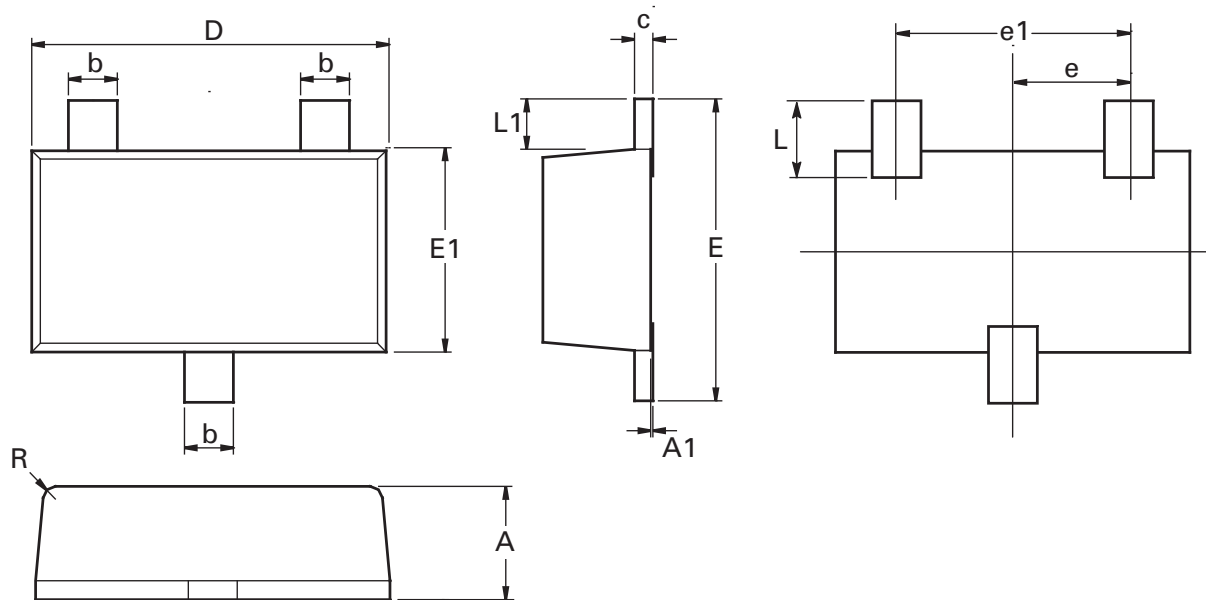


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## Package outline - SOT23F



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

# ZXTP05120HFF

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Europe	Americas	Asia Pacific	Corporate Headquarters
Zetex GmbH Kustermann-park Balanstraße 59 D-81541 München Germany Telephone: (49) 89 45 49 49 0 Fax: (49) 89 45 49 49 49 europe.sales@zetex.com	Zetex Inc 700 Veterans Memorial Highway Hauppauge, NY 11788 USA Telephone: (1) 631 360 2222 Fax: (1) 631 360 8222 usa.sales@zetex.com	Zetex (Asia Ltd) 3701-04 Metroplaza Tower 1 Hing Fong Road, Kwai Fong Hong Kong Telephone: (852) 26100 611 Fax: (852) 24250 494 asia.sales@zetex.com	Zetex Semiconductors plc Zetex Technology Park, Chadderton Oldham, OL9 9LL United Kingdom Telephone: (44) 161 622 4444 Fax: (44) 161 622 4446 hq@zetex.com

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**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.