

# ZXTP07012EFF

## 12V, SOT23F, PNP medium power transistor

### Summary;

$BV_{CEO} > -12V$

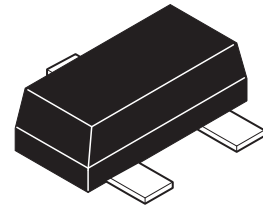
$I_{C(cont)} = -4A$

$V_{CE(sat)} < -75mV @ 1A$

$R_{CE(sat)} = 50m\Omega$

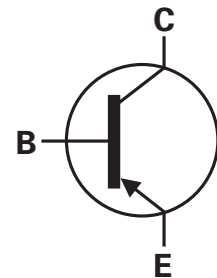
$P_D = 1.5W$

Complementary part number ZXTN07012EFF



### Description

This low voltage PNP transistor has been designed for applications requiring high gain and very low saturation voltage. The SOT23F package is pin compatible with the industry standard SOT23 footprint but offers lower profile and higher dissipation for applications where power density is of utmost importance.

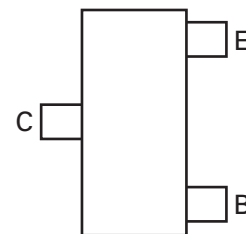


### Features

- Low profile SOT23F package
- Low saturation voltage
- High gain
- High power dissipation

### Applications

- Load switches
- Battery charging
- Motor drive



Pinout - top view

### Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTP07012EFFTA	7	8	3000

### Device marking

1D1

# ZXTP07012EFF

## Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	$V_{CBO}$	-12	V
Collector-emitter voltage	$V_{CEO}$	-12	V
Emitter-base voltage	$V_{EBO}$	-7	V
Continuous collector current <sup>(c)</sup>	$I_C$	-4	A
Peak pulse current	$I_{CM}$	-8	A
Base current	$I_B$	-1	A
Power dissipation at $T_{amb} = 25^\circ\text{C}^{(a)}$		0.84	W
Linear derating factor	$P_D$	6.72	mW/°C
Power dissipation at $T_{amb} = 25^\circ\text{C}^{(b)}$		1.34	W
Linear derating factor	$P_D$	10.72	mW/°C
Power dissipation at $T_{amb} = 25^\circ\text{C}^{(c)}$		1.50	W
Linear derating factor	$P_D$	12.0	mW/°C
Power dissipation at $T_{amb} = 25^\circ\text{C}^{(d)}$		2.0	W
Linear derating factor	$P_D$	16.0	mW/°C
Operating and storage temperature range	$T_j, T_{stg}$	-55 to 150	°C

## Thermal resistance

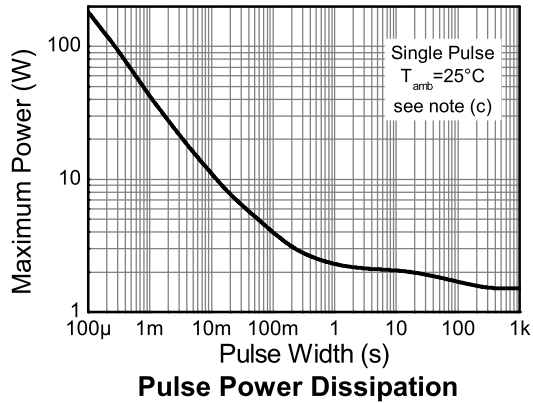
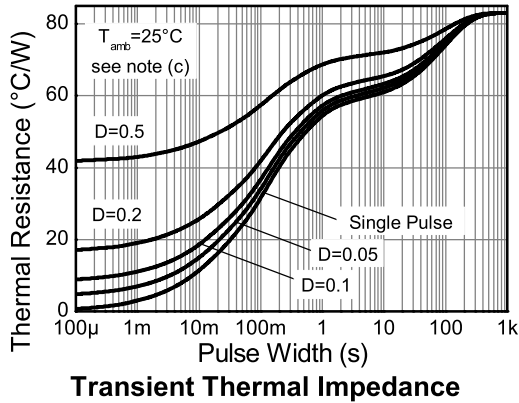
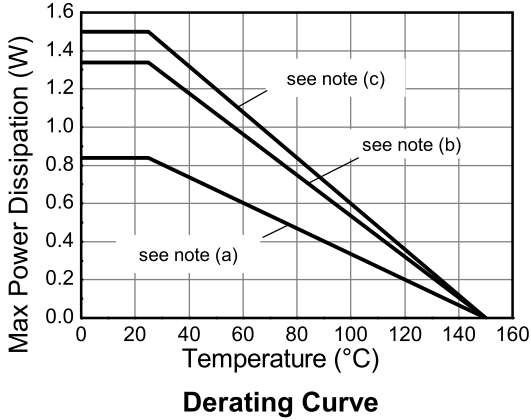
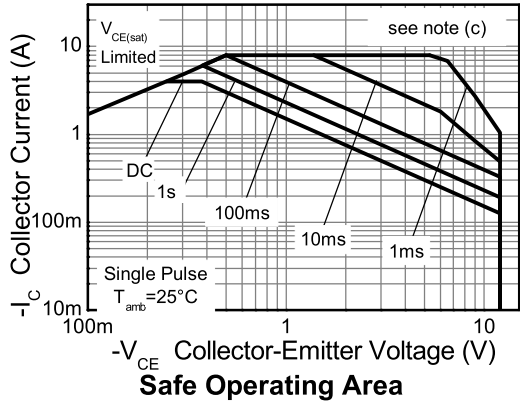
Parameter	Symbol	Limit	Unit
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	149	°C/W
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	93	°C/W
Junction to ambient <sup>(c)</sup>	$R_{\theta JA}$	83	°C/W
Junction to ambient <sup>(d)</sup>	$R_{\theta JA}$	60	°C/W

### 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)

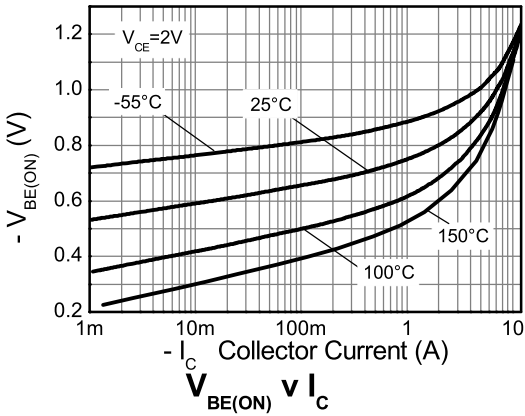
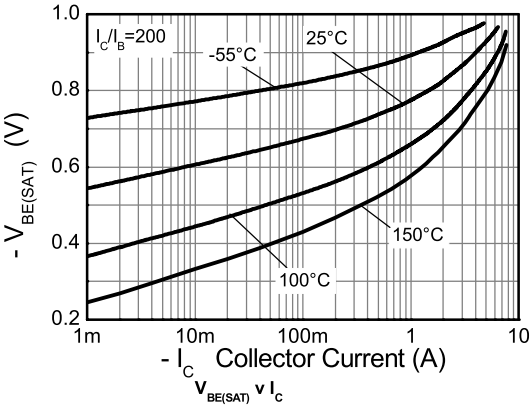
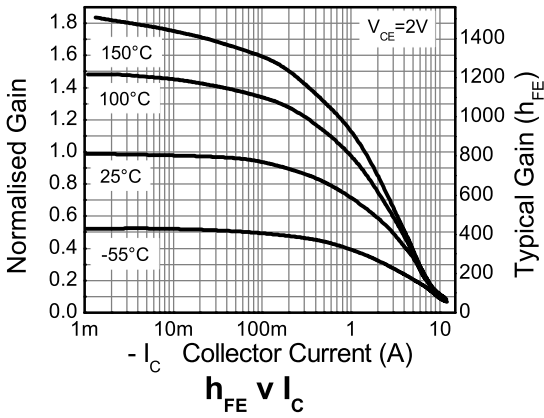
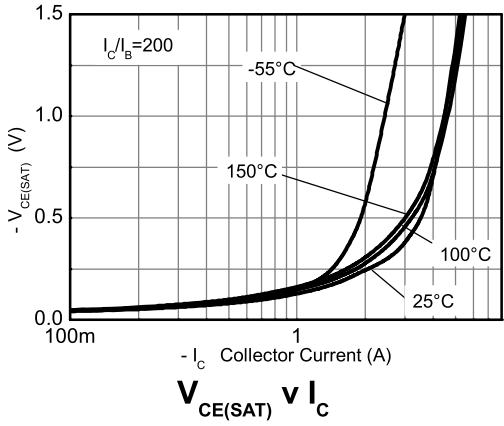
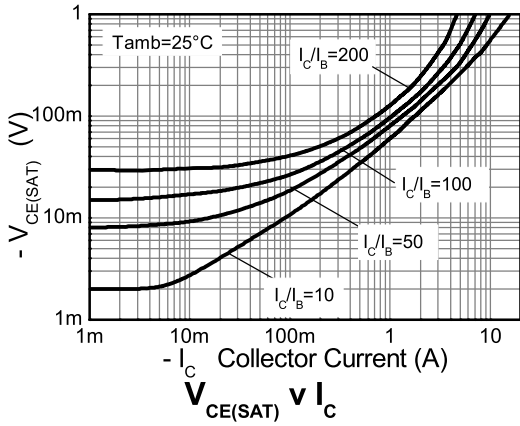
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CBO}$	-12	-23		V	$I_C = -100\mu\text{A}$
Collector-emitter breakdown voltage (base open)	$BV_{CEO}$	-12	-16		V	$I_C = -10\text{mA}^{(*)}$ *
Emitter-base breakdown voltage	$BV_{EBO}$	-7	-8.4		V	$I_E = -100\mu\text{A}$
Collector-base cut-off current	$I_{CBO}$		<-1	-50 -20	nA $\mu\text{A}$	$V_{CB} = -10\text{V}$ $V_{CB} = -10\text{V}, T_{amb} = 100^{\circ}\text{C}$
Emitter-base cut-off current	$I_{EBO}$		<-1	-50	nA	$V_{EB} = -5.6\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$		-80 -60 -130 -250 -260	-100 -75 -165 -350 -340	mV mV mV mV mV	$I_C = -0.5\text{A}, I_B = -2.5\text{mA}^{(*)}$ $I_C = -1\text{A}, I_B = -100\text{mA}^{(*)}$ $I_C = -1\text{A}, I_B = -5\text{mA}^{(*)}$ $I_C = -2\text{A}, I_B = -10\text{mA}^{(*)}$ $I_C = -4\text{A}, I_B = -80\text{mA}^{(*)}$
Base-emitter saturation voltage	$V_{BE(sat)}$		-945	-1050	mV	$I_C = -4\text{A}, I_B = -80\text{mA}^{(*)}$
Base-emitter turn-on voltage	$V_{BE(on)}$		-850	-950	mV	$I_C = -4\text{A}, V_{CE} = -2\text{V}^{(*)}$
Static forward current transfer ratio	$h_{FE}$	500 400 230 150	750 570 320 210	1500		$I_C = -10\text{mA}, V_{CE} = -2\text{V}^{(*)}$ $I_C = -1\text{A}, V_{CE} = -2\text{V}^{(*)}$ $I_C = -4\text{A}, V_{CE} = -2\text{V}^{(*)}$ $I_C = -6\text{A}, V_{CE} = -2\text{V}^{(*)}$
Transition frequency	$f_T$	100	250		MHz	$I_C = -50\text{mA}, V_{CE} = -5\text{V}$ $f = 50\text{MHz}$
Input capacitance	$C_{ibo}$		223		pF	$V_{CB} = -0.5\text{V}, f = 1\text{MHz}^{(*)}$
Output capacitance	$C_{obo}$		49	60	pF	$V_{CB} = -8\text{V}, f = 1\text{MHz}^{(*)}$
Delay time	$t_d$		12.8		ns	$V_{CC} = -10\text{V}.$
Rise time	$t_r$		15.6		ns	$I_C = -500\text{mA},$
Storage time	$t_s$		240		ns	$I_{B1} = I_{B2} = -50\text{mA}.$
Fall time	$t_f$		92.8		ns	

### NOTES:

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

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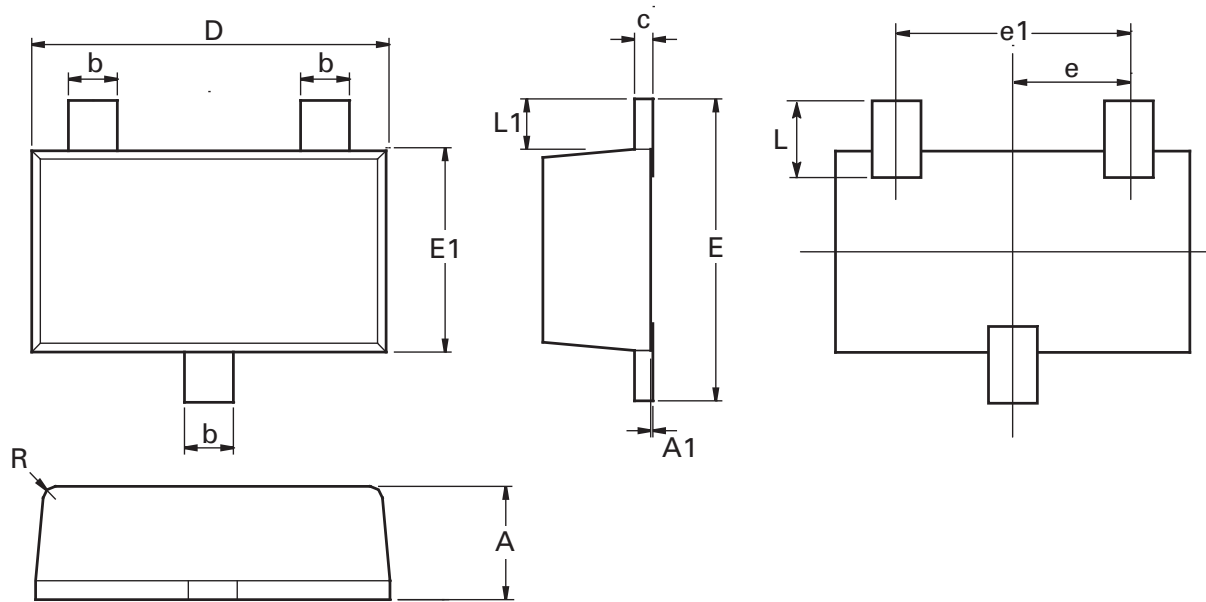
## Typical characteristics



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# ZXTP07012EFF

## Package outline - SOT23F



Dim.	Millimeters		Inches		Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Max.	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	E2	1.10	1.26	0.0433	0.0496
c	0.10	0.20	0.0043	0.0079	L	0.48	0.68	0.0189	0.0268
D	2.80	3.00	0.1102	0.1181	L1	0.30	0.50	0.0153	0.0161
e	0.95 ref		0.0374 ref		R	0.05	0.15	0.0019	0.0059
e1	1.80	2.00	0.0709	0.0787	O	0°	12°	0°	12°

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

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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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