

# ZXTP2025F

## 50V, SOT23, PNP medium power transistor

### Summary

$V_{(BR)CEO} > -50V$

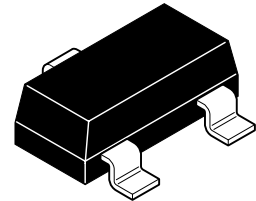
$I_{C(cont)} = -5A$

$R_{CE(sat)} = 30m\Omega$  typical

$V_{CE(sat)} < -60mV @ -1A$

$P_D = 1.2W$

Complementary part number: ZXTN2031F



### Description

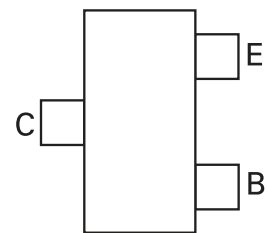
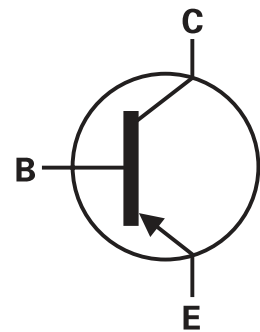
Advanced process capability and package design have been used to maximize the power handling and performance of this small outline transistor. The compact size and ratings of this device make it ideally suited to applications where space is at a premium.

### Features

- Higher power dissipation SOT23 package
- High peak current
- Low saturation voltage
- High gain
- 50V forward blocking voltage

### Applications

- MOSFET and IGBT gate driving
- Motor drive
- Relay, lamp and solenoid drive
- High side switches
- DC-DC converters



Pinout - top view

### Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTP2025FTA	7	8	3,000

### Device marking

312

# ZXTP2025F

## Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	$V_{CBO}$	-50	V
Collector-emitter voltage	$V_{CEO}$	-50	V
Emitter-base voltage	$V_{EBO}$	-7.0	V
Peak pulse current	$I_{CM}$	-10	A
Continuous collector current <sup>(c)</sup>	$I_C$	-5	A
Base current	$I_B$	-1.2	A
Power dissipation @ $T_A=25^\circ\text{C}$ <sup>(a)</sup>	$P_D$	1.0	W
Linear derating factor		8.0	mW/°C
Power dissipation @ $T_A=25^\circ\text{C}$ <sup>(b)</sup>	$P_D$	1.2	W
Linear derating factor		9.6	mW/°C
Power dissipation @ $T_A=25^\circ\text{C}$ <sup>(c)</sup>	$P_D$	1.56	W
Linear derating factor		12.5	mW/°C
Operating and storage temperature	$T_j; T_{stg}$	-55 to +150	°C

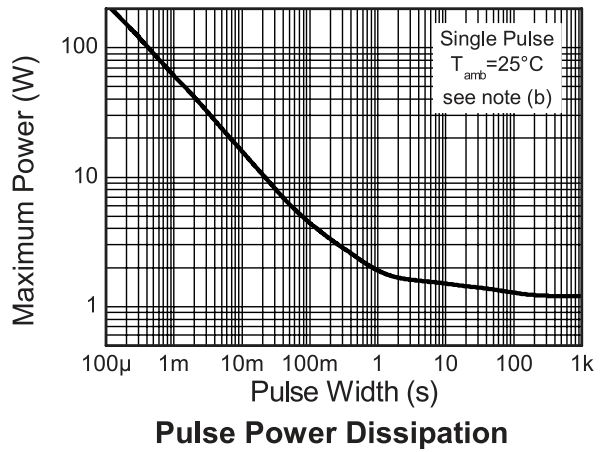
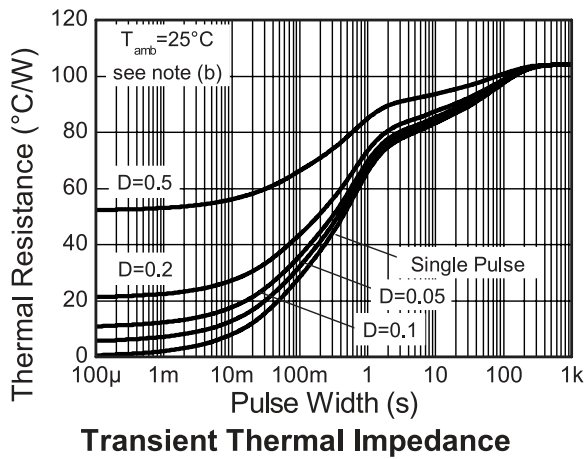
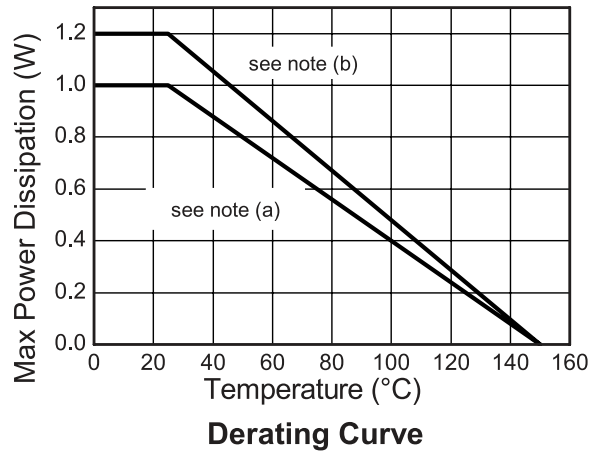
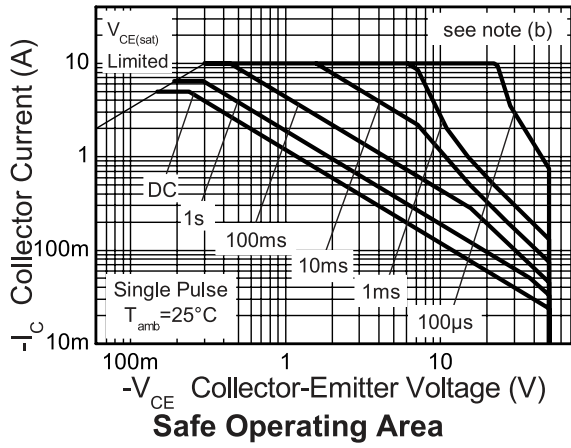
## Thermal resistance

Parameter	Symbol	Value	Unit
Junction to ambient <sup>(a)</sup>	$R\theta_{JA}$	125	°C/W
Junction to ambient <sup>(b)</sup>	$R\theta_{JA}$	104	°C/W
Junction to ambient <sup>(c)</sup>	$R\theta_{JA}$	80	°C/W

### NOTES:

- (a) Mounted on 18mm x 18mm x 1.6mm FR4 PCB with a very high coverage of 2 oz weight copper in still air conditions.  
(b) Mounted on 30mm x 30mm x 1.6mm FR4 PCB with a very high coverage of 2 oz weight copper in still air conditions.  
(c) As (b) above measured at  $t < 5$ secs.

## Characteristics



# ZXTP2025F

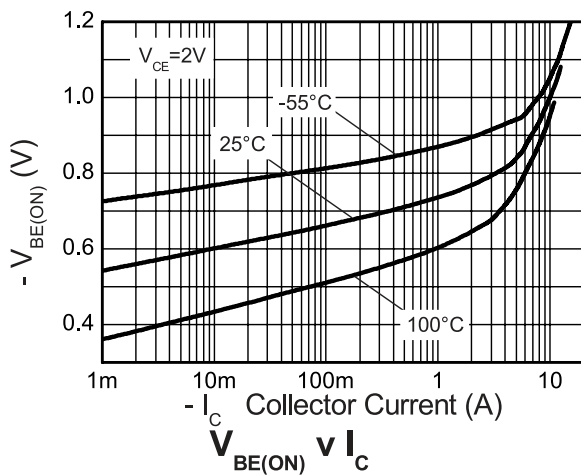
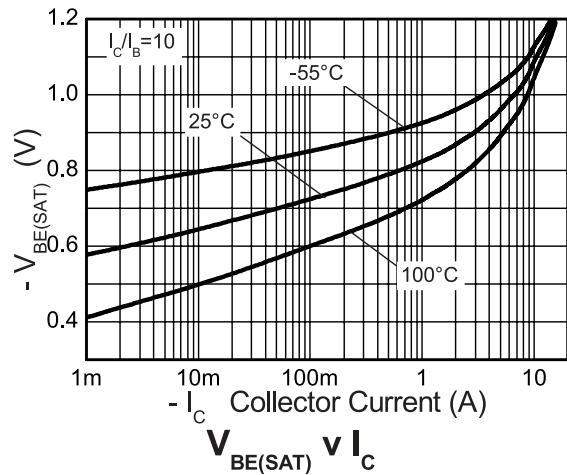
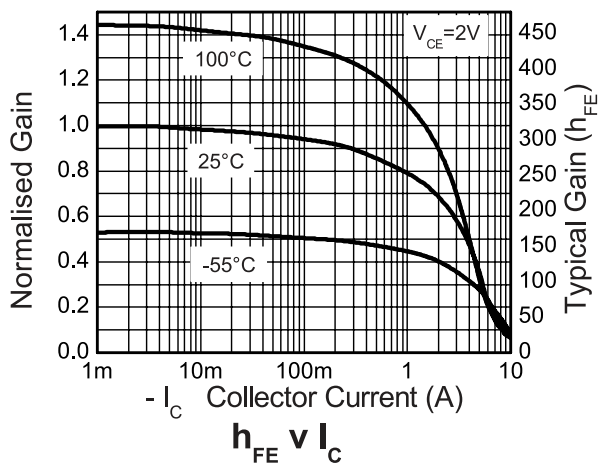
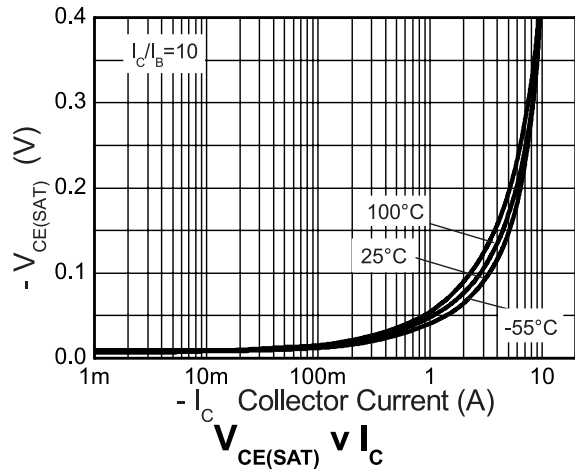
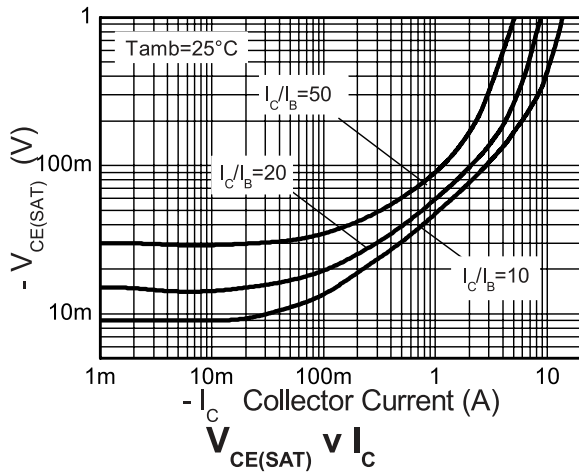
## Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$V_{(BR)CBO}$	-50	100		V	$I_C = -100\mu\text{A}$
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	-50	70		V	$I_C = -10\text{mA}^{(a)}$
Emitter-base breakdown voltage	$V_{(BR)EBO}$	-7.0	8.5		V	$I_E = -100\mu\text{A}$
Collector-emitter cut-off current	$I_{CEV}$			-20	nA	$V_{CE} = -40\text{V}$ , $V_{BE} = 1\text{V}$
Collector-base cut-off current	$I_{CBO}$			-20	nA	$V_{CB} = -40\text{V}$
Emitter-base cut-off current	$I_{EBO}$			-10	nA	$V_{EB} = -6\text{V}$
Static forward current transfer ratio	$H_{FE}$	180 200 70 12	380 350 120 30	560		$I_C = -10\text{mA}$ , $V_{CE} = -2\text{V}^{(a)}$ $I_C = -500\text{mA}$ , $V_{CE} = -2\text{V}^{(a)}$ $I_C = -5\text{A}$ , $V_{CE} = -2\text{V}^{(a)}$ $I_C = -10\text{A}$ , $V_{CE} = -2\text{V}^{(a)}$
Collector-emitter saturation voltage	$V_{CE(sat)}$		-11 -40 -150 -150	-20 -60 -230 -200	mV mV mV mV	$I_C = -100\text{mA}$ , $I_B = -10\text{mA}^{(a)}$ $I_C = -1\text{A}$ , $I_B = -100\text{mA}^{(a)}$ $I_C = -2\text{A}$ , $I_B = -40\text{mA}^{(a)}$ $I_C = -5\text{A}$ , $I_B = -500\text{mA}^{(a)}$
Base-emitter saturation voltage	$V_{BE(sat)}$		-0.81 -0.95	-0.88 -1.05	V V	$I_C = -2\text{A}$ , $I_B = -40\text{mA}^{(a)}$ $I_C = -5\text{A}$ , $I_B = -500\text{mA}^{(a)}$
Base-emitter turn-on voltage	$V_{BE(on)}$		-0.82	-0.92	V	$I_C = -5\text{A}$ , $V_{CE} = -2\text{V}^{(a)}$
Transition frequency	$f_T$		190		MHz	$I_C = -500\text{mA}$ , $V_{CE} = -10\text{V}$ , $f = 50\text{MHz}$
Output capacitance	$C_{obo}$		42		pF	$V_{CB} = -10\text{V}$ , $f = 1\text{MHz}$
Delay time	$t_{(d)}$		14		ns	$V_{CC} = -12\text{V}$ , $I_C = -2.5\text{A}$ , $I_{B1} = I_{B2} = -125\text{mA}$
Rise time	$t_{(r)}$		23		ns	
Storage time	$t_{(stg)}$		240		ns	
Fall time	$t_{(f)}$		30		ns	

### NOTES:

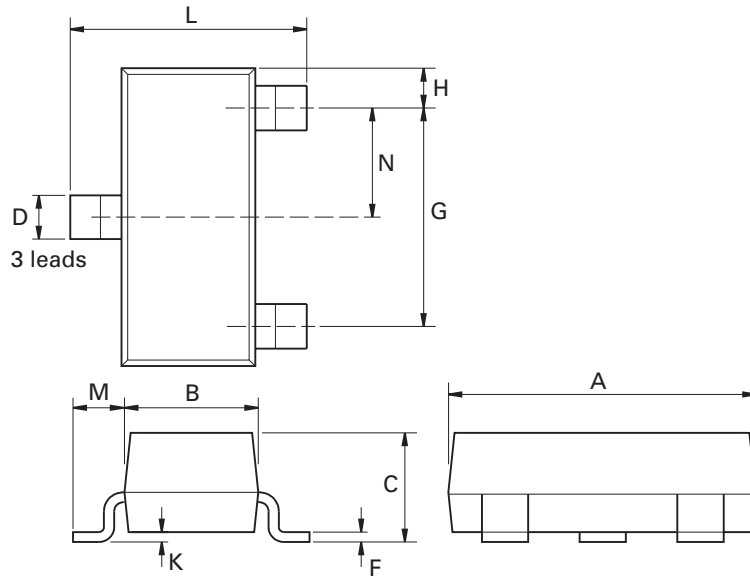
(a) Measured under pulsed conditions. Pulse width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

## Typical characteristics



# ZXTP2025F

## Packaging details - 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

Europe	Americas	Asia Pacific	Corporate Headquarters
Zetex GmbH Streitfeldstraße 19 D-81673 München Germany	Zetex Inc 700 Veterans Memorial Highway Hauppauge, NY 11788 USA	Zetex (Asia Ltd) 3701-04 Metroplaza Tower 1 Hing Fong Road, Kwai Fong Hong Kong	Zetex Semiconductors plc Zetex Technology Park, Chadderton Oldham, OL9 9LL United Kingdom
Telefon: (49) 89 45 49 49 0 Fax: (49) 89 45 49 49 49 europe.sales@zetex.com	Telephone: (1) 631 360 2222 Fax: (1) 631 360 8222 usa.sales@zetex.com	Telephone: (852) 26100 611 Fax: (852) 24250 494 asia.sales@zetex.com	Telephone: (44) 161 622 4444 Fax: (44) 161 622 4446 hq@zetex.com

For international sales offices visit [www.zetex.com/offices](http://www.zetex.com/offices)

Zetex products are distributed worldwide. For details, see [www.zetex.com/salesnetwork](http://www.zetex.com/salesnetwork)

This publication is issued to provide outline information only which (unless agreed by the company in writing) may not be used, applied or reproduced for any purpose or form part of any order or contact or be regarded as a representation relating to the products or services concerned. The company reserves the right to alter without notice the specification, design, price or conditions of supply of any product or service.