

# ZXTN07045EFF

## 45V, SOT23F, NPN high gain power transistor

### Summary

$BV_{CEO} > 45V$

$BV_{ECO} > 6V$

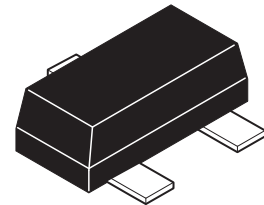
$I_{C(cont)} = 4A$

$V_{CE(sat)} < 80mV @ 1A$

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

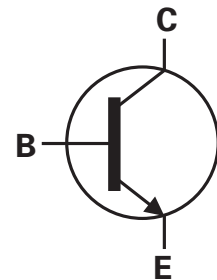
$P_D = 1.5W$

Complementary part number ZXTP07040DFF



### Description

This low voltage NPN 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.

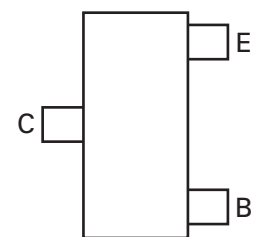


### Features

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

### Applications

- Boost converters
- Lamp and relay driver
- Siren driver
- MOSFET and IGBT gate driving
- Motor drive



Pinout - top view

### Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN07045EFFTA	7	8	3000

### Device marking

1D4

# ZXTN07045EFF

## Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	$V_{CBO}$	45	V
Collector-emitter voltage	$V_{CEO}$	45	V
Emitter-collector voltage (reverse blocking)	$V_{ECO}$	6	V
Emitter-base voltage	$V_{EBO}$	7	V
Continuous collector current <sup>(c)</sup>	$I_C$	4	A
Base current	$I_B$	1	A
Peak pulse current	$I_{CM}$	6	A
Power dissipation at $T_{amb}=25^{\circ}C^{(a)}$	$P_D$	0.84	W
Linear derating factor		6.72	mW/ $^{\circ}C$
Power dissipation at $T_{amb}=25^{\circ}C^{(b)}$	$P_D$	1.34	W
Linear derating factor		10.72	mW/ $^{\circ}C$
Power dissipation at $T_{amb}=25^{\circ}C^{(c)}$	$P_D$	1.50	W
Linear derating factor		12.0	mW/ $^{\circ}C$
Power dissipation at $T_{amb}=25^{\circ}C^{(d)}$	$P_D$	2.0	W
Linear derating factor		16.0	mW/ $^{\circ}C$
Operating and storage temperature range	$T_j, T_{stg}$	- 55 to 150	$^{\circ}C$

## Thermal resistance

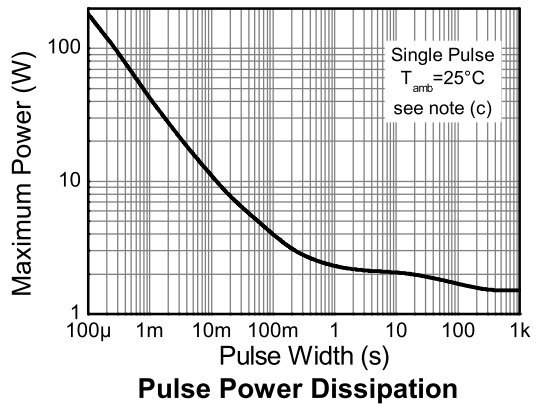
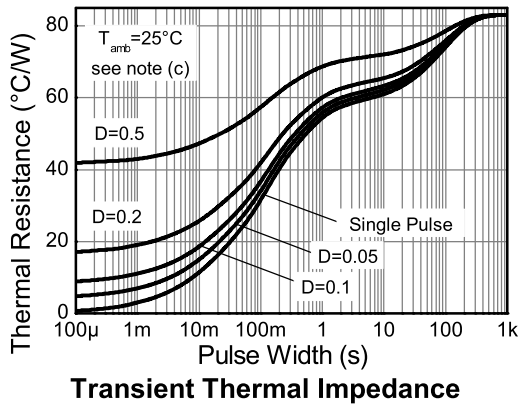
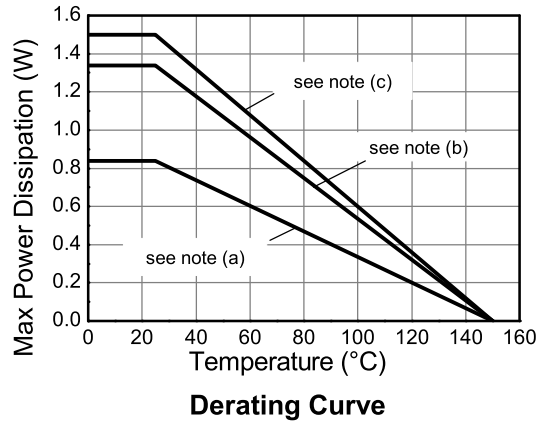
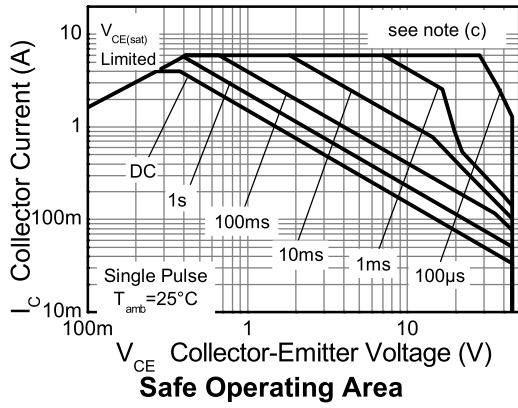
Parameter	Symbol	Limit	Unit
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	149	$^{\circ}C/W$
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	93	$^{\circ}C/W$
Junction to ambient <sup>(c)</sup>	$R_{\theta JA}$	83	$^{\circ}C/W$
Junction to ambient <sup>(d)</sup>	$R_{\theta JA}$	60	$^{\circ}C/W$

### 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.

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## Characteristics



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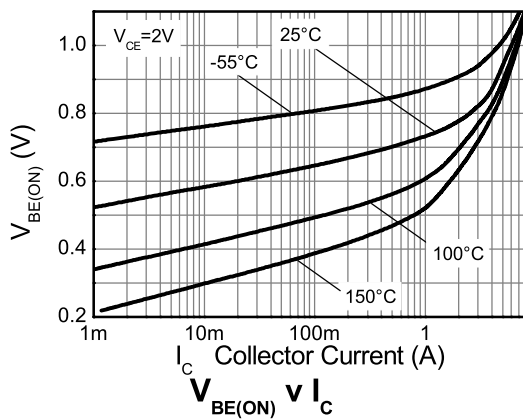
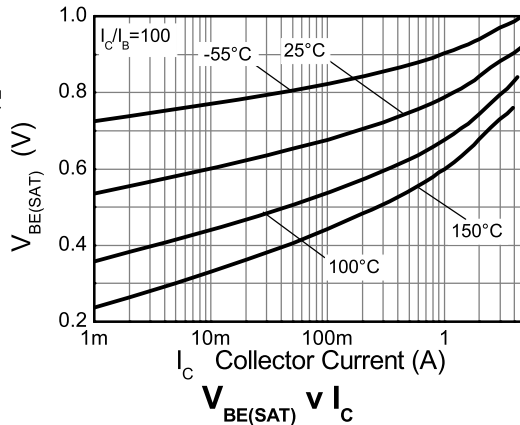
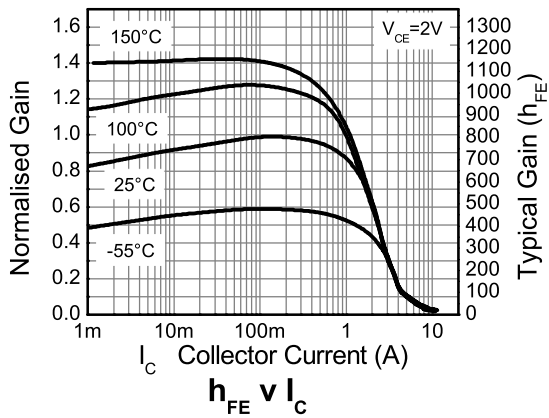
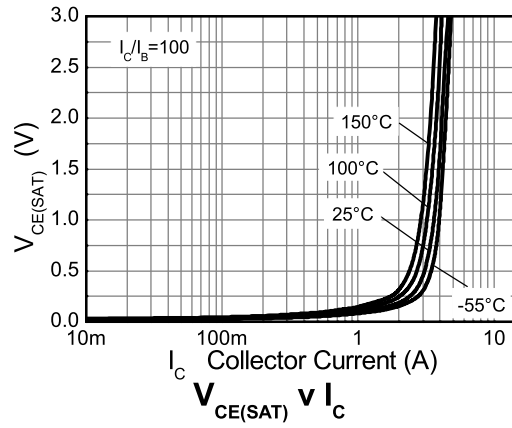
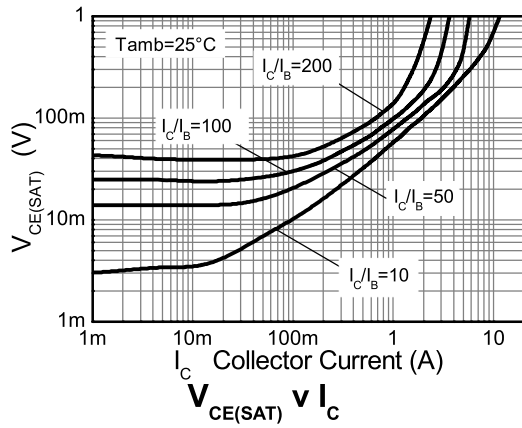
## Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CBO}$	45	160		V	$I_C = 100\mu\text{A}$
Collector-emitter breakdown voltage (base open)	$BV_{CEO}$	45	60		V	$I_C = 10\text{mA}^{(*)}$
Emitter-base breakdown voltage	$BV_{EBO}$	7	8.3		V	$I_E = 100\mu\text{A}$
Emitter-collector breakdown voltage (reverse blocking)	$BV_{ECX}$	6	8.2		V	$I_E = 100\mu\text{A}$ , $R_{BC} < 1\text{k}\Omega$ or $0.25\text{V} > V_{BC} > -0.25\text{V}$
Emitter-collector breakdown voltage (base open)	$BV_{ECO}$	6	7.2		V	$I_E = 100\mu\text{A}$ ,
Collector-base cut-off current	$I_{CBO}$		<1	50 20	nA $\mu\text{A}$	$V_{CB} = 35\text{V}$ $V_{CB} = 35\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$
Emitter-base cut-off current	$I_{EBO}$		<1	50	nA	$V_{EB} = 5.6\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$		45 160 60 200 230	70 230 80 270 280	mV mV mV mV mV	$I_C = 0.1\text{A}$ , $I_B = 0.5\text{mA}^{(*)}$ $I_C = 1\text{A}$ , $I_B = 5\text{mA}^{(*)}$ $I_C = 1\text{A}$ , $I_B = 100\text{mA}^{(*)}$ $I_C = 2\text{A}$ , $I_B = 20\text{mA}^{(*)}$ $I_C = 4\text{A}$ , $I_B = 80\text{mA}^{(*)}$
Base-emitter saturation voltage	$V_{BE(sat)}$		1000	1100	mV	$I_C = 4\text{A}$ , $I_B = 80\text{mA}^{(*)}$
Base-emitter turn-on voltage	$V_{BE(on)}$		875	1000	mV	$I_C = 4\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$
Static forward current transfer ratio	$h_{FE}$	500 400 250 70	800 710 530 125	1500		$I_C = 0.1\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$ $I_C = 1\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$ $I_C = 2\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$ $I_C = 4\text{A}$ , $V_{CE} = 2\text{V}^{(*)}$
Transition frequency	$f_T$	150	190		MHz	$I_C = 50\text{mA}$ , $V_{CE} = 5\text{V}$ $f = 50\text{MHz}$
Input capacitance	$C_{ibo}$		225		pF	$V_{EB} = 0.5\text{V}$ , $f = 1\text{MHz}^{(*)}$
Output capacitance	$C_{obo}$		18.4	25	pF	$V_{CB} = 10\text{V}$ , $f = 1\text{MHz}^{(*)}$
Delay time	$t_d$		22.3		ns	$V_{CC} = 10\text{V}$ .
Rise time	$t_r$		10.6		ns	$I_C = 500\text{mA}$ ,
Storage time	$t_s$		613		ns	$I_{B1} = I_{B2} = 50\text{mA}$ .
Fall time	$t_f$		146		ns	

### NOTES:

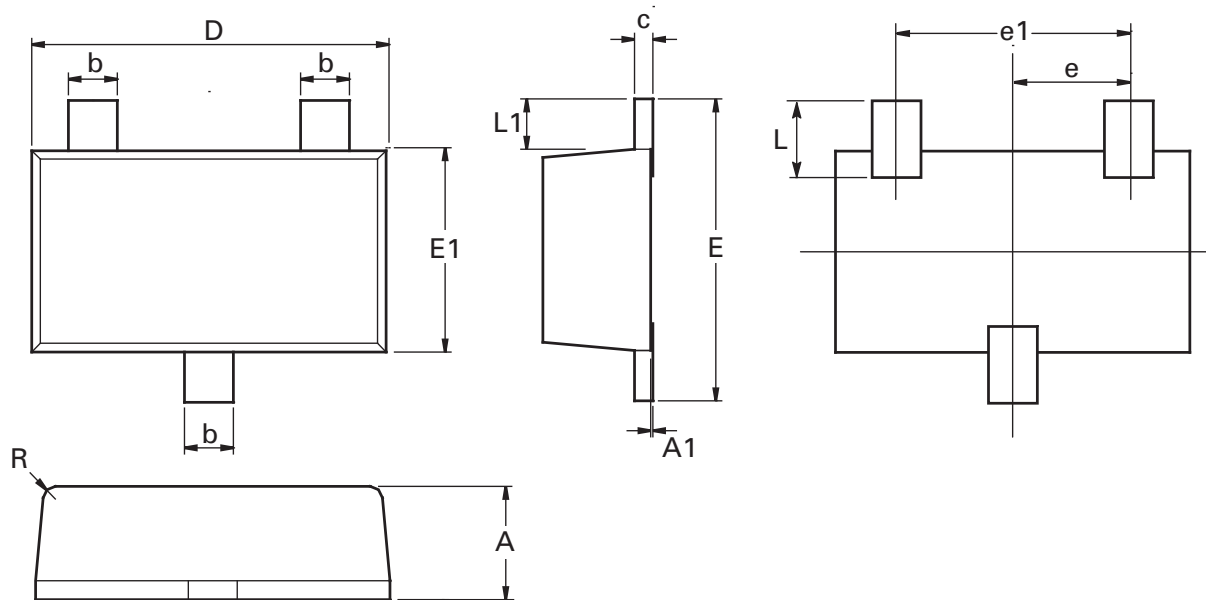
(\*) Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

## Typical characteristics



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## 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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