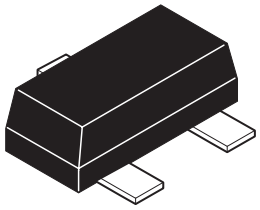
ZXTN07045EFF
45V, SOT23F, NPN high gain power transistor

Summary



BV_{CEO} > 45V

BV_{ECO} > 6V

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

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

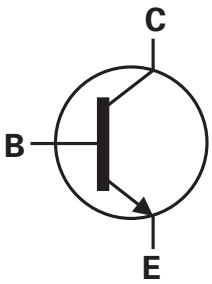
$R_{CE(sat)}$ = 50mΩ

P_D = 1.5W

Complementary part number ZXTP07040DFF

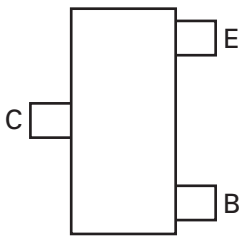
Description

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



Pinout - top view

Applications

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

Ordering information

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

Device marking

1D4

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[c]	I_C	4	A
Base current	I_B	1	A
Peak pulse current	I_{CM}	6	A
Power dissipation at T_{amb}=25°C[a]	P_D	0.84	W
Linear derating factor		6.72	mW/°C
Power dissipation at T_{amb}=25°C[b]	P_D	1.34	W
Linear derating factor		10.72	mW/°C
Power dissipation at T_{amb}=25°C[c]	P_D	1.50	W
Linear derating factor		12.0	mW/°C
Power dissipation at T_{amb}=25°C[d]	P_D	2.0	W
Linear derating factor		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[a]	$R_{\Theta JA}$	149	°C/W
Junction to ambient[b]	$R_{\Theta JA}$	93	°C/W
Junction to ambient[c]	$R_{\Theta JA}$	83	°C/W
Junction to ambient[d]	$R_{\Theta JA}$	60	°C/W

NOTES:

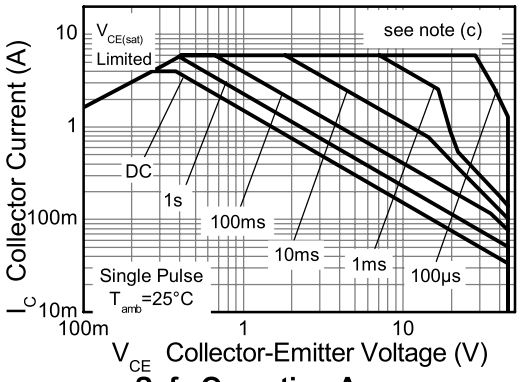
(a) For a device surface mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(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.

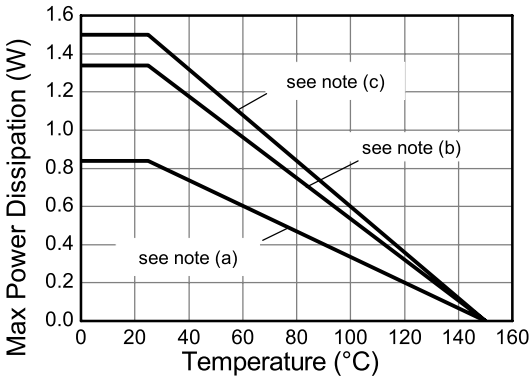
(c) Mounted on 50mm x 50mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

(d) As (c) above measured at t<5secs.

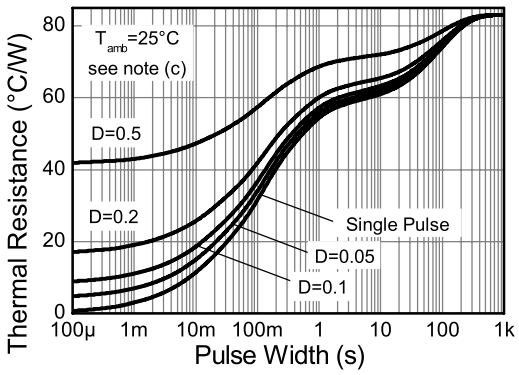
Characteristics



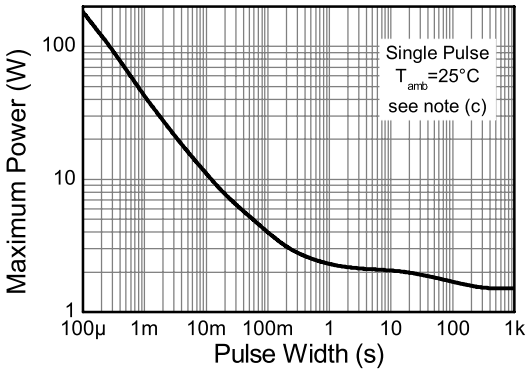
Safe Operating Area



Derating Curve



Transient Thermal Impedance



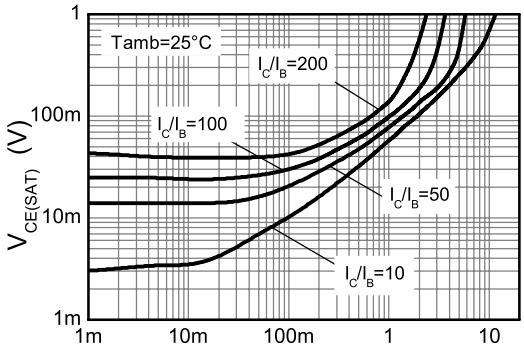
Pulse Power Dissipation

Electrical characteristics (at T_{amb} = 25°C unless otherwise stated)

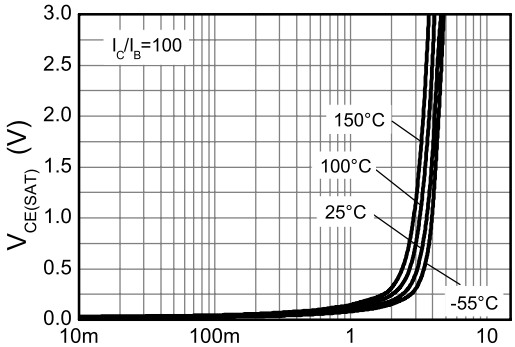
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	45	160		V	I_C = 100μA
Collector-emitter breakdown voltage (base open)	BV_{CEO}	45	60		V	I_C = 10mA (*)
Emitter-base breakdown voltage	BV_{EBO}	7	8.3		V	I_E = 100μA
Emitter-collector breakdown voltage (reverse blocking)	BV_{ECX}	6	8.2		V	I_E = 100μA, R_{BC} < 1kΩ or 0.25V > V_{BC} > -0.25V
Emitter-collector breakdown voltage (base open)	BV_{ECO}	6	7.2		V	I_E = 100μA,
Collector-base cut-off current	I_{CBO}		<1	50 20	nA μA	V_{CB} = 35V V_{CB} = 35V, T_{amb}= 100°C
Emitter-base cut-off current	I_{EBO}		<1	50	nA	V_{EB} = 5.6V
Collector-emitter saturation voltage	$V_{CE(sat)}$		40 140 60 180 270	65 190 80 220 340	mV mV mV mV mV	I_C = 0.1A, I_B = 0.5mA(*) I_C = 1A, I_B = 5mA(*) I_C = 1A, I_B = 100mA(*) I_C = 2A, I_B = 20mA(*) I_C = 4A, I_B = 80mA(*)
Base-emitter saturation voltage	$V_{BE(sat)}$		950	1050	mV	I_C = 4A, I_B = 80mA(*)
Base-emitter turn-on voltage	$V_{BE(on)}$		875	1000	mV	I_C = 4A, V_{CE} = 2V(*)
Static forward current transfer ratio	h_{FE}	500 400 250 70	800 710 530 125	1500		I_C = 0.1A, V_{CE} = 2V(*) I_C = 1A, V_{CE} = 2V(*) I_C = 2A, V_{CE} = 2V(*) I_C = 4A, V_{CE} = 2V(*)
Transition frequency	f_T	150	190		MHz	I_C = 50mA, V_{CE} = 5V f = 50MHz
Input capacitance	C_{ibo}		225		pF	V_{EB} = 0.5V, f = 1MHz(*)
Output capacitance	C_{obo}		18.4	25	pF	V_{CB} = 10V, f = 1MHz(*)
Delay time	t_d		22.3		ns	V_{CC} = 10V. I_C = 500mA, I_{B1} = I_{B2}= 50mA.
Rise time	t_r		10.6		ns	
Storage time	t_s		613		ns	
Fall time	t_f		146		ns	

NOTES:
(*) Measured under pulsed conditions. Pulse width ≤300μs; duty cycle ≤2%.

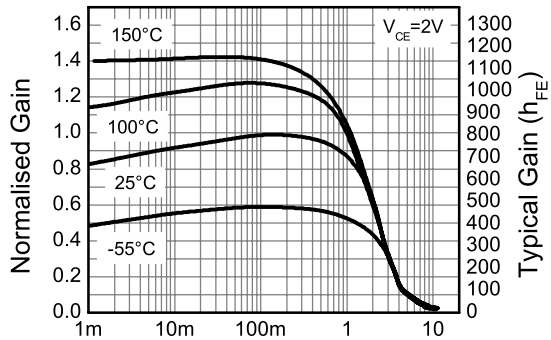
Typical characteristics



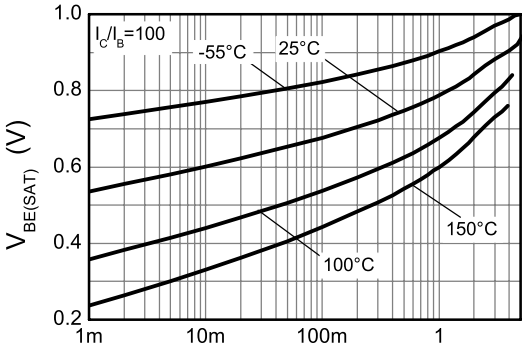
$V_{CE(SAT)}$ v I_C



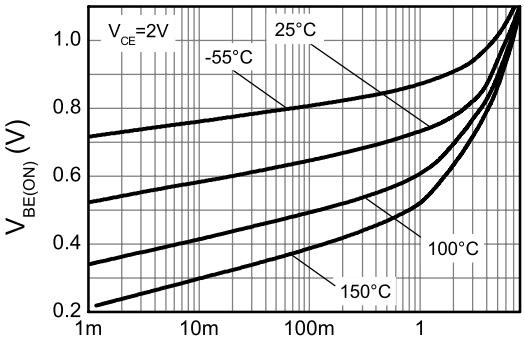
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

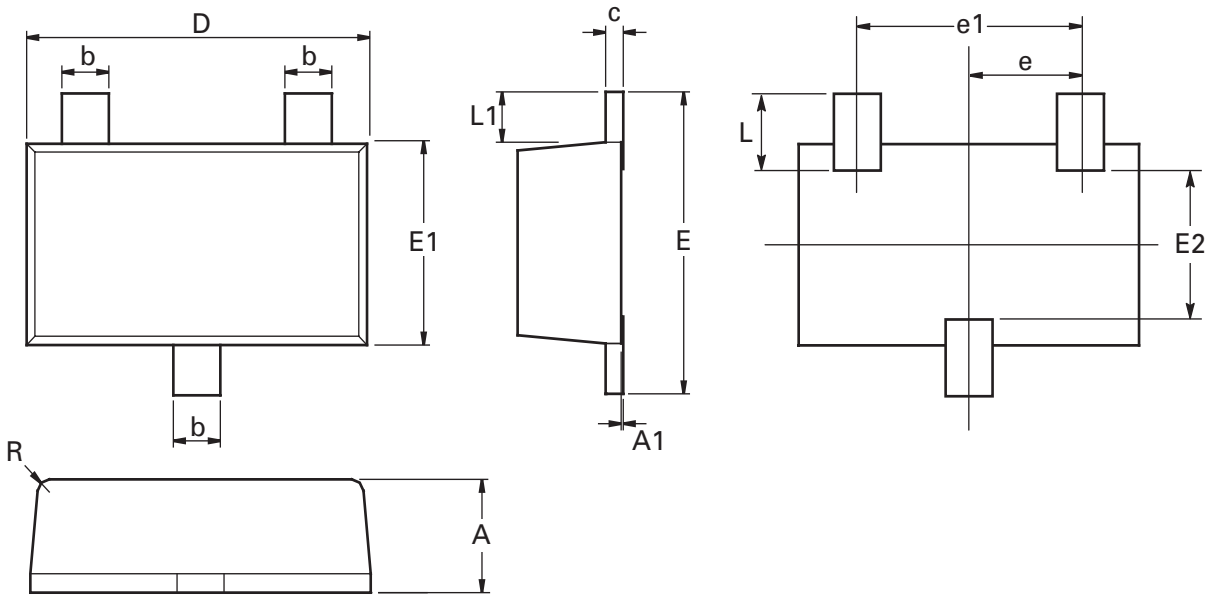


$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

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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