ZXTN07045EFF

45V NPN MEDIUM POWER PLANAR TRANSISTOR IN SOT23F

Features and Benefits

- BV_{CEO} > 45V
- I_C = 4A Continuous Collector Current
- Low Saturation Voltage $V_{CE(sat)}$ < 80mV @ 1A
- $R_{CE(sat)}$ = 50mΩ
- h_{FE} characterised up to 4A
- High h_{FE} min 400 @ 1A
- 1.5W power dissipation
- Complementary part number ZXTP07040DFF
- **Totally Lead-Free & Fully RoHS compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

- Case: SOT23F
- Case material: Molded Plastic. "Green" Molding Compound (Note 2) UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish; Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (Approximate)

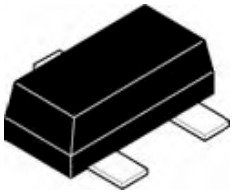
Description

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.

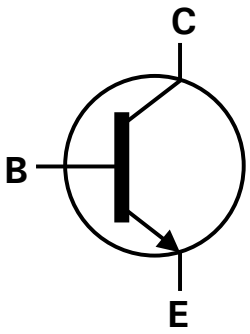
Applications

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

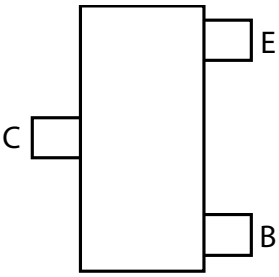
SOT23F



Top View



Device symbol



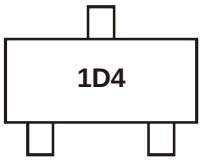
Top View
Pin Configuration

Ordering Information (Note 3)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN07045EFFTA	1D4	7	8	3,000

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. Halogen and Antimony free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
3. For packaging details, go to our website at http://www.diodes.com.

Marking Information



1D4 = Product Type Marking Code

Maximum Ratings @T_A = 25°C unless otherwise specified

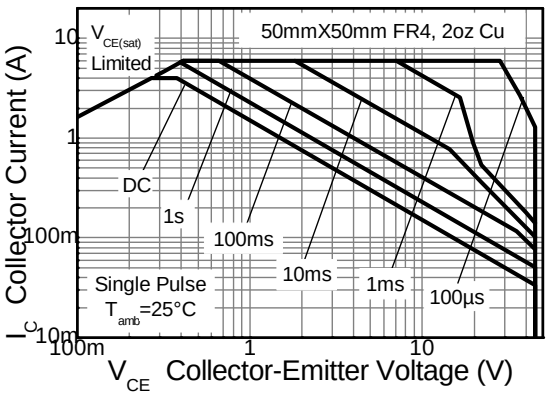
Characteristic		Symbol	Value	Unit
Collector-Base Voltage		V_{CBO}	45	V
Collector-Emitter Voltage		V_{CEO}	45	V
Emitter-Collector Voltage (Reverse Blocking)		V_{ECO}	6	V
Emitter-Base Voltage		V_{EBO}	7	V
Continuous Collector Current	(Note 6)	I_C	4	A
Peak Pulse Current		I_{CM}	6	A
Base Current		I_B	1	A

Thermal Characteristics @T_A = 25°C unless otherwise specified

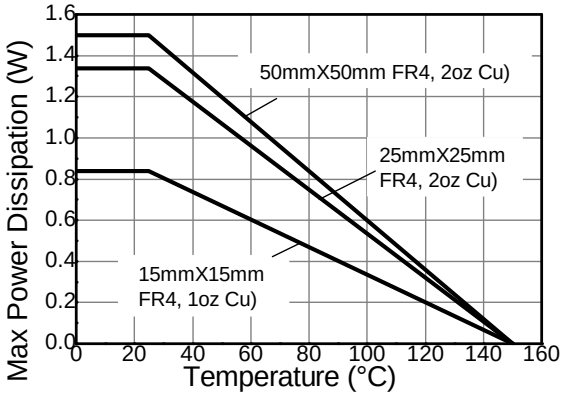
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 4)	P_D -	0.84 6.72	W mW/°C
	(Note 5)		1.34 10.72	
	(Note 6)		1.50 12.0	
	(Note 7)		2.0 16.0	
Thermal Resistance, Junction to Ambient	(Note 4)	$R_{\theta JA}$	149	°C/W
	(Note 5)		93	
	(Note 6)		83	
	(Note 7)		60	
Thermal Resistance, Junction to Lead	(Note 8)	$R_{\theta JL}$	43.77	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes:
4. For a device surface mounted on 15mm X 15mm X 1.6mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
5. For a device surface mounted on 25mm X 25mm X 1.6mm FR4 PCB with high coverage of single sided 2 oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
6. For a device surface mounted on 50mm X 50mm X 1.6mm FR4 PCB with high coverage of single sided 2 oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
7. As note 6 above, measured at t < 5 seconds
8. Thermal resistance from junction to solder-point (at the end of the collector lead).

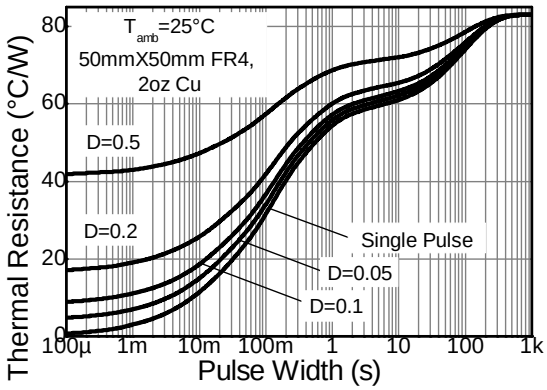
Typical Thermal Characteristics



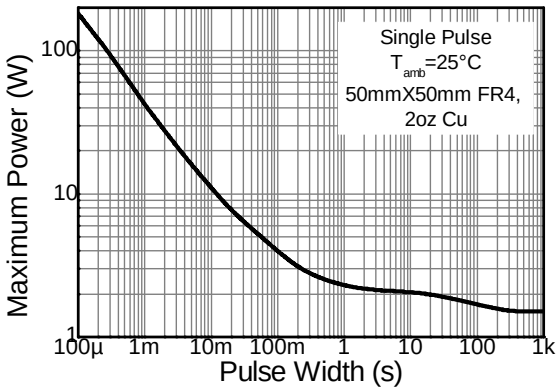
Safe Operating Area



Derating Curve



Transient Thermal Impedance



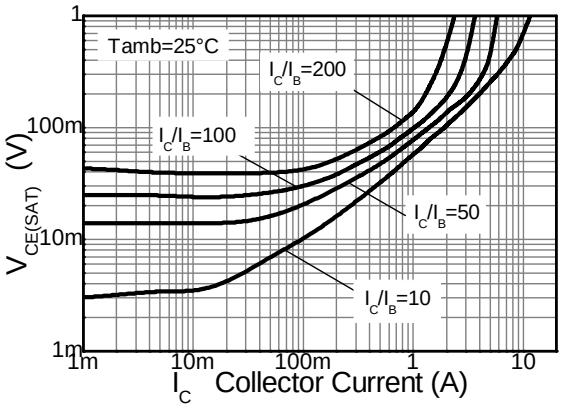
Pulse Power Dissipation

Electrical Characteristics @T_A = 25°C unless otherwise specified

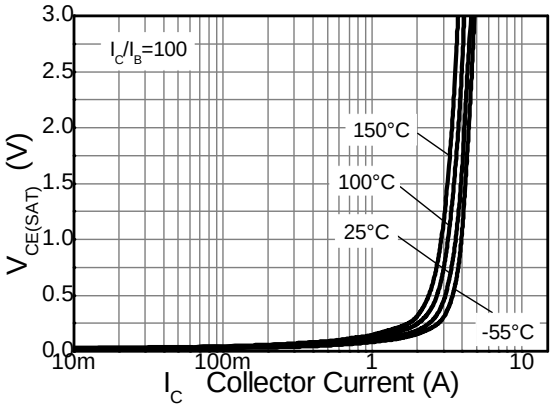
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	45	160	-	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (base open) (Note 9)	BV_{CEO}	45	60	-	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.3	-	V	I_E = 100µA
Emitter-collector 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_A = 100°C
Emitter-base Cut-off Current	I_{EBO}	-	<1	50	nA	V_{EB} = 5.6V
ON CHARACTERISTICS (Note 9)						
Static Forward Current Transfer Ratio	h_{FE}	500 400 250 70	800 710 530 125	1500 - - -	-	I_C = 100mA, V_{CE} = 2V I_C = 1A, V_{CE} = 2V I_C = 2A, V_{CE} = 2V I_C = 4A, V_{CE} = 2V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	-	45 160 60 200 230	70 230 80 270 280	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	$V_{BE(sat)}$	-	1000	1100	mV	I_C = 4A, I_B = 80mA
Base-Emitter On Voltage	$V_{BE(on)}$	-	875	1000	mV	I_C = 4A, V_{CE} = 2V
SMALL SIGNAL CHARACTERISTICS (Note 9)						
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: 9. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%

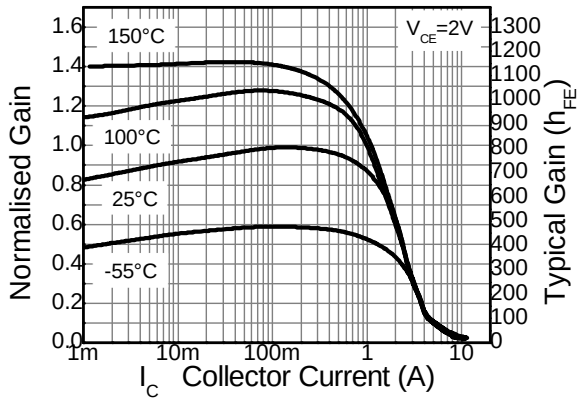
Typical Electrical Characteristics



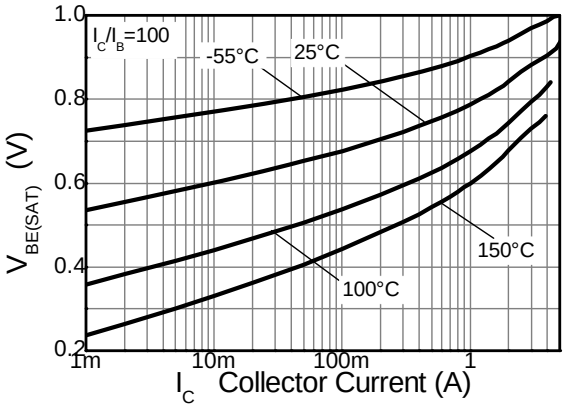
$V_{CE(SAT)}$ v I_C



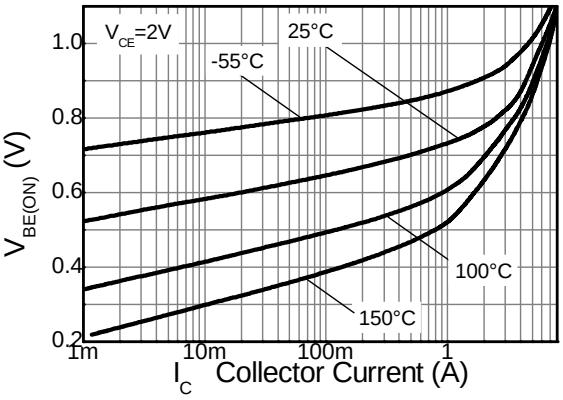
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

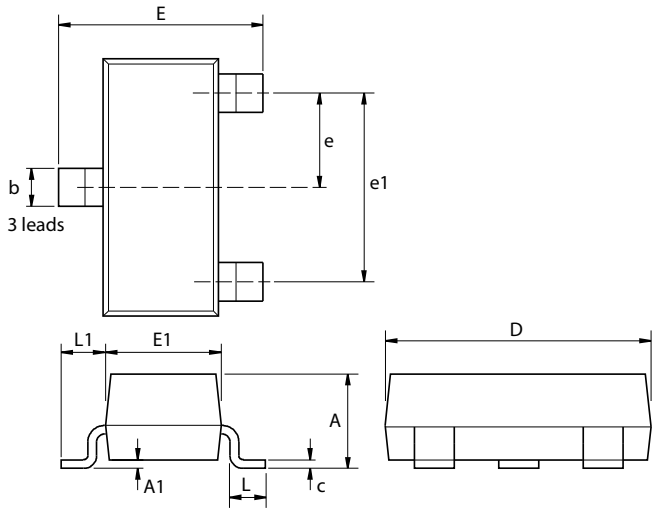


$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

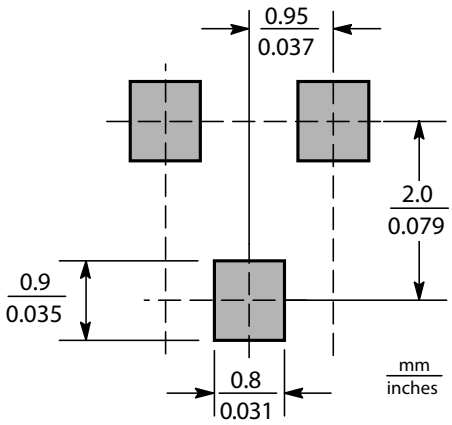
Package Outline Dimensions



Dim.	Millimeters		Inches		Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	-	1.12	-	0.044	e1	1.90 NOM		0.075 NOM	
A1	0.01	0.10	0.0004	0.004	E	2.10	2.64	0.083	0.104
b	0.30	0.50	0.012	0.020	E1	1.20	1.40	0.047	0.055
c	0.085	0.20	0.003	0.008	L	0.25	0.60	0.0098	0.0236
D	2.80	3.04	0.110	0.120	L1	0.45	0.62	0.018	0.024
e	0.95 NOM		0.037 NOM		-	-	-	-	-

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

Suggested Pad Layout



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