



**ZXTN25040DFH**

**40V NPN MEDIUM POWER PLANAR TRANSISTOR IN SOT23**

**Features and Benefits**

- $BV_{CEO} > 40V$
- $I_C = 4A$  Continuous Collector Current
- Low Saturation Voltage  $V_{CE(sat)} < 55mV @ 1A$
- $R_{CE(sat)} = 35m\Omega$
- $h_{FE}$  characterised up to 10A
- High  $h_{FE}$  min 300 @ 1A
- 1.25W power dissipation
- 130V forward blocking voltage
- 6V reverse blocking voltage
- Complementary part number ZXTP25040DFH
- **“Lead-Free”, RoHS Compliant (Note 1)**
- **Halogen and Antimony Free. “Green” Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

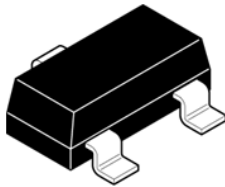
**Mechanical Data**

- Case: SOT23
- 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)

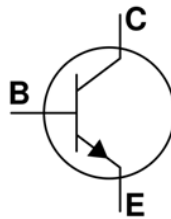
**Applications**

- MOSFET gate drivers
- Power switches
- Motor control
- DC fans
- DC-DC converters

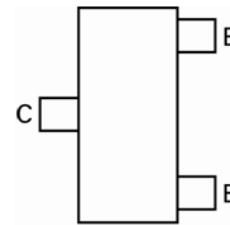
SOT23



Top View



Device Symbol



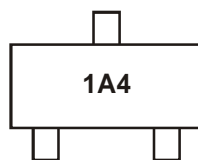
Top View  
Pin Configuration

**Ordering Information** (Note 3)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN25040DFHTA	1A4	7	8	3,000

- Notes:
1. No purposefully added lead.
  2. Diodes Inc's “Green” Policy can be found on our website at <https://www.diodes.com/>
  3. Devices with lot number starting from PID0155145 (March 2010) are “Green” products.

**Marking Information**



1A4 = Product Type Marking Code

**Maximum Ratings** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

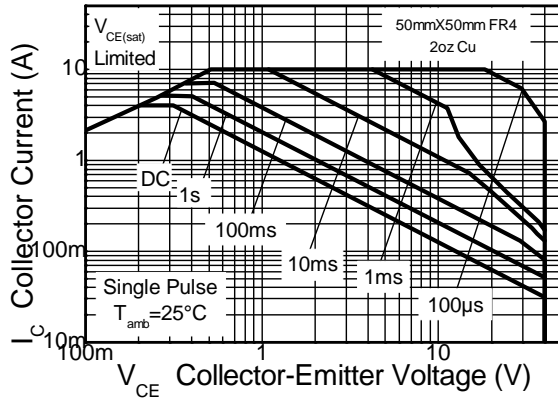
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	130	V
Collector-Emitter Voltage (Forward Blocking)	$V_{CEX}$	130	V
Collector-Emitter Voltage	$V_{CEO}$	40	V
Emitter-Collector Voltage (Reverse Blocking)	$V_{ECO}$	6	V
Emitter-Base Voltage	$V_{EBO}$	7	V
Continuous Collector Current (Note 6)	$I_C$	4	A
Peak Pulse Current	$I_{CM}$	10	A
Base Current	$I_B$	1	A

**Thermal Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

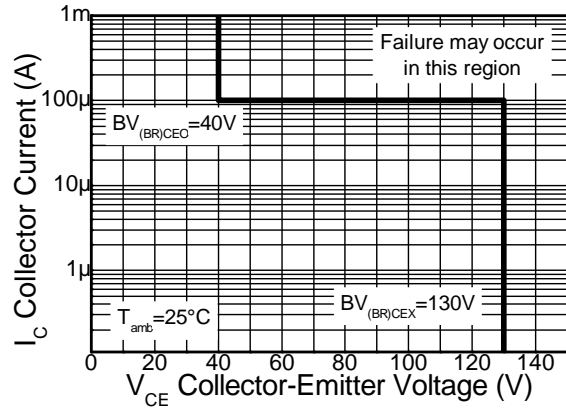
Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	$P_D$ -	0.73	W mW/ $^\circ\text{C}$
		5.84	
		1.05	
		8.4	
		1.25	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	9.6	$^\circ\text{C/W}$
		1.81	
		14.5	
		171	
Thermal Resistance, Junction to Lead	$R_{\theta JL}$	119	$^\circ\text{C/W}$
		100	
		69	
		74.95	
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

- 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).

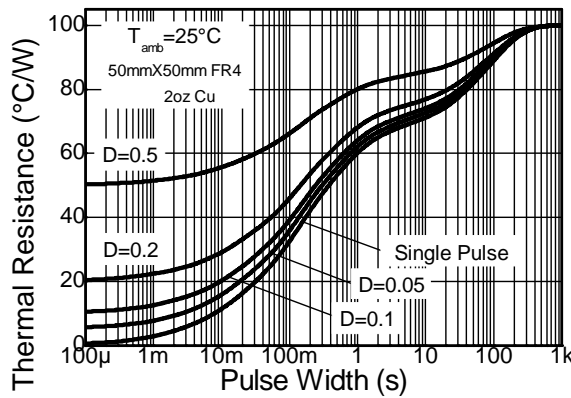
**Typical Thermal Characteristics**



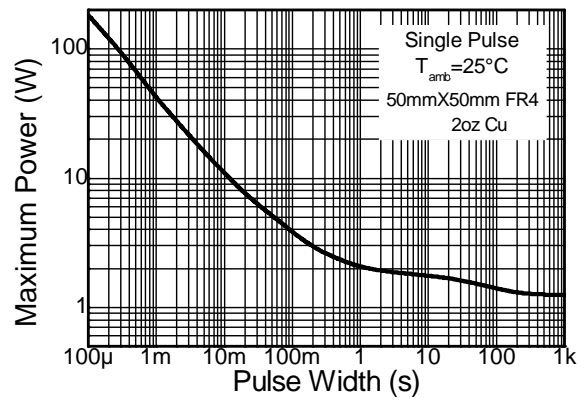
**Safe Operating Area**



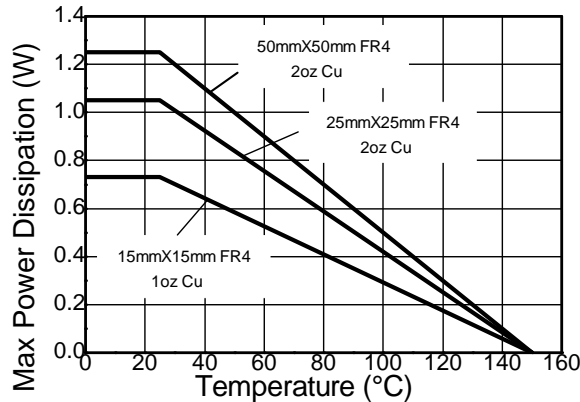
**Safe Operating Area**



**Transient Thermal Impedance**



**Pulse Power Dissipation**



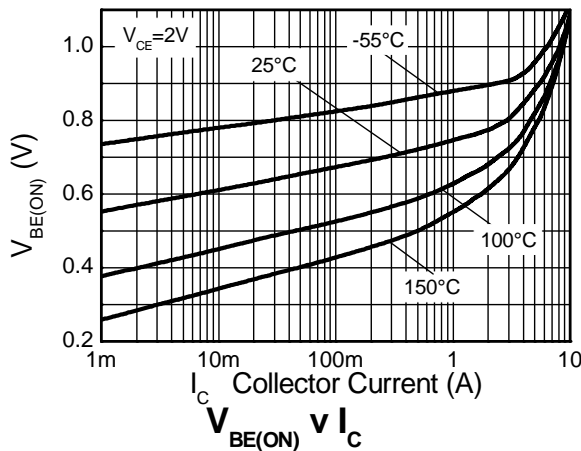
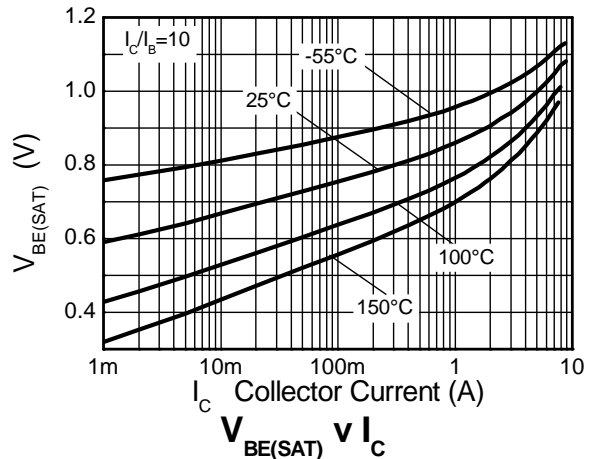
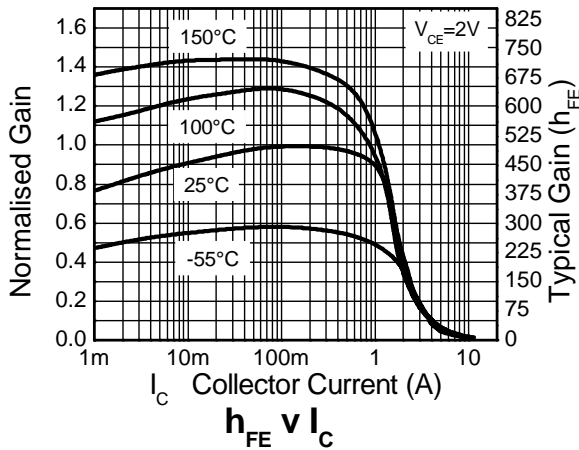
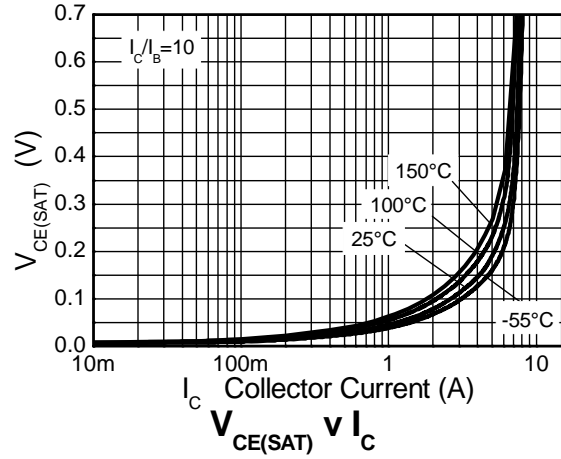
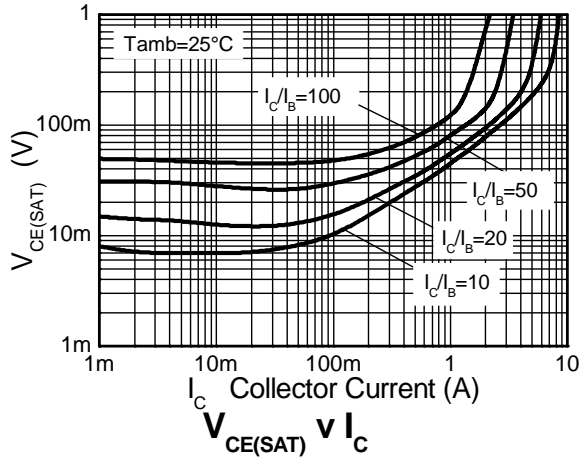
**Derating Curve**

**Electrical Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

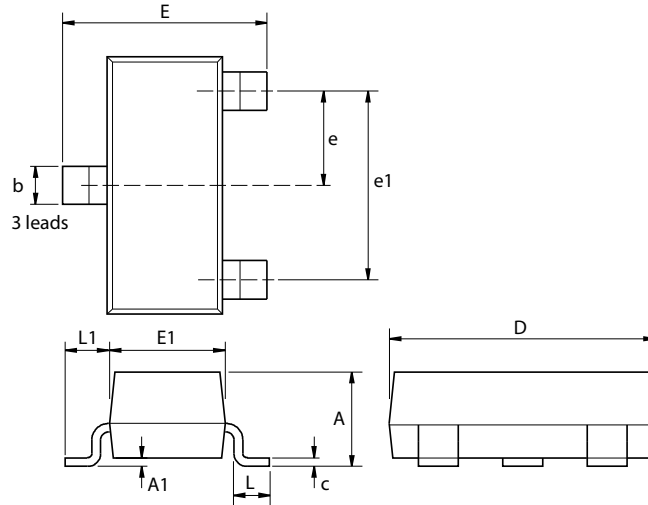
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	$BV_{CBO}$	130	170	-	V	$I_C = 100\mu\text{A}$
Collector-emitter breakdown voltage (forward blocking)	$BV_{CEX}$	130	170	-	V	$I_C = 100\mu\text{A}$ ; $R_{BE} < 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$
Collector-Emitter Breakdown Voltage (base open) (Note 9)	$BV_{CEO}$	40	63	-	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	7.4	-	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	7.4	-	V	$I_E = 100\mu\text{A}$ ;
Collector-base Cut-off Current	$I_{CBO}$	-	<1	50	nA	$V_{CB} = 100\text{V}$
				20	$\mu\text{A}$	$V_{CB} = 100\text{V}$ , $T_A = 100^\circ\text{C}$
Collector-emitter Cut-off Current	$I_{CEX}$	-	-	100	nA	$V_{CE} = 100\text{V}$ ; $R_{BE} < 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$
Emitter-base Cut-off Current	$I_{EBO}$	-	<1	50	nA	$V_{EB} = 5.6\text{V}$
<b>ON CHARACTERISTICS (Note 9)</b>						
Static Forward Current Transfer Ratio	$h_{FE}$	300	450	900	-	$I_C = 10\text{mA}$ , $V_{CE} = 2\text{V}$
		300	450	-		
		30	60	-		
		-	10	-		
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	-	45	55	mV	$I_C = 1\text{A}$ , $I_B = 100\text{mA}$
		-	120	210		
		-	135	210		
		-	140	190		
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	-	960	1050	mV	$I_C = 4\text{A}$ , $I_B = 400\text{mA}$
Base-Emitter On Voltage	$V_{BE(on)}$	-	840	950	mV	$I_C = 4\text{A}$ , $V_{CE} = 2\text{V}$
<b>SMALL SIGNAL CHARACTERISTICS (Note 9)</b>						
Transition Frequency	$f_T$	-	190	-	MHz	$I_C = 50\text{mA}$ , $V_{CE} = 10\text{V}$ , $f = 100\text{MHz}$
Collector Output Capacitance	$C_{obo}$	-	11.7	20	pF	$V_{CB} = 10\text{V}$ , $f = 1\text{MHz}$
Delay time	$t_d$	-	64	-	ns	$V_{CC} = 10\text{V}$ , $I_C = 1\text{A}$ , $I_{B1} = I_{B2} = 10\text{mA}$
Rise time	$t_r$	-	108	-	ns	
Storage time	$t_s$	-	428	-	ns	
Fall time	$t_f$	-	130	-	ns	

Notes: 9. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$

**Typical Electrical Characteristics**



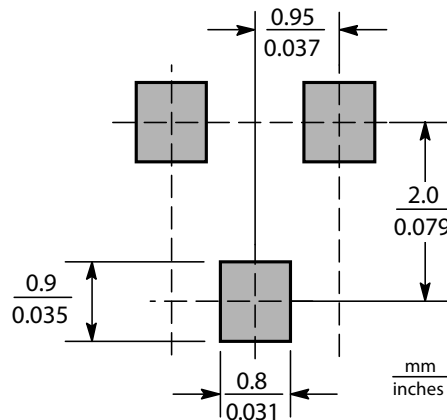
**Package Outline Dimensions**



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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