



ZXTN25040DFH

40V NPN MEDIUM POWER PLANAR TRANSISTOR IN SOT23

Features and Benefits

- $BV_{CE0} > 40V$
- $I_C = 4A$ 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**

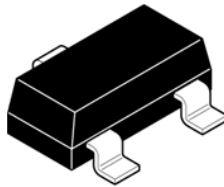
Mechanical Data

- 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)

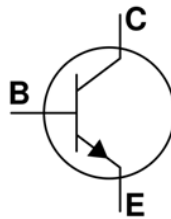
Applications

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

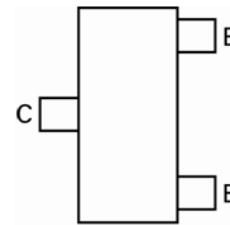
SOT23



Top View



Device Symbol



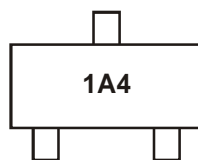
Top View
Pin Configuration

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

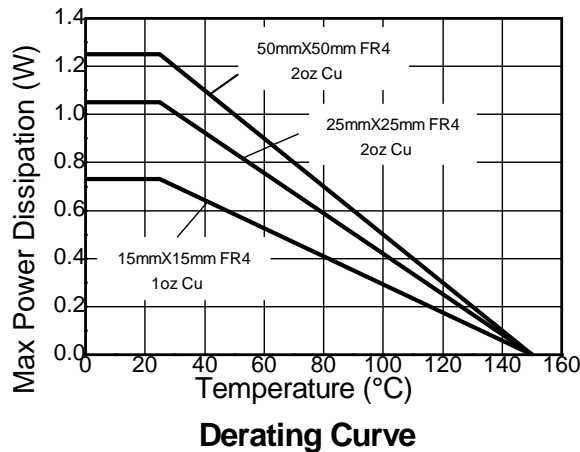
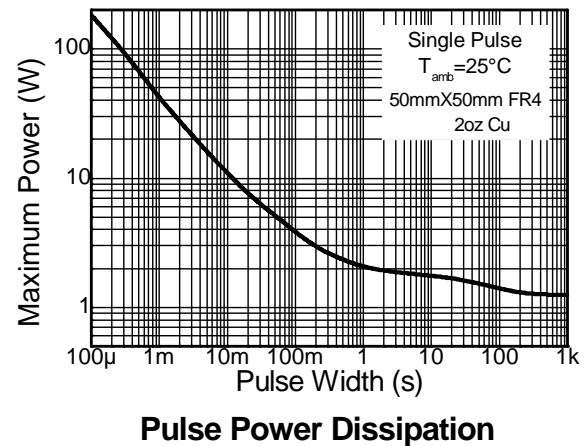
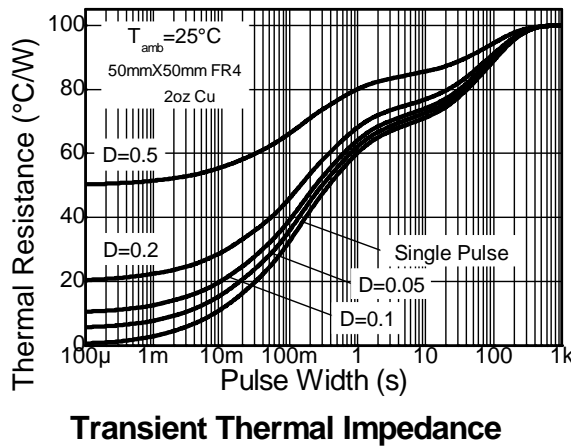
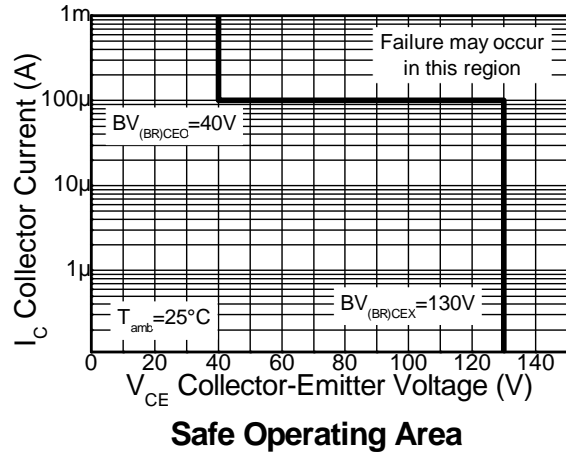
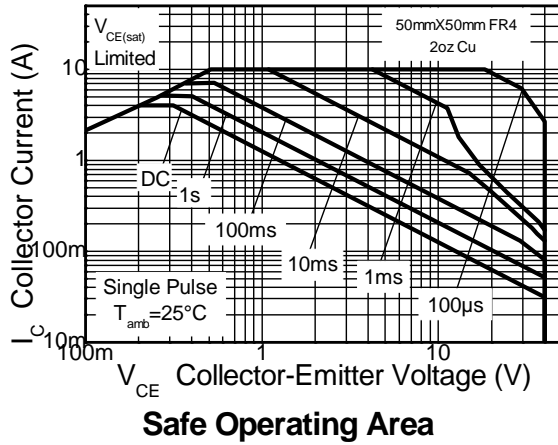
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	130	V
Collector-Emitter Voltage (Forward Blocking)	V_{CEX}	130	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Collector Voltage (Reverse Blocking)	V_{ECO}	6	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current (Note 6)	I_C	4	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

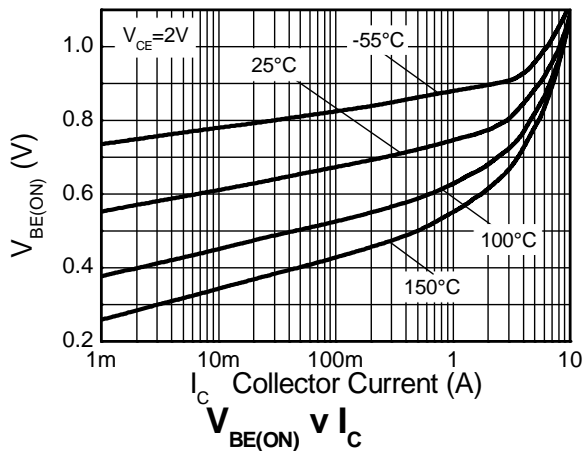
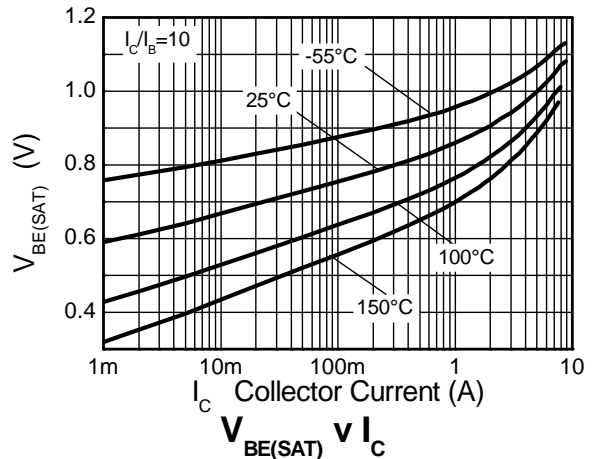
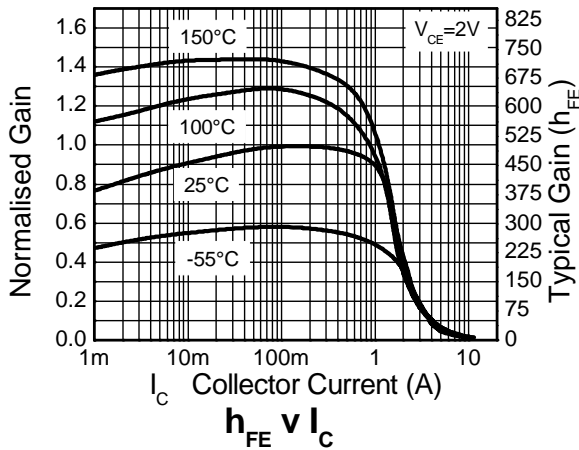
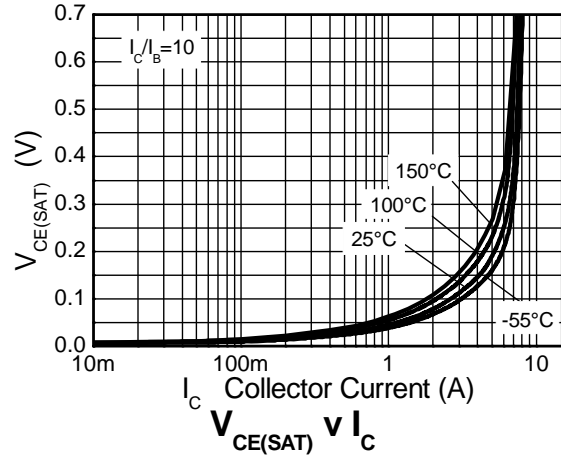
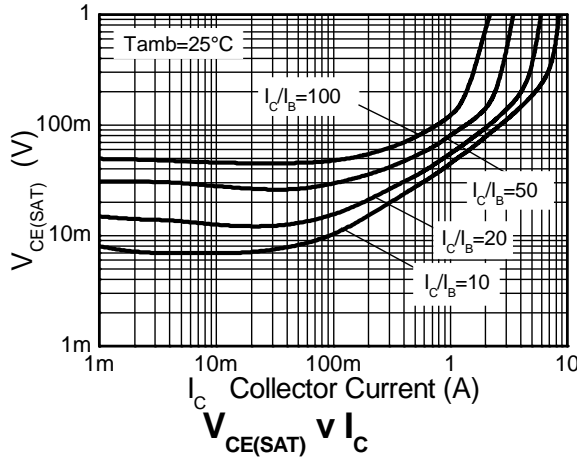


Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

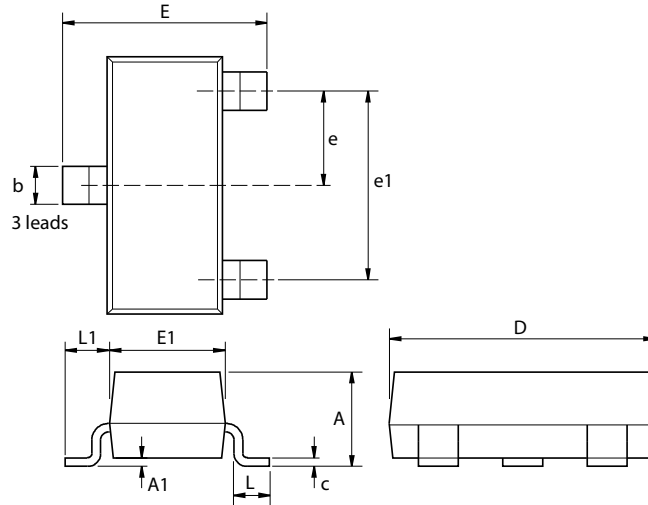
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	130	170	-	V	$I_C = 100\mu\text{A}$
Collector-emitter breakdown voltage (forward blocking)	BV_{CEX}	130	170	-	V	$I_C = 100\mu\text{A}$; $R_{BE} < 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$
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	μA	$V_{CB} = 100\text{V}$, $T_A = 100^\circ\text{C}$
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	$V_{EB} = 5.6\text{V}$
ON CHARACTERISTICS (Note 9)						
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	$I_C = 4\text{A}$, $V_{CE} = 2\text{V}$
SMALL SIGNAL CHARACTERISTICS (Note 9)						
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



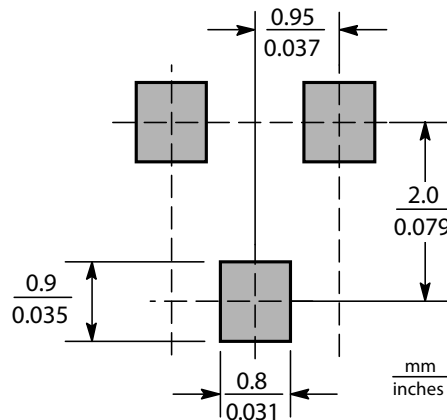
Package Outline Dimensions



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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