Lead-free Green

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
- $R_{CE(sat)}$ = 35mΩ
- 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**

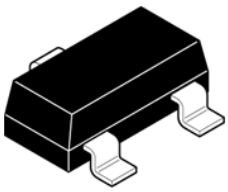
Mechanical Data

- 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)

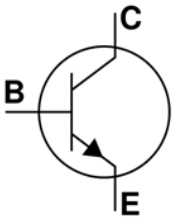
Applications

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

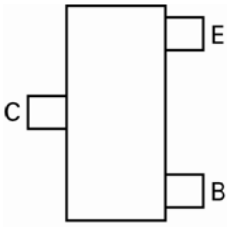
SOT23



Top View



Device Symbol



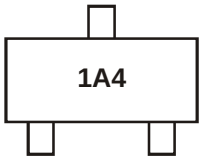
Top View
Pin Configuration

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°C unless otherwise specified

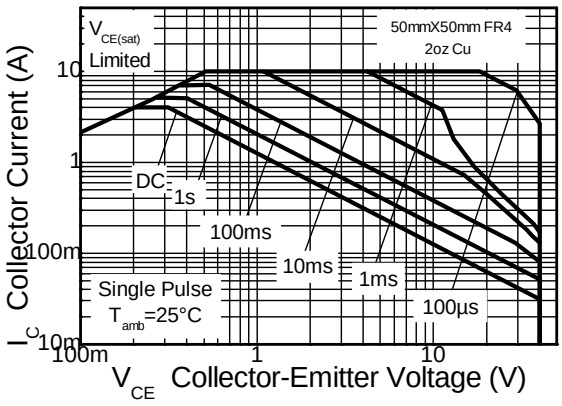
Characteristic		Symbol	Value	Unit
Collector-Base Voltage		V_{CBO}	130	V
Collector-Emitter Voltage (Forward Blocking)		V_{CEX}	130	V
Collector-Emitter Voltage		V_{CEO}	40	V
Emitter-Collector Voltage (Reverse Blocking)		V_{ECO}	6	V
Emitter-Base Voltage		V_{EBO}	7	V
Continuous Collector Current	(Note 6)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

Thermal Characteristics @T_A = 25°C unless otherwise specified

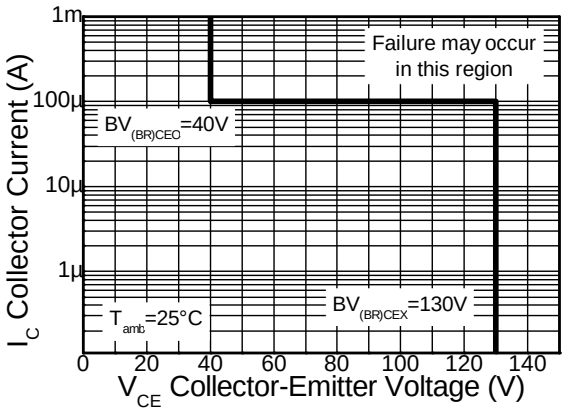
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 4)	P_D -	0.73 5.84	W mW/°C
	(Note 5)		1.05 8.4	
	(Note 6)		1.25 9.6	
	(Note 7)		1.81 14.5	
Thermal Resistance, Junction to Ambient	(Note 4)	$R_{\theta JA}$	171	°C/W
	(Note 5)		119	
	(Note 6)		100	
	(Note 7)		69	
Thermal Resistance, Junction to Lead	(Note 8)	$R_{\theta JL}$	74.95	°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).

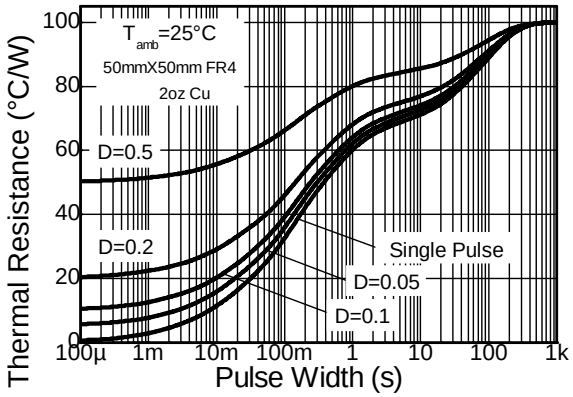
Typical Thermal Characteristics



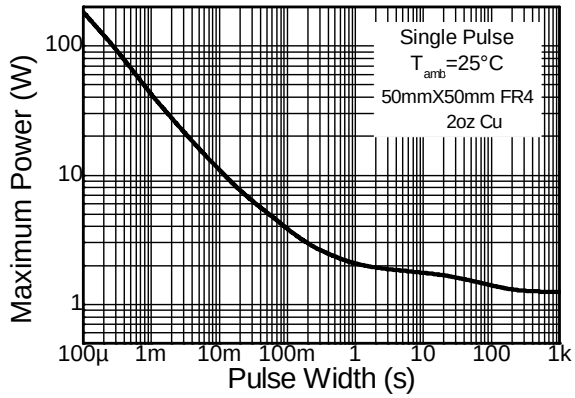
Safe Operating Area



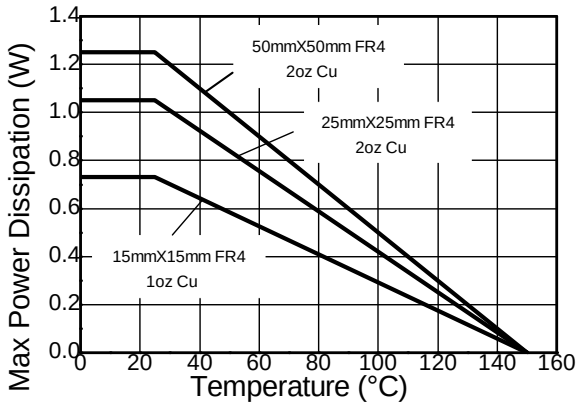
Safe Operating Area



Transient Thermal Impedance



Pulse Power Dissipation



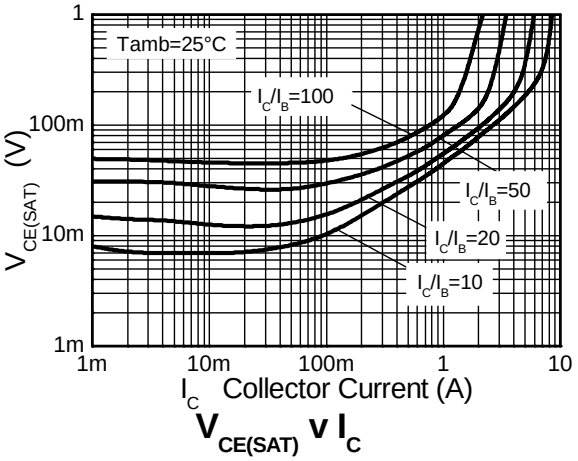
Derating Curve

Electrical Characteristics @T_A = 25°C unless otherwise specified

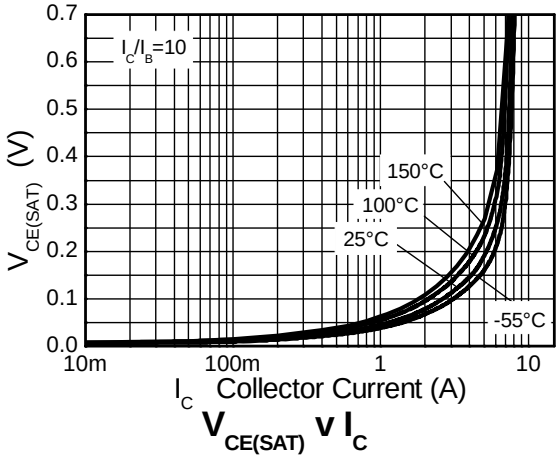
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	130	170	-	V	I_C = 100µA
Collector-emitter breakdown voltage (forward blocking)	BV_{CEX}	130	170	-	V	I_C = 100µA; R_{BE} < 1kΩ or -1V < V_{BE} < 0.25V
Collector-Emitter Breakdown Voltage (base open) (Note 9)	BV_{CEO}	40	63	-	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	7.4	-	V	I_E = 100µA; R_{BC} < 1kΩ or -0.25V < V_{BC} < 0.25V
Emitter-collector breakdown voltage (base open)	BV_{ECO}	6	7.4	-	V	I_E = 100µA;
Collector-base Cut-off Current	I_{CBO}	-	<1 -	50 20	nA µA	V_{CB} = 100V V_{CB} = 100V, T_A = 100°C
Collector-emitter Cut-off Current	I_{CEX}	-	-	100	nA	V_{CE} = 100V; R_{BE} < 1kΩ or -1V < V_{BE} < 0.25V
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}	300 300 30 -	450 450 60 10	900 - - -	-	I_C = 10mA, V_{CE} = 2V I_C = 1A, V_{CE} = 2V I_C = 4A, V_{CE} = 2V I_C = 10A, V_{CE} = 2V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	-	45 120 135 140	55 210 210 190	mV	I_C = 1A, I_B = 100mA I_C = 1A, I_B = 10mA I_C = 2A, I_B = 40mA I_C = 4A, I_B = 400mA
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	-	960	1050	mV	I_C = 4A, I_B = 400mA
Base-Emitter On Voltage	$V_{BE(on)}$	-	840	950	mV	I_C = 4A, V_{CE} = 2V
SMALL SIGNAL CHARACTERISTICS (Note 9)						
Transition Frequency	f_T	-	190	-	MHz	I_C = 50mA, V_{CE} = 10V, f = 100MHz
Collector Output Capacitance	C_{obo}	-	11.7	20	pF	V_{CB} = 10V, f = 1MHz
Delay time	t_d	-	64	-	ns	V_{CC} = 10V, I_C = 1A, I_{B1} = I_{B2} = 10mA
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 ≤ 300µs. Duty cycle ≤ 2%

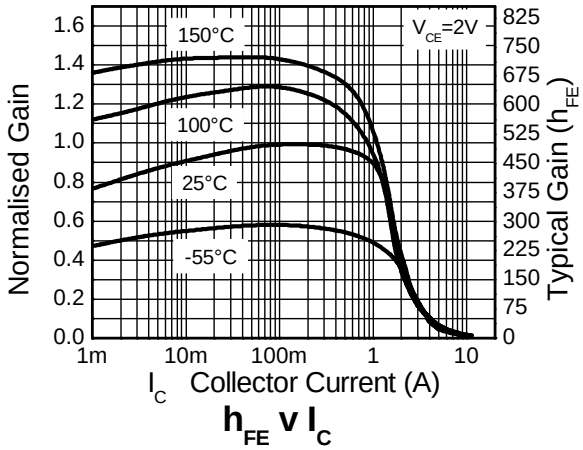
Typical Electrical Characteristics



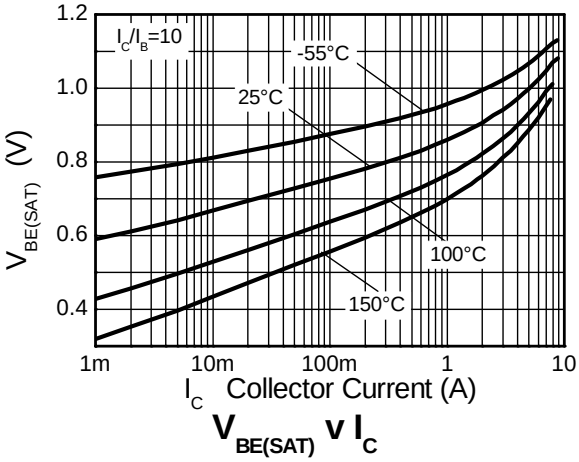
$V_{CE(SAT)}$ v I_C



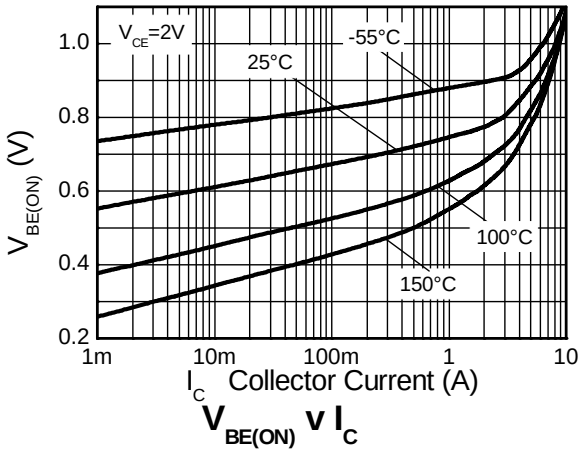
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

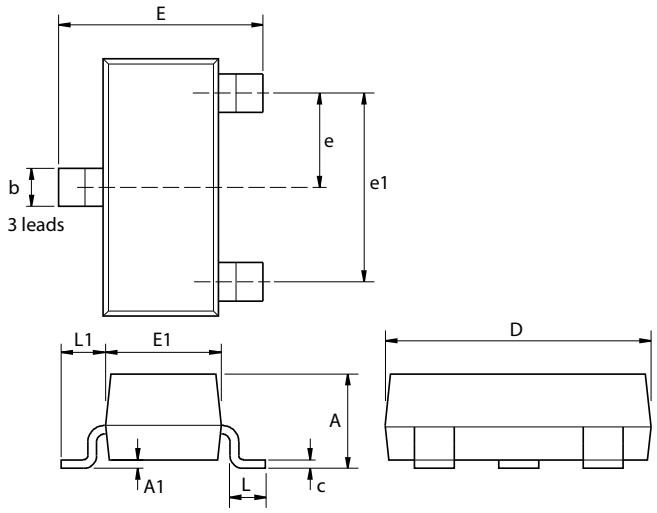


$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

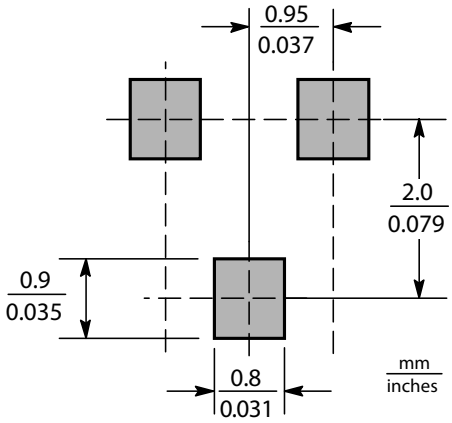
Package Outline Dimensions



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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