



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**

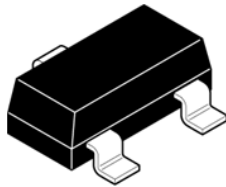
Mechanical Data

- 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)

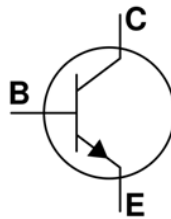
Applications

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

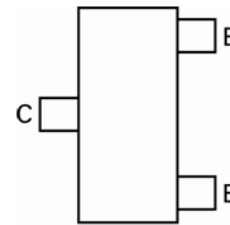
SOT23



Top View



Device Symbol



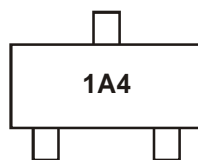
Top View
Pin Configuration

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

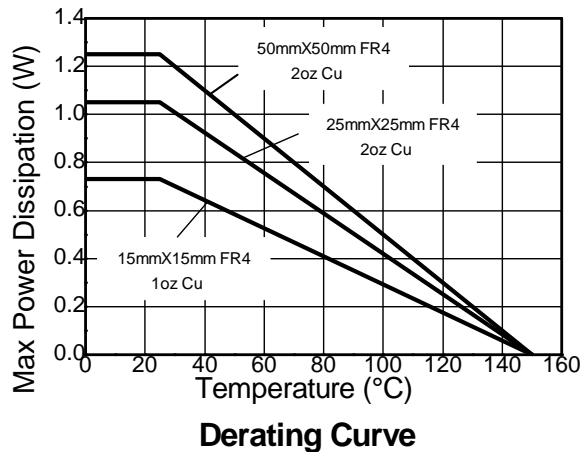
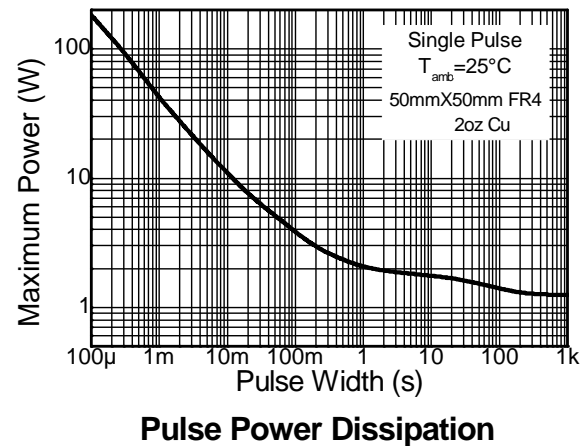
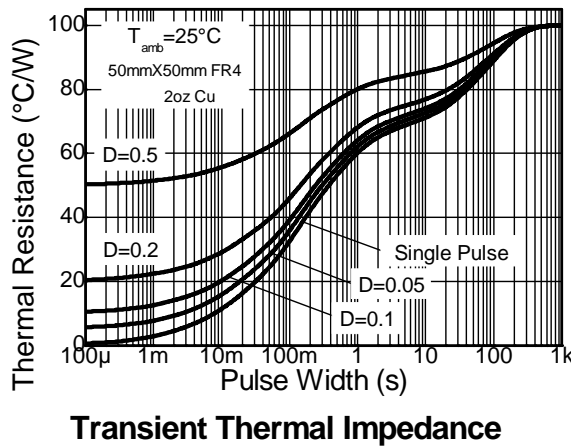
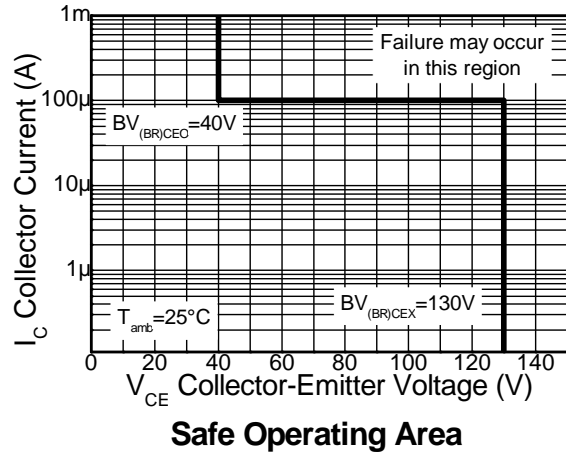
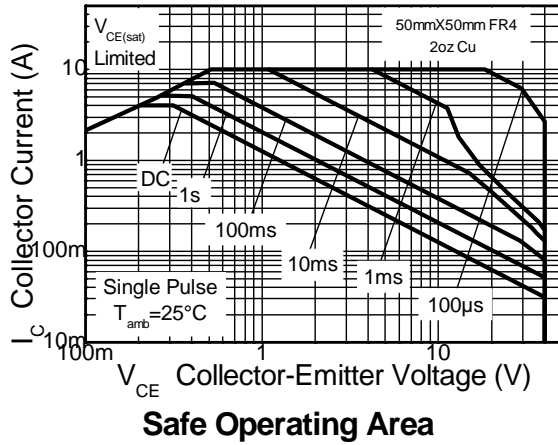
| Characteristic | Symbol | Value | Unit |
|--|-----------|-------|------|
| Collector-Base Voltage | V_{CBO} | 130 | V |
| Collector-Emitter Voltage (Forward Blocking) | V_{CEX} | 130 | V |
| Collector-Emitter Voltage | V_{CEO} | 40 | V |
| Emitter-Collector Voltage (Reverse Blocking) | V_{ECO} | 6 | 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/°C |
| | | 5.84 | |
| | | 1.05 | |
| | | 8.4 | |
| | | 1.25 | |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 9.6 | °C/W |
| | | 1.81 | |
| | | 14.5 | |
| | | 171 | |
| Thermal Resistance, Junction to Lead | $R_{\theta JL}$ | 119 | °C/W |
| | | 100 | |
| | | 69 | |
| | | 74.95 | |
| 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

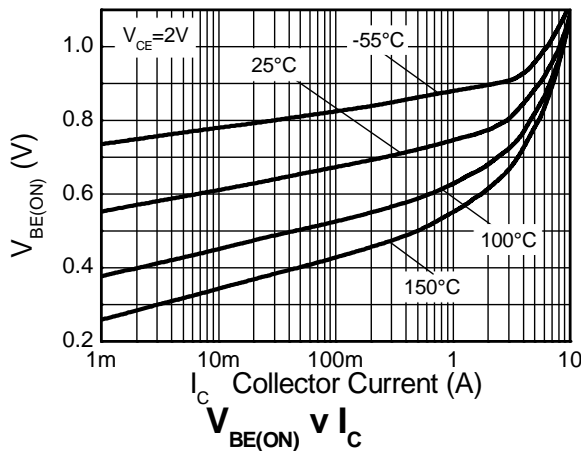
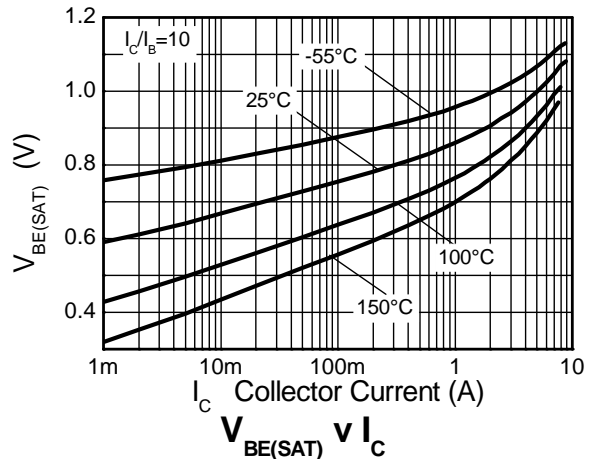
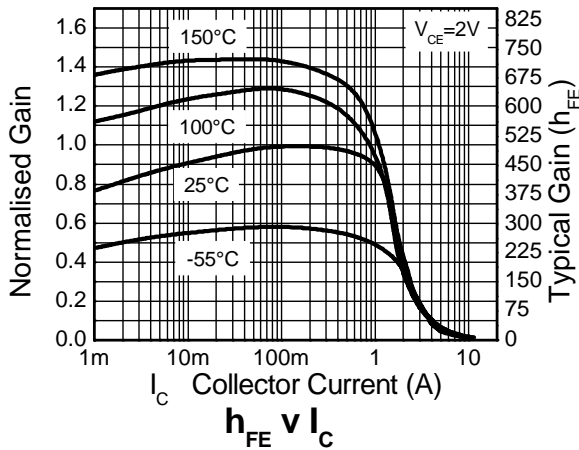
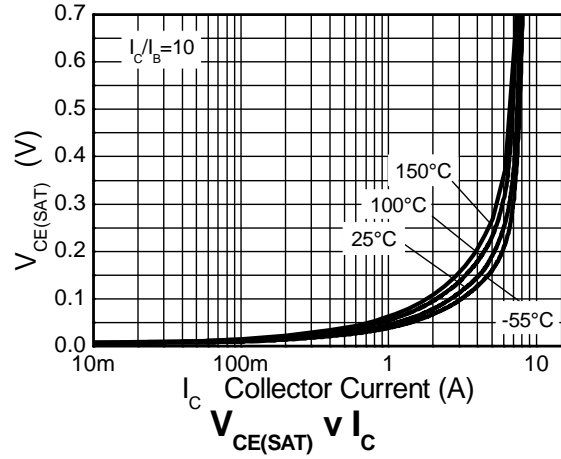
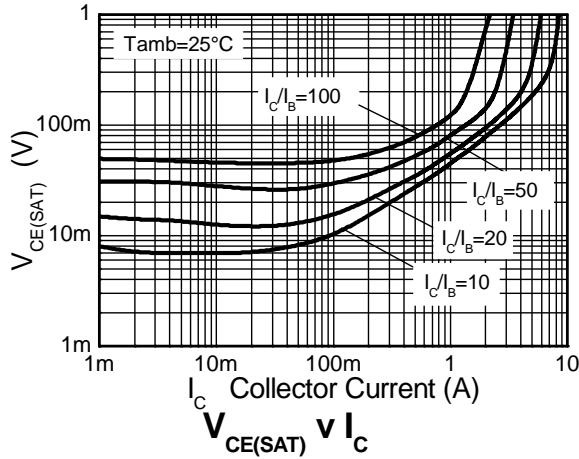


Electrical Characteristics @T_A = 25°C unless otherwise specified

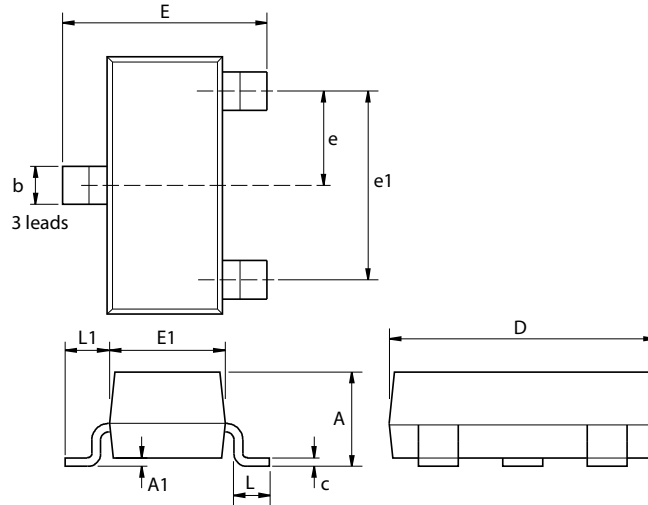
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|----------------------|-----|------|------|------|--|
| OFF CHARACTERISTICS | | | | | | |
| Collector-Base Breakdown Voltage | BV _{CB0} | 130 | 170 | - | V | I _C = 100μA |
| Collector-emitter breakdown voltage (forward blocking) | 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 _{CB0} | - | <1 | 50 | nA | V _{CB} = 100V |
| | | | | 20 | μA | 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 | 450 | 900 | - | I _C = 10mA, V _{CE} = 2V |
| | | 300 | 450 | - | | |
| | | 30 | 60 | - | | |
| | | - | 10 | - | | |
| Collector-Emitter Saturation Voltage | V _{CE(sat)} | - | 45 | 55 | mV | I _C = 1A, I _B = 100mA |
| | | - | 120 | 210 | | |
| | | - | 135 | 210 | | |
| | | - | 140 | 190 | | |
| 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



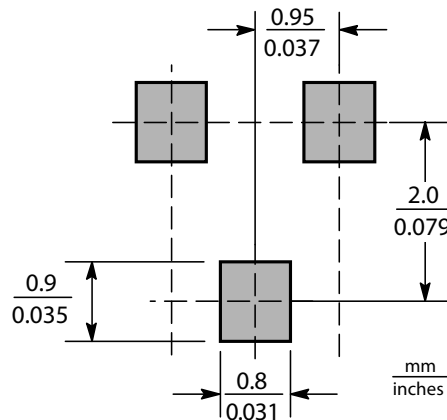
Package Outline Dimensions



| 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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