



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**

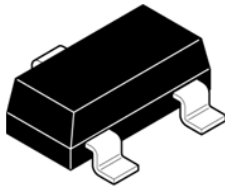
Mechanical Data

- 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)

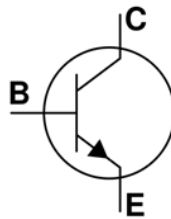
Applications

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

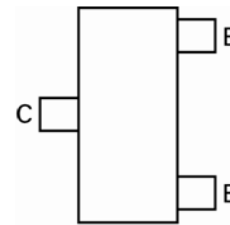
SOT23



Top View



Device Symbol



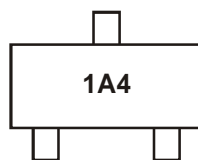
Top View
Pin Configuration

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

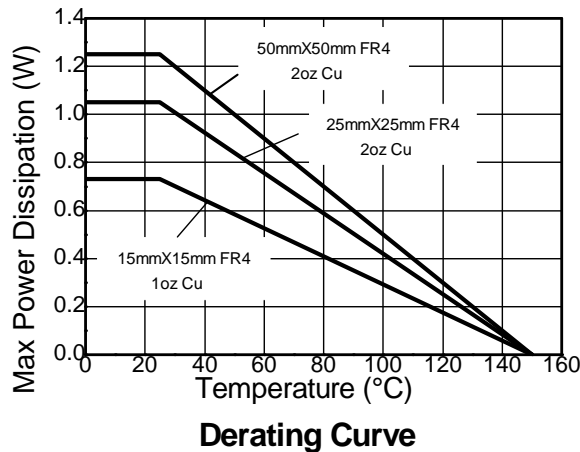
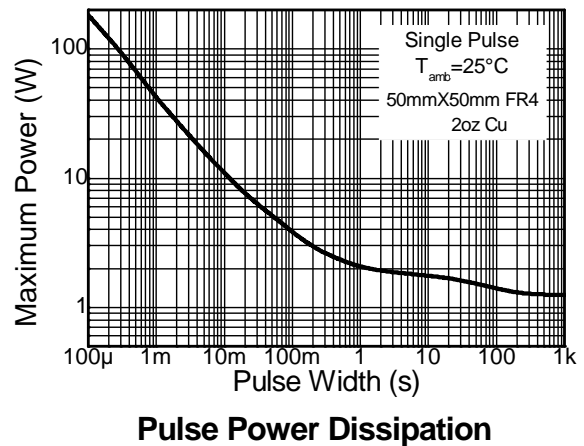
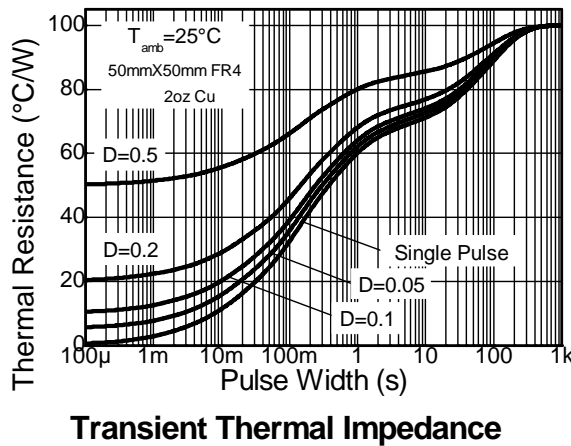
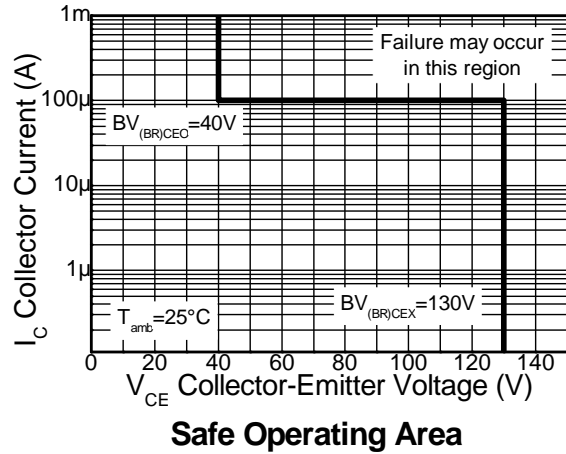
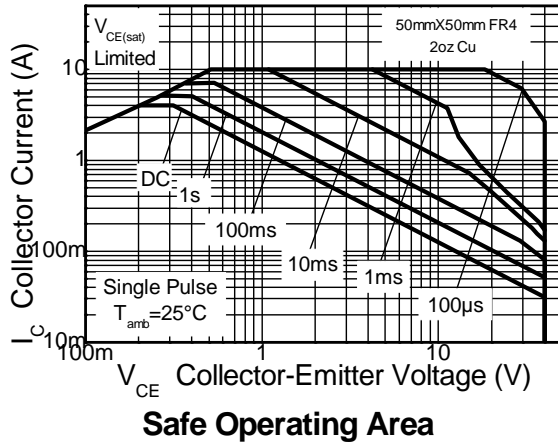
| Characteristic | Symbol | Value | Unit |
|--|-----------|-------|------|
| Collector-Base Voltage | V_{CBO} | 130 | V |
| Collector-Emitter Voltage (Forward Blocking) | V_{CEX} | 130 | V |
| Collector-Emitter Voltage | V_{CEO} | 40 | V |
| Emitter-Collector Voltage (Reverse Blocking) | V_{ECO} | 6 | 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 | $^\circ\text{C}/\text{W}$ |
| | | 1.81 | |
| | | 14.5 | |
| | | 171 | |
| Thermal Resistance, Junction to Lead | $R_{\theta JL}$ | 119 | $^\circ\text{C}/\text{W}$ |
| | | 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

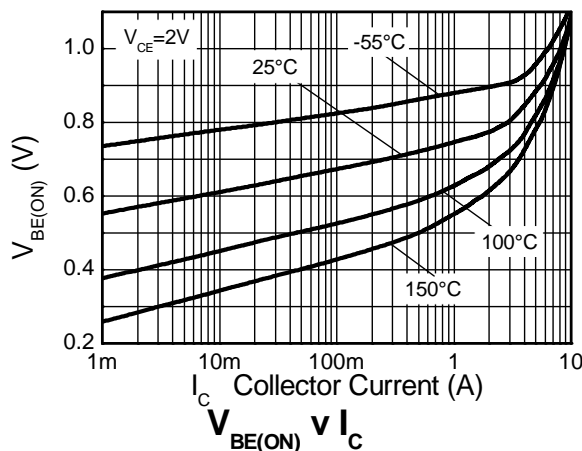
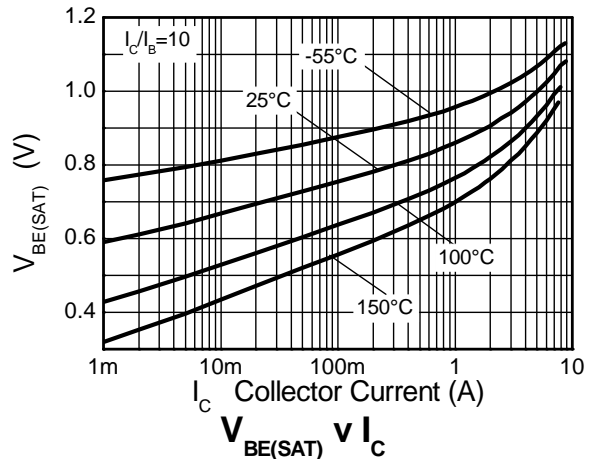
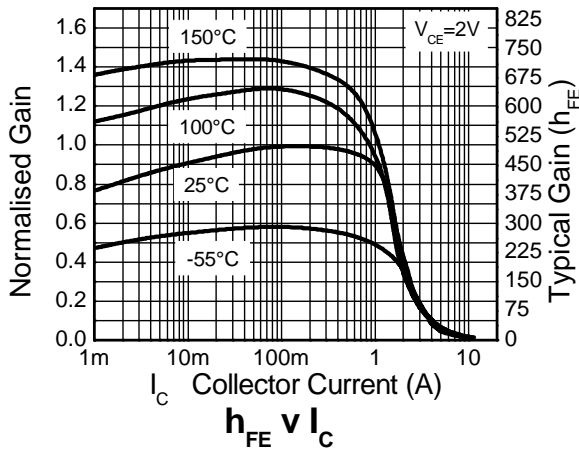
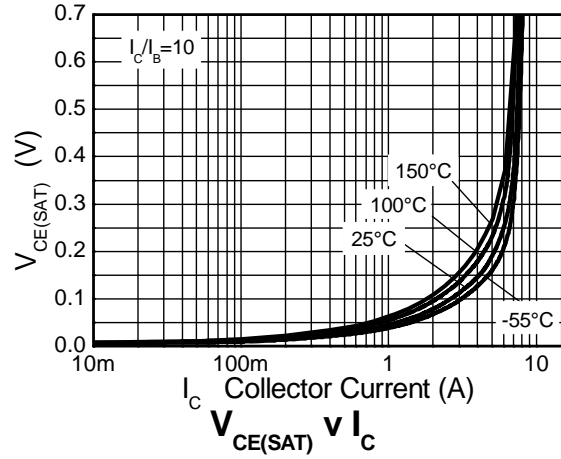
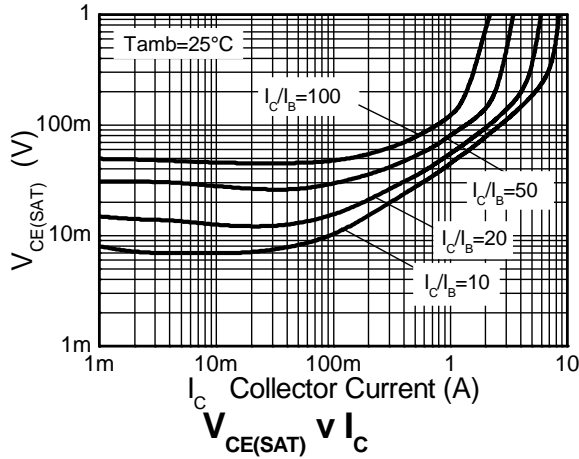


Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

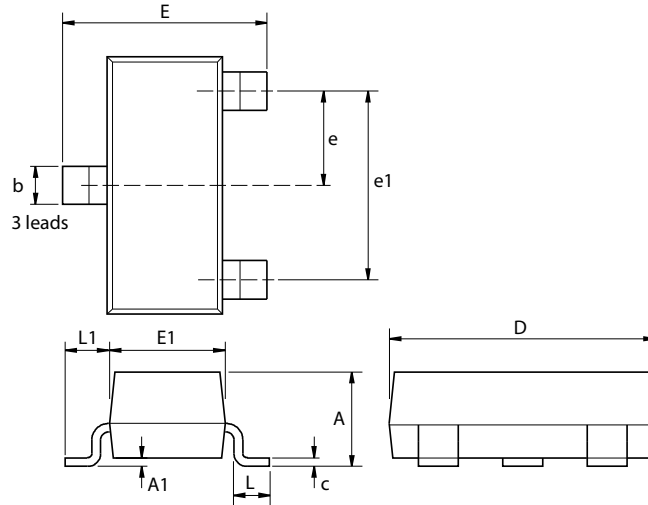
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------|-----|------|------|---------------|--|
| OFF CHARACTERISTICS | | | | | | |
| Collector-Base Breakdown Voltage | BV_{CBO} | 130 | 170 | - | V | $I_C = 100\mu\text{A}$ |
| Collector-emitter breakdown voltage (forward 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



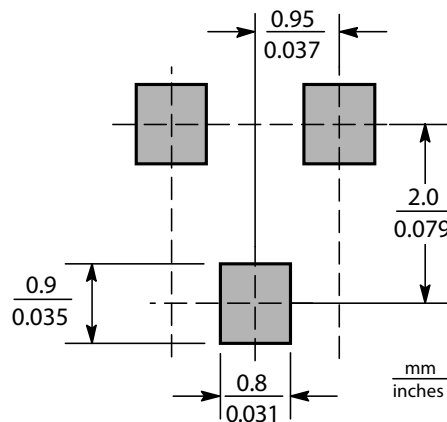
Package Outline Dimensions



| 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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