

ZXTN4004K

150V NPN LED DRIVING TRANSISTOR IN TO252

Features

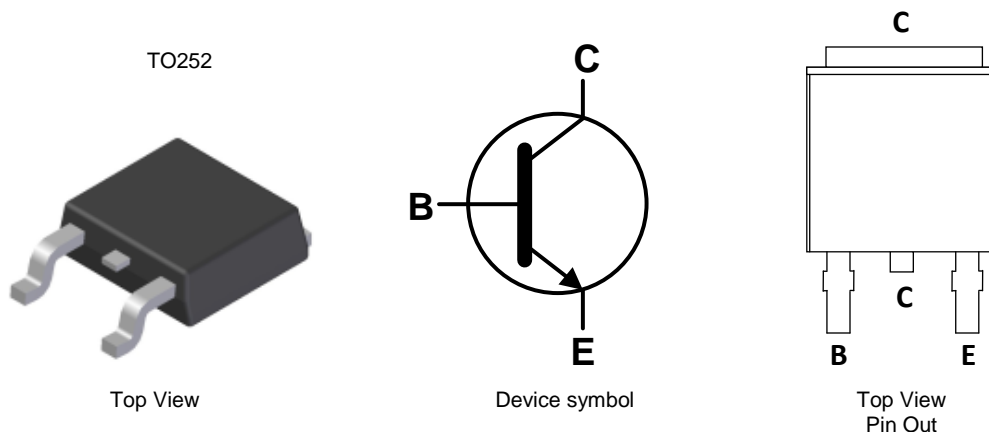
- $BV_{CEO} > 150V$
- $h_{FE} > 100$ for $I_C = 150mA$, $V_{CE} = 0.25V$
- $I_C (cont) = 1A$
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Applications

- LED TV Backlight

Mechanical Data

- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.34 grams (Approximate)

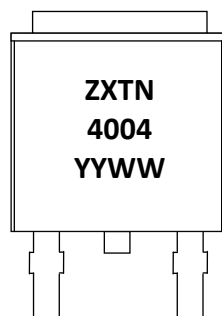


Ordering Information (Notes 4 & 5)

| Product | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|--------------|------------|----------|--------------------|-----------------|-------------------|
| ZXTN4004KTC | AEC-Q101 | ZXTN4004 | 13 | 16 | 2,500 |
| ZXTN4004KQTC | Automotive | ZXTN4004 | 13 | 16 | 2,500 |

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
 2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_compliance_definitions/.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



ZXTN4004 = Product Marking Code
 YYWW = Date Code Marking
 YY = Last Digit of Year (ex: 10 = 2010)
 WW = Week Code (01 – 53)

Absolute Maximum Ratings (@T_A = +25°C unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CBO} | 150 | V |
| Collector-Emitter Voltage | V _{CEO} | 150 | V |
| Emitter-Base Voltage | V _{EBO} | 7 | V |
| Continuous Collector Current | I _C | 1 | A |
| Peak Pulse Current | I _{CM} | 3 | A |
| Base Current | I _B | 500 | mA |

Thermal Characteristics (@T_A = +25°C unless otherwise specified.)

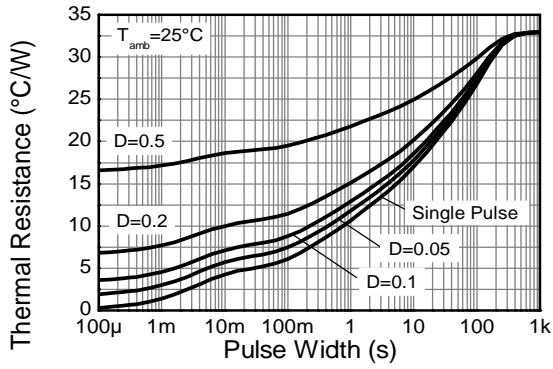
| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 6) | P _D | 3.8 | W |
| Thermal Resistance, Junction to Ambient (Note 6) | R _{θJA} | 33 | °C/W |
| Thermal Resistance, Junction to Leads (Note 7) | R _{θJL} | 12 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

ESD Ratings (Note 8)

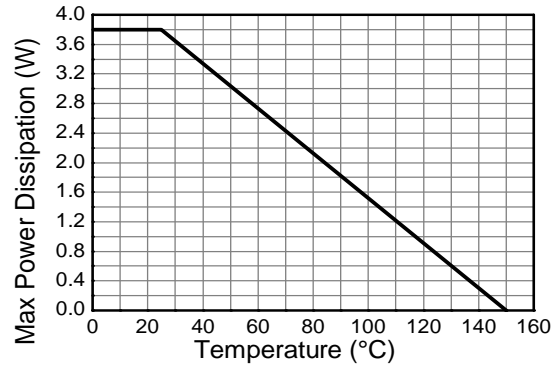
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | C |

- Notes:
6. For a device mounted with the exposed collector pad on 50mm x 50mm, 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 7. Thermal resistance from junction to solder-point (on the exposed collector pad).
 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

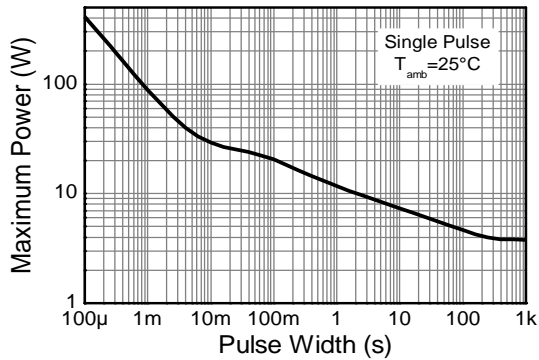
Thermal Characteristics and Derating Information



Transient Thermal Impedance



Derating Curve



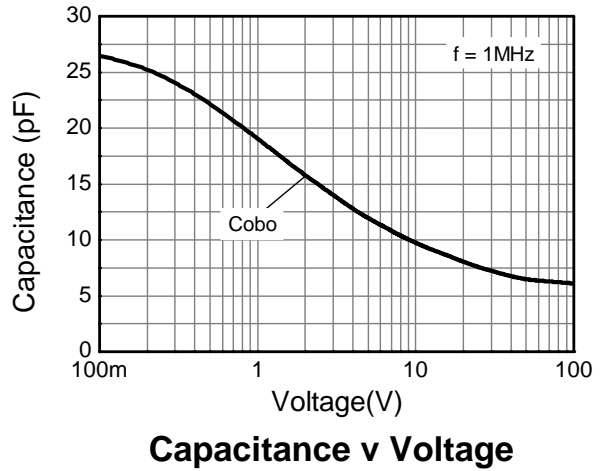
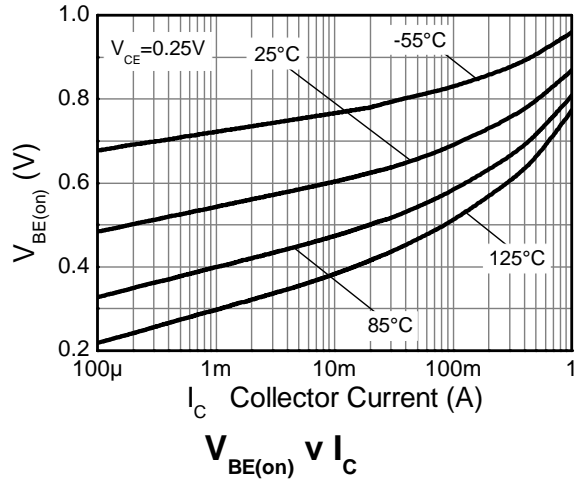
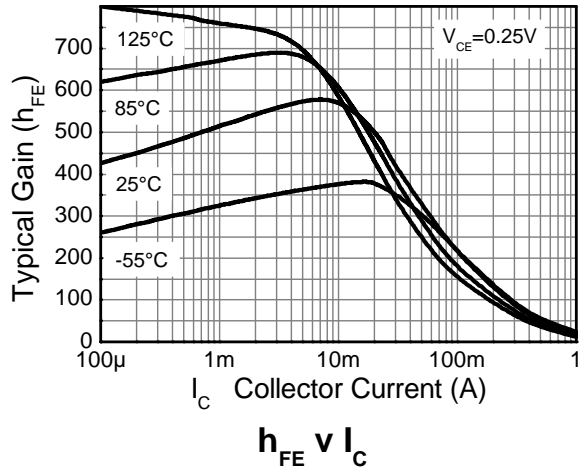
Pulse Power Dissipation

Electrical Characteristics (@T_A = +25°C unless otherwise specified)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|----------------------|-----------|------|------|------|--|
| Collector-Base Breakdown Voltage (Note 9) | BV _{CBO} | 150 | - | - | V | I _C = 0.1mA |
| Collector-Emitter Breakdown Voltage (Note 9) | BV _{CEO} | 150 | 175 | - | V | I _C = 10mA |
| Emitter-Base Breakdown Voltage (Note 9) | BV _{EBO} | 7 | - | - | V | I _E = 0.1mA |
| Collector – Emitter Cut-off Current | I _{CES} | - | - | 50 | nA | V _{CE} = 150V |
| Collector Cut-off Current | I _{CBO} | - | - | 50 | nA | V _{CB} = 150V |
| Emitter Cut-off Current | I _{EBO} | - | - | 50 | nA | V _{EB} = 7V |
| Static Forward Current Transfer Ratio (Note 9) | h _{FE} | 60 100 | - | - | - | I _C = 85mA, V _{CE} = 0.20V I _C = 150mA, V _{CE} = 0.25V |
| Collector-Emitter Saturation Voltage (Note 9) | V _{CE(sat)} | - | - | 0.25 | V | I _C = 100mA, I _B = 5mA |
| Base-Emitter Saturation Voltage (Note 9) | V _{BE(sat)} | - | - | 0.95 | V | I _C = 100mA, I _B = 5mA |
| Base-Emitter Turn-On Voltage (Note 9) | V _{BE(on)} | - | 0.71 | 0.95 | V | I _C = 150mA, V _{CE} = 0.25V |
| Delay Time | t _(d) | - | 512 | - | ns | V _{CC} = 120V, I _C = 150mA, -I _{B2} = 1.5mA, V _{CE(ON)} = 0.25V |
| Rise Time | t _(r) | - | 426 | - | ns | |
| Storage Time | t _(s) | - | 3413 | - | ns | |
| Fall Time | t _(f) | - | 321 | - | ns | |
| Storage Time | t _(s) | - | 65 | - | ns | V _{CC} = 120V, I _C = 150mA, -I _{B2} = 1.5mA, V _{CE(ON)} = 4V |
| Fall Time | t _(f) | - | 294 | - | ns | |

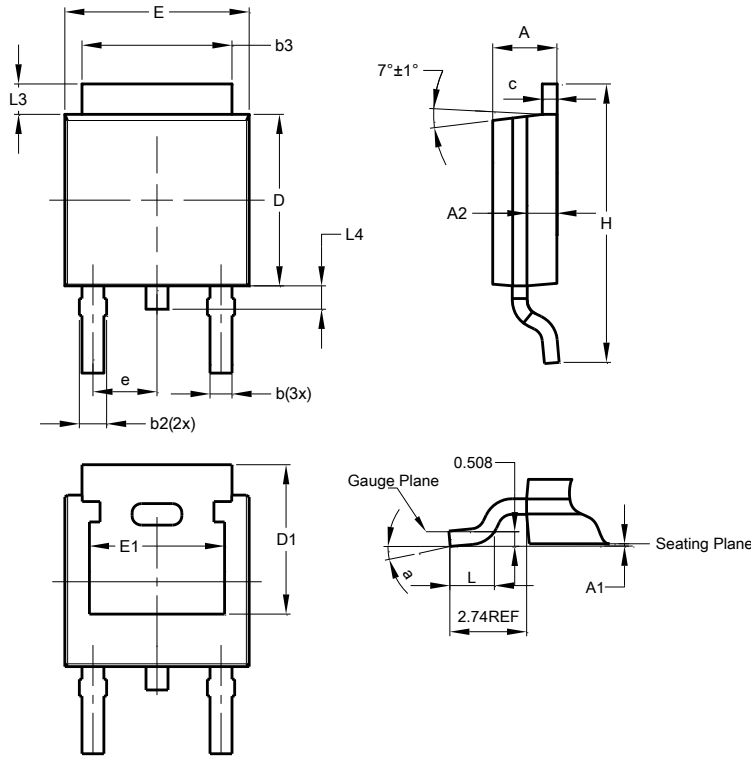
Note: 9. Measured under pulsed conditions. Pulse width = 300µs. Duty cycle ≤ 2%.

Typical Electrical Characteristics



Package Outline Dimensions

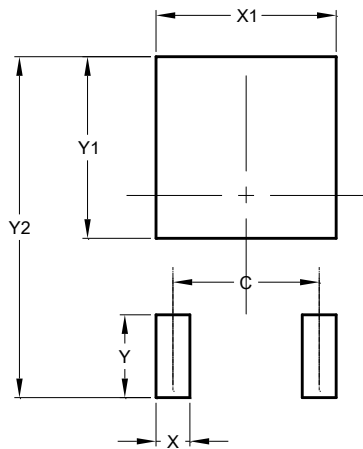
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| TO252 (DPAK) | | | |
|-----------------------------|------|-------|-------|
| Dim | Min | Max | Typ |
| A | 2.19 | 2.39 | 2.29 |
| A1 | 0.00 | 0.13 | 0.08 |
| A2 | 0.97 | 1.17 | 1.07 |
| b | 0.64 | 0.88 | 0.783 |
| b2 | 0.76 | 1.14 | 0.95 |
| b3 | 5.21 | 5.46 | 5.33 |
| c | 0.45 | 0.58 | 0.531 |
| D | 6.00 | 6.20 | 6.10 |
| D1 | 5.21 | - | - |
| e | - | - | 2.286 |
| E | 6.45 | 6.70 | 6.58 |
| E1 | 4.32 | - | - |
| H | 9.40 | 10.41 | 9.91 |
| L | 1.40 | 1.78 | 1.59 |
| L3 | 0.88 | 1.27 | 1.08 |
| L4 | 0.64 | 1.02 | 0.83 |
| a | 0° | 10° | - |
| All Dimensions in mm | | | |

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 4.572 |
| X | 1.060 |
| X1 | 5.632 |
| Y | 2.600 |
| Y1 | 5.700 |
| Y2 | 10.700 |

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