

75V NPN LOW SATURATION MEDIUM POWER TRANSISTOR

Features

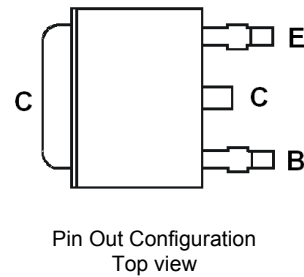
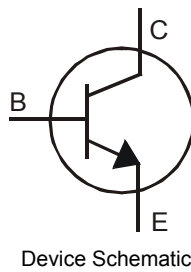
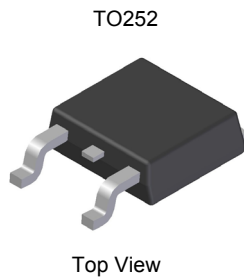
- $BV_{CEO} > 75V$
- $I_C = 5A$ high Continuous Collector Current
- Up to 10A Peak Current
- $R_{SAT} = 70m\Omega$ for a low equivalent On-Resistance
- Low Saturation Voltage
- h_{FE} specified up to 10A for a high gain hold up
- **Lead-Free Finish; RoHS compliant (Note 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

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

Application

- DC – DC converters
- Power Switches
- Motor Control
- Automotive Circuits
- Inverter Circuits

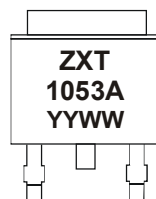


Ordering Information (Note 4)

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-------------|----------|--------------------|-----------------|-------------------|
| ZXT1053AKTC | ZXT1053A | 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> 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. For packaging details, go to our website at <http://www.diodes.com>

Marking Information



ZXT1053AK = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Digit of Year (ex: 09 = 2009)
 WW = Week Code (01 – 53)

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

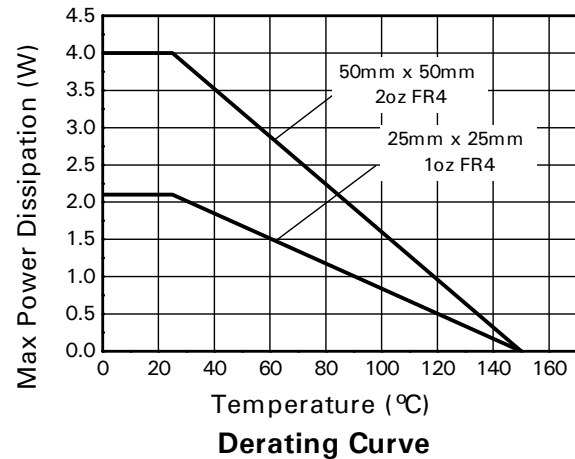
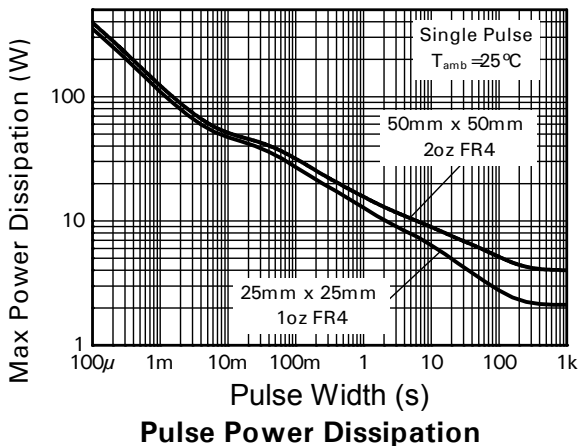
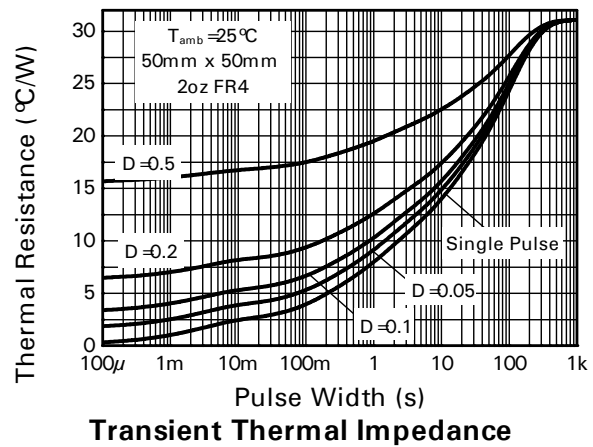
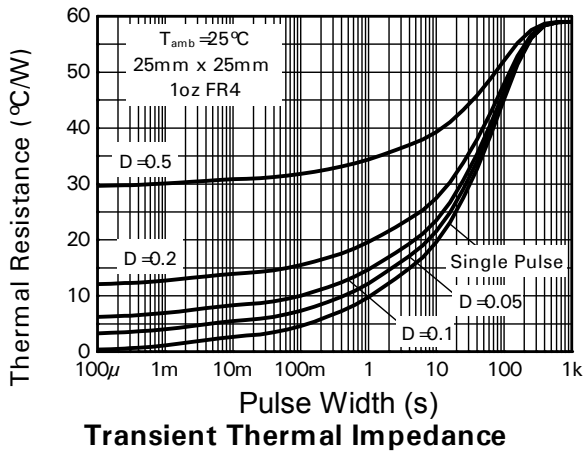
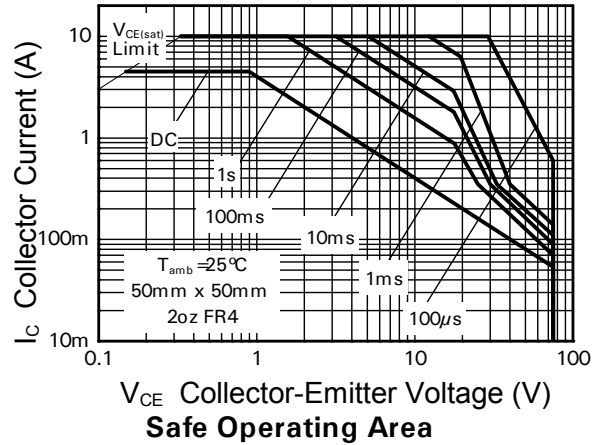
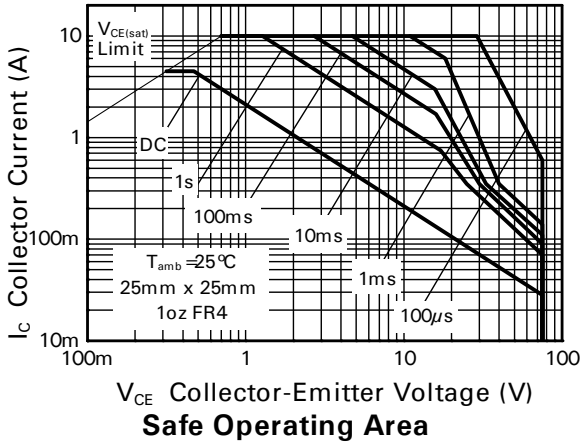
| Characteristic | Symbol | Value | Unit |
|------------------------------|-----------|-------|------|
| Collector-Base Voltage | V_{CBO} | 150 | V |
| Collector-Emitter Voltage | V_{CEO} | 75 | V |
| Emitter-Base Voltage | V_{EBO} | 7 | V |
| Continuous Collector Current | I_C | 5 | A |
| Peak Pulse Collector Current | I_{CM} | 10 | A |

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---|-----------------|-------------|---------------------------|
| Power Dissipation | P_D | (Note 5) | 2.1 |
| | | (Note 6) | 3.4 |
| | | (Note 7) | 4.0 |
| Thermal Resistance, Junction to Ambient Air | $R_{\theta JA}$ | (Note 5) | 59 |
| | | (Note 6) | 36 |
| | | (Note 7) | 32 |
| Thermal Resistance, Junction to Leads | $R_{\theta JL}$ | 2.97 | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

- Notes:
5. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
 6. Same as note (5), except the device is surface mounted on 25mm x 25mm with 2oz copper.
 7. Same as note (5), except the device is surface mounted on 50mm x 50mm with 2oz copper.
 8. Thermal resistance from junction to solder-point (at the end of the collector lead).

Thermal Characteristics and Derating Information

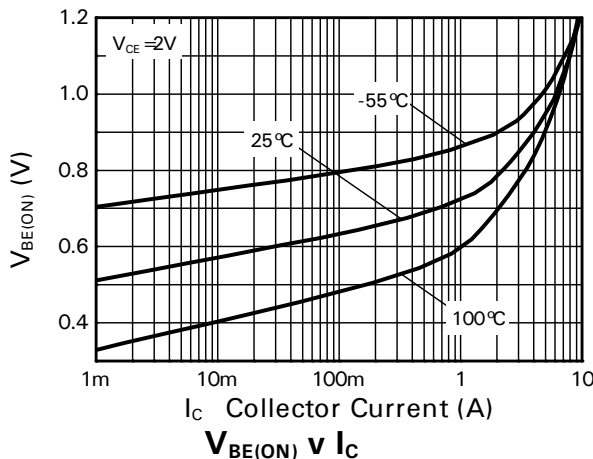
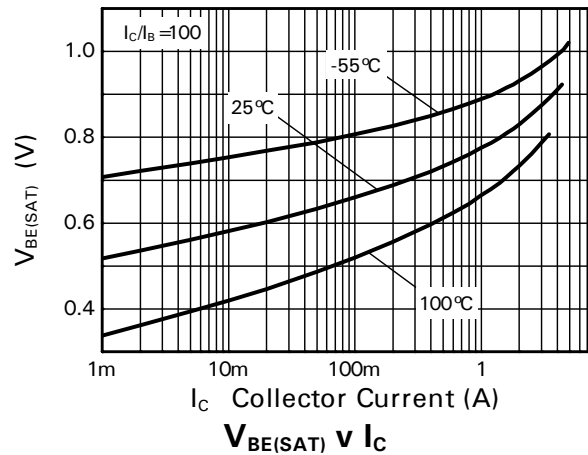
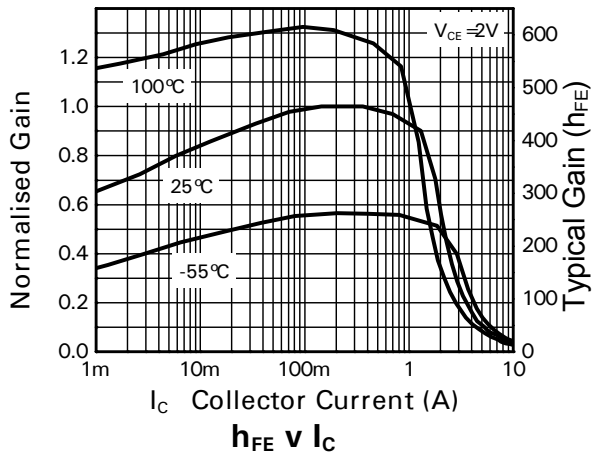
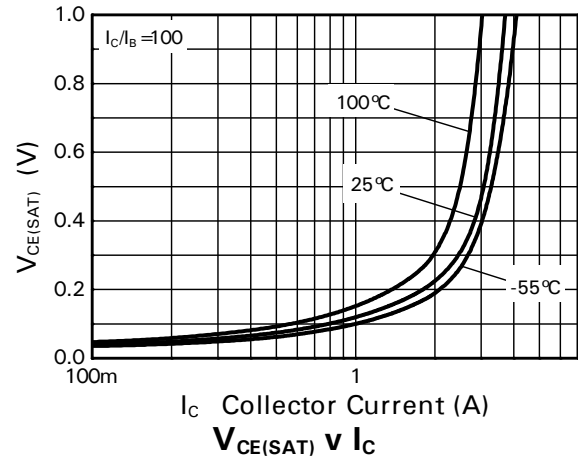
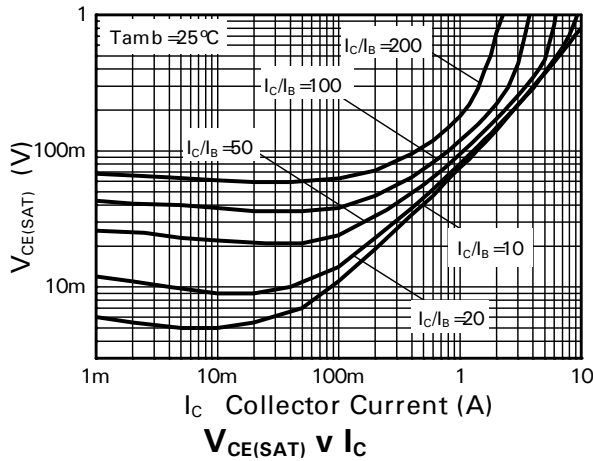


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ. | Max | Unit | Test Condition |
|---|----------------------|-----|-------|------|------|---|
| Collector-Base Breakdown Voltage | BV _{CBO} | 150 | 240 | - | V | I _C = 100μA |
| Collector-Base Breakdown Voltage | BV _{CES} | 150 | 240 | - | V | I _C = 100μA |
| Collector-Emitter Breakdown Voltage (Note 9) | BV _{CEO} | 75 | 90 | - | V | I _C = 10mA |
| Collector-Emitter Breakdown Voltage | BV _{CEV} | 150 | 240 | - | V | I _C = 1μA, V _{EB} = 1V |
| Emitter-Base Breakdown Voltage | BV _{EBO} | 7 | 8.7 | - | V | I _E = 100μA |
| Collector Cutoff Current | I _{CBO} | - | <1 | 10 | nA | V _{CB} = 120V |
| Emitter Cutoff Current | I _{EBO} | - | <1 | 10 | nA | V _{EB} = 6V |
| Emitter Cutoff Current | I _{CES} | - | <1 | 10 | nA | V _{CE} = 120V |
| DC current transfer Static ratio (Note 9) | h _{FE} | 260 | 375 | - | - | I _C = 10mA, V _{CE} = 2V |
| | | 300 | 450 | 1200 | | I _C = 1A, V _{CE} = 2V |
| | | 50 | 75 | - | | I _C = 5A, V _{CE} = 2V |
| | | 10 | 25 | - | | I _C = 10A, V _{CE} = 2V |
| Collector-Emitter Saturation Voltage (Note 9) | V _{CE(sat)} | - | 19 | 30 | mV | I _C = 0.2A, I _B = 20mA |
| | | - | 70 | 95 | | I _C = 1A, I _B = 100mA |
| | | - | 120 | 160 | | I _C = 1A, I _B = 10mA |
| | | - | 140 | 190 | | I _C = 2A, I _B = 100mA |
| | | - | 350 | 460 | | I _C = 5A, I _B = 200mA |
| Base-Emitter Saturation Voltage (Note 9) | V _{BE(sat)} | - | 1.0 | 1.1 | V | I _C = 5A, I _B = 200mA |
| Base-Emitter Turn-on Voltage (Note 9) | V _{BE(on)} | - | 0.925 | 1.05 | V | I _C = 5A, V _{CE} = 2V |
| Transitional Frequency | f _T | - | 140 | - | MHz | I _C = 50mA, V _{CE} = 10V f = 100MHz |
| Output capacitance | C _{OBO} | - | 21 | 30 | pF | V _{CB} = 10V, f = 1MHz, |
| Switching times | t _{ON} | - | 162 | - | nS | I _C = 2A, V _{CC} = 50V, I _{B1} = I _{B2} = 20mA |
| | t _{OFF} | - | 900 | - | | |

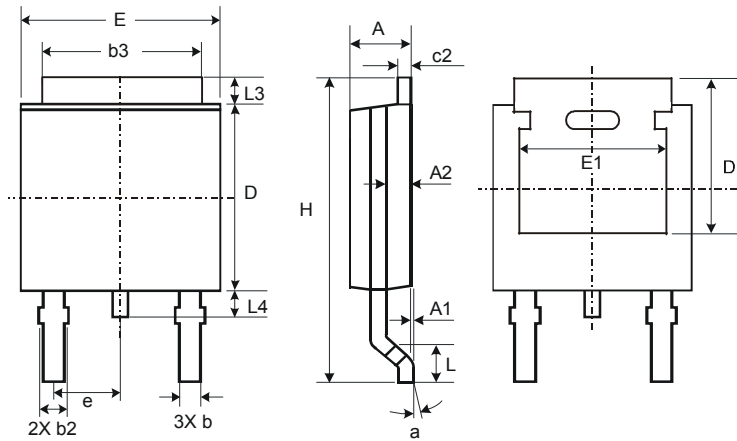
Notes: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

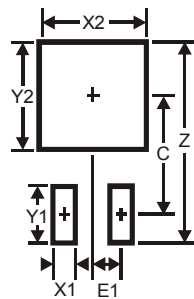
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| TO252 | | | |
|-----------------------------|------|-------|-------|
| 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 |
| c2 | 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) |
|------------|---------------|
| Z | 11.6 |
| X1 | 1.5 |
| X2 | 7.0 |
| Y1 | 2.5 |
| Y2 | 7.0 |
| C | 6.9 |
| E1 | 2.3 |

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