

**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**

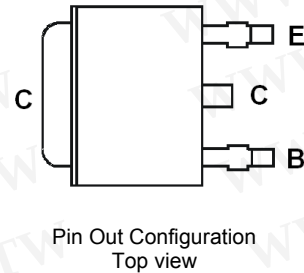
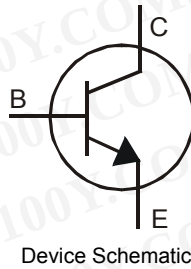
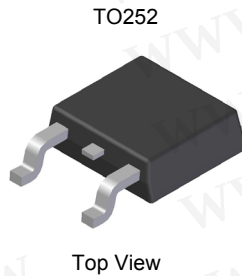
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**Mechanical Data**

- 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

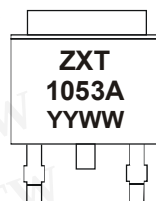


**Ordering Information (Note 4)**

| 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<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic               | Symbol           | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage       | V <sub>CBO</sub> | 150   | V    |
| Collector-Emitter Voltage    | V <sub>CEO</sub> | 75    | V    |
| Emitter-Base Voltage         | V <sub>EBO</sub> | 7     | V    |
| Continuous Collector Current | I <sub>C</sub>   | 5     | A    |
| Peak Pulse Collector Current | I <sub>CM</sub>  | 10    | A    |

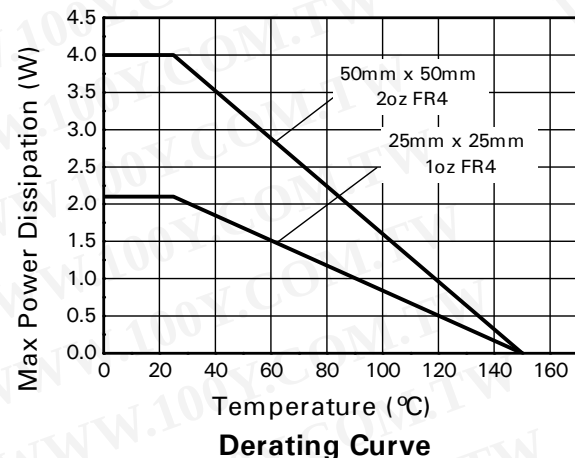
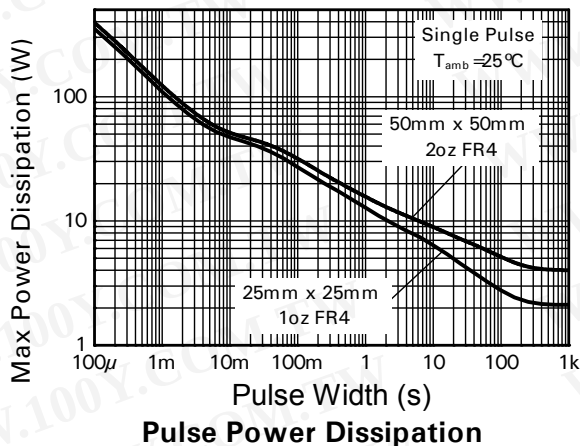
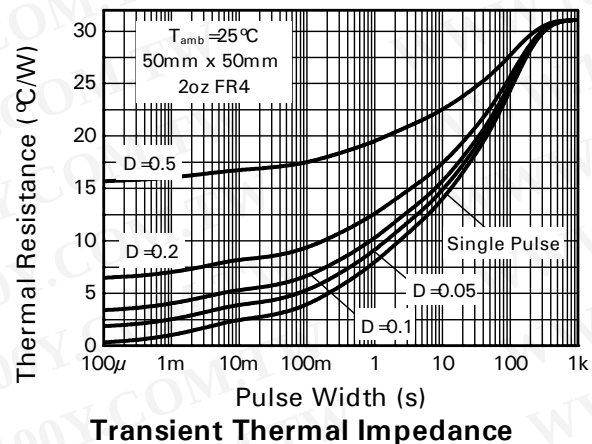
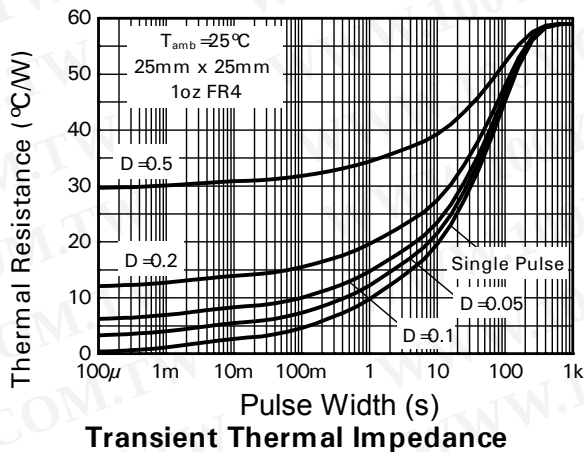
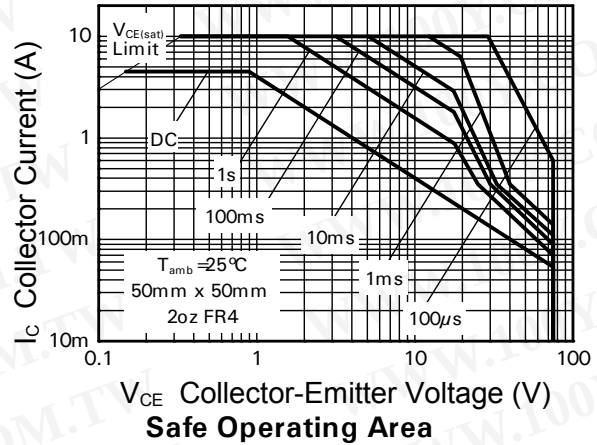
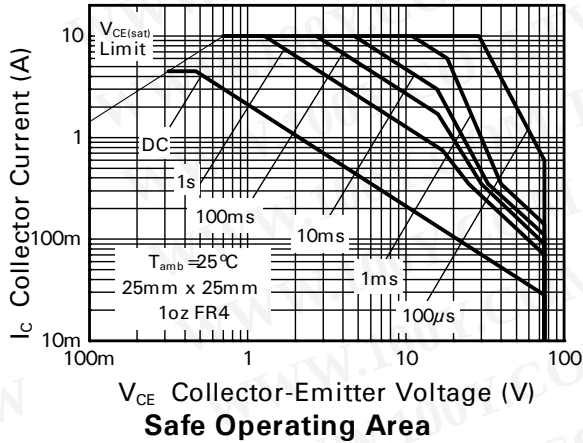
**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                              | Symbol                            | Value       | Unit |
|---------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation                           | P <sub>D</sub>                    | 2.1         | W    |
|                                             |                                   | 3.4         |      |
|                                             |                                   | 4.0         |      |
| Thermal Resistance, Junction to Ambient Air | R <sub>θJA</sub>                  | 59          | °C/W |
|                                             |                                   | 36          |      |
|                                             |                                   | 32          |      |
| Thermal Resistance, Junction to Leads       | R <sub>θJL</sub>                  | 2.97        | °C/W |
| Operating and Storage Temperature Range     | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

- Notes:
- 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.
  - Same as note (5), except the device is surface mounted on 25mm x 25mm with 2oz copper.
  - Same as note (5), except the device is surface mounted on 50mm x 50mm with 2oz copper.
  - Thermal resistance from junction to solder-point (at the end of the collector lead).

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## Thermal Characteristics and Derating Information



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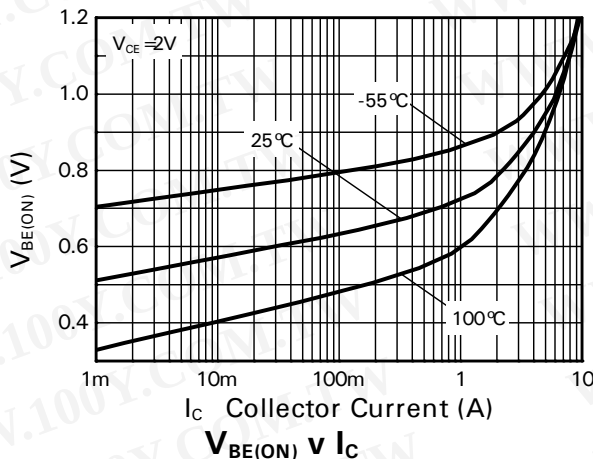
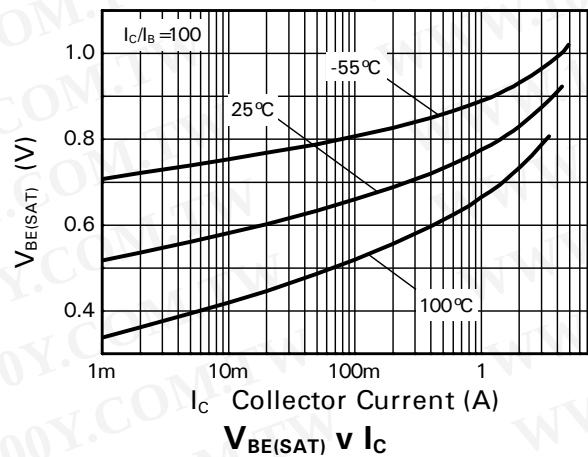
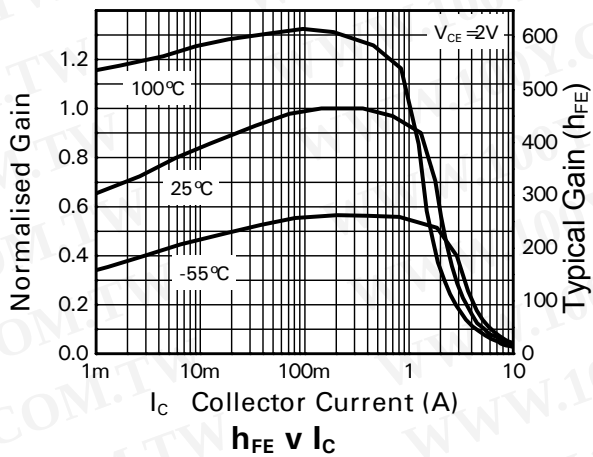
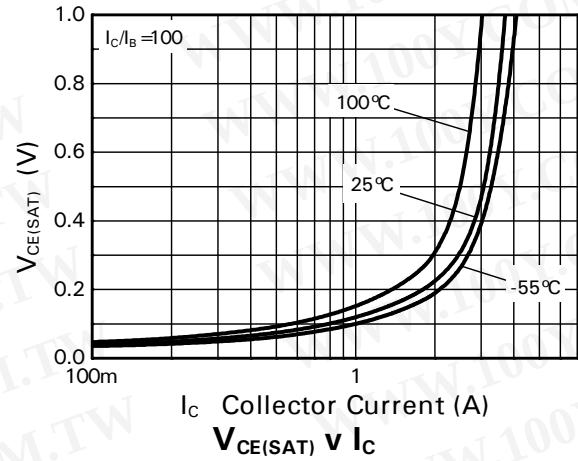
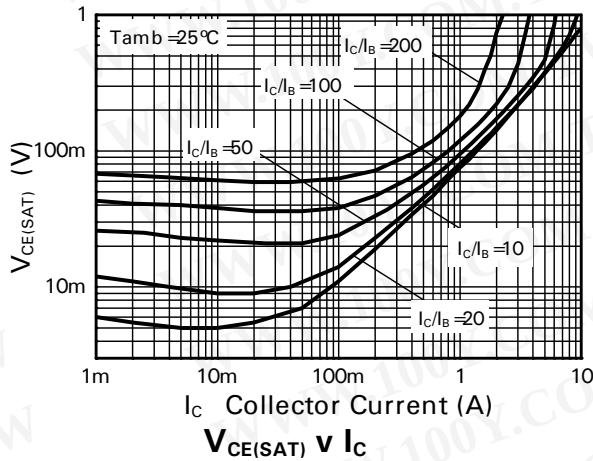
**ZXT1053AK**
**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

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

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



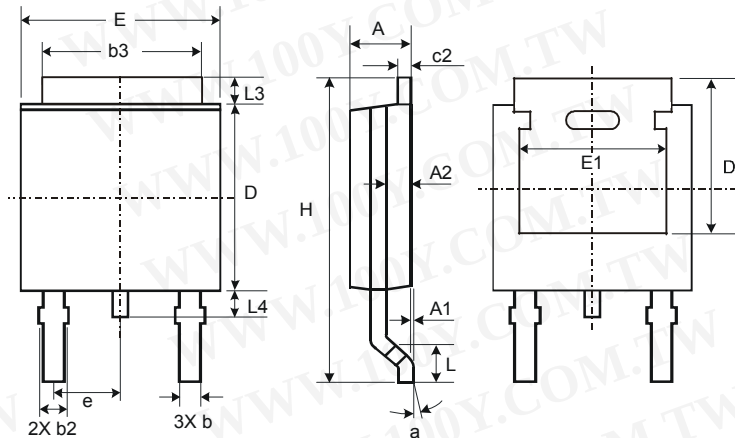
**Typical Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)



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## Package Outline Dimensions

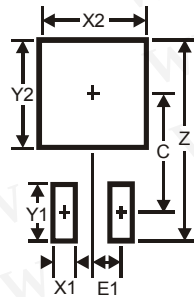
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| 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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