

ZXT1053AK

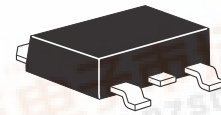
75V NPN LOW SATURATION MEDIUM POWER TRANSISTOR IN D-PAK

SUMMARY

$BV_{CEO} = 75V$; $R_{SAT} = 70m\Omega$ typical; $I_C = 5A$

DESCRIPTION

Packaged in the D-Pak outline this high current high gain 75V NPN transistor offers low on state losses making it ideal for use in DC-DC circuits and various driving and power management functions.



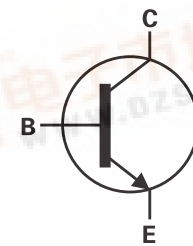
DPAK

FEATURES

- 5 amps continuous current
- Up to 10 amps peak current
- Low equivalent on resistance
- Low saturation voltages
- High h_{FE} (300 min @ 1A)

APPLICATIONS

- DC - DC converters
- DC - DC modules
- Power switches
- Motor control
- Automotive circuits
- Inverter circuits



ORDERING INFORMATION

| DEVICE | REEL SIZE | TAPE WIDTH | QUANTITY PER REEL |
|-------------|-----------|------------|-------------------|
| ZXT1053AKTC | 13" | 16mm | 2500 units |

PINOUT



TOP VIEW

DEVICE MARKING

- ZXT1053A



ZXT1053AK

ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | LIMIT | 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 ^(b) | I_C | 5 | A |
| Peak pulse current | I_{CM} | 10 | A |
| Power dissipation at $T_A = 25^\circ\text{C}$ ^(a) | P_D | 2.1 | W |
| Linear derating factor | | 16.8 | mW/ $^\circ\text{C}$ |
| Power dissipation at $T_A = 25^\circ\text{C}$ ^(b) | P_D | 3.4 | W |
| Linear derating factor | | 27.4 | mW/ $^\circ\text{C}$ |
| Power dissipation at $T_A = 25^\circ\text{C}$ ^(c) | P_D | 4.4 | W |
| Linear derating factor | | 9.3 | mW/ $^\circ\text{C}$ |
| Operating and storage temperature range | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

THERMAL RESISTANCE

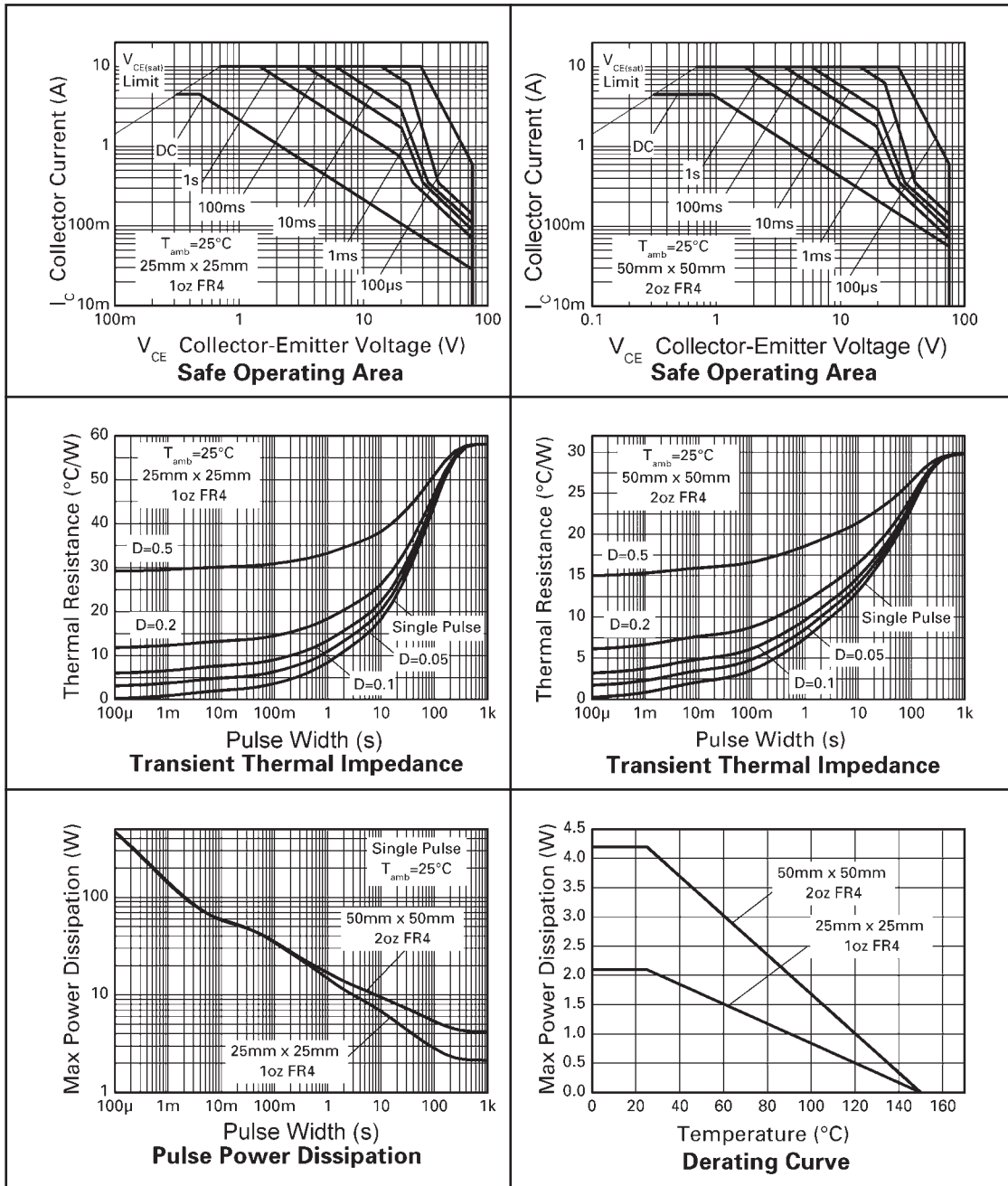
| PARAMETER | SYMBOL | VALUE | UNIT |
|------------------------------------|-----------------|-------|---------------------------|
| Junction to ambient ^(a) | $R_{\theta JA}$ | 59 | $^\circ\text{C}/\text{W}$ |
| Junction to ambient ^(b) | $R_{\theta JA}$ | 36 | $^\circ\text{C}/\text{W}$ |
| Junction to ambient ^(c) | $R_{\theta JA}$ | 28 | $^\circ\text{C}/\text{W}$ |

NOTES

- (a) 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.
(b) For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper in still air conditions.
(c) For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper in still air conditions.

ZXT1053AK

TYPICAL CHARACTERISTICS



ZXT1053AK

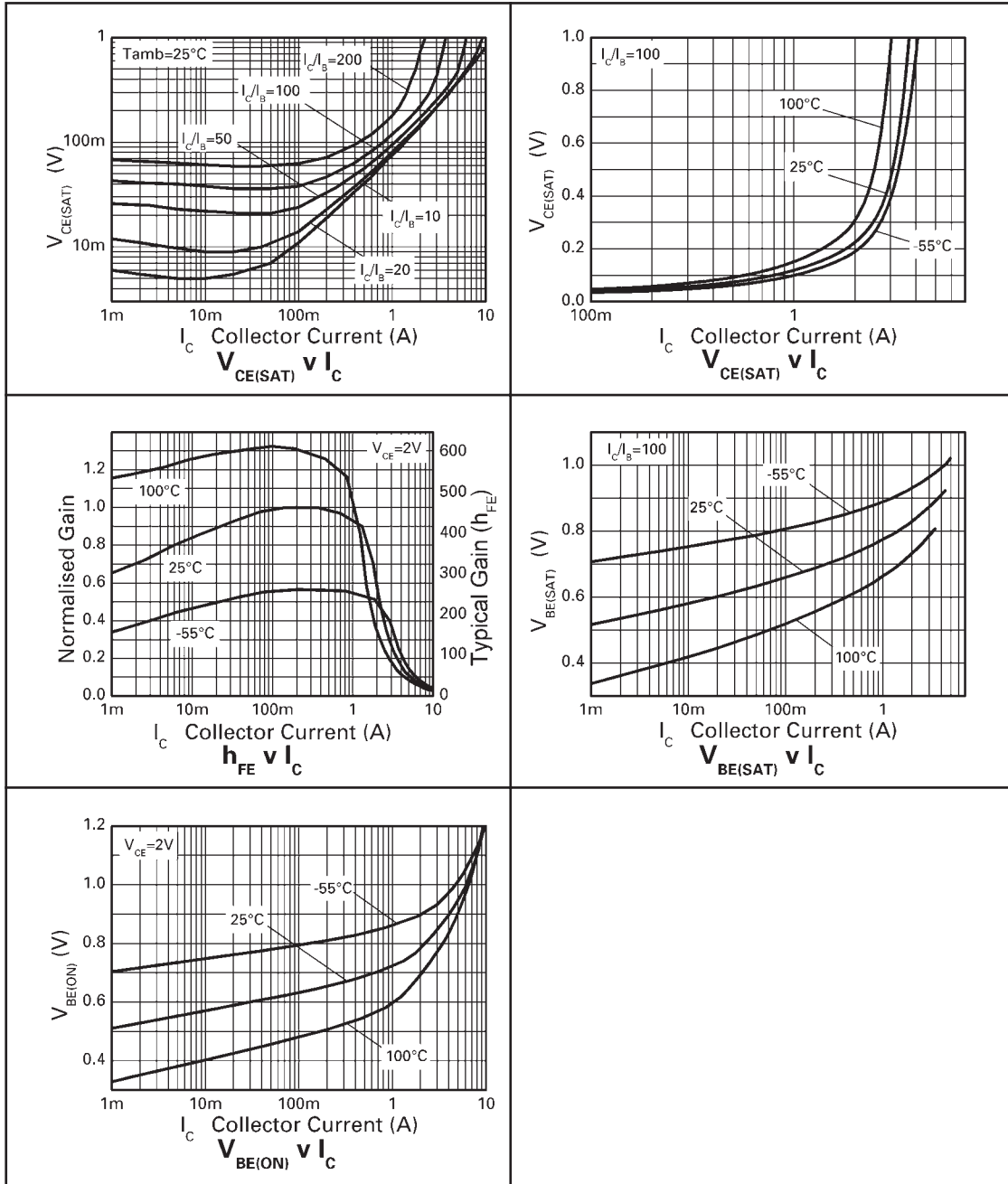
ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS |
|---------------------------------------|---------------|------|-------|------|------|---|
| Collector-base breakdown voltage | BV_{CBO} | 150 | 240 | | V | $I_C=100\mu\text{A}$ |
| Collector-emitter breakdown voltage | BV_{CES} | 150 | 240 | | V | $I_C=100\mu\text{A}$ |
| Collector-emitter breakdown voltage | BV_{CEO} | 75 | 90 | | V | $I_C=10\text{mA}^*$ |
| Collector-emitter breakdown voltage | BV_{CEV} | 150 | 240 | | V | $I_C=1\mu\text{A}, V_{EB}=1\text{V}$ |
| Emitter-base breakdown voltage | BV_{EBO} | 7 | 8.7 | | V | $I_E=100\mu\text{A}$ |
| Collector cut-off current | I_{CBO} | | <1 | 10 | nA | $V_{CB}=120\text{V}$ |
| Collector cut-off current | I_{CES} | | <1 | 10 | nA | $V_{CES}=120\text{V}$ |
| Emitter cut-off current | I_{EBO} | | <1 | 10 | nA | $V_{EB}=6\text{V}$ |
| Collector-emitter saturation voltage | $V_{CE(SAT)}$ | | 19 | 30 | mV | $I_C=0.2\text{A}, I_B=20\text{mA}^*$ |
| | | | 70 | 95 | mV | $I_C=1\text{A}, I_B=100\text{mA}^*$ |
| | | | 120 | 160 | mV | $I_C=1\text{A}, I_B=10\text{mA}^*$ |
| | | | 140 | 190 | mV | $I_C=2\text{A}, I_B=100\text{mA}^*$ |
| | | | 350 | 460 | mV | $I_C=5\text{A}, I_B=200\text{mA}^*$ |
| Base-emitter saturation voltage | $V_{BE(SAT)}$ | | 1.0 | 1.1 | mV | $I_C=5\text{A}, I_B=200\text{mA}^*$ |
| Base-emitter turn-on voltage | $V_{BE(ON)}$ | | 0.925 | 1.05 | mV | $I_C=5\text{A}, V_{CE}=2\text{V}^*$ |
| Static forward current transfer ratio | H_{FE} | 260 | 375 | | | $I_C=10\text{mA}, V_{CE}=2\text{V}^*$ |
| | | 300 | 450 | 1200 | | $I_C=1\text{A}, V_{CE}=2\text{V}^*$ |
| | | 50 | 75 | | | $I_C=5\text{A}, V_{CE}=2\text{V}^*$ |
| | | 10 | 25 | | | $I_C=10\text{A}, V_{CE}=2\text{V}^*$ |
| Transition frequency | f_T | | 140 | | MHz | $I_C=50\text{mA}, V_{CE}=10\text{V}$ $f=100\text{MHz}$ |
| Output capacitance | C_{OBO} | | 21 | 30 | pF | $V_{CB}=10\text{V}, f=1\text{MHz}^*$ |
| Switching times | t_{ON} | | 162 | | nS | $I_C=2\text{A}, V_{CC}=50\text{V},$ |
| | t_{OFF} | | 900 | | nS | $I_{B1}=I_{B2}=20\text{mA}$ |

* Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

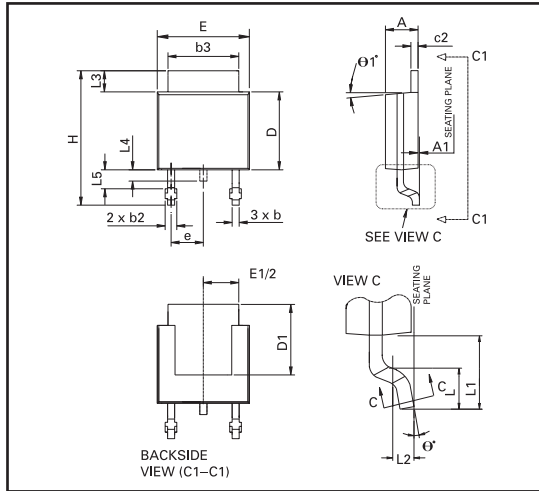
ZXT1053AK

TYPICAL CHARACTERISTICS



ZXT1053AK

PACKAGE OUTLINE



Controlling dimensions are in millimeters. Approximate conversions are given in inches

PACKAGE DIMENSIONS

| DIM | Millimeters | | Inches | | DIM | Millimeters | | Inches | |
|-----|-------------|-------|--------|-------|----------|-------------|-------|-----------|-------|
| | Min | Max | Min | Max | | Min | Max | Min | Max |
| A | 2.18 | 2.38 | 0.086 | 0.094 | e | 2.30 BSC | | 0.090 BSC | |
| A1 | — | 0.127 | — | 0.005 | H | 9.40 | 10.41 | 0.370 | 0.410 |
| b | 0.635 | 0.89 | 0.025 | 0.035 | L | 1.40 | 1.78 | 0.055 | 0.070 |
| b2 | 0.762 | 1.114 | 0.030 | 0.045 | L1 | 2.74 REF | | 0.108 REF | |
| b3 | 5.20 | 5.46 | 0.205 | 0.215 | L2 | 0.051 BSC | | 0.020 BSC | |
| c | 0.457 | 0.609 | 0.018 | 0.024 | L3 | 0.89 | 1.27 | 0.035 | 0.050 |
| c2 | 0.457 | 0.584 | 0.018 | 0.023 | L4 | 0.635 | 1.01 | 0.025 | 0.040 |
| D | 5.97 | 6.22 | 0.235 | 0.245 | L5 | 1.14 | 1.52 | 0.045 | 0.060 |
| D1 | 5.20 | — | 0.205 | — | theta 1° | 0° | 10° | 0° | 10° |
| E | 6.35 | 6.73 | 0.250 | 0.265 | theta° | 0° | 15° | 0° | 15° |
| E1 | 4.32 | — | 0.170 | — | — | — | — | — | — |

© Zetex plc 2003

Europe

Zetex plc
Fields New Road
Chadderton
Oldham, OL9 8NP
United Kingdom
Telephone: (44) 161 622 4444
Fax: (44) 161 622 4446
hq@zetex.com

Zetex GmbH
Streitfeldstraße 19
D-81673 München

Germany
Telefon: (49) 89 45 49 49 0
Fax: (49) 89 45 49 49 49
europa.sales@zetex.com

Americas

Zetex Inc
700 Veterans Memorial Hwy
Hauppauge, NY 11788

USA
Telephone: (1) 631 360 2222
Fax: (1) 631 360 8222
usa.sales@zetex.com

Asia Pacific

Zetex (Asia) Ltd
3701-04 Metroplaza Tower 1
Hing Fong Road
Kwai Fong
Hong Kong
Telephone: (852) 26100 611
Fax: (852) 24250 494
asia.sales@zetex.com

These offices are supported by agents and distributors in major countries world-wide.

This publication is issued to provide outline information only which (unless agreed by the Company in writing) may not be used, applied or reproduced for any purpose or form part of any order or contract or be regarded as a representation relating to the products or services concerned. The Company reserves the right to alter without notice the specification, design, price or conditions of supply of any product or service.

For the latest product information, log on to www.zetex.com