

# ZXT1053AK

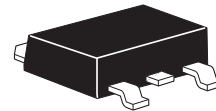
## 75V NPN LOW SATURATION MEDIUM POWER TRANSISTOR IN D-PAK

### 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.



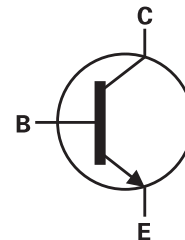
DPAK

### 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



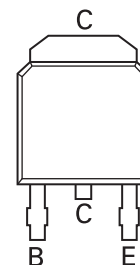
### ORDERING INFORMATION

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

### DEVICE MARKING

- ZXT1053A

PINOUT



TOP VIEW

# ZXT1053AK

## ABSOLUTE MAXIMUM RATINGS

| PARAMETER                                                    | SYMBOL         | LIMIT       | UNIT  |
|--------------------------------------------------------------|----------------|-------------|-------|
| Collector-base voltage                                       | $BV_{CBO}$     | 150         | V     |
| Collector-emitter voltage                                    | $BV_{CEO}$     | 75          | V     |
| Emitter-base voltage                                         | $BV_{EBO}$     | 7           | V     |
| Continuous collector current <sup>(b)</sup>                  | $I_C$          | 5           | A     |
| Peak pulse current                                           | $I_{CM}$       | 10          | A     |
| Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(a)</sup> | $P_D$          | 2.1         | W     |
| Linear derating factor                                       |                | 16.8        | mW/°C |
| Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(b)</sup> | $P_D$          | 3.4         | W     |
| Linear derating factor                                       |                | 27.4        | mW/°C |
| Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(c)</sup> | $P_D$          | 4.4         | W     |
| Linear derating factor                                       |                | 9.3         | mW/°C |
| Operating and storage temperature range                      | $T_J, T_{stg}$ | -55 to +150 | °C    |

## THERMAL RESISTANCE

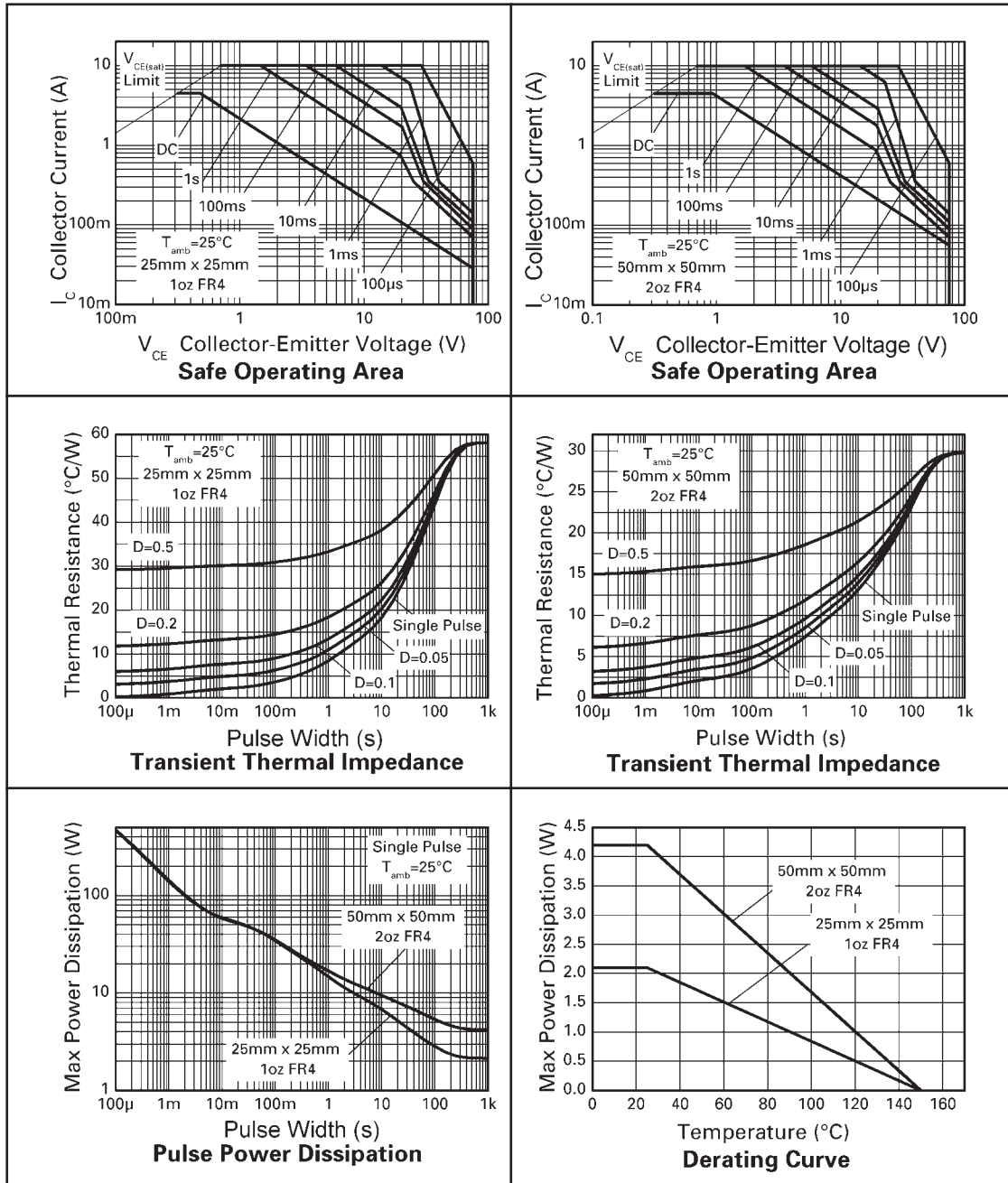
| PARAMETER                          | SYMBOL          | VALUE | UNIT |
|------------------------------------|-----------------|-------|------|
| Junction to ambient <sup>(a)</sup> | $R_{\theta JA}$ | 59    | °C/W |
| Junction to ambient <sup>(b)</sup> | $R_{\theta JA}$ | 36    | °C/W |
| Junction to ambient <sup>(c)</sup> | $R_{\theta JA}$ | 28    | °C/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.

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## TYPICAL CHARACTERISTICS



# ZXT1053AK

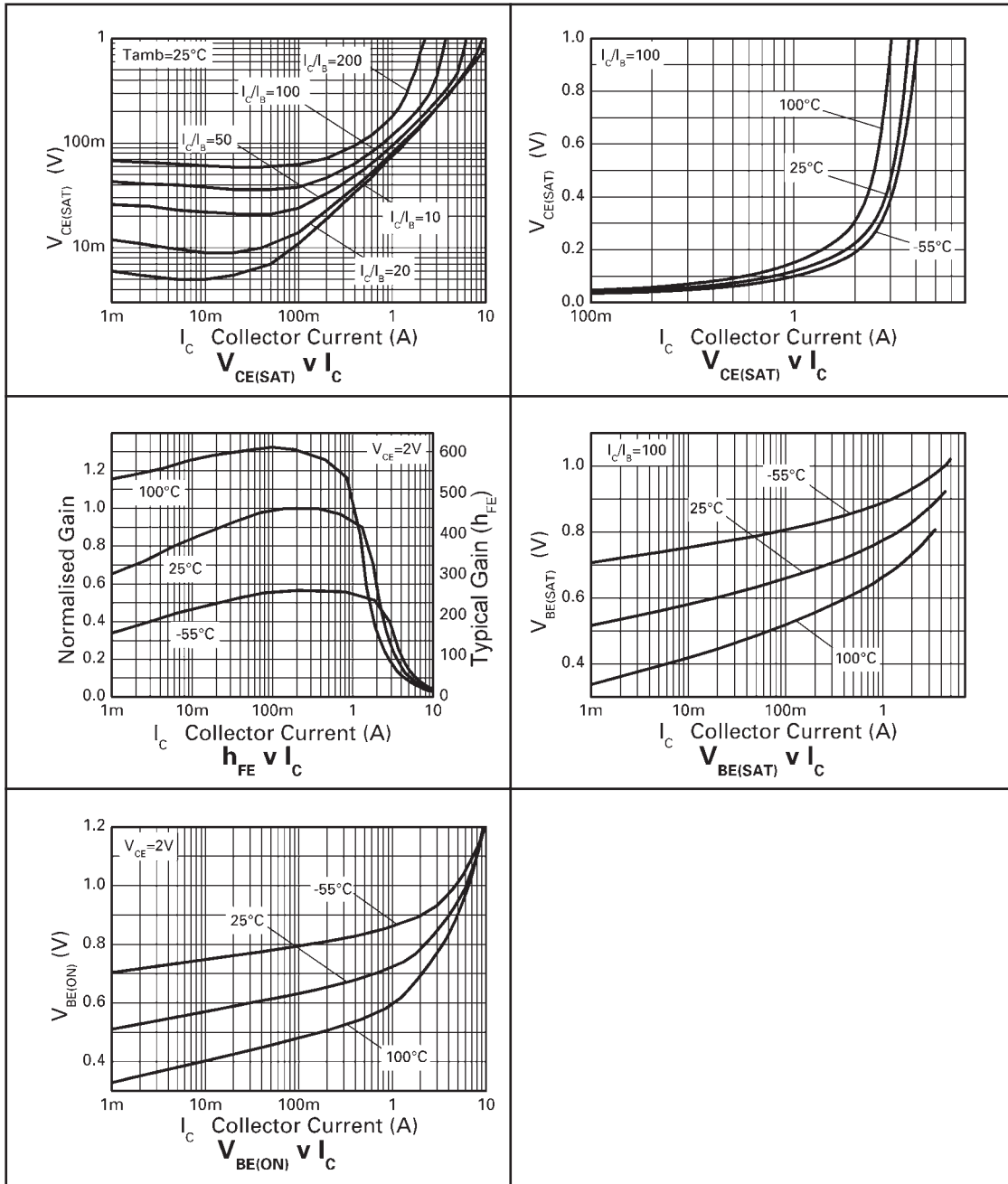
## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

| 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  | $I_C=50\text{mA}$ , $V_{CE}=10\text{V}$<br>$f=100\text{MHz}$ |
| 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  $\leq 2\%$ .

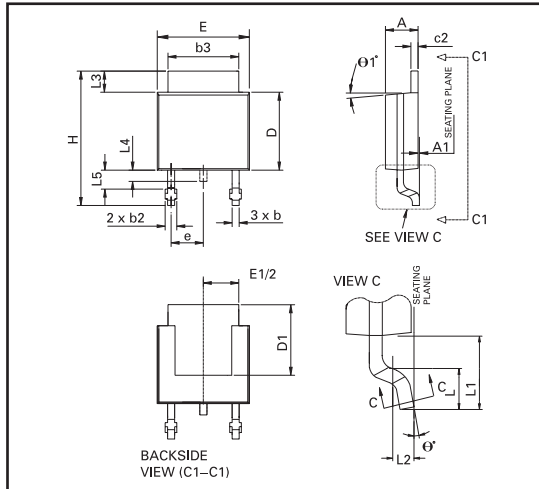
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## TYPICAL CHARACTERISTICS



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## 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  | —     | Θ1° | 0°          | 10°   | 0°        | 10°   |
| E   | 6.35        | 6.73  | 0.250  | 0.265 | Θ°  | 0°          | 15°   | 0°        | 15°   |
| E1  | 4.32        | —     | 0.170  | —     | —   | —           | —     | —         | —     |

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