

# ZXTN2007G

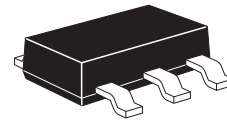
## 30V NPN MEDIUM POWER LOW SATURATION TRANSISTOR IN SOT223

### SUMMARY

$BV_{CEO} = 30V$  ;  $R_{SAT} = 28m\Omega$ ;  $I_C = 7A$

### DESCRIPTION

Packaged in the SOT223 outline this new low saturation 30V NPN transistor offers extremely low on state losses making it ideal for use in DC-DC circuits and various driving and power management functions.



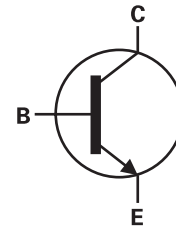
SOT223

### FEATURES

- Extremely low equivalent on-resistance;  $R_{SAT} = 28m\Omega$  at 6.5A
- 7 amps continuous current
- Up to 20 amps peak current
- Very low saturation voltages
- Excellent  $h_{FE}$  characteristics up to 20 amps

### APPLICATIONS

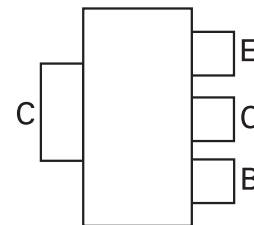
- DC - DC converters
- MOSFET gate drivers
- Charging circuits
- Power switches
- Motor control



### ORDERING INFORMATION

| DEVICE      | REEL SIZE | TAPE WIDTH    | QUANTITY PER REEL |
|-------------|-----------|---------------|-------------------|
| ZXTN2007GTA | 7"        | 12mm embossed | 1,000 units       |
| ZXTN2007GTC | 13"       |               | 4,000 units       |

### PINOUT



TOP VIEW

### DEVICE MARKING

ZXTN  
2007

ISSUE 2 - MAY 2006

# ZXTN2007G

## ABSOLUTE MAXIMUM RATINGS

| PARAMETER  | SYMBOL         | LIMIT       | UNIT  |
|--|----------------|-------------|-------|
| Collector-base voltage                                       | $BV_{CBO}$     | 80          | V     |
| Collector-emitter voltage                                    | $BV_{CEO}$     | 30          | V     |
| Emitter-base voltage   | $BV_{EBO}$     | 7           | V     |
| Continuous collector current <sup>(a)</sup>                  | $I_C$          | 7           | A     |
| Peak pulse current   | $I_{CM}$       | 20          | A     |
| Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(a)</sup> | $P_D$          | 3.0         | W     |
| Linear derating factor                                       |                | 24          | mW/°C |
| Power dissipation at $T_A = 25^\circ\text{C}$ <sup>(b)</sup> | $P_D$          | 1.6         | W     |
| Linear derating factor                                       |                | 12.8        | mW/°C |
| Operating and storage temperature range                      | $T_j, T_{stg}$ | -55 to +150 | °C    |

## THERMAL RESISTANCE

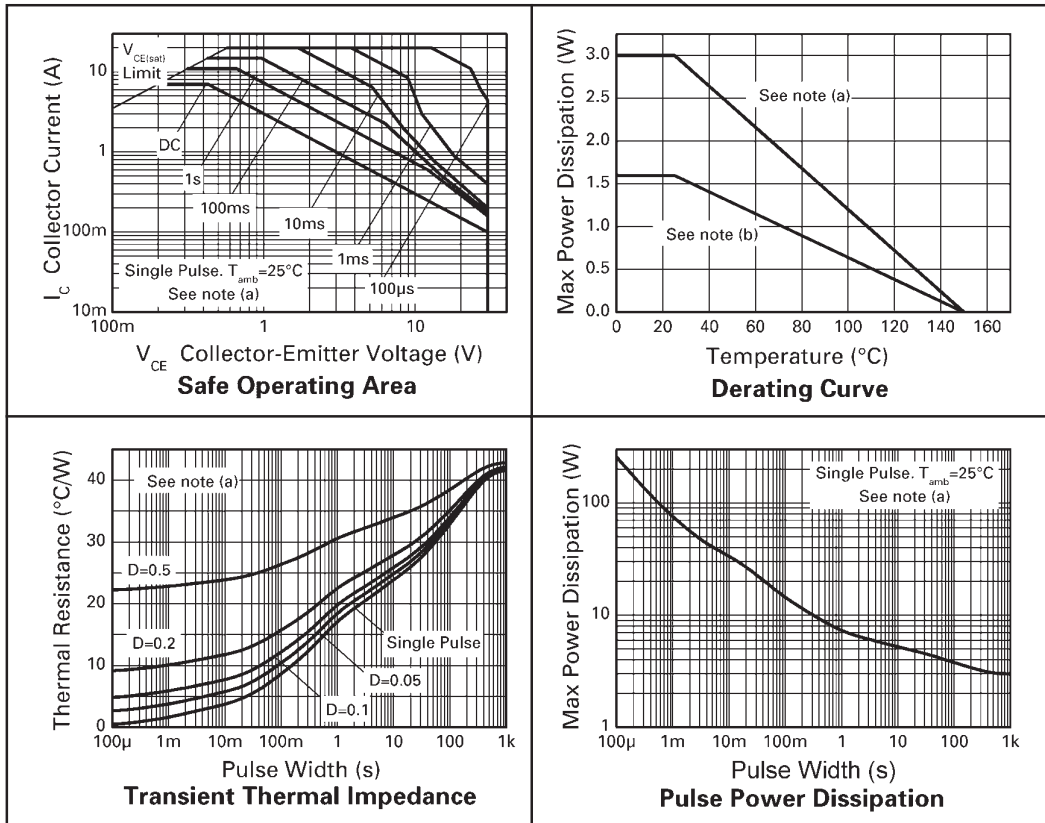
| PARAMETER                          | SYMBOL          | VALUE | UNIT |
|------------------------------------|-----------------|-------|------|
| Junction to ambient <sup>(a)</sup> | $R_{\theta JA}$ | 42    | °C/W |
| Junction to ambient <sup>(b)</sup> | $R_{\theta JA}$ | 78    | °C/W |

### NOTES

- (a) For a device surface mounted on 52mm x 52mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.  
(b) 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.

# ZXTN2007G

## CHARACTERISTICS



# ZXTN2007G

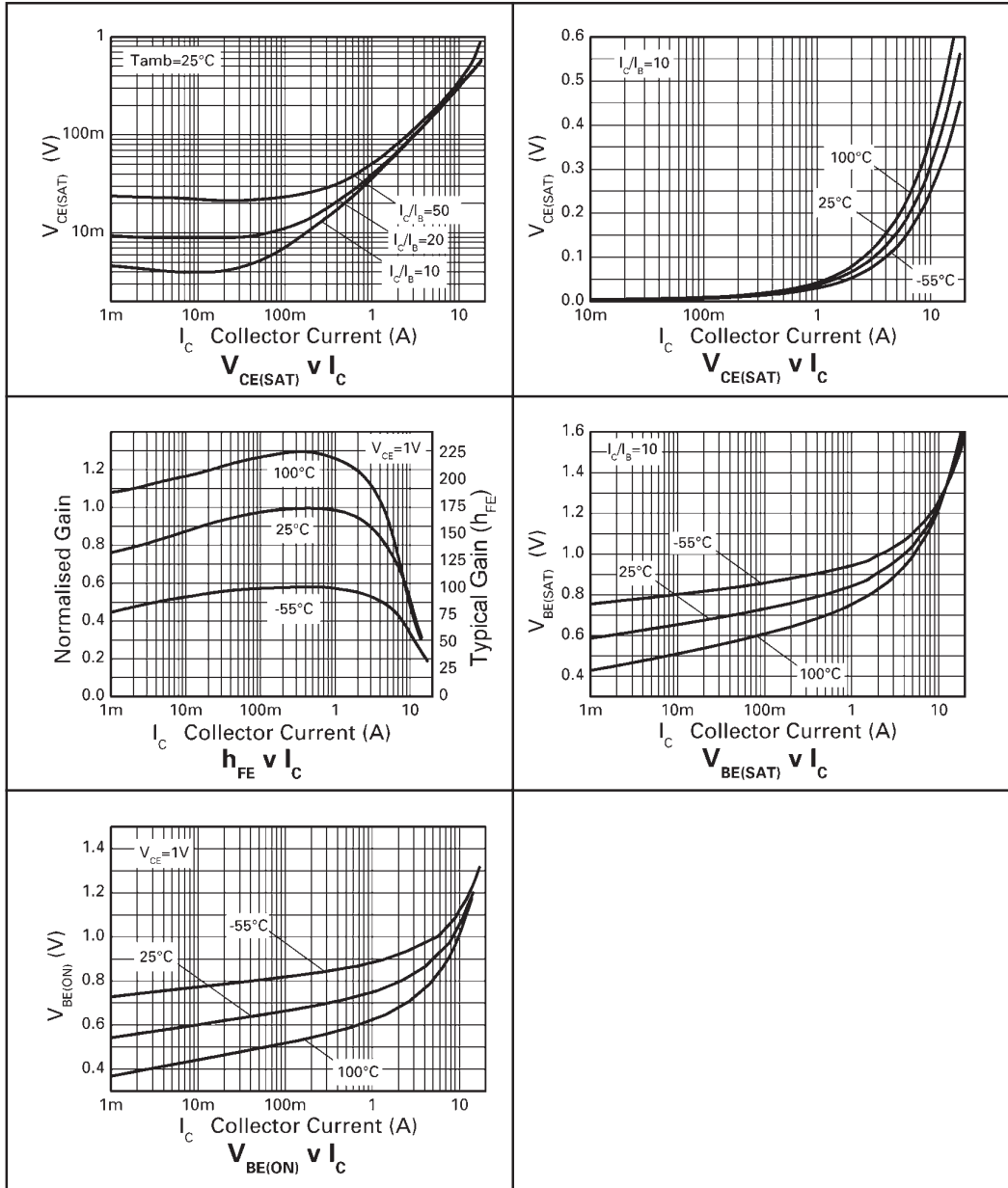
## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

| PARAMETER                             | SYMBOL                                | MIN.                    | TYP.                         | MAX.                         | UNIT                | CONDITIONS  |
|---------------------------------------|---------------------------------------|-------------------------|------------------------------|------------------------------|---------------------|---|
| Collector-base breakdown voltage      | $BV_{CBO}$                            | 80                      | 125                          |                              | V                   | $I_C = 100\mu\text{A}$  |
| Collector-emitter breakdown voltage   | $BV_{CER}$                            | 80                      | 125                          |                              | V                   | $I_C = 1\mu\text{A}$ , $R_B \leq 1\text{k}\Omega$   |
| Collector-emitter breakdown voltage   | $BV_{CEO}$                            | 30                      | 40                           |                              | V                   | $I_C = 10\text{mA}^*$   |
| Emitter-base breakdown voltage        | $BV_{EBO}$                            | 7                       | 8.1                          |                              | V                   | $I_E = 100\mu\text{A}$  |
| Collector cut-off current             | $I_{CBO}$                             |                         |                              | 50<br>0.5                    | nA<br>$\mu\text{A}$ | $V_{CB} = 70\text{V}$<br>$V_{CB} = 70\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$  |
| Collector cut-off current             | $I_{CER}$<br>$R \leq 1\text{k}\Omega$ |                         |                              | 100<br>0.5                   | nA<br>$\mu\text{A}$ | $V_{CB} = 70\text{V}$<br>$V_{CB} = 70\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$  |
| Emitter cut-off current               | $I_{EBO}$                             |                         |                              | 10                           | nA                  | $V_{EB} = 6\text{V}$  |
| Collector-emitter saturation voltage  | $V_{CE(SAT)}$                         |                         | 25<br>35<br>50<br>100<br>185 | 35<br>50<br>65<br>125<br>220 | mV                  | $I_C = 0.5\text{A}$ , $I_B = 20\text{mA}^*$<br>$I_C = 1\text{A}$ , $I_B = 100\text{mA}^*$<br>$I_C = 1\text{A}$ , $I_B = 20\text{mA}^*$<br>$I_C = 2\text{A}$ , $I_B = 20\text{mA}^*$<br>$I_C = 6.5\text{A}$ , $I_B = 300\text{mA}^*$ |
| Base-emitter saturation voltage       | $V_{BE(SAT)}$                         |                         | 1025                         | 1130                         | mV                  | $I_C = 6.5\text{A}$ , $I_B = 300\text{mA}^*$  |
| Base-emitter turn-on voltage          | $V_{BE(ON)}$                          |                         | 920                          | 1000                         | mV                  | $I_C = 6.5\text{A}$ , $V_{CE} = 1\text{V}^*$  |
| Static forward current transfer ratio | $h_{FE}$                              | 100<br>100<br>100<br>20 | 175<br>200<br>150<br>30      | 300                          |                     | $I_C = 10\text{mA}$ , $V_{CE} = 1\text{V}^*$<br>$I_C = 1\text{A}$ , $V_{CE} = 1\text{V}^*$<br>$I_C = 7\text{A}$ , $V_{CE} = 1\text{V}^*$<br>$I_C = 20\text{A}$ , $V_{CE} = 1\text{V}^*$   |
| Transition frequency                  | $f_T$                                 |                         | 140                          |                              | MHz                 | $I_C = 100\text{mA}$ , $V_{CE} = 10\text{V}$<br>$f = 50\text{MHz}$  |
| Output capacitance                    | $C_{OBO}$                             |                         | 48                           |                              | pF                  | $V_{CB} = 10\text{V}$ , $f = 1\text{MHz}^*$   |
| Switching times                       | $t_{ON}$<br>$t_{OFF}$                 |                         | 37<br>425                    |                              | ns                  | $I_C = 1\text{A}$ , $V_{CC} = 10\text{V}$ ,<br>$I_{B1} = -I_{B2} = 100\text{mA}$  |

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

# ZXTN2007G

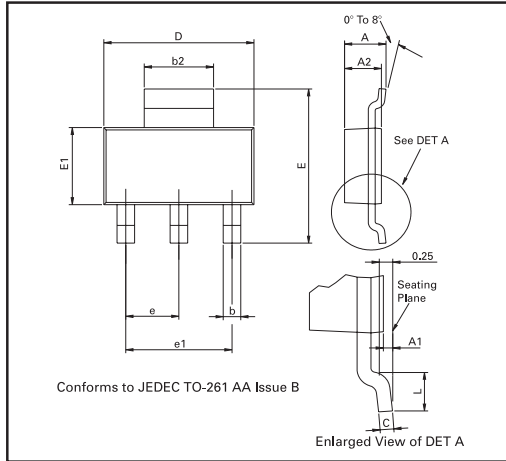
## TYPICAL CHARACTERISTICS



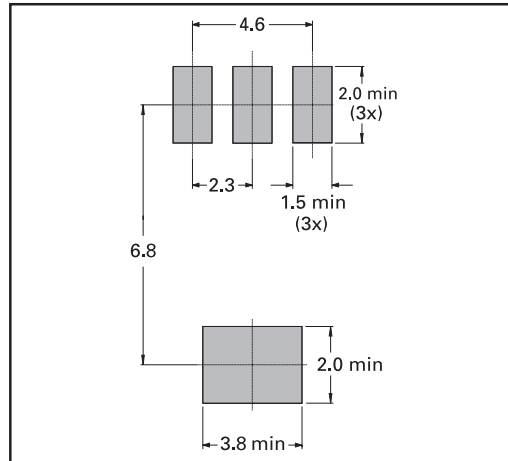
ISSUE 2 - MAY 2006

# ZXTN2007G

## PACKAGE OUTLINE



## PAD LAYOUT DETAILS



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   | -           | 1.80 | -      | 0.071 | e   | 2.30 BSC    |      | 0.0905 BSC |       |
| A1  | 0.02        | 0.10 | 0.0008 | 0.004 | e1  | 4.60 BSC    |      | 0.181 BSC  |       |
| b   | 0.66        | 0.84 | 0.026  | 0.033 | E   | 6.70        | 7.30 | 0.264      | 0.287 |
| b2  | 2.90        | 3.10 | 0.114  | 0.122 | E1  | 3.30        | 3.70 | 0.130      | 0.146 |
| C   | 0.23        | 0.33 | 0.009  | 0.013 | L   | 0.90        | -    | 0.355      | -     |
| D   | 6.30        | 6.70 | 0.248  | 0.264 | -   | -           | -    | -          | -     |

© Zetex Semiconductors plc 2005

| Europe  | Americas   | Asia Pacific   | Corporate Headquarters  |
|---|--|--|---|
| Zetex GmbH<br>Streitfeldstraße 19<br>D-81673 München<br>Germany   | Zetex Inc<br>700 Veterans Memorial Hwy<br>Hauppauge, NY 11788<br>USA   | Zetex (Asia) Ltd<br>3701-04 Metroplaza Tower 1<br>Hing Fong Road, Kwai Fong<br>Hong Kong                             | Zetex Semiconductors plc<br>Zetex Technology Park<br>Chadderton, Oldham, OL9 9LL<br>United Kingdom      |
| Telefon: (49) 89 45 49 49 0<br>Fax: (49) 89 45 49 49 49<br><a href="mailto:europa.sales@zetex.com">europa.sales@zetex.com</a> | Telephone: (1) 631 360 2222<br>Fax: (1) 631 360 8222<br><a href="mailto:usa.sales@zetex.com">usa.sales@zetex.com</a> | Telephone: (852) 26100 611<br>Fax: (852) 24250 494<br><a href="mailto:asia.sales@zetex.com">asia.sales@zetex.com</a> | Telephone (44) 161 622 4444<br>Fax: (44) 161 622 4446<br><a href="mailto:hq@zetex.com">hq@zetex.com</a> |

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](http://www.zetex.com)



ISSUE 2 - MAY 2006