

ZXTN2005Z

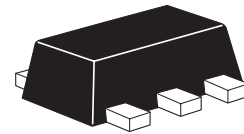
25V NPN LOW SATURATION MEDIUM POWER TRANSISTOR IN SOT89

SUMMARY

$BV_{CEO} = 25V$; $R_{SAT} = 25m\Omega$; $I_C = 5.5A$

DESCRIPTION

Packaged in the SOT89 outline this new low saturation 25V NPN transistor offers extremely low on state losses making it ideal for use in DC-DC circuits and various driving and power management functions.



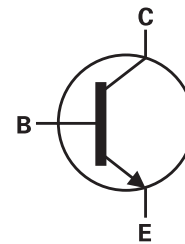
SOT89

FEATURES

- Extremely low equivalent on-resistance; $R_{SAT} = 25m\Omega$ at 6.5A
- 5.5 amps continuous current
- Up to 20 amps peak current
- Very low saturation voltages
- Excellent h_{FE} characteristics up to 20 amps

APPLICATIONS

- Emergency lighting circuits
- Motor driving (including DC fans)
- Solenoid, relay and actuator drivers
- DC modules
- Backlight Inverters



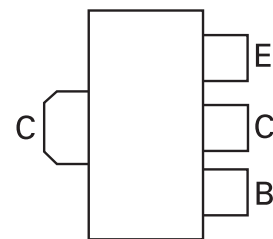
ORDERING INFORMATION

| DEVICE | REEL SIZE | TAPE WIDTH | QUANTITY PER REEL |
|-------------|-----------|---------------|-------------------|
| ZXTN2005ZTA | 7" | 12mm embossed | 1,000 units |

DEVICE MARKING

869

PINOUT



TOP VIEW

ZXTN2005Z

ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | LIMIT | UNIT |
|--|----------------|-------------|-------|
| Collector-base voltage | BV_{CBO} | 60 | V |
| Collector-emitter voltage | BV_{CEO} | 25 | V |
| Emitter-base voltage | BV_{EBO} | 7 | V |
| Continuous collector current ^(a) | I_C | 5.5 | A |
| Peak pulse current | I_{CM} | 20 | A |
| Power dissipation at $T_A=25^\circ\text{C}$ ^(a) | P_D | 1.5 | W |
| Linear derating factor | | 12 | mW/°C |
| Power dissipation at $T_A=25^\circ\text{C}$ ^(b) | P_D | 2.1 | W |
| Linear derating factor | | 16.8 | mW/°C |
| Operating and storage temperature range | T_j, T_{stg} | -55 to +150 | °C |

THERMAL RESISTANCE

| PARAMETER | SYMBOL | LIMIT | UNIT |
|------------------------------------|-----------------|-------|------|
| Junction to ambient ^(a) | $R_{\theta JA}$ | 83 | °C/W |
| Junction to ambient ^(b) | $R_{\theta JA}$ | 60 | °C/W |

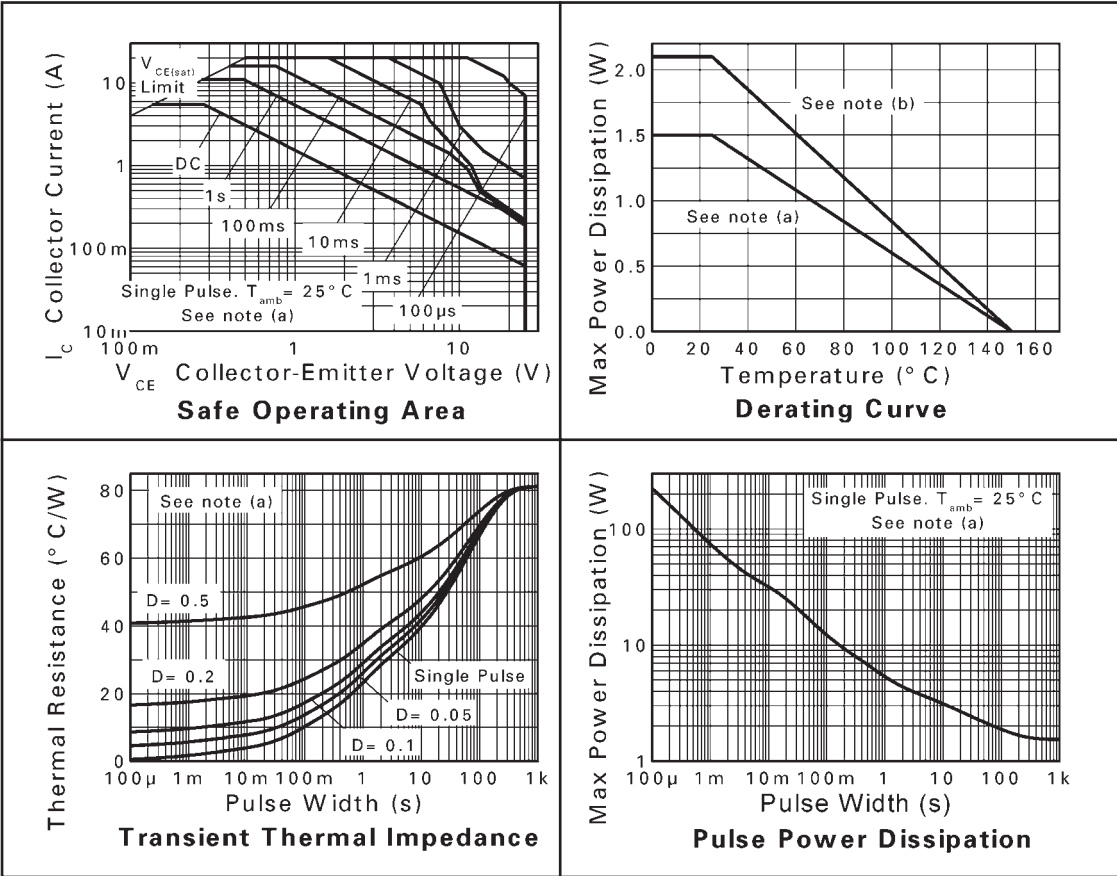
NOTES:

(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.

ZXTN2005Z

CHARACTERISTICS



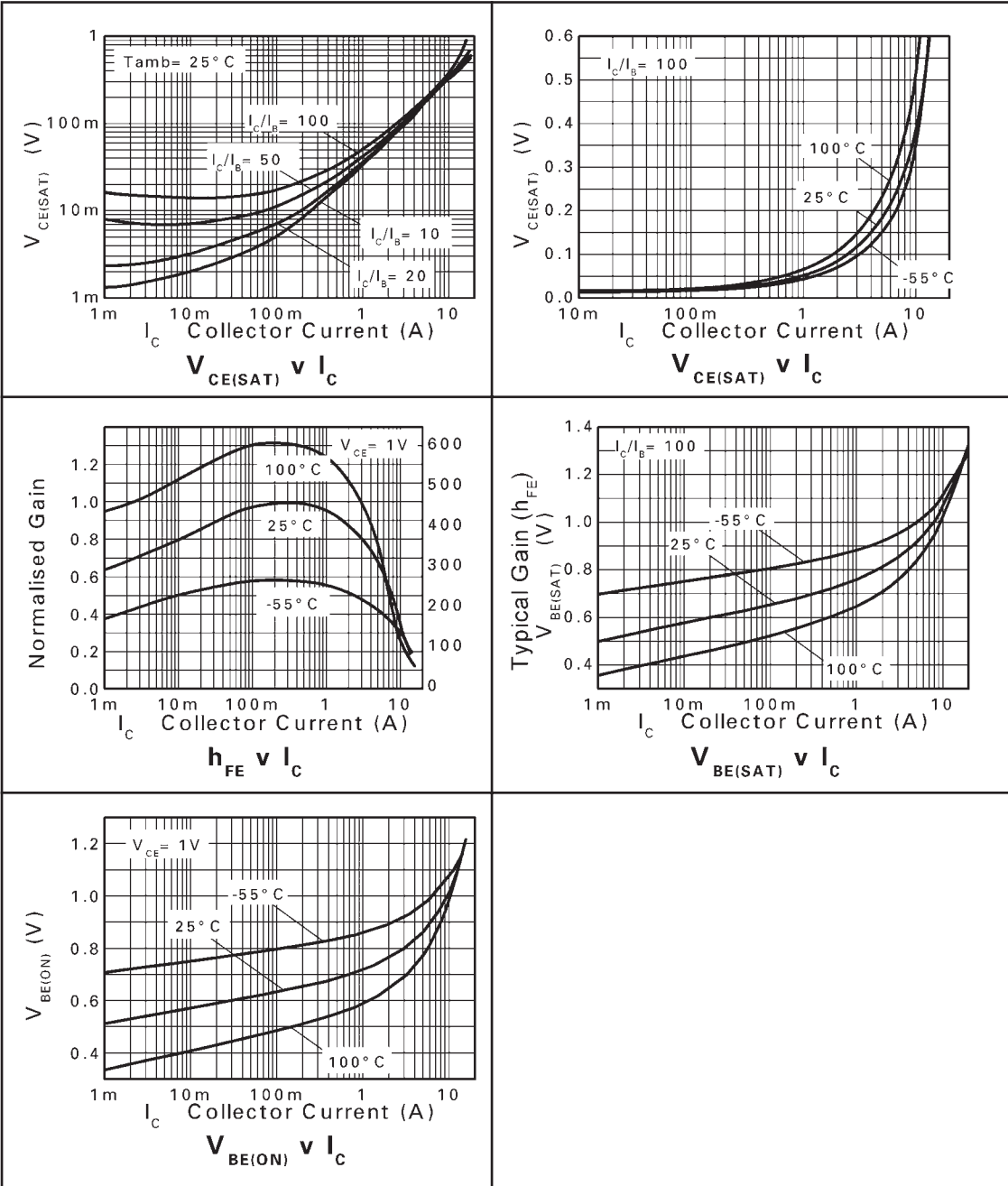
ZXTN2005Z

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} | 60 | 120 | | V | $I_C = 100\mu\text{A}$ |
| Collector-emitter breakdown voltage | BV_{CER} | 60 | 120 | | V | $I_C = 1\mu\text{A}$, $R_B \leq 1\text{k}\Omega$ |
| Collector-emitter breakdown voltage | BV_{CEO} | 25 | 35 | | V | $I_C = 10\text{mA}^*$ |
| Emitter base breakdown voltage | BV_{EBO} | 7.0 | 8.1 | | V | $I_E = 100\mu\text{A}$ |
| Collector cut-off current | I_{CBO} | | | 20 0.5 | nA μA | $V_{CB} = 50\text{V}$ $V_{CB} = 50\text{V}$, $T_{amb}=100^{\circ}\text{C}$ |
| Collector cut-off current | I_{CER} $R \leq 1\text{k}\Omega$ | | | 20 0.5 | nA μA | $V_{CB} = 50\text{V}$ $V_{CB} = 50\text{V}$, $T_{amb}=100^{\circ}\text{C}$ |
| Emitter cut-off current | I_{EBO} | | | 10 | nA | $V_{EB} = 6\text{V}$ |
| Collector-emitter saturation voltage | $V_{CE(SAT)}$ | | 25 30 45 105 160 | 35 45 70 130 200 | mV | $I_C = 500\text{mA}$, $I_B = 10\text{mA}^*$ $I_C = 1\text{A}$, $I_B = 100\text{mA}^*$ $I_C = 1\text{A}$, $I_B = 10\text{mA}^*$ $I_C = 2\text{A}$, $I_B = 10\text{mA}^*$ $I_C = 6.5\text{A}$, $I_B = 150\text{mA}^*$ |
| Base-emitter saturation voltage | $V_{BE(SAT)}$ | | 950 | 1050 | mV | $I_C = 6.5\text{A}$, $I_B = 150\text{mA}^*$ |
| Base-emitter turn on voltage | $V_{BE(ON)}$ | | 860 | 960 | mV | $I_C = 6.5\text{A}$, $V_{CE} = 1\text{V}^*$ |
| Static forward current transfer ratio | h_{FE} | 300 300 200 40 | 400 450 275 55 | | | $I_C = 10\text{mA}$, $V_{CE} = 1\text{V}^*$ $I_C = 1\text{A}$, $V_{CE} = 1\text{V}^*$ $I_C = 7\text{A}$, $V_{CE} = 1\text{V}^*$ $I_C = 20\text{A}$, $V_{CE} = 1\text{V}^*$ |
| Transition frequency | f_T | | 150 | | | $I_C = 100\text{mA}$, $V_{CE} = 10\text{V}$ $f=50\text{MHz}$ |
| Output capacitance | C_{OBO} | | 48 | | pF | $V_{CB} = 10\text{V}$, $f= 1\text{MHz}^*$ |
| Switching times | t_{ON} t_{OFF} | | 33 464 | | ns | $I_C = 1\text{A}$, $V_{CC} = 10\text{V}$, $I_{B1} = -I_{B2} = 100\text{mA}$ |

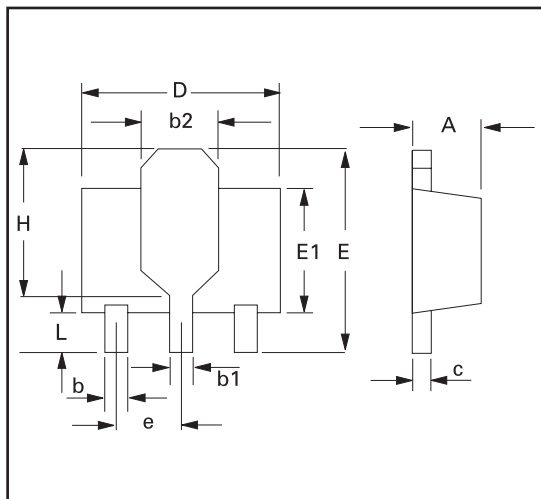
* Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

TYPICAL CHARACTERISTICS



ZXTN2005Z

PACKAGE OUTLINE



PACKAGE DIMENSIONS

| DIM | Millimeters | | Inches | | DIM | Millimeters | | Inches | |
|-----|-------------|------|--------|-------|-----|-------------|------|--------|-------|
| | Min | Max | Min | Max | | Min | Max | Min | Max |
| A | 1.40 | 1.60 | 0.550 | 0.630 | e | 1.40 | 1.50 | 0.055 | 0.059 |
| b | 0.38 | 0.48 | 0.015 | 0.019 | E | 3.75 | 4.25 | 0.150 | 0.167 |
| b1 | - | 0.53 | - | 0.021 | E1 | - | 2.60 | - | 0.102 |
| b2 | 1.50 | 1.80 | 0.060 | 0.071 | G | 2.90 | 3.00 | 0.114 | 0.118 |
| c | 0.28 | 0.44 | 0.011 | 0.017 | H | 2.60 | 2.85 | 0.102 | 0.112 |
| D | 4.40 | 4.60 | 0.173 | 0.181 | - | - | - | - | - |

© Zetex Semiconductors plc 2005

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



ISSUE 2 - JUNE 2005