

ZXTN2005Z

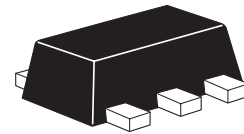
25V NPN LOW SATURATION MEDIUM POWER TRANSISTOR IN SOT89

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.



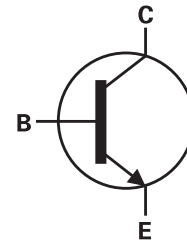
SOT89

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



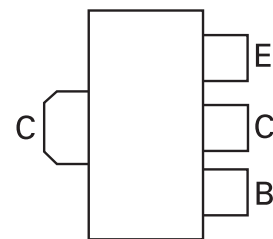
ORDERING INFORMATION

| 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 |

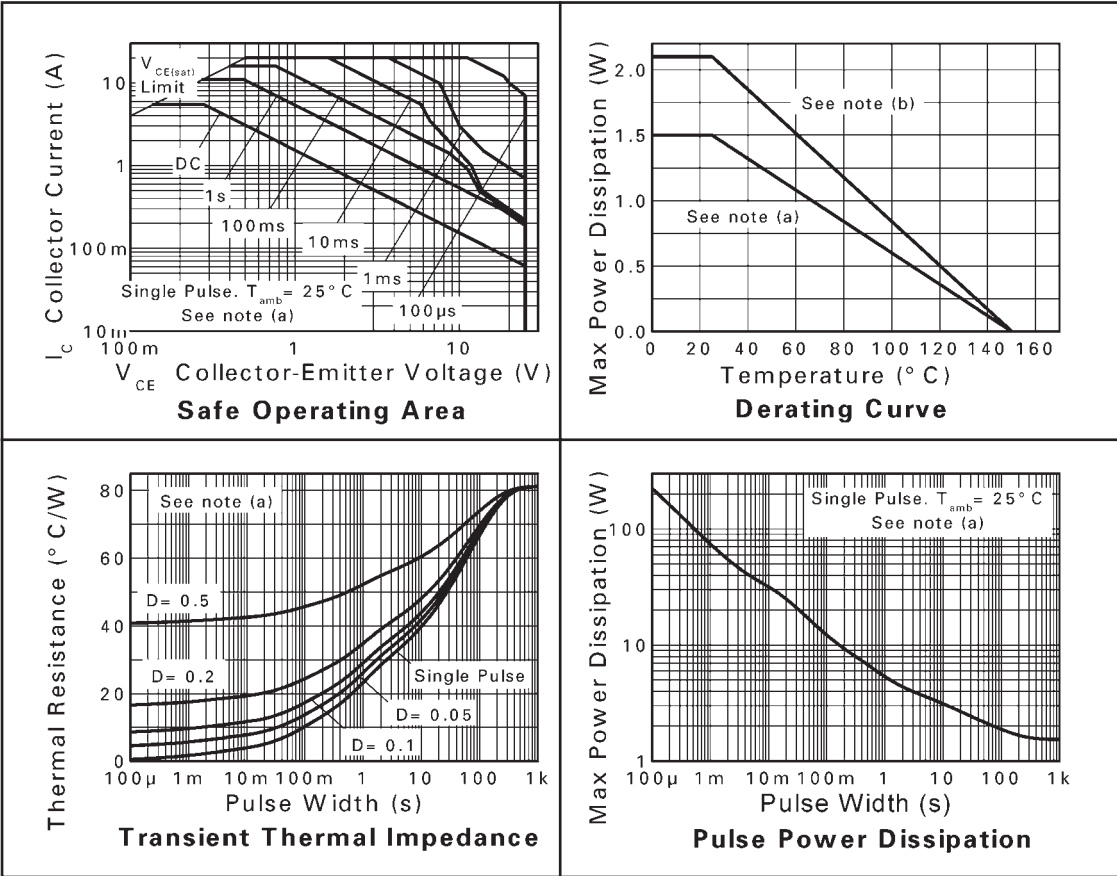
NOTES:

(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



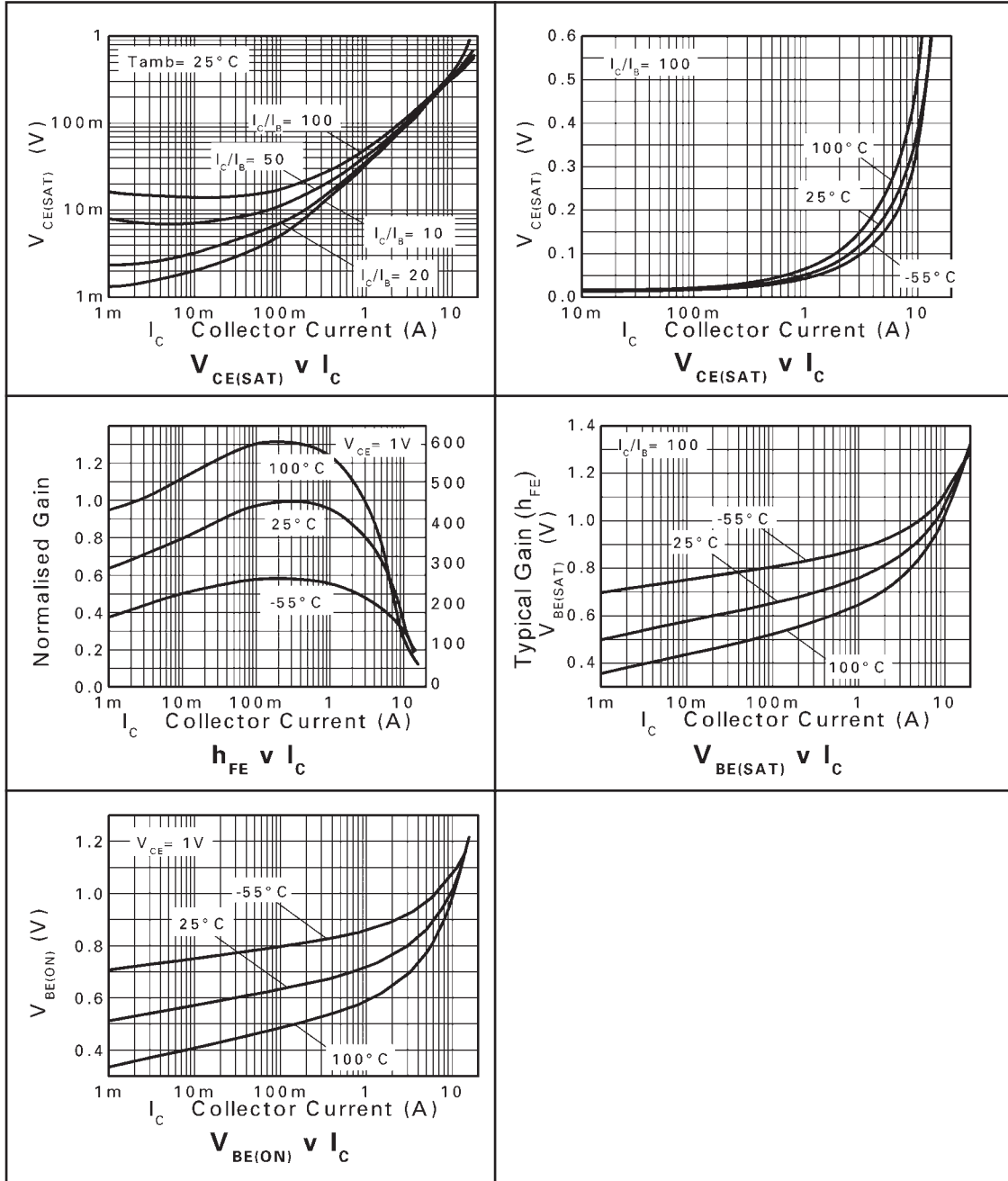
ZXTN2005Z

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 mV mV mV 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 | $I_C = 1\text{A}$, $V_{CC} = 10\text{V}$, $I_{B1} = -I_{B2} = 100\text{mA}$ |

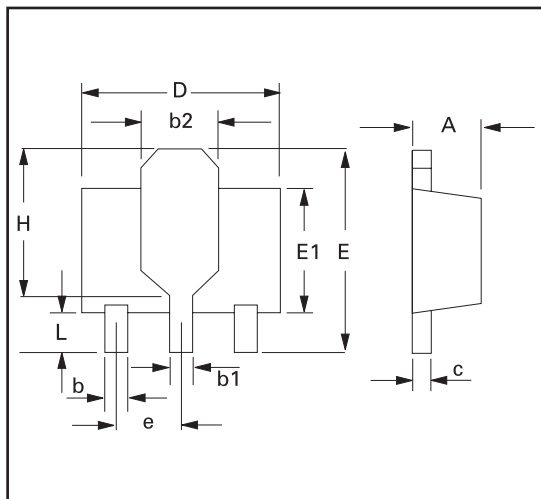
* Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

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 | - | - | - | - | - |

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