

# OBSOLETE

## ALTERNATIVE IS ZXTN2005G

ZX5T869G

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### 25V NPN LOW SATURATION TRANSISTOR IN SOT223

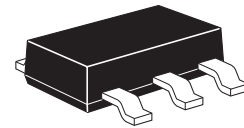
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#### SUMMARY

$BV_{CEO} = 25V$  ;  $R_{SAT} = 30m\Omega$  ;  $I_C = 7A$

#### DESCRIPTION

Packaged in the SOT223 outline this new 5th generation 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.



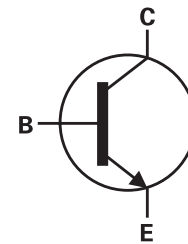
SOT223

#### FEATURES

- Extremely low equivalent on-resistance;  $R_{SAT} = 30m\Omega$  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

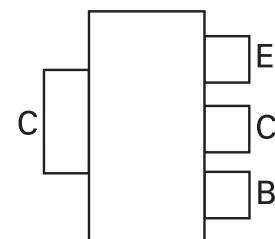
- DC - DC converters
- MOSFET gate drivers
- Charging circuits
- Power switches
- Motor control



#### ORDERING INFORMATION

| DEVICE     | REEL SIZE | TAPE WIDTH    | QUANTITY PER REEL |
|------------|-----------|---------------|-------------------|
| ZX5T869GTA | 7"        | 12mm embossed | 1000 units        |
| ZX5T869GTC | 13"       | 12mm embossed | 4000 units        |

#### PINOUT



TOP VIEW

#### DEVICE MARKING

- X5T869

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#### 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                                 | $I_C$          | 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 |

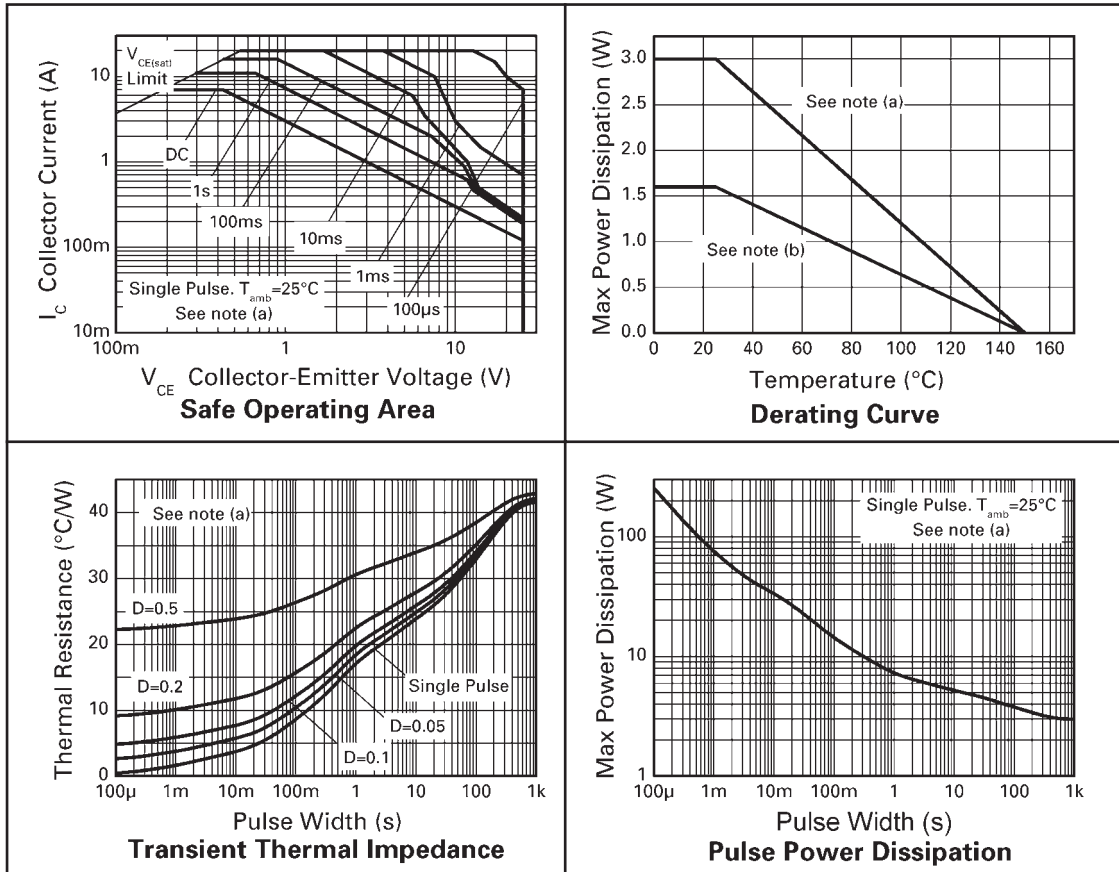
#### NOTES

- (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.

# OBSOLETE ALTERNATIVE IS ZXTN2005G

**ZX5T869G**

## CHARACTERISTICS



# OBSOLETE

## ALTERNATIVE IS ZXTN2005G

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

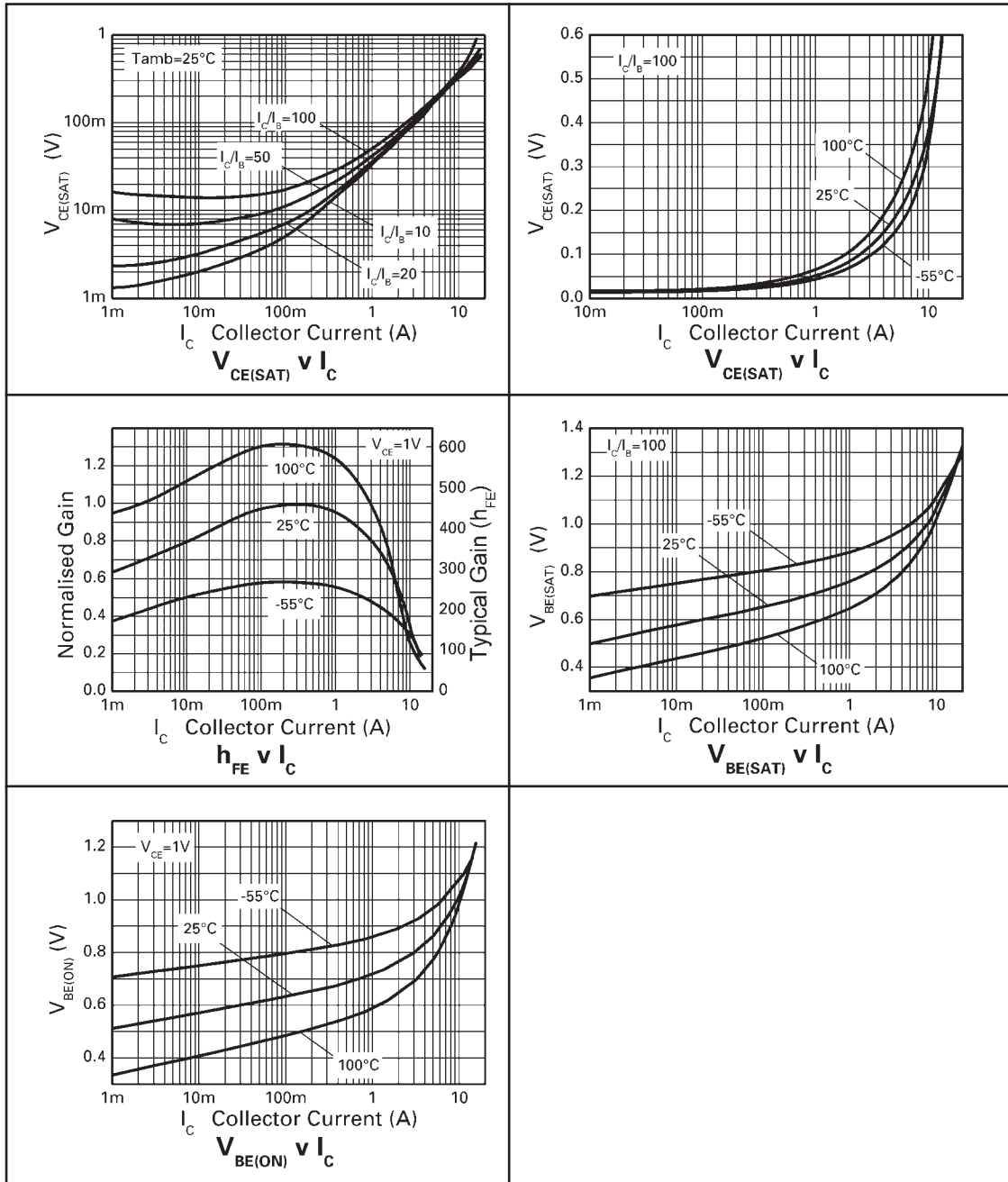
| PARAMETER                             | SYMBOL                               | MIN.                    | TYP.                         | MAX.                         | UNIT                | CONDITIONS   |
|---------------------------------------|--------------------------------------|-------------------------|------------------------------|------------------------------|---------------------|--|
| 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                       | 8.1                          |                              | V                   | $I_E=100\mu\text{A}$   |
| Collector cut-off current             | $I_{CBO}$                            |                         |                              | 20<br>0.5                    | nA<br>$\mu\text{A}$ | $V_{CB}=50\text{V}$<br>$V_{CB}=50\text{V}$ , $T_{amb}=100^{\circ}\text{C}$   |
| Collector cut-off current             | $I_{CER}$<br>$R\leq 1\text{k}\Omega$ |                         |                              | 20<br>0.5                    | nA<br>$\mu\text{A}$ | $V_{CB}=50\text{V}$<br>$V_{CB}=50\text{V}$ , $T_{amb}=100^{\circ}\text{C}$   |
| Emitter cut-off current               | $I_{EBO}$                            |                         |                              | 10                           | nA                  | $V_{EB}=6\text{V}$   |
| Collector-emitter saturation voltage  | $V_{CE(SAT)}$                        |                         | 28<br>35<br>55<br>115<br>195 | 40<br>50<br>75<br>140<br>230 | mV                  | $I_C=500\text{mA}$ , $I_B=10\text{mA}^*$<br>$I_C=1\text{A}$ , $I_B=100\text{mA}^*$<br>$I_C=1\text{A}$ , $I_B=10\text{mA}^*$<br>$I_C=2\text{A}$ , $I_B=10\text{mA}^*$<br>$I_C=6.5\text{A}$ , $I_B=150\text{mA}^*$ |
| Base-emitter saturation voltage       | $V_{BE(SAT)}$                        |                         | 980                          | 1080                         | mV                  | $I_C=6.5\text{A}$ , $I_B=150\text{mA}^*$   |
| Base-emitter turn-on voltage          | $V_{BE(ON)}$                         |                         | 890                          | 980                          | mV                  | $I_C=6.5\text{A}$ , $V_{CE}=1\text{V}^*$   |
| Static forward current transfer ratio | $h_{FE}$                             | 300<br>300<br>200<br>40 | 400<br>450<br>275<br>55      |                              |                     | $I_C=10\text{mA}$ , $V_{CE}=1\text{V}^*$<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                  | $f_T$                                |                         | 150                          |                              |                     | $I_C=100\text{mA}$ , $V_{CE}=10\text{V}$<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>$t_{OFF}$                |                         | 33<br>464                    |                              | 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  $\leq 2\%$ .

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## TYPICAL CHARACTERISTICS

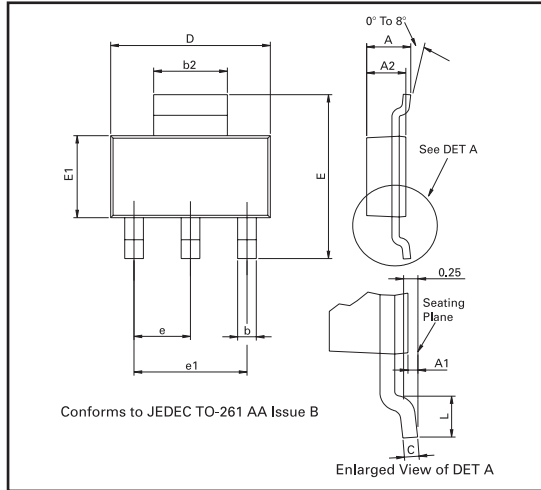


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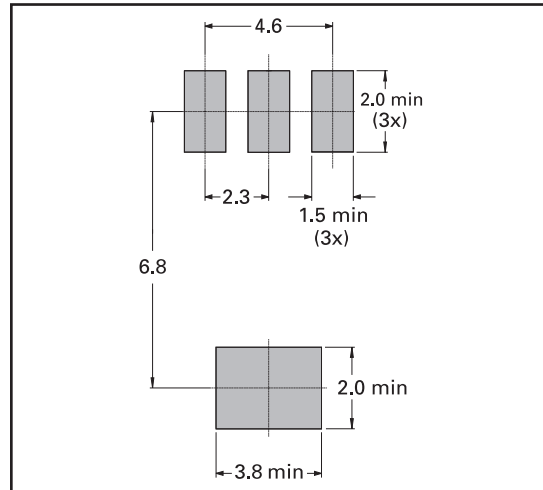
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## ZX5T869G

### 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 | -   | -           | -    | -          | -     |

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