

# NPN SILICON PLANAR MEDIUM POWER HIGH GAIN TRANSISTOR

## ZTX696B

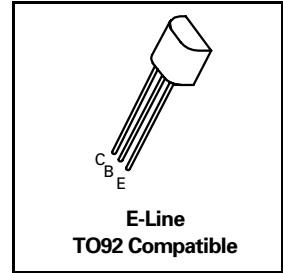
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### FEATURES

- \* 180 Volt  $V_{CE0}$
- \* Gain of 500 at  $I_C=100\text{mA}$
- \* Very low saturation voltage

### APPLICATIONS

- \* Darlington replacement
- \* Battery powered circuits
- \* Motor drivers
- \* Relay / solenoid drivers



### ABSOLUTE MAXIMUM RATINGS.

| PARAMETER  | SYMBOL         | VALUE       | UNIT                      |
|--|----------------|-------------|---------------------------|
| Collector-Base Voltage   | $V_{CBO}$      | 180         | V                         |
| Collector-Emitter Voltage  | $V_{CEO}$      | 180         | V                         |
| Emitter-Base Voltage   | $V_{EBO}$      | 5           | V                         |
| Peak Pulse Current   | $I_{CM}$       | 1           | A                         |
| Continuous Collector Current   | $I_C$          | 0.5         | A                         |
| Practical Power Dissipation *  | $P_{totp}$     | 1.5         | W                         |
| Power Dissipation at $T_{amb}=25^\circ\text{C}$<br>derate above $25^\circ\text{C}$ | $P_{tot}$      | 1<br>5.7    | W<br>mW/ $^\circ\text{C}$ |
| Operating and Storage Temperature Range  | $T_j; T_{stg}$ | -55 to +200 | $^\circ\text{C}$          |

\*The power which can be dissipated assuming the device is mounted in a typical manner on a P.C.B. with copper equal to 1 inch square minimum

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

| PARAMETER                             | SYMBOL        | MIN.       | TYP. | MAX.               | UNIT          | CONDITIONS.   |
|---------------------------------------|---------------|------------|------|--------------------|---------------|---|
| Collector-Base Breakdown Voltage      | $V_{(BR)CBO}$ | 180        |      |                    | V             | $I_C=100\mu\text{A}$  |
| Collector-Emitter Breakdown Voltage   | $V_{(BR)CEO}$ | 180        |      |                    | V             | $I_C=10\text{mA}^*$   |
| Emitter-Base Breakdown Voltage        | $V_{(BR)EBO}$ | 5          |      |                    | V             | $I_E=100\mu\text{A}$  |
| Collector Cut-Off Current             | $I_{CBO}$     |            |      | 0.1                | $\mu\text{A}$ | $V_{CB}=145\text{V}$  |
| Emitter Cut-Off Current               | $I_{EBO}$     |            |      | 0.1                | $\mu\text{A}$ | $V_{EB}=4\text{V}$  |
| Collector-Emitter Saturation Voltage  | $V_{CE(sat)}$ |            |      | 0.2<br>0.2<br>0.25 | V<br>V<br>V   | $I_C=50\text{mA}, I_B=0.5\text{mA}^*$<br>$I_C=100\text{mA}, I_B=2\text{mA}^*$<br>$I_C=200\text{mA}, I_B=5\text{mA}^*$ |
| Base-Emitter Saturation Voltage       | $V_{BE(sat)}$ |            |      | 0.9                | V             | $I_C=200\text{mA}, I_B=5\text{mA}^*$  |
| Base-Emitter Turn-On Voltage          | $V_{BE(on)}$  |            |      | 0.9                | V             | $I_C=200\text{mA}, V_{CE}=5\text{V}^*$  |
| Static Forward Current Transfer Ratio | $h_{FE}$      | 500<br>150 |      |                    |               | $I_C=100\text{mA}, V_{CE}=5\text{V}^*$<br>$I_C=200\text{mA}, V_{CE}=5\text{V}^*$                                      |

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

| PARAMETER            | SYMBOL    | MIN. | TYP. | MAX. | UNIT | CONDITIONS.   |
|----------------------|-----------|------|------|------|------|---|
| Transition Frequency | $f_T$     | 70   |      |      | MHz  | $I_C=50\text{mA}$ , $V_{CE}=5\text{V}$<br>$f=50\text{MHz}$                              |
| Input Capacitance    | $C_{ibo}$ |      | 200  |      | pF   | $V_{EB}=0.5\text{V}$ , $f=1\text{MHz}$  |
| Output Capacitance   | $C_{obo}$ |      | 6    |      | pF   | $V_{CE}=10\text{V}$ , $f=1\text{MHz}$   |
| Switching Times      | $t_{on}$  |      | 80   |      | ns   | $I_C=100\text{mA}$ , $I_{BI}=10\text{mA}$<br>$I_{B2}=10\text{mA}$ , $V_{CC}=50\text{V}$ |
|                      | $t_{off}$ |      | 4400 |      | ns   |   |

\*Measured under pulsed conditions. Pulse width=300 $\mu$ s. Duty cycle  $\leq 2\%$

## THERMAL CHARACTERISTICS

| PARAMETER  | SYMBOL                   | MAX. | UNIT                 |
|--|--------------------------|------|----------------------|
| Thermal Resistance: Junction to Ambient <sub>1</sub> | $R_{th(j-amb)1}$         | 175  | $^{\circ}\text{C/W}$ |
| Junction to Ambient <sub>2</sub>                     | $R_{th(j-amb)2} \dagger$ | 116  | $^{\circ}\text{C/W}$ |
| Junction to Case                                     | $R_{th(j-case)}$         | 70   | $^{\circ}\text{C/W}$ |

$\dagger$  Device mounted on P.C.B. with copper equal to 1 sq. Inch minimum.

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## TYPICAL CHARACTERISTICS

