

# NPN SILICON PLANAR MEDIUM POWER HIGH GAIN TRANSISTOR

**ZTX690B**

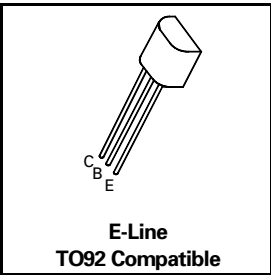
ISSUE 1 – MAY 94

## FEATURES

- \* 45 Volt  $V_{CEO}$
- \* Gain of 400 at  $I_C=1$  Amp
- \* Very low saturation voltage

## APPLICATIONS

- \* Darlington replacement
- \* Siren Drivers
- \* Battery powered circuits
- \* Motor drivers



## ABSOLUTE MAXIMUM RATINGS.

| PARAMETER                                                                | SYMBOL         | VALUE       | UNIT                 |
|--------------------------------------------------------------------------|----------------|-------------|----------------------|
| Collector-Base Voltage                                                   | $V_{CBO}$      | 45          | V                    |
| Collector-Emitter Voltage                                                | $V_{CEO}$      | 45          | V                    |
| Emitter-Base Voltage                                                     | $V_{EBO}$      | 5           | V                    |
| Peak Pulse Current                                                       | $I_{CM}$       | 6           | A                    |
| Continuous Collector Current                                             | $I_C$          | 2           | A                    |
| Practical Power Dissipation*                                             | $P_{totp}$     | 1.5         | W                    |
| Power Dissipation at $T_{amb}=25^{\circ}C$<br>derate above $25^{\circ}C$ | $P_{tot}$      | 1<br>5.7    | W<br>mW/ $^{\circ}C$ |
| Operating and Storage Temperature Range                                  | $T_j; T_{stg}$ | -55 to +200 | $^{\circ}C$          |

\*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 $T_{amb} = 25^{\circ}C$ )

| PARAMETER                             | SYMBOL        | MIN.              | TYP. | MAX.       | UNIT    | CONDITIONS.                                                                |
|---------------------------------------|---------------|-------------------|------|------------|---------|----------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage      | $V_{(BR)CBO}$ | 45                |      |            | V       | $I_C=100\mu A$                                                             |
| Collector-Emitter Breakdown Voltage   | $V_{(BR)CEO}$ | 45                |      |            | V       | $I_C=10mA^*$                                                               |
| Emitter-Base Breakdown Voltage        | $V_{(BR)EBO}$ | 5                 |      |            | V       | $I_E=100\mu A$                                                             |
| Collector Cut-Off Current             | $I_{CBO}$     |                   |      | 0.1        | $\mu A$ | $V_{CB}=35V$                                                               |
| Emitter Cut-Off Current               | $I_{EBO}$     |                   |      | 0.1        | $\mu A$ | $V_{EB}=4V$                                                                |
| Collector-Emitter Saturation Voltage  | $V_{CE(sat)}$ |                   |      | 0.1<br>0.5 | V<br>V  | $I_C=0.1A, I_B=0.5mA^*$<br>$I_C=1A, I_B=5mA^*$                             |
| Base-Emitter Saturation Voltage       | $V_{BE(sat)}$ |                   |      | 0.9        | V       | $I_C=1A, I_B=10mA^*$                                                       |
| Base-Emitter Turn-On Voltage          | $V_{BE(on)}$  |                   |      | 0.9        | V       | $I_C=1A, V_{CE}=2V^*$                                                      |
| Static Forward Current Transfer Ratio | $h_{FE}$      | 500<br>400<br>150 |      |            |         | $I_C=100mA, V_{CE}=2V^*$<br>$I_C=1A, V_{CE}=2V^*$<br>$I_C=2A, V_{CE}=2V^*$ |

# ZTX690B

## ELECTRICAL CHARACTERISTICS (at T<sub>amb</sub> = 25°C)

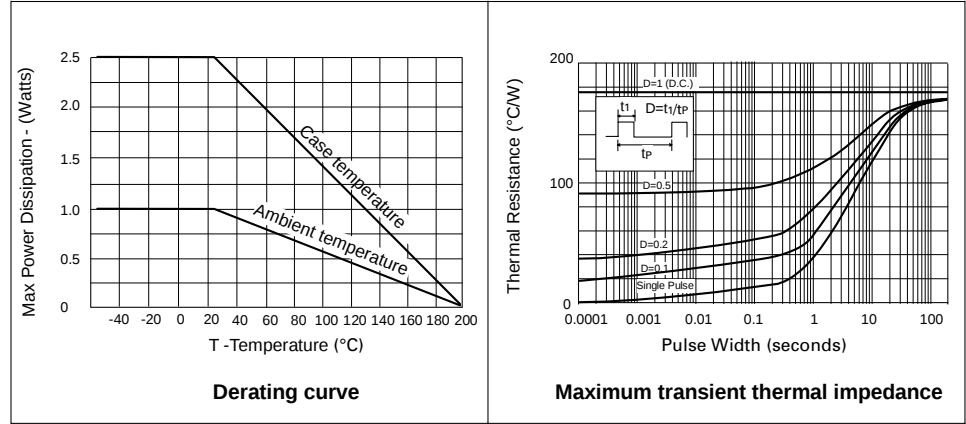
| PARAMETER            | SYMBOL    | MIN. | TYP. | MAX. | UNIT | CONDITIONS.                                                                          |
|----------------------|-----------|------|------|------|------|--------------------------------------------------------------------------------------|
| Transition Frequency | $f_T$     | 150  |      |      | 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   | $C_{obo}$ |      | 16   |      | pF   | $V_{CB}=10\text{V}$ , $f=1\text{MHz}$                                                |
| Switching Times      | $t_{on}$  |      | 33   |      | ns   | $I_C=500\text{mA}$ , $I_B=50\text{mA}$<br>$I_{B2}=50\text{mA}$ , $V_{CC}=10\text{V}$ |
|                      | $t_{off}$ |      | 1300 |      | ns   |                                                                                      |

\*Measured under pulsed conditions. Pulse width=300μs. Duty cycle ≤2%

## THERMAL CHARACTERISTICS

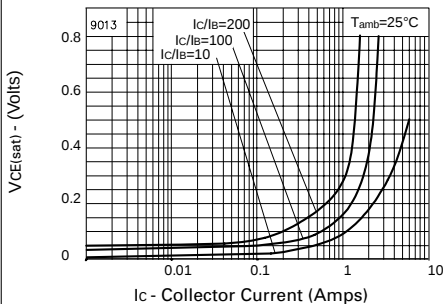
| PARAMETER                                            | SYMBOL                   | MAX. | UNIT |
|------------------------------------------------------|--------------------------|------|------|
| Thermal Resistance: Junction to Ambient <sub>1</sub> | $R_{th(j-amb)1}$         | 175  | °C/W |
| Junction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

† Device mounted on P.C.B. with copper equal to 1 sq. Inch minimum.

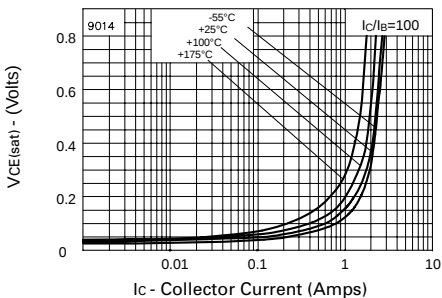


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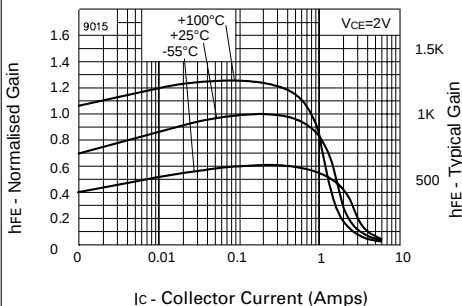
## TYPICAL CHARACTERISTICS



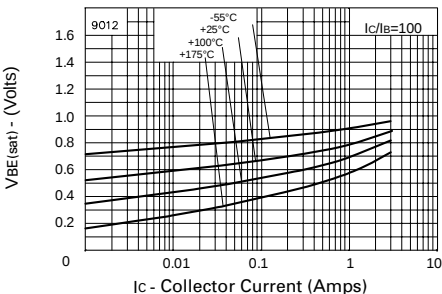
$V_{CE(sat)}$  v  $I_C$



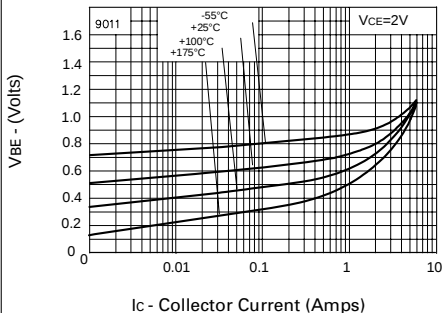
$V_{CE(sat)}$  v  $I_C$



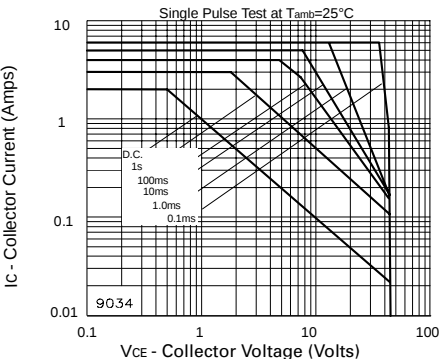
$h_{FE}$  v  $I_C$



$V_{BE(sat)}$  v  $I_C$



$V_{BE(on)}$  v  $I_C$



Safe Operating Area

# AMEYA360

## Components Supply Platform

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