# NPN SILICON PLANAR MEDIUM POWER HIGH GAIN TRANSISTOR

# FXT690B

**ISSUE 1 – MAY 94**

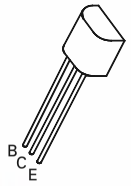
FEATURES

* 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

REFER TO ZTX690B FOR GRAPHS




**E-Line**
**TO92 Compatible**

## 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°C<br>derate above 25°C | $P_{tot}$ | 1<br>5.7 | W<br>mW/°C |
| Operating and Storage Temperature Range | $T_j$:$T_{stg}$ | -55 to +200 | °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°C)

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS. |
|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | 45 | | | V | $I_C$=100μA |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | 45 | | | V | $I_C$=10mA* |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | 5 | | | V | $I_E$=100μA |
| Collector Cut-Off Current | $I_{CBO}$ | | | 0.1 | μA | $V_{CB}$=35V |
| Emitter Cut-Off Current | $I_{EBO}$ | | | 0.1 | μA | $V_{EB}$=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 | IC=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* |





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## ELECTRICAL CHARACTERISTICS (at $T_{amb}$ = 25°C)

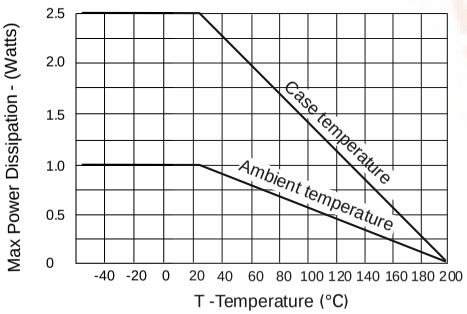
| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS. |
|---|---|---|---|---|---|---|
| Transition Frequency | $f_T$ | 150 | | | MHz | $I_C$=50mA, $V_{CE}$=5V<br>f=50MHz |
| Input Capacitance | $C_{ibo}$ | | 200 | | pF | $V_{EB}$=0.5V, f=1MHz |
| Output Capacitance | $C_{obo}$ | | 16 | | pF | $V_{CB}$=10V, f=1MHz |
| Switching Times | $t_{on}$<br>$t_{off}$ | | 33<br>1300 | | ns<br>ns | $I_C$=500mA, $I_{B1}$=50mA<br>$I_{B2}$=50mA, $V_{CC}$=10V |

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

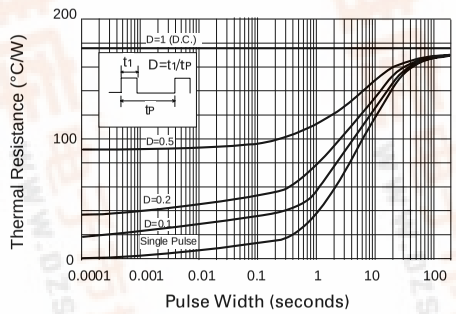
## THERMAL CHARACTERISTICS

| PARAMETER | SYMBOL | MAX. | UNIT |
|---|---|---|---|
| Thermal Resistance:Junction to Ambient$_1$ | $R_{th(j\text{-}amb)1}$ | 175 | °C/W |
| Junction to Ambient$_2$ | $R_{th(j\text{-}amb)2}$† | 116 | °C/W |
| Junction to Case | $R_{th(j\text{-}case)}$ | 70 | °C/W |

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




**Derating curve**




**Maximum transient thermal impedance**

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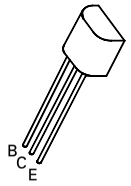


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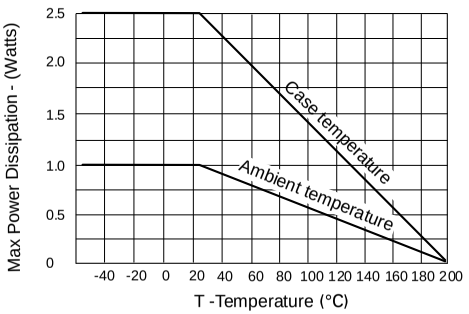


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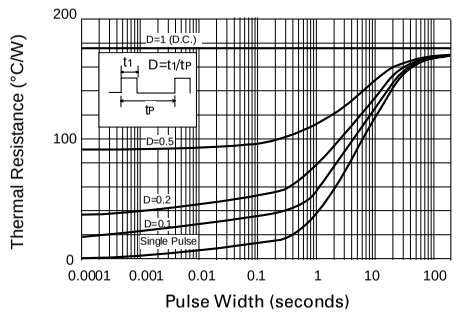


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