# NPN SILICON PLANAR HIGH SPEED SWITCHING TRANSISTORS

**ZTX320 ZTX321 ZTX322 ZTX323**

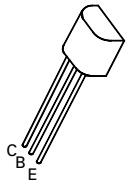
**ISSUE 3 – APRIL 94**

FEATURES

* 15 Volt $V_{CEO}$
* $f_T$=600 MHz

APPLICATIONS

* VHF/UHF operation




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

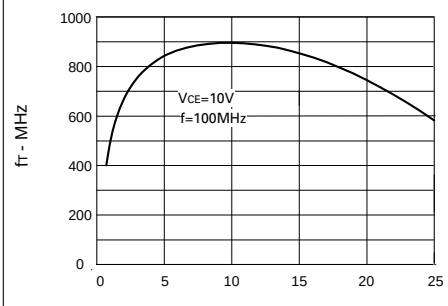
## ABSOLUTE MAXIMUM RATINGS.

| PARAMETER | SYMBOL | VALUE | UNIT |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | 30 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | 15 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 3 | V |
| Base Current | $I_B$ | 100 | mA |
| Continuous Collector Current | $I_C$ | 500 | mA |
| Power Dissipation at $T_{amb}$=25°C | $P_{tot}$ | 300 | mW |
| Operating and Storage Temperature Range | $T_j$:$T_{stg}$ | -55 to +175 | °C |

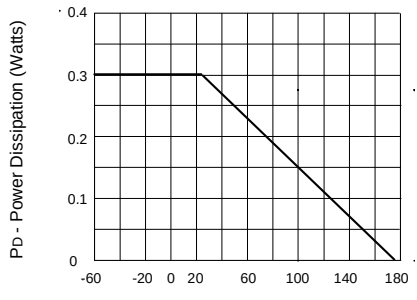
## ELECTRICAL CHARACTERISTICS (at $T_{amb}$ = 25°C).

| PARAMETER | | SYMBOL | MIN. | MAX. | UNIT | CONDITIONS. |
|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | | $V_{(BR)CBO}$ | 30 | | V | $I_C$=10μA, $I_E$=0 |
| Collector-Emitter Sustaining Voltage | | $V_{CEO(SUS)}$ | 15 | | V | $I_C$=10mA, $I_B$=0 |
| Emitter-Base Breakdown Voltage | | $V_{(BR)EBO}$ | 3 | | V | $I_E$=10μA, $I_C$=0 |
| Collector Cut-Off Current | | $I_{CBO}$ | | 0.01 | μA | $V_{CB}$=15V, $I_E$=0 |
| Emitter Cut-Off Current | | $I_{EBO}$ | | 0.2 | μA | $V_{EB}$=2V, $I_C$=0 |
| Collector-Emitter Saturation Voltage | ZTX320, ZTX322<br>ZTX323<br>ZTX321 | $V_{CE(sat)}$ | | 0.4<br>0.4<br>0.4 | V<br>V<br>V | $I_C$=10mA, $I_B$=1mA<br>$I_C$=10mA, $I_B$=1mA<br>$I_C$=3mA, $I_B$=0.3mA |
| Base-Emitter Saturation Voltage | ZTX320, ZTX322<br>ZTX323<br>ZTX321 | $V_{BE(sat)}$ | | 1.0<br>1.0<br>1.0 | V<br>V<br>V | $I_C$=10mA, $I_B$=1mA<br>$I_C$=10mA, $I_B$=1mA<br>$I_C$=3mA, $I_B$=0.3mA |
| Static Forward Current Transfer Ratio | ZTX320, ZTX321<br>ZTX322<br>ZTX323 | $h_{FE}$ | 20<br>20<br>100 | 300<br>150<br>300 | | $I_C$=3mA, $V_{CE}$=1V<br>$I_C$=3mA, $V_{CE}$=1V<br>$I_C$=3mA, $V_{CE}$=1V |
| Output Capacitance | | $C_{obo}$ | | 1.7 | pF | $V_{CB}$=10V, f=1MHz |
| Input Capacitance | | $C_{ibo}$ | | 1.6 | pF | $V_{EB}$=0.5V, f=1MHz |
| Transition Frequency at f=100MHz | | $f_T$ | 600<br>400 | | MHz<br>MHz | $I_C$=4mA, $V_{CE}$=10V<br>$I_C$=30mA, $V_{CE}$=10V |
| Noise Figure | | N | | 6 | dB | $I_E$=1mA, $V_{CE}$=6V<br>$R_S$=400Ω, f=60MHz |
| Power Gain | | $g_{pe}$ | typical 15 | | dB | $I_C$=6mA, $V_{CB}$=12V<br>f=200MHz |

## TYPICAL CHARACTERISTICS




**fT v Ic**




**Derating Curve**