

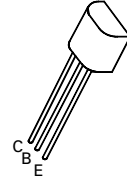
# PNP SILICON PLANAR MEDIUM POWER HIGH CURRENT TRANSISTOR

ISSUE 3 – JUNE 94

## ZTX957

### FEATURES

- \* 1 Amp continuous current
- \* Up to 2 Amps peak current
- \* Very low saturation voltage
- \* Excellent gain characteristics up to 1 Amp
- \* Spice model available



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

### ABSOLUTE MAXIMUM RATINGS.

| PARAMETER                                  | SYMBOL         | VALUE       | UNIT        |
|--------------------------------------------|----------------|-------------|-------------|
| Collector-Base Voltage                     | $V_{CBO}$      | -330        | V           |
| Collector-Emitter Voltage                  | $V_{CEO}$      | -300        | V           |
| Emitter-Base Voltage                       | $V_{EBO}$      | -6          | V           |
| Peak Pulse Current                         | $I_{CM}$       | -2          | A           |
| Continuous Collector Current               | $I_C$          | -1          | A           |
| Practical Power Dissipation*               | $P_{totp}$     | 1.58        | W           |
| Power Dissipation at $T_{amb}=25^{\circ}C$ | $P_{tot}$      | 1.2         | W           |
| 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 $T_{amb} = 25^{\circ}C$ unless otherwise stated)

| PARAMETER                            | SYMBOL                         | MIN. | TYP.                | MAX.                 | UNIT           | CONDITIONS.                                                                                    |
|--------------------------------------|--------------------------------|------|---------------------|----------------------|----------------|------------------------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$                  | -330 | -440                |                      | V              | $I_C = -100\mu A$                                                                              |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CER}$                  | -330 | -440                |                      | V              | $I_C = -1\mu A, R_B \leq 1K\Omega$                                                             |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$                  | -300 | -400                |                      | V              | $I_C = -10mA^*$                                                                                |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$                  | -6   | -8                  |                      | V              | $I_E = -100\mu A$                                                                              |
| Collector Cut-Off Current            | $I_{CBO}$                      |      |                     | -50<br>-1            | nA<br>$\mu A$  | $V_{CB} = -300V$<br>$V_{CB} = -300V, T_{amb} = 100^{\circ}C$                                   |
| Collector Cut-Off Current            | $I_{CER}$<br>$R \leq 1K\Omega$ |      |                     | -50<br>-1            | nA<br>$\mu A$  | $V_{CB} = -300V$<br>$V_{CB} = -300V, T_{amb} = 100^{\circ}C$                                   |
| Emitter Cut-Off Current              | $I_{EBO}$                      |      |                     | -10                  | nA             | $V_{EB} = -6V$                                                                                 |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$                  |      | -60<br>-100<br>-140 | -100<br>-150<br>-200 | mV<br>mV<br>mV | $I_C = -100mA, I_B = -10mA^*$<br>$I_C = -500mA, I_B = -100mA^*$<br>$I_C = -1A, I_B = -300mA^*$ |
| Base-Emitter Saturation Voltage      | $V_{BE(sat)}$                  |      | -870                | -1000                | mV             | $I_C = -1A, I_B = -300mA^*$                                                                    |

# ZTX957

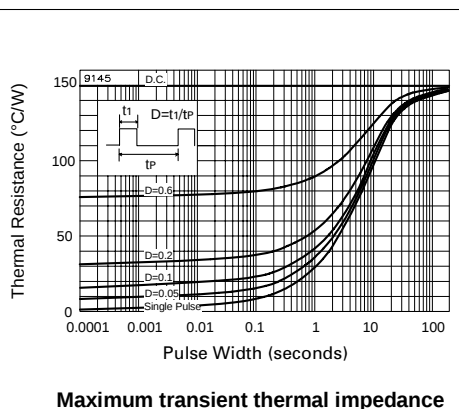
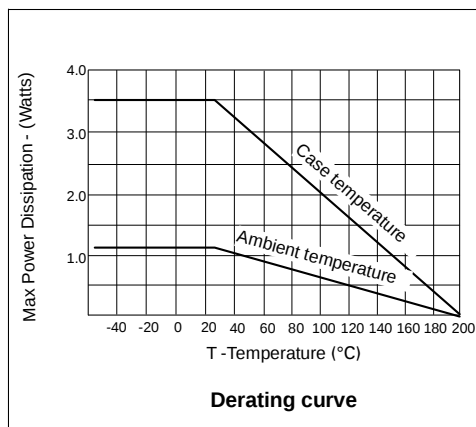
## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ )

| PARAMETER                             | SYMBOL                | MIN.             | TYP.                    | MAX. | UNIT     | CONDITIONS.                                                                                                                                                                                          |
|---------------------------------------|-----------------------|------------------|-------------------------|------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Base-Emitter Turn-On Voltage          | $V_{BE(on)}$          |                  | -710                    | -850 | mV       | $I_C = -1\text{A}$ , $V_{CE} = -10\text{V}^*$                                                                                                                                                        |
| Static Forward Current Transfer Ratio | $h_{FE}$              | 100<br>100<br>90 | 200<br>200<br>170<br>10 | 300  |          | $I_C = -10\text{mA}$ , $V_{CE} = -10\text{V}^*$<br>$I_C = -0.5\text{A}$ , $V_{CE} = -10\text{V}^*$<br>$I_C = -1\text{A}$ , $V_{CE} = -10\text{V}^*$<br>$I_C = -2\text{A}$ , $V_{CE} = -10\text{V}^*$ |
| Transition Frequency                  | $f_T$                 |                  | 85                      |      | MHz      | $I_C = -100\text{mA}$ , $V_{CE} = -10\text{V}$<br>$f = 50\text{MHz}$                                                                                                                                 |
| Output Capacitance                    | $C_{obo}$             |                  | 23                      |      | pF       | $V_{CB} = -20\text{V}$ , $f = 1\text{MHz}$                                                                                                                                                           |
| Switching Times                       | $t_{on}$<br>$t_{off}$ |                  | 108<br>2500             |      | ns<br>ns | $I_C = -500\text{mA}$ , $I_{B1} = -50\text{mA}$<br>$I_{B2} = 50\text{mA}$ , $V_{CC} = -100\text{V}$                                                                                                  |

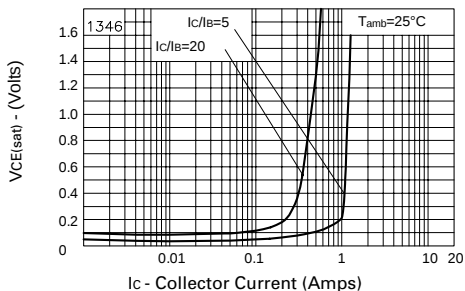
\*Measured under pulsed conditions. Pulse width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$

## THERMAL CHARACTERISTICS

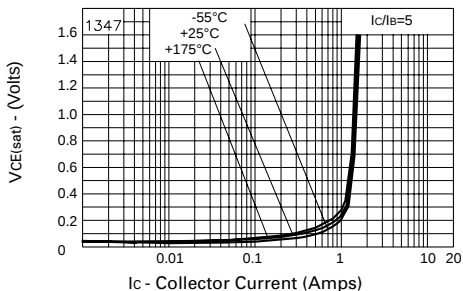
| PARAMETER                               | SYMBOL           | MAX. | UNIT                 |
|-----------------------------------------|------------------|------|----------------------|
| Thermal Resistance: Junction to Ambient | $R_{th(j-amb)}$  | 150  | $^{\circ}\text{C/W}$ |
| Junction to Case                        | $R_{th(j-case)}$ | 50   | $^{\circ}\text{C/W}$ |



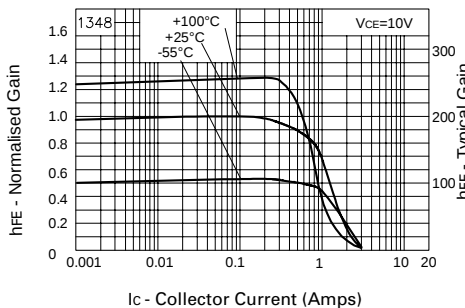
TYPICAL CHARACTERISTICS



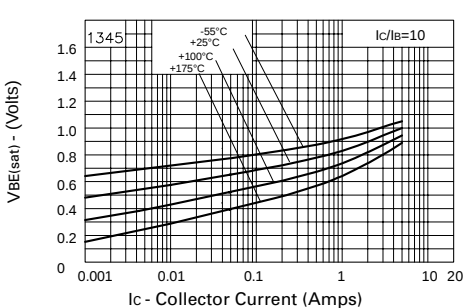
$V_{CE(sat)}$  v  $I_C$



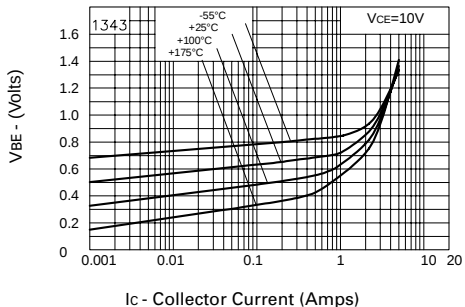
$V_{CE(sat)}$  v  $I_C$



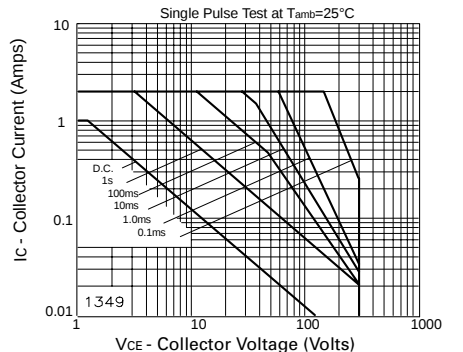
$h_{FE}$  v  $I_C$



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



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



Safe Operating Area