

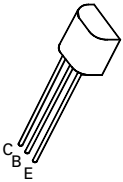
# PNP SILICON PLANAR MEDIUM POWER HIGH CURRENT TRANSISTOR

ISSUE 3 – JUNE 94

**ZTX958**

## FEATURES

- \* 0.5 Amp continuous current
- \* Up to 1.5 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                     | $V_{CBO}$     | -400        | V           |
| Collector-Emitter Voltage                  | $V_{CEO}$     | -400        | V           |
| Emitter-Base Voltage                       | $V_{EBO}$     | -6          | V           |
| Peak Pulse Current                         | $I_{CM}$      | -1.5        | A           |
| Continuous Collector Current               | $I_C$         | -0.5        | 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     | $V_{(BR)CBO}$                  | -400 | -600                 |                      | V              | $I_C = -100\mu A$                                                                                    |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CER}$                  | -400 | -600                 |                      | V              | $I_C = -1\mu A$ , $R_B \leq 1K\Omega$                                                                |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$                  | -400 | -550                 |                      | 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 | $V_{CE(sat)}$                  |      | -100<br>-150<br>-300 | -150<br>-200<br>-400 | mV<br>mV<br>mV | $I_C = 10mA$ , $I_B = -1mA^*$<br>$I_C = 100mA$ , $I_B = -10mA^*$<br>$I_C = 500mA$ , $I_B = -100mA^*$ |
| Base-Emitter Saturation Voltage      | $V_{BE(sat)}$                  |      | -790                 | -900                 | mV             | $I_C = 500mA$ , $I_B = -100mA^*$                                                                     |

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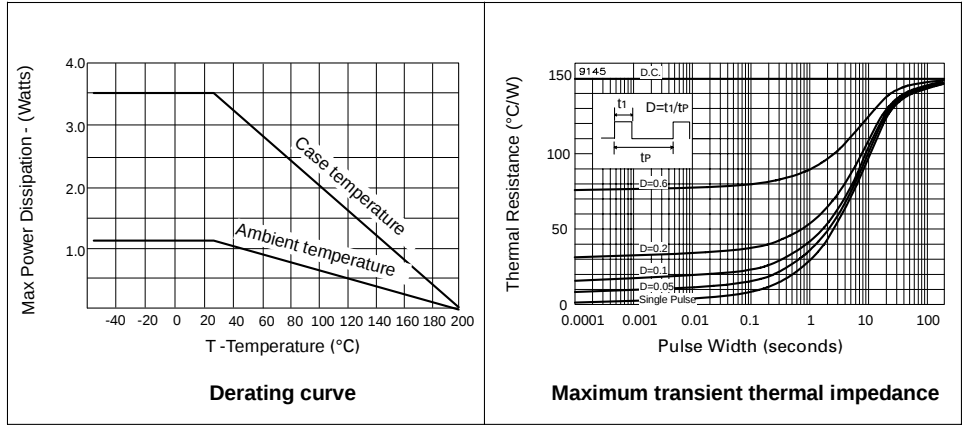
## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ )

| PARAMETER                             | SYMBOL                | MIN.             | TYP.             | MAX. | UNIT     | CONDITIONS.                                                                                                                                          |
|---------------------------------------|-----------------------|------------------|------------------|------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Base-Emitter Turn-On Voltage          | $V_{BE(on)}$          |                  | -690             | -800 | mV       | $I_C = -500\text{mA}$ , $V_{CE} = -10\text{V}^*$                                                                                                     |
| Static Forward Current Transfer Ratio | $h_{FE}$              | 100<br>100<br>10 | 200<br>200<br>20 | 300  |          | $I_C = -10\text{mA}$ , $V_{CE} = -10\text{V}^*$<br>$I_C = -500\text{mA}$ , $V_{CE} = -10\text{V}^*$<br>$I_C = -1\text{A}$ , $V_{CE} = -10\text{V}^*$ |
| Transition Frequency                  | $f_T$                 |                  | 85               |      | MHz      | $I_C = -100\text{mA}$ , $V_{CE} = -10\text{V}$<br>$f = 50\text{MHz}$                                                                                 |
| Output Capacitance                    | $C_{obo}$             |                  | 19               |      | pF       | $V_{CB} = -20\text{V}$ , $f = 1\text{MHz}$                                                                                                           |
| Switching Times                       | $t_{on}$<br>$t_{off}$ |                  | 104<br>2400      |      | 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  $\leq 2\%$

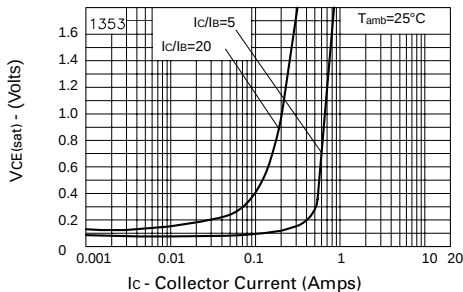
## THERMAL CHARACTERISTICS

| 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   | $^{\circ}\text{C/W}$ |

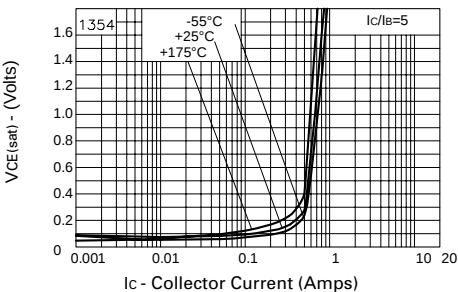


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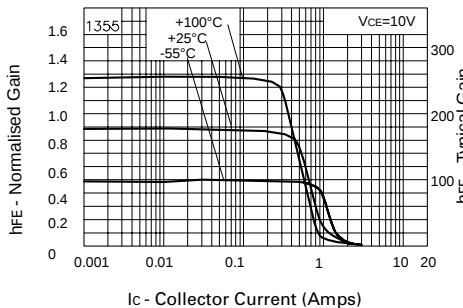
## TYPICAL CHARACTERISTICS



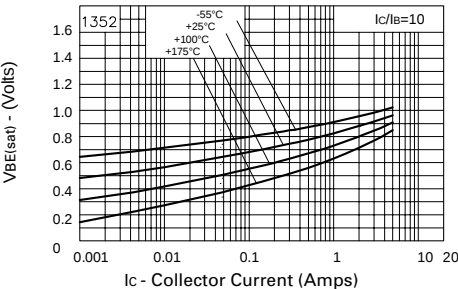
**$V_{CE(sat)}$  v  $I_C$**



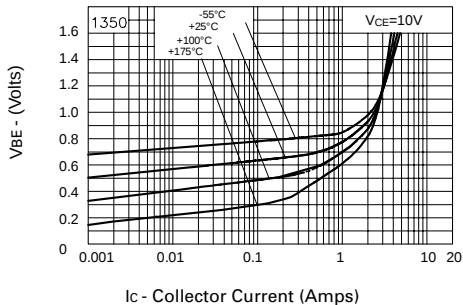
**$V_{CE(sat)}$  v  $I_C$**



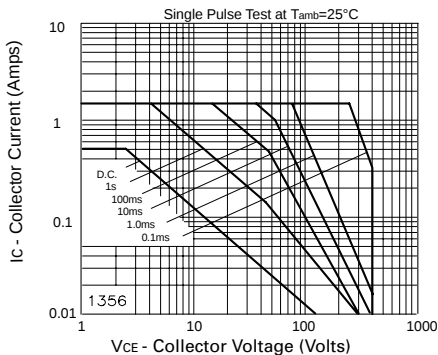
**$h_{FE}$  v  $I_C$**



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



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



**Safe Operating Area**