

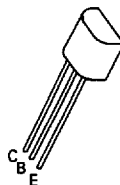
# NPN SILICON PLANAR MEDIUM POWER HIGH VOLTAGE TRANSISTOR

## ZTX458

ISSUE 2 – MARCH 1994

### FEATURES

- \* 400 Volt  $V_{CEO}$
- \* 0.5 Amp continuous current
- \*  $P_{tot} = 1$  Watt



E-Line

TO92 Compatible

### ABSOLUTE MAXIMUM RATINGS.

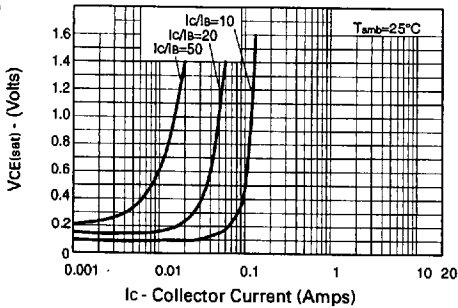
| PARAMETER                                  | SYMBOL         | VALUE       | UNIT        |
|--------------------------------------------|----------------|-------------|-------------|
| Collector-Base Voltage                     | $V_{CBO}$      | 400         | V           |
| Collector-Emitter Voltage                  | $V_{CEO}$      | 400         | V           |
| Emitter-Base Voltage                       | $V_{EBO}$      | 5           | V           |
| Continuous Collector Current               | $I_C$          | 300         | mA          |
| Power Dissipation at $T_{amb}=25^{\circ}C$ | $P_{tot}$      | 1           | W           |
| Operating and Storage Temperature Range    | $T_j; T_{stg}$ | -55 to +200 | $^{\circ}C$ |

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

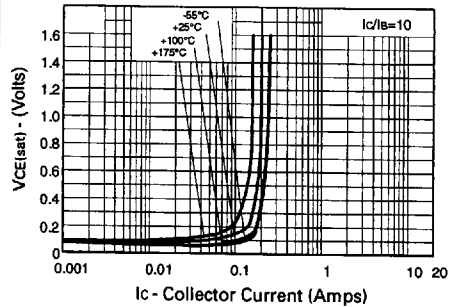
| PARAMETER                             | SYMBOL                | MIN.             | TYP.        | MAX.       | UNIT     | CONDITIONS.                                                                  |
|---------------------------------------|-----------------------|------------------|-------------|------------|----------|------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage      | $V_{(BR)CBO}$         | 400              |             |            | V        | $I_C=100\mu A$                                                               |
| Collector-Emitter Breakdown Voltage   | $V_{CEO(sus)}$        | 400              |             |            | V        | $I_C=10mA^*$                                                                 |
| Emitter-Base Breakdown Voltage        | $V_{(BR)EBO}$         | 5                |             |            | V        | $I_E=100\mu A$                                                               |
| Collector Cut-Off Current             | $I_{CBO}$             |                  |             | 100        | nA       | $V_{CB}=320V$                                                                |
| Collector Cut-Off Current             | $I_{CES}$             |                  |             | 100        | nA       | $V_{CE}=320V$                                                                |
| Emitter Cut-Off Current               | $I_{EBO}$             |                  |             | 100        | nA       | $V_{EB}=4V$                                                                  |
| Collector-Emitter Saturation Voltage  | $V_{CE(sat)}$         |                  |             | 0.2<br>0.5 | V<br>V   | $I_C=20mA, I_B=2mA$<br>$I_C=50mA, I_B=6mA$                                   |
| Base-Emitter Saturation Voltage       | $V_{BE(sat)}$         |                  |             | 0.9        | V        | $I_C=50mA, I_B=5mA$                                                          |
| Base-Emitter Turn On Voltage          | $V_{BE(on)}$          |                  |             | 0.9        | V        | $I_C=50mA, V_{CE}=10V$                                                       |
| Static Forward Current Transfer Ratio | $h_{FE}$              | 100<br>100<br>15 |             | 300        |          | $I_C=1mA, V_{CE}=10V$<br>$I_C=50mA, V_{CE}=10V$<br>$I_C=100mA, V_{CE}=10V^*$ |
| Transition Frequency                  | $f_T$                 | 50               |             |            | MHz      | $I_C=10mA, V_{CE}=20V$<br>$f=20MHz$                                          |
| Collector-Base Breakdown Voltage      | $C_{obo}$             |                  |             | 5          | pF       | $V_{CB}=20V, f=1MHz$                                                         |
| Switching times                       | $t_{on}$<br>$t_{off}$ |                  | 135<br>2260 |            | ns<br>ns | $I_C=50mA, V_{CE}=100V$<br>$I_{B1}=5mA, I_{B2}=-10mA$                        |

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

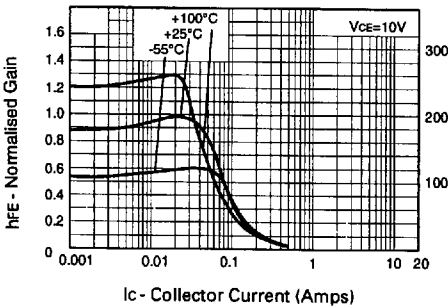
## TYPICAL CHARACTERISTICS



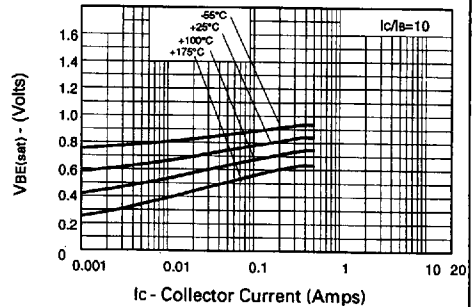
**$V_{CE(sat)}$  v  $I_C$**



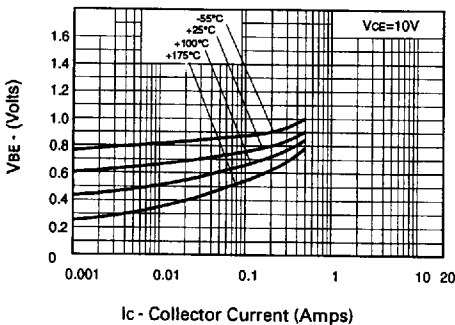
**$V_{CE(sat)}$  v  $I_C$**



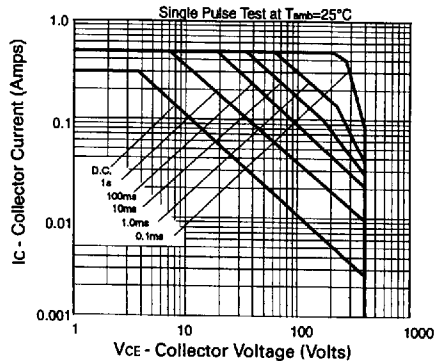
**$h_{FE}$  v  $I_C$**



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



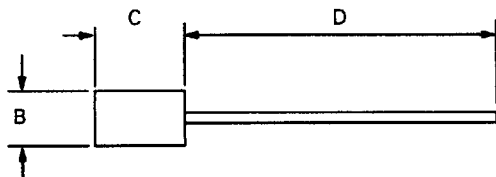
**$V_{BE(on)}$  v  $I_C$**



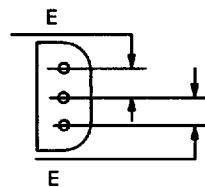
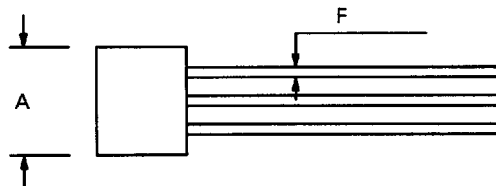
**Safe Operating Area**

# E-Line Package Dimensions

## 3 Pin Device



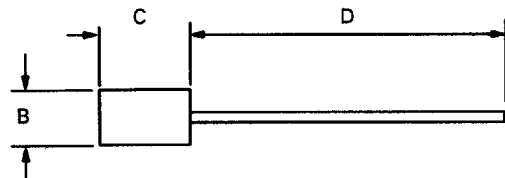
| DIM | Millimeters |       | Inches   |        |
|-----|-------------|-------|----------|--------|
|     | Min         | Max   | Min      | Max    |
| A   | 4.37        | 4.77  | 0.172    | 0.188  |
| B   | 2.16        | 2.41  | 0.085    | 0.095  |
| C   | 3.61        | 4.01  | 0.142    | 0.158  |
| D   | 13.00       | 13.97 | 0.512    | 0.550  |
| E   | NOM 1.27    |       | NOM 0.05 |        |
| F   | 0.37        | 0.495 | 0.016    | 0.0195 |



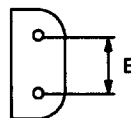
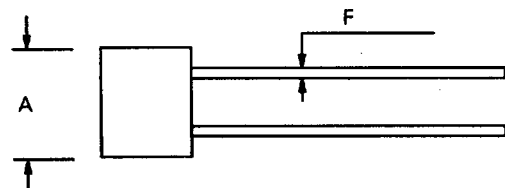
Leads to pass through a hole 0.7mm dia.

Various lead forms are offered, details of which are available on request.

## 2 Pin Device

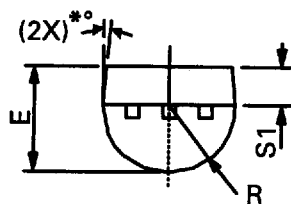
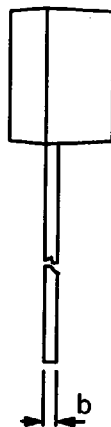
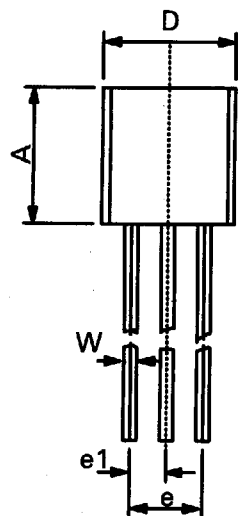


| DIM | Millimeters |       | Inches   |        |
|-----|-------------|-------|----------|--------|
|     | Min         | Max   | Min      | Max    |
| A   | 4.37        | 4.77  | 0.172    | 0.188  |
| B   | 2.16        | 2.41  | 0.085    | 0.095  |
| C   | 3.61        | 4.01  | 0.142    | 0.158  |
| D   | 13.00       | 13.97 | 0.512    | 0.550  |
| E   | NOM 2.54    |       | NOM 0.10 |        |
| F   | 0.37        | 0.495 | 0.016    | 0.0195 |



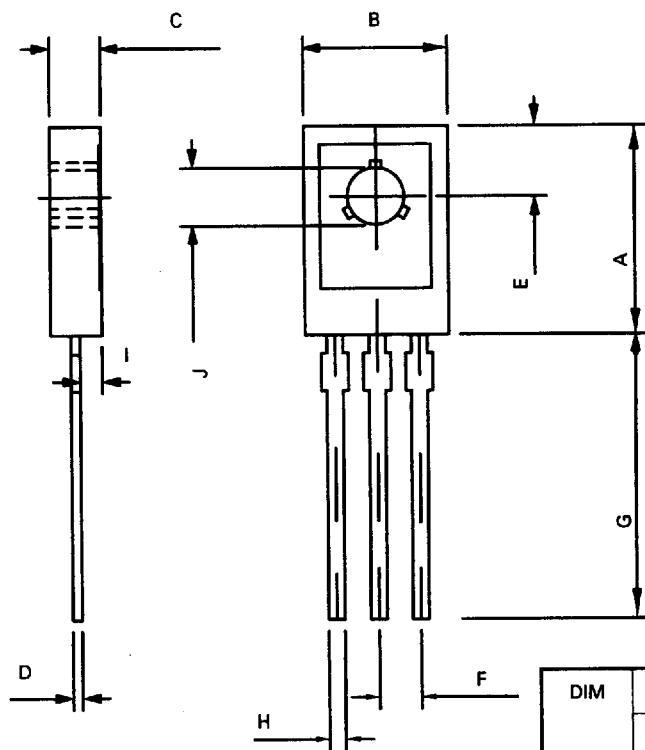
Leads to pass through a hole 0.7mm dia.

# T092 Package Dimensions



| DIM | Millimeters |       | Inches |       |
|-----|-------------|-------|--------|-------|
|     | Min         | Max   | Min    | Max   |
| A   | 4.32        | 4.95  | 0.170  | 0.195 |
| b   | 0.36        | 0.51  | 0.014  | 0.020 |
| E   | 3.30        | 3.94  | 0.130  | 0.155 |
| e   | 2.41        | 2.67  | 0.095  | 0.105 |
| e1  | 1.14        | 1.40  | 0.045  | 0.055 |
| L   | 12.70       | 15.49 | 0.500  | 0.610 |
| R   | 2.16        | 2.41  | 0.085  | 0.095 |
| S1  | 1.14        | 1.52  | 0.045  | 0.060 |
| W   | 0.41        | 0.56  | 0.016  | 0.022 |
| D   | 4.45        | 4.95  | 0.175  | 0.195 |
| °   | 4°          | 6°    | 4°     | 6°    |

# **TO126 Package Dimensions**



| DIM | Millimeters  |      |
|-----|--------------|------|
|     | Min          | Max  |
| A   |              | 11.1 |
| B   |              | 7.80 |
| C   |              | 2.80 |
| D   | 0.50 typical |      |
| E   | 3.75 typical |      |
| F   | 2.29 typical |      |
| G   | 15.3         |      |
| H   |              | 0.88 |
| I   | 1.2 typical  |      |
| J   | 3.00         | 3.20 |