

# PNP SILICON PLANAR MEDIUM POWER HIGH GAIN TRANSISTOR

ISSUE 2 – APRIL 94

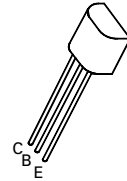
## ZTX790A

### FEATURES

- \* 40 Volt  $V_{CEO}$
- \* Gain of 200 at  $I_C=1$  Amps
- \* Very low saturation voltage

### APPLICATIONS

- \* Darlington replacement
- \* Siren driver
- \* Battery powered circuits
- \* Motor drivers



**E-Line**  
**T092 Compatible**

### ABSOLUTE MAXIMUM RATINGS.

| PARAMETER                                                                | SYMBOL         | VALUE       | UNIT                 |
|--------------------------------------------------------------------------|----------------|-------------|----------------------|
| Collector-Base Voltage                                                   | $V_{CBO}$      | -50         | V                    |
| Collector-Emitter Voltage                                                | $V_{CEO}$      | -40         | 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 $T_{amb}=25^{\circ}C$<br>derate above $25^{\circ}C$ | $P_{tot}$      | 1<br>5.7    | W<br>mW/ $^{\circ}C$ |
| 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 $T_{amb} = 25^{\circ}C$ )

| PARAMETER                             | SYMBOL        | MIN.                     | TYP.  | MAX.                    | UNIT        | CONDITIONS.                                                                                         |
|---------------------------------------|---------------|--------------------------|-------|-------------------------|-------------|-----------------------------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage      | $V_{(BR)CBO}$ | -50                      |       |                         | V           | $I_C=-100\mu A$                                                                                     |
| Collector-Emitter Breakdown Voltage   | $V_{(BR)CEO}$ | -40                      |       |                         | V           | $I_C=-10mA^*$                                                                                       |
| Emitter-Base Breakdown Voltage        | $V_{(BR)EBO}$ | -5                       |       |                         | V           | $I_E=-100\mu A$                                                                                     |
| Collector Cut-Off Current             | $I_{CBO}$     |                          |       | -0.1                    | $\mu A$     | $V_{CB}=-30V$                                                                                       |
| Emitter Cut-Off Current               | $I_{EBO}$     |                          |       | -0.1                    | $\mu A$     | $V_{EB}=-4V$                                                                                        |
| Collector-Emitter Saturation Voltage  | $V_{CE(sat)}$ |                          |       | -0.25<br>-0.45<br>-0.75 | V<br>V<br>V | $I_C=500mA, I_B=5mA^*$<br>$I_C=1A, I_B=10mA^*$<br>$I_C=2A, I_B=50mA^*$                              |
| Base-Emitter Saturation Voltage       | $V_{BE(sat)}$ |                          |       | -1.0                    | V           | $I_C=1A, I_B=10mA^*$                                                                                |
| Base-Emitter Turn-On Voltage          | $V_{BE(on)}$  |                          | -0.75 |                         | V           | $I_C=-1A, V_{CE}=-2V^*$                                                                             |
| Static Forward Current Transfer Ratio | $h_{FE}$      | 300<br>250<br>200<br>150 |       | 800                     |             | $I_C=10mA, V_{CE}=2V$<br>$I_C=500mA, V_{CE}=2V^*$<br>$I_C=1A, V_{CE}=2V^*$<br>$I_C=2A, V_{CE}=2V^*$ |

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

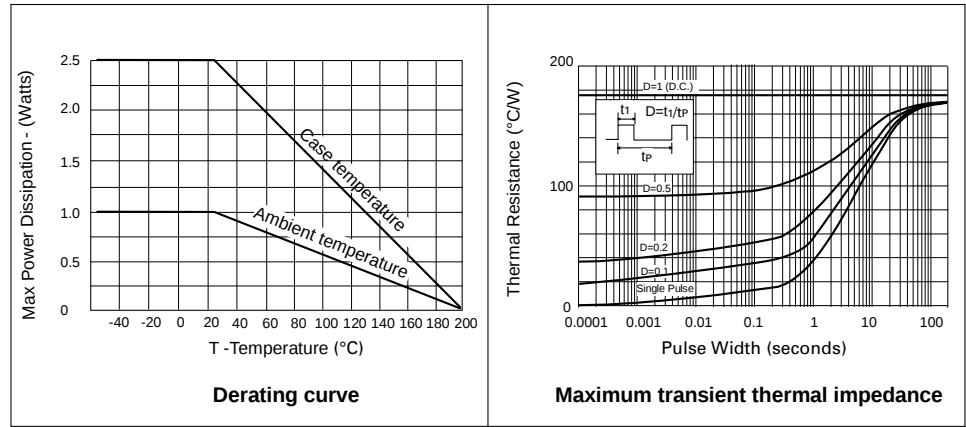
| PARAMETER            | SYMBOL                | MIN. | TYP.      | MAX. | UNIT     | CONDITIONS.                                                                                     |
|----------------------|-----------------------|------|-----------|------|----------|-------------------------------------------------------------------------------------------------|
| Transition Frequency | $f_T$                 | 100  |           |      | MHz      | $I_C = 50\text{mA}$ , $V_{CE} = 5\text{V}$<br>$f = 50\text{MHz}$                                |
| Input Capacitance    | $C_{ibo}$             |      | 225       |      | pF       | $V_{EB} = 0.5\text{V}$ , $f = 1\text{MHz}$                                                      |
| Output Capacitance   | $C_{obo}$             |      | 24        |      | pF       | $V_{CB} = 10\text{V}$ , $f = 1\text{MHz}$                                                       |
| Switching Times      | $t_{on}$<br>$t_{off}$ |      | 35<br>600 |      | ns<br>ns | $I_C = 500\text{mA}$ , $I_{B1} = 50\text{mA}$<br>$I_{B2} = 50\text{mA}$ , $V_{CC} = 10\text{V}$ |

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

## THERMAL CHARACTERISTICS

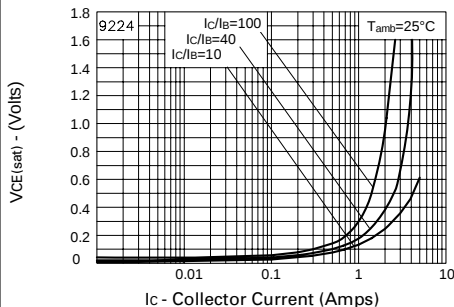
| PARAMETER                                            | SYMBOL                     | MAX. | UNIT                 |
|------------------------------------------------------|----------------------------|------|----------------------|
| Thermal Resistance: Junction to Ambient <sub>1</sub> | $R_{th(j-amb)1}$           | 175  | $^{\circ}\text{C/W}$ |
| Junction to Ambient <sub>2</sub>                     | $R_{th(j-amb)2}^{\dagger}$ | 116  | $^{\circ}\text{C/W}$ |
| Junction to Case                                     | $R_{th(j-case)}$           | 70   | $^{\circ}\text{C/W}$ |

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

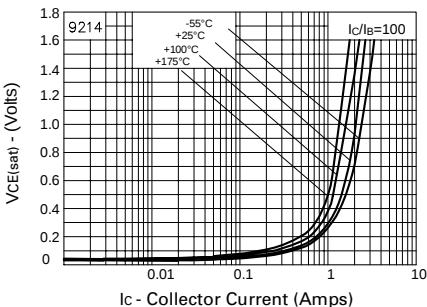


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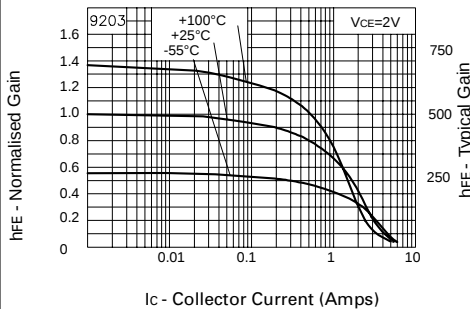
## TYPICAL CHARACTERISTICS



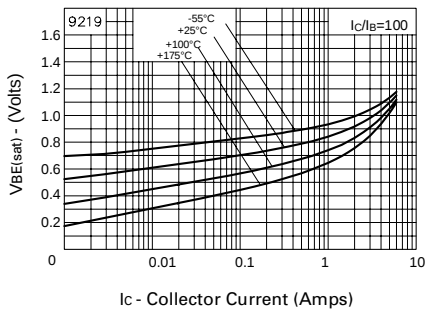
**VCE(sat) v IC**



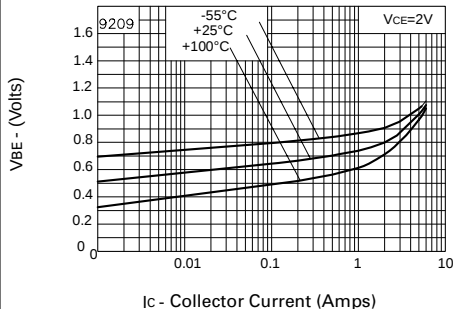
**VCE(sat) v IC**



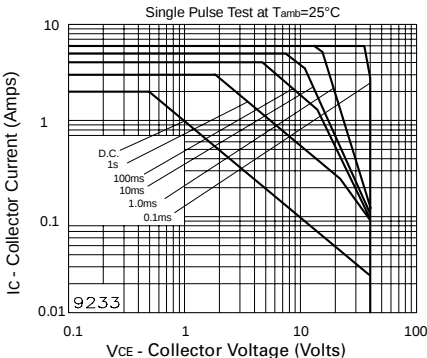
**hFE v IC**



**VBE(sat) v IC**



**VBE(on) v IC**



**Safe Operating Area**