

# NPN SILICON PLANAR MEDIUM POWER HIGH GAIN TRANSISTOR

**ZTX1048A**

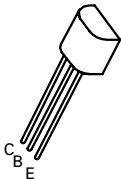
**ISSUE 3 – FEBRUARY 1995**

## FEATURES

- \*  $V_{CEV}=50V$
- \* Very Low Saturation Voltages
- \* High Gain
- \* 20 Amps pulse current

## APPLICATIONS

- \* LCD Backlight Convertors
- \* Emergency Lighting
- \* DC-DC Convertors



**E-Line  
TO92 Compatible**

## ABSOLUTE MAXIMUM RATINGS.

| PARAMETER                                  | SYMBOL        | ZTX1048A    | UNIT        |
|--------------------------------------------|---------------|-------------|-------------|
| Collector-Base Voltage                     | $V_{CBO}$     | 50          | V           |
| Collector-Emitter Voltage                  | $V_{CEO}$     | 17.5        | V           |
| Emitter-Base Voltage                       | $V_{EBO}$     | 5           | V           |
| Peak Pulse Current                         | $I_{CM}$      | 20          | A           |
| Continuous Collector Current               | $I_C$         | 4           | A           |
| Base Current                               | $I_B$         | 500         | 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 | $^{\circ}C$ |

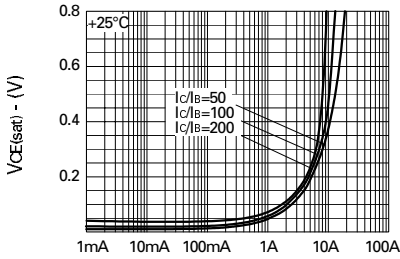
# ZTX1048A

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

| PARAMETER                             | SYMBOL        | ZTX1048A                       |                                |                        | UNIT                 | CONDITIONS.                                                                                                                                                                                                         |
|---------------------------------------|---------------|--------------------------------|--------------------------------|------------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                       |               | MIN.                           | TYP.                           | MAX.                   |                      |                                                                                                                                                                                                                     |
| Collector-Base Breakdown Voltage      | $V_{(BR)CBO}$ | 50                             | 85                             |                        | V                    | $I_C=100\mu\text{A}$                                                                                                                                                                                                |
| Collector-Emitter Breakdown Voltage   | $V_{CES}$     | 50                             | 85                             |                        | V                    | $I_C=100\mu\text{A}$                                                                                                                                                                                                |
| Collector-Emitter Breakdown Voltage   | $V_{CEO}$     | 17.5                           | 24                             |                        | V                    | $I_C=10\text{mA}$                                                                                                                                                                                                   |
| Collector-Emitter Breakdown Voltage   | $V_{CEV}$     | 50                             | 85                             |                        | V                    | $I_C=100\mu\text{A}$ , $V_{EB}=1\text{V}$                                                                                                                                                                           |
| Emitter-Base Breakdown Voltage        | $V_{(BR)EBO}$ | 5                              | 8.7                            |                        | V                    | $I_E=100\mu\text{A}$                                                                                                                                                                                                |
| Collector Cut-Off Current             | $I_{CBO}$     |                                | 0.3                            | 10                     | nA                   | $V_{CB}=35\text{V}$                                                                                                                                                                                                 |
| Emitter Cut-Off Current               | $I_{EBO}$     |                                | 0.3                            | 10                     | nA                   | $V_{EB}=4\text{V}$                                                                                                                                                                                                  |
| Collector Emitter Cut-Off Current     | $I_{CES}$     |                                | 0.3                            | 10                     | nA                   | $V_{CES}=35\text{V}$                                                                                                                                                                                                |
| Collector-Emitter Saturation Voltage  | $V_{CE(sat)}$ |                                | 27<br>55<br>110<br>210         | 45<br>75<br>150<br>245 | mV<br>mV<br>mV<br>mV | $I_C=0.5\text{A}$ , $I_B=10\text{mA}^*$<br>$I_C=1\text{A}$ , $I_B=10\text{mA}^*$<br>$I_C=2\text{A}$ , $I_B=10\text{mA}^*$<br>$I_C=4\text{A}$ , $I_B=20\text{mA}^*$                                                  |
| Base-Emitter Saturation Voltage       | $V_{BE(sat)}$ |                                | 860                            | 950                    | mV                   | $I_C=4\text{A}$ , $I_B=20\text{mA}^*$                                                                                                                                                                               |
| Base-Emitter Turn-On Voltage          | $V_{BE(on)}$  |                                | 860                            | 950                    | mV                   | $I_C=4\text{A}$ , $V_{CE}=2\text{V}^*$                                                                                                                                                                              |
| Static Forward Current Transfer Ratio | $h_{FE}$      | 280<br>300<br>300<br>220<br>50 | 440<br>450<br>450<br>330<br>80 | 1200                   |                      | $I_C=10\text{mA}$ , $V_{CE}=2\text{V}^*$<br>$I_C=0.5\text{A}$ , $V_{CE}=2\text{V}^*$<br>$I_C=1\text{A}$ , $V_{CE}=2\text{V}^*$<br>$I_C=4\text{A}$ , $V_{CE}=2\text{V}^*$<br>$I_C=20\text{A}$ , $V_{CE}=2\text{V}^*$ |
| Transition Frequency                  | $f_T$         |                                | 150                            |                        | MHz                  | $I_C=50\text{mA}$ , $V_{CE}=10\text{V}$<br>$f=50\text{MHz}$                                                                                                                                                         |
| Output Capacitance                    | $C_{obo}$     |                                | 60                             | 80                     | pF                   | $V_{CB}=10\text{V}$ , $f=1\text{MHz}$                                                                                                                                                                               |
| Switching Times                       | $t_{on}$      |                                | 130                            |                        | ns                   | $I_C=4\text{A}$ , $I_B=40\text{mA}$ , $V_{CC}=10\text{V}$                                                                                                                                                           |
|                                       | $t_{off}$     |                                | 180                            |                        | ns                   | $I_C=4\text{A}$ , $I_B=\pm 40\text{mA}$ , $V_{CC}=10\text{V}$                                                                                                                                                       |

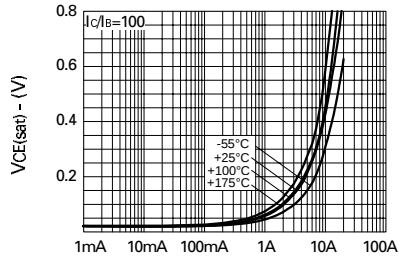
# ZTX1048A

## TYPICAL CHARACTERISTICS



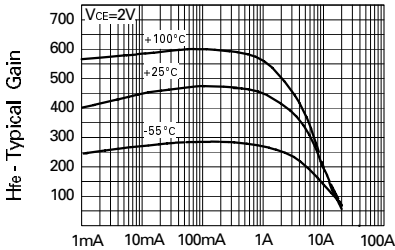
$I_C$ -Collector Current

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



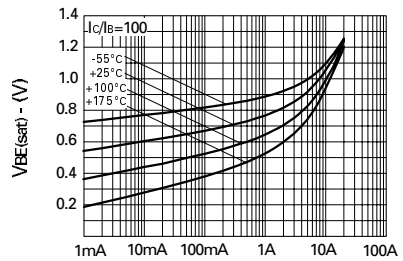
$I_C$ -Collector Current

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



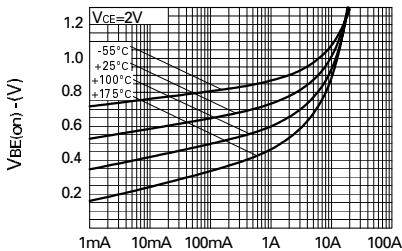
$I_C$ -Collector Current

**$h_{fe}$  v  $I_C$**



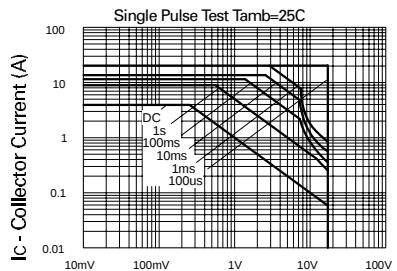
$I_C$ -Collector Current

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



$I_C$ -Collector Current

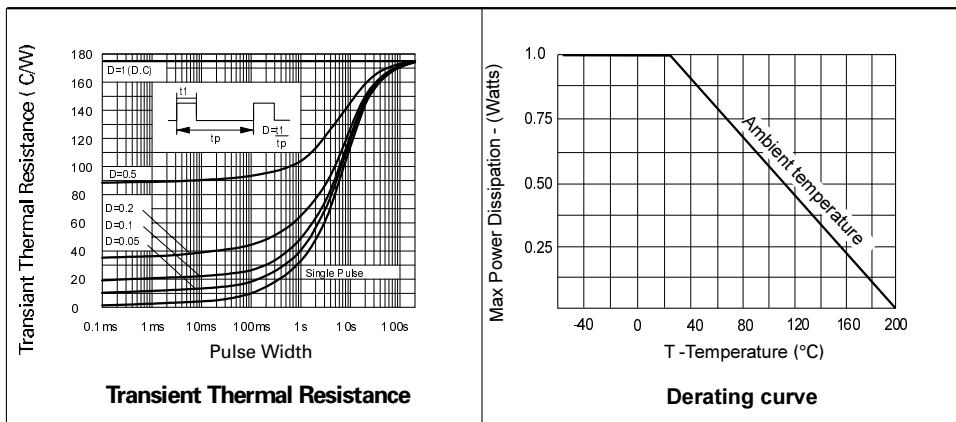
**$V_{BE(on)}$  v  $I_C$**



$V_{CE}$  - Collector Voltage

**Safe Operating Area**

# ZTX1048A



## SPICE PARAMETERS

\*ZETEX ZTX1048A Spice model Last revision 20/01/95

\*

```
.MODEL ZTX1048A NPN IS=13.73E-13 NF=1.0 BF=550 IKF=8.0 VAF=120
```

```
+ ISE=2.6E-13 NE=1.38 NR=1.0 BR=300 IKR=6 VAR=15
```

```
+ ISC=1.6E-12 NC=1.4 RB=0.1 RE=0.022 RC=0.010
```

```
+ CJC=136E-12 CJE=559.1E-12 MJC=0.267 MJE=0.299
```

```
+ VJC=0.420 VJE=0.533 TF=600E-12 TR=3E-9
```

\*

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