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# NPN SILICON PLANAR MEDIUM POWER HIGH GAIN TRANSISTOR

## ZTX1053A

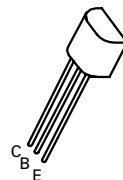
ISSUE 3- JANUARY 1995

### FEATURES

- \*  $V_{CE0}=75V$
- \* 3 Amp Continuous Current
- \* 10 Amp Pulse Current
- \* Very Low Saturation Voltage

### APPLICATIONS

- \* Automotive Switching Circuits
- \* DC-DC Convertors



E-Line  
TO92 Compatible

### ABSOLUTE MAXIMUM RATINGS.

| PARAMETER                                  | SYMBOL        | ZTX1053A    | UNIT        |
|--|---------------|-------------|-------------|
| Collector-Base Voltage                     | $V_{CBO}$     | 150         | V           |
| Collector-Emitter Voltage                  | $V_{CEO}$     | 75          | V           |
| Emitter-Base Voltage                       | $V_{EBO}$     | 5           | V           |
| Peak Pulse Current                         | $I_{CM}$      | 10          | A           |
| Continuous Collector Current               | $I_C$         | 3           | 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 | $^{\circ}C$ |

# ZTX1053A

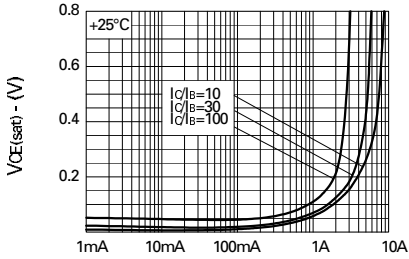
## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

| PARAMETER                             | SYMBOL        | MIN.              | TYP.                    | MAX.             | UNIT           | CONDITIONS.   |
|---------------------------------------|---------------|-------------------|-------------------------|------------------|----------------|---|
| Collector-Base Breakdown Voltage      | $V_{(BR)CBO}$ | 150               | 245                     |                  | V              | $I_C=100\mu\text{A}$  |
| Collector-Emitter Breakdown Voltage   | $V_{CES}$     | 150               | 245                     |                  | V              | $I_C=100\mu\text{A}$  |
| Collector-Emitter Breakdown Voltage   | $V_{CEO}$     | 75                | 100                     |                  | V              | $I_C=10\text{mA}$   |
| Collector-Emitter Breakdown Voltage   | $V_{CEV}$     | 150               | 245                     |                  | V              | $I_C=100\mu\text{A}, V_{EB}=1\text{V}$  |
| Emitter-Base Breakdown Voltage        | $V_{(BR)EBO}$ | 5                 | 8.8                     |                  | V              | $I_E=100\mu\text{A}$  |
| Collector Cut-Off Current             | $I_{CBO}$     |                   | 0.3                     | 10               | nA             | $V_{CB}=120\text{V}$  |
| 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             | $V_{CES}=120\text{V}$   |
| Collector-Emitter Saturation Voltage  | $V_{CE(sat)}$ |                   | 17<br>120<br>180        | 25<br>150<br>250 | mV<br>mV<br>mV | $I_C=0.2\text{A}, I_B=20\text{mA}^*$<br>$I_C=1\text{A}, I_B=10\text{mA}^*$<br>$I_C=3\text{A}, I_B=100\text{mA}^*$   |
| Base-Emitter Saturation Voltage       | $V_{BE(sat)}$ |                   | 900                     | 1000             | mV             | $I_C=3\text{A}, I_B=100\text{mA}^*$   |
| Base-Emitter Turn-On Voltage          | $V_{BE(on)}$  |                   | 825                     | 950              | mV             | $I_C=3\text{A}, V_{CE}=2\text{V}^*$   |
| Static Forward Current Transfer Ratio | $h_{FE}$      | 260<br>300<br>100 | 420<br>450<br>150<br>15 | 1200             |                | $I_C=10\text{mA}, V_{CE}=2\text{V}^*$<br>$I_C=1\text{A}, V_{CE}=2\text{V}^*$<br>$I_C=3\text{A}, V_{CE}=2\text{V}^*$<br>$I_C=10\text{A}, V_{CE}=2\text{V}^*$ |
| Transition Frequency                  | $f_T$         |                   | 140                     |                  | MHz            | $I_C=50\text{mA}, V_{CE}=10\text{V}$<br>$f=100\text{MHz}$   |
| Output Capacitance                    | $C_{obo}$     |                   | 21                      | 30               | pF             | $V_{CB}=10\text{V}, f=1\text{MHz}$  |
| Switching Times                       | $t_{on}$      |                   | 90                      |                  | ns             | $I_C=2\text{A}, I_B=20\text{mA}, V_{CC}=50\text{V}$   |
|                                       | $t_{off}$     |                   | 750                     |                  | ns             | $I_C=2\text{A}, I_B=\pm 20\text{mA}, V_{CC}=50\text{V}$   |

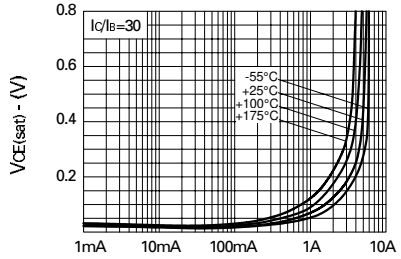
\*Measured under pulsed conditions. Pulse width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$

# ZTX1053A

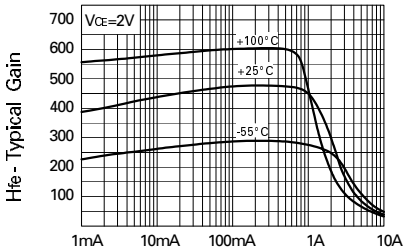
## TYPICAL CHARACTERISTICS



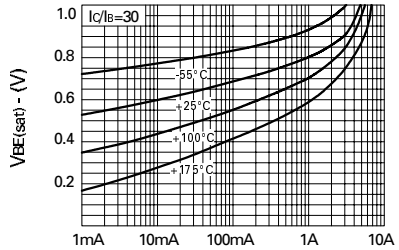
IC-Collector Current  
 **$V_{CE(sat)}$  v IC**



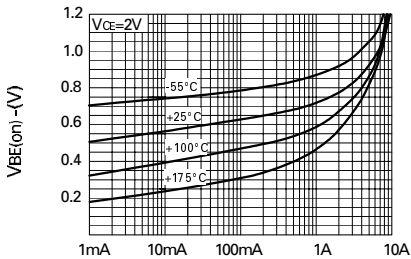
IC-Collector Current  
 **$V_{CE(sat)}$  v IC**



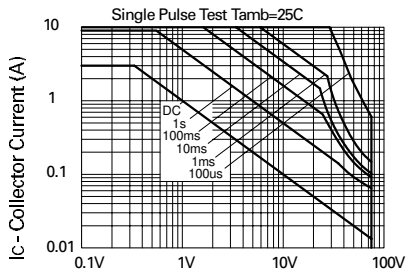
IC-Collector Current  
 **$h_{fe}$  v IC**



IC-Collector Current  
 **$V_{BE(sat)}$  v IC**

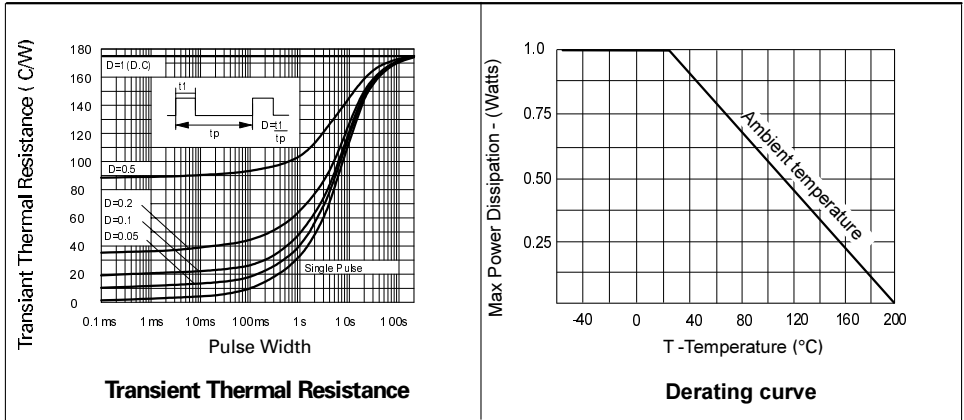


IC-Collector Current  
 **$V_{BE(on)}$  v IC**



VCE - Collector Voltage  
**Safe Operating Area**

# ZTX1053A



## SPICE PARAMETERS

\*ZETEX ZTX1053A Spice model Last revision 19/01/95

\*

```
.MODEL ZTX1053A NPN IS=2.1E-12 NF=1.0 BF=600 IKF=2.2 VAF=100
```

```
+ ISE=0.9E-13 NE=1.25 NR=0.99 BR=150 IKR=2.5 VAR=15
```

```
+ ISC=5.0E-10 NC=1.76 RB=0.1 RE=0.028 RC=0.016
```

```
+ CJC=75.1E-12 CJE=520E-12 MJC=0.415 MJE=0.367
```

```
+ VJC=0.512 VJE=0.766 TF=550E-12 TR=22E-9
```

\*

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