

NPN SILICON PLANAR MEDIUM POWER HIGH GAIN TRANSISTOR

ZTX1053A

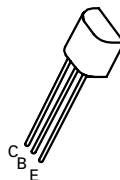
ISSUE 3- JANUARY 1995

FEATURES

- * $V_{CEO}=75V$
- * 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 | $^{\circ}C$ |

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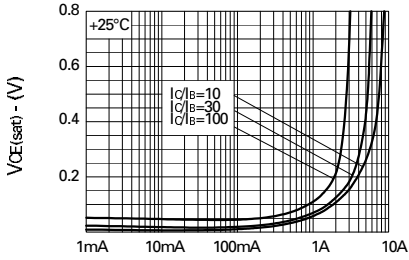
ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

| 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 | $V_{CE(sat)}$ | | 17 120 180 | 25 150 250 | mV mV mV | $I_C=0.2\text{A}, I_B=20\text{mA}^*$ $I_C=1\text{A}, I_B=10\text{mA}^*$ $I_C=3\text{A}, I_B=100\text{mA}^*$ |
| 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} | 260 300 100 | 420 450 150 15 | 1200 | | $I_C=10\text{mA}, V_{CE}=2\text{V}^*$ $I_C=1\text{A}, V_{CE}=2\text{V}^*$ $I_C=3\text{A}, V_{CE}=2\text{V}^*$ $I_C=10\text{A}, V_{CE}=2\text{V}^*$ |
| Transition Frequency | f_T | | 140 | | MHz | $I_C=50\text{mA}, V_{CE}=10\text{V}$ $f=100\text{MHz}$ |
| 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 | $I_C=2\text{A}, I_B=\pm 20\text{mA}, V_{CC}=50\text{V}$ |

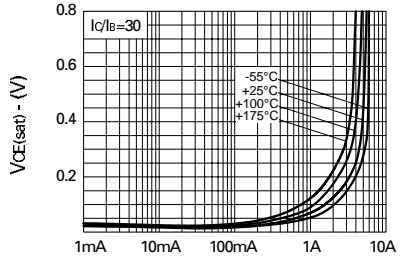
*Measured under pulsed conditions. Pulse width=300 μs . Duty cycle $\leq 2\%$

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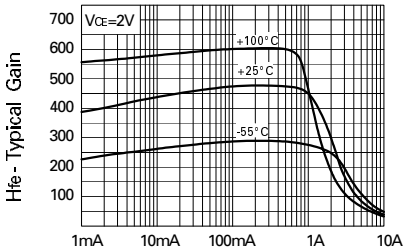
TYPICAL CHARACTERISTICS



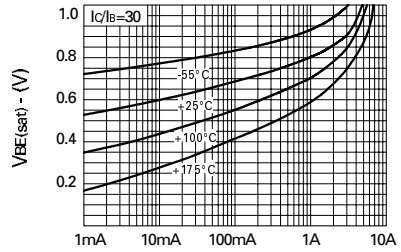
IC-Collector Current
 $V_{CE(sat)}$ v I_C



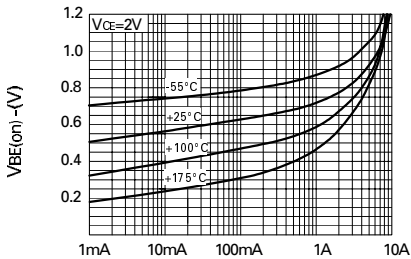
IC-Collector Current
 $V_{CE(sat)}$ v I_C



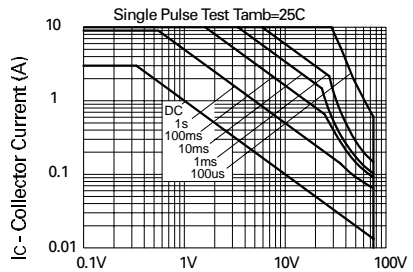
IC-Collector Current
 h_{FE} v I_C



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

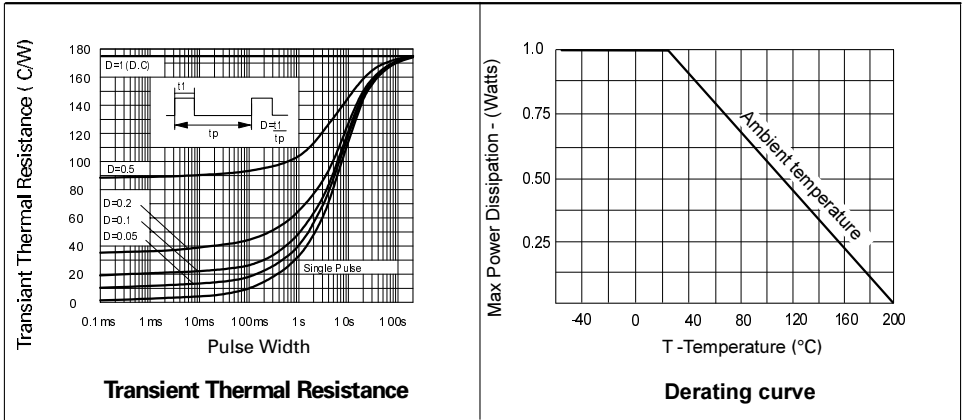


IC-Collector Current
 $V_{BE(on)}$ v I_C



V_{CE} - Collector Voltage
Safe Operating Area

ZTX1053A



SPICE PARAMETERS

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

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.MODEL ZTX1053A NPN IS=2.1E-12 NF=1.0 BF=600 IKF=2.2 VAF=100
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+ 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
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+ VJC=0.512 VJE=0.766 TF=550E-12 TR=22E-9
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