

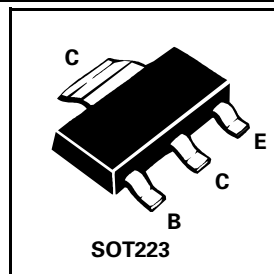
# SOT223 NPN SILICON PLANAR MEDIUM POWER HIGH GAIN TRANSISTOR

ISSUE 2 - MARCH 2001

**FZT1053A**

## FEATURES

- \*  $V_{CE0} = 75V$
- \* 4.5 Amp Continuous Current
- \* 10 Amp Pulse Current
- \* Low Saturation Voltage
- \* High Gain
- \* Extremely Low Equivalent On-resistance;  $R_{CE(sat)} = 78m\Omega$  at 4.5A



## ABSOLUTE MAXIMUM RATINGS.

| PARAMETER                                   | SYMBOL         | VALUE       | UNIT       |
|---|----------------|-------------|------------|
| Collector-Base Voltage                      | $V_{CBO}$      | 150         | V          |
| Collector-Emitter Voltage                   | $V_{CEO}$      | 75          | V          |
| Emitter-Base Voltage                        | $V_{EBO}$      | 7.5         | V          |
| Peak Pulse Current                          | $I_{CM}$       | 10          | A          |
| Continuous Collector Current                | $I_C$          | 4.5         | A          |
| Base Current                                | $I_B$          | 500         | mA         |
| Power Dissipation at $T_{amb}=25^\circ C$ † | $P_{tot}$      | 2.5         | W          |
| Operating and Storage Temperature Range     | $T_j; T_{stg}$ | -55 to +150 | $^\circ C$ |

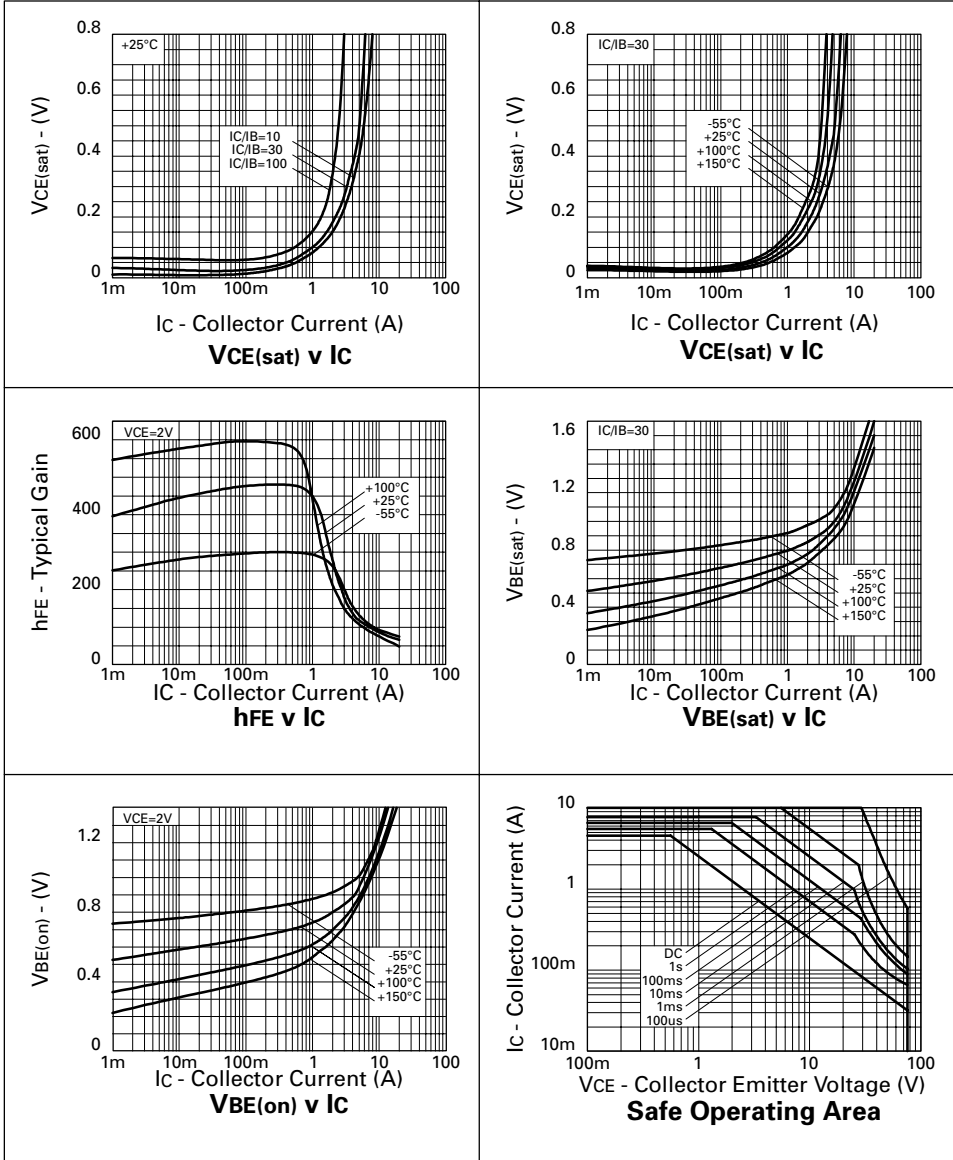
† The power which can be dissipated assuming the device is mounted in typical manner on a PCB with copper equal to 2 inches x 2 inches.

# FZT1053A

## 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                     | 250                           |                               | V    | $I_C = 100\mu\text{A}$   |
| Collector-Emitter Breakdown Voltage   | $V_{CES}$     | 150                     | 250                           |                               | 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                     | 250                           |                               | V    | $I_C = 100\mu\text{A}, V_{EB} = 1\text{V}$   |
| Emitter-Base Breakdown Voltage        | $V_{(BR)EBO}$ | 7.5                     | 8.8                           |                               | V    | $I_E = 100\mu\text{A}$   |
| Collector Cut-Off Current             | $I_{CBO}$     |                         | 0.9                           | 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     | $I_{CES}$     |                         | 1.5                           | 10                            | nA   | $V_{CES} = 120\text{V}$  |
| Collector-Emitter Saturation Voltage  | $V_{CE(sat)}$ |                         | 21<br>55<br>150<br>160<br>350 | 30<br>75<br>200<br>210<br>440 | mV   | $I_C = 0.2\text{A}, I_B = 20\text{mA}^*$<br>$I_C = 0.5\text{A}, I_B = 20\text{mA}^*$<br>$I_C = 1\text{A}, I_B = 10\text{mA}^*$<br>$I_C = 2\text{A}, I_B = 100\text{mA}^*$<br>$I_C = 4.5\text{A}, I_B = 200\text{mA}^*$     |
| 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 | $h_{FE}$      | 270<br>300<br>300<br>40 | 440<br>450<br>450<br>60<br>20 | 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>$I_C = 4.5\text{A}, V_{CE} = 2\text{V}^*$<br>$I_C = 10\text{A}, V_{CE} = 2\text{V}^*$ |
| Switching Times                       | $t_{on}$      |                         | 162                           |                               | ns   | $I_C = 2\text{A}, I_{B1} = I_{B2} = \pm 20\text{mA}, V_{CC} = 50\text{V}$  |
|                                       | $t_{off}$     |                         | 900                           |                               | ns   | $I_C = 2\text{A}, I_{B1} = I_{B2} = \pm 20\text{mA}, V_{CC} = 50\text{V}$  |
| 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   | $V_{CB} = 10\text{V}, f = 1\text{MHz}$   |

## TYPICAL CHARACTERISTICS



**FZT1053A**

## SPICE PARAMETERS

**\*ZETEX FZT1053A Spice model Last revision 18/3/97**

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**.MODEL FZT1053A**

**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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