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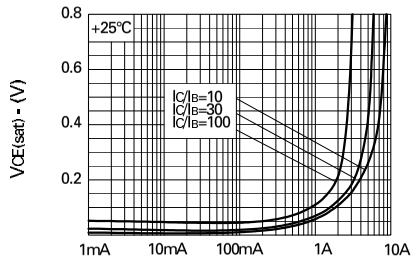
## ELECTRICAL CHARACTERISTICS (at $T_{amb}$ = 25°C unless otherwise stated).

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS. |
|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | 150 | 245 | | V | $I_C$=100μA |
| Collector-Emitter Breakdown Voltage | $V_{CES}$ | 150 | 245 | | V | IC=100μA |
| Collector-Emitter Breakdown Voltage | $V_{CEO}$ | 75 | 100 | | V | IC=10mA |
| Collector-Emitter Breakdown Voltage | $V_{CEV}$ | 150 | 245 | | V | IC=100μA, $V_{EB}$=1V |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | 5 | 8.8 | | V | $I_E$=100μA |
| Collector Cut-Off Current | $I_{CBO}$ | | 0.3 | 10 | nA | $V_{CB}$=120V |
| Emitter Cut-Off Current | $I_{EBO}$ | | 0.3 | 10 | nA | $V_{EB}$=4V |
| Collector Emitter Cut-Off Current | $I_{CES}$ | | 0.3 | 10 | nA | VCES=120V |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | | 17<br>120<br>180 | 25<br>150<br>250 | mV<br>mV<br>mV | $I_C$=0.2A, $I_B$=20mA*<br>$I_C$=1A, $I_B$=10mA*<br>$I_C$=3A, $I_B$=100mA* |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | | 900 | 1000 | mV | $I_C$=3A, $I_B$=100mA* |
| Base-Emitter Turn-On Voltage | $V_{BE(on)}$ | | 825 | 950 | mV | IC=3A, $V_{CE}$=2V* |
| Static Forward Current Transfer Ratio | $h_{FE}$ | 260<br>300<br>100 | 420<br>450<br>150<br>15 | 1200 | | $I_C$=10mA, $V_{CE}$=2V*<br>$I_C$=1A, $V_{CE}$=2V*<br>$I_C$=3A, $V_{CE}$=2V*<br>$I_C$=10A, $V_{CE}$=2V* |
| Transition Frequency | $f_T$ | | 140 | | MHz | $I_C$=50mA, $V_{CE}$=10V<br>f=100MHz |
| Output Capacitance | $C_{obo}$ | | 21 | 30 | pF | $V_{CB}$=10V, f=1MHz |
| Switching Times | $t_{on}$ | | 90 | | ns | $I_C$=2A, $I_B$=20mA, $V_{CC}$=50V |
| | $t_{off}$ | | 750 | | ns | $I_C$=2A, $I_B$=±20mA, $V_{CC}$=50V |

*Measured under pulsed conditions. Pulse width=300μs. Duty cycle ≤ 2%

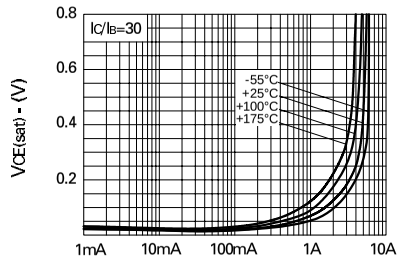
ZTX1053A

## TYPICAL CHARACTERISTICS



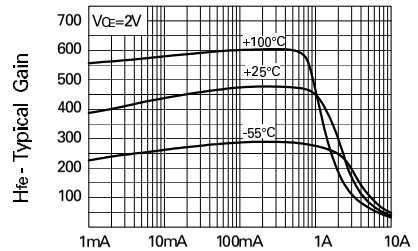

IC-Collector Current

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



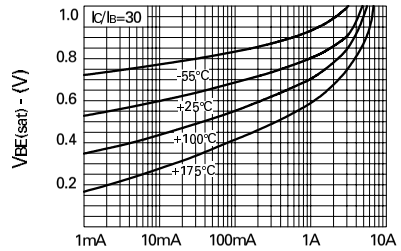

IC-Collector Current

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



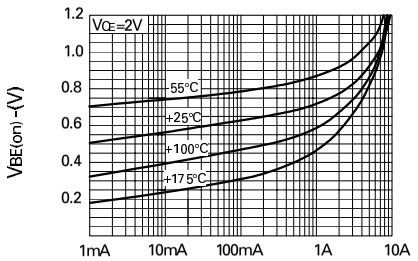

IC-Collector Current

**$h_{FE}$ v $I_C$**



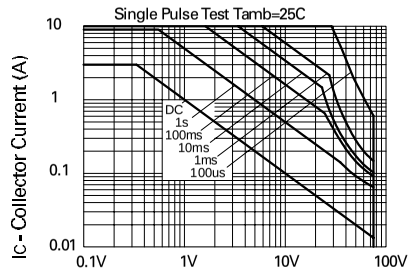

IC-Collector Current

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




IC-Collector Current

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




VCE - Collector Voltage

**Safe Operating Area**

Downloaded from Arrow.com.



## ELECTRICAL CHARACTERISTICS (at $T_{amb}$ = 25°C unless otherwise stated).

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS. |
|---|---|---|---|---|---|---|
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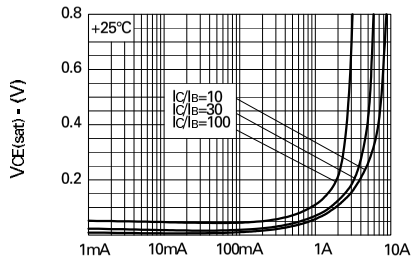
| Collector-Emitter Breakdown Voltage | $V_{CEO}$ | 75 | 100 | | V | IC=10mA |
| Collector-Emitter Breakdown Voltage | $V_{CEV}$ | 150 | 245 | | V | IC=100μA, $V_{EB}$=1V |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | 5 | 8.8 | | V | $I_E$=100μA |
| Collector Cut-Off Current | $I_{CBO}$ | | 0.3 | 10 | nA | $V_{CB}$=120V |
| Emitter Cut-Off Current | $I_{EBO}$ | | 0.3 | 10 | nA | $V_{EB}$=4V |
| Collector Emitter Cut-Off Current | $I_{CES}$ | | 0.3 | 10 | nA | VCES=120V |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | | 17<br>120<br>180 | 25<br>150<br>250 | mV<br>mV<br>mV | $I_C$=0.2A, $I_B$=20mA*<br>$I_C$=1A, $I_B$=10mA*<br>$I_C$=3A, $I_B$=100mA* |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | | 900 | 1000 | mV | $I_C$=3A, $I_B$=100mA* |
| Base-Emitter Turn-On Voltage | $V_{BE(on)}$ | | 825 | 950 | mV | IC=3A, $V_{CE}$=2V* |
| Static Forward Current Transfer Ratio | $h_{FE}$ | 260<br>300<br>100 | 420<br>450<br>150<br>15 | 1200 | | $I_C$=10mA, $V_{CE}$=2V*<br>$I_C$=1A, $V_{CE}$=2V*<br>$I_C$=3A, $V_{CE}$=2V*<br>$I_C$=10A, $V_{CE}$=2V* |
| Transition Frequency | $f_T$ | | 140 | | MHz | $I_C$=50mA, $V_{CE}$=10V<br>f=100MHz |
| Output Capacitance | $C_{obo}$ | | 21 | 30 | pF | $V_{CB}$=10V, f=1MHz |
| Switching Times | $t_{on}$ | | 90 | | ns | $I_C$=2A, $I_B$=20mA, $V_{CC}$=50V |
| | $t_{off}$ | | 750 | | ns | $I_C$=2A, $I_B$=±20mA, $V_{CC}$=50V |

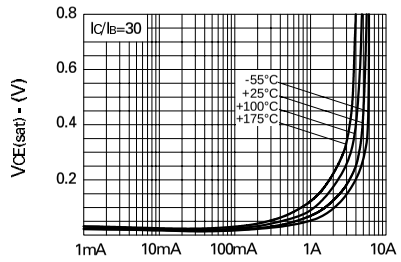
*Measured under pulsed conditions. Pulse width=300μs. Duty cycle ≤ 2%

ZTX1053A

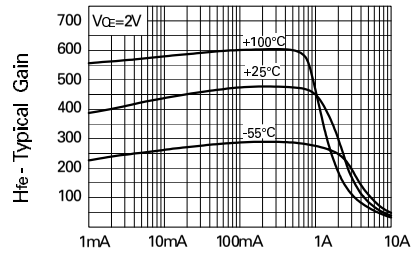
## TYPICAL CHARACTERISTICS



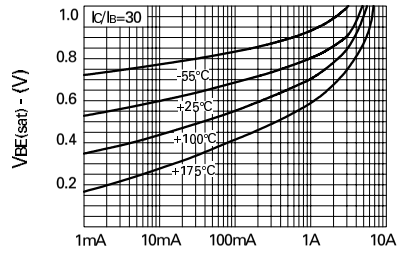

**$V_{CE(sat)}$ v $I_C$**



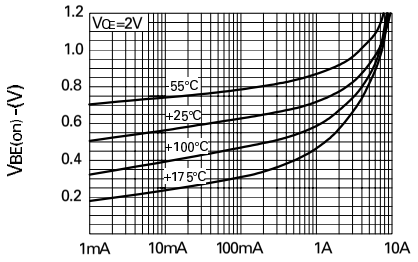

**$V_{CE(sat)}$ v $I_C$**



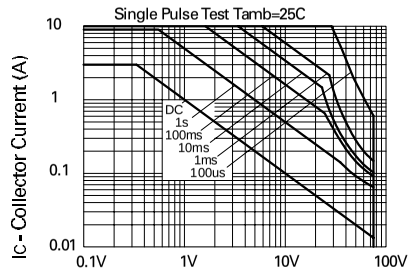

**$h_{FE}$ v $I_C$**




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




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




**Safe Operating Area**

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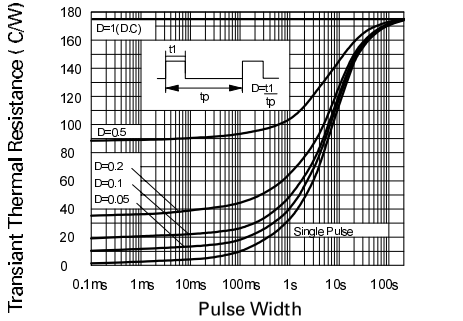
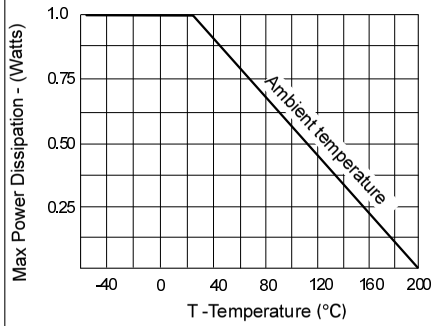
# ZTX1053A




**Transient Thermal Resistance**




**Derating curve**

SPICE PARAMETERS

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*ZETEX  ZTX1053A Spice model   Last revision 19/01/95
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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
+          VJC=0.512  VJE=0.766  TF=550E-12  TR=22E-9
*
```

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# NPN SILICON PLANAR MEDIUM POWER HIGH GAIN TRANSISTOR

ZTX1053A

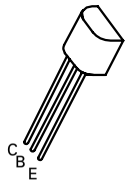
**ISSUE 3– JANUARY 1995**

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°C | $P_{tot}$ | 1 | W |
| Operating and Storage Temperature Range | $T_j$:$T_{stg}$ | -55 to +200 | °C |