

# NPN SILICON PLANAR MEDIUM POWER HIGH GAIN TRANSISTOR

## ZTX1053A

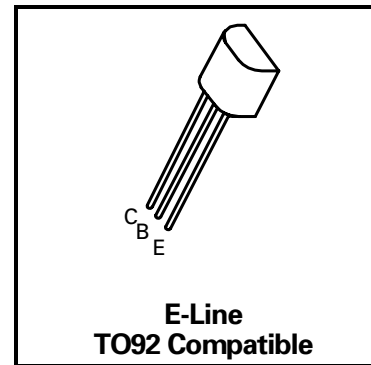
ISSUE 3- JANUARY 1995

### FEATURES

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

### APPLICATIONS

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



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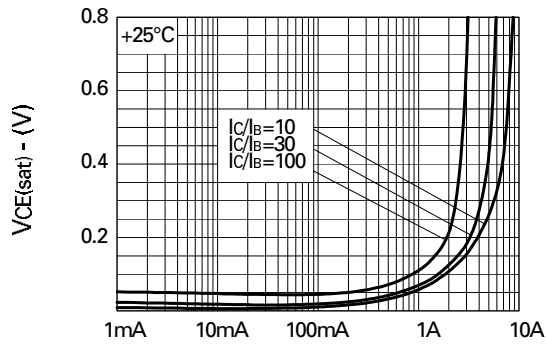
## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

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 $\mu\text{s}$ . Duty cycle  $\leq 2\%$

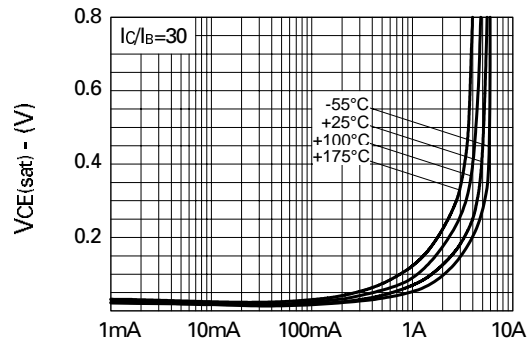
# ZTX1053A

## TYPICAL CHARACTERISTICS



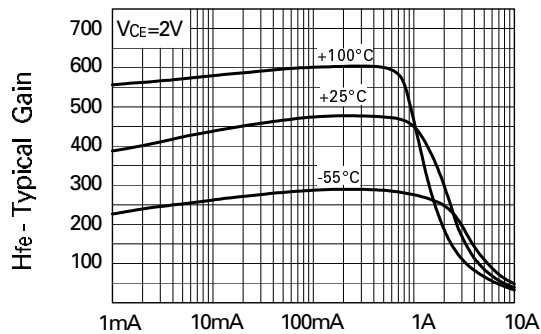
$I_C$ -Collector Current

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



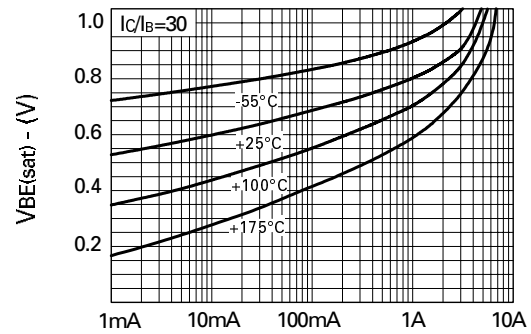
$I_C$ -Collector Current

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



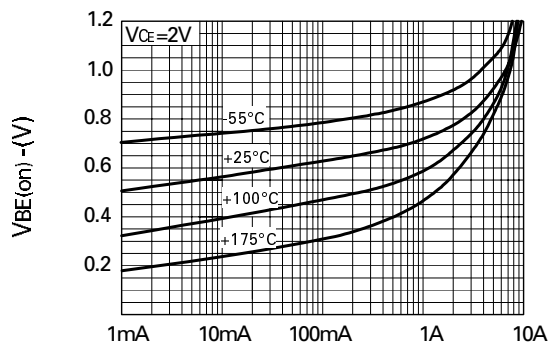
$I_C$ -Collector Current

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



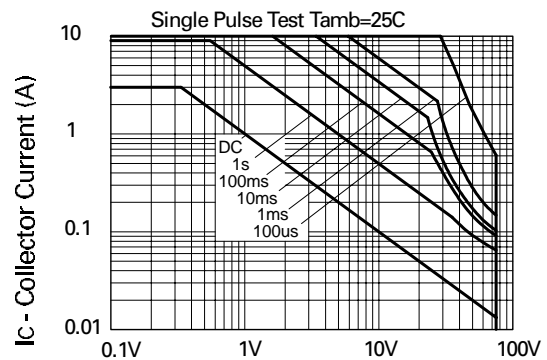
$I_C$ -Collector Current

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



$I_C$ -Collector Current

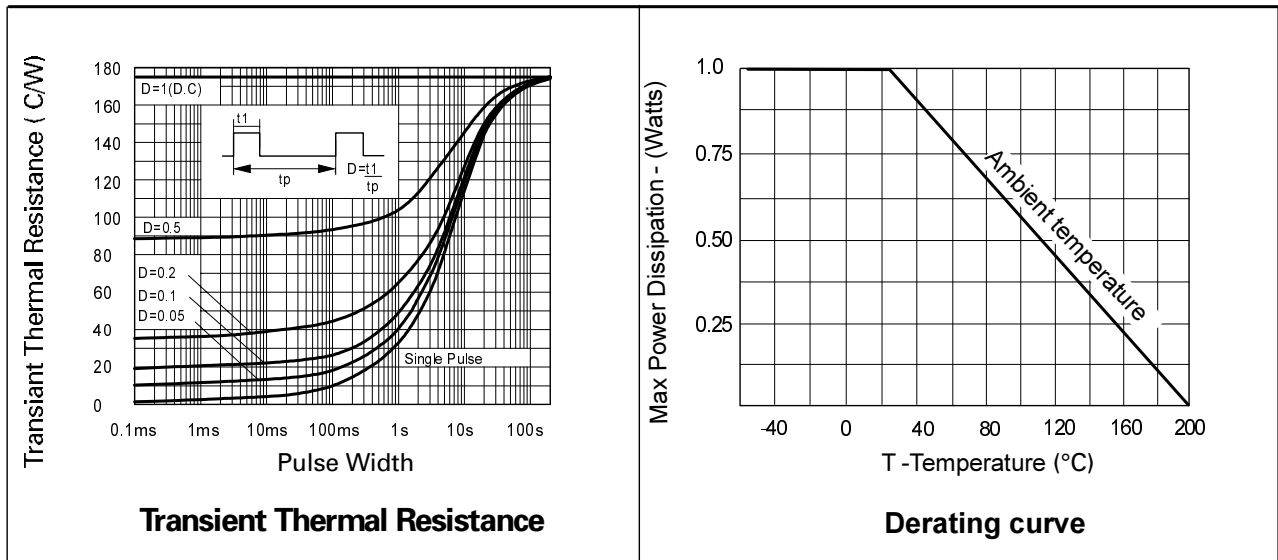
**$V_{BE(on)}$  v  $I_C$**



$V_{CE}$  - Collector Voltage

**Safe Operating Area**

# 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
+ 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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