

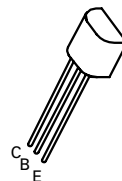
# NPN SILICON PLANAR MEDIUM POWER HIGH GAIN TRANSISTOR

## ZTX1056A

ISSUE 3 – JANUARY 1995

### FEATURES

- \*  $V_{CE0}=160V$
- \* 3 Amp Continuous Current
- \* 6 Amp Pulse Current
- \* Low Saturation Voltage



E-Line  
TO92 Compatible

### ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	$V_{CBO}$	200	V
Collector-Emitter Voltage	$V_{CEO}$	160	V
Emitter-Base Voltage	$V_{EBO}$	5	V
Peak Pulse Current	$I_{CM}$	6	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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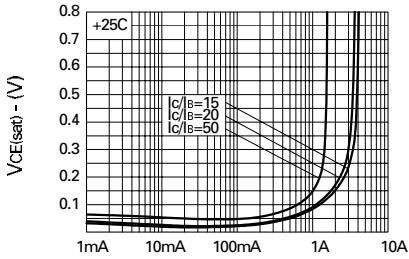
## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	200	310		V	$I_C=100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{CES}$	200	310		V	$I_C=100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{CEO}$	160	190		V	$I_C=10\text{mA}$
Collector-Emitter Breakdown Voltage	$V_{CEV}$	200	310		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	$V_{CB}=150\text{V}$
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	$V_{CES}=150\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		25 95 175 220	60 140 250 300	mV mV mV mV	$I_C=0.1\text{A}$ , $I_B=5\text{mA}^*$ $I_C=1\text{A}$ , $I_B=50\text{mA}^*$ $I_C=2\text{A}$ , $I_B=100\text{mA}^*$ $I_C=3\text{A}$ , $I_B=200\text{mA}^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$		950	1050	mV	$I_C=3\text{A}$ , $I_B=200\text{mA}^*$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$		860	950	mV	$I_C=3\text{A}$ , $V_{CE}=10\text{V}^*$
Static Forward Current Transfer Ratio	$h_{FE}$	275 300 250 60 30	420 450 400 120 50 15	1200		$I_C=10\text{mA}$ , $V_{CE}=10\text{V}^*$ $I_C=0.5\text{A}$ , $V_{CE}=10\text{V}^*$ $I_C=1\text{A}$ , $V_{CE}=10\text{V}^*$ $I_C=2\text{A}$ , $V_{CE}=10\text{V}^*$ $I_C=3\text{A}$ , $V_{CE}=10\text{V}^*$ $I_C=6\text{A}$ , $V_{CE}=10\text{V}^*$
Transition Frequency	$f_T$		120		MHz	$I_C=50\text{mA}$ , $V_{CE}=10\text{V}$ $f=100\text{MHz}$
Output Capacitance	$C_{obo}$		14	25	pF	$V_{CB}=10\text{V}$ , $f=1\text{MHz}$
Switching Times	$t_{on}$		110		ns	$I_C=1\text{A}$ , $I_B=10\text{mA}$ , $V_{CC}=50\text{V}$
	$t_{off}$		2450		ns	$I_C=1\text{A}$ , $I_B=\pm 10\text{mA}$ , $V_{CC}=50\text{V}$

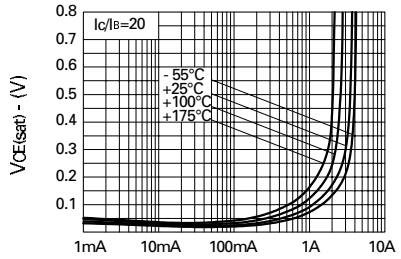
\*Measured under pulsed conditions. Pulse width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$

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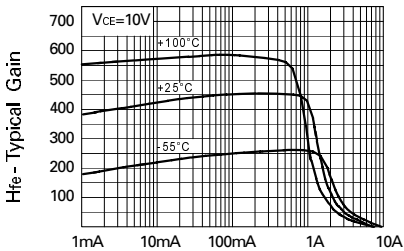
## TYPICAL CHARACTERISTICS



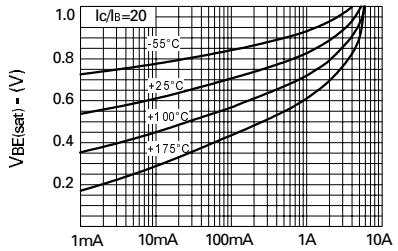
$V_{CE(sat)}$  v  $I_C$



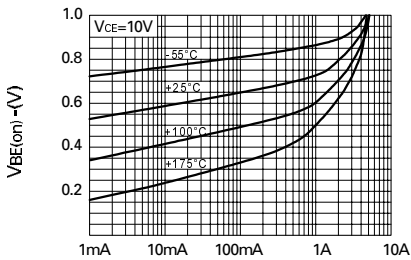
$V_{CE(sat)}$  v  $I_C$



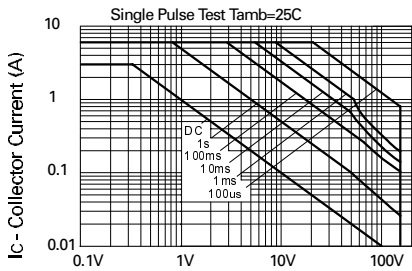
$H_{fe}$  v  $I_C$



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

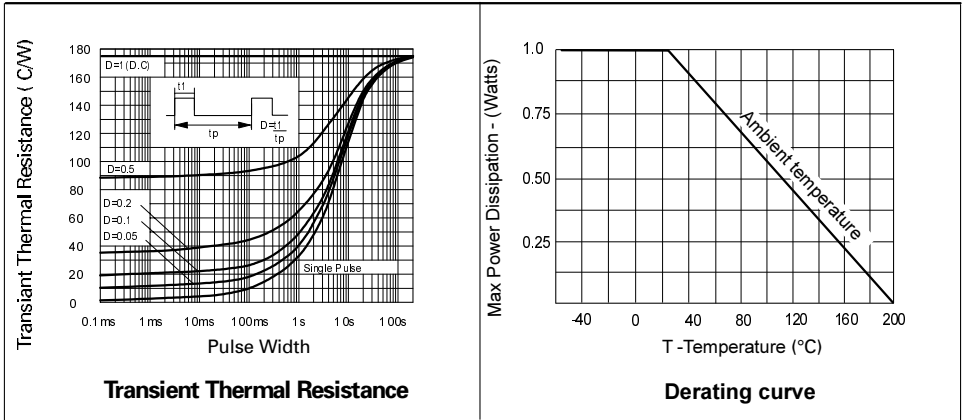


$V_{BE(on)}$  v  $I_C$



Safe Operating Area

# ZTX1056A



## SPICE PARAMETERS

\*ZETEX ZTX1056A Spice model Last revision 24/1/95

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.MODEL ZTX1056A NPN IS=1.41E-12 NF=1.0 BF=600 IKF=2.0 VAF=120
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```
+ ISE=4.0E-13 NE=1.4 NR=1.0 BR=80 IKR=2.5 VAR=10
```

```
+ ISC=6.0E-10 NC=1.7 RB=0.1 RE=0.065 RC=0.015
```

```
+ CJC=53.1E-12 CJE=508.6E-12 MJC=0.461 MJE=0.350
```

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+ VJC=0.461 VJE=0.679 TF=800E-12 TR=110E-9
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\*

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