

# NPN SILICON PLANAR MEDIUM POWER HIGH GAIN TRANSISTOR

## ZTX1047A

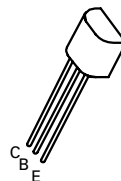
ISSUE 3 – JANUARY 1995

### FEATURES

- \* Very Low Saturation Voltage
- \* High Gain
- \* 4 Amp Continuous Current

### APPLICATIONS

- \* DC-DC Convertors
- \* Power Management - Supply Switching



E-Line  
TO92 Compatible

### ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	ZTX1047A	UNIT
Collector-Base Voltage	$V_{CBO}$	35	V
Collector-Emitter Voltage	$V_{CEO}$	10	V
Emitter-Base Voltage	$V_{EBO}$	5	V
Peak Pulse Current	$I_{CM}$	20	A
Continuous Collector Current	$I_C$	4	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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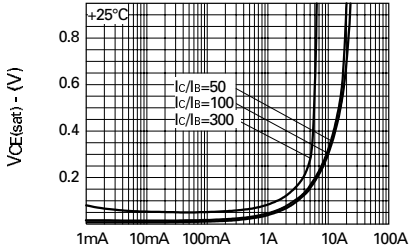
## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	35	55		V	$I_C=100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{CES}$	35	55		V	$I_C=100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{CEO}$	10	14		V	$I_C=10\text{mA}$
Collector-Emitter Breakdown Voltage	$V_{CEV}$	35	55		V	$I_C=100\mu\text{A}, V_{EB}=1\text{V}$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5	8.7		V	$I_E=100\mu\text{A}$
Collector Cut-Off Current	$I_{CBO}$		0.3	10	nA	$V_{CB}=20\text{V}$
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	$V_{CES}=20\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		23 44 120 130	40 70 185 190	mV mV mV mV	$I_C=0.5\text{A}, I_B=10\text{mA}^*$ $I_C=1\text{A}, I_B=10\text{mA}^*$ $I_C=3\text{A}, I_B=10\text{mA}^*$ $I_C=4\text{A}, I_B=20\text{mA}^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$		860	950	mV	$I_C=4\text{A}, I_B=20\text{mA}^*$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$		810	900	mV	$I_C=4\text{A}, V_{CE}=2\text{V}^*$
Static Forward Current Transfer Ratio	$h_{FE}$	280 300 240 150 60	440 450 380 230 110	1200		$I_C=10\text{mA}, V_{CE}=2\text{V}^*$ $I_C=1\text{A}, V_{CE}=2\text{V}^*$ $I_C=4\text{A}, V_{CE}=2\text{V}^*$ $I_C=10\text{A}, V_{CE}=2\text{V}^*$ $I_C=20\text{A}, V_{CE}=2\text{V}^*$
Transition Frequency	$f_T$		150		MHz	$I_C=50\text{mA}, V_{CE}=10\text{V}$ $f=50\text{MHz}$
Output Capacitance	$C_{obo}$		85	110	pF	$V_{CB}=10\text{V}, f=1\text{MHz}$
Switching Times	$t_{on}$		130		ns	$I_C=4\text{A}, I_B=40\text{mA}, V_{CC}=10\text{V}$
	$t_{off}$		180		ns	$I_C=4\text{A}, I_B=\pm 40\text{mA}, V_{CC}=10\text{V}$

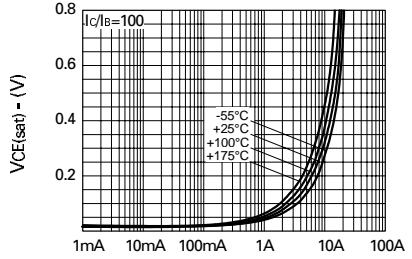
\*Measured under pulsed conditions. Pulse width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$

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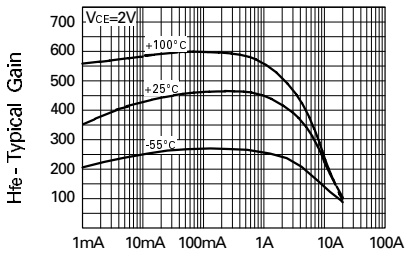
## TYPICAL CHARACTERISTICS



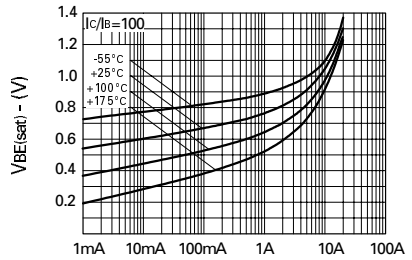
$I_C$ -Collector Current  
 **$V_{CE(sat)}$  v  $I_C$**



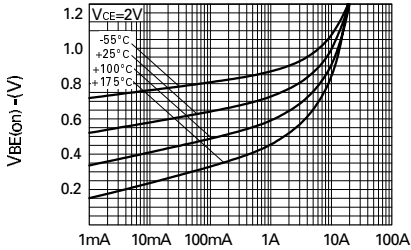
$I_C$ -Collector Current  
 **$V_{CE(sat)}$  v  $I_C$**



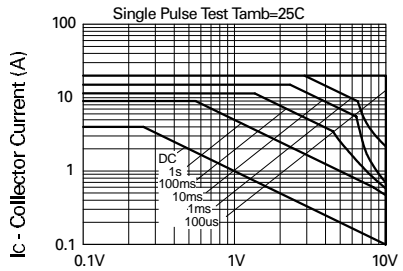
$I_C$ -Collector Current  
 **$h_{FE}$  v  $I_C$**



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

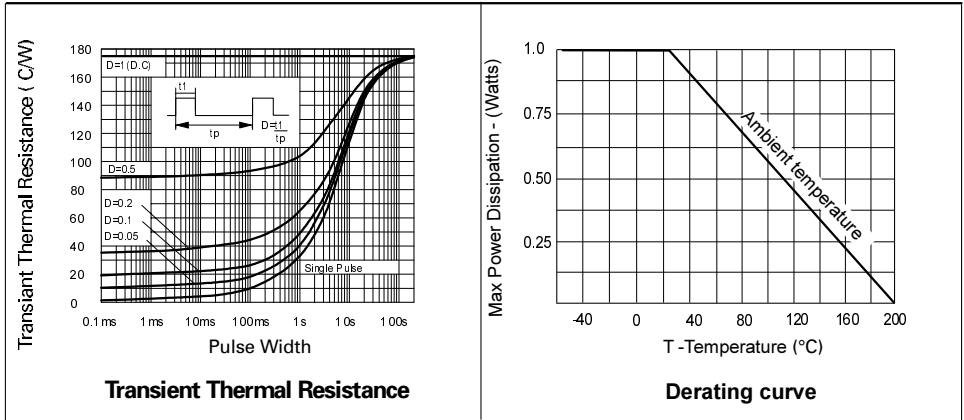


$I_C$ -Collector Current  
 **$V_{BE(on)}$  v  $I_C$**



$V_{CE}$  - Collector Voltage  
**Safe Operating Area**

# ZTX1047A



## SPICE PARAMETERS

\*ZETEX ZTX1047A Spice model Last revision 20/01/95

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```
.MODEL ZTX1047A NPN IS=9.73E-13 NF=1.0 BF=550 IKF=8.0 VAF=120
```

```
+ ISE=2.6E-13 NE=1.38 NR=1.0 BR=400 IKR=5 VAR=15
```

```
+ ISC=8E-13 NC=1.4 RB=0.1 RE=0.017 RC=0.010
```

```
+ CJC=195.4E-12 CJE=540.4E-12 MJC=0.257 MJE=0.359
```

```
+ VJC=0.390 VJE=0.753 TF=450E-12 TR=1.2E-9
```

\*

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