



**THE DATASHEET OF  
ZTX1048ASTZ**



# ZTX1048A

## NPN SILICON PLANAR ME HIGH GAIN TRANSISTOR

ISSUE 3 – FEBRUARY 1995

### FEATURES

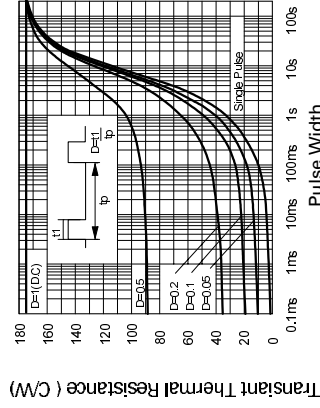
- \*  $V_{CEV}=50V$
- \* Very Low Saturation Voltages
- \* High Gain
- \* 20 Amps pulse current

### APPLICATIONS

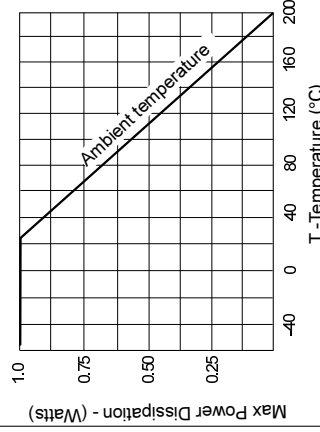
- \* LCD Backlight Convertors
- \* Emergency Lighting
- \* DC-DC Convertors

### ABSOLUTE MAXIMUM RATINGS

PARAMETER
Collector-Base Voltage
Collector-Emitter Voltage
Emitter-Base Voltage
Peak Pulse Current
Continuous Collector Current
Base Current
Power Dissipation at $T_{amb}=25^{\circ}C$
Operating and Storage Temperature Range



**Transient Thermal Resistance**



**Derating curve**

### SPICE PARAMETERS

\*ZETEX ZTX1048A Spice model Last revision 20/01/95

```
*.MODEL ZTX1048A NPN IS=13.73E-13 NF=1.0 BF=550 IKF=8.0 VAF=120
+   |SE=2.6E-13 NE=1.38 NR=1.0 BR=300 IKR=6 VAR=15
+   |SC=1.6E-12 NC=1.4 RB=0.1 RE=0.022 RC=0.010
+   |CJC=136E-12 CJE=559.1E-12 MJC=0.267 MJE=0.299
+   |VJC=0.420 VJE=0.533 TF=600E-12 TR=3E-9
*
```

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# ZTX1048A

## NPN SILICON PLANAR MEDIUM GAIN TRANSISTOR HIGH GAIN TRANSISTOR ISSUE 2 - JANUARY 1995

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

PARAMETER	SYMBOL	ZTX1048A			UNIT	CONDITIONS.
		MIN.	TYP.	MAX.		
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	50	85		V	$I_C=100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{CES}$	50	85		V	$I_C=100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{CEO}$	17.5	24		V	$I_C=10\text{mA}$
Collector-Emitter Breakdown Voltage	$V_{CEV}$	50	85		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	$V_{CB}=35\text{V}$
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	$V_{CES}=35\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		27	45	mV	$I_C=0.5\text{A}, I_B=10\text{mA}^*$
			55	75	mV	$I_C=1\text{A}, I_B=10\text{mA}^*$
			110	150	mV	$I_C=2\text{A}, I_B=10\text{mA}^*$
			210	245	mV	$I_C=4\text{A}, I_B=20\text{mA}^*$
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	$V_{BE(on)}$		860	950	mV	$I_C=4\text{A}, V_{CE}=2\text{V}^*$
Static Forward Current Transfer Ratio	$h_{FE}$		280	440		$I_C=10\text{mA}, V_{CE}=2\text{V}^*$
			300	450		$I_C=0.5\text{A}, V_{CE}=2\text{V}^*$
			300	450	1200	$I_C=1\text{A}, V_{CE}=2\text{V}^*$
			220	330		$I_C=4\text{A}, V_{CE}=2\text{V}^*$
			50	80		$I_C=20\text{A}, V_{CE}=2\text{V}^*$
Transition Frequency	$f_T$		150		MHz	$I_C=50\text{mA}, V_{CE}=10\text{V}$ $f=50\text{MHz}$
Output Capacitance	$C_{obo}$		60	80	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	$I_C=4\text{A}, I_B=40\text{mA}, V_{CC}=10\text{V}$

Full characterised data now available

### ABSOLUTE MAXIMUM RATINGS

PARAMETER
Collector-Base Voltage
Collector-Emitter Voltage
Emitter-Base Voltage
Peak Pulse Current
Continuous Collector Current
Base Current
Power Dissipation at $T_{amb}=25^{\circ}\text{C}$
Operating and Storage Temperature Range

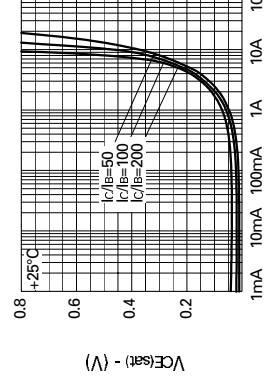
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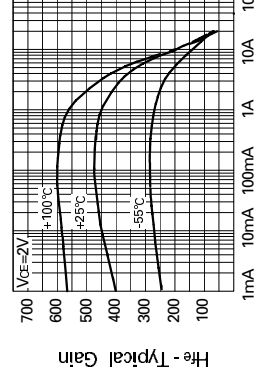
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Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	50	85		V	$I_C = 100\mu\text{A}$
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Collector-Emitter Breakdown Voltage	$V_{CEO}$	17.5	24		V	$I_C = 10\text{mA}$
Collector-Emitter Breakdown Voltage	$V_{CEV}$	50	85		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	$V_{CB} = 35\text{V}$
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	$V_{CES} = 35\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		27	45	mV	$I_C = 0.5\text{A}$ , $I_B = 10\text{mA}^*$
			55	75	mV	$I_C = 1\text{A}$ , $I_B = 10\text{mA}^*$
			110	150	mV	$I_C = 2\text{A}$ , $I_B = 10\text{mA}^*$
			210	245	mV	$I_C = 4\text{A}$ , $I_B = 20\text{mA}^*$
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	$V_{BE(on)}$		860	950	mV	$I_C = 4\text{A}$ , $V_{CE} = 2\text{V}^*$
Static Forward Current Transfer Ratio	$h_{FE}$	280 300 300 220 50	440 450 450 330 80	1200		$I_C = 10\text{mA}$ , $V_{CE} = 2\text{V}^*$ $I_C = 0.5\text{A}$ , $V_{CE} = 2\text{V}^*$ $I_C = 1\text{A}$ , $V_{CE} = 2\text{V}^*$ $I_C = 4\text{A}$ , $V_{CE} = 2\text{V}^*$ $I_C = 20\text{A}$ , $V_{CE} = 2\text{V}^*$
Transition Frequency	$f_T$		150		MHz	$I_C = 50\text{mA}$ , $V_{CE} = 10\text{V}$ $f = 50\text{MHz}$
Output Capacitance	$C_{obo}$		60	80	pF	$V_{CB} = 10\text{V}$ , $f = 1\text{MHz}$
Switching Times	$t_{on}$		120		ns	$I_C = 4\text{A}$ , $I_B = 40\text{mA}$ , $V_{CC} = 10\text{V}$
	$t_{off}$		250		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  $\leq 2\%$

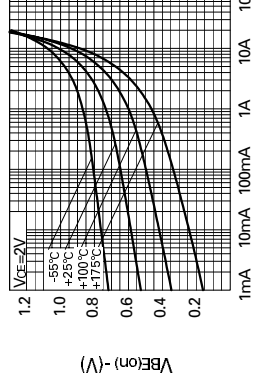
## TYPICAL



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



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



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

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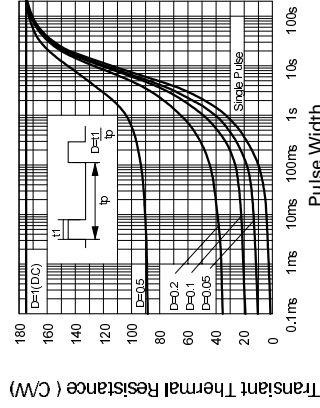
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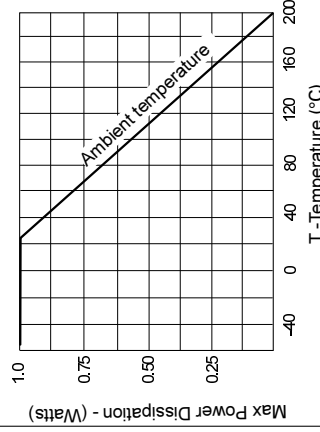
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+   |VJC=0.420 VJE=0.533 TF=600E-12 TR=3E-9
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```

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