

NPN SILICON PLANAR MEDIUM POWER HIGH GAIN TRANSISTOR

ZTX1047A

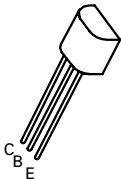
ISSUE 3 – JANUARY 1995

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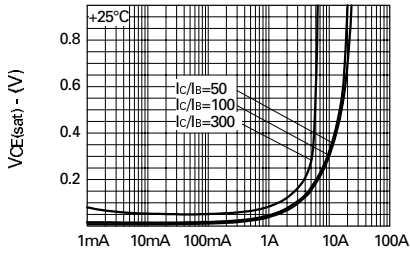
ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

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 μs . Duty cycle $\leq 2\%$

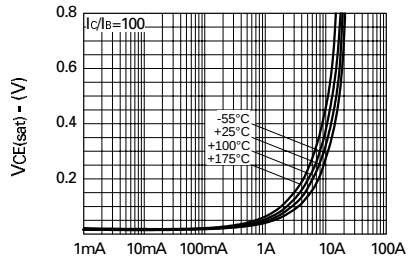
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TYPICAL CHARACTERISTICS



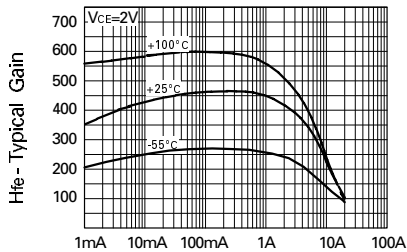
I_C -Collector Current

$V_{CE(sat)}$ v I_C



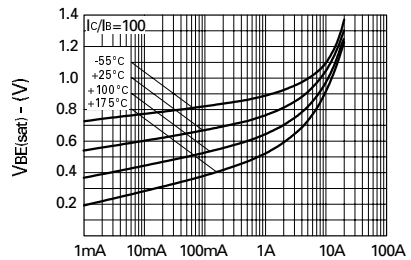
I_C -Collector Current

$V_{CE(sat)}$ v I_C



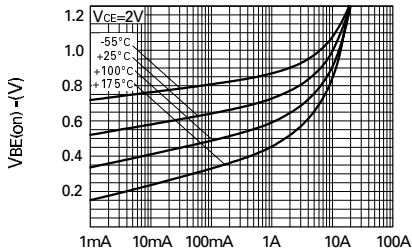
I_C -Collector Current

h_{FE} v I_C



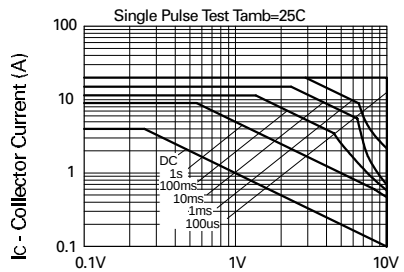
I_C -Collector Current

$V_{BE(sat)}$ v I_C



I_C -Collector Current

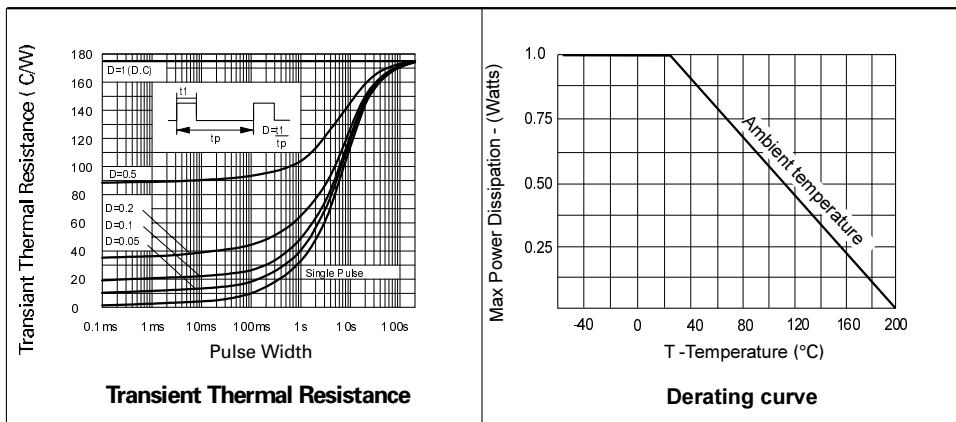
$V_{BE(on)}$ v I_C



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
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+ ISE=2.6E-13 NE=1.38 NR=1.0 BR=400 IKR=5 VAR=15
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+ ISC=8E-13 NC=1.4 RB=0.1 RE=0.017 RC=0.010
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+ CJC=195.4E-12 CJE=540.4E-12 MJC=0.257 MJE=0.359
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+ VJC=0.390 VJE=0.753 TF=450E-12 TR=1.2E-9
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