

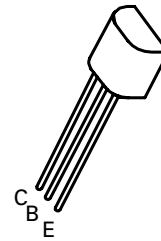
NPN SILICON PLANAR MEDIUM POWER HIGH GAIN TRANSISTOR

ISSUE 3 – JANUARY 1995

ZTX1056A

FEATURES

- * $V_{CEO}=160V$
- * 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	$^{\circ}C$

 **ZETEX**

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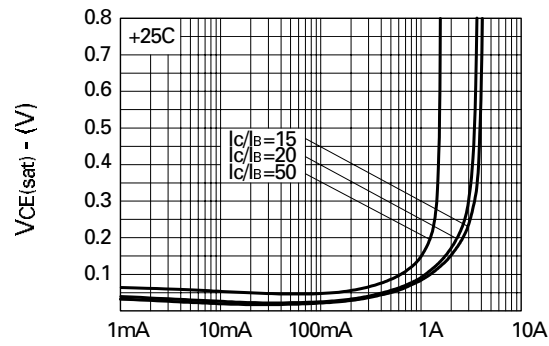
ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

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 μs . Duty cycle $\leq 2\%$

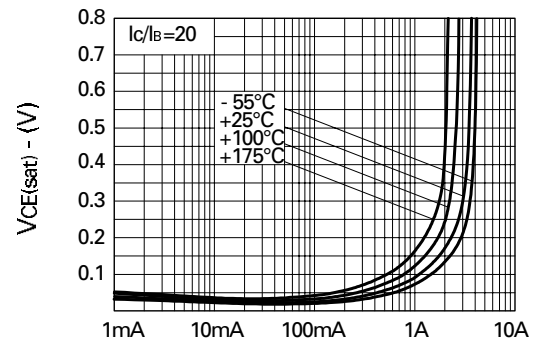
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TYPICAL CHARACTERISTICS



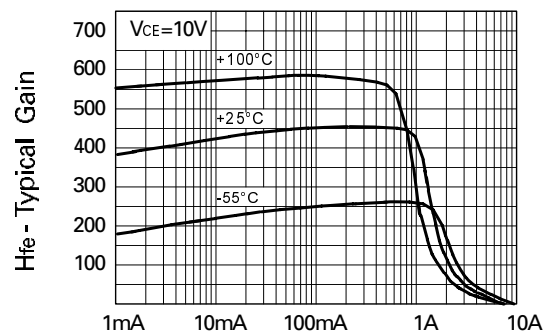
$V_{CE(sat)}$ v I_C

$V_{CE(sat)}$ v I_C



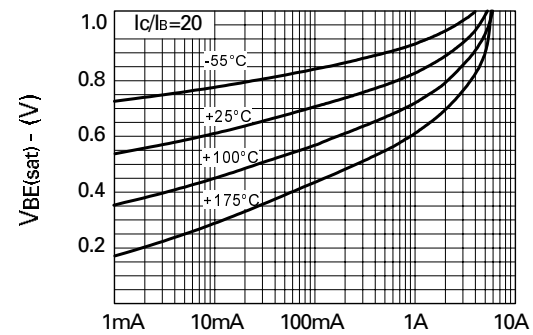
$V_{CE(sat)}$ v I_C

$V_{CE(sat)}$ v I_C



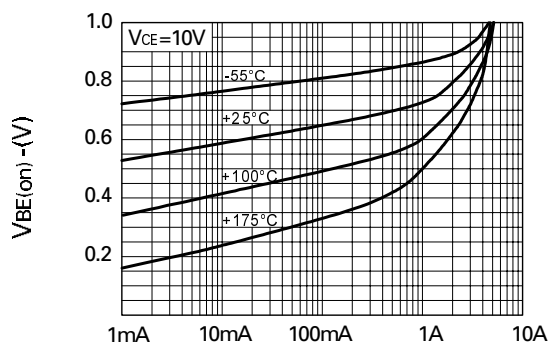
h_{FE} v I_C

h_{FE} v I_C



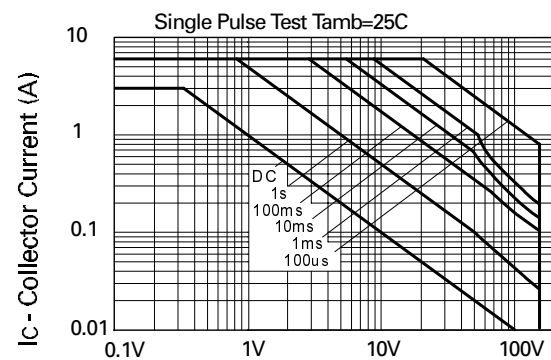
$V_{BE(sat)}$ v I_C

$V_{BE(sat)}$ v I_C



$V_{BE(on)}$ v I_C

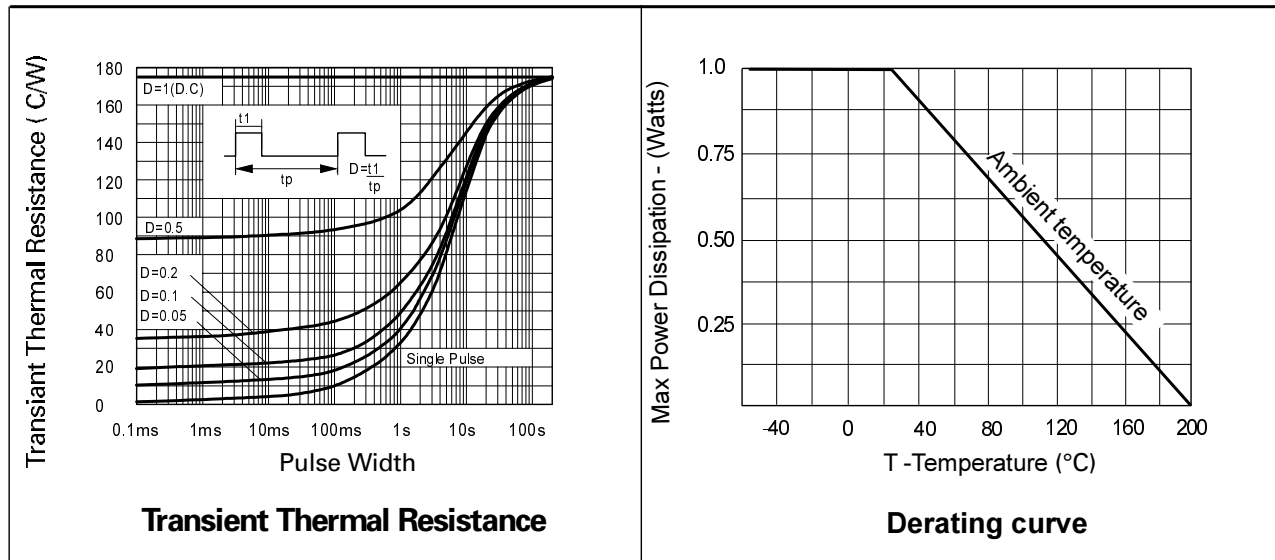
$V_{BE(on)}$ v I_C



V_{CE} - Collector Voltage

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
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+ ISC=6.0E-10 NC=1.7 RB=0.1 RE=0.065 RC=0.015
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+ 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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Zetex plc.
Fields New Road, Chadderton, Oldham, OL9-8NP, United Kingdom.
Telephone: (44)161-627 5105 (Sales), (44)161-627 4963 (General Enquiries)
Facsimile: (44)161-627 5467

Zetex GmbH
Streitfeldstraße 19
D-81673 München
Telefon: (49) 89 45 49 49 0
Fax: (49) 89 45 49 49 49

Zetex Inc.
87 Modular Avenue
Commack NY11725
Telephone: (516) 543-7100
Fax: (516) 864-7630

Zetex (Asia) Ltd.
3510 Metroplaza, Tower 2
Hing Fong Road, Kwai Fong
Telephone: (852) 26100 611
Fax: (852) 24250 494

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