

ZTX1051A

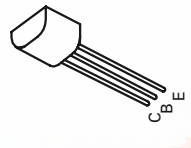
**NPN SILICON PLANAR MEDIUM POWER HIGH GAIN TRANSISTOR**

ISSUE 3 - FEBRUARY 95

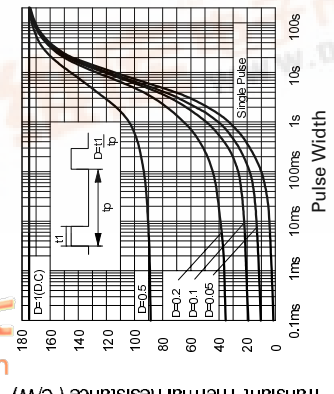
ZTX1051A

**FEATURES**

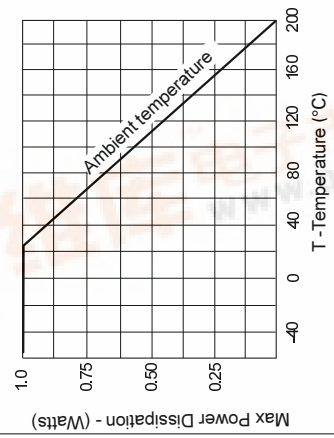
- \*  $B_{CEV}=150V$
  - \* Very Low Saturation Voltage
  - \* High Gain
  - \* Inherently Low Noise
- APPLICATIONS**
- \* Emergency Lighting
  - \* Low Noise Audio



E-Line  
TO92 Compatible



**Transient Thermal Resistance**



**Derating curve**

**ABSOLUTE MAXIMUM RATINGS.**

PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	$V_{CBO}$	150	V
Collector-Emitter Voltage	$V_{CEO}$	40	V
Emitter-Base Voltage	$V_{EBO}$	5	V
Peak Pulse Current	$I_{CM}$	10	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	$^{\circ}C$

**SPICE PARAMETERS**

ZETEX ZTX1051A Spice model Last revision 16/12/94

MODEL ZTX1051A NPN IS=1.35E-12 NF=1.0 BF=600 IKF=5.0 VAF=120  
 ISE=0.6E-13 NE=1.25 NR=1.0 BR=150 IKR=3 VAR=15  
 ISC=1.0E-10 NC=1.7 RB=0.1 RE=0.023 RC=0.010  
 CJC=90.36E-12 CJE=547.5E-12 MJC=0.385 MJE=0.357  
 VJC=0.5 VJE=0.741 TF=600E-12 TR=8E-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  
 Treibfeldstraße 19  
 D-81673 München  
 Telefon: (49) 89 45 49 49 0  
 Fax: (49) 89 45 49 49 9

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

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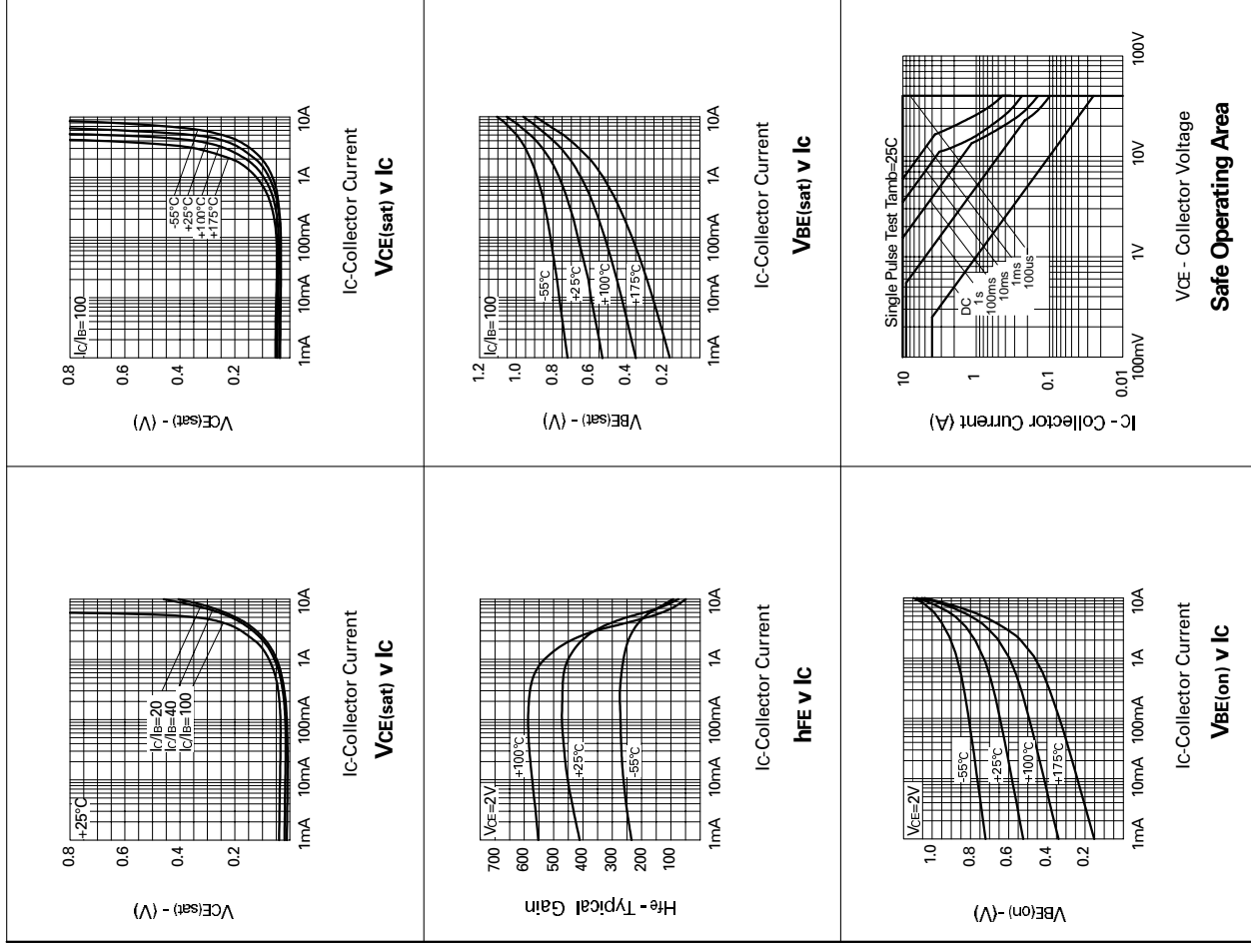
ZTX1051A

**ELECTRICAL CHARACTERISTICS (at T<sub>amb</sub> = 25°C unless otherwise stated).**

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	V <sub>BR(CBO)</sub>	150	190		V	I <sub>C</sub> =100μA
Collector-Emitter Breakdown Voltage	V <sub>CES</sub>	150	190		V	I <sub>C</sub> =100μA
Collector-Emitter Breakdown Voltage	V <sub>CEO</sub>	40	60		V	I <sub>C</sub> =10mA
Collector-Emitter Breakdown Voltage	V <sub>CEV</sub>	150	190		V	I <sub>C</sub> =100μA, V <sub>EB</sub> =1V
Emitter-Base Breakdown Voltage	V <sub>BR(EBO)</sub>	5	8.8		V	I <sub>E</sub> =100μA
Collector Cut-Off Current	I <sub>CBO</sub>		0.3	10	nA	V <sub>CB</sub> =120V
Emitter Cut-Off Current	I <sub>EBO</sub>		0.3	10	nA	V <sub>EB</sub> =4V
Collector Emitter Cut-Off Current	I <sub>CES</sub>		0.3	10	nA	V <sub>CES</sub> =120V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>		17	25	mV	I <sub>C</sub> =0.2A, I <sub>B</sub> =10mA*
			75	110	mV	I <sub>C</sub> =1A, I <sub>B</sub> =10mA*
			165	210	mV	I <sub>C</sub> =4A, I <sub>B</sub> =100mA*
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>		920	1000	mV	I <sub>C</sub> =4A, I <sub>B</sub> =100mA*
Base-Emitter Turn-On Voltage	V <sub>BE(on)</sub>		825	950	mV	I <sub>C</sub> =4A, V <sub>CE</sub> =2V*
Static Forward Transfer Ratio	h <sub>FE</sub>	290	440	1200		I <sub>C</sub> =10mA, V <sub>CE</sub> =2V*
		300	450			I <sub>C</sub> =1A, V <sub>CE</sub> =2V*
		190	310			I <sub>C</sub> =4A, V <sub>CE</sub> =2V*
		45	70			I <sub>C</sub> =10A, V <sub>CE</sub> =2V*
Transition Frequency	f <sub>T</sub>		155		MHz	I <sub>C</sub> =50mA, V <sub>CE</sub> =10V f=100MHz
Output Capacitance	C <sub>obo</sub>		27	40	pF	V <sub>CB</sub> =10V, f=1MHz
Switching Times	t <sub>on</sub>		100		ns	I <sub>C</sub> =4A, I <sub>B</sub> =40mA, V <sub>CC</sub> =10V
	t <sub>off</sub>		300		ns	I <sub>C</sub> =4A, I <sub>B</sub> =±40mA, V <sub>CC</sub> =10V

\*Measured under pulsed conditions. Pulse width=300μs. Duty cycle ≤ 2%

**TYPICAL CHARACTERISTICS**



ZTX1051A

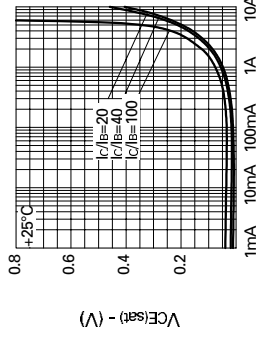
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**ELECTRICAL CHARACTERISTICS (at  $T_{amb} = 25^{\circ}C$  unless otherwise stated).**

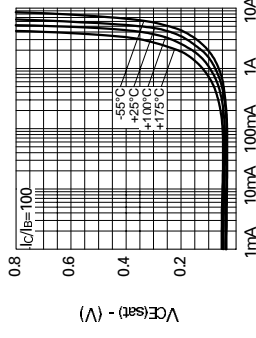
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{BR(CBO)}$	150	190		V	$I_C = 100\mu A$
Collector-Emitter Breakdown Voltage	$V_{CES}$	150	190		V	$I_C = 100\mu A$
Collector-Emitter Breakdown Voltage	$V_{CEO}$	40	60		V	$I_C = 10mA$
Collector-Emitter Breakdown Voltage	$V_{CEV}$	150	190		V	$I_C = 100\mu A, V_{EB} = 1V$
Emitter-Base Breakdown Voltage	$V_{BREBO}$	5	8.8		V	$I_E = 100\mu A$
Collector Cut-Off Current	$I_{CBO}$		0.3	10	nA	$V_{CB} = 120V$
Emitter Cut-Off Current	$I_{EBO}$		0.3	10	nA	$V_{EB} = 4V$
Collector Emitter Cut-Off Current	$I_{CES}$		0.3	10	nA	$V_{CES} = 120V$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		17	25	mV	$I_C = 0.2A, I_B = 10mA^*$
			75	110	mV	$I_C = 1A, I_B = 10mA^*$
			165	210	mV	$I_C = 4A, I_B = 100mA^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$		920	1000	mV	$I_C = 4A, I_B = 100mA^*$
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Static Forward Transfer Ratio	$h_{FE}$	290	440	1200		$I_C = 10mA, V_{CE} = 2V^*$
		300	450			$I_C = 1A, V_{CE} = 2V^*$
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Transition Frequency	$f_T$		155		MHz	$I_C = 50mA, V_{CE} = 10V, f = 100MHz$
Output Capacitance	$C_{obo}$		27	40	pF	$V_{CB} = 10V, f = 1MHz$
Switching Times	$t_{on}$		100		ns	$I_C = 4A, I_B = 40mA, V_{CC} = 10V$
	$t_{off}$		300		ns	$I_C = 4A, I_B = \pm 40mA, V_{CC} = 10V$

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

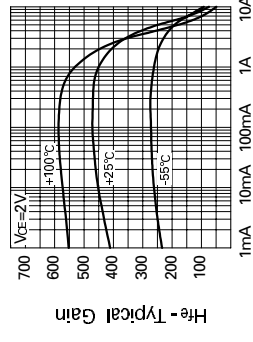
**TYPICAL CHARACTERISTICS**



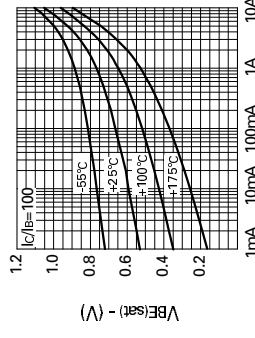
IC-Collector Current  
 **$V_{CE(sat)}$  v  $I_C$**



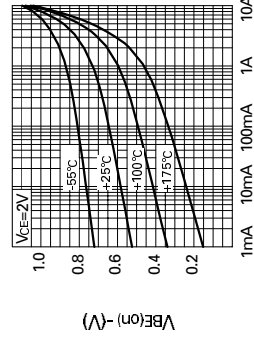
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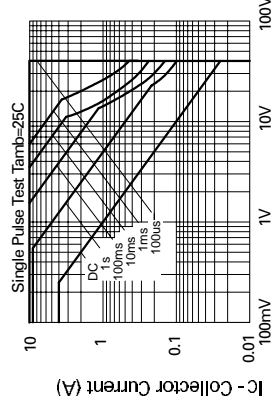
IC-Collector Current  
 **$h_{FE}$  v  $I_C$**



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



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



VCE - Collector Voltage  
**Safe Operating Area**

# ZTX1051A

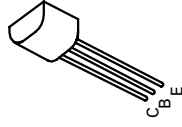
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ISSUE 3 - FEBRUARY 95

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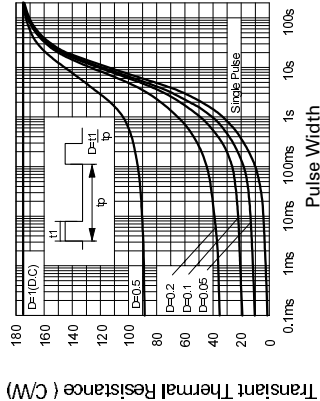
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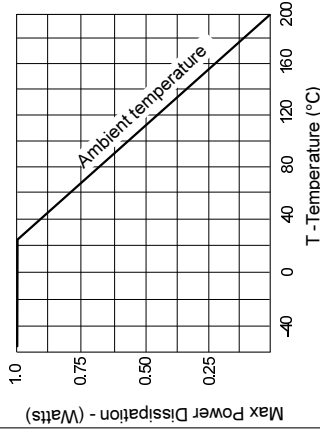
E-Line  
TO92 Compatible

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

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

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

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