

NPN SILICON PLANAR MEDIUM POWER HIGH GAIN TRANSISTOR

ZTX1053A

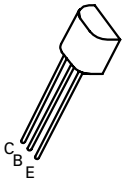
ISSUE 3- JANUARY 1995

FEATURES

- * $V_{CE0}=75V$
- * 3 Amp Continuous Current
- * 10 Amp Pulse Current
- * Very Low Saturation Voltage

APPLICATIONS

- * Automotive Switching Circuits
- * DC-DC Convertors



**E-Line
TO92 Compatible**

ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	ZTX1053A	UNIT
Collector-Base Voltage	V_{CBO}	150	V
Collector-Emitter Voltage	V_{CEO}	75	V
Emitter-Base Voltage	V_{EBO}	5	V
Peak Pulse Current	I_{CM}	10	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	$^{\circ}C$

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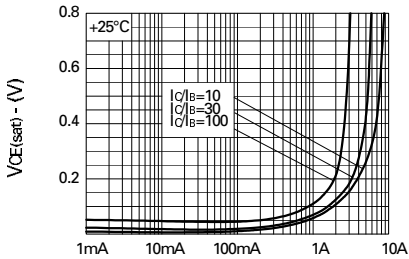
ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	150	245		V	$I_C=100\mu\text{A}$
Collector-Emitter Breakdown Voltage	V_{CES}	150	245		V	$I_C=100\mu\text{A}$
Collector-Emitter Breakdown Voltage	V_{CEO}	75	100		V	$I_C=10\text{mA}$
Collector-Emitter Breakdown Voltage	V_{CEV}	150	245		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	$V_{CB}=120\text{V}$
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	$V_{CES}=120\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		17 120 180	25 150 250	mV mV mV	$I_C=0.2\text{A}$, $I_B=20\text{mA}^*$ $I_C=1\text{A}$, $I_B=10\text{mA}^*$ $I_C=3\text{A}$, $I_B=100\text{mA}^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$		900	1000	mV	$I_C=3\text{A}$, $I_B=100\text{mA}^*$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$		825	950	mV	$I_C=3\text{A}$, $V_{CE}=2\text{V}^*$
Static Forward Current Transfer Ratio	h_{FE}	260 300 100	420 450 150 15	1200		$I_C=10\text{mA}$, $V_{CE}=2\text{V}^*$ $I_C=1\text{A}$, $V_{CE}=2\text{V}^*$ $I_C=3\text{A}$, $V_{CE}=2\text{V}^*$ $I_C=10\text{A}$, $V_{CE}=2\text{V}^*$
Transition Frequency	f_T		140		MHz	$I_C=50\text{mA}$, $V_{CE}=10\text{V}$ $f=100\text{MHz}$
Output Capacitance	C_{obo}		21	30	pF	$V_{CB}=10\text{V}$, $f=1\text{MHz}$
Switching Times	t_{on}		90		ns	$I_C=2\text{A}$, $I_B=20\text{mA}$, $V_{CC}=50\text{V}$
	t_{off}		750		ns	$I_C=2\text{A}$, $I_B=\pm 20\text{mA}$, $V_{CC}=50\text{V}$

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

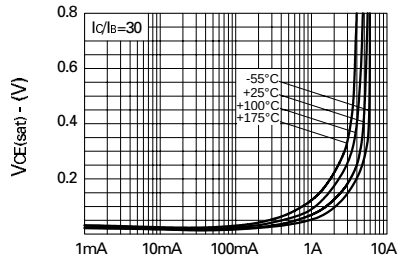
ZTX1053A

TYPICAL CHARACTERISTICS



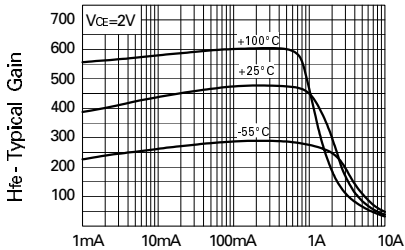
I_C -Collector Current

$V_{CE(sat)}$ v I_C



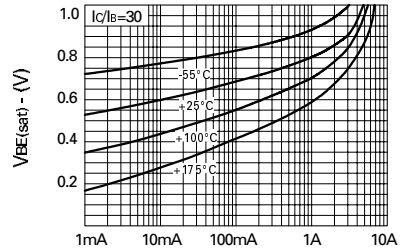
I_C -Collector Current

$V_{CE(sat)}$ v I_C



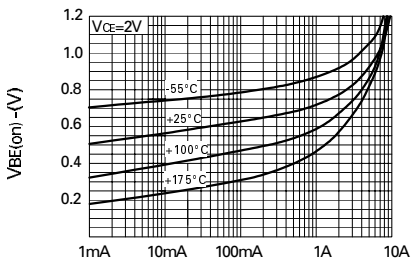
I_C -Collector Current

h_{fe} v I_C



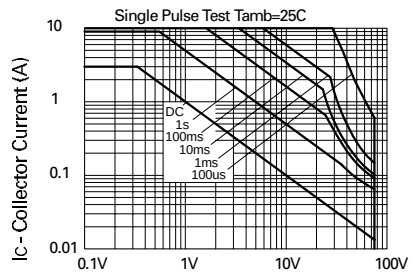
I_C -Collector Current

$V_{BE(sat)}$ v I_C



I_C -Collector Current

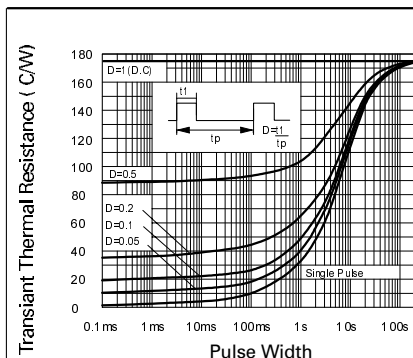
$V_{BE(on)}$ v I_C



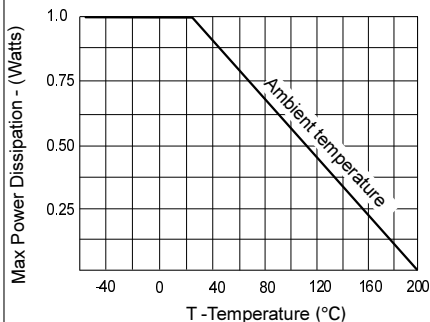
V_{CE} - Collector Voltage

Safe Operating Area

ZTX1053A



Transient Thermal Resistance



Derating curve

SPICE PARAMETERS

*ZETEX ZTX1053A Spice model Last revision 19/01/95

*

.MODEL ZTX1053A NPN IS=2.1E-12 NF=1.0 BF=600 IKF=2.2 VAF=100

+ ISE=0.9E-13 NE=1.25 NR=0.99 BR=150 IKR=2.5 VAR=15

+ ISC=5.0E-10 NC=1.76 RB=0.1 RE=0.028 RC=0.016

+ CJC=75.1E-12 CJE=520E-12 MJC=0.415 MJE=0.367

+ VJC=0.512 VJE=0.766 TF=550E-12 TR=22E-9

*

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