

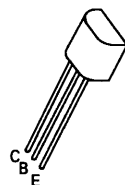
NPN SILICON PLANAR MEDIUM POWER HIGH VOLTAGE TRANSISTOR

ZTX457

ISSUE 2 – MARCH 1994

FEATURES

- * 300 Volt V_{CEO}
- * 0.5 Amp continuous current
- * $P_{tot} = 1$ Watt



E-Line
T92 Compatible

ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	V_{CBO}	300	V
Collector-Emitter Voltage	V_{CEO}	300	V
Emitter-Base Voltage	V_{EBO}	5	V
Peak Pulse Current	I_{CM}	1	A
Continuous Collector Current	I_C	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	$^{\circ}C$

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	300			V	$I_C=100\mu A, I_E=0$
Collector-Emitter Breakdown Voltage	$V_{CEO(sus)}$	300			V	$I_C=10mA, I_B=0^*$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5			V	$I_E=100\mu A$
Collector Cut-Off Current	I_{CBO}			100 10	nA μA	$V_{CB}=200V$ $V_{CB}=200V, T_{amb}=100^{\circ}C$
Emitter Cut-Off Current	I_{EBO}			100	nA	$V_{EB}=4V$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			0.3	V	$I_C=100mA, I_B=10mA^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$			1	V	$I_C=100mA, I_B=10mA^*$
Base-Emitter Turn On Voltage	$V_{BE(on)}$			1	V	$I_C=100mA, V_{CE}=10V^*$
Static Forward Current Transfer Ratio	h_{FE}	50 50 25		300		$I_C=10mA, V_{CE}=10V^*$ $I_C=50mA, V_{CE}=10V^*$ $I_C=100mA, V_{CE}=10V^*$
Transition Frequency	f_T	75			MHz	$I_C=50mA, V_{CE}=10V$ $f=20MHz$

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

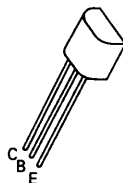
NPN SILICON PLANAR MEDIUM POWER HIGH VOLTAGE TRANSISTOR

ISSUE 2 - MARCH 1994

ZTX458

FEATURES

- * 400 Volt V_{CEO}
- * 0.5 Amp continuous current
- * $P_{tot} = 1$ Watt



E-Line
TO92 Compatible

ABSOLUTE MAXIMUM RATINGS.

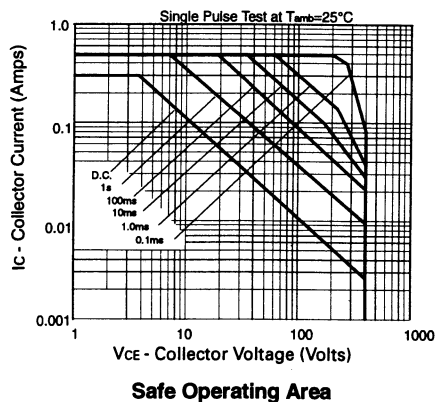
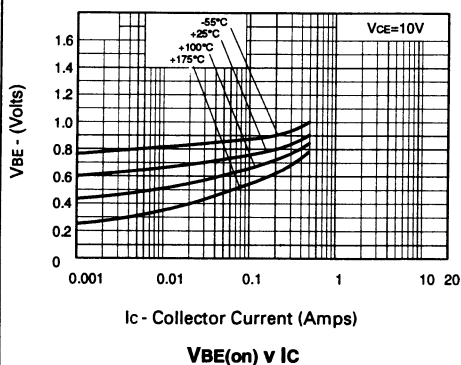
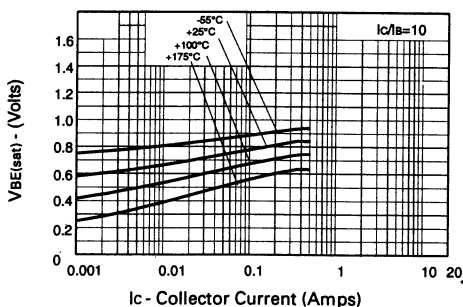
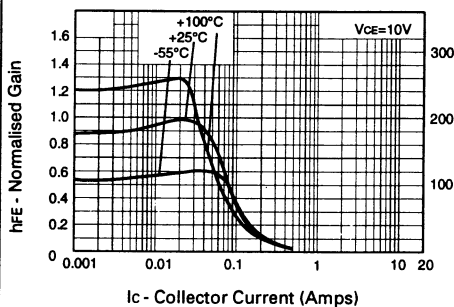
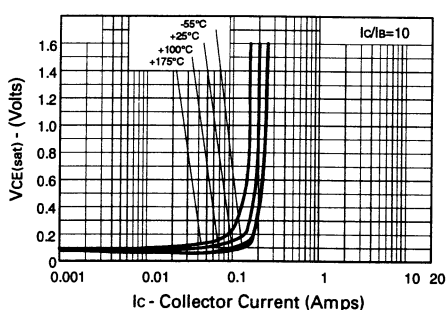
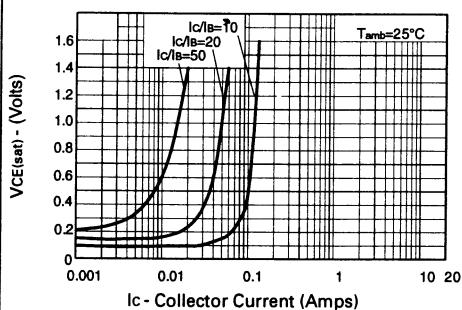
PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	V_{CBO}	400	V
Collector-Emitter Voltage	V_{CEO}	400	V
Emitter-Base Voltage	V_{EBO}	5	V
Continuous Collector Current	I_C	300	mA
Power Dissipation at $T_{amb}=25^{\circ}C$	P_{tot}	1	W
Operating and Storage Temperature Range	T_j, T_{stg}	-55 to +200	$^{\circ}C$

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	400			V	$I_C = 100\mu A$
Collector-Emitter Breakdown Voltage	$V_{CEO(sus)}$	400			V	$I_C = 10mA^*$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5			V	$I_E = 100\mu A$
Collector Cut-Off Current	I_{CBO}			100	nA	$V_{CB} = 320V$
Collector Cut-Off Current	I_{CES}			100	nA	$V_{CE} = 320V$
Emitter Cut-Off Current	I_{EBO}			100	nA	$V_{EB} = 4V$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			0.2 0.5	V V	$I_C = 20mA, I_B = 2mA$ $I_C = 50mA, I_B = 6mA$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$			0.9	V	$I_C = 50mA, I_B = 5mA$
Base-Emitter Turn On Voltage	$V_{BE(on)}$			0.9	V	$I_C = 50mA, V_{CE} = 10V$
Static Forward Current Transfer Ratio	h_{FE}	100 100 15		300		$I_C = 1mA, V_{CE} = 10V$ $I_C = 50mA, V_{CE} = 10V$ $I_C = 100mA, V_{CE} = 10V^*$
Transition Frequency	f_T	50			MHz	$I_C = 10mA, V_{CE} = 20V$ $f = 20MHz$
Collector-Base Breakdown Voltage	C_{obo}			5	pF	$V_{CB} = 20V, f = 1MHz$
Switching times	t_{on} t_{off}		135 2260		ns ns	$I_C = 50mA, V_{CE} = 100V$ $I_{B1} = 5mA, I_{B2} = 10mA$

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

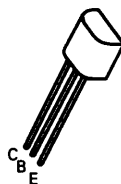
TYPICAL CHARACTERISTICS



PNP SILICON PLANAR SMALL SIGNAL TRANSISTOR

ISSUE 1 – MARCH 94

ZTX500



E-Line
TO92 Compatible

ABSOLUTE MAXIMUM RATINGS.

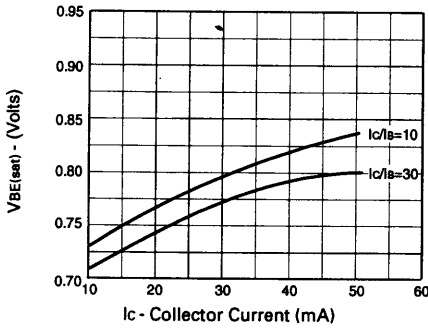
PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	V_{CBO}	-25	V
Collector-Emitter Voltage	V_{CEO}	-25	V
Emitter-Base Voltage	V_{EBO}	-5	V
Continuous Collector Current	I_C	-500	mA
Power Dissipation at $T_{amb}=25^{\circ}C$	P_{tot}	300	mW
Operating and Storage Temperature Range	$T_j: T_{stg}$	-55 to +175	$^{\circ}C$

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

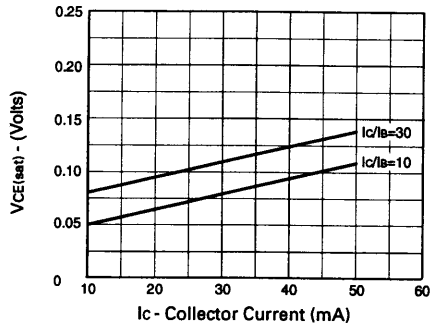
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-25			V	$I_C = -10\mu A$
Collector-Emitter Sustaining Voltage	$V_{CEO(sus)}$	-25			V	$I_C = -5mA$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-5			V	$I_E = -10\mu A$
Collector Cut-Off Current	I_{CBO}			-0.2	μA	$V_{CB} = -25V$
Emitter Cut-Off Current	I_{EBO}			-0.2	μA	$V_{EB} = -4V$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			-0.35	V	$I_C = -50mA, I_B = -5mA^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	-0.65		-1	V	$I_C = -10mA, I_B = -1mA^*$
Static Forward Current Transfer Ratio	h_{FE}	50		300		$I_C = -10mA, V_{CE} = -6V^*$
Transition Frequency	f_T	150			MHz	$I_C = -10mA, V_{CE} = -6V$ $f = 100MHz$
Output Capacitance	C_{obo}			6	pF	$V_{CB} = -6V, f = 1MHz$
Noise Figure	N		7		dB	$I_C = -100\mu A, R_S = 1.5K\Omega$ $f = 1KHz$

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

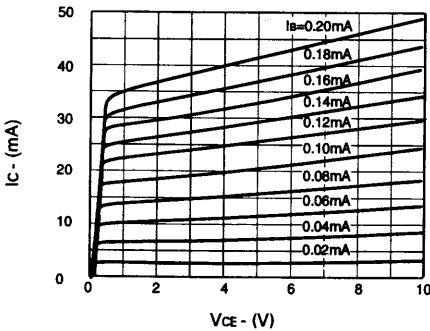
TYPICAL CHARACTERISTICS



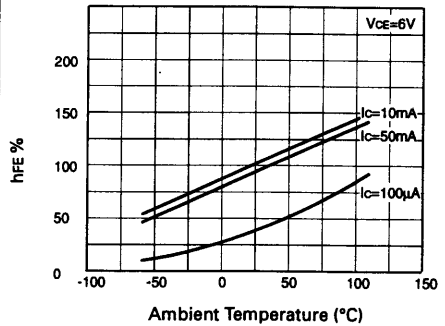
$V_{BE(sat)}$ v I_C



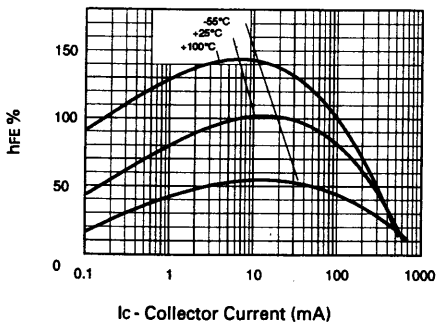
$V_{CE(sat)}$ v I_C



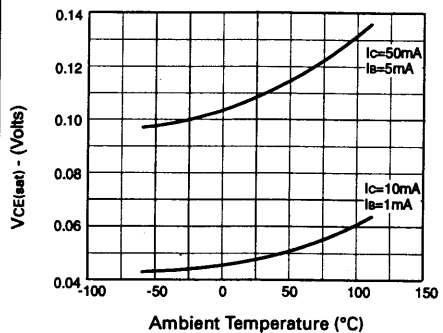
V_{CE} v I_C



h_{FE} v Ambient Temperature



h_{FE} v I_C



$V_{CE(sat)}$ v Ambient Temperature

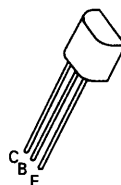
PNP SILICON PLANAR HIGH SPEED SWITCHING TRANSISTOR

ZTX510

ISSUE 2 – MARCH 94

FEATURES

- * 12 Volt V_{CEO}
- * $f_T=400\text{MHz}$



E-Line
TO92 Compatible

ABSOLUTE MAXIMUM RATINGS.

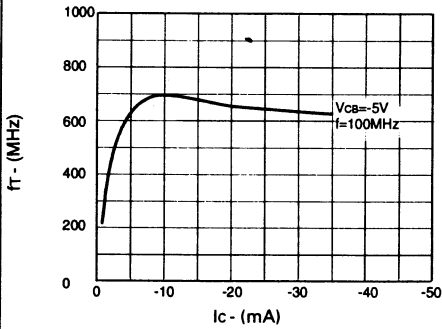
PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	V_{CBO}	-12	V
Collector-Emitter Voltage	V_{CEO}	-12	V
Emitter-Base Voltage	V_{EBO}	-4	V
Base Current	I_B	-40	mA
Continuous Collector Current	I_C	-200	mA
Power Dissipation at $T_{amb}=25^\circ\text{C}$	P_{tot}	300	mW
Operating and Storage Temperature Range	$T_j; T_{stg}$	-55 to +175	$^\circ\text{C}$

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

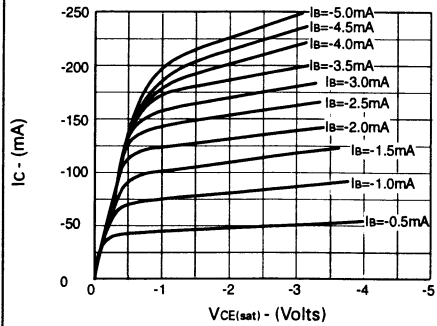
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-12			V	$I_C=-10\mu\text{A}$
Collector-Emitter Sustaining Voltage	$V_{CEO(sus)}$	-12			V	$I_C=-10\text{mA}$
Collector Cut-Off Current	I_{CBO}			-0.1	μA	$V_{CB}=-6\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			-0.15 -0.2 -0.5	V V V	$I_C=-10\text{mA}, I_B=-1\text{mA}^*$ $I_C=-30\text{mA}, I_B=-3\text{mA}^*$ $I_C=100\text{mA}, I_B=-10\text{mA}^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	-0.76 -0.82 -1.7		-0.98 -1.2	V V V	$I_C=-10\text{mA}, I_B=-1\text{mA}^*$ $I_C=-30\text{mA}, I_B=-3\text{mA}^*$ $I_C=100\text{mA}, I_B=-10\text{mA}^*$
Static Forward Current Transfer Ratio	h_{FE}	30 40 20		150		$I_C=-10\text{mA}, V_{CE}=-0.3\text{V}^*$ $I_C=-30\text{mA}, V_{CE}=-0.5\text{V}^*$ $I_C=100\text{mA}, V_{CE}=-1\text{V}^*$
Transition Frequency	f_T	400			MHz	$I_C=-30\text{mA}, V_{CE}=-5\text{V}$ $f=100\text{MHz}$
Output Capacitance	C_{obo}			6	pF	$V_{CB}=-5\text{V}, f=140\text{KHz}$
Input Capacitance	C_{ibo}			6	pF	$V_{EB}=-0.5\text{V}, f=140\text{KHz}$
Switching Times	t_{on}			60	ns	$I_C=-30\text{mA},$ $I_{B1}=I_{B2}=-1.5\text{mA}$
	t_{off}			90	ns	

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

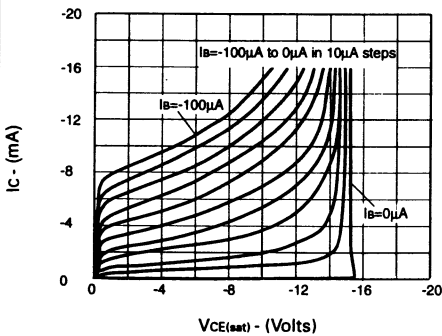
TYPICAL CHARACTERISTICS



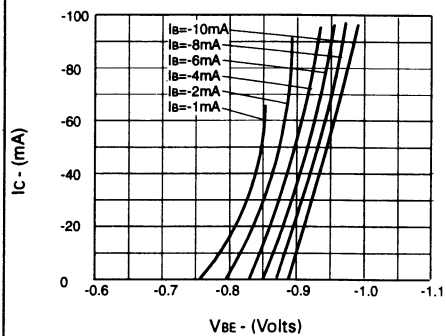
I_C v f_T



$V_{CE(sat)}$ v I_C



$V_{CE(sat)}$ v I_C

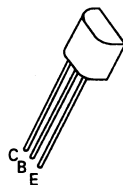


V_{BE} v I_C

PNP SILICON PLANAR MEDIUM POWER TRANSISTOR

ISSUE 2 – MARCH 94

ZTX537C



E-Line
TO92 Compatible

ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	V_{CBO}	-50	V
Collector-Emitter Voltage	V_{CEO}	-45	V
Emitter-Base Voltage	V_{EBO}	-5	V
Peak Pulse Current	I_{CM}	-1	A
Continuous Collector Current	I_C	-800	mA
Power Dissipation at $T_{amb}=25^{\circ}C$	P_{tot}	750	mW
Operating and Storage Temperature Range	$T_j; T_{stg}$	-55 to +175	$^{\circ}C$

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-50			V	$I_C = -100\mu A$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-45			V	$I_C = -100\mu A$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-5			V	$I_E = -100\mu A, I_C = 0$
Collector Cut-Off Current	I_{CBO}			-100	nA	$V_{CB} = -45V$
Emitter Cut-Off Current	I_{EBO}			-0.2	μA	$V_{EB} = -4V$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			-0.7	V	$I_C = -500mA, I_B = -50mA^*$
Base-Emitter Saturation Voltage	$V_{BE(on)}$			-1.2	V	$I_C = -300mA, V_{CE} = -1V^*$
Static Forward Current Transfer Ratio	h_{FE}	250 170		630		$I_C = -100mA, V_{CE} = -1V^*$ $I_C = -300mA, V_{CE} = -1V^*$
Transition Frequency	f_T		200		MHz	$I_C = -10mA, V_{CE} = -5V$ $f = 50MHz$
Output Capacitance	Cobo		12		pF	$V_{CB} = -10V, f = 1MHz$

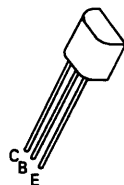
*Measured under pulsed conditions. Pulse width=300 μs . Duty cycle $\leq 2\%$

PNP SILICON PLANAR

SMALL SIGNAL TRANSISTOR

ISSUE 2 – MARCH 94

ZTX541



E-Line
TO92 Compatible

ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	V_{CBO}	-100	V
Collector-Emitter Voltage	V_{CEO}	-100	V
Emitter-Base Voltage	V_{EBO}	-5	V
Continuous Collector Current	I_C	-100	mA
Power Dissipation at $T_{amb}=25^{\circ}C$	P_{tot}	300	mW
Operating and Storage Temperature Range	$T_j; T_{stg}$	-55 to +175	$^{\circ}C$

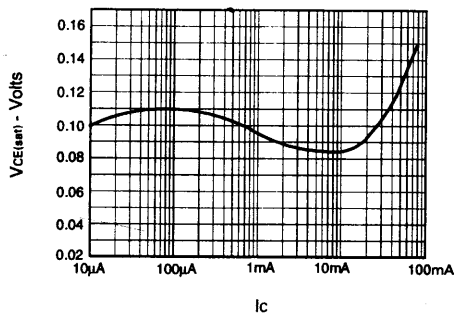
ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}C$).

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-100			V	$I_C = -100\mu A$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-100			V	$I_C = -10\mu A$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-5			V	$I_E = -100\mu A$
Collector Cut-Off Current	I_{CBO}			-0.5	μA	$V_{CB} = -80V$
Emitter Cut-Off Current	I_{CER}			-0.5 -10	μA μA	$V_{CE} = -80V, R_{BE} = 50K\Omega$ $V_{CE} = -80V, R_{BE} = 50K\Omega$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			-0.5	V	$I_C = -2mA, I_B = -0.1mA$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$			-1.0	V	$I_C = -2mA, I_B = -0.1mA$
Static Forward Current Transfer Ratio	h_{FE}	30				$I_C = -2mA, V_{CE} = -1V$
Transition Frequency	f_T	80			MHz	$I_C = -5mA, V_{CE} = -5V$ $f = 60MHz$
Output Capacitance	C_{obo}			10	pF	$V_{CB} = -6V, f = 1MHz$

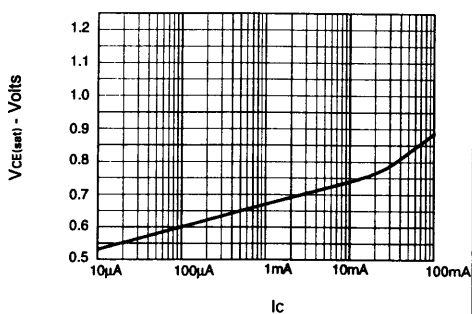
*Measured under pulsed conditions. Pulse width=300 μs . Duty cycle $\leq 2\%$

ZTX541

TYPICAL CHARACTERISTICS



$V_{CE(sat)}$ V I_C



$V_{BE(sat)}$ V I_C