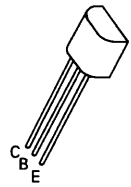
NPN SILICON PLANAR SMALL SIGNAL TRANSISTOR

ISSUE 2 – MARCH 94

ZTX300



E-Line
TO92 Compatible

ABSOLUTE MAXIMUM RATINGS.

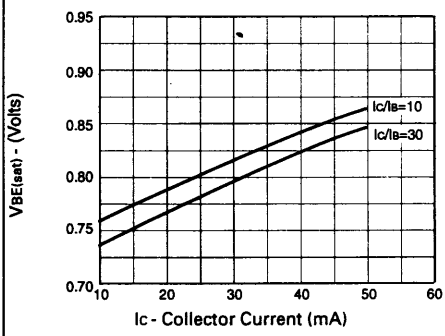
PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	V_{CBO}	25	V
Collector-Emitter Voltage	V_{CEO}	25	V
Emitter-Base Voltage	V_{EBO}	5	V
Continuous Collector Current	I_C	500	mA
Power Dissipation at T_{amb}=25°C	P_{tot}	300	mW
Operating and Storage Temperature Range	T_j:T_{stg}	-55 to +175	°C

ELECTRICAL CHARACTERISTICS (at T_{amb} = 25°C unless otherwise stated).

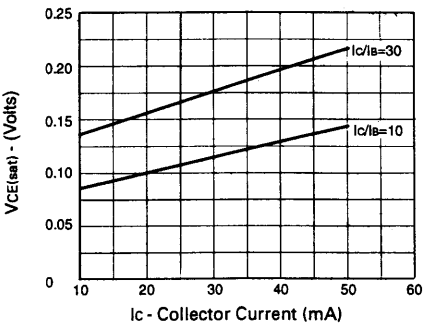
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	25			V	I_C=10μA, I_E=0
Collector-Emitter Sustaining Voltage	$V_{CEO(sus)}$	25			V	I_C=5mA, I_B=0
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5			V	I_E=10μA, I_C=0
Collector Cut-Off Current	I_{CBO}			0.2	μA	V_{CB}=25V, I_E=0
Emitter Cut-Off Current	I_{EBO}			0.2	μA	V_{EB}=4V, I_C=0
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		1.0	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, I_E=0 f=1MHz
Noise Figure	N		7		dB	V_{CE}=6V, f=1KHz R_S=1500Ω, I_C=100μA

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

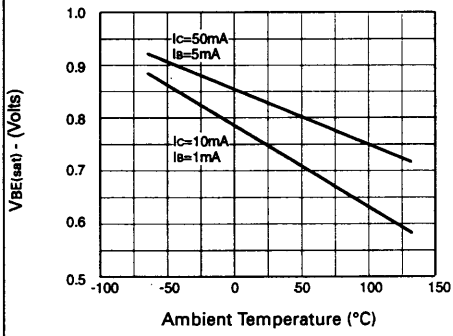
TYPICAL CHARACTERISTICS



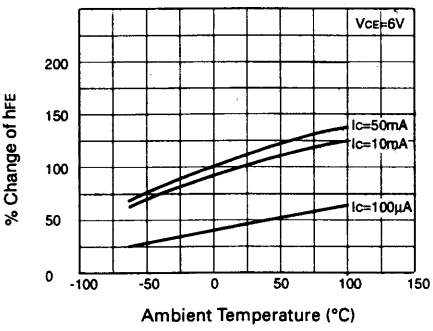
VBE(sat) v IC



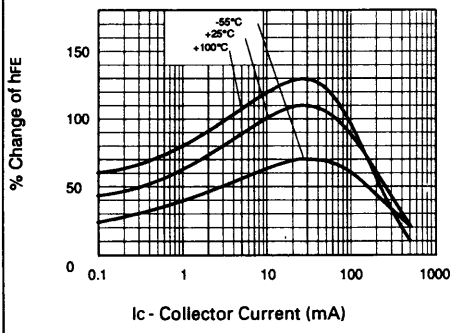
VCE(sat) v IC



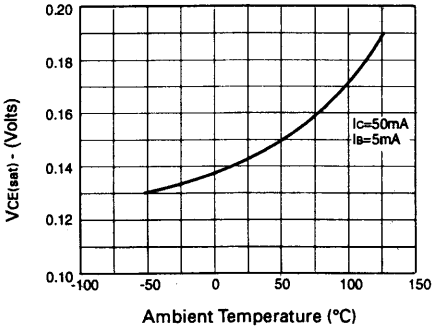
VBE(sat) v Ambient Temperature



hFE v Ambient Temperature



hFE v IC



VCE(sat) v Ambient Temperature

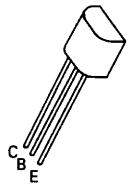
NPN SILICON PLANAR
HIGH SPEED SWITCHING TRANSISTOR

ZTX314

ISSUE 2 – MARCH 94

FEATURES

* 15 Volt V_{CEO}
* f_T=500 MHz



E-Line
TO92 Compatible

ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	V_{CBO}	40	V
Collector-Emitter Voltage	V_{CEO}	15	V
Emitter-Base Voltage	V_{EBO}	5	V
Base Current	I_B	100	mA
Continuous Collector Current	I_C	500	mA
Power Dissipation at T_{amb}=25°C	P_{tot}	300	mW
Operating and Storage Temperature Range	T_j:T_{stg}	-55 to +175	°C

ELECTRICAL CHARACTERISTICS (at T_{amb} = 25°C unless otherwise stated).

PARAMETER	SYMBOL	MIN.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	40		V	I_C=10μA, I_E=0
Collector-Emitter Sustaining Voltage	$V_{CEO(SUS)}$	15		V	I_C=10mA, I_B=0*
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5		V	I_E=10μA, I_C=0
Collector Cut-Off Current	I_{CBO}		200 30	nA μA	V_{CB}=20V, I_E=0 V_{CB}=20V, I_E=0, T_{amb}=100°C
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$		0.2 0.5	V V	I_C=10mA, I_B=1mA* I_C=100mA, I_B=10mA*
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	0.7	0.85 1.6	V	I_C=10mA, I_B=1mA* I_C=100mA, I_B=10mA*
Static Forward Current Transfer Ratio	h_{FE}	40 40 30 20	120 120		I_C=10mA, V_{CE}=1V* I_C=10mA, V_{CE}=0.35V* I_C=30mA, V_{CE}=1V* I_C=100mA, V_{CE}=1V*
Transition Frequency	f_T	500		MHz	I_C=10mA, V_{CE}=10V f=100MHz
Output Capacitance	C_{obo}		4	pF	V_{CB}=5V, f=1MHz
Storage Time	t_{stg}		13	ns	I_C=I_{B1}=I_{B2}=10mA
Turn-on Time	t_{on}		12	ns	I_C=10mA, I_{B1}=3mA
Turn-off Time	t_{off}		18	ns	I_C=10mA, I_{B1}=3mA, I_{B2}=1.5mA

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

NPN SILICON PLANAR HIGH SPEED SWITCHING TRANSISTORS

ZTX320 ZTX321 ZTX322 ZTX323

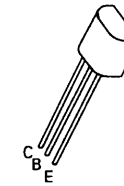
ISSUE 3 – APRIL 94

FEATURES

* 15 Volt V_{CEO}
* f_T=600 MHz

APPLICATIONS

* VHF/UHF operation



E-Line
TO92 Compatible

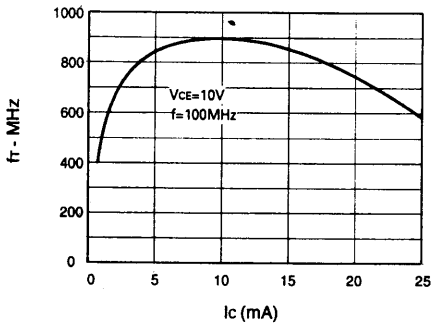
ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	V_{CBO}	30	V
Collector-Emitter Voltage	V_{CEO}	15	V
Emitter-Base Voltage	V_{EBO}	3	V
Base Current	I_B	100	mA
Continuous Collector Current	I_C	500	mA
Power Dissipation at T_{amb}=25°C	P_{tot}	300	mW
Operating and Storage Temperature Range	T_j:T_{stg}	-55 to +175	°C

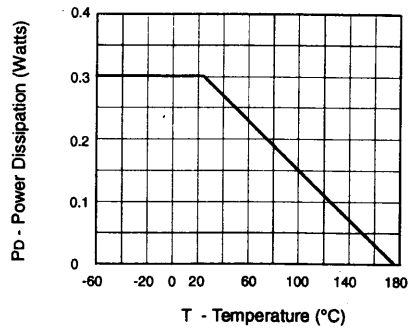
ELECTRICAL CHARACTERISTICS (at T_{amb} = 25°C).

PARAMETER		SYMBOL	MIN.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage		$V_{(BR)CBO}$	30		V	I_C=10μA, I_E=0
Collector-Emitter Sustaining Voltage		$V_{CEO(SUS)}$	15		V	I_C=10mA, I_B=0
Emitter-Base Breakdown Voltage		$V_{(BR)EBO}$	3		V	I_E=10μA, I_C=0
Collector Cut-Off Current		I_{CBO}		0.01	μA	V_{CB}=15V, I_E=0
Emitter Cut-Off Current		I_{EBO}		0.2	μA	V_{EB}=2V, I_C=0
Collector-Emitter Saturation Voltage	ZTX320, ZTX322 ZTX323 ZTX321	$V_{CE(sat)}$		0.4 0.4 0.4	V V V	I_C=10mA, I_B=1mA I_C=10mA, I_B=1mA I_C=3mA, I_B=0.3mA
Base-Emitter Saturation Voltage	ZTX320, ZTX322 ZTX323 ZTX321	$V_{BE(sat)}$		1.0 1.0 1.0	V V V	I_C=10mA, I_B=1mA I_C=10mA, I_B=1mA I_C=3mA, I_B=0.3mA
Static Forward Current Transfer Ratio	ZTX320, ZTX321 ZTX322 ZTX323	h_{FE}	20 20 100	300 150 300		I_C=3mA, V_{CE}=1V I_C=3mA, V_{CE}=1V I_C=3mA, V_{CE}=1V
Output Capacitance		C_{obo}		1.7	pF	V_{CB}=10V, f=1MHz
Input Capacitance		C_{ibo}		1.6	pF	V_{EB}=0.5V, f=1MHz
Transition Frequency at f=100MHz		f_T	600 400		MHz MHz	I_C=4mA, V_{CE}=10V I_C=30mA, V_{CE}=10V
Noise Figure		N		6	dB	I_E=1mA, V_{CE}=6V R_S=400Ω, f=60MHz
Power Gain		g_{pe}	typical 15		dB	I_C=6mA, V_{CB}=12V f=200MHz

TYPICAL CHARACTERISTICS



fT v Ic



Derating Curve

NPN SILICON PLANAR RF TRANSISTOR

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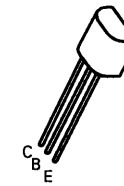
ZTX325

FEATURES

* High f_T, 1.3GHz
* Low noise < 5dB at 500MHz
* Power output at 500MHz >175mW



E-Line
TO92 Compatible

ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	V_{CBO}	30	V
Collector-Emitter Voltage	V_{CEO}	15	V
Emitter-Base Voltage	V_{EBO}	2.5	V
Mean Collector Current (Averaged over 100µs)	I_{AV}	25	mA
Collector Current	I_{CM}	50	mA
Power Dissipation at T_{amb}=25°C	P_{tot}	350	mW
Operating and Storage Temperature Range	T_j:T_{stg}	-55 to +200	°C

ELECTRICAL CHARACTERISTICS (at T_{amb} = 25°C unless otherwise stated).

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Emitter Sustaining Voltage	$V_{CEO(SUS)}$	15			V	I_C=10mA, I_B=0
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5			V	I_E=10µA, I_C=0
Collector Cut-Off Current	I_{CBO}			10	nA	V_{CB}=15V, I_E=0
Emitter Cut-Off Current	I_{CES}			10	µA	V_{CE}=15V, V_{BE}=0
Static Forward Current Transfer Ratio	h_{FE}	25 20		150 125		I_C=2mA, V_{CE}=1V* I_C=25mA, V_{CE}=1V*
Transition Frequency	f_T	1.0 1.3			GHz GHz	I_C=2mA, V_{CE}=5V, f=400MHz I_C=25mA, V_{CE}=5V, f=400MHz
Capacitance, Collector Depletion Layer	C_{TC}			1.5	pF	V_{CB}=10V, I_E=I_e=0, f=1MHz
Capacitance, Emitter Depletion Layer	C_{TE}			2.0	pF	V_{EB}=0.5V, I_C=I_c=0, f=1MHz
Feedback Capacitance	$-C_{re}$		0.85		pF	V_{CE}=5V, I_C=2mA, f=1MHz
Feedback Time Constant	$r_{bb}'C_{b'c}$	2.0		12	ps	V_{CB}=5V, $-I_E$=2mA, f=10.7MHz

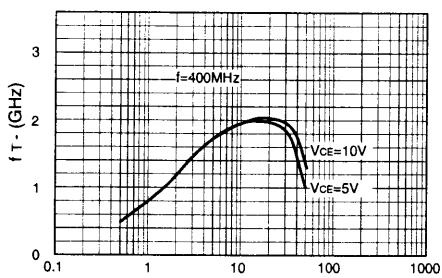
ZTX325

ELECTRICAL CHARACTERISTICS

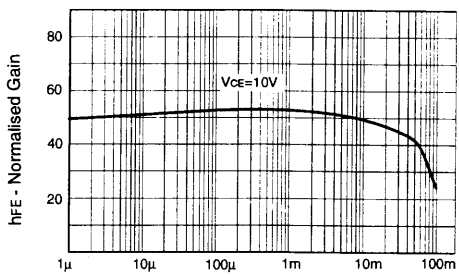
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Noise Figure	N			5.0	dB	f=500MHz, V_{CE}=5V, I_C=2mA, R_S=50Ω
Intermodulation Distortion	d_{im}		-53		dB	I_C=14mA, V_{CE}=6V, f=217MHz V_0=100mV, R_L=37.5Ω, f_1=183MHz, f_2=200MHz
Output Power (at T_{case}=25°C)*	P_O	175			mW	V_{CE}=13.5V, I_C=22.5mA P_{in}=25mW, f=500MHz

*It is essential that care be taken to reduce steady state current when no h.f. signal is applied.

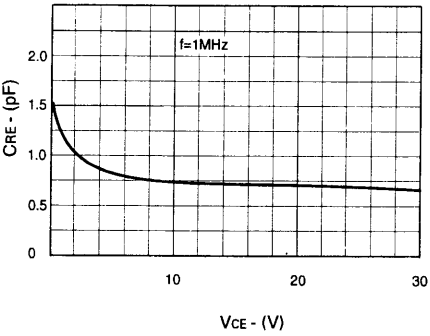
TYPICAL CHARACTERISTICS



fT v IC



hFE v IC



CRE v VCE

NPN SILICON PLANAR MEDIUM POWER TRANSISTOR

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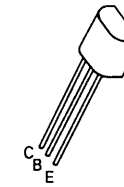
ZTX337C



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
Base Current	I_B	100	mA
Continuous Collector Current	I_C	800	mA
Power Dissipation	P_{tot}	750	mW
Operating and Storage Temperature Range	T_j:T_{stg}	-55 to +175	°C

ELECTRICAL CHARACTERISTICS (at T_{amb} = 25°C unless otherwise stated).

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	50			V	I_C=100μA
Collector-Emitter Breakdown Voltage	$V_{(BR)CES}$	45			V	I_C=100μA
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5			V	I_E=100μA
Collector Cut-Off Current	I_{CBO}			100	nA	V_{CB}=45V, I_E=0
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			0.7	V	I_C=500mA, I_B=50mA*
Base-Emitter Turn On Voltage	$V_{BE(on)}$			1.2	V	I_C=300mA,V_{CE}=1V*
Static Forward Current Transfer	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	C_{obo}		12		pF	V_{CB}=10V, f=1MHz

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