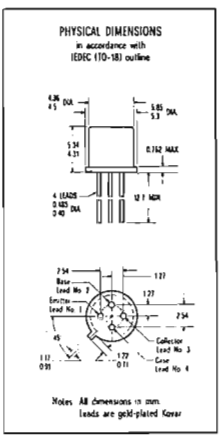
BFX 73

ULTRA HIGH FREQUENCY OSCILLATOR AND AMPLIFIER

NPN DIFFUSED SILICON PLANAR EPITAXIAL TRANSISTOR

GENERAL DESCRIPTION - The BFX73 is an NPN double diffused silicon PLANAR epitaxial transistor. It is designed for low noise high-frequency amplifiers; 1 MHz local oscillators; non-neutralized IF amplifiers and non-saturating circuits with rise and fall time of less than 2.5 nanoseconds.



ABSOLUTE MAXIMUM RATINGS (Note 1)

Maximum Temperatures

T_{STG}	Storage Temperature	-55°C to +200°C
T_J	Operating Junction Temperature	200°C Maximum
T_L	Lead Temperature (Soldering, 10 sec. time limit)	260°C Maximum

Maximum Power Dissipations (Notes 2 and 3)

P	Total Dissipation at 25°C Case Temperature	0.3 Watt
	at 25°C Ambient Temperature	0.2 Watt

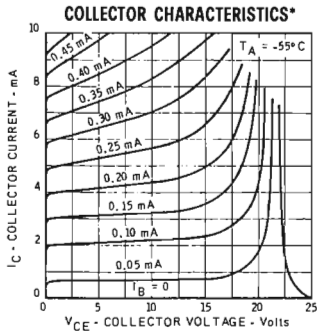
Maximum Voltages and Current (25°C free air temperature unless otherwise noted)

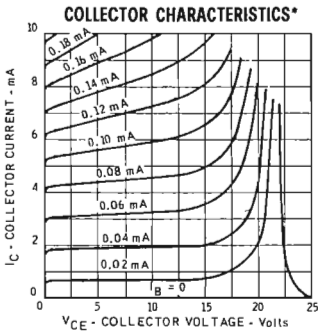
V_{CBO}	Collector to Base Voltage	30 Volts
V_{CEO}	Collector to Emitter Voltage (Note 4)	15 Volts
V_{EBO}	Emitter to Base Voltage	3 Volts
I_C	DC Collector Current	50 mA

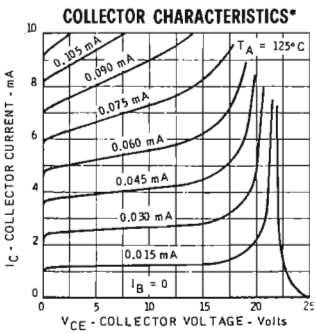
ELECTRICAL CHARACTERISTICS (25°C free air temperature unless otherwise noted)

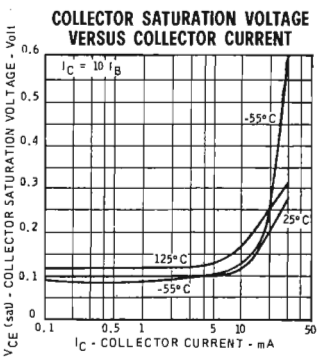
SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS	
h_{FE}	DC Pulse Current Gain (Note 5)	20	50			I_C = 3 mA	V_{CE} = 1 V
V_{BE} (sat)	Base-Emitter Saturation Voltage (Note 5)			1	V	I_C = 10 mA	I_B = 1 mA
V_{CE} (sat)	Collector-Emitter Saturation Voltage (Note 5)			0.4	V	I_C = 10 mA	I_B = 1 mA
I_{CBO}	Collector Cutoff Current			10	nA	I_E = 0	V_{CB} = 15 V
I_{CBO} (125°C)	Collector Cutoff Current			1	µA	I_E = 0	V_{CB} = 15 V
BV_{CBO}	Collector to Base Breakdown Voltage	30			V	I_C = 1 µA	I_E = 0
BV_{EBO}	Emitter to Base Breakdown Voltage	3			V	I_C = 0	I_E = 10 µA
V_{CEO} (sust)	Collector to Emitter Sustaining Voltage (Notes 4 and 5)	15			V	I_C = 3 mA	I_B = 0
h_{fe}	High Frequency Current Gain (f = 100 MHz)	6	9			I_C = 4 mA	V_{CE} = 10 V
C_{ob}	Output Capacitance		1	1.7	pF	I_E = 0	V_{CB} = 10 V
C_{ob}	Output Capacitance		1.8	3	pF	I_E = 0	V_{CB} = 0
C_{TE}	Emitter Transition Capacitance			2	pF	I_C = 0	V_{EB} = 0.5 V
NF	Noise Figure (Note 6)		3	6	dB	I_C = 1 mA	V_{CE} = 6 V
P_o	Power Output (f = 500 MHz)	30	40		mW	I_C = 8 mA	V_{CB} = 15 V
η	Collector Efficiency (f = 500 MHz)	25			%	I_C = 8 mA	V_{CB} = 15 V
G_{pe}	Available Power Gain (neutralized) (f = 200 MHz)	15	18		dB	I_C = 6 mA	V_{CE} = 12 V

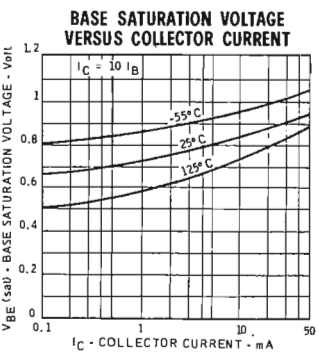
TYPICAL ELECTRICAL CHARACTERISTICS (25° C free air temperature unless otherwise noted)

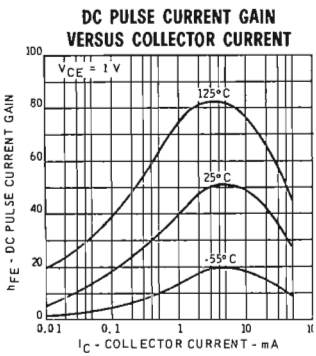


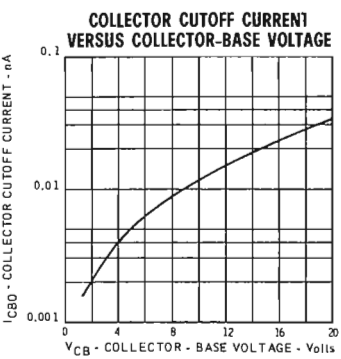


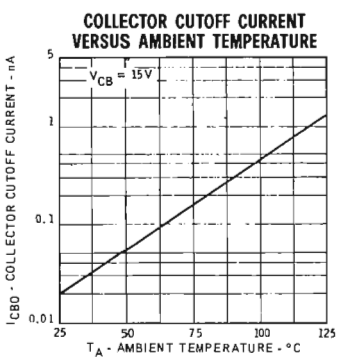


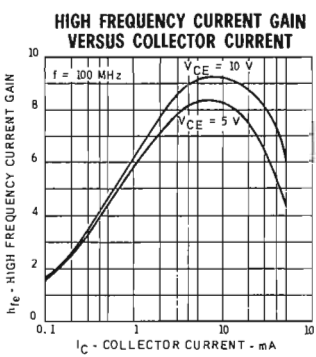








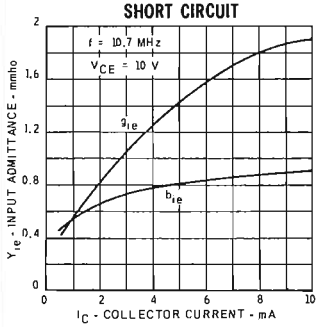




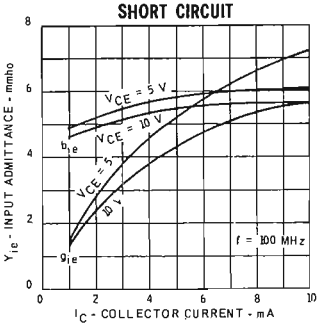
* Single family characteristics on Transistor Curve Tracer.

TYPICAL ELECTRICAL CHARACTERISTICS (25° C free air temperature unless otherwise noted)

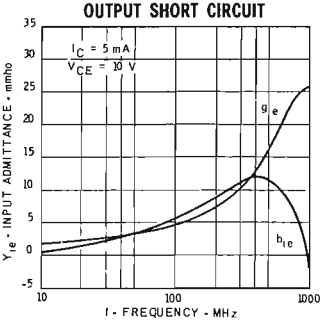
INPUT ADMITTANCE VERSUS COLLECTOR CURRENT OUTPUT SHORT CIRCUIT



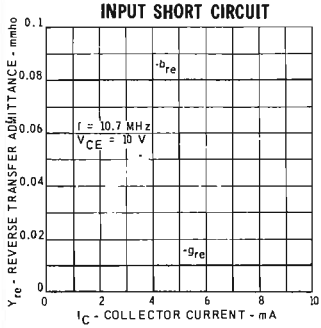
INPUT ADMITTANCE VERSUS COLLECTOR CURRENT OUTPUT SHORT CIRCUIT



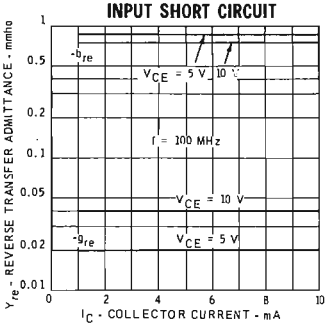
INPUT ADMITTANCE VERSUS FREQUENCY OUTPUT SHORT CIRCUIT



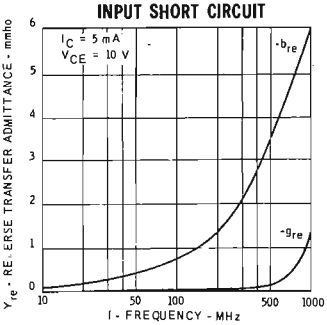
REVERSE TRANSFER ADMITTANCE VERSUS COLLECTOR CURRENT INPUT SHORT CIRCUIT



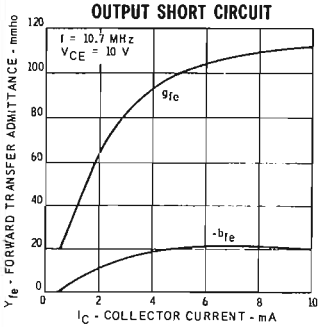
REVERSE TRANSFER ADMITTANCE VERSUS COLLECTOR CURRENT INPUT SHORT CIRCUIT



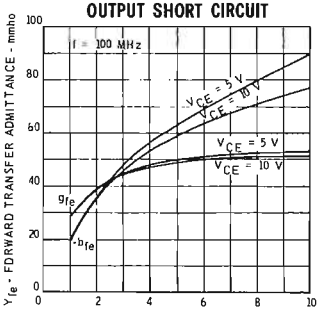
REVERSE TRANSFER ADMITTANCE VERSUS FREQUENCY INPUT SHORT CIRCUIT



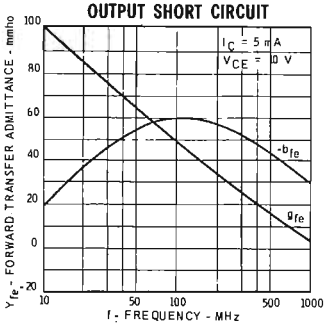
FORWARD TRANSFER ADMITTANCE VERSUS COLLECTOR CURRENT OUTPUT SHORT CIRCUIT



FORWARD TRANSFER ADMITTANCE VERSUS COLLECTOR CURRENT OUTPUT SHORT CIRCUIT

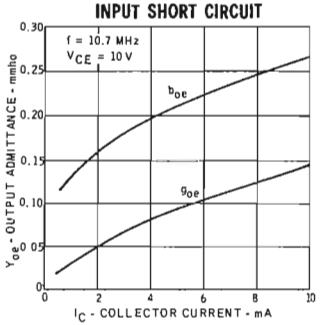


FORWARD TRANSFER ADMITTANCE VERSUS FREQUENCY OUTPUT SHORT CIRCUIT

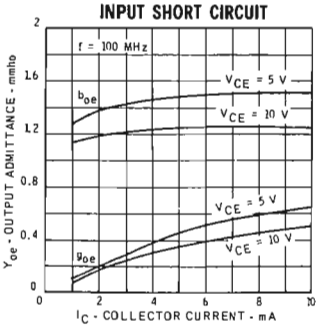


TYPICAL ELECTRICAL CHARACTERISTICS (25° C free air temperature unless otherwise noted)

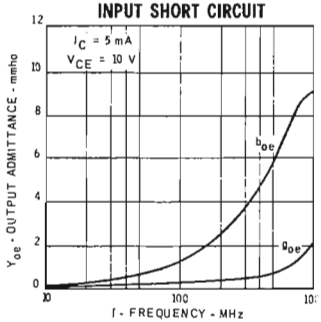
OUTPUT ADMITTANCE VERSUS COLLECTOR CURRENT INPUT SHORT CIRCUIT



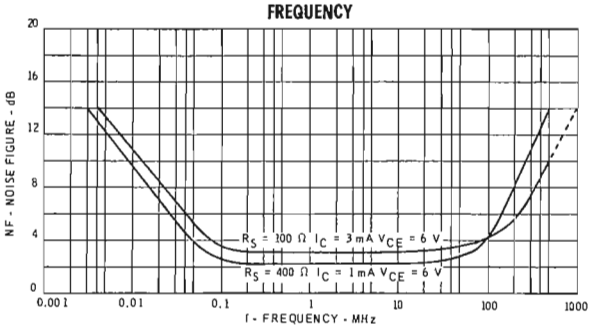
OUTPUT ADMITTANCE VERSUS COLLECTOR CURRENT INPUT SHORT CIRCUIT



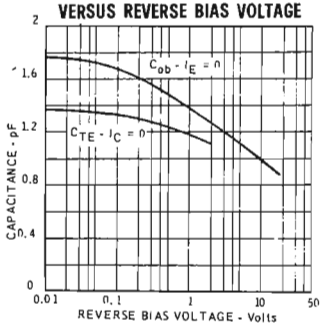
OUTPUT ADMITTANCE VERSUS FREQUENCY INPUT SHORT CIRCUIT



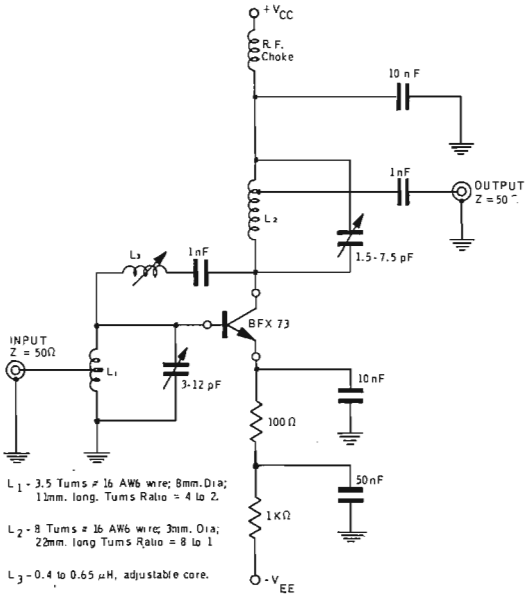
NOISE FIGURE VERSUS FREQUENCY



INPUT AND OUTPUT CAPACITANCE VERSUS REVERSE BIAS VOLTAGE



NEUTRALIZED 200 MHz POWER GAIN AMPLIFIER TEST CIRCUIT

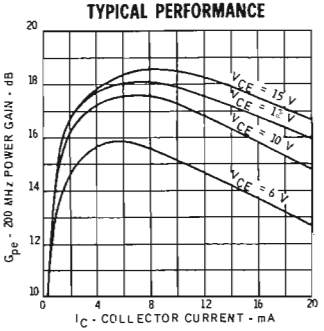


L_1 - 3.5 Turns # 16 AWG wire; 8mm. Dia; 11mm. long. Turns Ratio = 4 to 2.

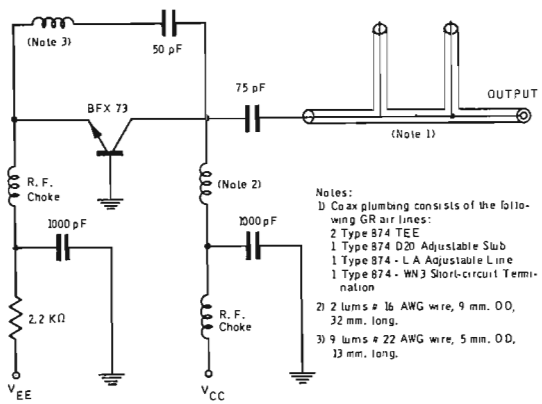
L_2 - 8 Turns # 16 AWG wire; 3mm. Dia; 22mm. long Turns Ratio = 8 to 1

L_3 - 0.4 to 0.65 μH, adjustable core.

TYPICAL PERFORMANCE

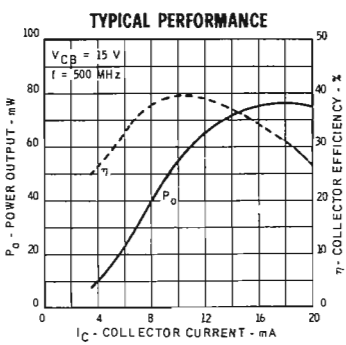


500 MHz OSCILLATOR TEST CIRCUIT

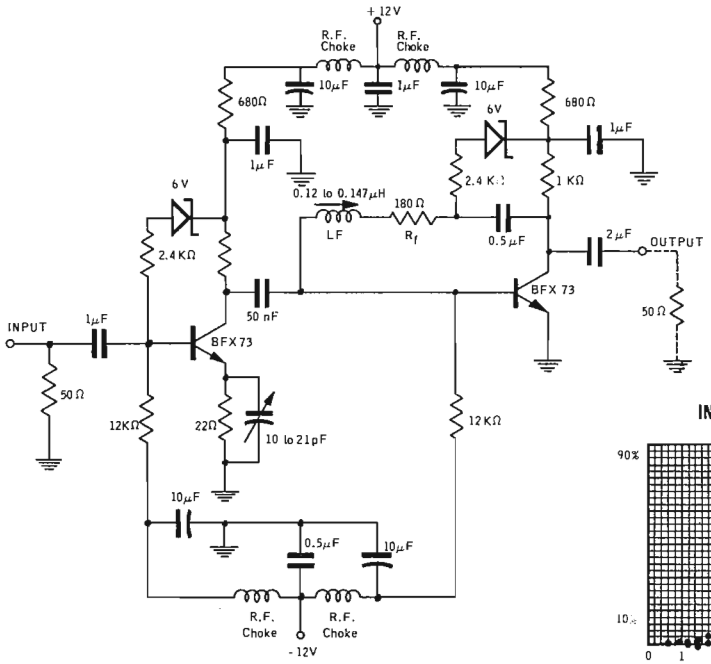


Notes:
1) Coax plumbing consists of the following GR air lines:
2 Type 874 TEE
1 Type 874 D20 Adjustable Stub
1 Type 874 - L A Adjustable Line
1 Type 874 - WN3 Short-circuit Termination
2) 2 turns # 16 AWG wire, 9 mm. OD, 32 mm. long.
3) 9 turns # 22 AWG wire, 5 mm. OD, 13 mm. long.

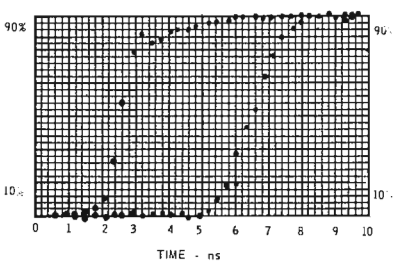
TYPICAL PERFORMANCE



TWO STAGE VIDEO AMPLIFIER



INPUT TO OUTPUT DELAY - 4 ns.



NOTES:

(1) These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.

(2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

(3) These ratings give a maximum junction temperature of 200°C and junction-to-case thermal resistance of 584°C/watt (derating factor of 1.71 mW/°C); junction-to-ambient thermal resistance of 875°C/watt (derating factor of 1.14 mW/°C).

(4) These ratings refer to a high-current point where collector-to-emitter voltage is lowest. For more information send for SGS-AR 5.

(5) Pulse Conditions: length = 300 μsec; duty cycle = 1%.

(6) f = 60 MHz; R_S = 400 Ω.