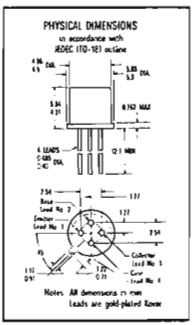
BFX 31

VERY LOW-NOISE, SMALL-SIGNAL AMPLIFIER

NPN DIFFUSED SILICON PLANAR EPITAXIAL TRANSISTOR

GENERAL DESCRIPTION - The BFX31 is an NPN silicon PLANAR transistor specially designed for very low noise, small signal, high frequency applications. It features 3 dB NF maximum at 60 MHz and 30 dB minimum P_G with excellent AGC characteristics.



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

P	Total Dissipation at 25°C Case Temperature (Notes 2 and 3)	0.26 Watt
	at 25°C Ambient Temperature (Notes 2 and 3)	0.175 Watt

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

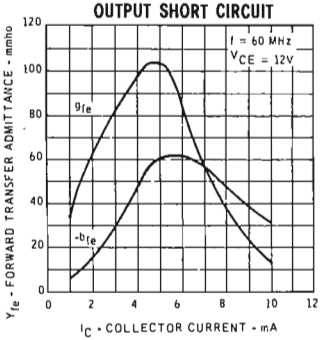
V_{CBO}	Collector to Base Voltage	30 Volts
V_{CEO}	Collector to Emitter Voltage (Note 4)	30 Volts
V_{EBO}	Emitter to Base Voltage	3 Volts

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

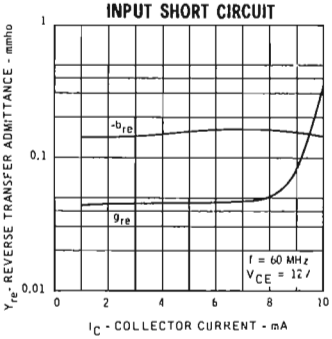
SIMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS	
h_{FE}	DC Pulse Current Gain (Note 5)	20	75			I_C = 2.5 mA	V_{CE} = 24 V
h_{FE}	DC Pulse Current Gain (Note 5)	25	80			I_C = 4 mA	V_{CE} = 12 V
V_{BE} (on)	Base-Emitter On Voltage (Note 5)			0.9	V	I_C = 2.5 mA	V_{CE} = 24 V
I_{CBO}	Collector Cutoff Current		0.1	50	nA	V_{CB} = 10 V	I_E = 0
BV_{CBO}	Collector to Base Breakdown Voltage	30			V	I_C = 50 µA	I_E = 0
BV_{EBO}	Emitter to Base Breakdown Voltage	3			V	I_E = 50 µA	I_C = 0
V_{CEO} (sust)	Collector to Emitter Sustaining Voltage (Notes 4 and 5)	30			V	I_C = 5 mA	I_B = 0
h_{fe}	High Frequency Current Gain (f = 100 MHz)	4	5			I_C = 2.5 mA	V_{CE} = 12 V
PG1	Power Gain (neutralized, f = 60 MHz)	30	33		dB	I_C = 4 mA	V_{CE} = 12 V
PG2	Power Gain (neutralized, f = 60 MHz)	29	32		dB	I_C = 2.5 mA	V_{CE} = 24 V
AGC	Automatic Gain Control (f = 60 MHz)	7		12	mA	I_C = for which $P_G = P_{G1} = -30$ dB	
NF	Noise Figure (Note 6)		2.3	3	dB	I_C = 2.5 mA	V_{CE} = 12 V
C_{re}	Reverse Transfer Capacitance		0.4	0.6	pF	I_C = 4 mA	V_{CE} = 12 V
C_{re}	Reverse Transfer Capacitance		0.27	0.5	pF	I_C = 2.5 mA	V_{CE} = 24 V

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

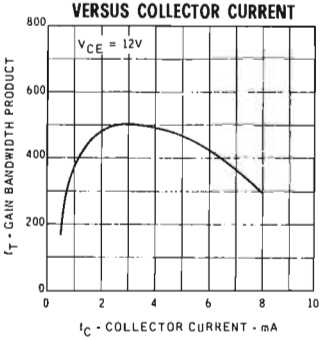
FORWARD TRANSFER ADMITTANCE VERSUS COLLECTOR CURRENT OUTPUT SHORT CIRCUIT



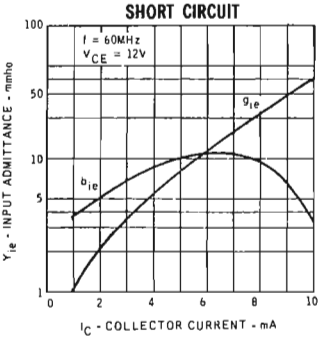
REVERSE TRANSFER ADMITTANCE VERSUS COLLECTOR CURRENT INPUT SHORT CIRCUIT



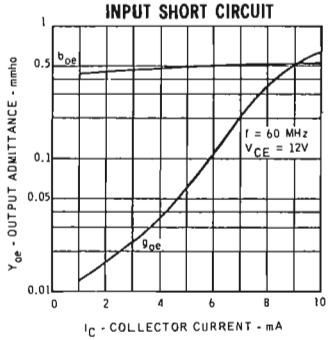
GAIN BANDWIDTH PRODUCT VERSUS COLLECTOR CURRENT



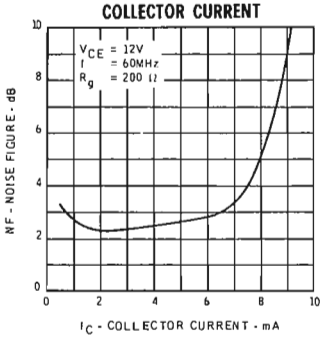
INPUT ADMITTANCE VERSUS COLLECTOR CURRENT OUTPUT SHORT CIRCUIT



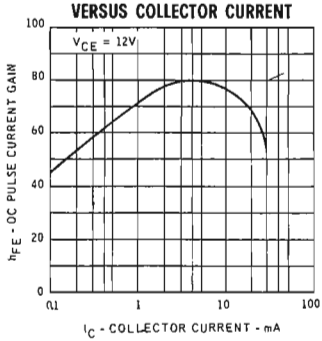
OUTPUT ADMITTANCE VERSUS COLLECTOR CURRENT INPUT SHORT CIRCUIT



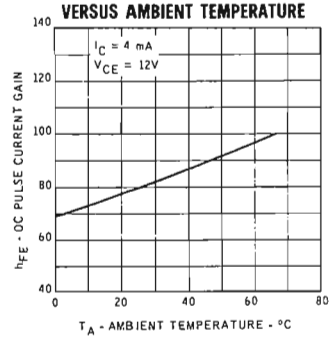
NOISE FIGURE VERSUS COLLECTOR CURRENT



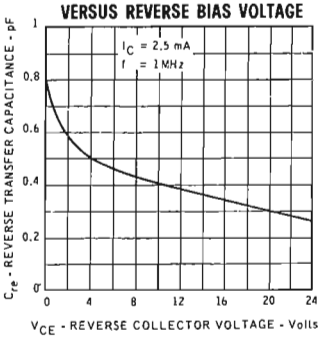
DC PULSE CURRENT GAIN VERSUS COLLECTOR CURRENT



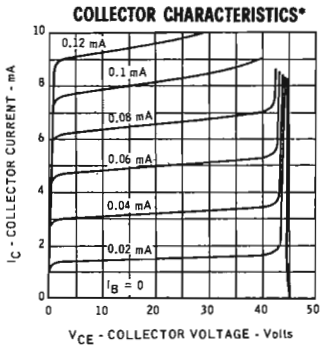
DC PULSE CURRENT GAIN VERSUS AMBIENT TEMPERATURE

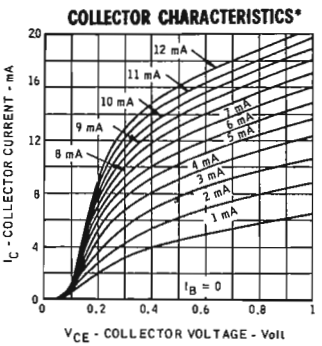


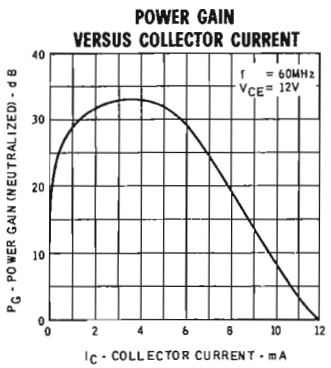
REVERSE TRANSFER CAPACITANCE VERSUS REVERSE BIAS VOLTAGE



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

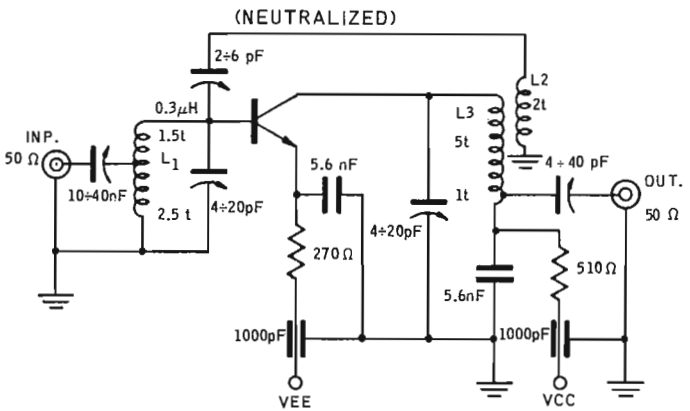






*Single family characteristics on Transistor Curve Tracer.

60 MHz POWER GAIN AND AGC TEST CIRCUIT



L_1 = 4 turns 1.5 mm. dia. copper wire. Internal dia = 11 mm
L_2 = 2 turns 1.5 mm. dia. copper wire. Internal dia = 11 mm
L_3 = 6 turns 1.5 mm. dia. copper wire. Internal dia = 11 mm