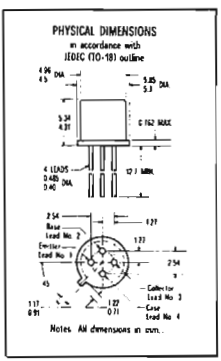
BFX 18

60 MHz LOW-NOISE, SMALL-SIGNAL AMPLIFIER

NPN DIFFUSED SILICON PLANAR TRANSISTOR

GENERAL DESCRIPTION - The BFX 18 is a high frequency NPN silicon PLANAR transistor specifically designed for low noise, small signal amplifiers and is particularly suitable for the IF stages of radar and telecommunications systems. It features 32 dB of Power Gain and 2.5 dB of NF at 60 MHz and 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, No Time Limit)	260°C Maximum

Maximum Power Dissipations

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

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

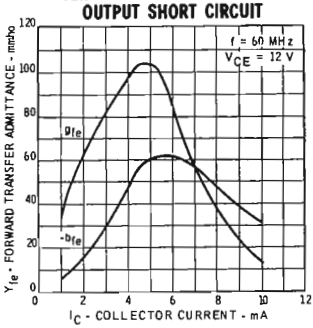
V_{CBO}	Collector to Base Voltage	30 Volts
V_{CEO}	Collector to Emitter Voltage (Note 3)	30 Volts
V_{EBO}	Emitter to Base Voltage	3 Volts

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

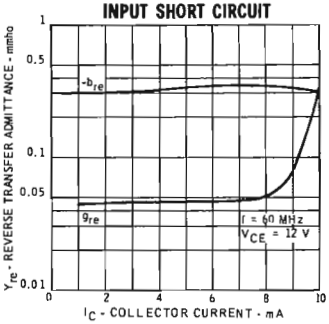
SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS	
h_{FE}	DC Pulse Current Gain (Note 4)	20	75			I_C = 2.5 mA	V_{CE} = 24 V
h_{FE}	DC Pulse Current Gain (Note 4)	25	80			I_C = 4 mA	V_{CE} = 12 V
V_{BE} (on)	Base to Collector Voltage			0.9	V	I_C = 2.5 mA	V_{CE} = 24 V
I_{CBO}	Collector Cutoff Current		0.1	50	nA	I_E = 0	V_{CB} = 10 V
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_C = 0	I_E = 50 µA
V_{CEO} (sust)	Collector to Emitter Sustaining Voltage (Notes 3 and 4)	30			V	I_C = 5 mA	I_B = 0
h_{fe}	High Frequency Current Gain (f = 100 MHz)	4	5.5			I_C = 2.5 mA	V_{CE} = 12 V
C_{re}	Common Emitter Feedback Capacitance		0.4	0.6	pF	I_C = 4 mA	V_{CE} = 12 V
C_{re}	Common Emitter Feedback Capacitance		0.27	0.5	pF	I_C = 4 mA	V_{CE} = 24 V
PG_1	Power Gain (f = 60 MHz) (Note 5)	30	33		dB	I_C = 4 mA	V_{CC} = 12 V
PG_2	Power Gain (f = 60 MHz) (Note 5)	29	32		dB	I_C = 2.5 mA	V_{CC} = 24 V
AGC	Automatic Gain Control (f = 60 MHz) (Note 5)			12	mA	I_C = for which $P_G = P_{G1} - 30$ dB	
NF	Noise Figure (Note 6)		2.8	5	dB	I_C = 4 mA	V_{CE} = 12 V
NF	Noise Figure (Note 6)		2.5	5	dB	I_C = 2.5 mA	V_{CE} = 24 V

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

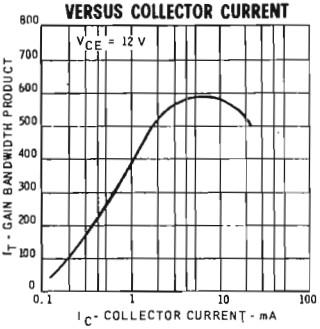
FORWARD TRANSFER ADMITTANCE VERSUS COLLECTOR CURRENT OUTPUT SHORT CIRCUIT



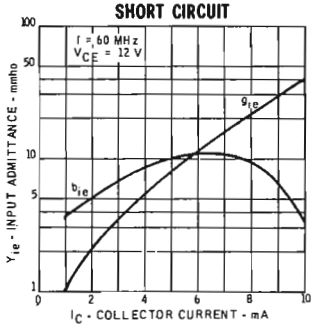
REVERSE TRANSFER ADMITTANCE VERSUS COLLECTOR CURRENT INPUT SHORT CIRCUIT



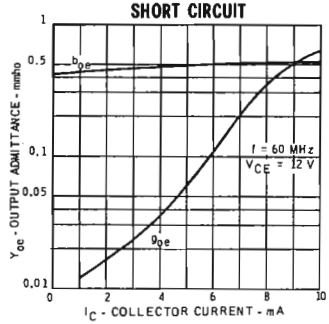
GAIN BANDWIDTH PRODUCT VERSUS COLLECTOR CURRENT



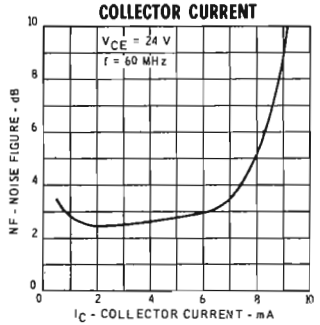
INPUT ADMITTANCE VERSUS COLLECTOR CURRENT OUTPUT SHORT CIRCUIT



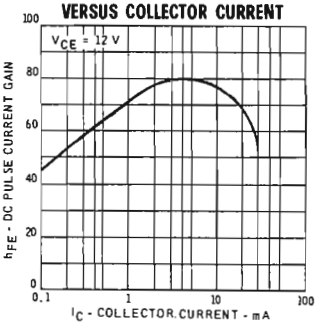
OUTPUT ADMITTANCE VERSUS COLLECTOR CURRENT INPUT SHORT CIRCUIT



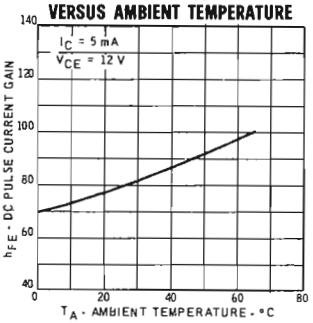
NOISE FIGURE VERSUS COLLECTOR CURRENT



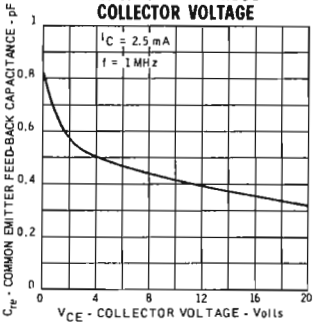
DC PULSE CURRENT GAIN VERSUS COLLECTOR CURRENT



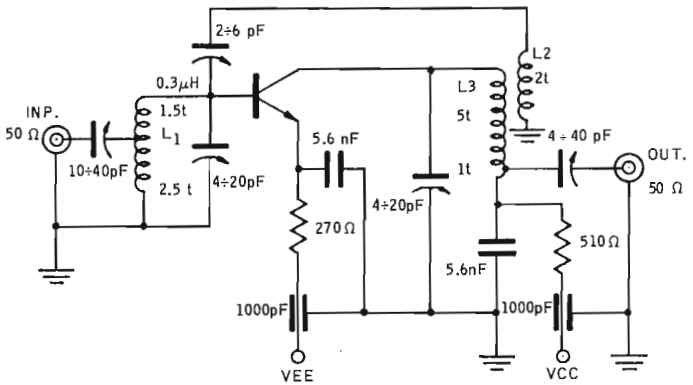
DC PULSE CURRENT GAIN VERSUS AMBIENT TEMPERATURE



COMMON EMITTER FEED-BACK CAPACITANCE VERSUS COLLECTOR VOLTAGE

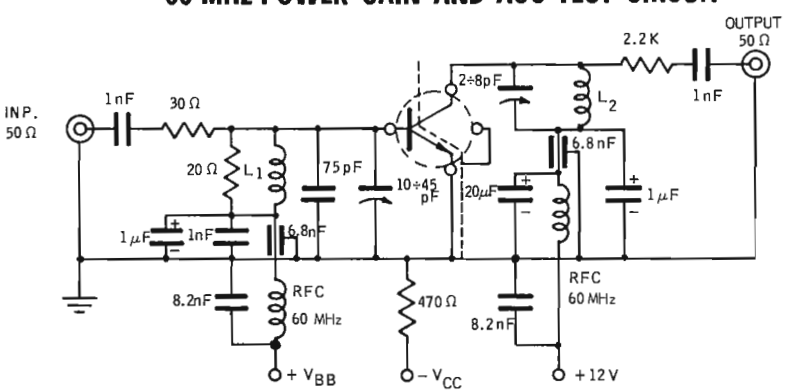


60 MHz POWER GAIN TEST CIRCUIT



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

60 MHz POWER GAIN AND AGC TEST CIRCUIT



L_1 = 1 Turn 1 mm dia.; copper wire - internal dia. = 10 mm
L_2 = 0.68 μH

NOTES:

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

(2) These ratings give a maximum junction temperature of 200°C and junction-to-case thermal resistance of 67°C/watt (derating factor of 1.48 mW/°C); junction-to-ambient thermal resistance of 1000°C/watt (derating factor of 1 mW/°C).

(3) Rating refers to a high-current point where collector-to-emitter voltage is lowest. For more information send for SGS-AR 5.

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

(5) See the 60 MHz Power Gain and AGC test circuits.

(6) f = 60 MHz; R_G = 200 Ω.