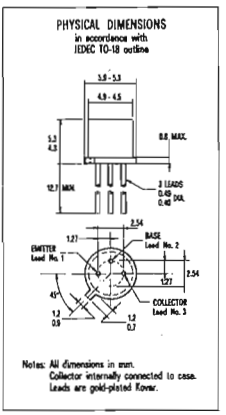
BFX90-BFX91

HIGH VOLTAGE AMPLIFIERS

PNP DIFFUSED SILICON PLANAR II TRANSISTORS

GENERAL DESCRIPTION - The BFX90 and the BFX91 are PNP silicon PLANAR epitaxial transistors featuring high voltage, high goin, low noise, excellent current gain linearity in the current range from 10 μA to 50 mA.

These devices are covered by Semiconductor Users Reliability Evaluation (SURE) Programme.



BFX90

ABSOLUTE MAXIMUM RATINGS (Note 1)

Maximum Temperatures

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

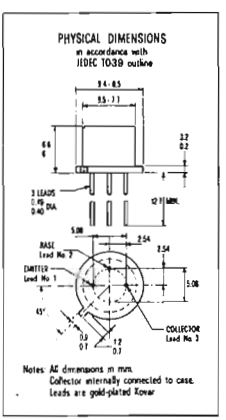
Maximum Power Dissipations (Notes 2 and 3)		BFX90	BFX91
P_D	Totol Dissipation ot 25°C Case Temperature	1.4 W	2.5 W
	at 25°C Ambient Temperature	0.4 W	0.7 W

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

V_{CBO}	Collector to Base Voltage	-180 V
V_{CEO}	Collector to Emitter Voltage (Note 4)	-180 V
V_{EBO}	Emitter to Base Voltage	-6 V

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

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS	
h_{FE}	DC Current Gain	60	110			I_C = 10 μA	V_{CE} = -10 V
h_{FE}	DC Current Gain (Note 5)	80	170			I_C = 1 mA	V_{CE} = -10 V
h_{FE}	DC Current Gain (Note 5)	80	200	300		I_C = 10 mA	V_{CE} = -10 V
h_{FE} (-55°C)	DC Current Gain	15	60			I_C = 10 μA	V_{CE} = -10 V
h_{FE} (-55°C)	DC Current Goin	30	90			I_C = 100 μA	V_{CE} = -10 V
$V_{BE\ sot}$	Base Saturation Voltage (Note 5)	-0.74	-0.9		V	I_C = 10 mA	I_B = 1 mA
$V_{CE\ sot}$	Collectar Saturatian Voltage (Note 5)	-0.1	-0.25		V	I_C = 10 mA	I_B = 1 mA
I_{EBO}	Emitter Reverse Current	0.2	10		nA	I_C = 0	V_{EB} = -4 V
I_{CBO}	Collector Reverse Current	0.2	10		nA	I_E = 0	V_{CB} = -100V
I_{CBO}(125°C)	Collector Reverse Current	0.03	10		μA	I_E = 0	V_{CB} = -100V
BV_{CBO}	Collector to Base Breakdown Voltage	-180			V	I_C = 10 μA	I_E = 0
BV_{EBO}	Emitter to Base Breakdown Voltage	-6			V	I_E = 10 μA	I_C = 0
LV_{CEO}	Collector to Emitter Sustaining Voltage	-180			V	I_C = 2 mA	I_B = 0
h_{fe}	High Frequency Current Gain (f = 20 MHz)	2	3	8		I_C = 1 mA	V_{CE} = -10 V
h_{fe}	Small Signal Current Gain	100		400		I_C = 1 mA	V_{CE} = -10 V
h_{ie}	Input Resistance (f = 1 kHz)	2.5		12	kΩ	I_C = 1 mA	V_{CE} = -10 V
h_{oe}	Output Conductance (f = 1 kHz)	5		25	μmhos	I_C = 1 mA	V_{CE} = -10 V



BFX91

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

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
C_{obo}	Base-Collector Capacitance		5	7	pF	$I_E = 0$ $V_{CB} = -5$ V
C_{TE}	Emitter Transition Capacitance		20	25	pF	$I_C = 0$ $V_{EB} = -0.5$ V
NF	Narrow Band Noise Figure (f = 10 kHz)		1	3	dB	$I_C = 10$ µA $V_{CE} = -5$ V
						$R_S = 10$ kΩ BW = 2 kHz
NF	Narrow Band Noise Figure (f = 1 kHz)		1	3	dB	$I_C = 10$ µA $V_{CE} = -5$ V
						$R_S = 10$ kΩ BW = 200 Hz
NF	Narrow Band Noise Figure (f = 100 Hz)		2	10	dB	$I_C = 10$ µA $V_{CE} = -5$ V
						$R_S = 10$ kΩ BW = 20 Hz

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.

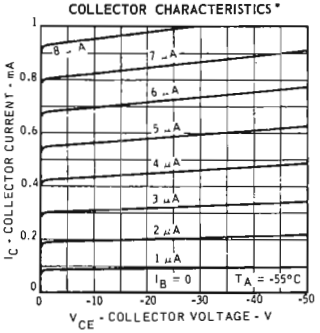
(3) These ratings give a maximum junction temperature of 200°C and junction-to-case thermal resistance of 125°C/W (derating factor of 8 mW/°C); junction-to-ambient thermal resistance of 438°C/W (derating factor of 2.28 mW/°C) for the BFX 90. Junction-to-case thermal resistance of 70°C/W (derating factor of 14.3 mW/°C); junction-to-ambient thermal resistance of 250°C/W (derating factor of 4 mW/°C) for the BFX 91.

(4) This rating refers to a high current point where collector to emitter voltage is lowest. For mare informotion send for SGS-AR 5.

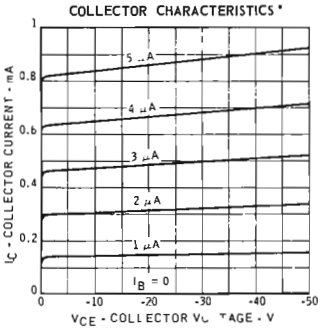
(5) Pulse Conditions: length = 300 µsec; duty cycle = 1%.

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

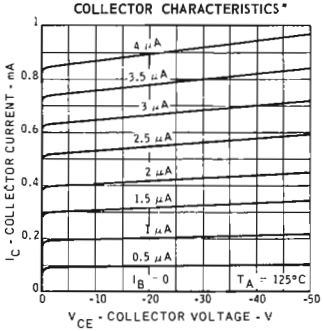
COLLECTOR CHARACTERISTICS *



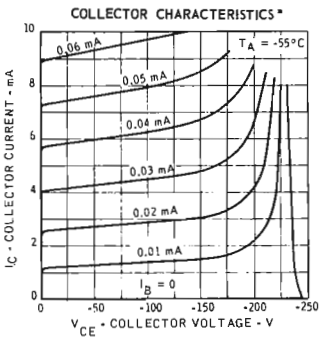
COLLECTOR CHARACTERISTICS *



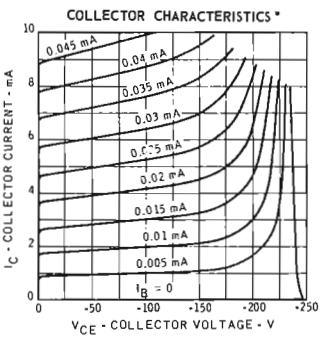
COLLECTOR CHARACTERISTICS *



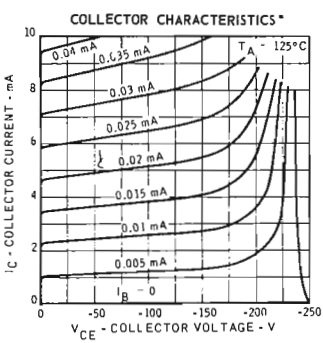
COLLECTOR CHARACTERISTICS *



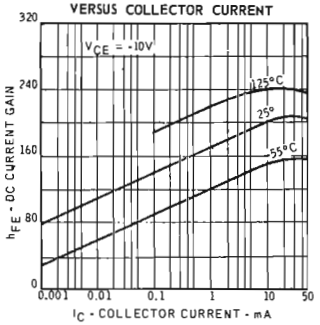
COLLECTOR CHARACTERISTICS *



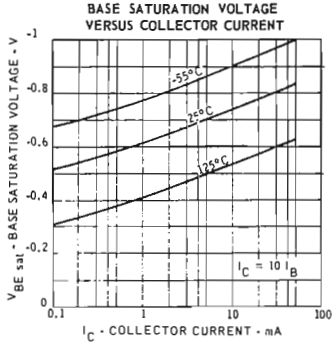
COLLECTOR CHARACTERISTICS *



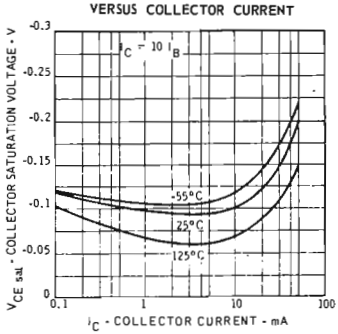
DC CURRENT GAIN VERSUS COLLECTOR CURRENT



BASE SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



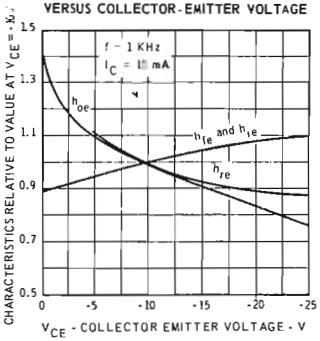
COLLECTOR SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



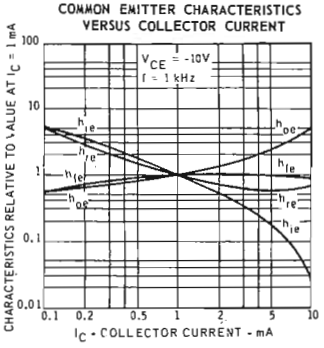
* Single family characteristics on Transistor Curve Tracer.

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

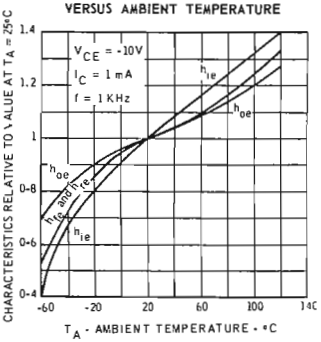
COMMON EMITTER CHARACTERISTICS VERSUS COLLECTOR-EMITTER VOLTAGE



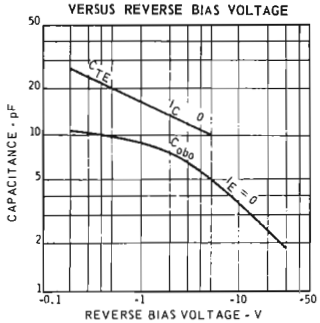
COMMON EMITTER CHARACTERISTICS VERSUS COLLECTOR CURRENT



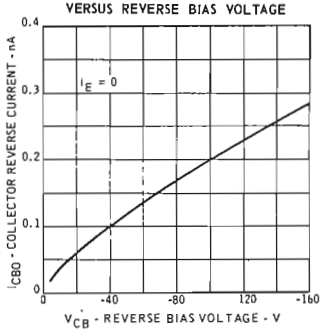
COMMON EMITTER CHARACTERISTICS VERSUS AMBIENT TEMPERATURE



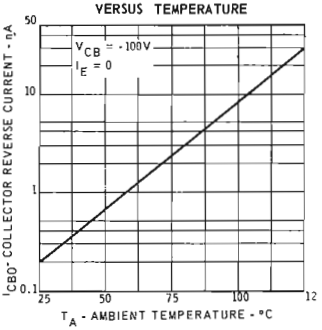
INPUT AND OUTPUT CAPACITANCE VERSUS REVERSE BIAS VOLTAGE



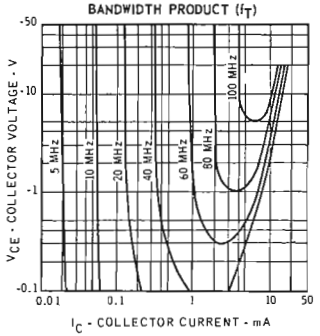
COLLECTOR REVERSE CURRENT VERSUS REVERSE BIAS VOLTAGE



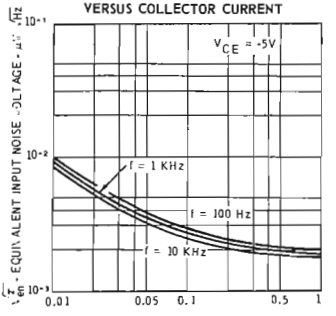
COLLECTOR REVERSE CURRENT VERSUS TEMPERATURE



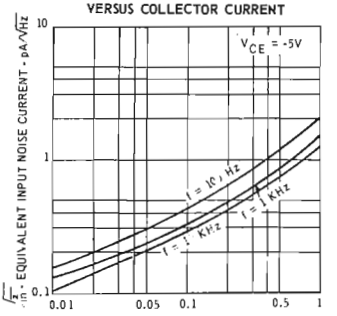
CONTOURS OF CONSTANT GAIN BANDWIDTH PRODUCT (f_T)



EQUIVALENT INPUT NOISE VOLTAGE VERSUS COLLECTOR CURRENT

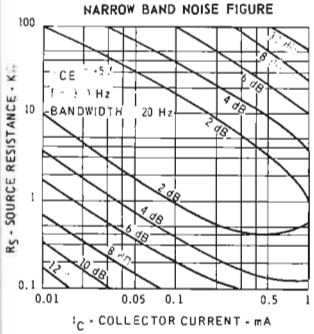


EQUIVALENT INPUT NOISE CURRENT VERSUS COLLECTOR CURRENT

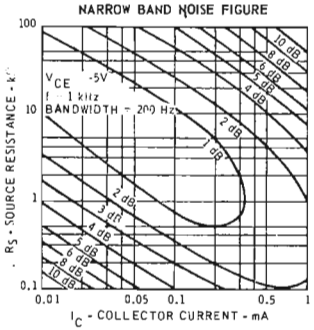


TYPICAL ELECTRICAL CHARACTERISTICS (25°C free air temperature unless otherwise noted)

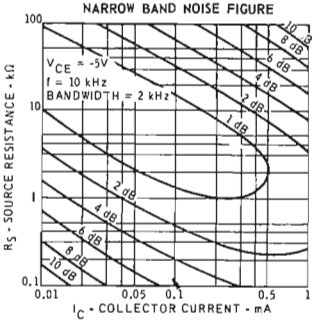
CONTOURS OF CONSTANT NARROW BAND NOISE FIGURE



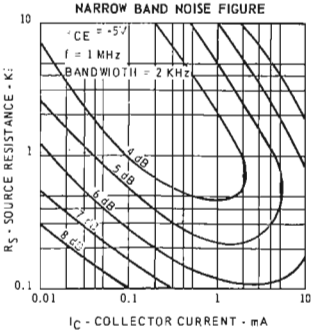
CONTOURS OF CONSTANT NARROW BAND NOISE FIGURE



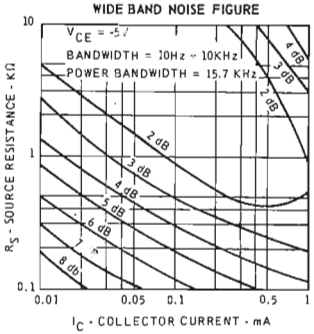
CONTOURS OF CONSTANT NARROW BAND NOISE FIGURE



CONTOURS OF CONSTANT NARROW BAND NOISE FIGURE



CONTOURS OF CONSTANT WIDE BAND NOISE FIGURE



NDISE FIGURE VERSUS FREQUENCY