SGS-THOMSON
MICROELECTRONICS

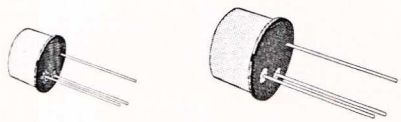
BFX90
BFX91

HIGH-VOLTAGE AMPLIFIERS

DESCRIPTION

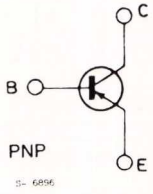
The BFX90 and BFX91 are silicon planar epitaxial PNP transistors in Jedec TO-18 (BFX90) and Jedec TO-39 (BFX91) metal cases.

Both devices feature high voltage, high gain, low noise and excellent current gain linearity from 10 μA to 50 mA.



TO–18 TO–39

INTERNAL SCHEMATIC DIAGRAM



S- 6896

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base Voltage (I_E = 0)	– 180	V
V_{CEO}	Collector-emitter Voltage (I_B = 0)	– 180	V
V_{EBO}	Emitter-base Voltage (I_C = 0)	– 6	V
I_C	Collector Current	– 100	mA
P_{tot}	Total Power Dissipation at $T_{amb} \leq 25$ °C		
	for **BFX90**	0.4	W
	for **BFX91**	0.7	W
	at $T_{case} \leq 25$ °C		
	for **BFX90**	1.4	W
	for **BFX91**	2.5	W
T_{stg}, T_j	Storage and Junction Temperature	– 55 to 200	°C

THERMAL DATA

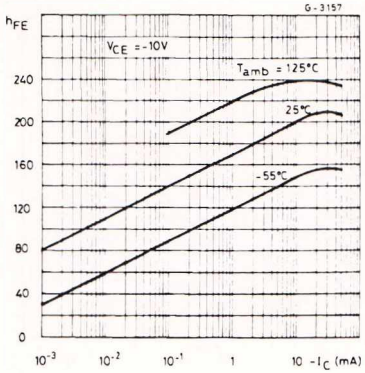
			BFX90	BFX91	Unit
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	Max	125	70	°C/W
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient	Max	438	250	°C/W

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C unless otherwise specified)

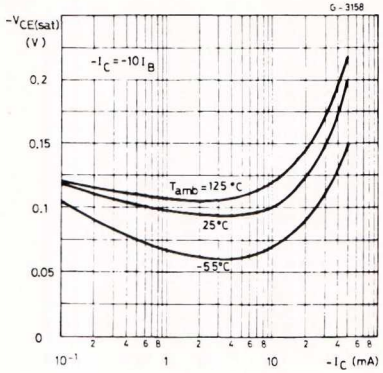
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cutoff Current (I_E = 0)	V_{CB} = – 100 V V_{CB} = – 100 V T_{amb} = 125 °C			– 10 – 10	nA µA
I_{EBO}	Emitter Cutoff Current (I_C = 0)	V_{EB} = – 4 V			– 10	nA
$V_{(BR)\ CBO}$	Collector-base Breakdown Voltage (I_E = 0)	I_C = – 10 µA	– 180			V
$V_{(BR)\ CEO}$*	Collector-emitter Breakdown Voltage (I_B = 0)	I_C = – 2 mA	– 180			V
$V_{(BR)\ EBO}$	Emitter-base Breakdown Voltage (I_C = 0)	I_E = – 10 µA	– 6			V
$V_{CE\ (sat)}$*	Collector-emitter Saturation Voltage	I_C = – 10 mA I_B = – 1 mA		– 0.1	– 0.25	V
$V_{BE\ (sat)}$ *	Base-emitter Saturation Voltage	I_C = – 10 mA I_B = – 1 mA		– 0.74	– 0.9	V
h_{FE}*	DC Current Gain	I_C = – 10 µA V_{CE} = – 10 V I_C = – 1 mA V_{CE} = – 10 V I_C = – 10 mA V_{CE} = – 10 V I_C = – 10 µA V_{CE} = – 10 V T_{amb} = – 55 °C I_C = – 100 µA V_{CE} = – 10 V T_{amb} = – 55 °C	60 80 80 15 30	110 170 200 60 90	 300 	
h_{fe}	Small Signal Current Gain	I_C = – 1 mA V_{CE} = – 10 V f = 1 kHz	80		400	
f_T	Transition Frequency	I_C = – 1 mA V_{CE} = – 10 V f = 20 MHz	40	60	160	MHz
C_{EBO}	Emitter-base Capacitance	I_C = 0 V_{EB} = – 0.5 V f = 1 MHz		20	25	pF
C_{CBO}	Collector-base Capacitance	I_E = 0 V_{CB} = – 5 V f = 1 MHz		5	7	pF
NF	Noise Figure	I_C = – 10 µA V_{CE} = – 5 V R_g = 10 kΩ f = 10 kHz B = 2 kHz f = 1 kHz B = 200 Hz f = 100 Hz B = 20 Hz		 1 1 2	 3 3 10	 dB dB dB
h_{ie}	Input Impedance	I_C = – 1 mA V_{CE} = – 10 V f = 1 kHz	2.5		12	kΩ
h_{oe}	Output Admittance	I_C = – 1 mA V_{CE} = – 10 V f = 1 kHz	5		25	µS

* Pulsed : pulse duration = 300 µs, duty cycle = 1 %.

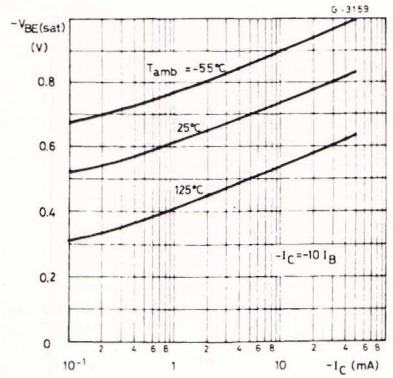
DC Current Gain.



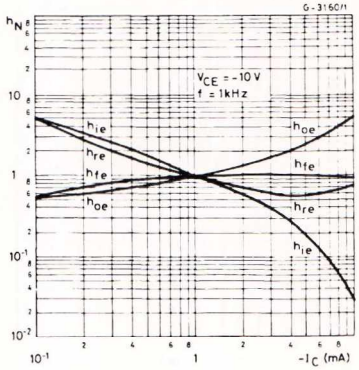
Collector-emitter Saturation Voltage.



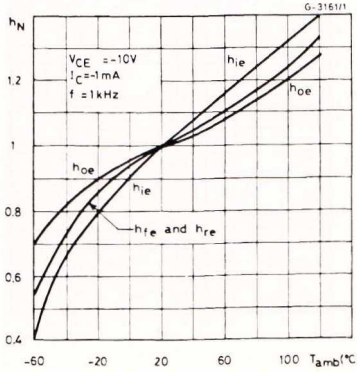
Base-emitter Saturation Voltage.



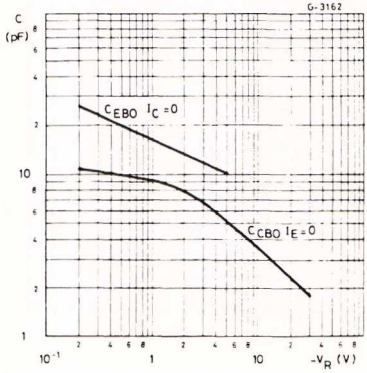
Normalized h Parameters vs. Collector Current.



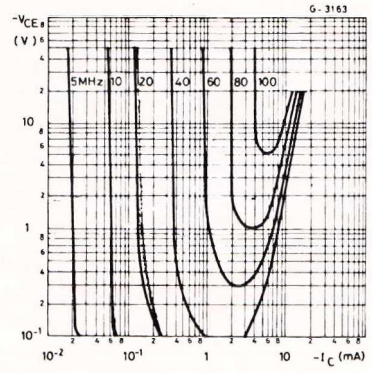
Normalized h Parameters vs. Ambient Temperature.



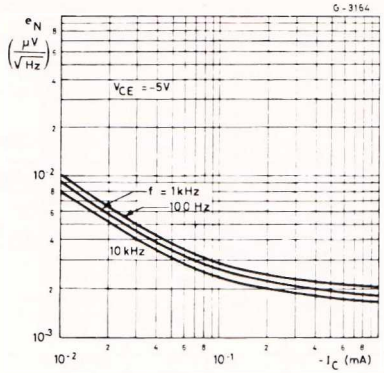
Emitter-base and Collector-base Capacitances.



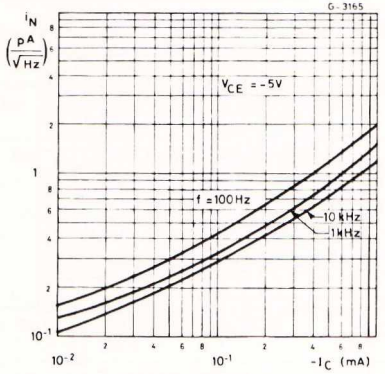
Contours of Constant Transition Frequency.



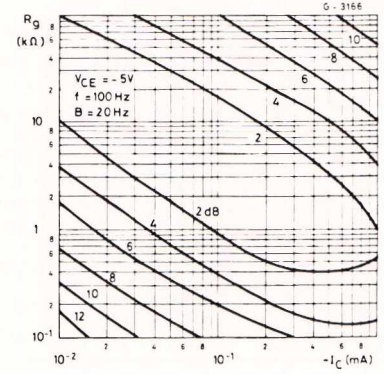
Equivalent Input Noise Voltage.



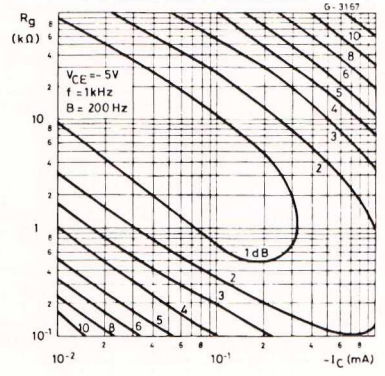
Equivalent Input Noise Current.



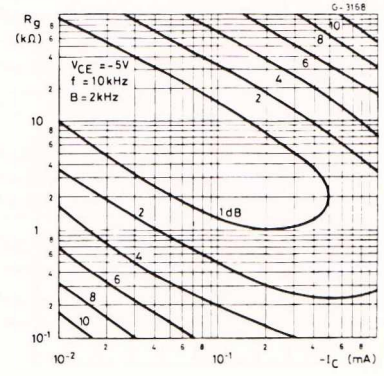
Contours of Constant Noise Figure (f = 100 Hz).



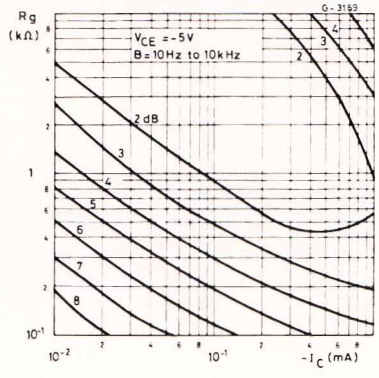
Contours of Constant Noise Figure (f = 1 kHz).



Contours of Constant Noise Figure (f = 10 kHz).



Contours of Constant Wide Band Noise Figure.



Noise Figure vs. Frequency.