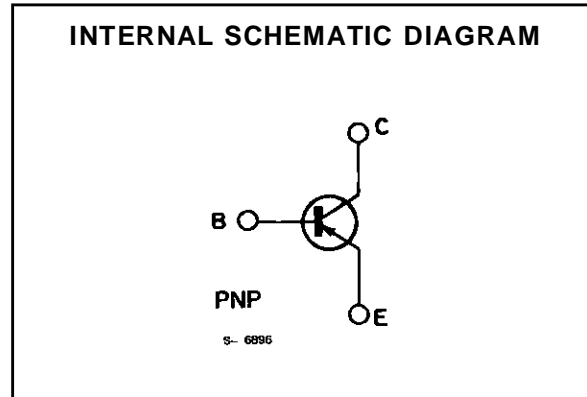
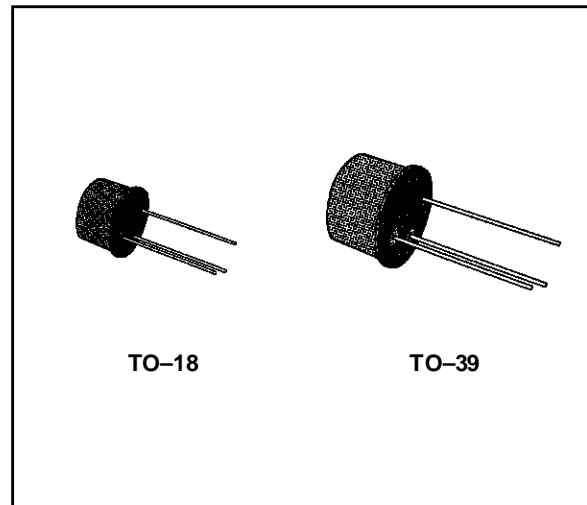


HIGH-VOLTAGE AMPLIFIERS

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 μ A to 50 mA.



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 $T_{amb} \leq 25\text{ }^\circ\text{C}$	for BFX90	0.4	W
		for BFX91	0.7	W
	at $T_{case} \leq 25\text{ }^\circ\text{C}$	for BFX90	1.4	W
		for BFX91	2.5	W
T_{stg}, T_j	Storage and Junction Temperature	- 55 to 200	$^\circ\text{C}$	

BFX90-BFX91

THERMAL DATA

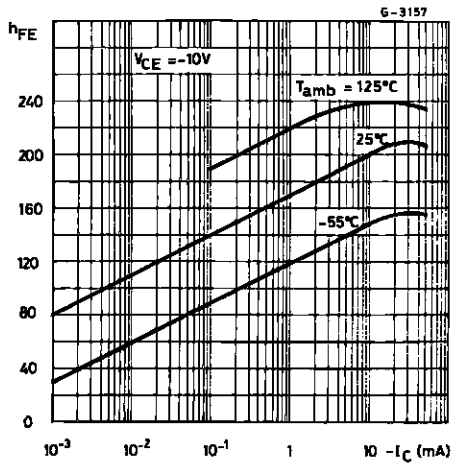
			BFX90	BFX91	Unit
$R_{th\ j-case}$	Thermal Resistance Junction-case	Max	125	70	°C/W
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient	Max	438	250	°C/W

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

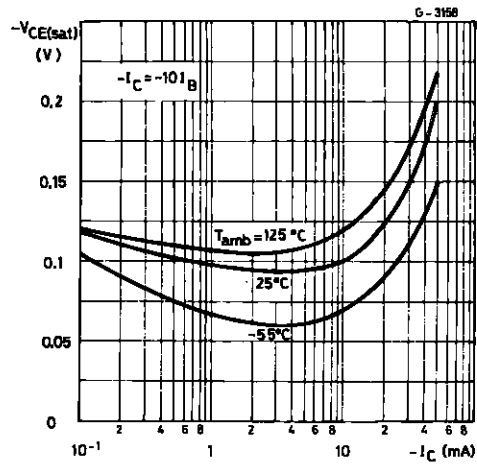
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cutoff Current ($I_E = 0$)	$V_{CB} = -100\text{ V}$			- 10	nA
		$V_{CB} = -100\text{ V}$ $T_{amb} = 125\text{ °C}$			- 10	μA
I_{EBO}	Emitter Cutoff Current ($I_C = 0$)	$V_{EB} = -4\text{ V}$			- 10	nA
$V_{(BR)\ CBO}$	Collector-base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

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

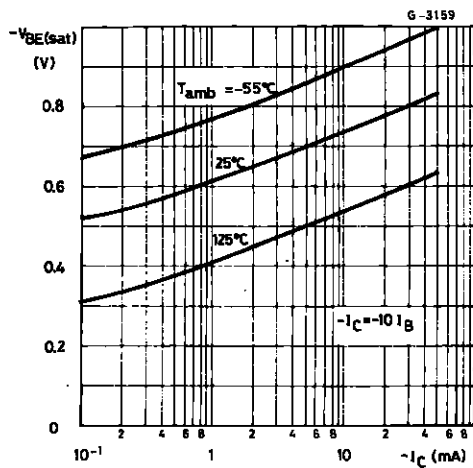
DC Current Gain.



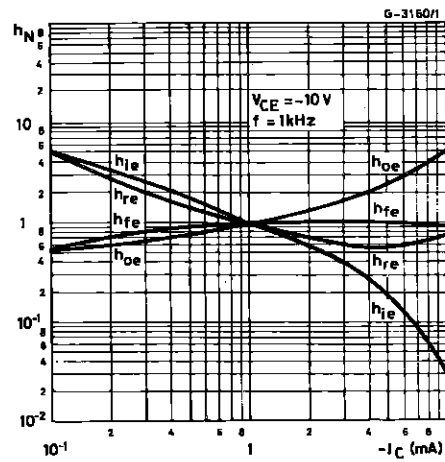
Collector-emitter Saturation Voltage.



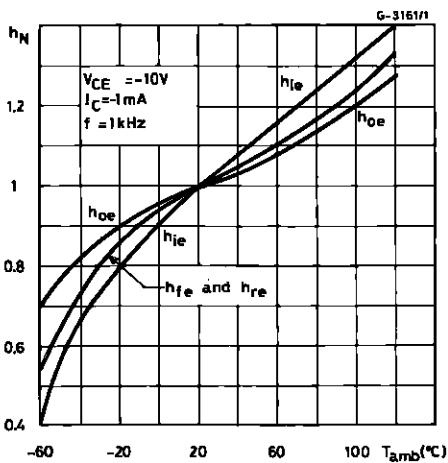
Base-emitter Saturation Voltage.



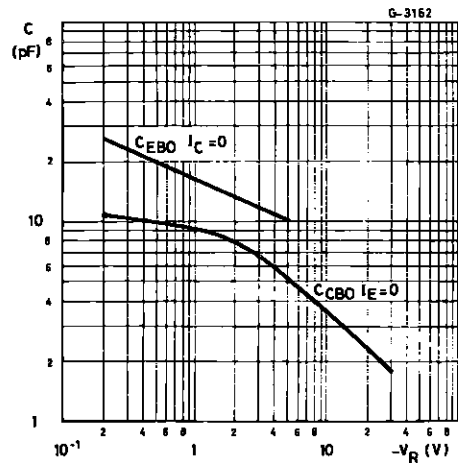
Normalized h Parameters vs. Collector Current.



Normalized h Parameters vs. Ambient Temperature.

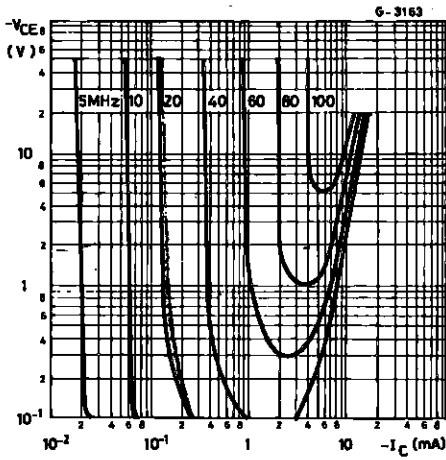


Emitter-base and Collector-base Capacitances.

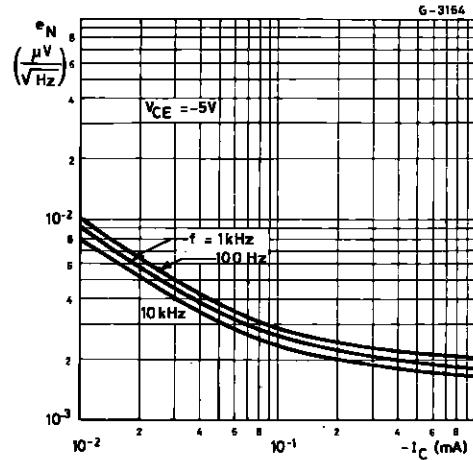


BFX90-BFX91

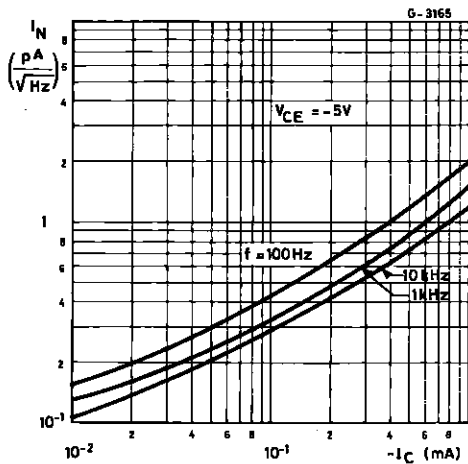
Contours of Constant Transition Frequency.



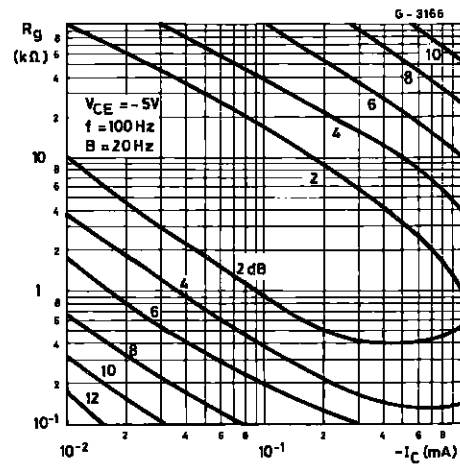
Equivalent Input Noise Voltage.



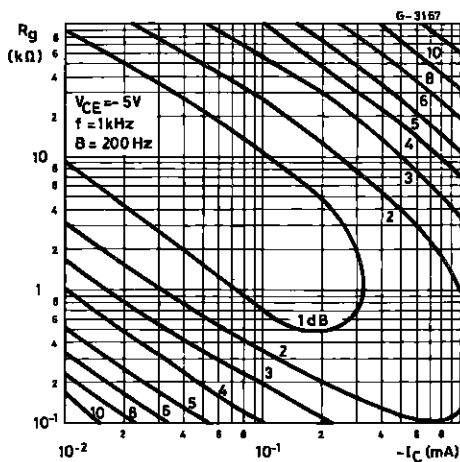
Equivalent Input Noise Current.



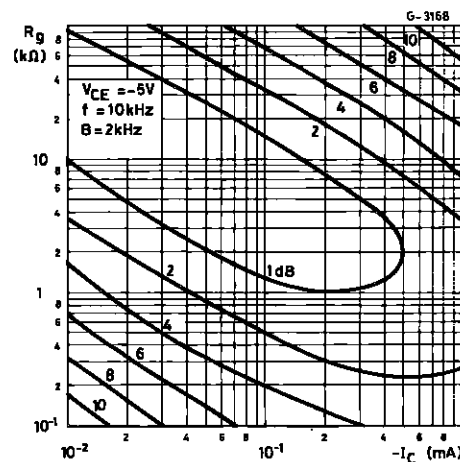
Contours of Constant Noise Figure (f = 100 Hz).



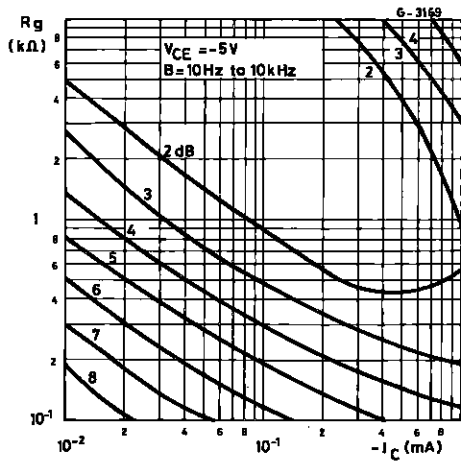
Contours of Constant Noise Figure (f = 1 kHz).



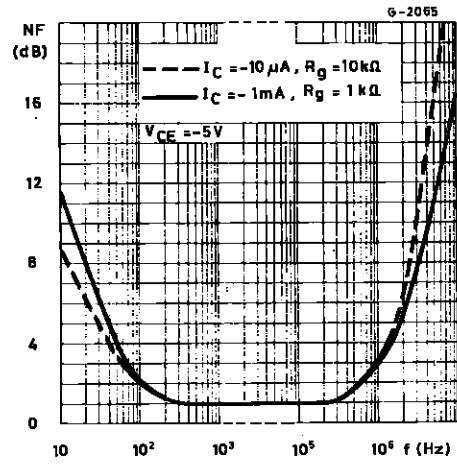
Contours of Constant Noise Figure (f = 10 kHz).



Contours of Constant Wide Band Noise Figure.

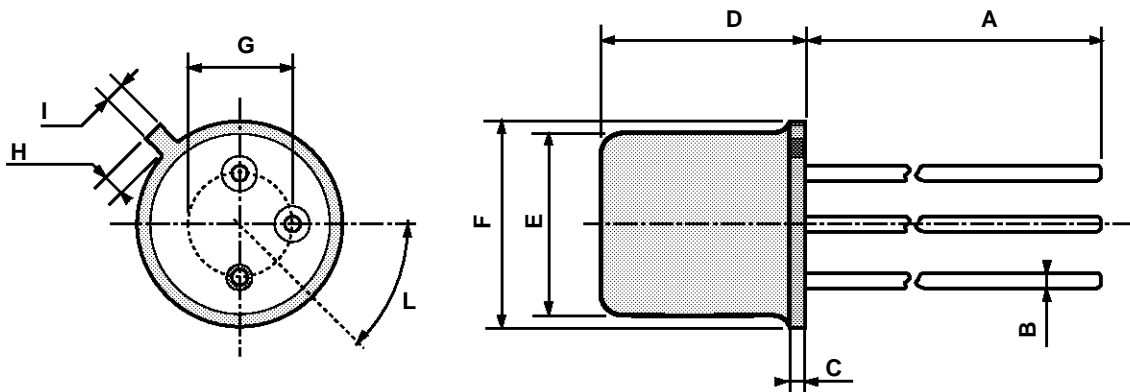


Noise Figure vs. Frequency.



TO-18 MECHANICAL DATA

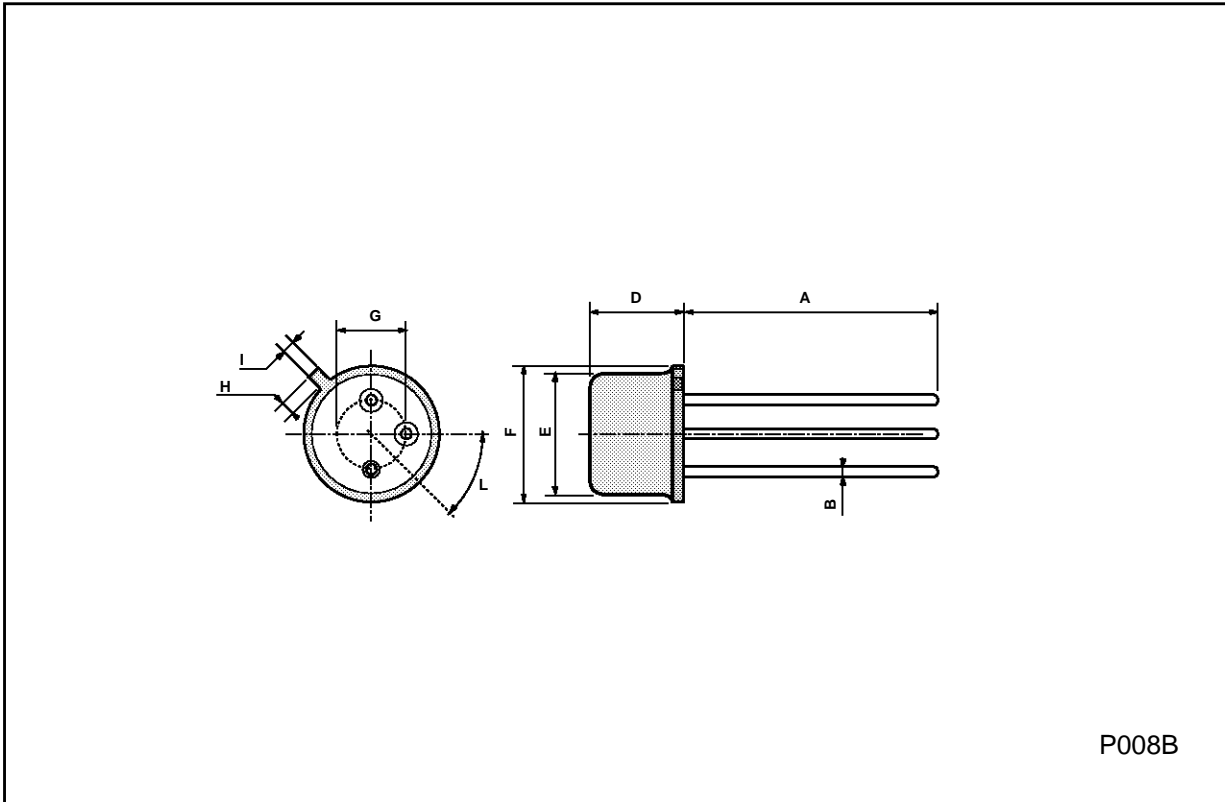
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A		12.7			0.500	
B			0.49			0.019
D			5.3			0.208
E			4.9			0.193
F			5.8			0.228
G	2.54			0.100		
H			1.2			0.047
I			1.16			0.045
L	45°			45°		



0016043

TO39 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	12.7			0.500		
B			0.49			0.019
D			6.6			0.260
E			8.5			0.334
F			9.4			0.370
G	5.08			0.200		
H			1.2			0.047
I			0.9			0.035
L	45° (typ.)					



P008B

Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1994 SGS-THOMSON Microelectronics - All Rights Reserved

SGS-THOMSON Microelectronics GROUP OF COMPANIES

Australia - Brazil - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands -
Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A