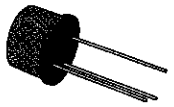
SGS-THOMSON MICROELECTRONICS

BFX37

LOW-LEVEL, LOW-NOISE AMPLIFIER

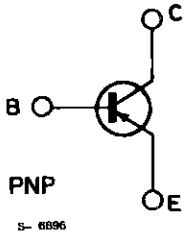
DESCRIPTION

The BFX37 is a silicon planar epitaxial PNP transistor in Jedec TO-18 metal case, designed for use in high performance, low-noise amplifiers over a wide frequency range. It features high current gain over the range from 1 μA to 100 mA and excellent NF at low frequency.



TO-18

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter Voltage (V_{BE} = 0)	– 90	V
V_{CEO}	Collector-emitter Voltage (I_B = 0)	– 80	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 at $T_{case} \leq 25$ °C	0.36 1.2	W W
T_{stg}, T_j	Storage and Junction Temperature	– 55 to 200	°C

THERMAL DATA

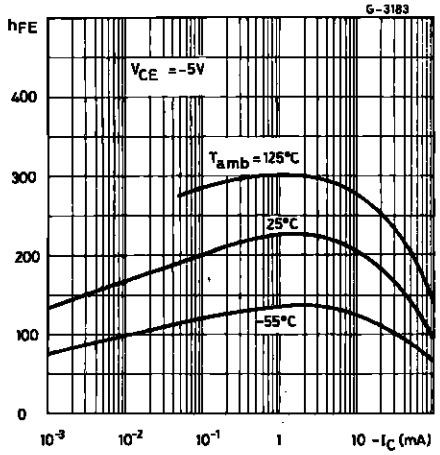
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	Max	146	°C/W
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient	Max	486	°C/W

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

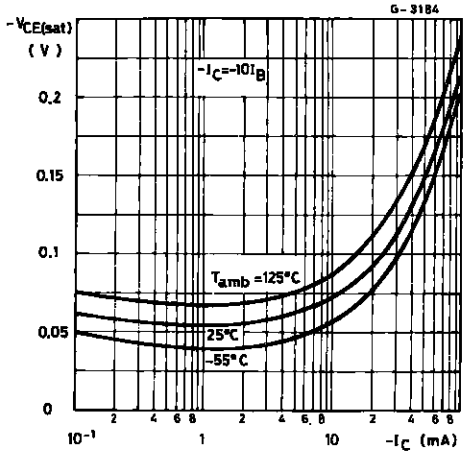
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_{CES}	Collector Cutoff Current (V_{BE} = 0)	V_{CE} = – 70 V V_{CE} = – 70 V	 T_{amb} = 150 °C		– 0.1 – 0.1	– 10 – 10	nA µA
I_{EBO}	Emitter Cutoff Current (I_C = 0)	V_{EB} = – 4 V			– 0.1	– 10	nA
$V_{(BR)CES}$	Collector-emitter Breakdown Voltage (V_{BE} = 0)	I_C = – 10 µA		– 90			V
$V_{(BR)CEO}$*	Collector-emitter Breakdown Voltage (I_B = 0)	I_C = – 5 mA		– 80			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_C = – 50 mA	I_B = – 0.5 mA I_B = – 5 mA		– 0.1 – 0.15	– 0.25 – 0.4	V V
V_{BE}	Base-emitter Voltage	I_C = – 1 mA	V_{CE} = – 5 V		– 0.65		V
$V_{BE(sat)}$*	Base-emitter Saturation Voltage	I_C = – 10 mA I_C = – 50 mA	I_B = – 0.5 mA I_B = – 5 mA		– 0.73 – 0.82	– 0.9 – 0.95	V V
h_{FE}*	DC Current Gain	I_C = – 1µA I_C = – 10 µA I_C = – 100 µA I_C = – 1 mA I_C = – 10 mA	V_{CE} = – 5 V V_{CE} = – 5 V V_{CE} = – 5 V V_{CE} = – 5 V V_{CE} = – 5 V	 70 125 125 125	130 170 200 220 200	 230 280 	
h_{fe}	Small Signal Current Gain	I_C = – 1 mA f = 1 kHz	V_{CE} = – 5 V		250		
f_T	Transition Frequency	I_C = – 0.5 mA f = 20 MHz	V_{CE} = – 5 V	40	70		MHz
C_{EBO}	Emitter-base Capacitance	I_C = 0 f = 1 MHz	V_{EB} = – 0.5 V		12	15	pF
C_{CBO}	Collector-base Capacitance	I_E = 0 f = 1 MHz	V_{CB} = – 5 V		4.5	6	pF
NF	Noise Figure	I_C = – 20 µA R_g = 10 kΩ f = 1 kHz f = 10 to 10000 Hz	V_{CE} = 5 V		 0.8 1	 2.5 3.5	 dB dB
h_{ie}	Input Impedance	I_C = – 1 mA f = 1 kHz	V_{CE} = – 5 V		6.5		kΩ
h_{re}	Reverse Voltage Ratio	I_C = – 1 mA f = 1 kHz	V_{CE} = – 5 V		$2.5x10^{-4}$		
h_{oe}	Output Admittance	I_C = – 1 mA f = 1 kHz	V_{CE} = – 5 V		15		µS

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

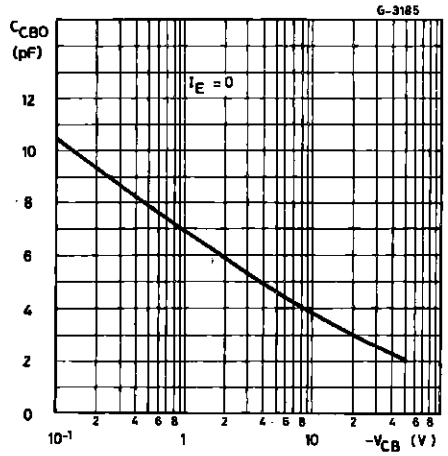
DC Current Gain.



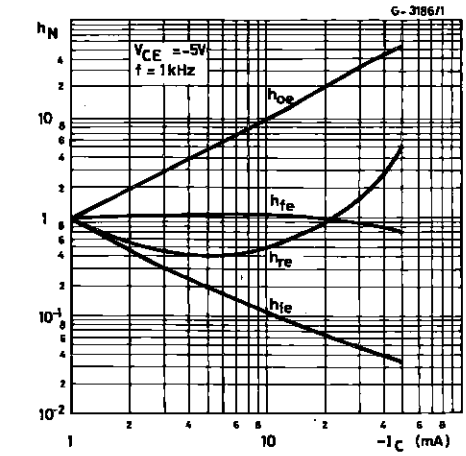
Collector-emitter Saturation Voltage.



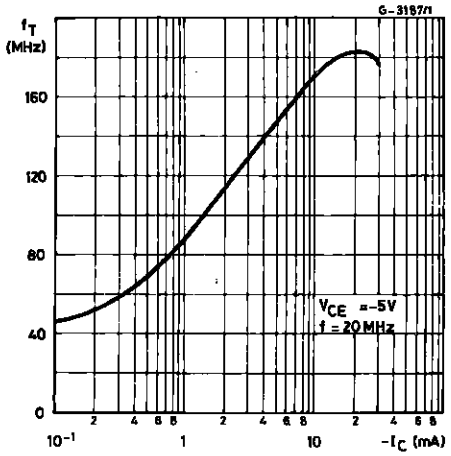
Collector-base Capacitance.



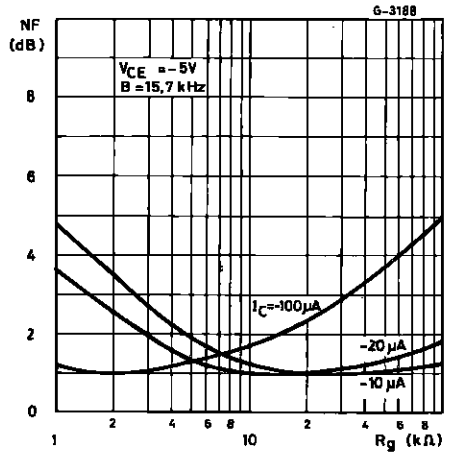
Normalized h Parameters.



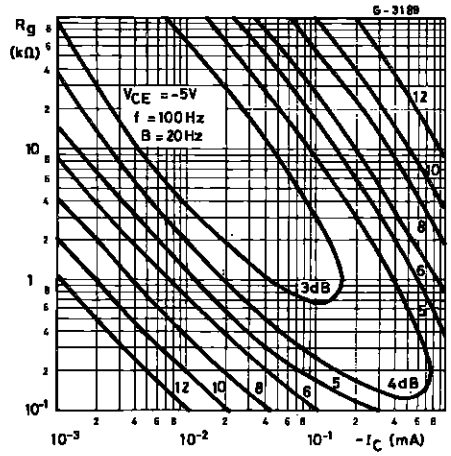
Transition Frequency.



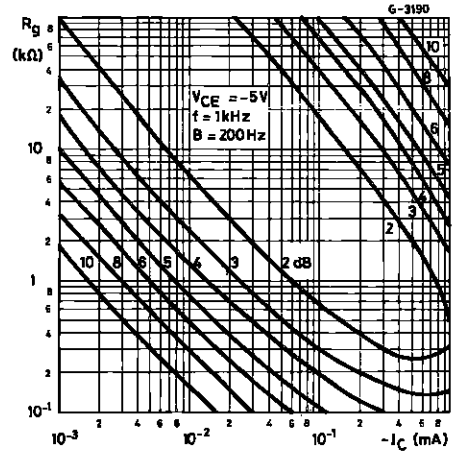
Noise Figure vs. Source Resistance.



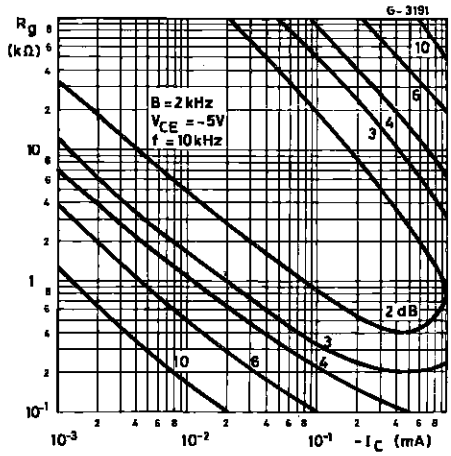
Contours of Constant Noise Figure (f = 100 Hz).



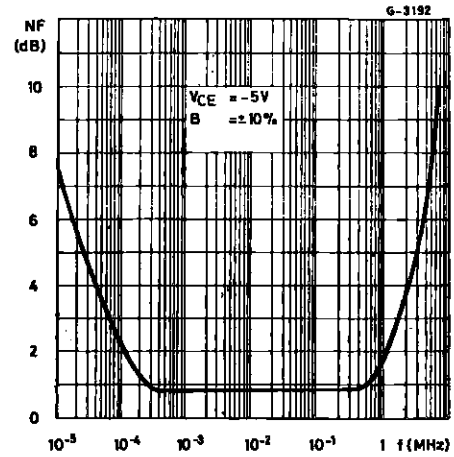
Countours of Constant Noise Figure (f = 1 kHz).



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

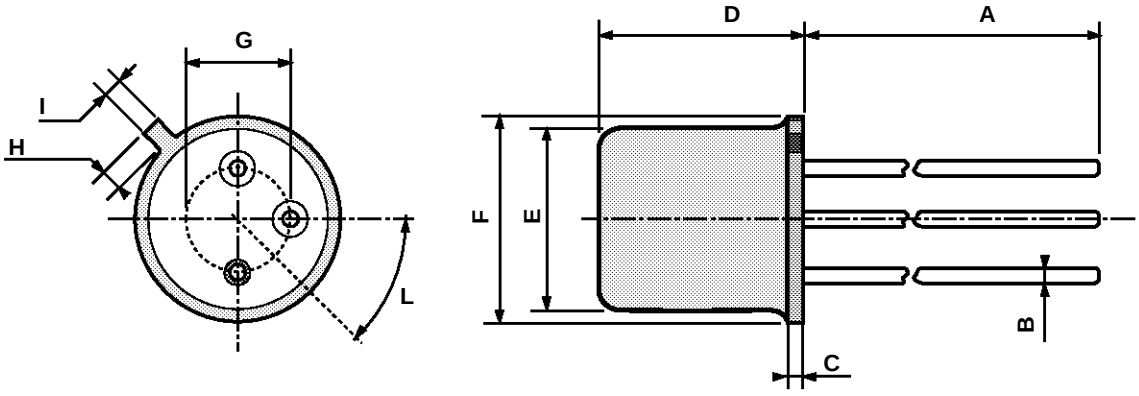


Noise Figure vs. Frequency.



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^o			45^o		



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