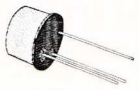
SGS-THOMSON MICROELECTRONICS

BFX37

LOW-LEVEL, LOW-NOISE AMPLIFIER

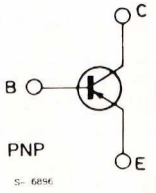
DESCRIPTION

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

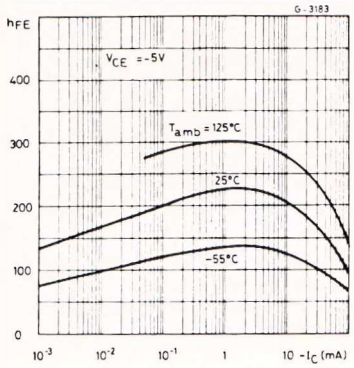
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	Max	146	°C/W
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient	Max	486	°C/W

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

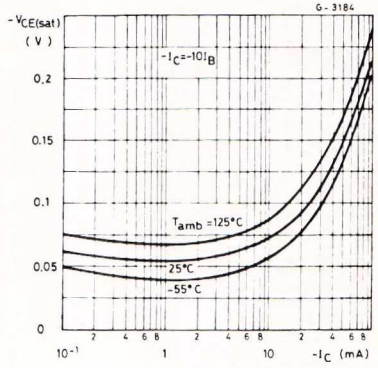
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cutoff Current (V_{BE} = 0)	V_{CE} = − 70 V V_{CE} = − 70 V T_{amb} = 150 °C		− 0.1 − 0.1	− 10 − 10	nA μA
I_{EBO}	Emitter Cutoff Current (I_C = 0)	V_{EB} = − 4 V		− 0.1	− 10	nA
$V_{(BR)CES}$	Collector-emitter Breakdown Voltage (V_{BE}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

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

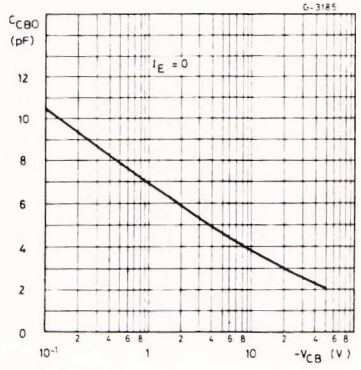
DC Current Gain.



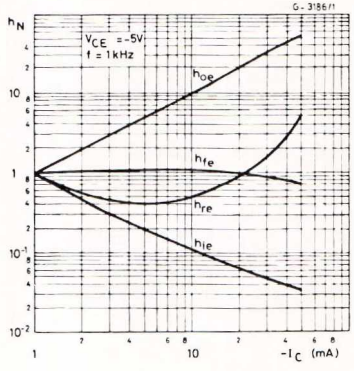
Collector-emitter Saturation Voltage.



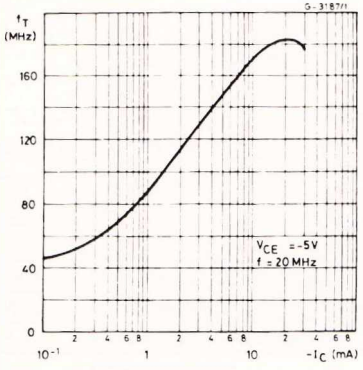
Collector-base Capacitance.



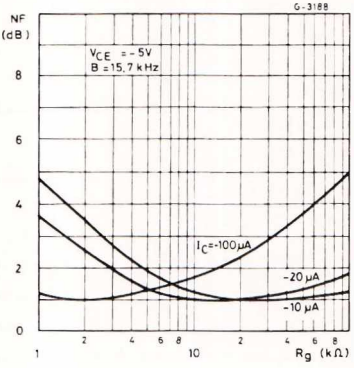
Normalized h Parameters.



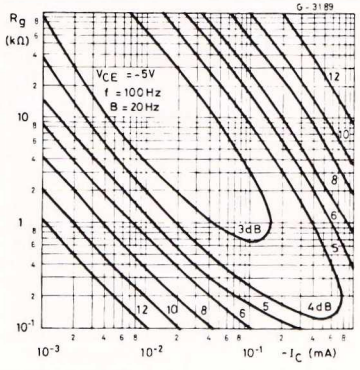
Transition Frequency.



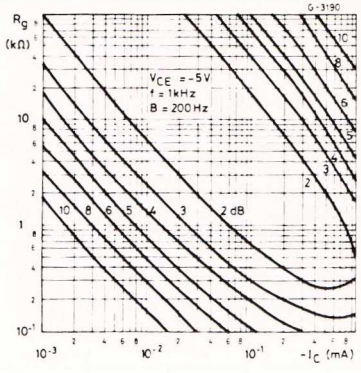
Noise Figure vs. Source Resistance.



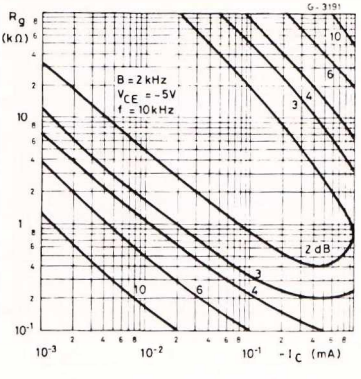
Contours of Constant Noise Figure (f = 100 Hz).



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



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



Noise Figure vs. Frequency.