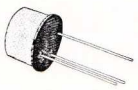
SGS-THOMSON MICROELECTRONICS

BFR17

LOW-LEVEL, LOW-NOISE, VERY HIGH GAIN AMPLIFIER

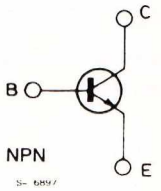
DESCRIPTION

The BFR17 is a silicon planar epitaxial NPN transistor in Jedec TO-18 metal case, designed for use in high performance low level, low noise amplifier applications.



TO-18

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CES}	Collector–emitter Voltage (V_{BE} = 0)	60	V
V_{CEO}	Collector–emitter Voltage (I_B = 0)	60	V
V_{EBO}	Emitter–base Voltage (I_C = 0)	8	V
I_C	Collector Current	50	mA
P_{tot}	Total Power Dissipation at T_{amb} = 25 °C at T_{case} = 25 °C	0.36 1.2	W W
T_{stg}, T_j	Storage and Junction Temperature	– 55 to 200	°C

THERMAL DATA

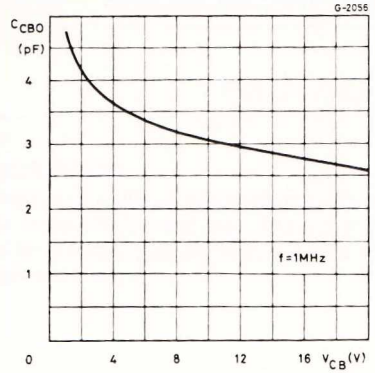
$R_{th\ j-case}$	Thermal Resistance Junction–case	Max	146	°C/W
$R_{th\ j-amb}$	Thermal Resistance Junction–ambient	Max	486	°C/W

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

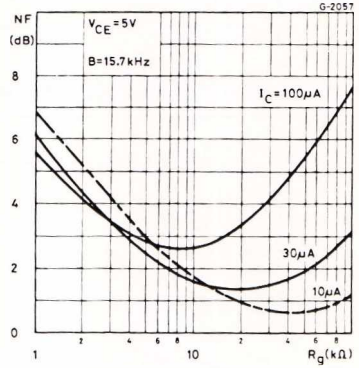
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cutoff Current (V_{BE} = 0)	V_{CE} = 50 V V_{CE} = 50 V T_{amb} = 150 °C		0.1 0.1	20 20	nA µA
I_{EBO}	Emitter Cutoff Current (I_C = 0)	V_{EB} = 5 V		0.1	20	nA
$V_{(BR)CEO}$*	Collector-emitter Breakdown Voltage (I_B = 0)	I_C = 10 mA	60			V
$V_{(BR)CES}$	Collector-emitter Breakdown Voltage (V_{BE} = 0)	I_C = 10 µA	60			V
$V_{(BR)EBO}$	Emitter-base Breakdown Voltage (I_C = 0)	I_E = 10 µA	8			V
$V_{CE(sat)}$*	Collector-emitter Saturation Voltage	I_C = 1 mA I_B = 0.1 mA		0.15	0.35	V
V_{BE}*	Base-emitter Voltage	I_C = 1 mA V_{CE} = 5 V I_C = 100 µA V_{CE} = 5 V		0.64 0.58	 0.7	V V
h_{FE}*	DC Current Gain	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	130 220 450	220 300 530 530		
h_{fe}	Small Signal Current Gain	I_C = 1 mA V_{CE} = 5 V f = 20 kHz		530		
f_T	Transition Frequency	I_C = 1 mA V_{CE} = 5 V f = 20 MHz	70	100		MHz
C_{CBO}	Collector-base Capacitance	I_E = 0 V_{CB} = 5 V		3.5	6	pF
C_{EBO}	Emitter-base Capacitance	I_C = 0 V_{EB} = 5 V		3.5	6	pF
NF	Noise Figure	I_C = 10 µA R_g = 10 kΩ f = 10 Hz to 10 kHz V_{CE} = 5 V f = 1 kHz f = 10 kHz		 1.8 1 1	 4 3 3	 dB dB dB
h_{ie}	Input Impedance	I_C = 1 mA V_{CE} = 5 V f = 1 kHz		10		kΩ
h_{oe}	Output Admittance			20		µS
h_{re}	Reverse Voltage Ratio			4.5×10^{-4}		

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

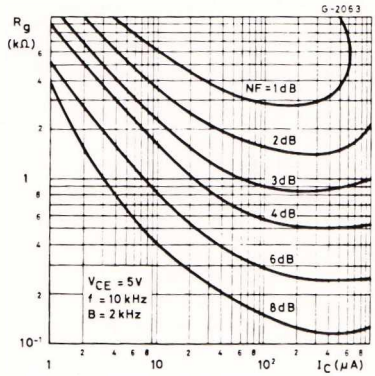
Collector-base Capacitance.



Noise Figure vs. Source Resistance.



Contours of Constant Noise Figure f = 10kHz.



Contours of Constant Noise Figure f = 1kHz.