Never stop thinkin

BFP420F

Low Noise Silicon Bipolar RF Transistor

Data Sheet

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RF & Protection Devices

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BFP420F, Low Noise Silicon Bipolar RF Transistor

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Previous Revision: Rev. 1.0	
Page	**Subjects (major changes since last revision)**
	This datasheet replaces the revision from 20 April 2007. The product itself has not been changed and the device characteristics remain unchanged. Only the product description and information available in the datasheet has been expanded and updated.

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Last Trademarks Update 2010-03-22

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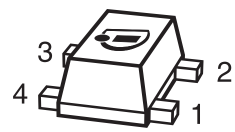
Low Noise Silicon Bipolar RF Transistor **BFP420F**

1 Features

- Low noise high gain silicon bipolar RF transistor
- Based on Infineon´s reliable very high volume 25 GHz silicon bipolar technology
- 0.9 dB minimum noise figure typical at 900 MHz, 3 V, 4 mA
- 16 dB maximum gain (G_{ma}) typical at 2.4 GHz, 3 V, 15 mA
- 28 dBm OIP_3 typical at 2.4 GHz, 4 V, 40 mA
- 16.5 dBm OP_{1dB} typical at 2.4 GHz, 4 V, 40 mA
- Popular in discrete oscillators
- Thin, small, flat, Pb-free (RoHS compliant) and Hal-free (“green”) package with visible leads



TSFP-4-1

RoHS

Applications

As Low Noise Amplifier (LNA) in

- Satellite communication systems: Navigation systems (GPS, Glonass), satellite radio (SDARs, DAB)
- Multimedia applications such as mobile/portable TV, CATV, FM Radio
- ISM applications like RKE, AMR and Zigbee

As discrete active mixer in RF Frontends

As active device in discretes oscillators

Attention: ESD (Electrostatic discharge) sensitive device, observe handling precautions

Product Name	Package	Pin Configuration				Marking
BFP420F	TSFP-4-1	1 = B	2 = E	3 = C	4 = E	AMs

2 Maximum Ratings

Table 1 Maximum Ratings at T_A = 25°C (unless otherwise specified)

Parameter	Symbol	Values		Unit	Note / Test Condition
		Min.	Max.		
Collector emitter voltage	V_{CEO}				Open base
		–	4.5	V	T_A = 25°C
		–	4.1	V	T_A = -55 °C
Collector base voltage	V_{CBO}	–	15	V	Open emitter
Collector emitter voltage	V_{CES}	–	15	V	Emitter / base shortened
Emitter base voltage	V_{EBO}	–	1.5	V	Open collector
Base current	I_B		9	mA	–
Collector current	I_C	–	60	mA	–
RF input power	P_{RFin}	–	–	dBm	–
Total power dissipation[1)]	P_{tot}	–	210	mW	$T_S \leq 100$ °C
Junction temperature	T_J	–	150	°C	–
Storage temperature	T_{Stg}	-55	150	°C	–

1) T_S is the soldering point temperature. T_S measured on the emitter lead at the soldering point of the pcb.

Attention: Stresses above the max. values listed here may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. Maximum ratings are absolute ratings; exceeding only one of these values may cause irreversible damage to the integrated circuit.

3 Thermal Characteristics

Table 2 Thermal Resistance

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Junction - soldering point[1)]	R_{thJS}	–	240	–	K/W	–

1) For calculation of R_{thJA} please refer to Application Note Thermal Resistance AN 077

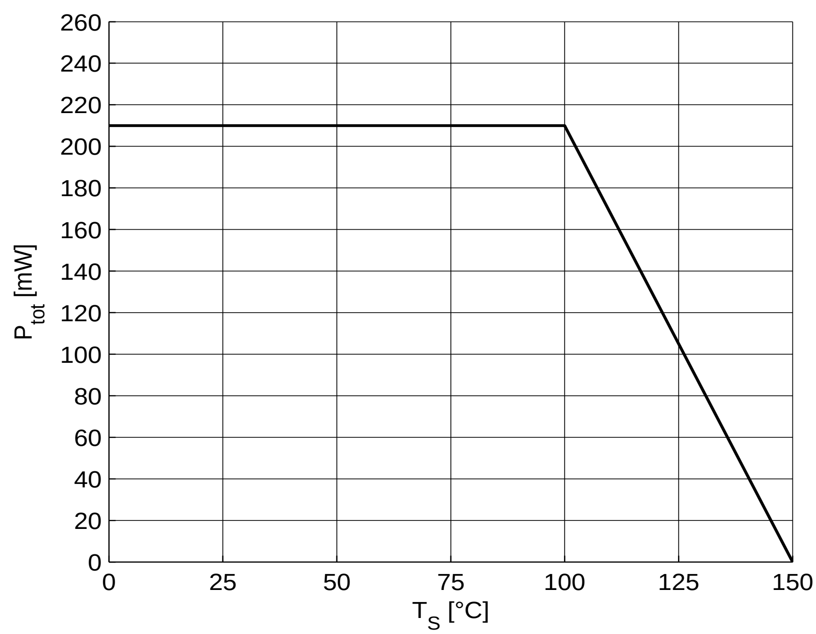


Figure 1 Total Power Dissipation $P_{tot} = f(T_s)$

4 Electrical Characteristics

4.1 DC Characteristics

Table 3 DC Characteristics at T_A = 25 °C

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Collector emitter breakdown voltage	$V_{(BR)CEO}$	4.5	5.5	–	V	I_C = 1 mA, I_B = 0 Open base
Collector emitter leakage current	I_{CES}	– –	– 1	10 30	µA nA	V_{CE} = 15 V, V_{BE} = 0 V_{CE} = 3 V, V_{BE} = 0 Emitter/base shorted
Collector base leakage current	I_{CBO}	–	1	30	nA	V_{CB} = 3 V, I_E = 0 Open emitter
Emitter base leakage current	I_{EBO}	–	10	100	nA	V_{EB} = 0.5 V, I_C = 0 Open collector
DC current gain	h_{FE}	60	95	130		V_{CE} = 4 V, I_C = 5 mA Pulse measured

4.2 General AC Characteristics

Table 4 General AC Characteristics at T_A = 25 °C

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Transition frequency	f_T	18	25	–	GHz	V_{CE} = 3 V, I_C = 30 mA f = 2 GHz
Collector base capacitance	C_{CB}	–	0.15	0.3	pF	V_{CB} = 2 V, V_{BE} = 0 f = 1 MHz Emitter grounded
Collector emitter capacitance	C_{CE}	–	0.46	–	pF	V_{CE} = 2 V, V_{BE} = 0 f = 1 MHz Base grounded
Emitter base capacitance	C_{EB}	–	0.55	–	pF	V_{EB} = 0.5 V, V_{CB} = 0 f = 1 MHz Collector grounded

4.3 Frequency Dependent AC Characteristics

Measurement setup is a test fixture with Bias T's in a 50 Ω system, T_A = 25 °C

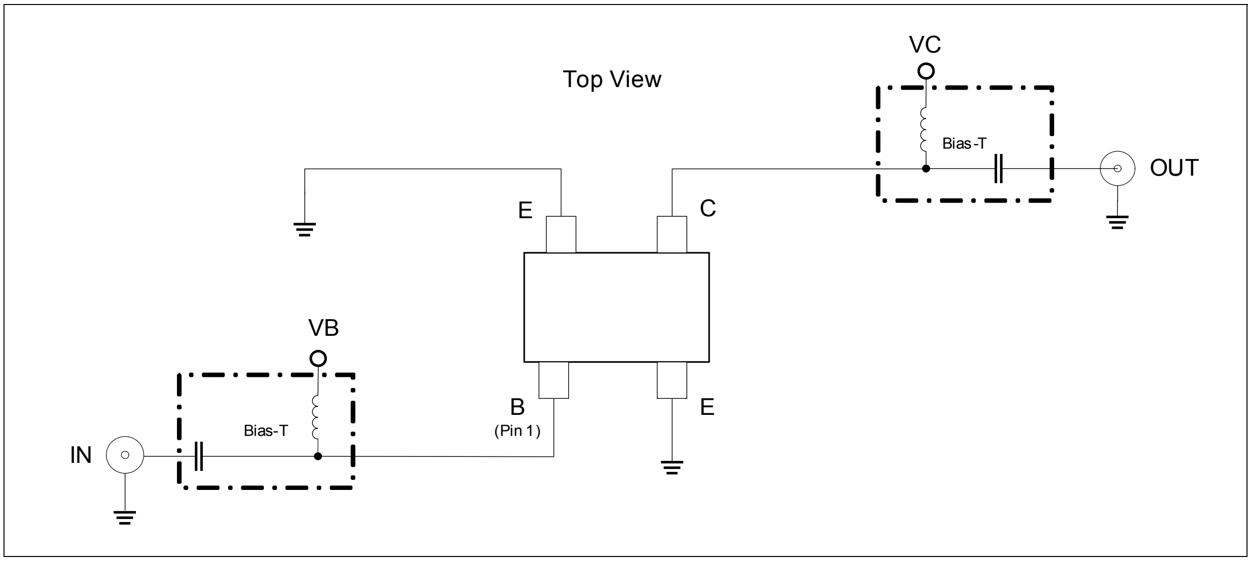


Figure 2 Testing Circuit

Table 5 AC Characteristics, *f* = 150 MHz

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Maximum power gain					dB	$Z_S = Z_{SoptG}$, $Z_L = Z_{LoptG}$
@ low noise operating point	G_{ms}	–	30	–		V_{CE} = 3 V, I_C = 4 mA
@ recommended trade off oper. point	G_{ms}	–	34.5	–		V_{CE} = 3 V, I_C = 15 mA
@ max. linearity operating point	G_{ms}	–	37	–		V_{CE} = 4 V, I_C = 40 mA
Transducer gain					dB	$Z_S = Z_L$ = 50 Ω
@ low noise operating point	S_{21}	–	22	–		V_{CE} = 3 V, I_C = 4 mA
@ recommended trade off oper. point	S_{21}	–	30	–		V_{CE} = 3 V, I_C = 15 mA
@ max. linearity operating point	S_{21}	–	33	–		V_{CE} = 4 V, I_C = 40 mA
Noise figure					dB	$Z_S = Z_{SoptN}$
@ low noise operating point						V_{CE} = 3 V, I_C = 4 mA
Minimum noise figure	NF_{min}	–	0.9	–		
Associated gain	G_{ass}	–	24	–		
@ recommended trade off oper. point						V_{CE} = 3 V, I_C = 15 mA
Minimum noise figure	NF_{min}	–	1.4	–		
Associated gain	G_{ass}	–	29	–		
Linearity					dBm	$Z_S = Z_L$ = 50 Ω
@ recommended trade off oper. point						V_{CE} = 3 V, I_C = 15 mA
3rd order intercept point at output	OIP_3	–	21	–		
1 dB gain compression point at output	OP_{1dB}	–	7	–		

Table 5 AC Characteristics, f = 150 MHz (cont'd)

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
@ max. linearity operating point						V_{CE} = 4 V, I_C = 40 mA
3rd order intercept point at output	OIP_3	–	25	–		
1 dB gain compression point at output	OP_{1dB}	–	15.5	–		

Table 6 AC Characteristics, f = 450 MHz

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Maximum power gain					dB	$Z_S = Z_{SoptG}$, $Z_L = Z_{LoptG}$
@ low noise operating point	G_{ms}	–	25	–		V_{CE} = 3 V, I_C = 4 mA
@ recommended trade off oper. point	G_{ms}	–	29	–		V_{CE} = 3 V, I_C = 15 mA
@ max. linearity operating point	G_{ms}	–	31	–		V_{CE} = 4 V, I_C = 40 mA
Transducer gain					dB	$Z_S = Z_L$ = 50 Ω
@ low noise operating point	S_{21}	–	21	–		V_{CE} = 3 V, I_C = 4 mA
@ recommended trade off oper. point	S_{21}	–	27	–		V_{CE} = 3 V, I_C = 15 mA
@ max. linearity operating point	S_{21}	–	28.5	–		V_{CE} = 4 V, I_C = 40 mA
Noise figure					dB	$Z_S = Z_{SoptN}$
@ low noise operating point						V_{CE} = 3 V, I_C = 4 mA
Minimum noise figure	NF_{min}	–	0.9	–		
Associated gain	G_{ass}	–	22.5	–		
@ recommended trade off oper. point						V_{CE} = 3 V, I_C = 15 mA
Minimum noise figure	NF_{min}	–	1.4	–		
Associated gain	G_{ass}	–	27	–		
Linearity					dBm	$Z_S = Z_L$ = 50 Ω
@ recommended trade off oper. point						V_{CE} = 3 V, I_C = 15 mA
3rd order intercept point at output	OIP_3	–	21.5	–		
1 dB gain compression point at output	OP_{1dB}	–	8	–		
@ max. linearity operating point						V_{CE} = 4 V, I_C = 40 mA
3rd order intercept point at output	OIP_3	–	26.5	–		
1 dB gain compression point at output	OP_{1dB}	–	16.5	–		

Table 7 AC Characteristics, f = 900 MHz

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Maximum power gain					dB	$Z_S = Z_{SoptG}$, $Z_L = Z_{LoptG}$
@ low noise operating point	G_{ms}	–	22	–		V_{CE} = 3 V, I_C = 4 mA
@ recommended trade off oper. point	G_{ms}	–	25	–		V_{CE} = 3 V, I_C = 15 mA
@ max. linearity operating point	G_{ms}	–	26.5	–		V_{CE} = 4 V, I_C = 40 mA

Table 7 AC Characteristics, f = 900 MHz (cont'd)

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Transducer gain					dB	$Z_S = Z_L = 50\ \Omega$
@ low noise operating point	S_{21}	–	19	–		$V_{CE} = 3$ V, $I_C = 4$ mA
@ recommended trade off oper. point	S_{21}	–	23	–		$V_{CE} = 3$ V, $I_C = 15$ mA
@ max. linearity operating point	S_{21}	–	24	–		$V_{CE} = 4$ V, $I_C = 40$ mA
Noise figure					dB	$Z_S = Z_{SoptN}$
@ low noise operating point						$V_{CE} = 3$ V, $I_C = 4$ mA
Minimum noise figure	NF_{min}	–	0.95	–		
Associated gain	G_{ass}	–	20	–		
@ recommended trade off oper. point						$V_{CE} = 3$ V, $I_C = 15$ mA
Minimum noise figure	NF_{min}	–	1.4	–		
Associated gain	G_{ass}	–	23	–		
Linearity					dBm	$Z_S = Z_L = 50\ \Omega$
@ recommended trade off oper. point						$V_{CE} = 3$ V, $I_C = 15$ mA
3rd order intercept point at output	OIP_3	–	23.5	–		
1 dB gain compression point at output	OP_{1dB}	–	8	–		
@ max. linearity operating point						$V_{CE} = 4$ V, $I_C = 40$ mA
3rd order intercept point at output	OIP_3	–	27.5	–		
1 dB gain compression point at output	OP_{1dB}	–	17	–		

Table 8 AC Characteristics, f = 1500 MHz

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Maximum power gain					dB	$Z_S = Z_{SoptG}$, $Z_L = Z_{LoptG}$
@ low noise operating point	G_{ms}	–	19	–		$V_{CE} = 3$ V, $I_C = 4$ mA
@ recommended trade off oper. point	G_{ms}	–	22	–		$V_{CE} = 3$ V, $I_C = 15$ mA
@ max. linearity operating point	G_{ma}	–	22	–		$V_{CE} = 4$ V, $I_C = 40$ mA
Transducer gain					dB	$Z_S = Z_L = 50\ \Omega$
@ low noise operating point	S_{21}	–	16	–		$V_{CE} = 3$ V, $I_C = 4$ mA
@ recommended trade off oper. point	S_{21}	–	19	–		$V_{CE} = 3$ V, $I_C = 15$ mA
@ max. linearity operating point	S_{21}	–	19.5	–		$V_{CE} = 4$ V, $I_C = 40$ mA
Noise figure					dB	$Z_S = Z_{SoptN}$
@ low noise operating point						$V_{CE} = 3$ V, $I_C = 4$ mA
Minimum noise figure	NF_{min}	–	1	–		
Associated gain	G_{ass}	–	16.5	–		
@ recommended trade off oper. point						$V_{CE} = 3$ V, $I_C = 15$ mA
Minimum noise figure	NF_{min}	–	1.5	–		
Associated gain	G_{ass}	–	19	–		

Table 8 AC Characteristics, f = 1500 MHz (cont'd)

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Linearity					dBm	$Z_S = Z_L = 50\ \Omega$
@ recommended trade off oper. point						$V_{CE} = 3$ V, $I_C = 15$ mA
3rd order intercept point at output	OIP_3	–	22.5	–		
1 dB gain compression point at output	OP_{1dB}	–	7	–		
@ max. linearity operating point						$V_{CE} = 4$ V, $I_C = 40$ mA
3rd order intercept point at output	OIP_3	–	27.5	–		
1 dB gain compression point at output	OP_{1dB}	–	16	–		

Table 9 AC Characteristics, f = 1900 MHz

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Maximum power gain					dB	$Z_S = Z_{SoptG}$, $Z_L = Z_{LoptG}$
@ low noise operating point	G_{ms}	–	18	–		$V_{CE} = 3$ V, $I_C = 4$ mA
@ recommended trade off oper. point	G_{ma}	–	19.5	–		$V_{CE} = 3$ V, $I_C = 15$ mA
@ max. linearity operating point	G_{ma}	–	19	–		$V_{CE} = 4$ V, $I_C = 40$ mA
Transducer gain					dB	$Z_S = Z_L = 50\ \Omega$
@ low noise operating point	S_{21}	–	14	–		$V_{CE} = 3$ V, $I_C = 4$ mA
@ recommended trade off oper. point	S_{21}	–	16.5	–		$V_{CE} = 3$ V, $I_C = 15$ mA
@ max. linearity operating point	S_{21}	–	17	–		$V_{CE} = 4$ V, $I_C = 40$ mA
Noise figure					dB	$Z_S = Z_{SoptN}$
@ low noise operating point						$V_{CE} = 3$ V, $I_C = 4$ mA
Minimum noise figure	NF_{min}	–	1.1	–		
Associated gain	G_{ass}	–	15	–		
@ recommended trade off oper. point						$V_{CE} = 3$ V, $I_C = 15$ mA
Minimum noise figure	NF_{min}	–	1.5	–		
Associated gain	G_{ass}	–	17	–		
Linearity					dBm	$Z_S = Z_L = 50\ \Omega$
@ recommended trade off oper. point						$V_{CE} = 3$ V, $I_C = 15$ mA
3rd order intercept point at output	OIP_3	–	24	–		
1 dB gain compression point at output	OP_{1dB}	–	9	–		
@ max. linearity operating point						$V_{CE} = 4$ V, $I_C = 40$ mA
3rd order intercept point at output	OIP_3	–	28	–		
1 dB gain compression point at output	OP_{1dB}	–	17	–		

Table 10 AC Characteristics, f = 2400 MHz

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Maximum power gain					dB	$Z_S = Z_{SoptG}$, $Z_L = Z_{LoptG}$
@ low noise operating point	G_{ms}	–	16.5	–		V_{CE} = 3 V, I_C = 4 mA
@ recommended trade off oper. point	G_{ma}	–	16.5	–		V_{CE} = 3 V, I_C = 15 mA
@ max. linearity operating point	G_{ma}	–	16.5	–		V_{CE} = 4 V, I_C = 40 mA
Transducer gain					dB	$Z_S = Z_L = 50\ \Omega$
@ low noise operating point	S_{21}	–	12	–		V_{CE} = 3 V, I_C = 4 mA
@ recommended trade off oper. point	S_{21}	–	14.5	–		V_{CE} = 3 V, I_C = 15 mA
@ max. linearity operating point	S_{21}	–	15	–		V_{CE} = 4 V, I_C = 40 mA
Noise figure					dB	$Z_S = Z_{SoptN}$
@ low noise operating point						V_{CE} = 3 V, I_C = 4 mA
Minimum noise figure	NF_{min}	–	1.2	–		
Associated gain	G_{ass}	–	12.5	–		
@ recommended trade off oper. point						V_{CE} = 3 V, I_C = 15 mA
Minimum noise figure	NF_{min}	–	1.6	–		
Associated gain	G_{ass}	–	15	–		
Linearity					dBm	$Z_S = Z_L = 50\ \Omega$
@ recommended trade off oper. point						V_{CE} = 3 V, I_C = 15 mA
3rd order intercept point at output	OIP_3	–	24.5	–		
1 dB gain compression point at output	OP_{1dB}	–	8.5	–		
@ max. linearity operating point						V_{CE} = 4 V, I_C = 40 mA
3rd order intercept point at output	OIP_3	–	28	–		
1 dB gain compression point at output	OP_{1dB}	–	16.5	–		

Table 11 AC Characteristics, f = 3500 MHz

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Maximum power gain					dB	$Z_S = Z_{SoptG}$, $Z_L = Z_{LoptG}$
@ low noise operating point	G_{ma}	–	11.5	–		V_{CE} = 3 V, I_C = 4 mA
@ recommended trade off oper. point	G_{ma}	–	12.5	–		V_{CE} = 3 V, I_C = 15 mA
@ max. linearity operating point	G_{ma}	–	13	–		V_{CE} = 4 V, I_C = 40 mA
Transducer gain					dB	$Z_S = Z_L = 50\ \Omega$
@ low noise operating point	S_{21}	–	9	–		V_{CE} = 3 V, I_C = 4 mA
@ recommended trade off oper. point	S_{21}	–	11	–		V_{CE} = 3 V, I_C = 15 mA
@ max. linearity operating point	S_{21}	–	11.5	–		V_{CE} = 4 V, I_C = 40 mA
Noise figure					dB	$Z_S = Z_{SoptN}$
@ low noise operating point						V_{CE} = 3 V, I_C = 4 mA
Minimum noise figure	NF_{min}	–	1.6	–		

Table 11 AC Characteristics, *f* = 3500 MHz (cont'd)

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Associated gain	G_{ass}	–	10	–		
@ recommended trade off oper. point						V_{CE} = 3 V, I_C = 15 mA
Minimum noise figure	NF_{min}	–	1.8	–		
Associated gain	G_{ass}	–	11.5	–		
Linearity					dBm	$Z_S = Z_L$ = 50 Ω
@ recommended trade off oper. point						V_{CE} = 3 V, I_C = 15 mA
3rd order intercept point at output	OIP_3	–	22	–		
1 dB gain compression point at output	OP_{1dB}	–	8	–		
@ max. linearity operating point						V_{CE} = 4 V, I_C = 40 mA
3rd order intercept point at output	OIP_3	–	26	–		
1 dB gain compression point at output	OP_{1dB}	–	17	–		

Table 12 AC Characteristics, *f* = 5500 MHz

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Maximum power gain					dB	$Z_S = Z_{SoptG}$, $Z_L = Z_{LoptG}$
@ low noise operating point	G_{ma}	–	7.5	–		V_{CE} = 3 V, I_C = 4 mA
@ recommended trade off oper. point	G_{ma}	–	8.5	–		V_{CE} = 3 V, I_C = 15 mA
@ max. linearity operating point	G_{ma}	–	9	–		V_{CE} = 4 V, I_C = 40 mA
Transducer gain					dB	$Z_S = Z_L$ = 50 Ω
@ low noise operating point	S_{21}	–	5.5	–		V_{CE} = 3 V, I_C = 4 mA
@ recommended trade off oper. point	S_{21}	–	7	–		V_{CE} = 3 V, I_C = 15 mA
@ max. linearity operating point	S_{21}	–	8	–		V_{CE} = 4 V, I_C = 40 mA
Noise figure					dB	$Z_S = Z_{SoptN}$
@ low noise operating point						V_{CE} = 3 V, I_C = 4 mA
Minimum noise figure	NF_{min}	–	2.2	–		
Associated gain	G_{ass}	–	5	–		
@ recommended trade off oper. point						V_{CE} = 3 V, I_C = 15 mA
Minimum noise figure	NF_{min}	–	2.3	–		
Associated gain	G_{ass}	–	8	–		
Linearity					dBm	$Z_S = Z_L$ = 50 Ω
@ recommended trade off oper. point						V_{CE} = 3 V, I_C = 15 mA
3rd order intercept point at output	OIP_3	–	22	–		
1 dB gain compression point at output	OP_{1dB}	–	8.5	–		
@ max. linearity operating point						V_{CE} = 4 V, I_C = 40 mA
3rd order intercept point at output	OIP_3	–	26	–		
1 dB gain compression point at output	OP_{1dB}	–	17	–		

Note:

1. $G_{ms} = |S_{21} / S_{12}|$ for $k < 1$; $G_{ma} = |S_{21} / S_{12}|(k-(k^2-1)^{1/2})$ for $k > 1$
2. *In order to get the NF_{min} values stated in this chapter the test fixture losses have been subtracted from all measured results.*
3. *OIP_3 value depends on termination of all intermodulation frequency components. Termination used for this measurement is 50 Ω from 0.2 MHz to 12 GHz.*

4.4 Characteristic DC Diagrams

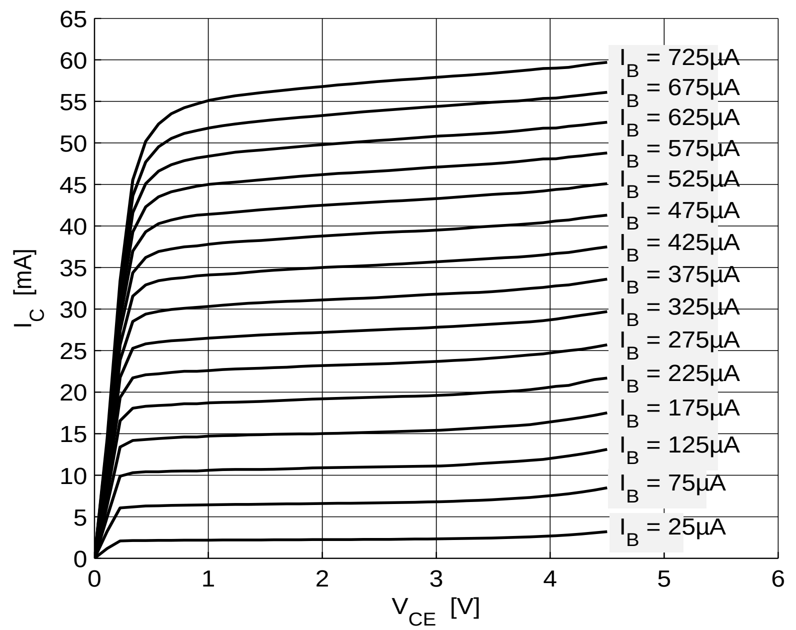


Figure 3 Collector Current vs. Collector Emitter Voltage $I_C = f(V_{CE})$, I_B = Parameter

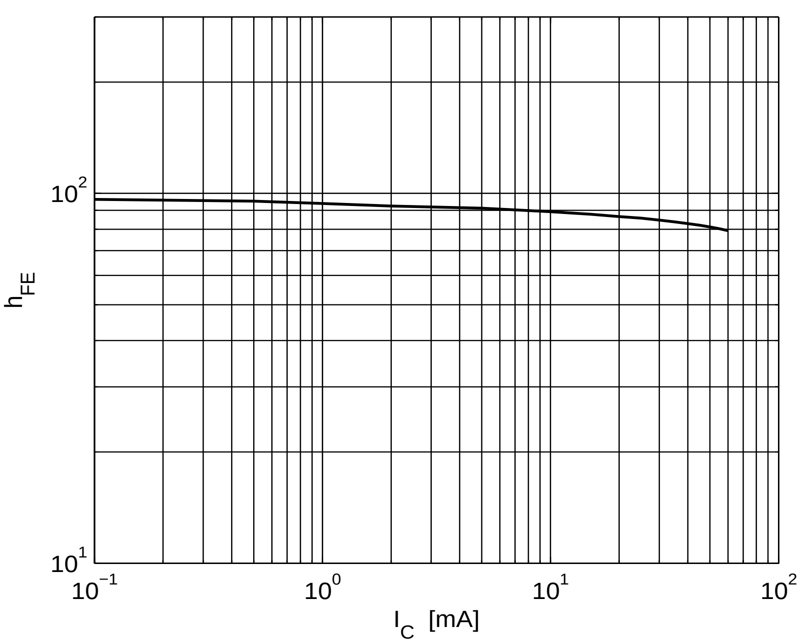


Figure 4 DC Current Gain $h_{FE} = f(I_C)$, V_{CE} = 3 V

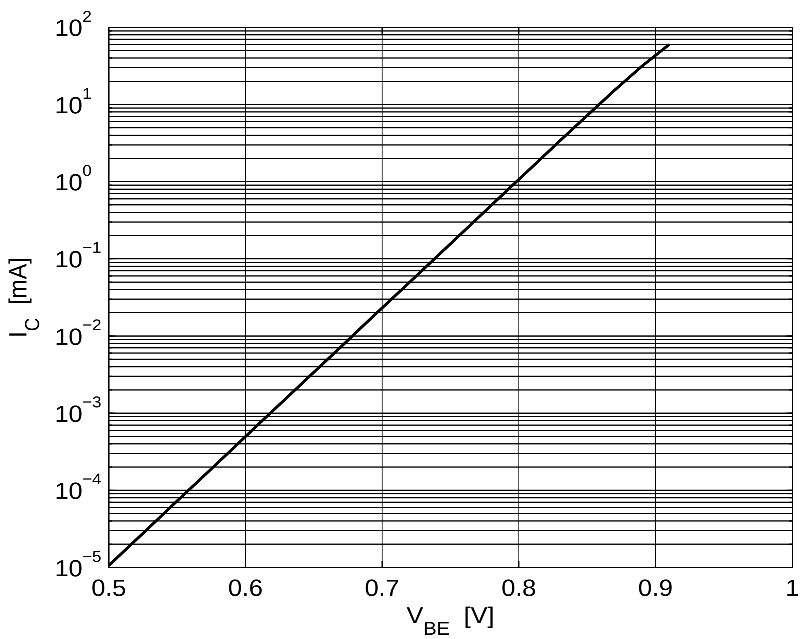


Figure 5 **Collector Current vs. Base Emitter Voltage $I_C = f(V_{BE})$, V_{CE} = 3 V**

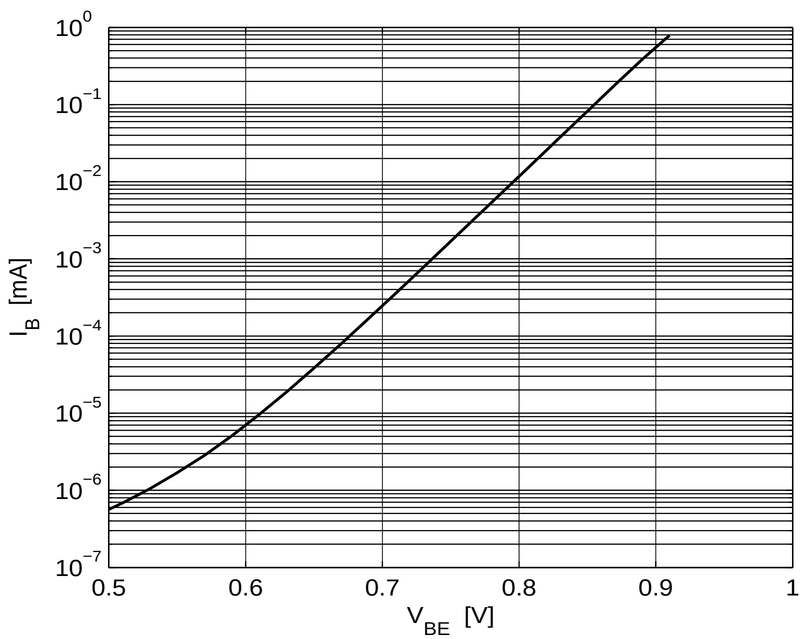


Figure 6 **Base Current vs. Base Emitter Forward Voltage $I_B = f(V_{BE})$, V_{CE} = 3 V**

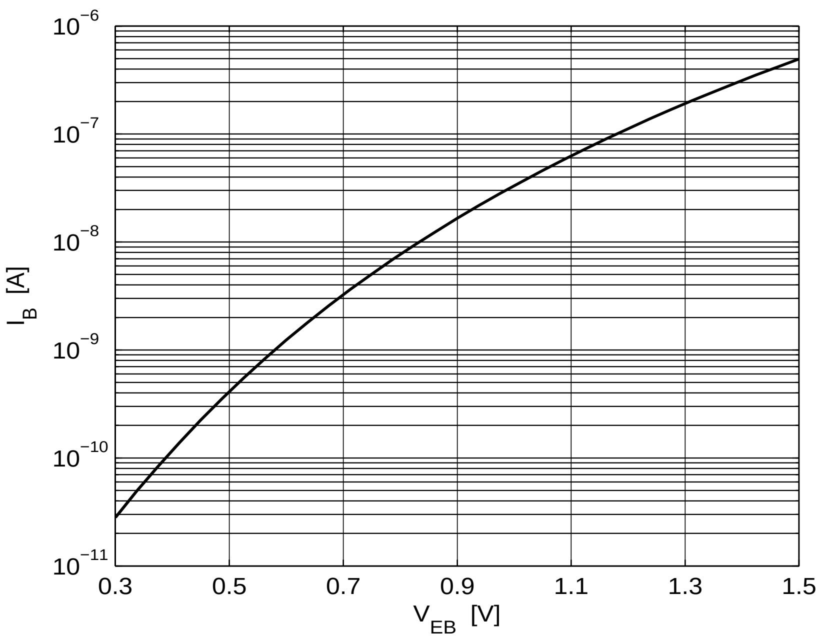


Figure 7 Base Current vs. Base Emitter Reverse Voltage $I_B = f(V_{EB})$, V_{CE} = 3 V

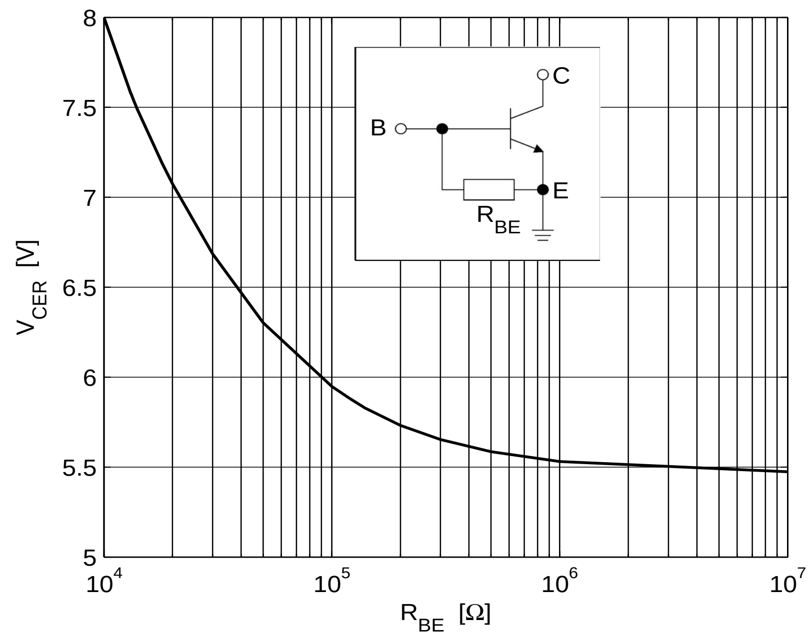


Figure 8 Collector Emitter Breakdown Voltage $V_{CER} = f(R_{BE})$, I_C = 1 mA

4.5 Characteristic AC Diagrams

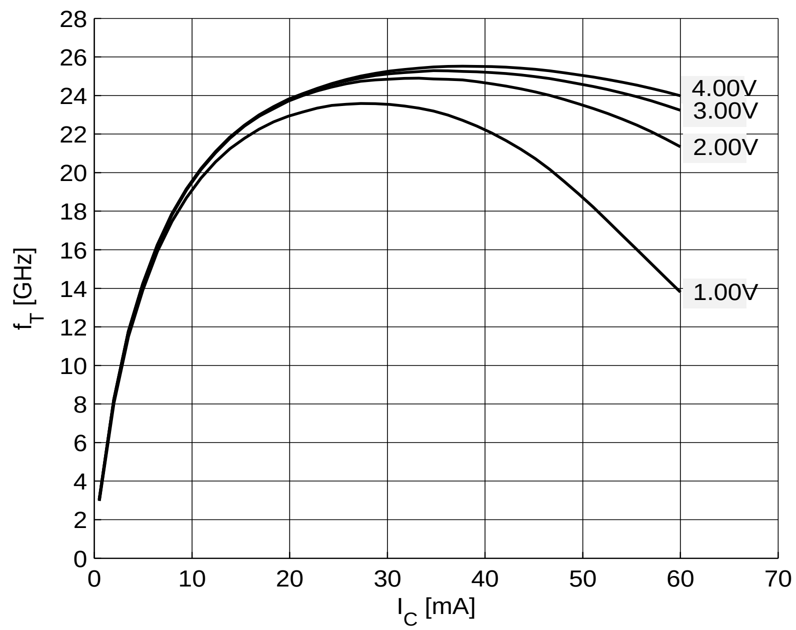


Figure 9 Transition Frequency $f_T = f(I_C)$, f **= 2 GHz,** V_{CE} **= Parameter**

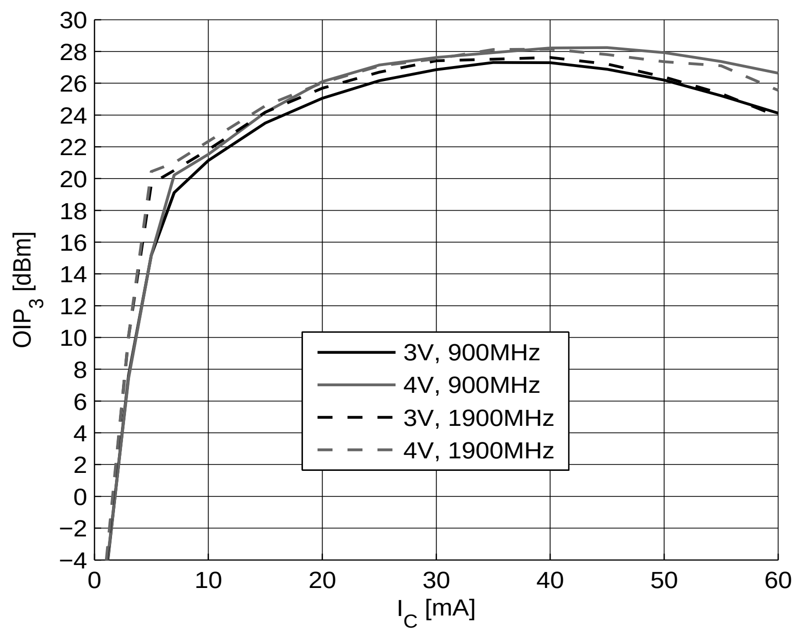


Figure 10 3rd Order Intercept Point $OIP_3 = f(I_C)$, $Z_S = Z_L = 50\ \Omega$, V_{CE}, f **= Parameters**

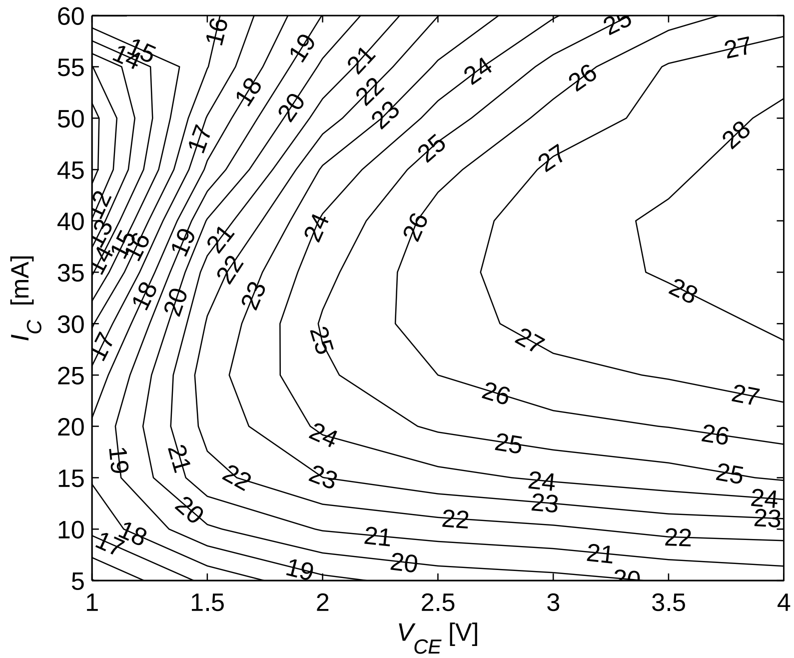


Figure 11 3rd Order Intercept Point at output OIP_3 [dBm] = $f(I_C, V_{CE})$, $Z_S = Z_L = 50\ \Omega$, f = 1900 MHz

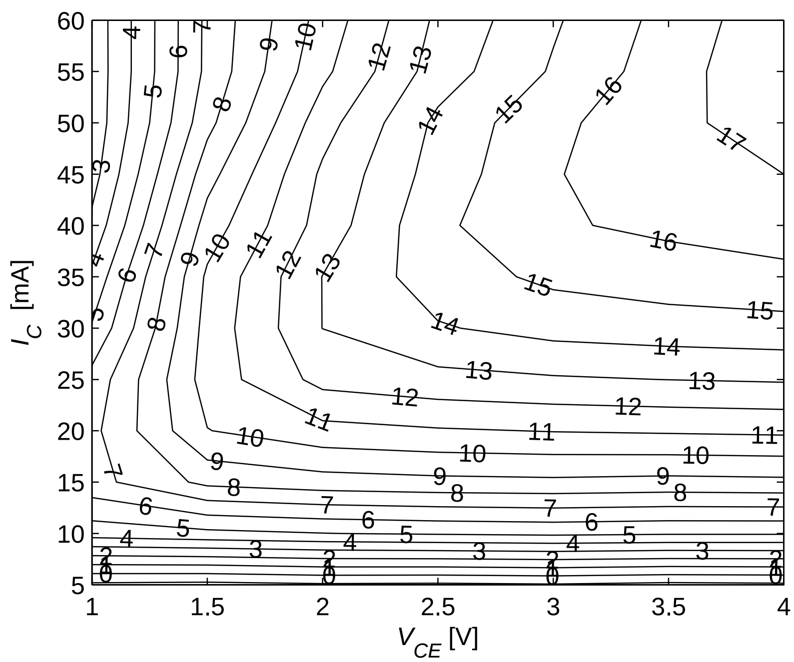


Figure 12 Compression Point at output OP_{1dB} [dBm] = $f(I_C, V_{CE})$, $Z_S = Z_L = 50\ \Omega$, f = 1900 MHz

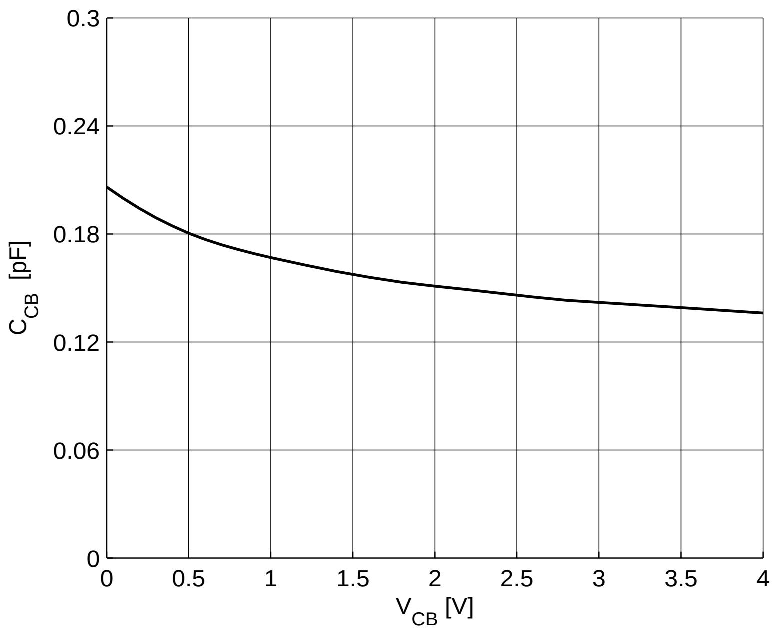


Figure 13 Collector Base Capacitance $C_{CB} = f(V_{CB})$, f = 1 MHz

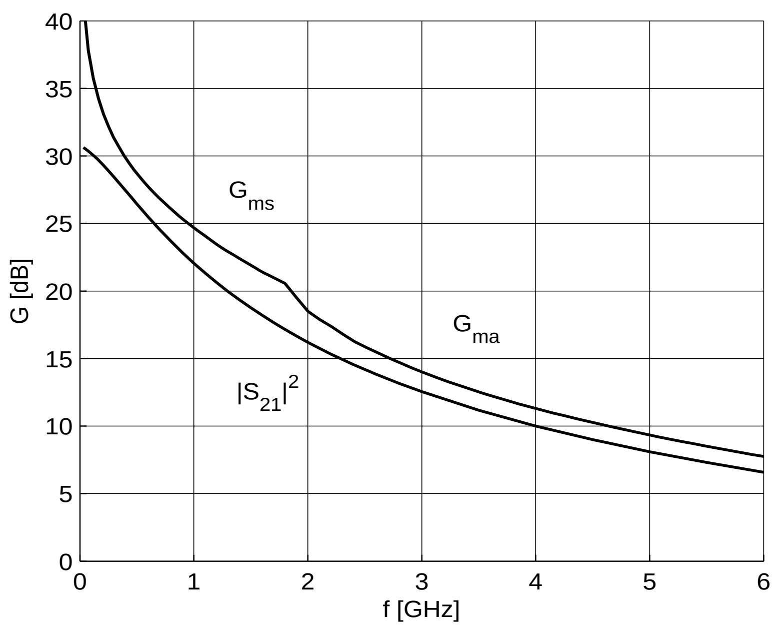


Figure 14 Gain G_{ma}, G_{ms}, $|S_{21}|^2 = f(f)$, V_{CE} = 3 V, I_C = 15 mA

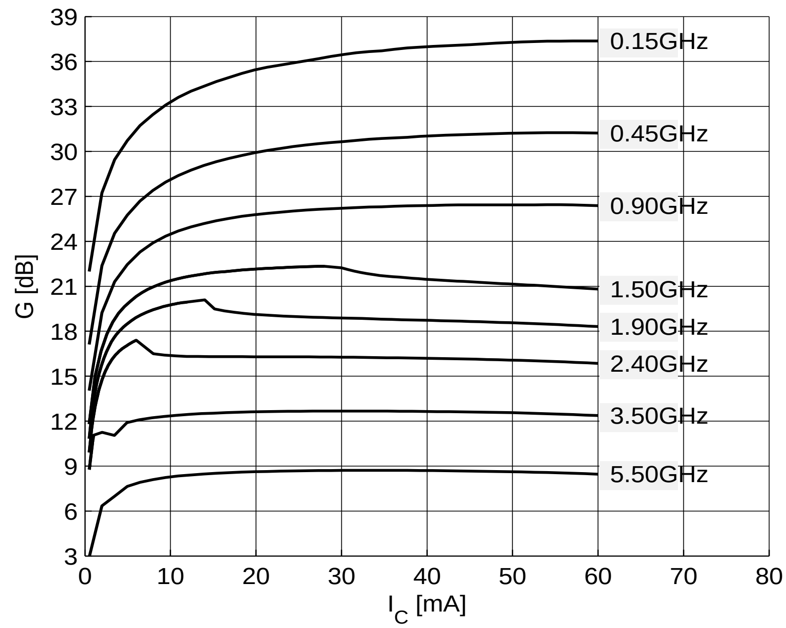


Figure 15 Maximum Power Gain $G_{max} = f(I_C)$, V_{CE} = 3 V, f = Parameter in GHz

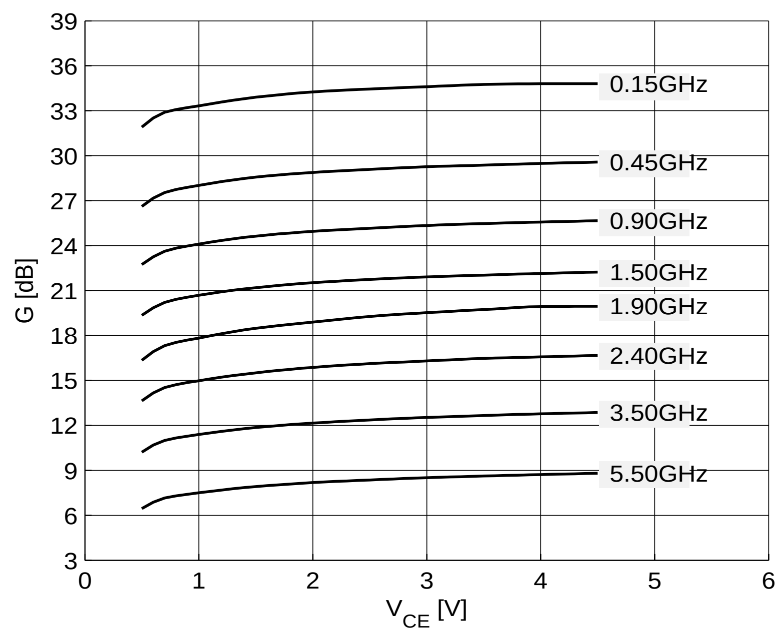


Figure 16 Maximum Power Gain $G_{max} = f(V_{CE})$, I_C = 15 mA, f = Parameter in GHz

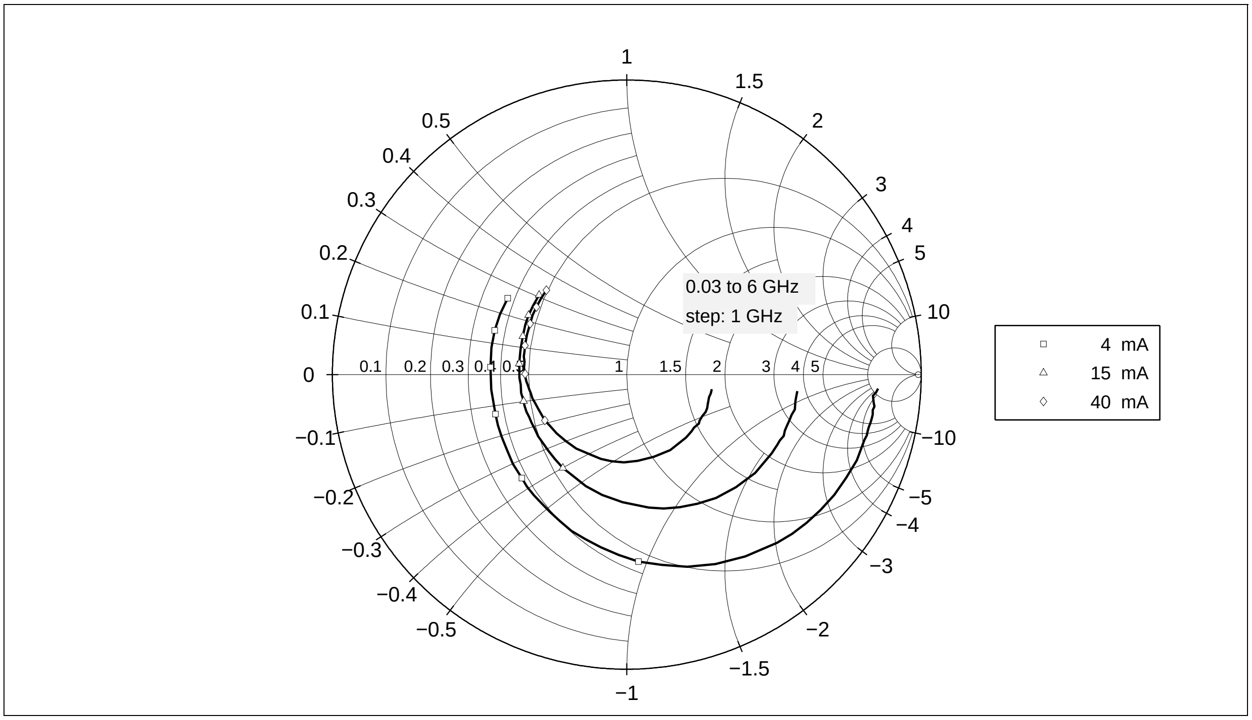


Figure 17 Input Matching $S_{11} = f(f)$, V_{CE} = 3 V, I_C = 4 / 15 / 45 mA

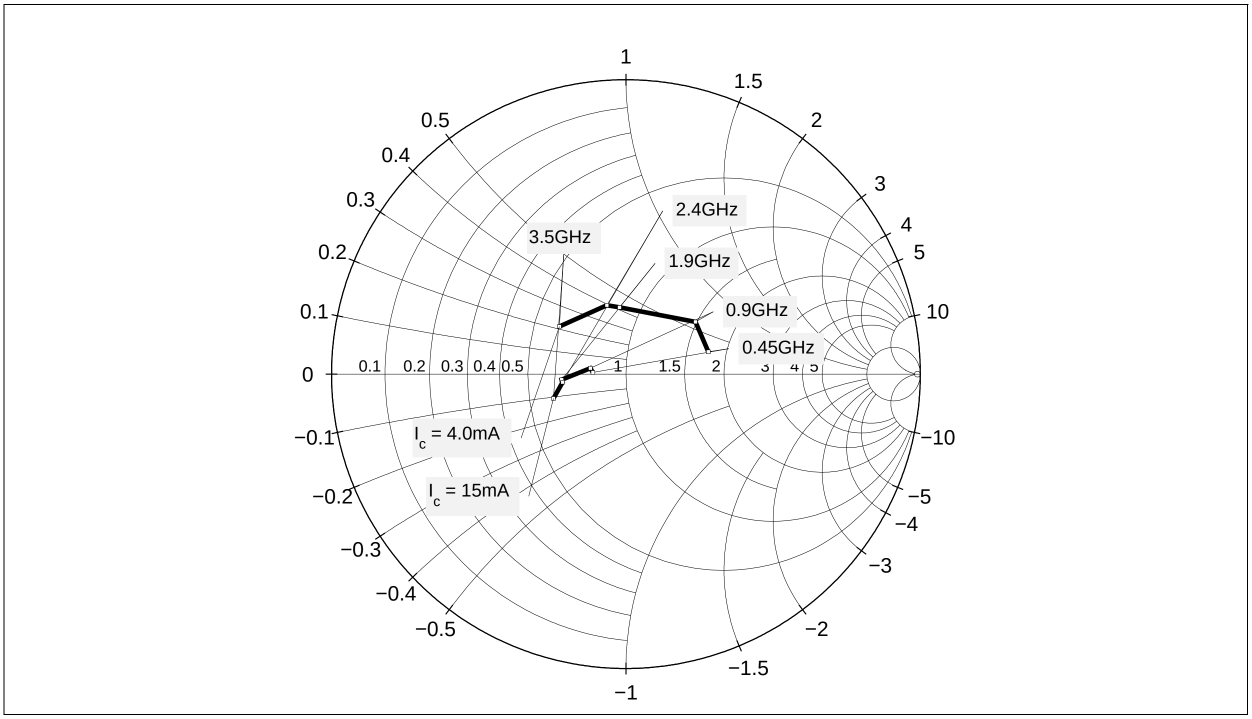


Figure 18 Source Impedance for Minimum Noise Figure $Z_{opt} = f(f)$, V_{CE} = 3 V, I_C = 4 / 15 mA

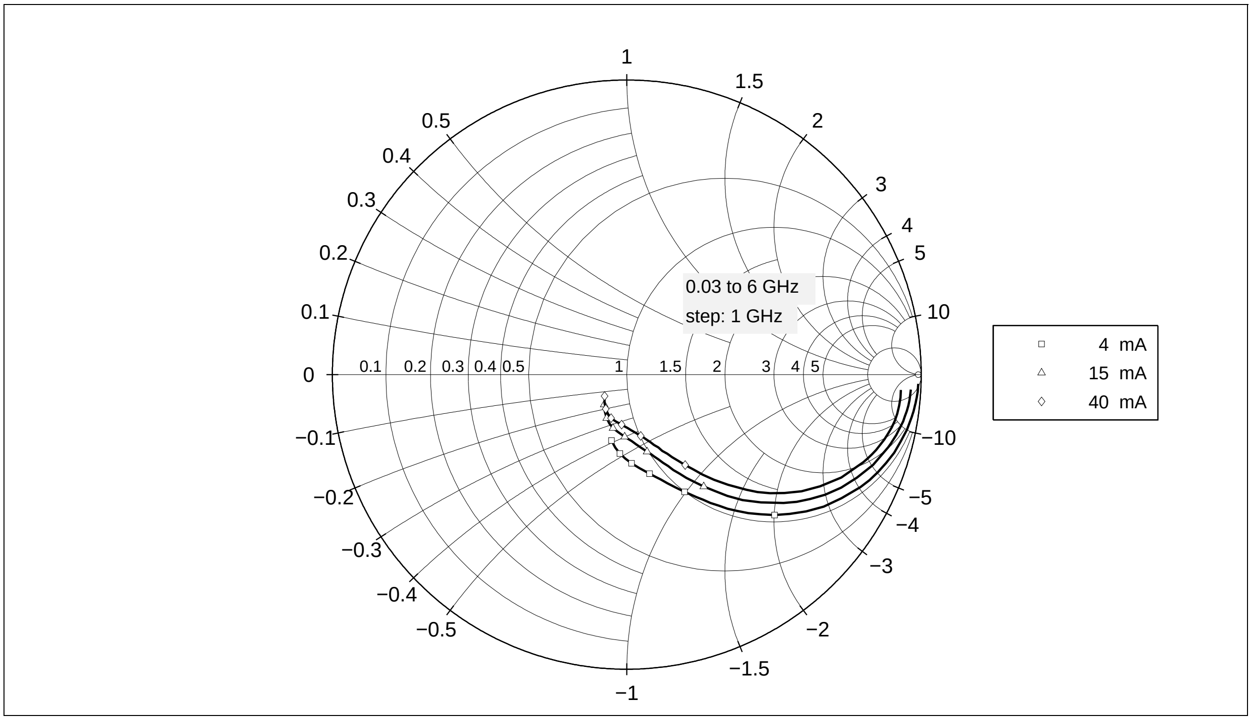


Figure 19 Output Matching $S_{22} = f(f)$, V_{CE} = 3 V, I_C = 4 / 15 / 45 mA

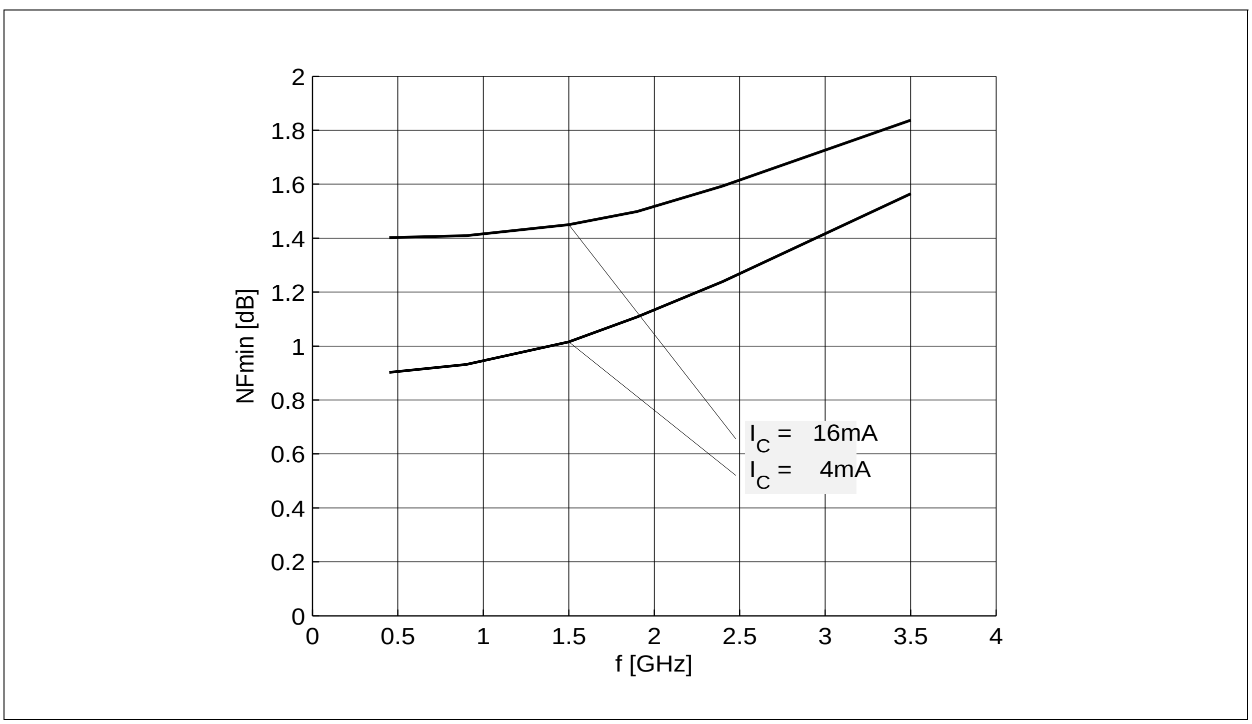


Figure 20 Noise Figure $NF_{min} = f(f)$, V_{CE} = 3 V, I_C = 4 / 15 mA, $Z_S = Z_{opt}$

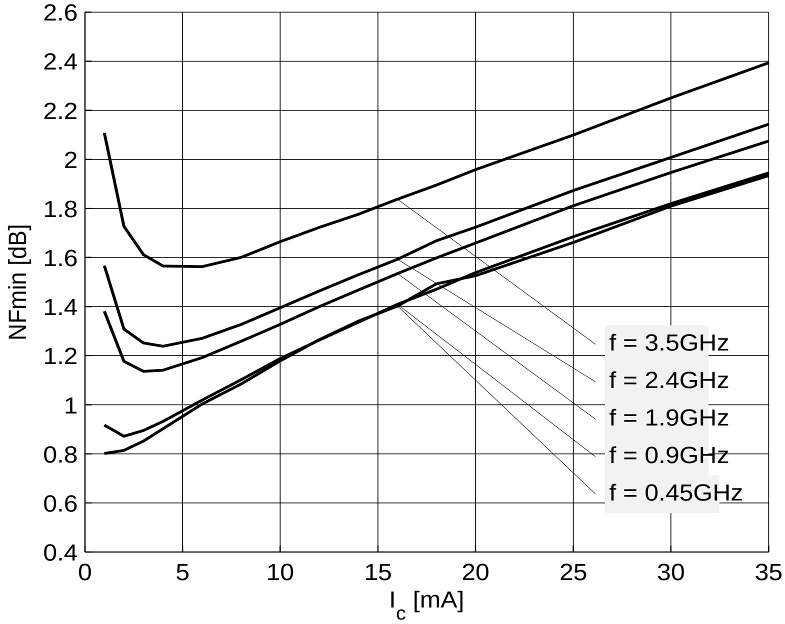


Figure 21 Noise Figure $NF_{min} = f(I_C)$, V_{CE} = 3 V, $Z_S = Z_{opt}$, f = Parameter in GHz

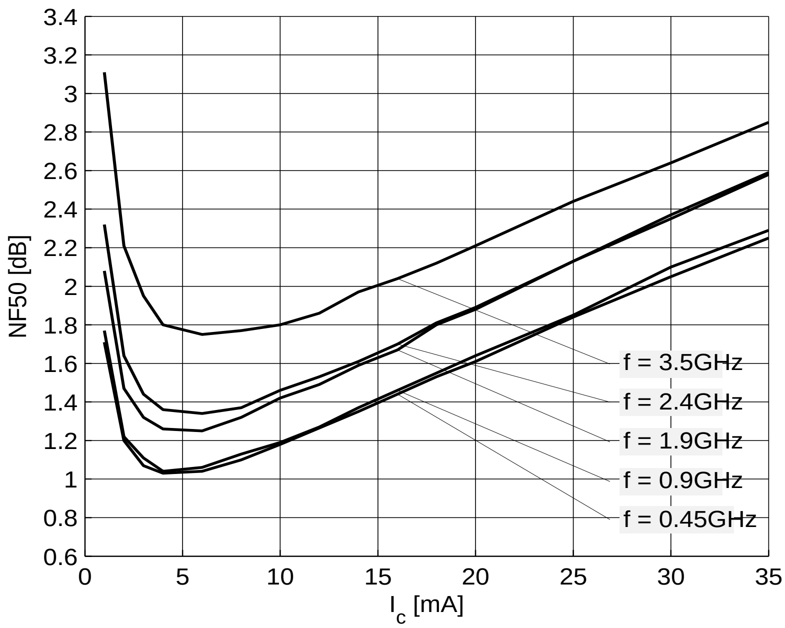


Figure 22 Noise Figure $NF_{50} = f(I_C)$, V_{CE} = 3 V, Z_S = 50 Ω, f = Parameter in GHz

Note: The curves shown in this chapter have been generated using typical devices but shall not be considered as a guarantee that all devices have identical characteristic curves. T_A = 25 °C.

5 Simulation Data

For the SPICE Gummel Poon (GP) model as well as for the S-parameters (including noise parameters) please consult our website and download the latest versions before actually starting your design.

You find the BFP420F SPICE GP model on the official homepage of Infineon RF transistors in MWO- and ADS-format, which you can import into these circuit simulation tools very quickly and conveniently. The model already contains the package parasitics and is ready to use for DC- and high frequency simulations. The terminals of the model circuit correspond to the pin configuration of the device.

The model parameters have been extracted and verified up to 10 GHz using typical devices. The BFP420F SPICE GP model reflects the typical DC- and RF-performance within the limitations which are given by the SPICE GP model itself. Besides the DC characteristics all S-parameters in magnitude and phase, as well as noise figure (including optimum source impedance, equivalent noise resistance and flicker noise) and intermodulation have been extracted.

6 Package Information TSFP-4

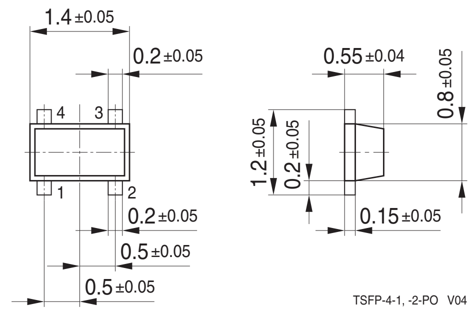


Figure 23 Package Outline

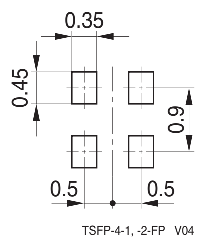


Figure 24 Package Foot Print

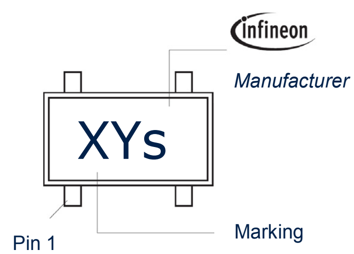


Figure 25 Marking Example (Marking BFP420F: AMs)

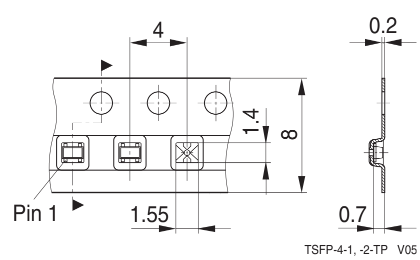


Figure 26 Tape Dimensions

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