Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

BFP420F

Low Noise Silicon Bipolar RF Transistor

Data Sheet

Revision 1.1, 2012-11-07

RF & Protection Devices

Edition 2012-11-07

Published by
Infineon Technologies AG
81726 Munich, Germany

Legal Disclaimer

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party.

Information

For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office (**www.infineon.com**).

Warnings

Due to technical requirements, components may contain dangerous substances. For information on the types in question, please contact the nearest Infineon Technologies Office.

Infineon Technologies components may be used in life-support devices or systems only with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.

BFP420F, Low Noise Silicon Bipolar RF Transistor

Revision History: 2012-11-07, Revision 1.1

Previous Revision: Rev. 1.0	
Page	**Subjects (major changes since last revision)**
	This datasheet replaces the revision from 2012-01-30. 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.

Table of Contents

List of Figures

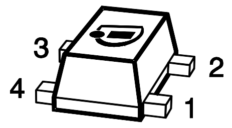
List of Tables

1 Product Brief

The BFP420F is a low noise wideband NPN bipolar RF transistor. The collector design supports voltages up to V_{CEO} = 4.5 V and currents up to I_C = 60 mA. The device is especially suited for mobile applications in which low power consumption is a key requirement. The typical transition frequency is approximately 25 GHz, hence the device offers high power gain at frequencies up to 4.5 GHz in amplifier applications. The device is housed in a thin small flat plastic package with visible leads.

2 Features

- General purpose low noise NPN bipolar RF transistor
- Based on Infineon´s reliable very high volume 25 GHz silicon bipolar technology
- 0.95 dB minimum noise figure typical at 900 MHz, 3 V, 4 mA
- 16.5 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 Halogen-free package with visible leads
- Qualification report according to AEC-Q101 available



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 well as for emerging wireless applications

As discrete active mixer in RF Frontends

As active device in discrete 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

3 Maximum Ratings

Table 3-1 Maximum Ratings at T_A = 25 °C (unless otherwise specified)

Parameter	Symbol	Values		Unit	Note / Test Condition
		Min.	Max.		
Collector emitter voltage	V_{CEO}	 – –	 4.5 4.1	V	Open base T_A = 25 °C T_A = -55 °C
Collector base voltage	V_{CBO}	–	15	V	Open emitter
Collector emitter voltage	V_{CES}	–	15	V	E-B short circuited
Emitter base voltage	V_{EBO}	–	1.5	V	Open collector
Base current	I_B	–	9	mA	–
Collector current	I_C	–	60	mA	–
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 is 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.

4 Thermal Characteristics

Table 4-1 Thermal Resistance

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

1)For the definition of R_{thJS} please refer to Application Note AN077 (Thermal Resistance Calculation)

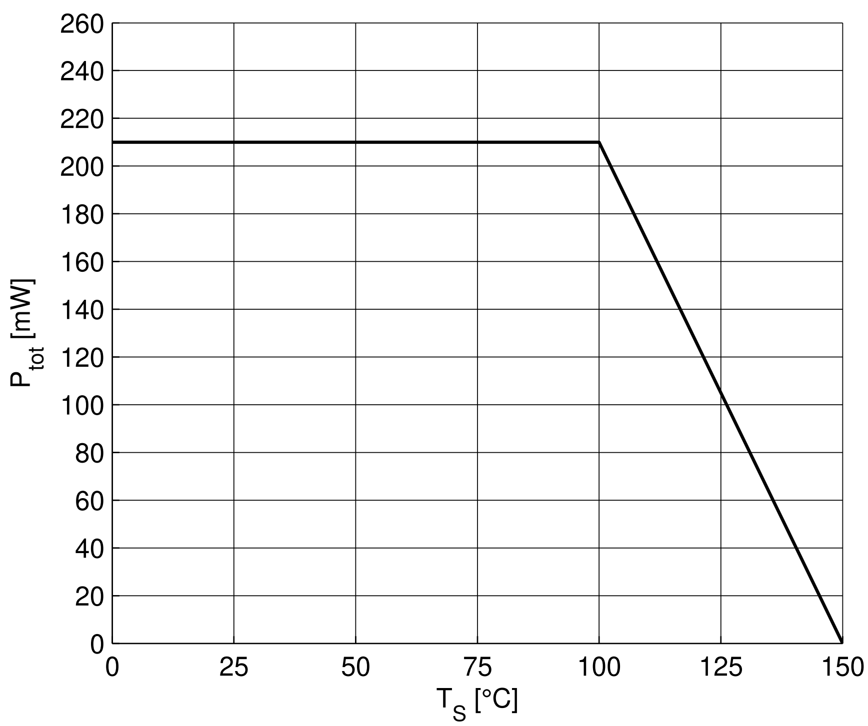


Figure 4-1 Total Power Dissipation $P_{tot} = f(T_s)$

5 Electrical Characteristics

5.1 DC Characteristics

Table 5-1 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 E-B short circuited
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

5.2 General AC Characteristics

Table 5-2 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

5.3 Frequency Dependent AC Characteristics

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

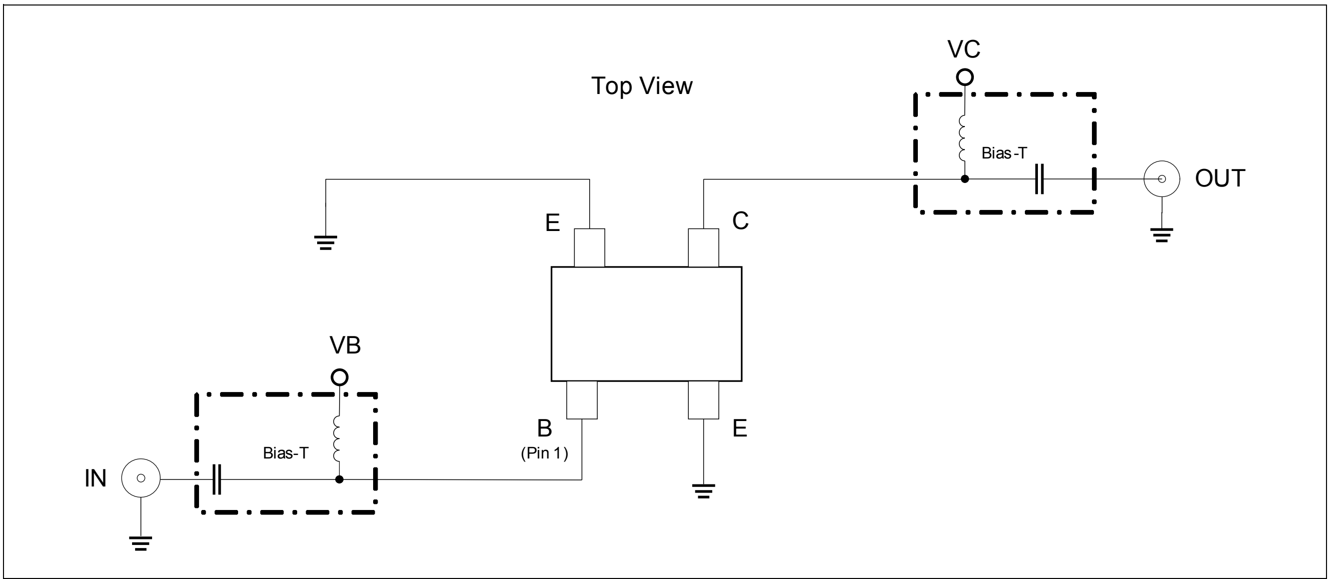


Figure 5-1 BFP420F Testing Circuit

Table 5-3 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					dB	$Z_S = Z_L$ = 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	–		
@ 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 5-4 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					dB	$Z_S = Z_L$ = 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 5-5 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
Transducer Gain					dB	$Z_S = Z_L$ = 50 Ω
@ 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

Table 5-5 AC Characteristics, f = 900 MHz (cont'd)

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
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					dB	$Z_S = Z_L$ = 50 Ω
@ recommended trade off oper. point						V_{CE} = 3 V, I_C = 15 mA
3rd order intercept point at output	OIP_3	–	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 5-6 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 Ω
@ 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	–		
Linearity					dB	$Z_S = Z_L$ = 50 Ω
@ recommended trade off oper. point						V_{CE} = 3 V, I_C = 15 mA
3rd order intercept point at output	OIP_3	–	22.5	–		
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 5-7 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 Ω
@ 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					dB	$Z_S = Z_L$ = 50 Ω
@ recommended trade off oper. point						V_{CE} = 3 V, I_C = 15 mA
3rd order intercept point at output	OIP_3	–	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 5-8 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 Ω
@ 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

Table 5-8 AC Characteristics, f = 2400 MHz (cont'd)

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
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					dB	$Z_S = Z_L$ = 50 Ω
@ recommended trade off oper. point						V_{CE} = 3 V, I_C = 15 mA
3rd order intercept point at output	OIP_3	–	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 5-9 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 Ω
@ 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	–		
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					dB	$Z_S = Z_L$ = 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 5-10 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					dB	$Z_S = Z_L$ = 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	–		

Notes

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.*

5.4 Characteristic DC Diagrams

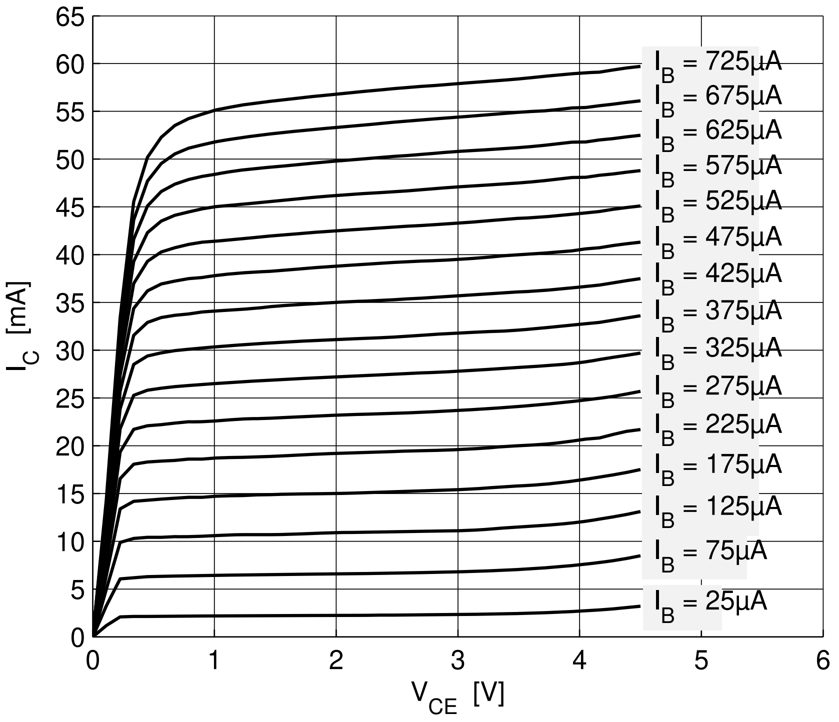


Figure 5-2 Collector Current vs. Collector Emitter Voltage $IC = f(V_{CE})$, I_B = Parameter in µA

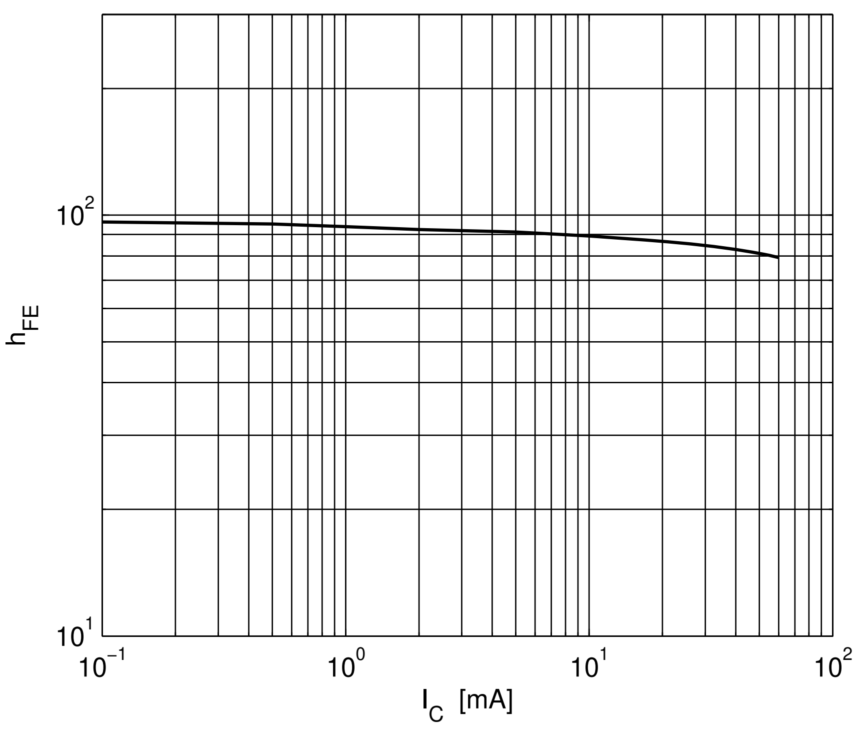


Figure 5-3 DC Current Gain $h_{FE} = f(I_C)$, V_{CE} = 3 V

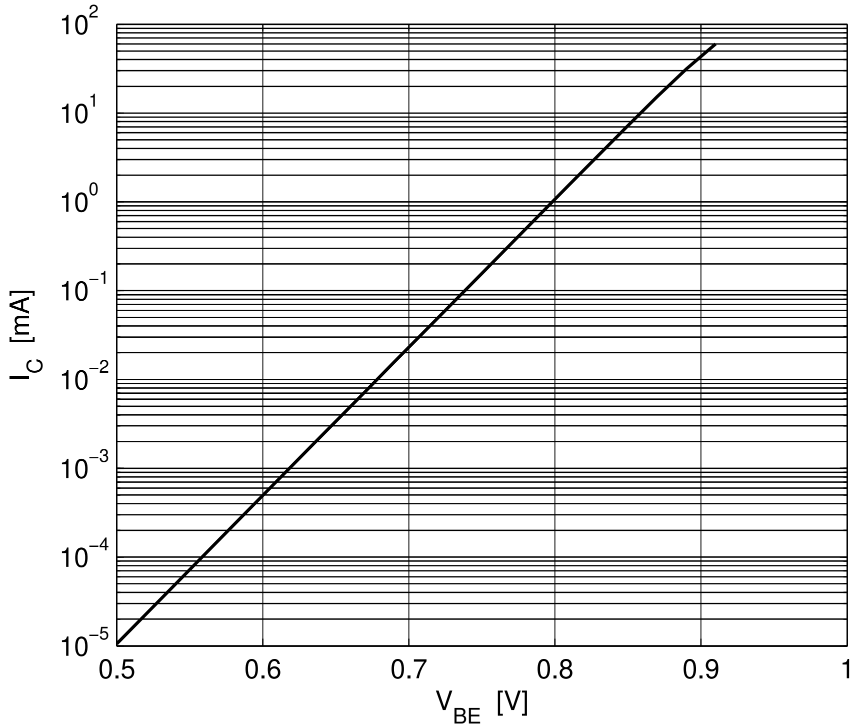


Figure 5-4 Collector Current vs. Base Emitter Voltage $I_C = f(V_{BE})$, V_{CE} = 3 V

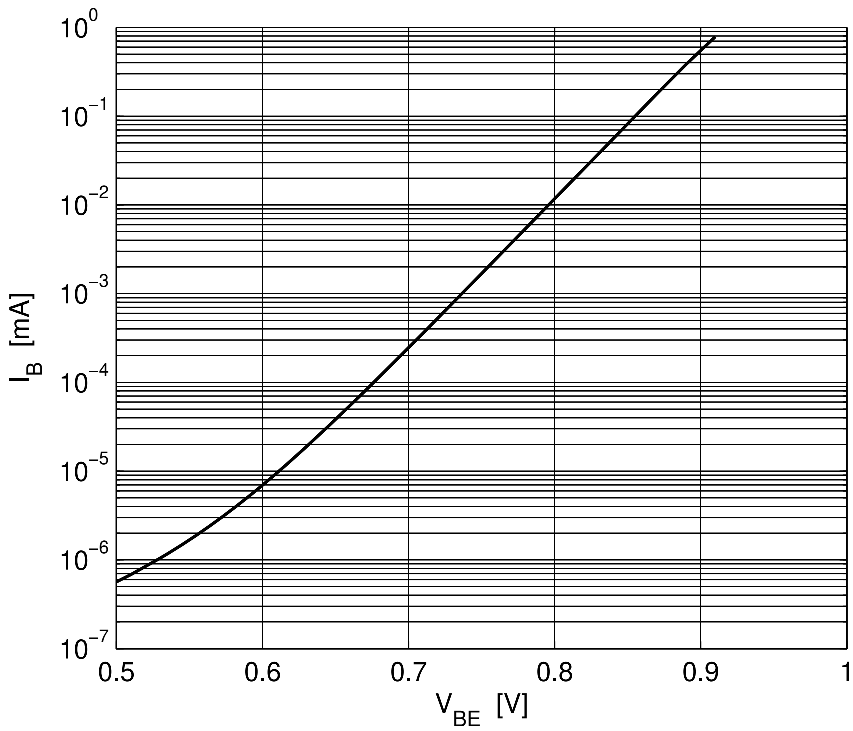


Figure 5-5 Base Current vs. Base Emitter Forward Voltage $I_B = f(V_{BE})$, V_{CE} = 3 V

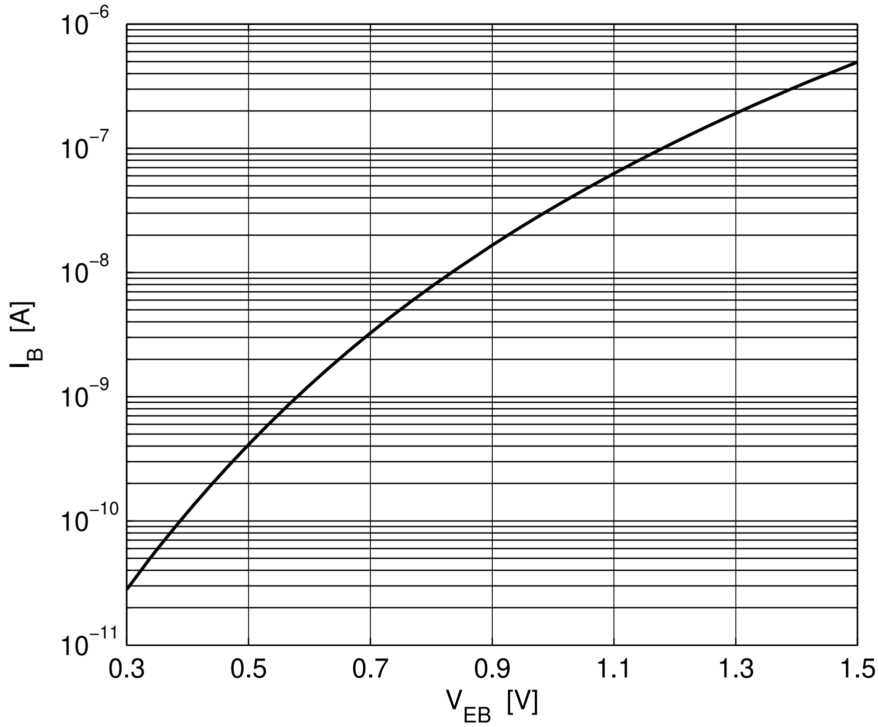


Figure 5-6 Base Current vs. Base Emitter Reverse Voltage $I_B = f(V_{EB})$, V_{CE} = 3 V

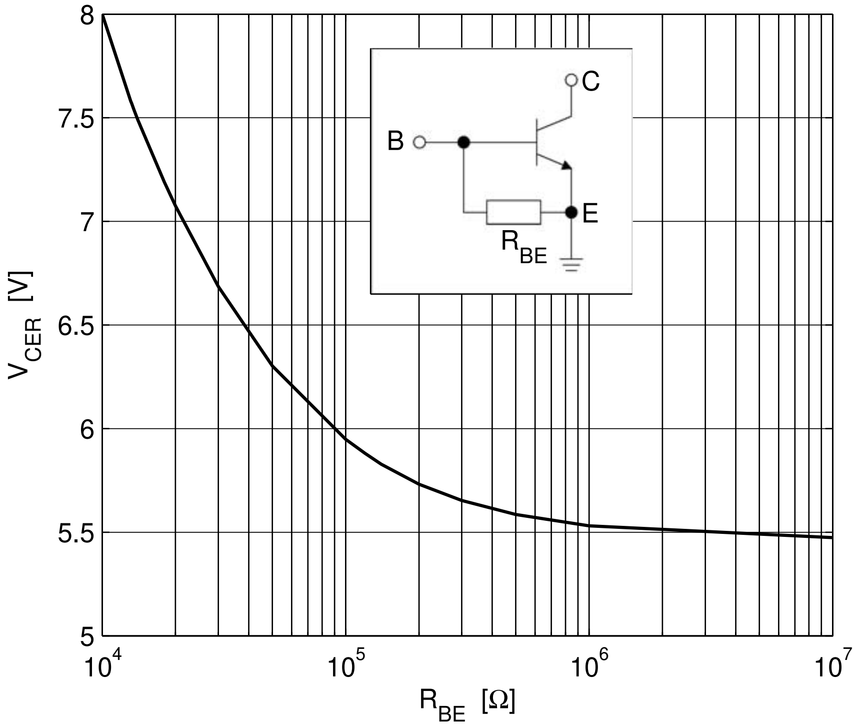


Figure 5-7 Collector Emitter Breakdown Voltage $V_{CER} = f(R_{BE})$, I_C = 1 mA

5.5 Characteristic AC Diagrams

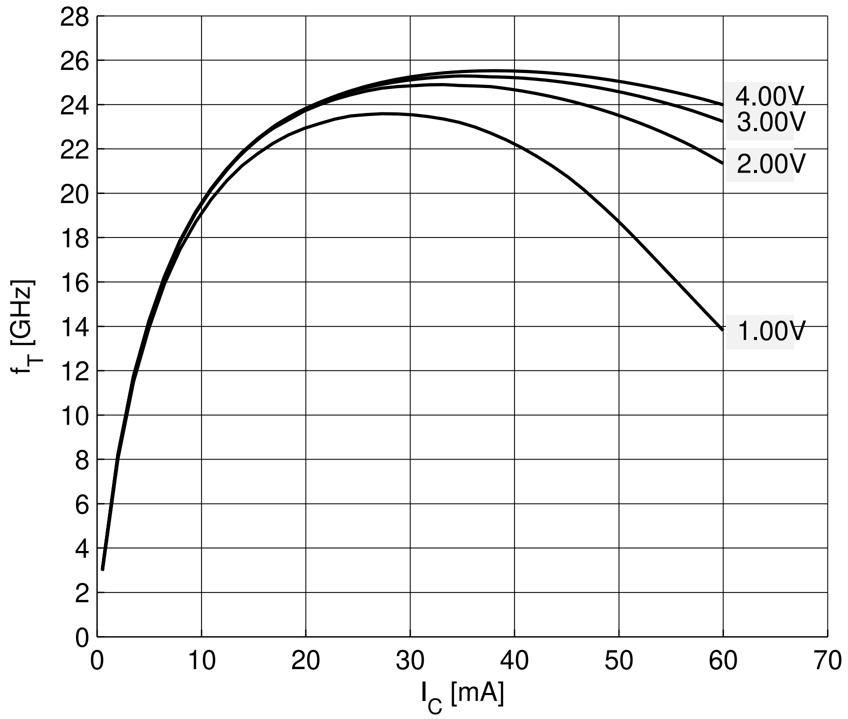


Figure 5-8 Transition Frequency $f_T = f(I_C)$, f = 2 GHz, V_{CE} = Parameter in V

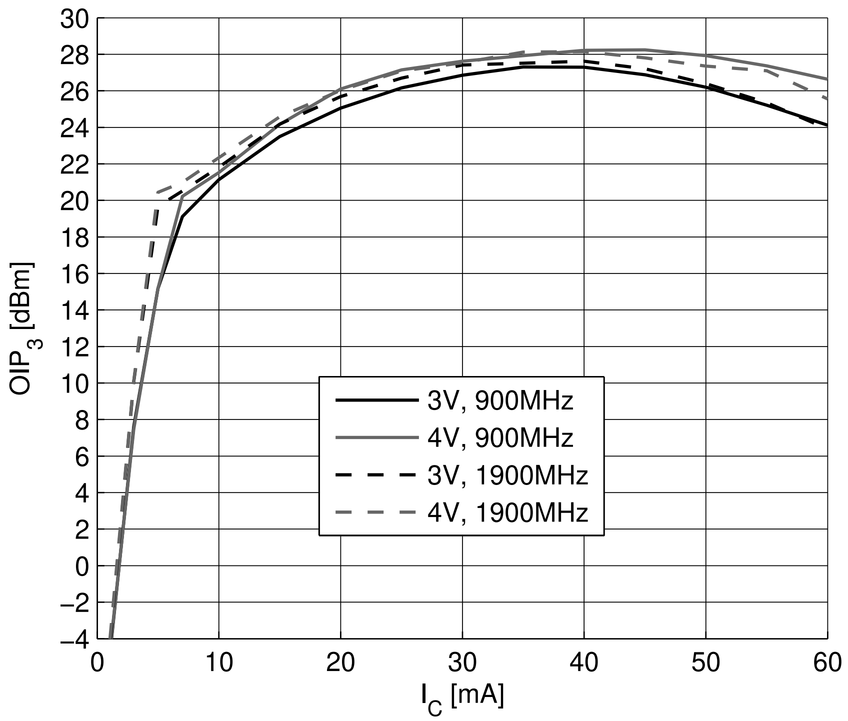


Figure 5-9 3rd Order Intercept Point $OIP_3 = f(I_C)$, $Z_S = Z_L$ = 50 Ω, V_{CE}, f = Parameters

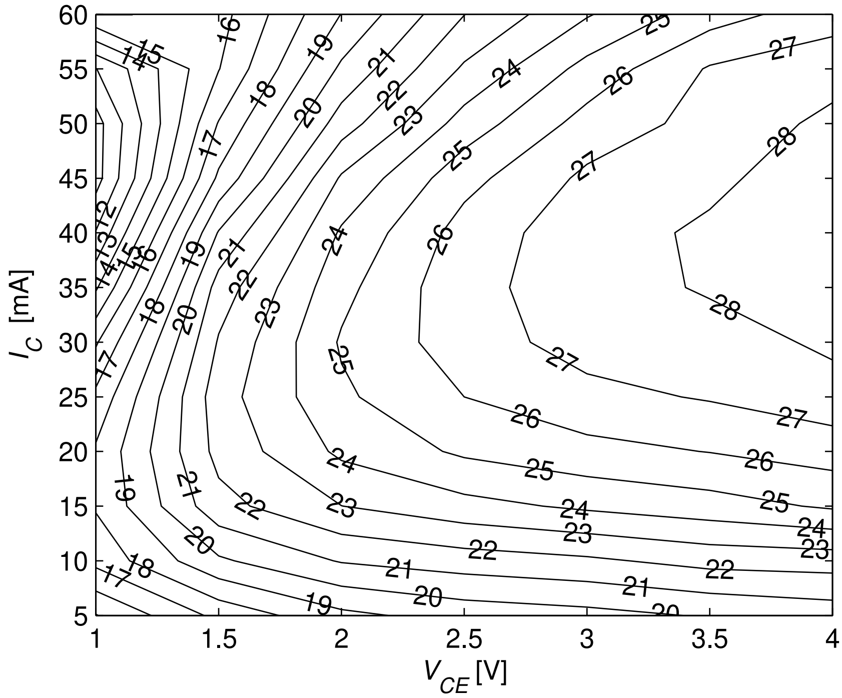


Figure 5-10 3rd Order Intercept Point at output OIP_3 [dBm]= f (I_C, V_{CE}), Z_S = Z_L= 50 Ω, f = 1900 MHz

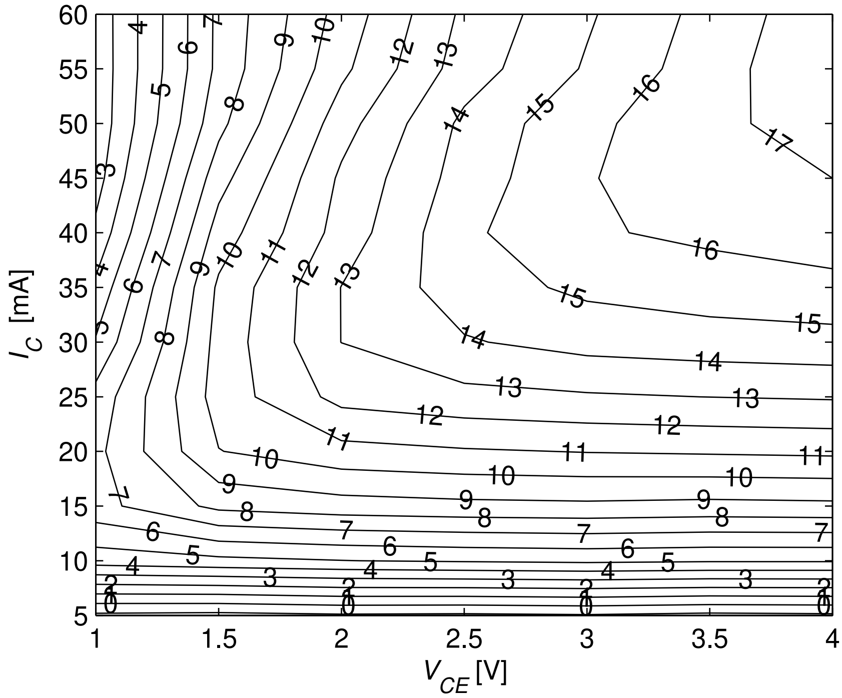


Figure 5-11 Compression Point at output OP_{1dB} [dBm]= f (I_C, V_{CE}), Z_S = Z_L= 50 Ω, f = 1900 MHz

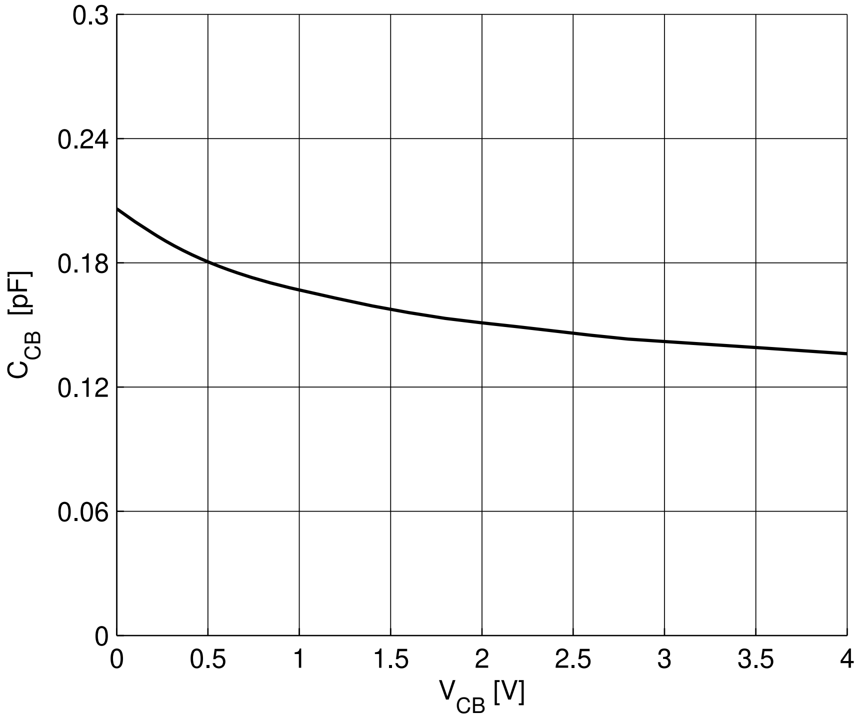


Figure 5-12 Collector Base Capacitance $C_{CB} = f\,(V_{CB})$, f = 1 MHz

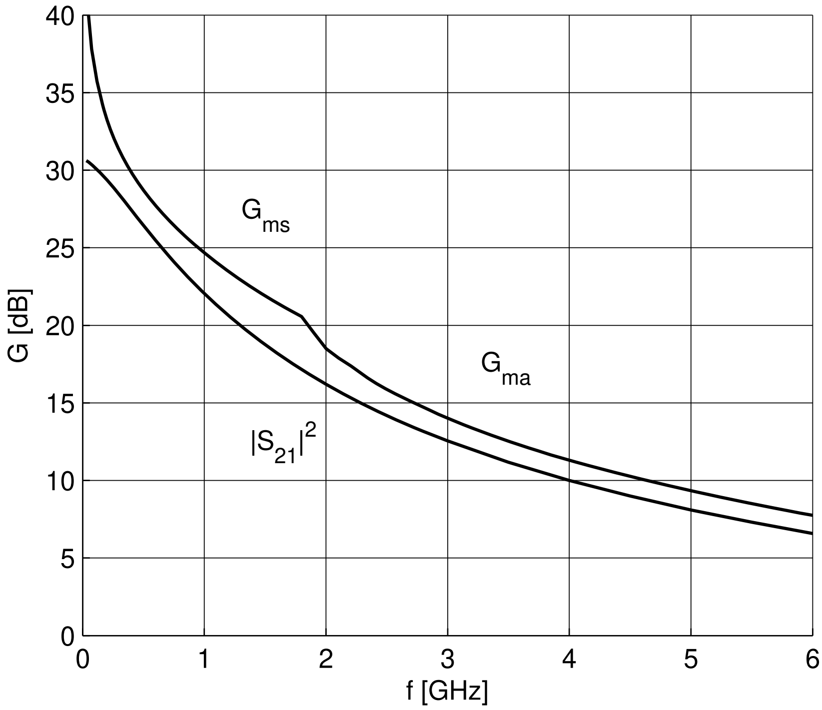


Figure 5-13 Gain G_{ma}, G_{ms}, $|S_{21}|^2 = f\,(f)$, V_{CE} = 3 V, I_C = 15 mA

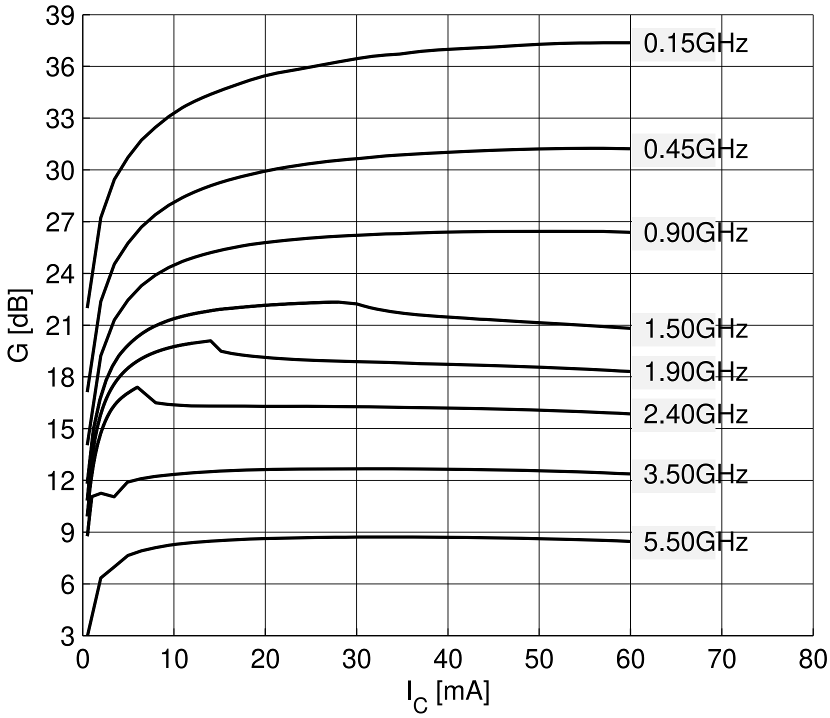


Figure 5-14 Maximum Power Gain $G_{max} = f(I_C)$, V_{CE} = 3 V, f = Parameter in GHz

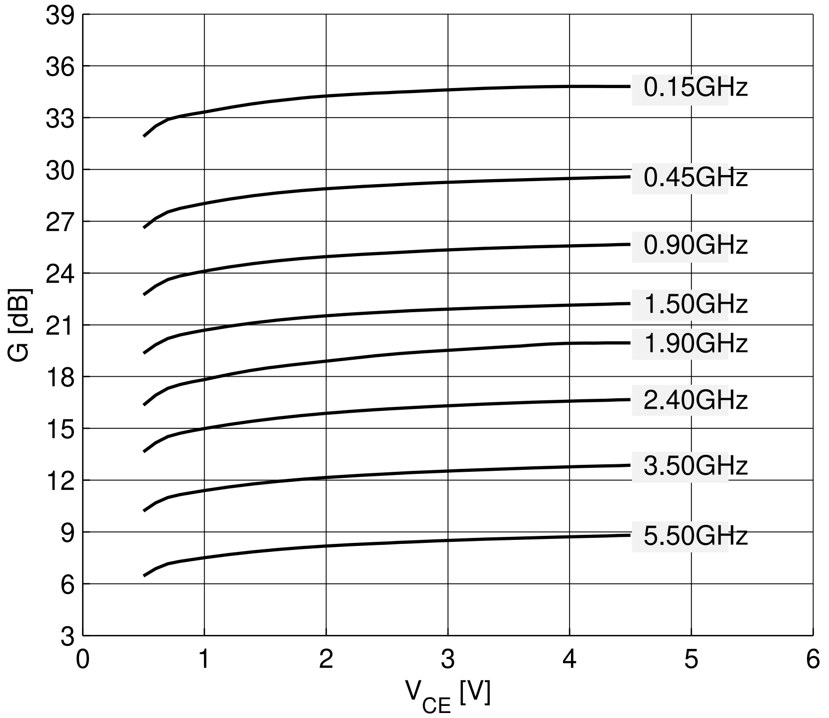


Figure 5-15 Maximum Power Gain $G_{max} = f(V_{CE})$, I_C = 15 mA, f = Parameter in GHz

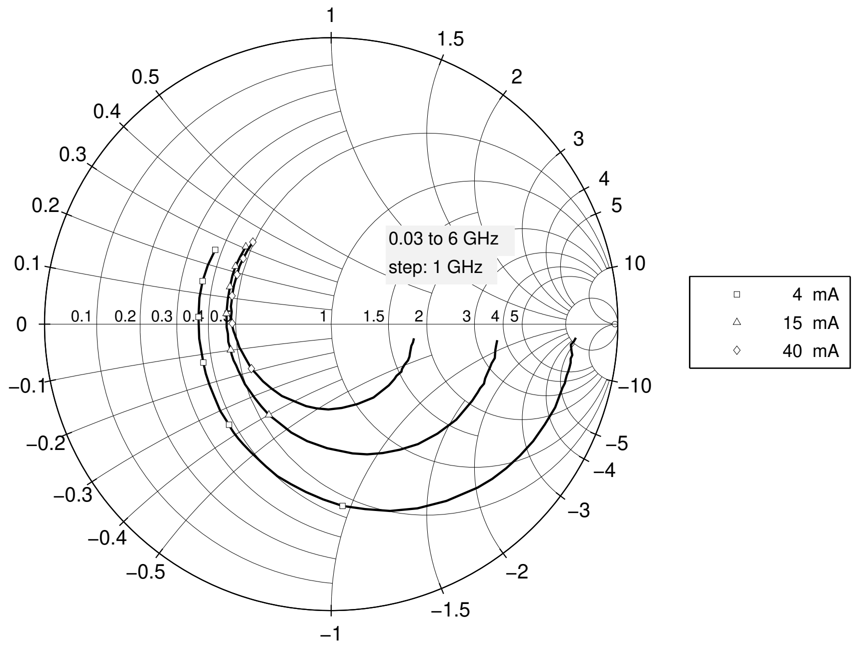


Figure 5-16 Input Matching $S_{11} = f(f)$, V_{CE} = 3 V, I_C = 4 / 15 / 40 mA

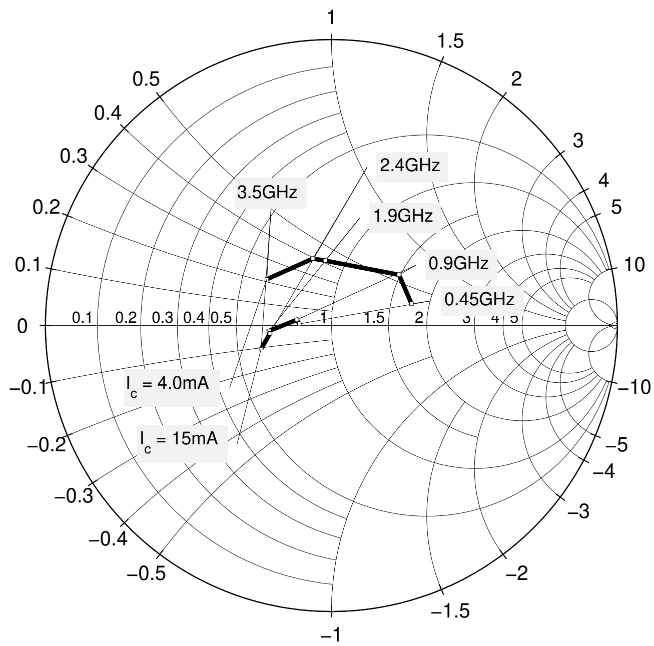


Figure 5-17 Source Impedance for Minimum Noise Figure $Z_{opt} = f(f)$, V_{CE} = 3 V, I_C = 4 / 15 mA