

BFP842ESD

Robust Low Noise Silicon Germanium Bipolar RF Transistor

Data Sheet

Revision 1.1, 2013-04-11

Edition 2013-04-11

**Published by
Infineon Technologies AG
81726 Munich, Germany**

**© 2013 Infineon Technologies AG
All Rights Reserved.**

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.

BFP842ESD, Robust Low Noise Silicon Germanium Bipolar RF Transistor

Revision History: 2013-04-11, Revision 1.1

| Page | Subjects (major changes since last revision) |
|-------|---|
| | This data sheet replaces the revision from 2012-08-03. |
| P. 8 | Item about AEC-Q101 added to feature list, minor changes. |
| P. 27 | Picture for marking description updated. |
| | |

Trademarks of Infineon Technologies AG

AURIX™, C166™, CanPAK™, CIPOS™, CIPURSE™, EconoPACK™, CoolMOS™, CoolSET™, CORECONTROL™, CROSSAVE™, DAVE™, DI-POL™, EasyPIM™, EconoBRIDGE™, EconoDUAL™, EconoPIM™, EconoPACK™, EiceDRIVER™, eupec™, FCOS™, HITFET™, HybridPACK™, I²RF™, ISOFACE™, IsoPACK™, MIPAQ™, ModSTACK™, my-d™, NovalithIC™, OptiMOS™, ORIGA™, POWERCODE™, PRIMARION™, PrimePACK™, PrimeSTACK™, PRO-SIL™, PROFET™, RASIC™, ReverSave™, SatRIC™, SIEGET™, SINDRION™, SIPMOS™, SmartLEWIS™, SOLID FLASH™, TEMPFET™, thinQ!™, TRENCHSTOP™, TriCore™.

Other Trademarks

Advance Design System™ (ADS) of Agilent Technologies, AMBA™, ARM™, MULTI-ICE™, KEIL™, PRIMECELL™, REALVIEW™, THUMB™, μVision™ of ARM Limited, UK. AUTOSAR™ is licensed by AUTOSAR development partnership. Bluetooth™ of Bluetooth SIG Inc. CAT-iq™ of DECT Forum. COLOSSUS™, FirstGPS™ of Trimble Navigation Ltd. EMV™ of EMVCo, LLC (Visa Holdings Inc.). EPCOS™ of Epcos AG. FLEXGO™ of Microsoft Corporation. FlexRay™ is licensed by FlexRay Consortium. HYPERTERMINAL™ of Hilgraeve Incorporated. IEC™ of Commission Electrotechnique Internationale. IrDA™ of Infrared Data Association Corporation. ISO™ of INTERNATIONAL ORGANIZATION FOR STANDARDIZATION. MATLAB™ of MathWorks, Inc. MAXIM™ of Maxim Integrated Products, Inc. MICROTEC™, NUCLEUS™ of Mentor Graphics Corporation. MIPI™ of MIPI Alliance, Inc. MIPS™ of MIPS Technologies, Inc., USA. muRata™ of MURATA MANUFACTURING CO., MICROWAVE OFFICE™ (MWO) of Applied Wave Research Inc., OmniVision™ of OmniVision Technologies, Inc. Openwave™ Openwave Systems Inc. RED HAT™ Red Hat, Inc. RFMD™ RF Micro Devices, Inc. SIRIUS™ of Sirius Satellite Radio Inc. SOLARIS™ of Sun Microsystems, Inc. SPANSION™ of Spansion LLC Ltd. Symbian™ of Symbian Software Limited. TAIYO YUDEN™ of Taiyo Yuden Co. TEAKLITE™ of CEVA, Inc. TEKTRONIX™ of Tektronix Inc. TOKO™ of TOKO KABUSHIKI KAISHA TA. UNIX™ of X/Open Company Limited. VERILOG™, PALLADIUM™ of Cadence Design Systems, Inc. VLYNQ™ of Texas Instruments Incorporated. VXWORKS™, WIND RIVER™ of WIND RIVER SYSTEMS, INC. ZETEX™ of Diodes Zetex Limited.

Last Trademarks Update 2011-11-11

Table of Contents

| | | |
|----------|--|----|
| | Table of Contents | 4 |
| | List of Figures | 5 |
| | List of Tables | 6 |
| 1 | Product Brief | 7 |
| 2 | Features | 8 |
| 3 | Maximum Ratings | 9 |
| 4 | Thermal Characteristics | 10 |
| 5 | Electrical Characteristics | 11 |
| 5.1 | DC Characteristics | 11 |
| 5.2 | General AC Characteristics | 11 |
| 5.3 | Frequency Dependent AC Characteristics | 12 |
| 5.4 | Characteristic DC Diagrams | 15 |
| 5.5 | Characteristic AC Diagrams | 18 |
| 6 | Simulation Data | 26 |
| 7 | Package Information SOT343 | 27 |

List of Figures

| | | |
|-------------|---|----|
| Figure 4-1 | Total Power Dissipation $P_{tot} = f(T_S)$ | 10 |
| Figure 5-1 | BFP842ESD Testing Circuit | 12 |
| Figure 5-2 | Collector Current vs. Collector Emitter Voltage $I_C = f(V_{CE})$, $I_B = \text{Parameter}$ | 15 |
| Figure 5-3 | DC Current Gain $h_{FE} = f(I_C)$, $V_{CE} = 2.5 \text{ V}$ | 15 |
| Figure 5-4 | Collector Current vs. Base Emitter Forward Voltage $I_C = f(V_{BE})$, $V_{CE} = 2.5 \text{ V}$ | 16 |
| Figure 5-5 | Base Current vs. Base Emitter Forward Voltage $I_B = f(V_{BE})$, $V_{CE} = 2.5 \text{ V}$ | 16 |
| Figure 5-6 | Base Current vs. Base Emitter Reverse Voltage $I_B = f(V_{EB})$, $V_{CE} = 2.5 \text{ V}$ | 17 |
| Figure 5-7 | Transition Frequency $f_T = f(I_C)$, $f = 1 \text{ GHz}$, $V_{CE} = \text{Parameter}$ | 18 |
| Figure 5-8 | 3rd Order Intercept Point at output $OIP3 = f(I_C)$, $Z_S = Z_L = 50 \Omega$, V_{CE} , $f = \text{Parameters}$ | 18 |
| Figure 5-9 | 3rd Order Intercept Point at output $OIP3 \text{ [dBm]} = f(I_C, V_{CE})$, $Z_S = Z_L = 50 \Omega$, $f = 3.5 \text{ GHz}$ | 19 |
| Figure 5-10 | Compression Point at output $OP_{1dB} \text{ [dBm]} = f(I_C, V_{CE})$, $Z_S = Z_L = 50 \Omega$, $f = 3.5 \text{ GHz}$ | 19 |
| Figure 5-11 | Collector Base Capacitance $C_{CB} = f(V_{CB})$, $f = 1 \text{ MHz}$ | 20 |
| Figure 5-12 | Gain $G_{ma}, G_{ms}, S_{21} ^2 = f(f)$, $V_{CE} = 2.5 \text{ V}$, $I_C = 15 \text{ mA}$ | 20 |
| Figure 5-13 | Maximum Power Gain $G_{max} = f(I_C)$, $V_{CE} = 2.5 \text{ V}$, $f = \text{Parameter in GHz}$ | 21 |
| Figure 5-14 | Maximum Power Gain $G_{max} = f(V_{CE})$, $I_C = 15 \text{ mA}$, $f = \text{Parameter in GHz}$ | 21 |
| Figure 5-15 | Input Reflection Coefficient $S_{11} = f(f)$, $V_{CE} = 2.5 \text{ V}$, $I_C = 5 / 15 \text{ mA}$ | 22 |
| Figure 5-16 | Source Impedance for Minimum Noise Figure $Z_{opt} = f(f)$, $V_{CE} = 2.5 \text{ V}$, $I_C = 5 / 10 / 15 \text{ mA}$ | 22 |
| Figure 5-17 | Input Reflection Coefficient $S_{11} = f(f)$, $V_{CE} = 2.5 \text{ V}$, $I_C = 5 / 15 \text{ mA}$ | 23 |
| Figure 5-18 | Output Reflection Coefficient $S_{22} = f(f)$, $V_{CE} = 2.5 \text{ V}$, $I_C = 5 / 15 \text{ mA}$ | 23 |
| Figure 5-19 | Noise Figure $NF_{min} = f(f)$, $V_{CE} = 2.5 \text{ V}$, $I_C = 5 / 10 / 15 \text{ mA}$, $Z_S = Z_{opt}$ | 24 |
| Figure 5-20 | Noise Figure $NF_{min} = f(I_C)$, $V_{CE} = 2.5 \text{ V}$, $Z_S = Z_{opt}$, $f = \text{Parameter in GHz}$ | 24 |
| Figure 5-21 | Noise Figure $NF_{50} = f(I_C)$, $V_{CE} = 2.5 \text{ V}$, $Z_S = 50 \Omega$, $f = \text{Parameter in GHz}$ | 25 |
| Figure 7-1 | Package Outline | 27 |
| Figure 7-2 | Package Footprint | 27 |
| Figure 7-3 | Marking Description (Marking BFP842ESD: T9s) | 27 |
| Figure 7-4 | Tape dimensions | 27 |

List of Tables

| | | |
|-----------|--|----|
| Table 3-1 | Maximum Ratings at $T_A = 25\text{ °C}$ (unless otherwise specified) | 9 |
| Table 4-1 | Thermal Resistance | 10 |
| Table 5-1 | DC Characteristics at $T_A = 25\text{ °C}$ | 11 |
| Table 5-2 | General AC Characteristics at $T_A = 25\text{ °C}$ | 11 |
| Table 5-3 | AC Characteristics, $V_{CE} = 2.5\text{ V}$, $f = 0.45\text{ GHz}$ | 12 |
| Table 5-4 | AC Characteristics, $V_{CE} = 2.5\text{ V}$, $f = 0.9\text{ GHz}$ | 13 |
| Table 5-5 | AC Characteristics, $V_{CE} = 2.5\text{ V}$, $f = 1.5\text{ GHz}$ | 13 |
| Table 5-6 | AC Characteristics, $V_{CE} = 2.5\text{ V}$, $f = 1.9\text{ GHz}$ | 13 |
| Table 5-7 | AC Characteristics, $V_{CE} = 2.5\text{ V}$, $f = 2.4\text{ GHz}$ | 14 |
| Table 5-8 | AC Characteristics, $V_{CE} = 2.5\text{ V}$, $f = 3.5\text{ GHz}$ | 14 |
| Table 5-9 | AC Characteristics, $V_{CE} = 2.5\text{ V}$, $f = 5.5\text{ GHz}$ | 14 |

1 Product Brief

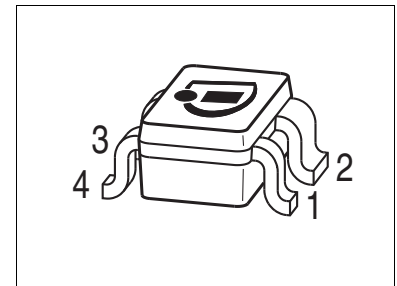
The BFP842ESD is a high performance HBT (Heterojunction Bipolar Transistor) specifically designed for 2.3 - 3.5 GHz LNA applications. The device is based upon the reliable high volume SiGe:C technology of Infineon.

The BFP842ESD provides inherently good input power match as well as inherently good noise match between 2.3 and 3.5 GHz. The simultaneous noise and power match without lossy external matching components at the input leads to a low external parts count, to a very good noise figure and to a high transducer gain in the application. Integrated protection elements at in- and output make the device robust against ESD and excessive RF input power.

The device offers its high performance at low current and voltage and is especially well-suited for portable battery-powered applications in which energy efficiency is a key requirement. The device comes in an easy to use industry standard package with visible leads.

2 Features

- Robust very low noise amplifier based on Infineon’s reliable, high volume SiGe:C technology
- Unique combination of high-end RF performance and robustness: 16 dBm maximum RF input power, 1 kV HBM ESD hardness
- High linearity $OIP3 = 25.5$ dBm at 3.5 GHz, 2.5 V, 15 mA
- High transition frequency $f_T = 60$ GHz enables very low noise figure at high frequencies: $NF_{min} = 0.65$ dB at 3.5 GHz, 2.5 V, 5 mA
- Transducer gain $|S_{21}|^2 = 16$ dB @ 3.5 GHz, 2.5 V, 15 mA
- Ideal for low voltage applications e.g. $V_{CC} = 1.8$ V and 2.85 V (3.3 V, 3.6 V requires corresponding collector resistor)
- Low power consumption, ideal for mobile applications
- Easy to use Pb free (RoHS compliant) and halogen free industry standard package with visible leads
- Qualification report according to AEC-Q101 available



SOT343



Applications

As very low noise amplifier (LNA) in

- Mobile and fixed connectivity applications: WLAN 802.11b/g/n, WiMAX 2.5/3.5 GHz, Bluetooth
- Satellite communication systems: GNSS Navigation systems (GPS, GLONASS, COMPASS/Beidu/Galileo) Satellite radio (SDARs, DAB and C-band LNB) and C-band LNB (1st and 2nd stage LNA)
- Multimedia applications such as mobile/portable TV, Mobile TV, FM Radio
- 3G/4G UMTS/LTE mobile phone applications
- ISM applications like RKE, AMR and Zigbee

As discrete active mixer, buffer amplifier in VCOs

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

| Product Name | Package | Pin Configuration | | | | Marking |
|--------------|---------|-------------------|-------|-------|-------|---------|
| BFP842ESD | SOT343 | 1 = B | 2 = E | 3 = C | 4 = E | T9s |

3 Maximum Ratings

Table 3-1 Maximum Ratings at $T_A = 25\text{ °C}$ (unless otherwise specified)

| Parameter | Symbol | Values | | Unit | Note / Test Condition |
|---|------------|--------|-------------|------|--|
| | | Min. | Max. | | |
| Collector emitter voltage | V_{CEO} | – | 3.25 2.9 | V | $T_A = 25\text{ °C}$ $T_A = -40\text{ °C}$ Open base |
| Collector emitter voltage ¹⁾ | V_{CES} | – | 3.25 2.9 | V | $T_A = 25\text{ °C}$ $T_A = -40\text{ °C}$ E-B short circuited |
| Collector base voltage ²⁾ | V_{CBO} | – | 4.1 3.5 | V | $T_A = 25\text{ °C}$ $T_A = -40\text{ °C}$ Open emitter |
| Base current | I_B | -5 | 3 | mA | |
| Collector current | I_C | – | 40 | mA | |
| RF input power | P_{RFIn} | – | 16 | dBm | |
| ESD stress pulse | V_{ESD} | -1 | 1 | kV | HBM, all pins, acc. to JESD22-A114 |
| Total power dissipation ³⁾ | P_{tot} | – | 120 | mW | $T_S \leq 111\text{ °C}$ |
| Junction temperature | T_J | – | 150 | | |
| Storage temperature | T_{Stg} | -55 | 150 | °C | |

1) V_{CES} is identical to V_{CEO} due to design

2) V_{CBO} is similar to V_{CEO} due to design

3) 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} | | 324 | | K/W | |

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

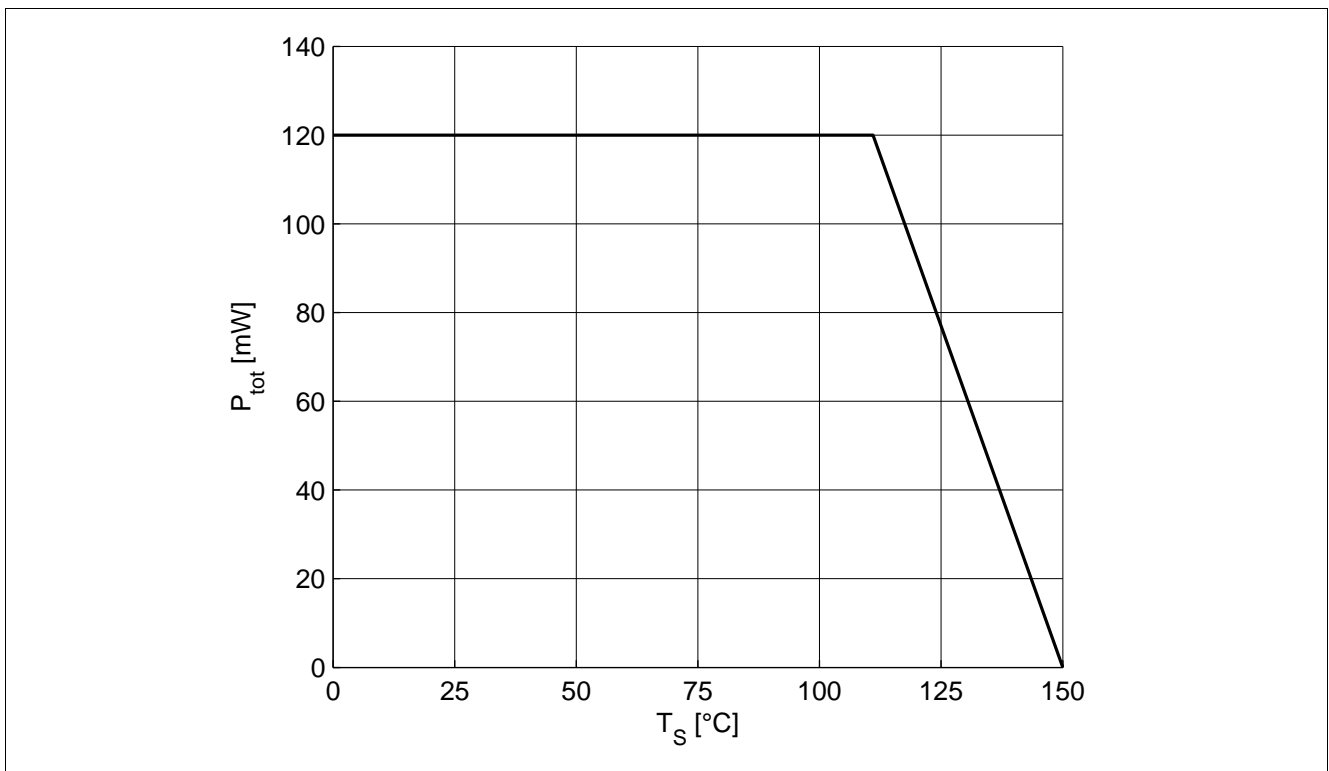


Figure 4-1 Total Power Dissipation $P_{tot} = f(T_S)$

5 Electrical Characteristics

5.1 DC Characteristics

Table 5-1 DC Characteristics at $T_A = 25\text{ °C}$

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|-------------------------------------|---------------|--------|------|------|---------------|--|
| | | Min. | Typ. | Max. | | |
| Collector emitter breakdown voltage | $V_{(BR)CEO}$ | 3.25 | 3.7 | | V | $I_C = 1\text{ mA}$, $I_B = 0$ Open base |
| Collector emitter leakage current | I_{CES} | | | 400 | nA | $V_{CE} = 2\text{ V}$, $V_{BE} = 0$ E-B short circuited |
| Collector base leakage current | I_{CBO} | | | 400 | nA | $V_{CB} = 2\text{ V}$, $I_E = 0$ Open emitter |
| Emitter base leakage current | I_{EBO} | | | 10 | μA | $V_{EB} = 0.5\text{ V}$, $I_C = 0$ Open collector |
| DC current gain | h_{FE} | 150 | 260 | 450 | | $V_{CE} = 2.5\text{ V}$, $I_C = 15\text{ mA}$ Pulse measured |

5.2 General AC Characteristics

Table 5-2 General AC Characteristics at $T_A = 25\text{ °C}$

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|-------------------------------|----------|--------|------|------|------|--|
| | | Min. | Typ. | Max. | | |
| Transition frequency | f_T | | 57 | | GHz | $V_{CE} = 2.5\text{ V}$, $I_C = 25\text{ mA}$ $f = 1\text{ GHz}$ |
| Collector base capacitance | C_{CB} | | 64 | | fF | $V_{CB} = 2\text{ V}$, $V_{BE} = 0$ $f = 1\text{ MHz}$ Emitter grounded |
| Collector emitter capacitance | C_{CE} | | 0.46 | | pF | $V_{CE} = 2\text{ V}$, $V_{BE} = 0$ $f = 1\text{ MHz}$ Base grounded |
| Emitter base capacitance | C_{EB} | | 0.44 | | pF | $V_{EB} = 0.4\text{ V}$, $V_{CB} = 0$ $f = 1\text{ MHz}$ Collector grounded |

5.3 Frequency Dependent AC Characteristics

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

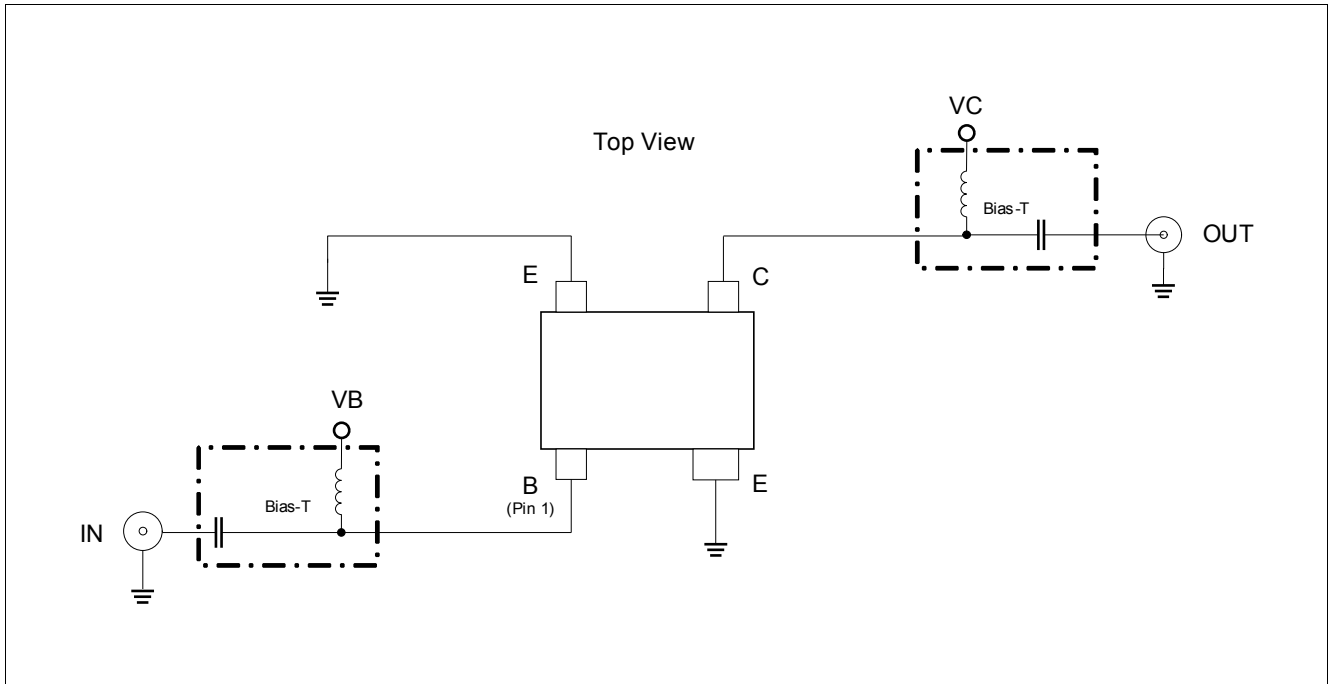


Figure 5-1 BFP842ESD Testing Circuit

Table 5-3 AC Characteristics, $V_{CE} = 2.5\text{ V}$, $f = 0.45\text{ GHz}$

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|-------------------------------------|--------------|--------|------|------|------|--|
| | | Min. | Typ. | Max. | | |
| Power Gain | | | | | | |
| Maximum power gain | G_{ms} | – | 33 | – | dB | $I_C = 15\text{ mA}$ |
| Transducer gain | $ S_{21} ^2$ | – | 29.5 | – | | |
| Minimum Noise Figure | | | | | | |
| Minimum noise figure | NF_{min} | – | 0.4 | – | dB | $I_C = 5\text{ mA}$ |
| Associated gain | G_{ass} | – | 26 | – | | |
| Linearity | | | | | | |
| 1 dB compression point at output | OP_{1dB} | – | 6.5 | – | dBm | $Z_S = Z_L = 50\text{ }\Omega$ $I_C = 15\text{ mA}$ |
| 3rd order intercept point at output | $OIP3$ | – | 22 | – | | |

Electrical Characteristics
Table 5-4 AC Characteristics, $V_{CE} = 2.5\text{ V}$, $f = 0.9\text{ GHz}$

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|-------------------------------------|--------------|--------|------|------|------|--------------------------|
| | | Min. | Typ. | Max. | | |
| Power Gain | | | | | | |
| Maximum power gain | G_{ms} | – | 29 | – | dB | $I_C = 15\text{ mA}$ |
| Transducer gain | $ S_{21} ^2$ | – | 26 | – | | $I_C = 15\text{ mA}$ |
| Minimum Noise Figure | | | | | | |
| Minimum noise figure | NF_{min} | – | 0.45 | – | dB | $I_C = 5\text{ mA}$ |
| Associated gain | G_{ass} | – | 24 | – | | $I_C = 5\text{ mA}$ |
| Linearity | | | | | | |
| 1 dB compression point at output | OP_{1dB} | – | 7 | – | dBm | $Z_S = Z_L = 50\ \Omega$ |
| 3rd order intercept point at output | $OIP3$ | – | 22.5 | – | | $I_C = 15\text{ mA}$ |

Table 5-5 AC Characteristics, $V_{CE} = 2.5\text{ V}$, $f = 1.5\text{ GHz}$

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|-------------------------------------|--------------|--------|------|------|------|--------------------------|
| | | Min. | Typ. | Max. | | |
| Power Gain | | | | | | |
| Maximum power gain | G_{ms} | – | 25.5 | – | dB | $I_C = 15\text{ mA}$ |
| Transducer gain | $ S_{21} ^2$ | – | 23 | – | | $I_C = 15\text{ mA}$ |
| Minimum Noise Figure | | | | | | |
| Minimum noise figure | NF_{min} | – | 0.45 | – | dB | $I_C = 5\text{ mA}$ |
| Associated gain | G_{ass} | – | 21 | – | | $I_C = 5\text{ mA}$ |
| Linearity | | | | | | |
| 1 dB compression point at output | OP_{1dB} | – | 7.5 | – | dBm | $Z_S = Z_L = 50\ \Omega$ |
| 3rd order intercept point at output | $OIP3$ | – | 23.5 | – | | $I_C = 15\text{ mA}$ |

Table 5-6 AC Characteristics, $V_{CE} = 2.5\text{ V}$, $f = 1.9\text{ GHz}$

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|-------------------------------------|--------------|--------|------|------|------|--------------------------|
| | | Min. | Typ. | Max. | | |
| Power Gain | | | | | | |
| Maximum power gain | G_{ms} | – | 23.5 | – | dB | $I_C = 15\text{ mA}$ |
| Transducer gain | $ S_{21} ^2$ | – | 21 | – | | $I_C = 15\text{ mA}$ |
| Minimum Noise Figure | | | | | | |
| Minimum noise figure | NF_{min} | – | 0.5 | – | dB | $I_C = 5\text{ mA}$ |
| Associated gain | G_{ass} | – | 19.5 | – | | $I_C = 5\text{ mA}$ |
| Linearity | | | | | | |
| 1 dB compression point at output | OP_{1dB} | – | 8 | – | dBm | $Z_S = Z_L = 50\ \Omega$ |
| 3rd order intercept point at output | $OIP3$ | – | 24.5 | – | | $I_C = 15\text{ mA}$ |

Electrical Characteristics
Table 5-7 AC Characteristics, $V_{CE} = 2.5\text{ V}$, $f = 2.4\text{ GHz}$

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|-------------------------------------|--------------|--------|------|------|------|--------------------------|
| | | Min. | Typ. | Max. | | |
| Power Gain | | | | | | |
| Maximum power gain | G_{ms} | – | 22 | – | dB | $I_C = 15\text{ mA}$ |
| Transducer gain | $ S_{21} ^2$ | – | 19 | – | | $I_C = 15\text{ mA}$ |
| Minimum Noise Figure | | | | | | |
| Minimum noise figure | NF_{min} | – | 0.5 | – | dB | $I_C = 5\text{ mA}$ |
| Associated gain | G_{ass} | – | 18 | – | | $I_C = 5\text{ mA}$ |
| Linearity | | | | | | |
| 1 dB compression point at output | OP_{1dB} | – | 8 | – | dBm | $Z_S = Z_L = 50\ \Omega$ |
| 3rd order intercept point at output | $OIP3$ | – | 25 | – | | $I_C = 15\text{ mA}$ |

Table 5-8 AC Characteristics, $V_{CE} = 2.5\text{ V}$, $f = 3.5\text{ GHz}$

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|-------------------------------------|--------------|--------|------|------|------|--------------------------|
| | | Min. | Typ. | Max. | | |
| Power Gain | | | | | | |
| Maximum power gain | G_{ma} | – | 17.5 | – | dB | $I_C = 15\text{ mA}$ |
| Transducer gain | $ S_{21} ^2$ | – | 16 | – | | $I_C = 15\text{ mA}$ |
| Minimum Noise Figure | | | | | | |
| Minimum noise figure | NF_{min} | – | 0.65 | – | dB | $I_C = 5\text{ mA}$ |
| Associated gain | G_{ass} | – | 15 | – | | $I_C = 5\text{ mA}$ |
| Linearity | | | | | | |
| 1 dB compression point at output | OP_{1dB} | – | 8.5 | – | dBm | $Z_S = Z_L = 50\ \Omega$ |
| 3rd order intercept point at output | $OIP3$ | – | 25.5 | – | | $I_C = 15\text{ mA}$ |

Table 5-9 AC Characteristics, $V_{CE} = 2.5\text{ V}$, $f = 5.5\text{ GHz}$

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|-------------------------------------|--------------|--------|------|------|------|--------------------------|
| | | Min. | Typ. | Max. | | |
| Power Gain | | | | | | |
| Maximum power gain | G_{ma} | – | 12.5 | – | dB | $I_C = 15\text{ mA}$ |
| Transducer gain | $ S_{21} ^2$ | – | 11.5 | – | | $I_C = 15\text{ mA}$ |
| Minimum Noise Figure | | | | | | |
| Minimum noise figure | NF_{min} | – | 0.85 | – | dB | $I_C = 5\text{ mA}$ |
| Associated gain | G_{ass} | – | 10.5 | – | | $I_C = 5\text{ mA}$ |
| Linearity | | | | | | |
| 1 dB compression point at output | OP_{1dB} | – | 8 | – | dBm | $Z_S = Z_L = 50\ \Omega$ |
| 3rd order intercept point at output | $OIP3$ | – | 24 | – | | $I_C = 15\text{ mA}$ |

Note: $OIP3$ value depends on termination of all intermodulation frequency components. Termination used for this measurement is $50\ \Omega$ from 0.2 MHz to 12 GHz.

5.4 Characteristic DC Diagrams

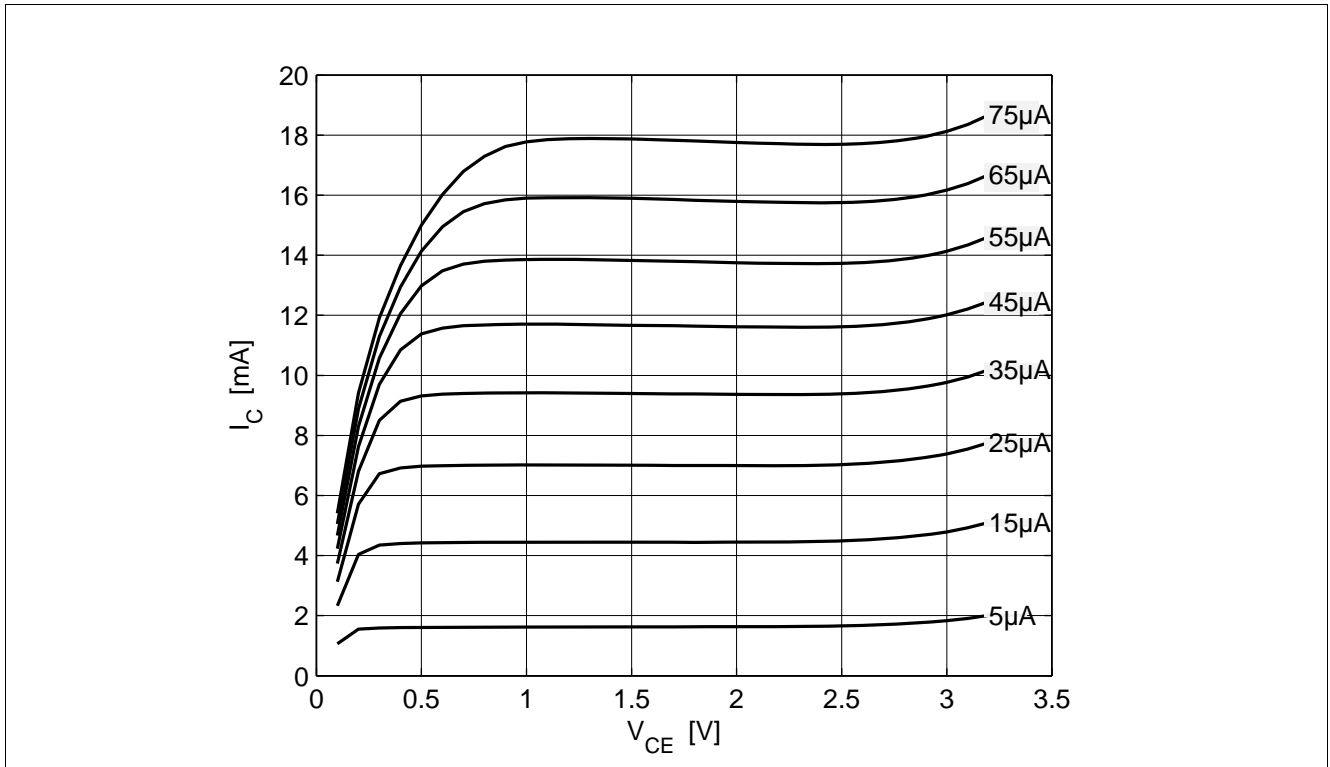


Figure 5-2 Collector Current vs. Collector Emitter Voltage $I_C = f(V_{CE})$, $I_B = \text{Parameter}$

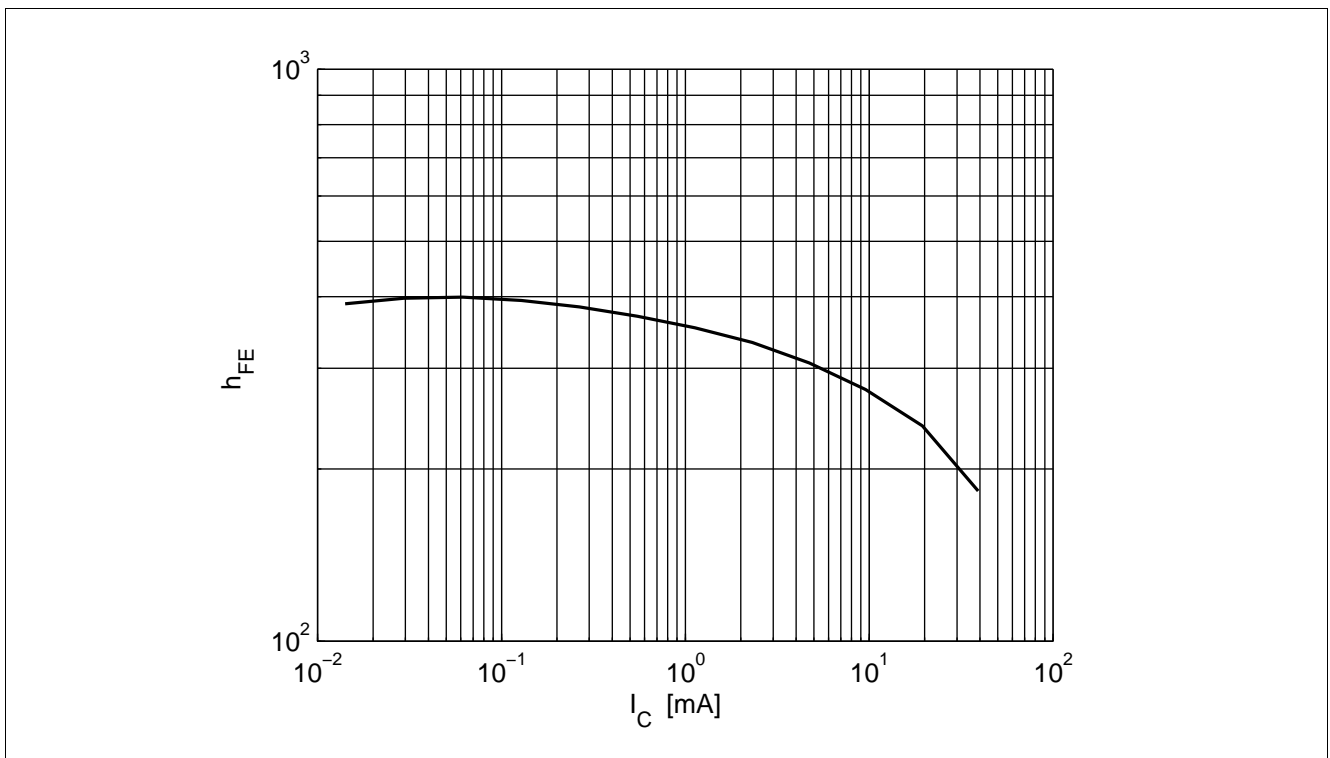


Figure 5-3 DC Current Gain $h_{FE} = f(I_C)$, $V_{CE} = 2.5 \text{ V}$

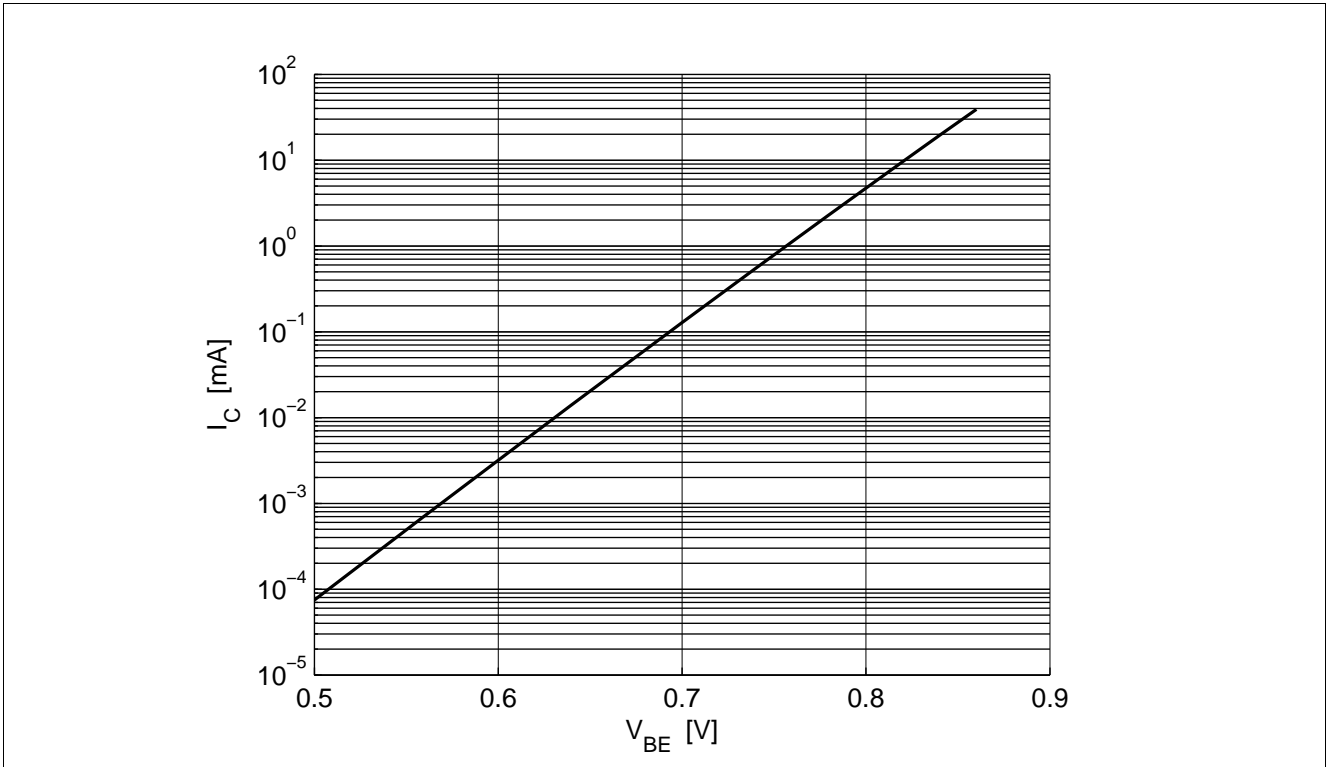


Figure 5-4 Collector Current vs. Base Emitter Forward Voltage $I_C = f(V_{BE})$, $V_{CE} = 2.5$ V

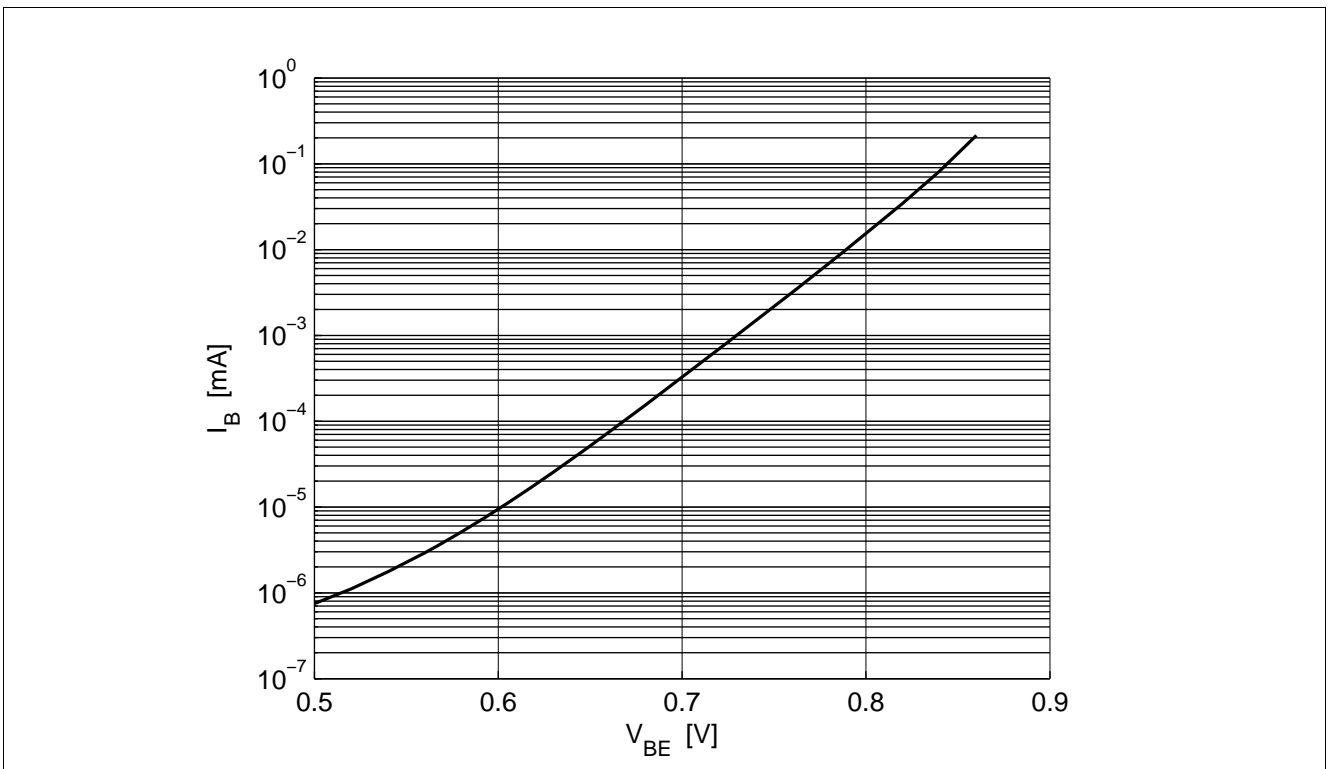


Figure 5-5 Base Current vs. Base Emitter Forward Voltage $I_B = f(V_{BE})$, $V_{CE} = 2.5$ V

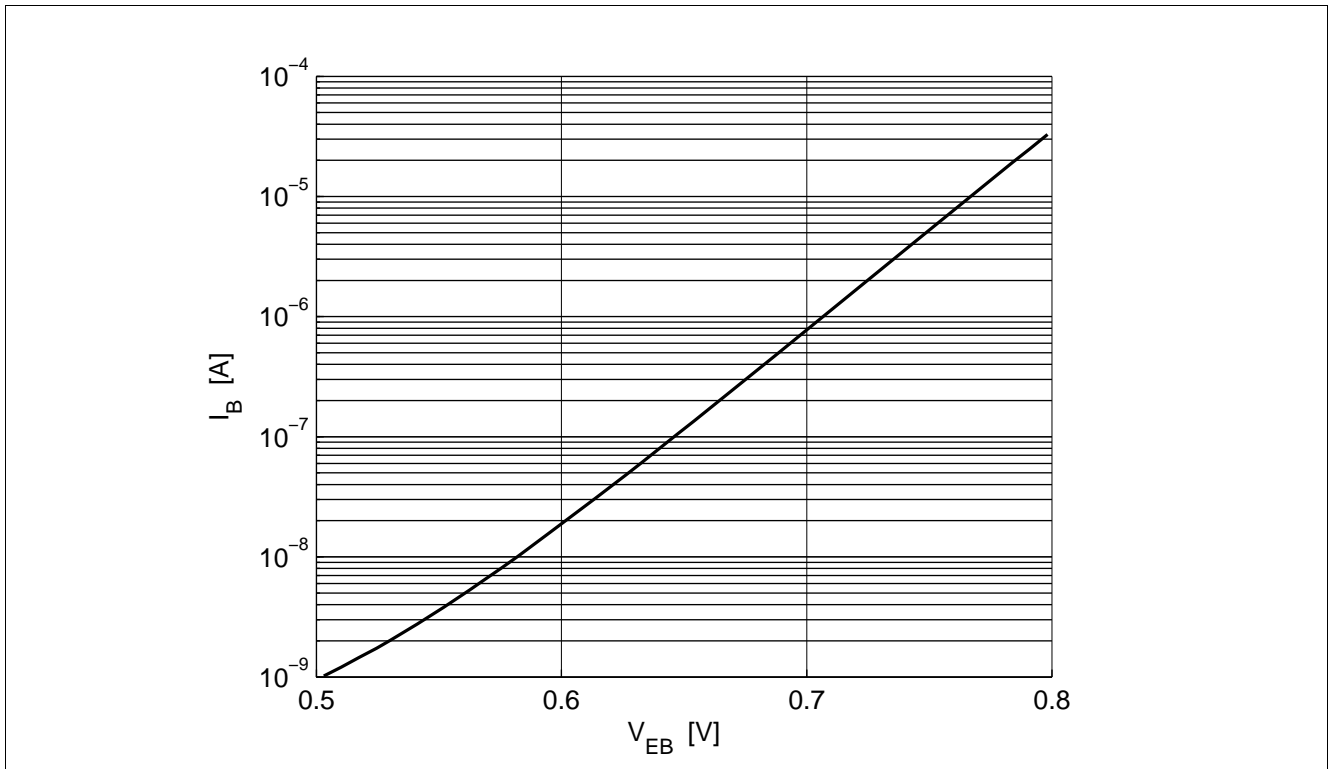


Figure 5-6 Base Current vs. Base Emitter Reverse Voltage $I_B = f(V_{EB})$, $V_{CE} = 2.5$ V

5.5 Characteristic AC Diagrams

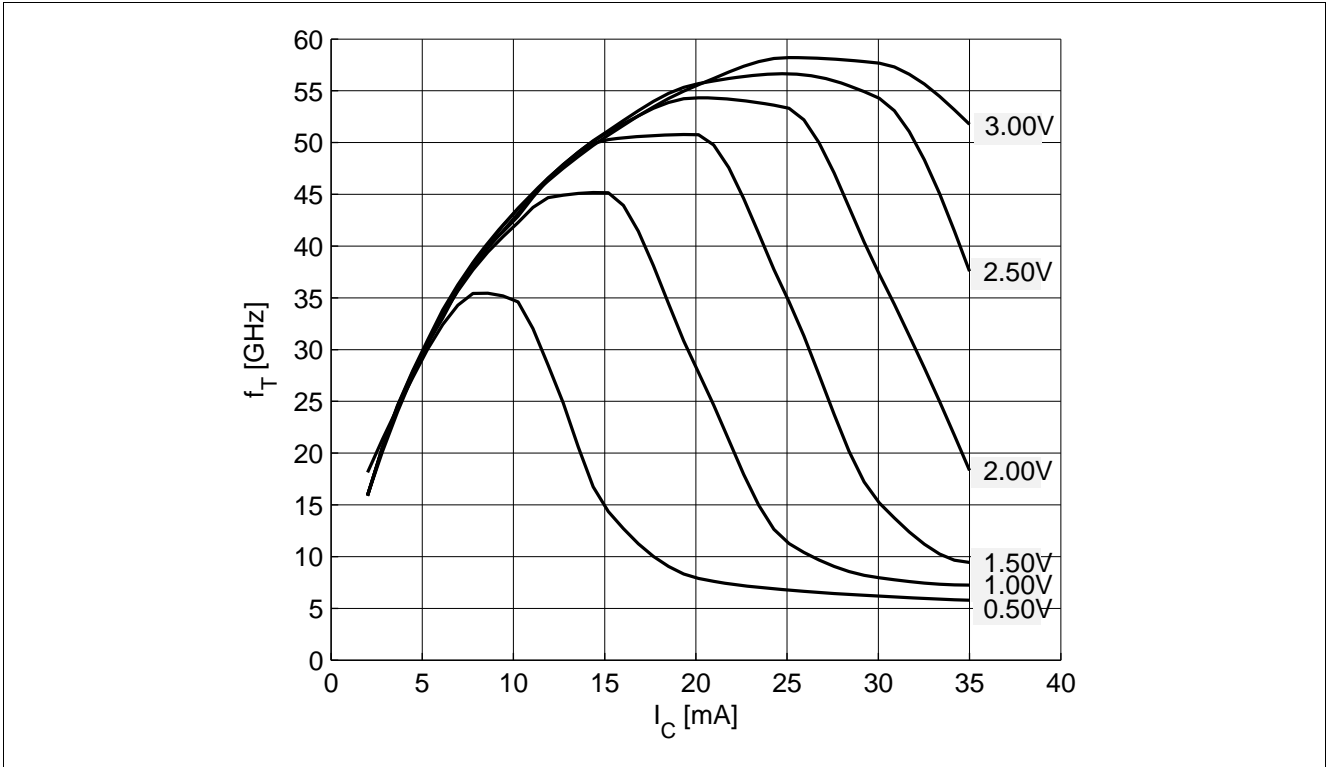


Figure 5-7 Transition Frequency $f_T = f(I_C)$, $f = 1 \text{ GHz}$, $V_{CE} = \text{Parameter}$

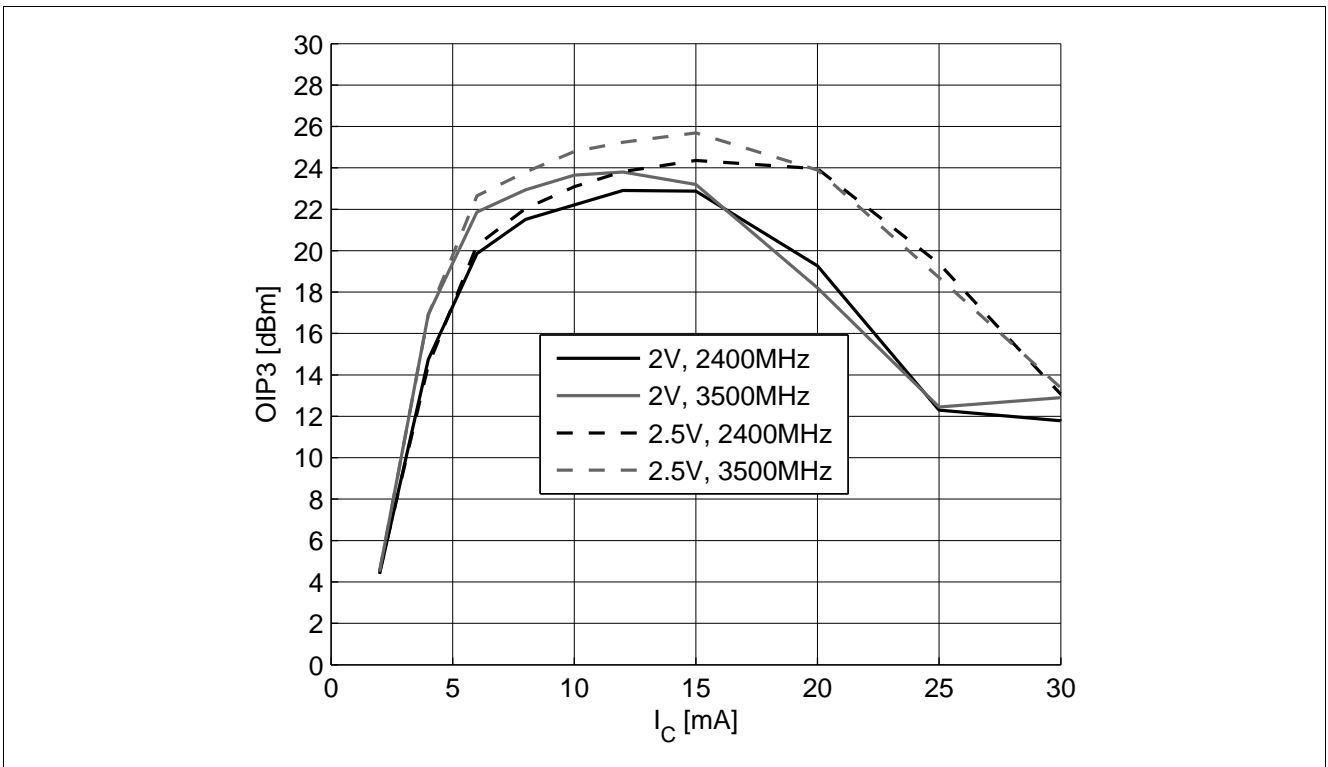


Figure 5-8 3rd Order Intercept Point at output $OIP3 = f(I_C)$, $Z_S = Z_L = 50 \Omega$, $V_{CE}, f = \text{Parameters}$

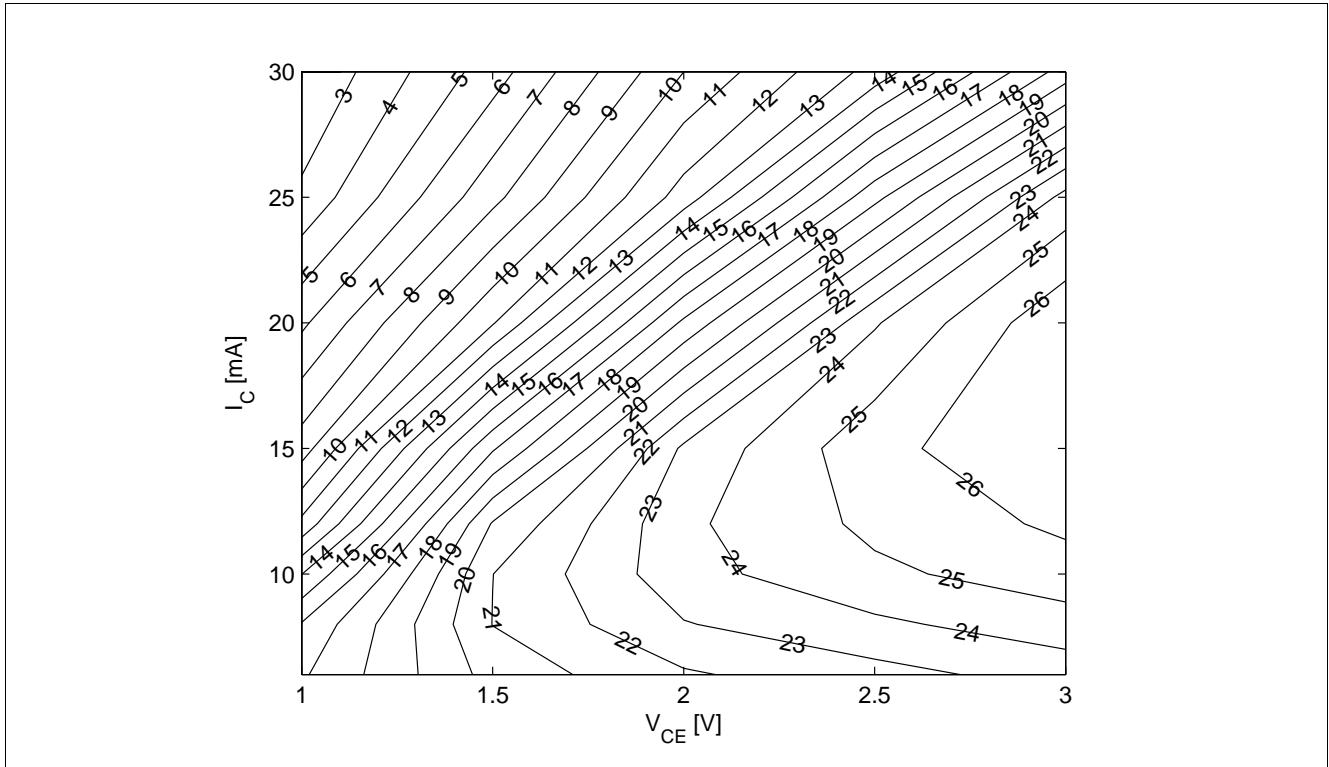


Figure 5-9 3rd Order Intercept Point at output $OIP3$ [dBm] = $f(I_C, V_{CE})$, $Z_S = Z_L = 50 \Omega$, $f = 3.5$ GHz

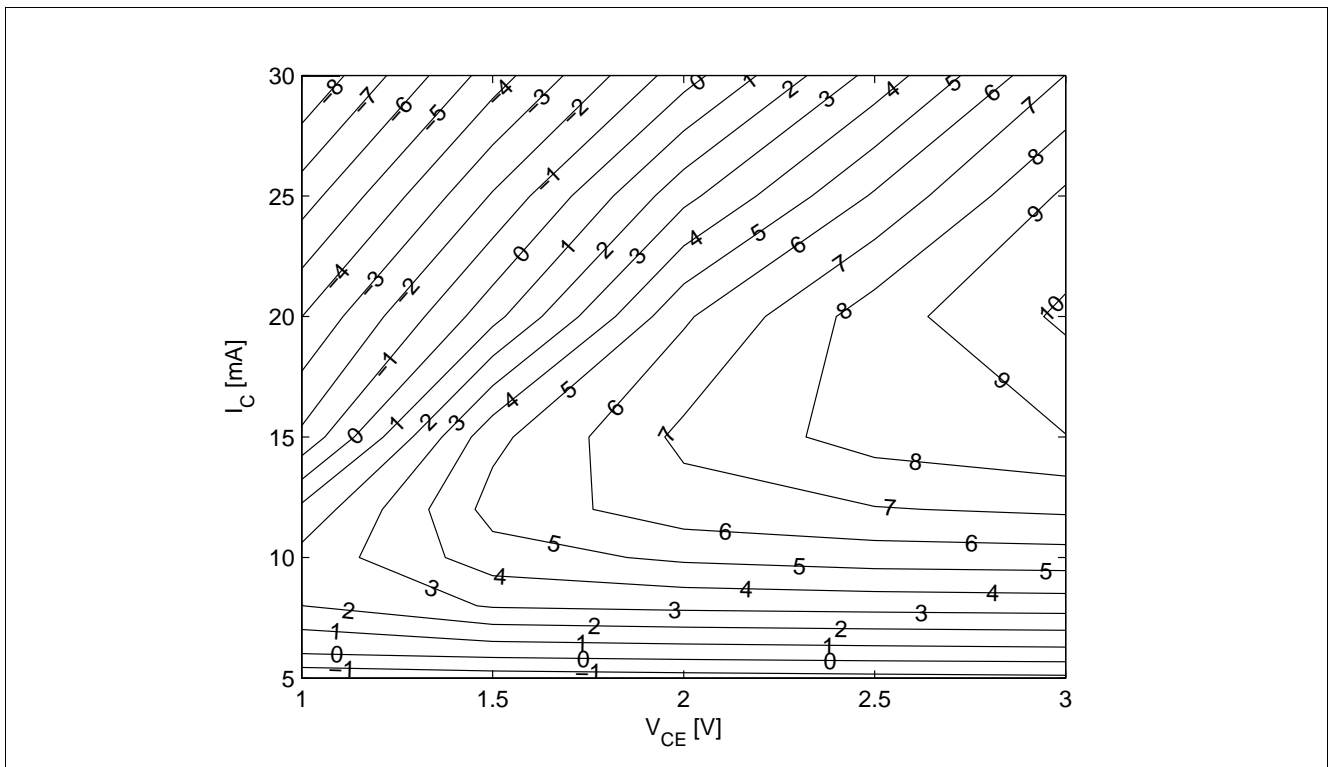


Figure 5-10 Compression Point at output OP_{1dB} [dBm] = $f(I_C, V_{CE})$, $Z_S = Z_L = 50 \Omega$, $f = 3.5$ GHz

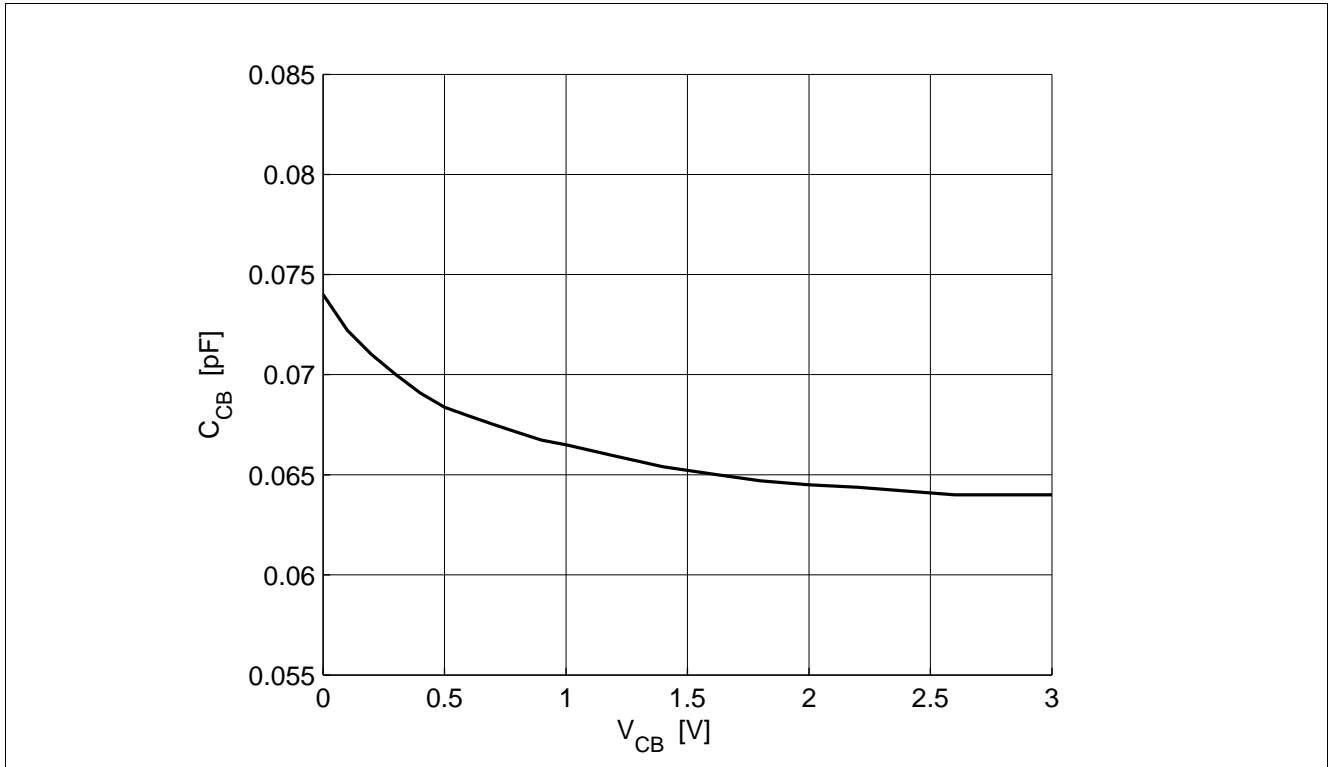


Figure 5-11 Collector Base Capacitance $C_{CB} = f(V_{CB}), f = 1 \text{ MHz}$

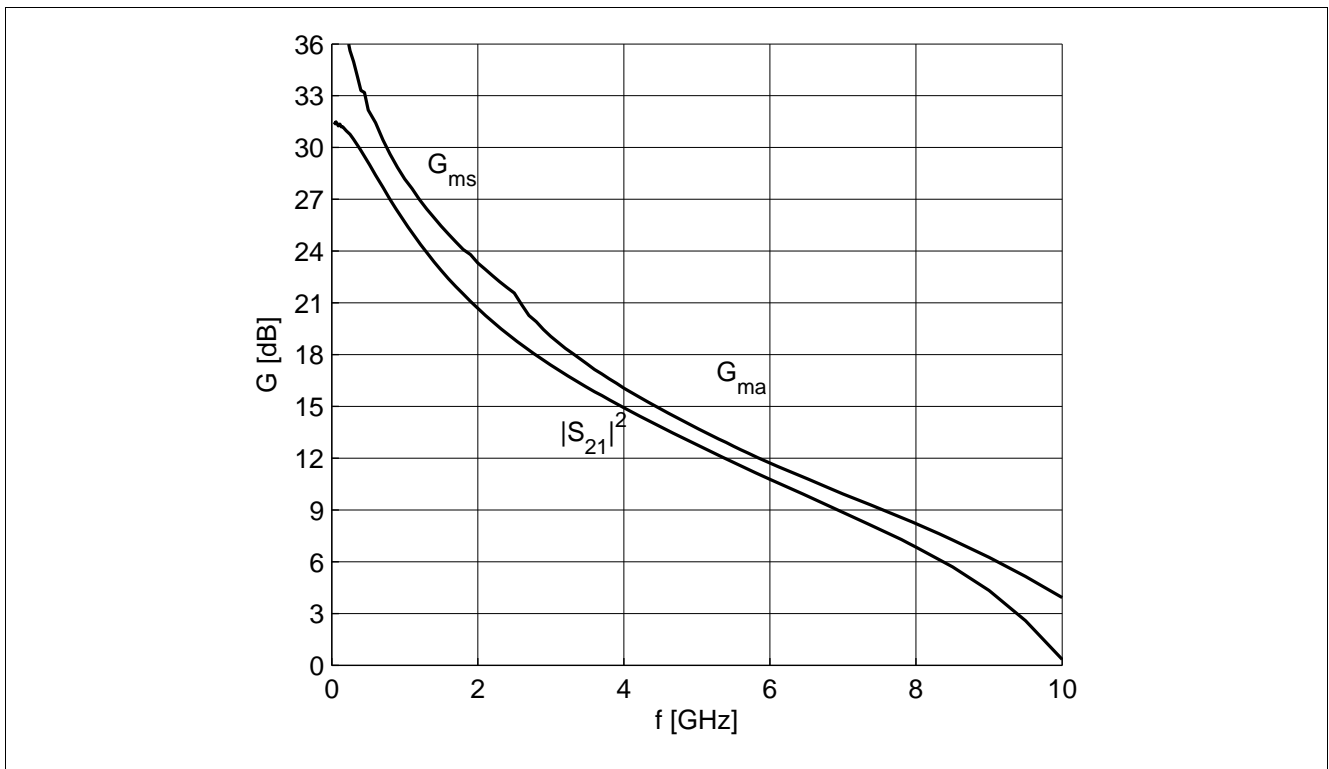


Figure 5-12 Gain $G_{ma}, G_{ms}, |S_{21}|^2 = f(f), V_{CE} = 2.5 \text{ V}, I_C = 15 \text{ mA}$

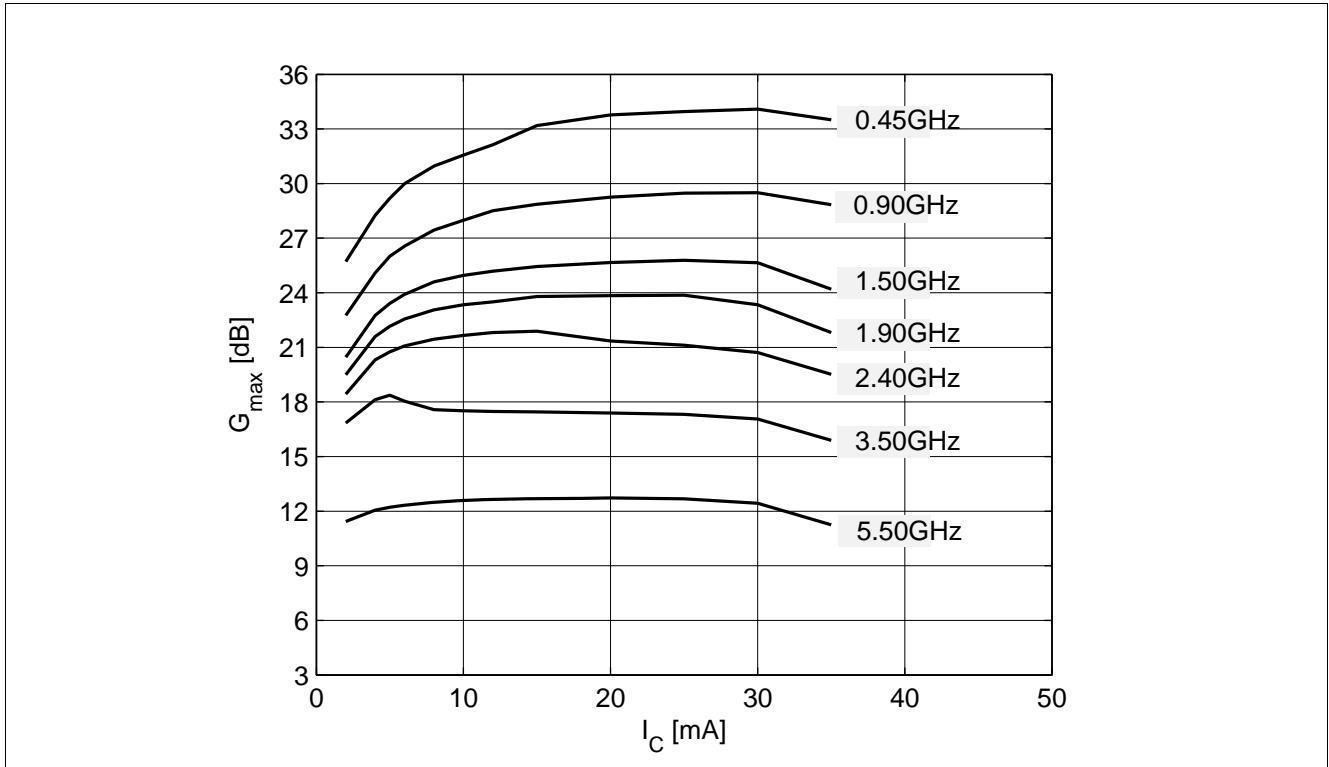


Figure 5-13 Maximum Power Gain $G_{max} = f(I_C)$, $V_{CE} = 2.5\text{ V}$, $f = \text{Parameter in GHz}$

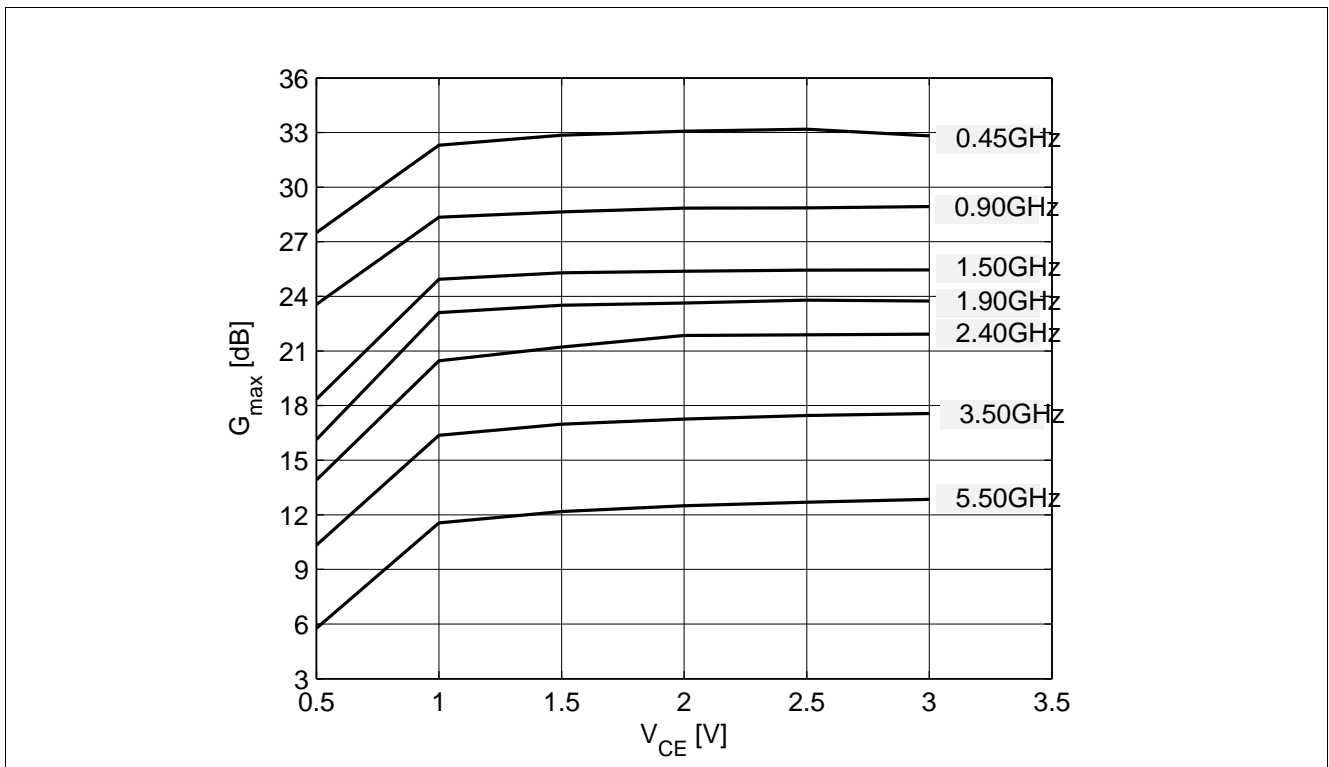


Figure 5-14 Maximum Power Gain $G_{max} = f(V_{CE})$, $I_C = 15\text{ mA}$, $f = \text{Parameter in GHz}$

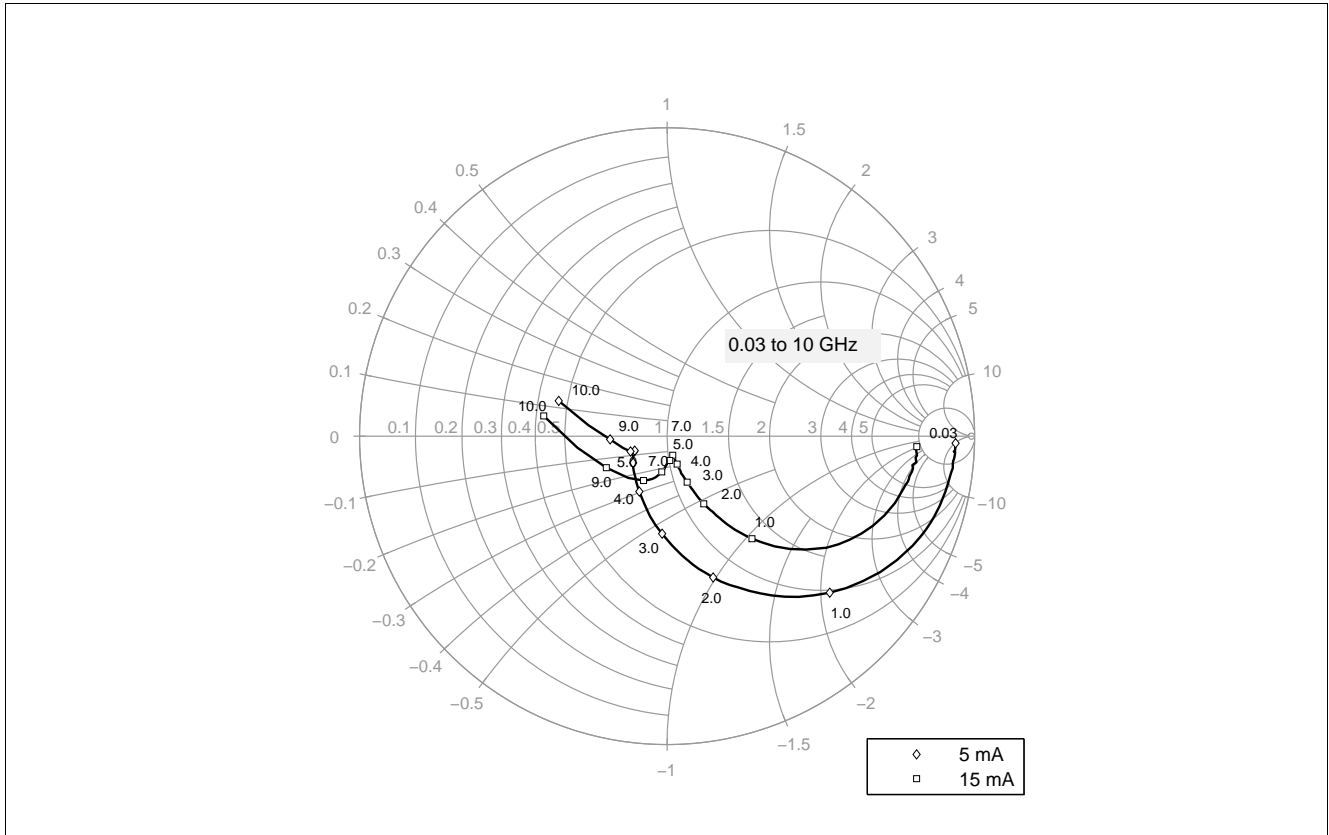


Figure 5-15 Input Reflection Coefficient $S_{11} = f(f)$, $V_{CE} = 2.5\text{ V}$, $I_C = 5 / 15\text{ mA}$

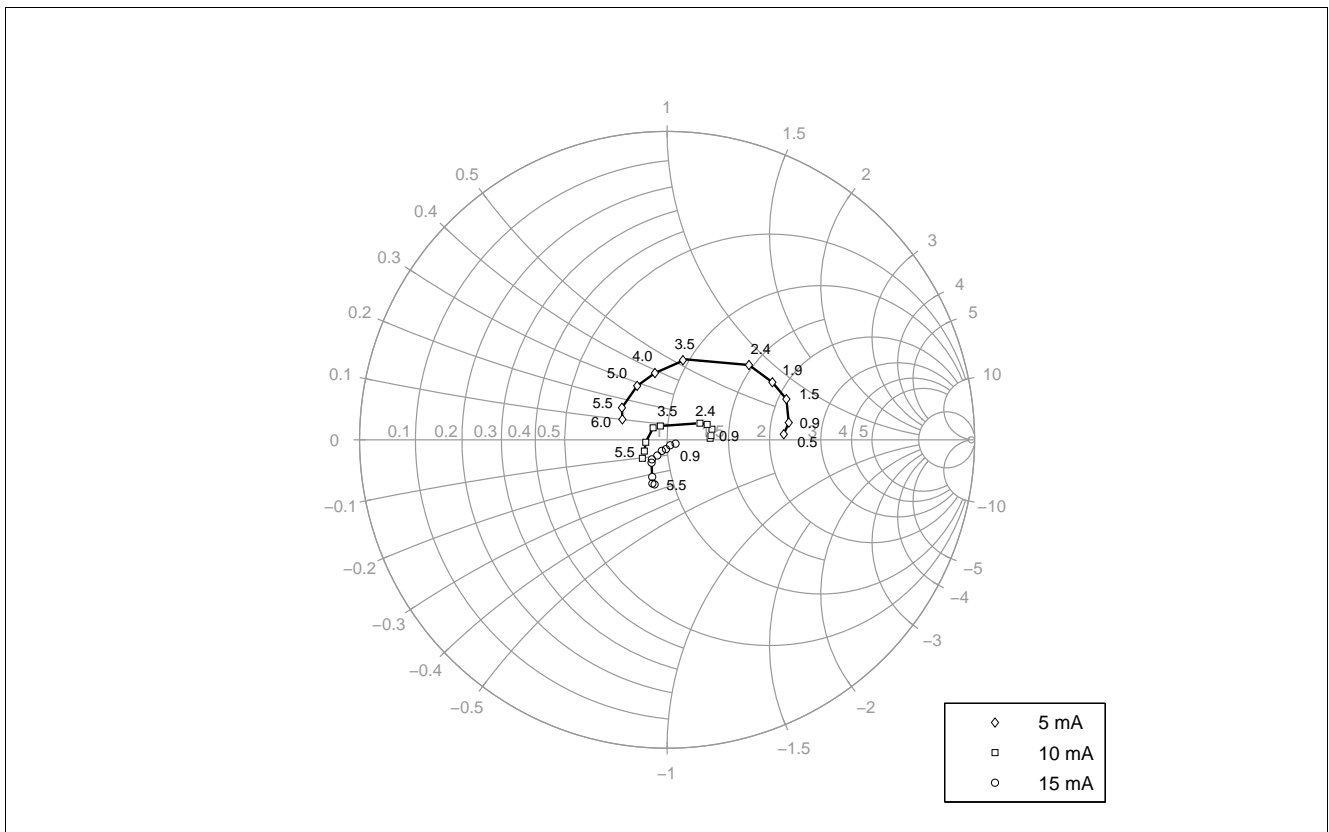


Figure 5-16 Source Impedance for Minimum Noise Figure $Z_{opt} = f(f)$, $V_{CE} = 2.5\text{ V}$, $I_C = 5 / 10 / 15\text{ mA}$

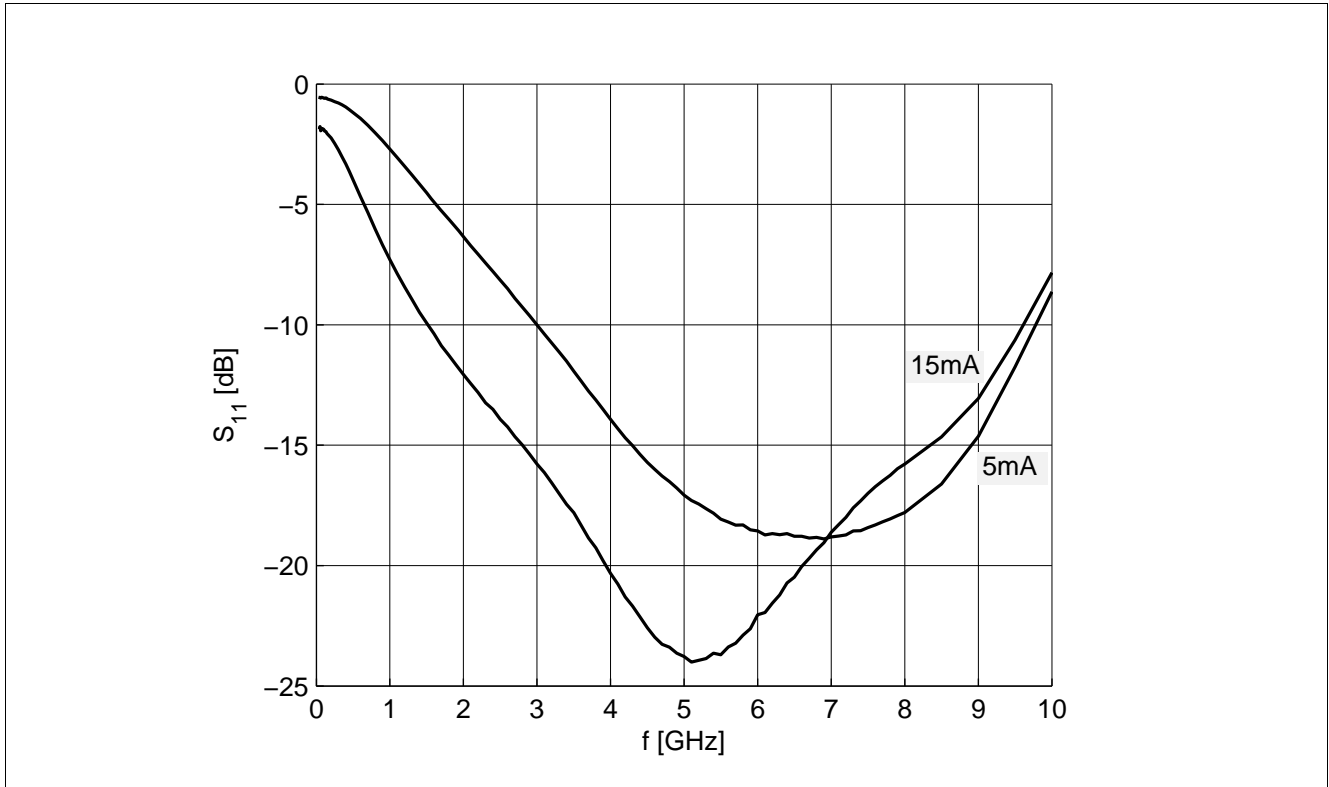


Figure 5-17 Input Reflection Coefficient $S_{11} = f(f)$, $V_{CE} = 2.5\text{ V}$, $I_C = 5 / 15\text{ mA}$

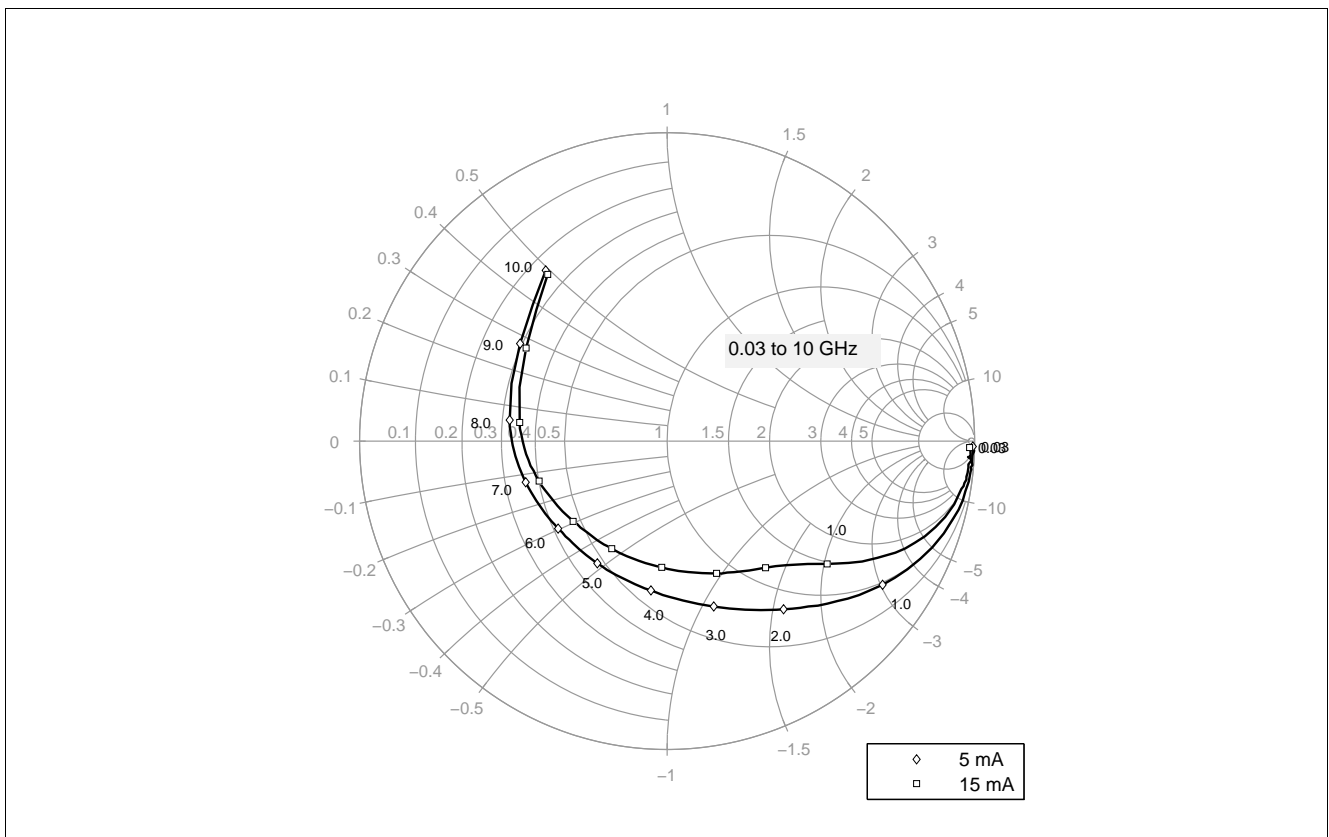


Figure 5-18 Output Reflection Coefficient $S_{22} = f(f)$, $V_{CE} = 2.5\text{ V}$, $I_C = 5 / 15\text{ mA}$

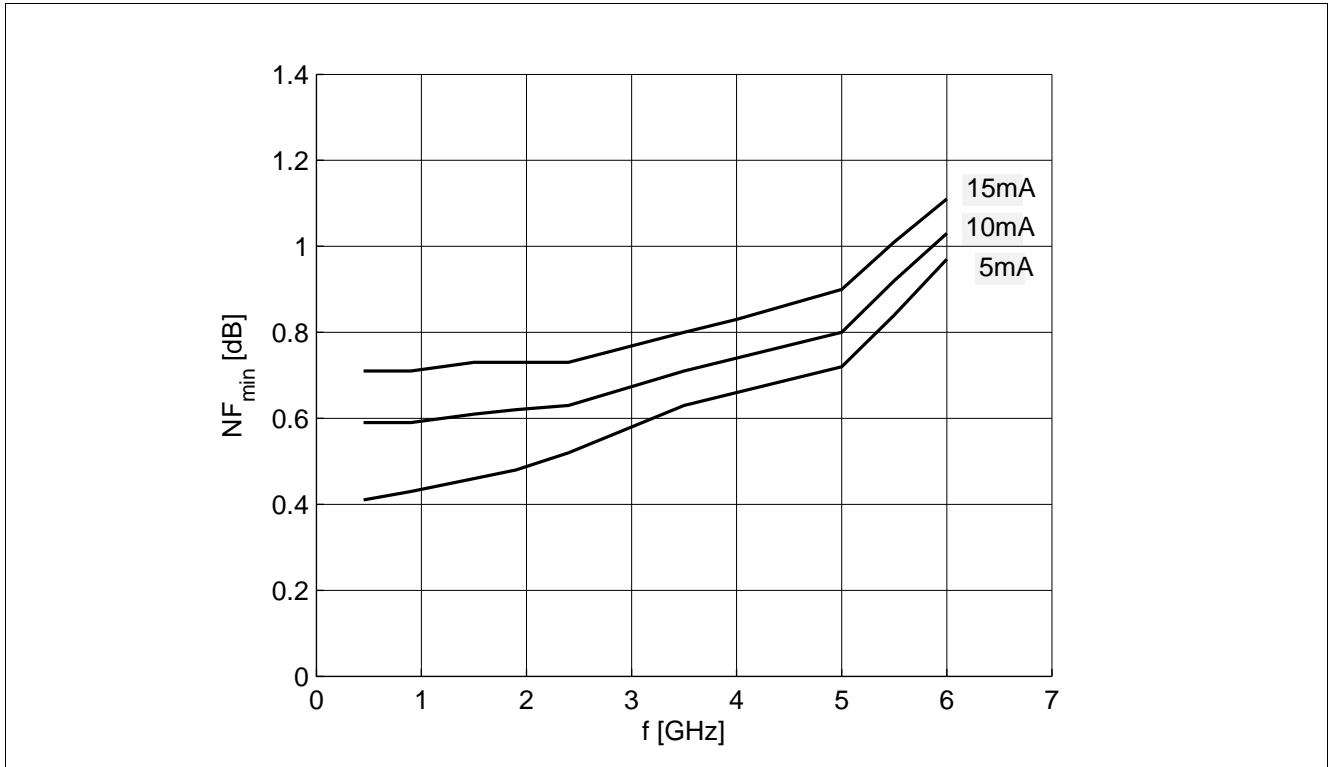


Figure 5-19 Noise Figure $NF_{min} = f(f)$, $V_{CE} = 2.5\text{ V}$, $I_C = 5 / 10 / 15\text{ mA}$, $Z_S = Z_{opt}$

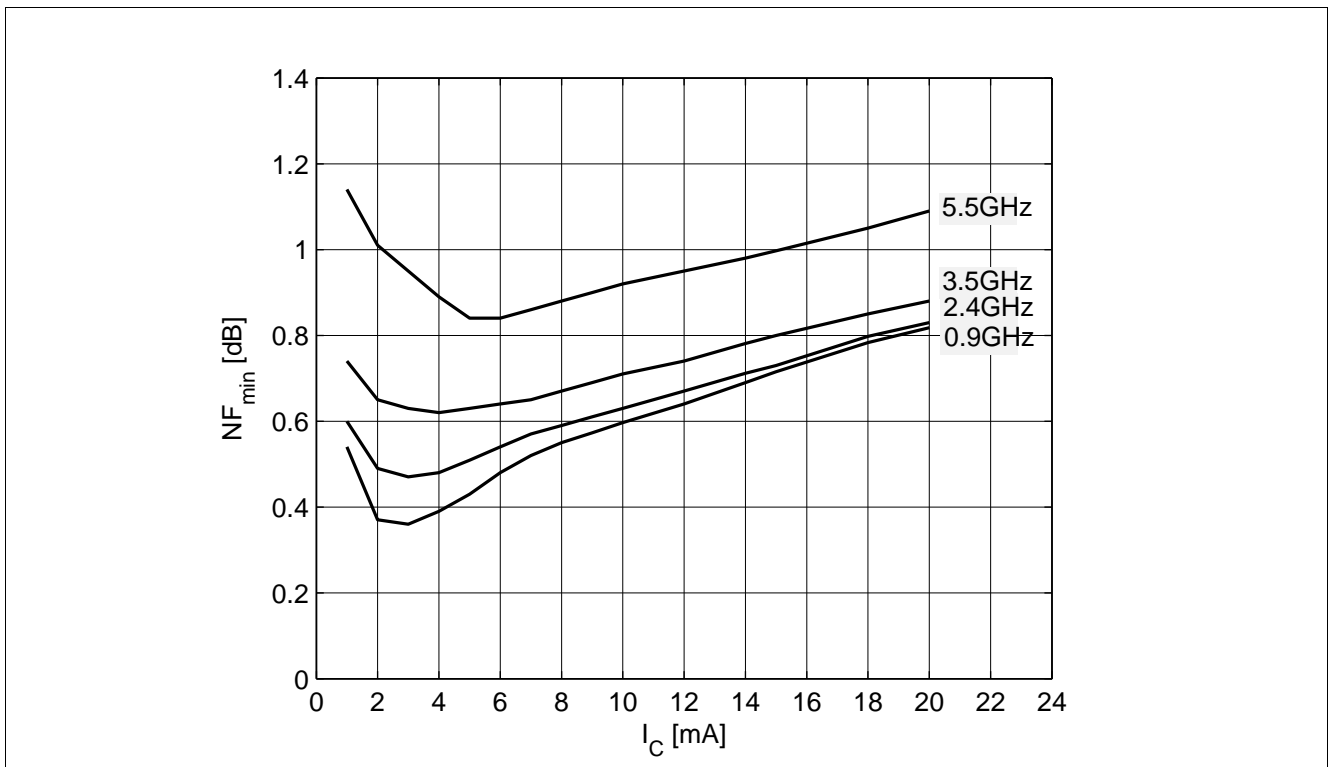


Figure 5-20 Noise Figure $NF_{min} = f(I_C)$, $V_{CE} = 2.5\text{ V}$, $Z_S = Z_{opt}$, $f = \text{Parameter in GHz}$

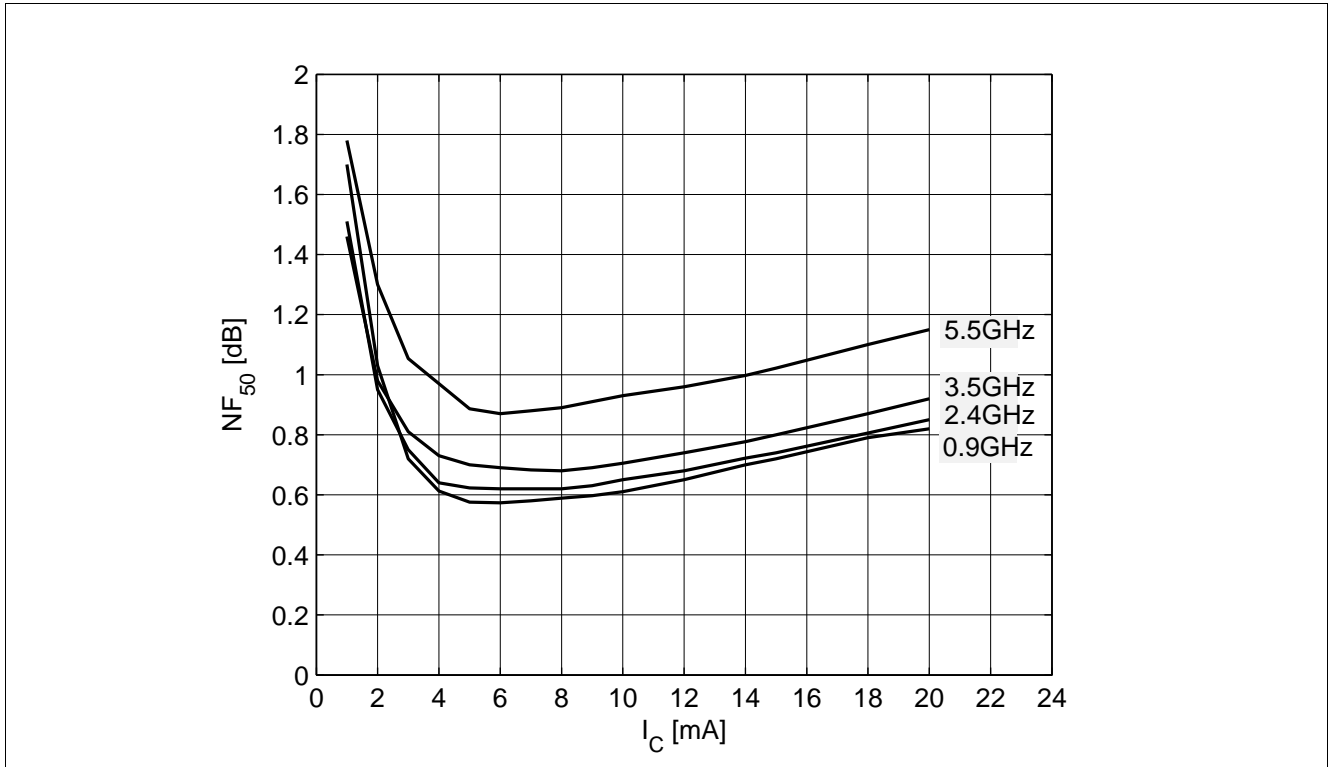


Figure 5-21 Noise Figure $NF_{50} = f(I_C)$, $V_{CE} = 2.5\text{ V}$, $Z_S = 50\ \Omega$, $f = \text{Parameter in GHz}$

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. $T_A = 25\text{ }^\circ\text{C}$

6 Simulation Data

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

You find the BFP842ESD SPICE GP model in the internet 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 12 GHz using typical devices. The BFP842ESD 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.

7 Package Information SOT343

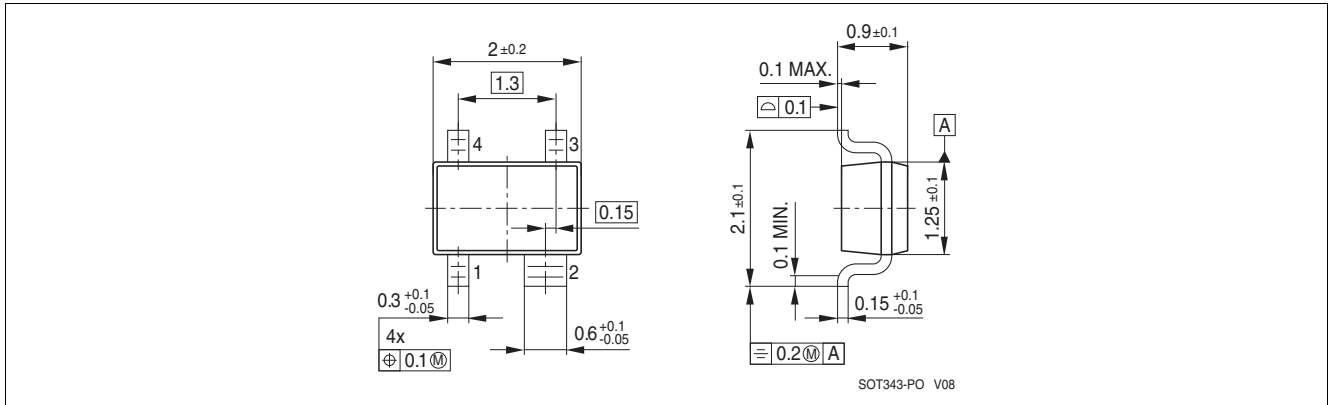


Figure 7-1 Package Outline

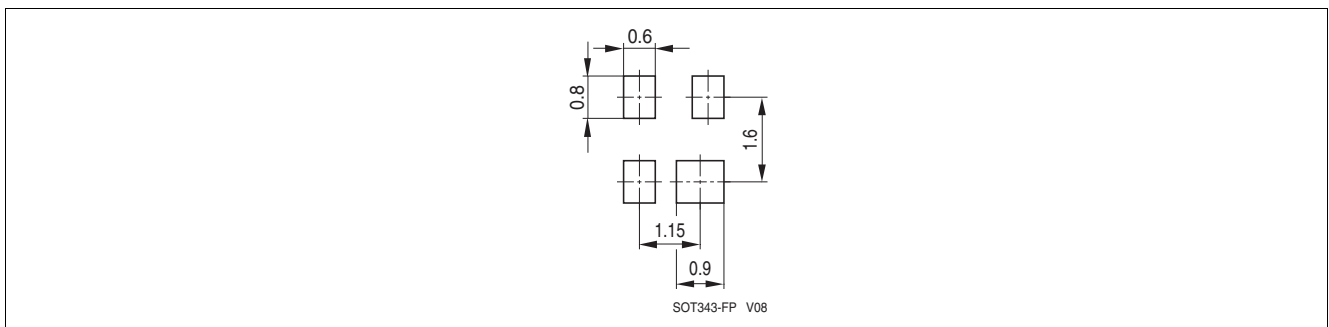


Figure 7-2 Package Footprint

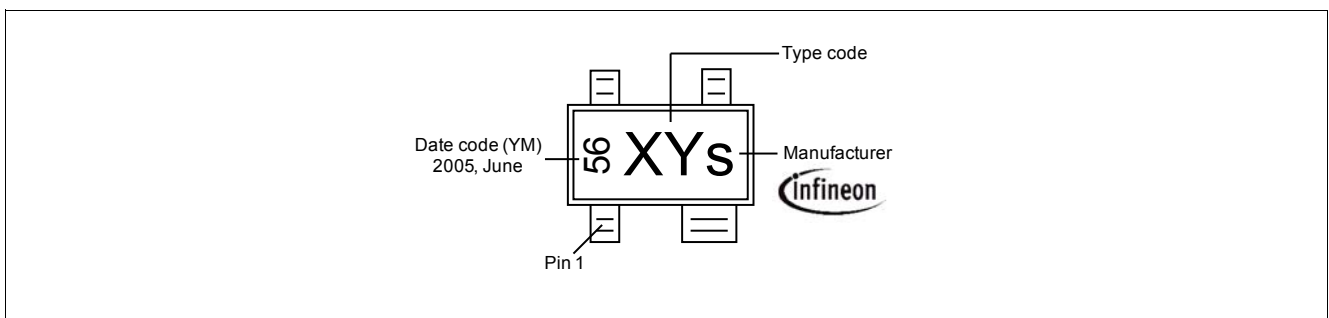


Figure 7-3 Marking Description (Marking BFP842ESD: T9s)

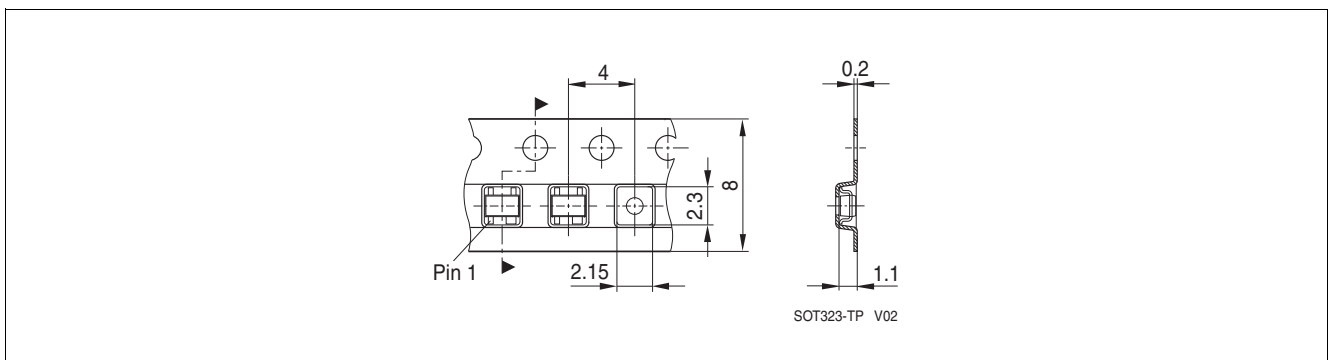


Figure 7-4 Tape dimensions

www.infineon.com

Published by Infineon Technologies AG

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9