

BFP450

High Linearity Low Noise Si NPN RF Transistor

Data Sheet

Revision 1.0, 2010-10-22

Edition 2010-10-22

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

**© 2010 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.

Revision History

| Page or Item | Subjects (changes since previous revision) |
|---------------------------------|--|
| Revision 1.0, 2010-10-22 | |
| | 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 have been expanded and updated. The old datasheet revision remains fully valid for those customers who have got the revision from 20 April 2007. |
| 1 | Maximum collector current ICmax increased from 100 mA to 170 mA and maximum DC power dissipation Ptot from 450 mW to 500 mW . |
| 2 | Typical values for leakage currents included. |
| 3 | Description of electrical parameters updated. |
| 4, 5 | Spice GP model parameters removed from datasheet, updated model parameters shifted to the internet simulation data section. |
| 6 | Pulse load curves removed. |
| 7, 8 | AC characteristic curves updated. |

Trademarks of Infineon Technologies AG

AURIX™, BlueMoon™, COMNEON™, C166™, CROSSAVE™, CanPAK™, CIPOS™, CoolMOS™, CoolSET™, CORECONTROL™, DAVE™, EasyPIM™, EconoBRIDGE™, EconoDUAL™, EconoPACK™, EconoPIM™, EiceDRIVER™, EUPEC™, FCOS™, HITFET™, HybridPACK™, ISOFACE™, I²RF™, IsoPACK™, MIPAQ™, ModSTACK™, my-d™, NovalithIC™, OmniTune™, OptiMOS™, ORIGA™, PROFET™, PRO-SIL™, PRIMARION™, PrimePACK™, RASIC™, ReverSave™, SatRIC™, SIEGET™, SINDRION™, SMARTi™, SmartLEWIS™, TEMPFET™, thinQ!™, TriCore™, TRENCHSTOP™, X-GOLD™, XMM™, X-PMU™, XPOSYS™.

Other Trademarks

Advance Design System™ (ADS) of Agilent Technologies, AMBA™, ARM™, MULTI-ICE™, PRIMECELL™, REALVIEW™, THUMB™ 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. Mifare™ of NXP. 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 Sattelite 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 2010-06-09

Table of Contents

| | | |
|----------|--|----|
| | Table of Contents | 4 |
| | List of Figures | 5 |
| | List of Tables | 6 |
| 1 | Features | 7 |
| 2 | Maximum Ratings | 8 |
| 3 | Thermal Characteristics | 9 |
| 4 | Electrical Characteristics | 10 |
| 4.1 | DC Characteristics | 10 |
| 4.2 | General AC Characteristics | 10 |
| 4.3 | Frequency Dependent AC Characteristics | 11 |
| 4.4 | Characteristic DC Diagrams | 15 |
| 4.5 | Characteristic AC Diagrams | 18 |
| 5 | Simulation Data | 25 |
| 6 | Package Information SOT343 | 26 |

List of Figures

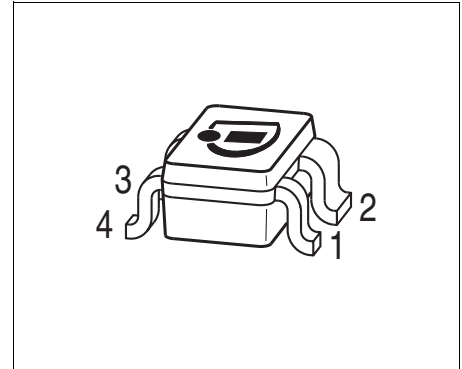
| | | |
|-----------|---|----|
| Figure 1 | Total Power Dissipation $P_{\text{tot}} = f(T_s)$ | 9 |
| Figure 2 | BFP450 Testing Circuit. | 11 |
| Figure 3 | Collector Current vs. Collector Emitter Voltage $I_C = f(V_{CE})$, $I_B = \text{Parameter}$ | 15 |
| Figure 4 | DC Current Gain $h_{FE} = f(I_C)$, $V_{CE} = 3 \text{ V}$ | 15 |
| Figure 5 | Collector Current vs. Base Emitter Voltage $I_C = f(V_{BE})$, $V_{CE} = 2 \text{ V}$ | 16 |
| Figure 6 | Base Current vs. Base Emitter Forward Voltage $I_B = f(V_{BE})$, $V_{CE} = 2 \text{ V}$ | 16 |
| Figure 7 | Base Current vs. Base Emitter Reverse Voltage $I_B = f(V_{EB})$, $V_{CE} = 2 \text{ V}$ | 17 |
| Figure 8 | Transition Frequency $f_T = f(I_C)$, $f = 1 \text{ GHz}$, $V_{CE} = \text{Parameter}$ | 18 |
| Figure 9 | 3rd Order Intercept Point $OIP_3 = f(I_C)$, $Z_S = Z_L = 50 \Omega$, $V_{CE}, f = \text{Parameters}$ | 18 |
| Figure 10 | Collector Base Capacitance $C_{CB} = f(V_{CB})$, $f = 1 \text{ MHz}$ | 19 |
| Figure 11 | Gain G_{ma} , G_{ms} , $ S_{21} ^2 = f(f)$, $V_{CE} = 3 \text{ V}$, $I_C = 90 \text{ mA}$ | 19 |
| Figure 12 | Maximum Power Gain $G_{\text{max}} = f(I_C)$, $V_{CE} = 3 \text{ V}$, $f = \text{Parameter in GHz}$ | 20 |
| Figure 13 | Maximum Power Gain $G_{\text{max}} = f(V_{CE})$, $I_C = 90 \text{ mA}$, $f = \text{Parameter in GHz}$ | 20 |
| Figure 14 | Input Matching $S_{11} = f(f)$, $V_{CE} = 3 \text{ V}$, $I_C = 50 / 90 \text{ mA}$ | 21 |
| Figure 15 | Source Impedance for Minimum Noise Figure $Z_{\text{opt}} = f(f)$, $V_{CE} = 3 \text{ V}$, $I_C = 50 / 90 \text{ mA}$ | 21 |
| Figure 16 | Output Matching $S_{22} = f(f)$, $V_{CE} = 3 \text{ V}$, $I_C = 50 / 90 \text{ mA}$ | 22 |
| Figure 17 | Noise Figure $NF_{\text{min}} = f(f)$, $V_{CE} = 3 \text{ V}$, $I_C = 50 / 90 \text{ mA}$, $Z_S = Z_{\text{opt}}$ | 22 |
| Figure 18 | Noise Figure $NF_{\text{min}} = f(I_C)$, $V_{CE} = 3 \text{ V}$, $Z_S = Z_{\text{opt}}$, $f = \text{Parameter in GHz}$ | 23 |
| Figure 19 | Noise Figure $NF_{50} = f(I_C)$, $V_{CE} = 3 \text{ V}$, $Z_S = 50 \Omega$, $f = \text{Parameter in GHz}$ | 23 |
| Figure 20 | Comparison Noise Figure $NF_{50} / NF_{\text{min}} = f(I_C)$, $V_{CE} = 3 \text{ V}$, $f = 1.9 \text{ GHz}$ | 24 |
| Figure 21 | Package Outline | 26 |
| Figure 22 | Package Foot Print | 26 |
| Figure 23 | Marking Description (Marking BFP450: ANs) | 26 |
| Figure 24 | Tape Dimensions | 26 |

List of Tables

| | | |
|----------|--|----|
| Table 1 | Maximum Ratings | 8 |
| Table 2 | Thermal Resistance | 9 |
| Table 3 | DC Characteristics at $T_A = 25\text{ °C}$ | 10 |
| Table 4 | General AC Characteristics at $T_A = 25\text{ °C}$ | 10 |
| Table 5 | AC Characteristics, $V_{CE} = 3\text{ V}$, $f = 150\text{ MHz}$ | 11 |
| Table 6 | AC Characteristics, $V_{CE} = 3\text{ V}$, $f = 450\text{ MHz}$ | 12 |
| Table 7 | AC Characteristics, $V_{CE} = 3\text{ V}$, $f = 900\text{ MHz}$ | 12 |
| Table 8 | AC Characteristics, $V_{CE} = 3\text{ V}$, $f = 1.5\text{ GHz}$ | 13 |
| Table 9 | AC Characteristics, $V_{CE} = 3\text{ V}$, $f = 1.9\text{ GHz}$ | 13 |
| Table 10 | AC Characteristics, $V_{CE} = 3\text{ V}$, $f = 2.4\text{ GHz}$ | 14 |
| Table 11 | AC Characteristics, $V_{CE} = 3\text{ V}$, $f = 3.5\text{ GHz}$ | 14 |

1 Features

- Highly linear low noise driver amplifier for all RF frontends up to 2.5 GHz
- Output compression point $OP_{1dB} = 18.5$ dBm at 90 mA, 3 V, 1.9 GHz, 50 Ω system
- Output 3rd order intermodulation point $OIP_3 = 31$ dBm at 90 mA, 3 V, 1.9 GHz, 50 Ω system
- Maximum available gain $G_{ma} = 15.5$ dB at 50 mA, 3 V, 1.9 GHz
- Minimum noise figure $NF_{min} = 1.7$ dB at 50 mA, 3 V, 1.9 GHz
- Based on Infineon's reliable, high volume 25 GHz SIEGETM line
- Easy to use Pb-free (RoHS compliant) standard package with visible leads
- Qualified according AEC Q101



Application Examples

Driver amplifier

- ISM bands 434 and 868 MHz
- 1.9 GHz cordless phones
- CATV LNA

Transmitter driver amplifier

- 2.4 GHz WLAN and Bluetooth

Output stage LNA for active antennas

- TV, GPS, SDARS, 2.4 GHz WLAN, etc

Suitable for 3 - 5.5 GHz oscillators

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

| Product Name | Package | Pin Configuration | | | | Marking |
|--------------|---------|-------------------|-------|-------|-------|---------|
| BFP450 | SOT343 | 1 = B | 2 = E | 3 = C | 4 = E | ANs |

2 Maximum Ratings

Table 1 Maximum Ratings

| Parameter | Symbol | Values | | Unit | Note / Test Condition |
|---------------------------------------|-----------|--------|------|------|-----------------------------------|
| | | Min. | Max. | | |
| Collector emitter voltage | V_{CEO} | – | 4.5 | V | Open base $T_A = 25\text{ °C}$ |
| | | – | 4.1 | V | $T_A = -55\text{ °C}$ |
| Collector emitter voltage | V_{CES} | – | 15 | V | Emitter / base shortened |
| Collector base voltage | V_{CBO} | – | 15 | V | Open emitter |
| Emitter base voltage | V_{EBO} | – | 1.5 | V | Open collector |
| Collector current | I_C | – | 170 | mA | – |
| Base current | I_B | – | 10 | mA | – |
| Total power dissipation ¹⁾ | P_{tot} | – | 500 | mW | $T_S \leq 90\text{ °C}$ |
| Junction temperature | T_J | – | 150 | °C | – |
| Storage temperature | T_{Stg} | -65 | 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} | – | – | 120 | K/W | – |

1)For calculation of R_{thJA} please refer to Application Note Thermal Resistance AN077

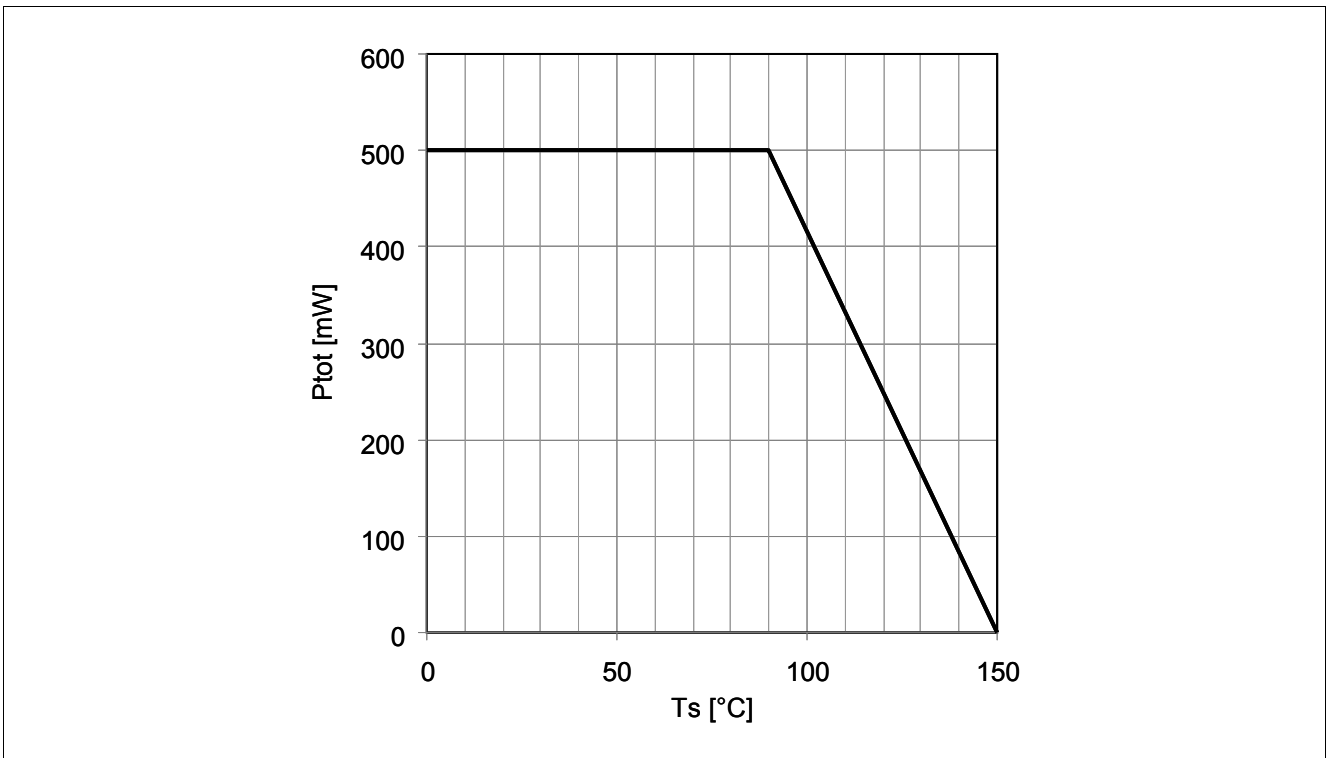


Figure 1 Total Power Dissipation $P_{tot} = f(T_s)$

4 Electrical Characteristics

4.1 DC Characteristics

Table 3 DC Characteristics at $T_A = 25\text{ °C}$

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|-------------------------------------|---------------|--------|------|------|---------------|--|
| | | Min. | Typ. | Max. | | |
| Collector emitter breakdown voltage | $V_{(BR)CEO}$ | 4.5 | 5 | – | V | $I_C = 1\text{ mA}$, $I_B = 0$ Open base |
| Collector emitter leakage current | I_{CES} | – | – | 10 | μA | $V_{CE} = 15\text{ V}$, $V_{BE} = 0$ |
| | | – | 1 | 30 | nA | $V_{CE} = 3\text{ V}$, $V_{BE} = 0$ Emitter/base shortened |
| Collector base leakage current | I_{CBO} | – | 1 | 30 | nA | $V_{CB} = 3\text{ V}$, $I_E = 0$ Open emitter |
| Emitter base leakage current | I_{EBO} | – | 0.1 | 3 | μA | $V_{EB} = 0.5\text{ V}$, $I_C = 0$ Open collector |
| DC current gain | h_{FE} | 60 | 95 | 130 | | $V_{CE} = 4\text{ V}$, $I_C = 50\text{ mA}$ |
| | | 50 | 85 | 120 | | $V_{CE} = 3\text{ V}$, $I_C = 90\text{ mA}$ Pulse measured |

4.2 General AC Characteristics

Table 4 General AC Characteristics at $T_A = 25\text{ °C}$

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|-------------------------------|----------|--------|------|------|------|---|
| | | Min. | Typ. | Max. | | |
| Transition frequency | f_T | 18 | 24 | – | GHz | $V_{CE} = 3\text{ V}$, $I_C = 90\text{ mA}$, $f = 1\text{ GHz}$ |
| Collector base capacitance | C_{CB} | – | 0.48 | 0.8 | pF | $V_{CB} = 3\text{ V}$, $V_{BE} = 0\text{ V}$ $f = 1\text{ MHz}$ Emitter grounded |
| Collector emitter capacitance | C_{CE} | – | 1.2 | – | pF | $V_{CE} = 3\text{ V}$, $V_{BE} = 0\text{ V}$ $f = 1\text{ MHz}$ Base grounded |
| Emitter base capacitance | C_{EB} | – | 1.7 | – | pF | $V_{EB} = 0.5\text{ V}$, $V_{CB} = 0\text{ V}$ $f = 1\text{ MHz}$ Collector grounded |

4.3 Frequency Dependent AC Characteristics

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

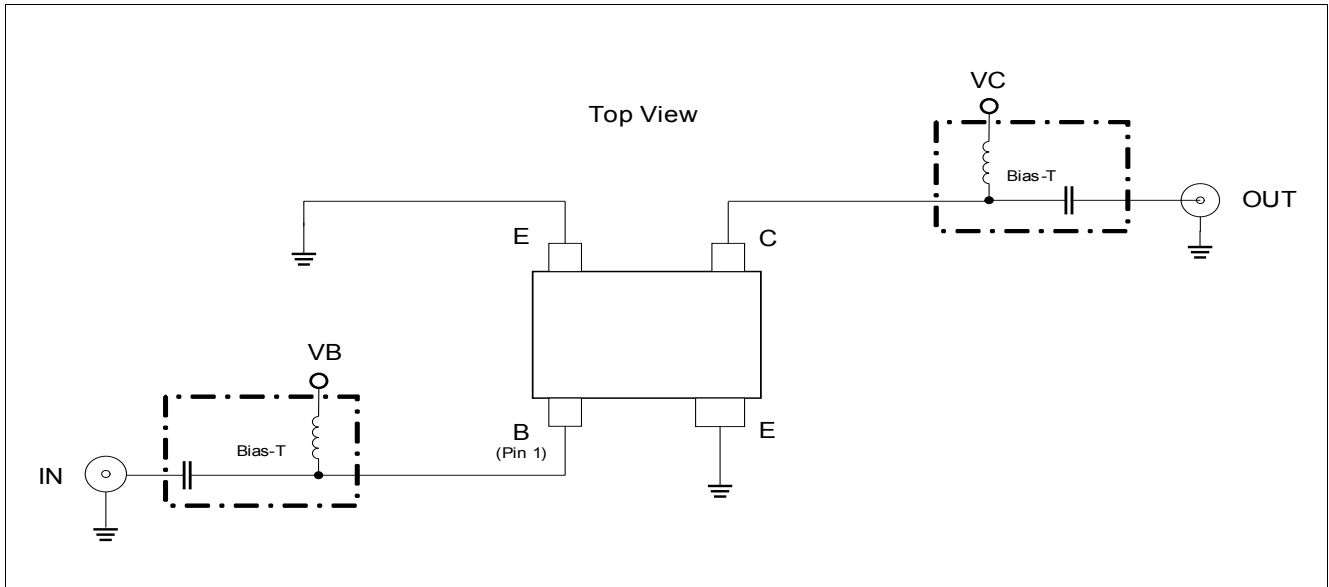


Figure 2 BFP450 Testing Circuit

Table 5 AC Characteristics, $V_{CE} = 3\text{ V}$, $f = 150\text{ MHz}$

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|--------------------------------|------------|--------|------|------|------|--------------------------------|
| | | Min. | Typ. | Max. | | |
| Maximum power gain | | | | | dB | |
| High linearity operation point | G_{ms} | – | 34.5 | – | | $I_C = 50\text{ mA}$ |
| Class A operation point | G_{ms} | – | 35.5 | – | | $I_C = 90\text{ mA}$ |
| Transducer gain | | | | | dB | $Z_S = Z_L = 50\text{ }\Omega$ |
| High linearity operation point | S_{21} | – | 33 | – | | $I_C = 50\text{ mA}$ |
| Class A operation point | S_{21} | – | 33.5 | – | | $I_C = 90\text{ mA}$ |
| Minimum noise figure | | | | | dB | $Z_S = Z_{opt}$ |
| Minimum noise figure | NF_{min} | – | 1.55 | – | | $I_C = 50\text{ mA}$ |
| Associated gain | G_{ass} | – | 32 | – | | $I_C = 50\text{ mA}$ |
| Linearity | | | | | dBm | $Z_S = Z_L = 50\text{ }\Omega$ |
| 1 dB gain compression point | OP_{1dB} | – | 19 | – | | $I_C = 90\text{ mA}$ |
| 3rd order intercept point | OIP_3 | – | 30.5 | – | | $I_C = 90\text{ mA}$ |

Electrical Characteristics
Table 6 AC Characteristics, $V_{CE} = 3\text{ V}$, $f = 450\text{ MHz}$

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|--------------------------------|------------|--------|------|------|------|--------------------------|
| | | Min. | Typ. | Max. | | |
| Maximum power gain | | | | | dB | |
| High linearity operation point | G_{ms} | – | 28.5 | – | | $I_C = 50\text{ mA}$ |
| Class A operation point | G_{ms} | – | 29 | – | | $I_C = 90\text{ mA}$ |
| Transducer gain | | | | | dB | $Z_S = Z_L = 50\ \Omega$ |
| High linearity operation point | S_{21} | – | 25 | – | | $I_C = 50\text{ mA}$ |
| Class A operation point | S_{21} | – | 25 | – | | $I_C = 90\text{ mA}$ |
| Minimum noise figure | | | | | dB | $Z_S = Z_{opt}$ |
| Minimum noise figure | NF_{min} | – | 1.55 | – | | $I_C = 50\text{ mA}$ |
| Associated gain | G_{ass} | – | 27.5 | – | | $I_C = 50\text{ mA}$ |
| Linearity | | | | | dBm | $Z_S = Z_L = 50\ \Omega$ |
| 1 dB gain compression point | OP_{1dB} | – | 19 | – | | $I_C = 90\text{ mA}$ |
| 3rd order intercept point | OIP_3 | – | 30 | – | | $I_C = 90\text{ mA}$ |

Table 7 AC Characteristics, $V_{CE} = 3\text{ V}$, $f = 900\text{ MHz}$

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|--------------------------------|------------|--------|------|------|------|--------------------------|
| | | Min. | Typ. | Max. | | |
| Maximum power gain | | | | | dB | |
| High linearity operation point | G_{ms} | – | 23 | – | | $I_C = 50\text{ mA}$ |
| Class A operation point | G_{ms} | – | 23.5 | – | | $I_C = 90\text{ mA}$ |
| Transducer gain | | | | | dB | $Z_S = Z_L = 50\ \Omega$ |
| High linearity operation point | S_{21} | – | 18.5 | – | | $I_C = 50\text{ mA}$ |
| Class A operation point | S_{21} | – | 19 | – | | $I_C = 90\text{ mA}$ |
| Minimum noise figure | | | | | dB | $Z_S = Z_{opt}$ |
| Minimum noise figure | NF_{min} | – | 1.6 | – | | $I_C = 50\text{ mA}$ |
| Associated gain | G_{ass} | – | 23 | – | | $I_C = 50\text{ mA}$ |
| Linearity | | | | | dBm | $Z_S = Z_L = 50\ \Omega$ |
| 1 dB gain compression point | OP_{1dB} | – | 19 | – | | $I_C = 90\text{ mA}$ |
| 3rd order intercept point | OIP_3 | – | 30.5 | – | | $I_C = 90\text{ mA}$ |

Table 8 AC Characteristics, $V_{CE} = 3\text{ V}$, $f = 1.5\text{ GHz}$

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|--------------------------------|------------|--------|------|------|------|--------------------------|
| | | Min. | Typ. | Max. | | |
| Maximum power gain | | | | | dB | |
| High linearity operation point | G_{ma} | – | 18 | – | | $I_C = 50\text{ mA}$ |
| Class A operation point | G_{ma} | – | 18 | – | | $I_C = 90\text{ mA}$ |
| Transducer gain | | | | | dB | $Z_S = Z_L = 50\ \Omega$ |
| High linearity operation point | S_{21} | – | 14 | – | | $I_C = 50\text{ mA}$ |
| Class A operation point | S_{21} | – | 14 | – | | $I_C = 90\text{ mA}$ |
| Minimum noise figure | | | | | dB | $Z_S = Z_{opt}$ |
| Minimum noise figure | NF_{min} | – | 1.65 | – | | $I_C = 50\text{ mA}$ |
| Associated gain | G_{ass} | – | 17 | – | | $I_C = 50\text{ mA}$ |
| Linearity | | | | | dBm | $Z_S = Z_L = 50\ \Omega$ |
| 1 dB gain compression point | OP_{1dB} | – | 19 | – | | $I_C = 90\text{ mA}$ |
| 3rd order intercept point | OIP_3 | – | 31 | – | | $I_C = 90\text{ mA}$ |

Table 9 AC Characteristics, $V_{CE} = 3\text{ V}$, $f = 1.9\text{ GHz}$

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|--------------------------------|------------|--------|------|------|------|--------------------------|
| | | Min. | Typ. | Max. | | |
| Maximum power gain | | | | | dB | |
| High linearity operation point | G_{ma} | – | 15.5 | – | | $I_C = 50\text{ mA}$ |
| Class A operation point | G_{ma} | – | 15.5 | – | | $I_C = 90\text{ mA}$ |
| Transducer gain | | | | | dB | $Z_S = Z_L = 50\ \Omega$ |
| High linearity operation point | S_{21} | 9.5 | 11.5 | – | | $I_C = 50\text{ mA}$ |
| Class A operation point | S_{21} | – | 11.5 | – | | $I_C = 90\text{ mA}$ |
| Minimum noise figure | | | | | dB | $Z_S = Z_{opt}$ |
| Minimum noise figure | NF_{min} | – | 1.7 | – | | $I_C = 50\text{ mA}$ |
| Associated gain | G_{ass} | – | 14 | – | | $I_C = 50\text{ mA}$ |
| Linearity | | | | | dBm | $Z_S = Z_L = 50\ \Omega$ |
| 1 dB gain compression point | OP_{1dB} | – | 19 | – | | $I_C = 90\text{ mA}$ |
| 3rd order intercept point | OIP_3 | – | 31 | – | | $I_C = 90\text{ mA}$ |

Table 10 AC Characteristics, $V_{CE} = 3\text{ V}$, $f = 2.4\text{ GHz}$

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|--------------------------------|------------|--------|------|------|------|--------------------------|
| | | Min. | Typ. | Max. | | |
| Maximum power gain | | | | | dB | |
| High linearity operation point | G_{ma} | – | 13.5 | – | | $I_C = 50\text{ mA}$ |
| Class A operation point | G_{ma} | – | 13.5 | – | | $I_C = 90\text{ mA}$ |
| Transducer gain | | | | | dB | $Z_S = Z_L = 50\ \Omega$ |
| High linearity operation point | S_{21} | – | 9.5 | – | | $I_C = 50\text{ mA}$ |
| Class A operation point | S_{21} | – | 9.5 | – | | $I_C = 90\text{ mA}$ |
| Minimum noise figure | | | | | dB | $Z_S = Z_{opt}$ |
| Minimum noise figure | NF_{min} | – | 1.8 | – | | $I_C = 50\text{ mA}$ |
| Associated gain | G_{ass} | – | 12 | – | | $I_C = 50\text{ mA}$ |
| Linearity | | | | | dBm | $Z_S = Z_L = 50\ \Omega$ |
| 1 dB gain compression point | OP_{1dB} | – | 19 | – | | $I_C = 90\text{ mA}$ |
| 3rd order intercept point | OIP_3 | – | 30 | – | | $I_C = 90\text{ mA}$ |

Table 11 AC Characteristics, $V_{CE} = 3\text{ V}$, $f = 3.5\text{ GHz}$

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|--------------------------------|------------|--------|------|------|------|--------------------------|
| | | Min. | Typ. | Max. | | |
| Maximum power gain | | | | | dB | |
| High linearity operation point | G_{ma} | – | 10 | – | | $I_C = 50\text{ mA}$ |
| Class A operation point | G_{ma} | – | 10 | – | | $I_C = 90\text{ mA}$ |
| Transducer gain | | | | | dB | $Z_S = Z_L = 50\ \Omega$ |
| High linearity operation point | S_{21} | – | 5.5 | – | | $I_C = 50\text{ mA}$ |
| Class A operation point | S_{21} | – | 6 | – | | $I_C = 90\text{ mA}$ |
| Minimum noise figure | | | | | dB | $Z_S = Z_{opt}$ |
| Minimum noise figure | NF_{min} | – | 2.05 | – | | $I_C = 50\text{ mA}$ |
| Associated gain | G_{ass} | – | 9 | – | | $I_C = 50\text{ mA}$ |
| Linearity | | | | | dBm | $Z_S = Z_L = 50\ \Omega$ |
| 1 dB gain compression point | OP_{1dB} | – | 18.5 | – | | $I_C = 90\text{ mA}$ |
| 3rd order intercept point | OIP_3 | – | 29.5 | – | | $I_C = 90\text{ mA}$ |

Note:

1. AC parameter limits verified by random sampling
2. In order to get the NF_{min} values stated in this chapter the test fixture losses have been subtracted from all measured result
3. OIP_3 value depends on termination of all intermodulation frequency components. Termination used for this measurement is $50\ \Omega$ from 0.2 MHz to 12 GHz.

4.4 Characteristic DC Diagrams

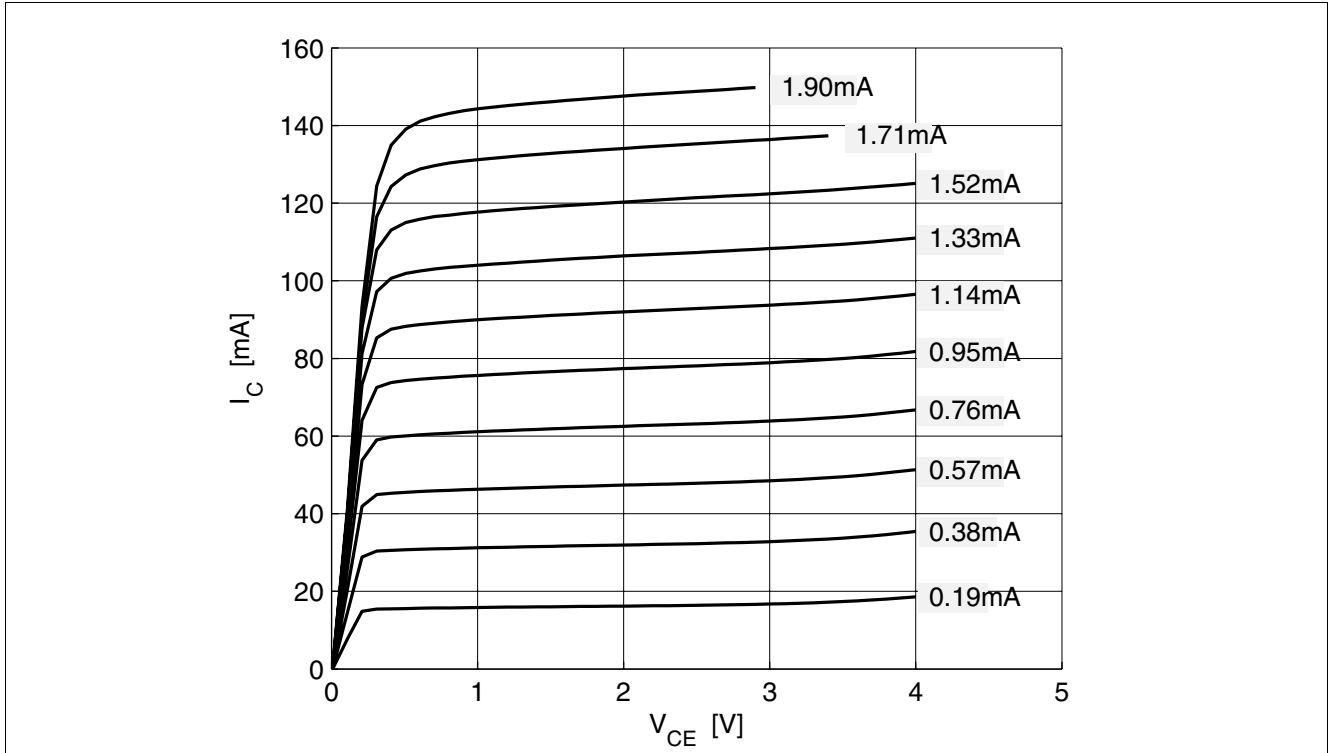


Figure 3 Collector Current vs. Collector Emitter Voltage $I_C = f(V_{CE})$, $I_B = \text{Parameter}$

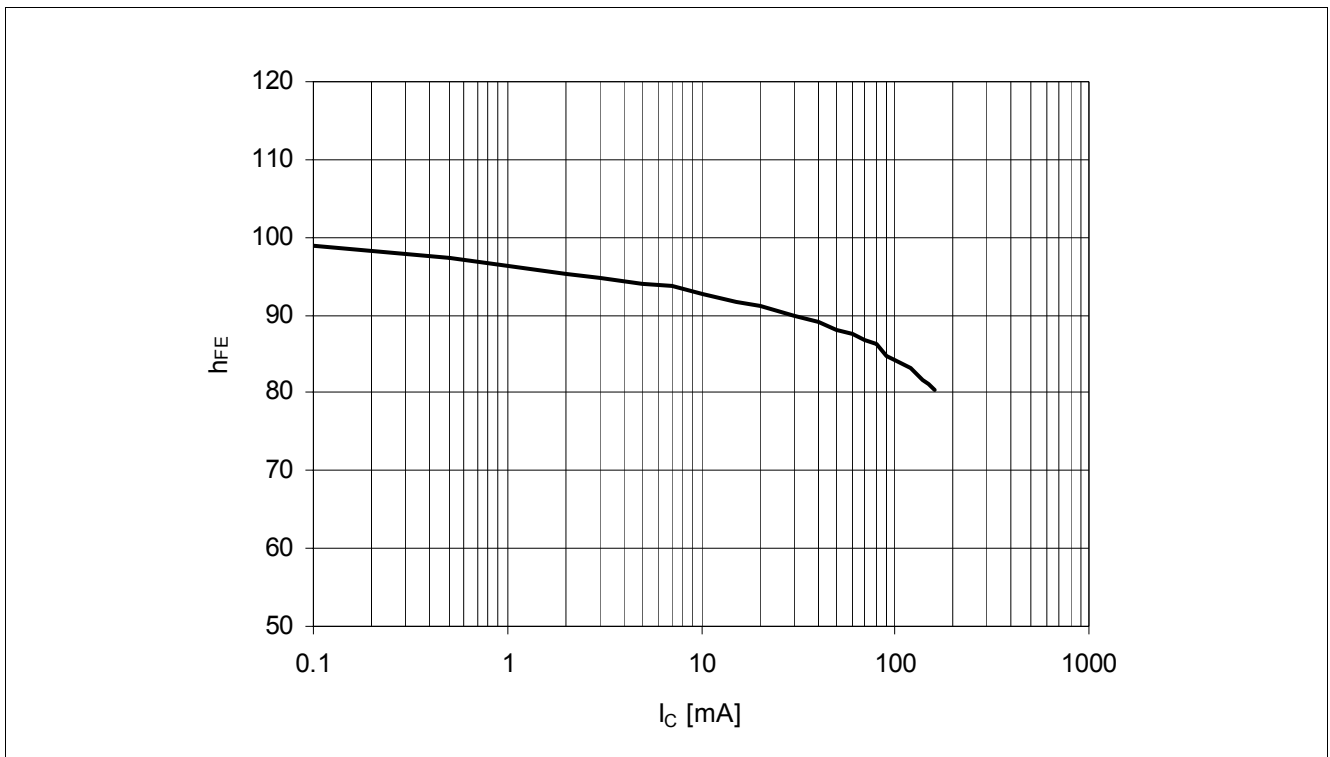


Figure 4 DC Current Gain $h_{FE} = f(I_C)$, $V_{CE} = 3 \text{ V}$

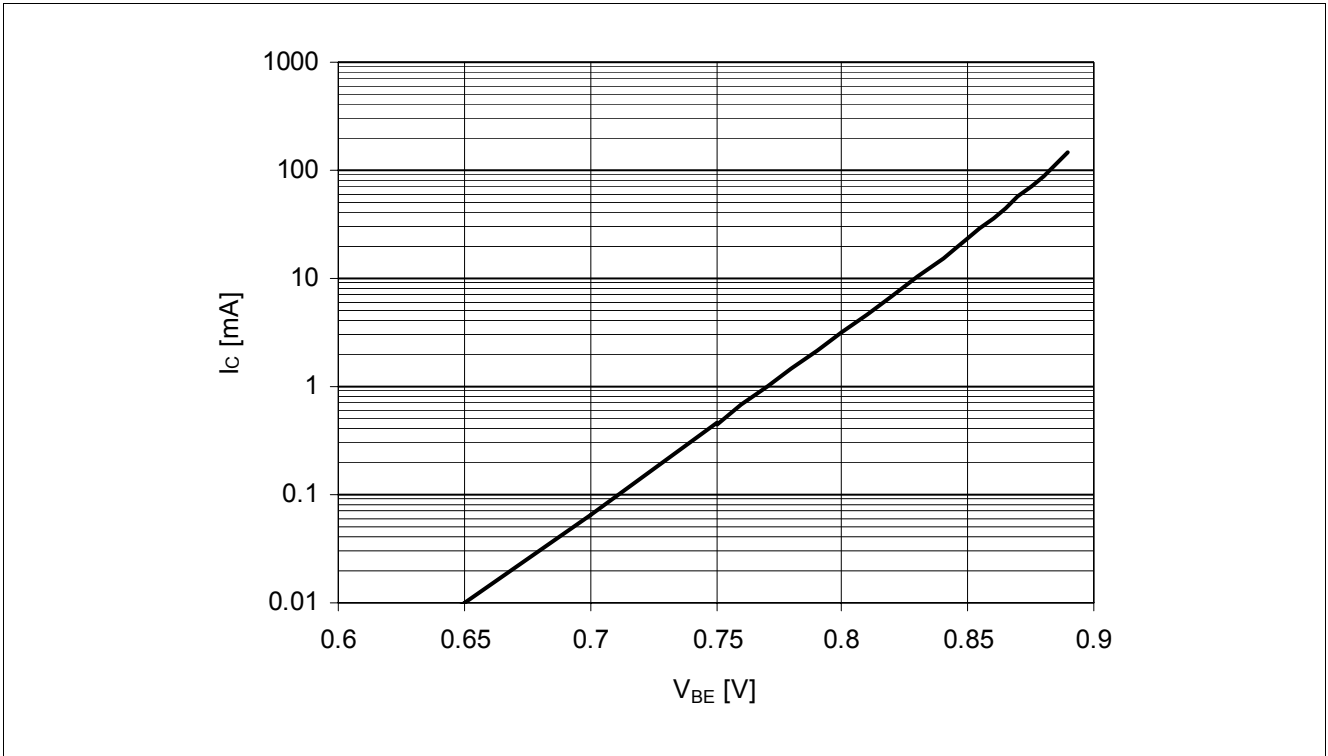


Figure 5 Collector Current vs. Base Emitter Voltage $I_C = f(V_{BE})$, $V_{CE} = 2\text{ V}$

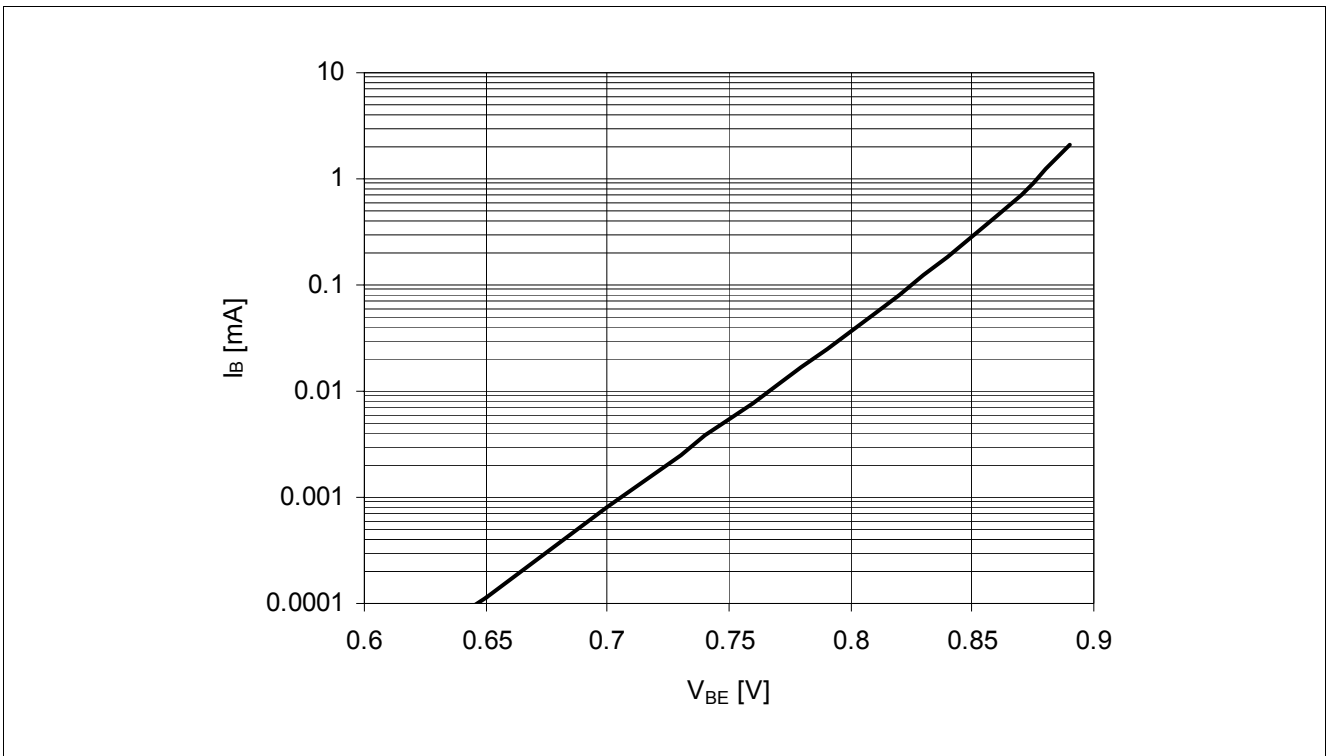


Figure 6 Base Current vs. Base Emitter Forward Voltage $I_B = f(V_{BE})$, $V_{CE} = 2\text{ V}$

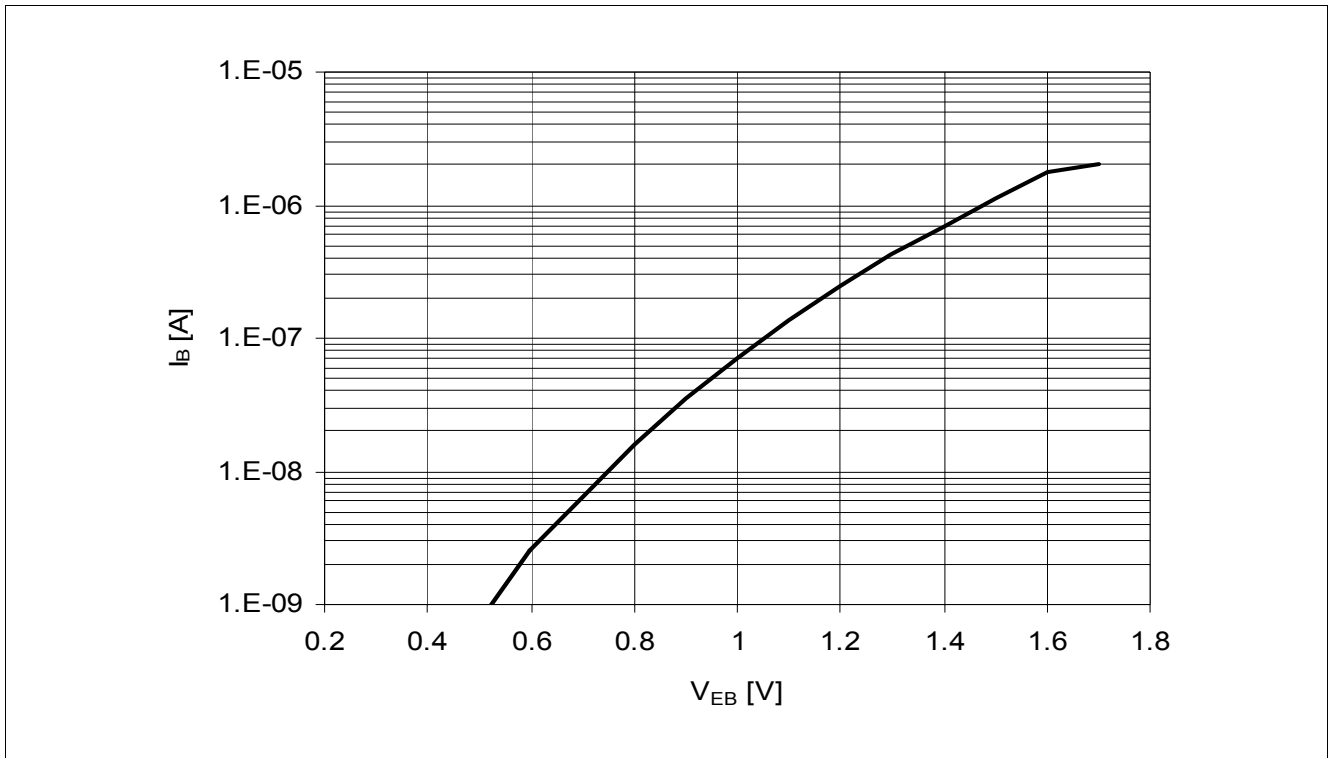


Figure 7 Base Current vs. Base Emitter Reverse Voltage $I_B = f(V_{EB})$, $V_{CE} = 2\text{ V}$

4.5 Characteristic AC Diagrams

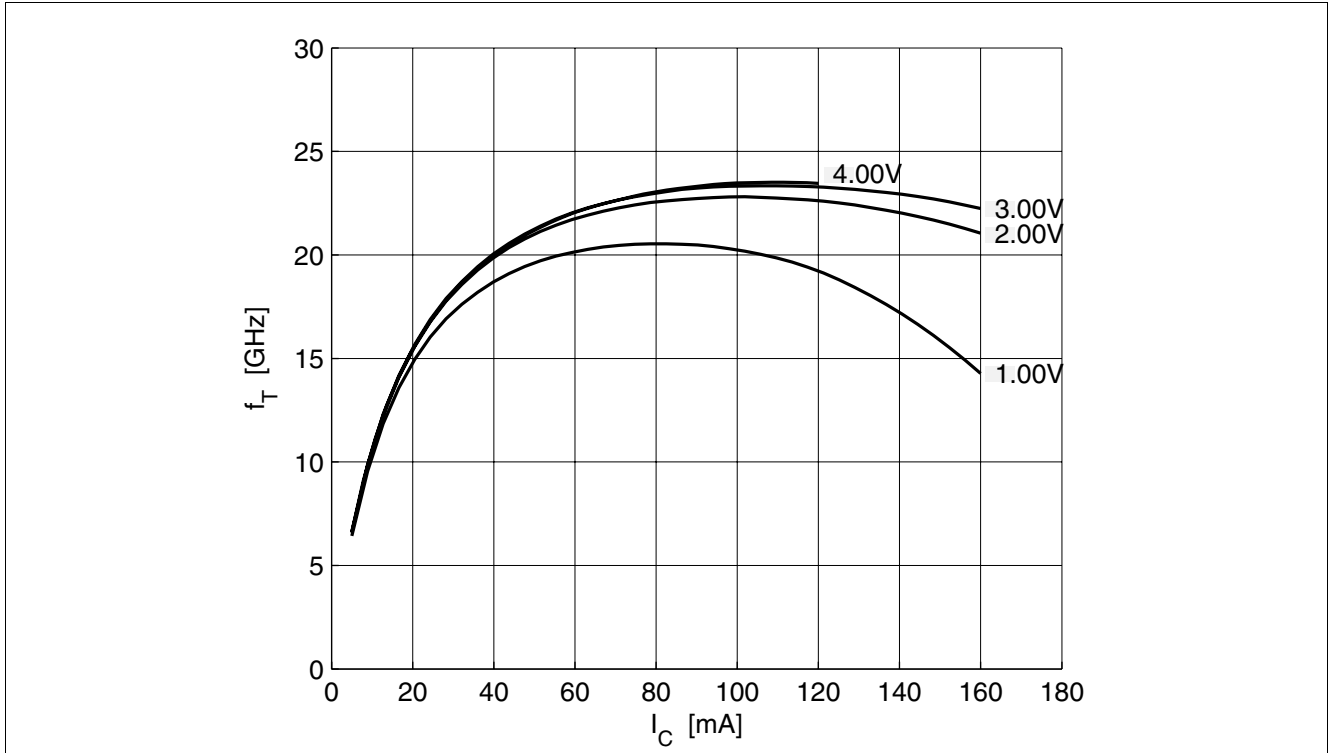


Figure 8 Transition Frequency $f_T = f(I_C)$, $f = 1 \text{ GHz}$, $V_{CE} = \text{Parameter}$

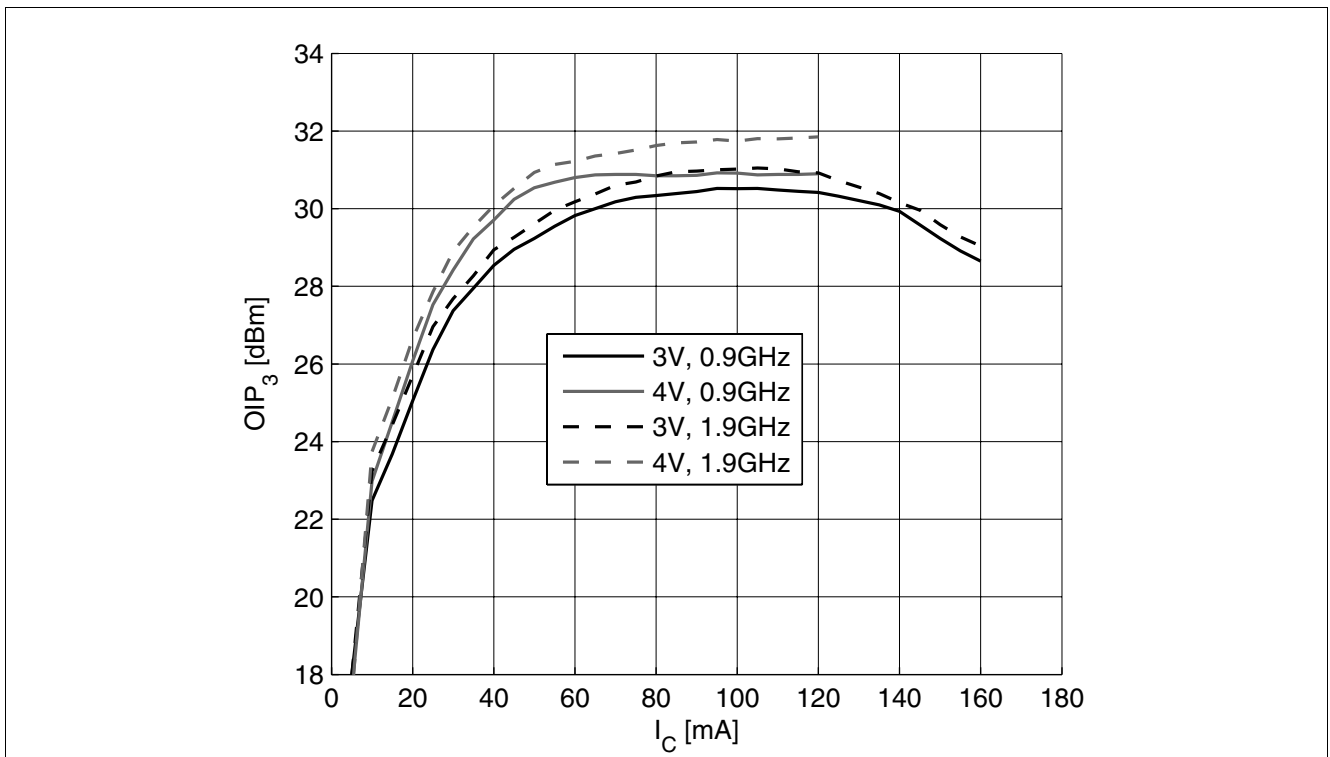


Figure 9 3rd Order Intercept Point $OIP_3 = f(I_C)$, $Z_S = Z_L = 50 \Omega$, $V_{CE}, f = \text{Parameters}$

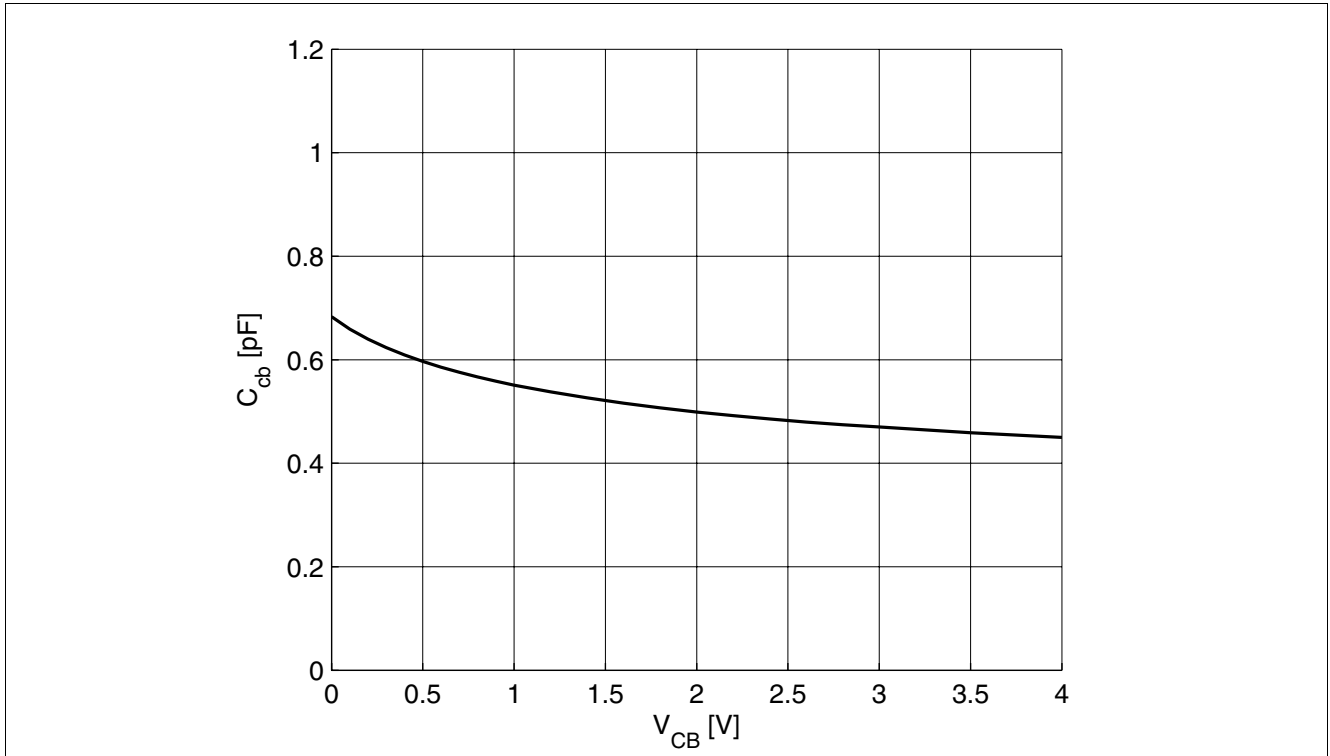


Figure 10 Collector Base Capacitance $C_{CB} = f(V_{CB}), f = 1 \text{ MHz}$

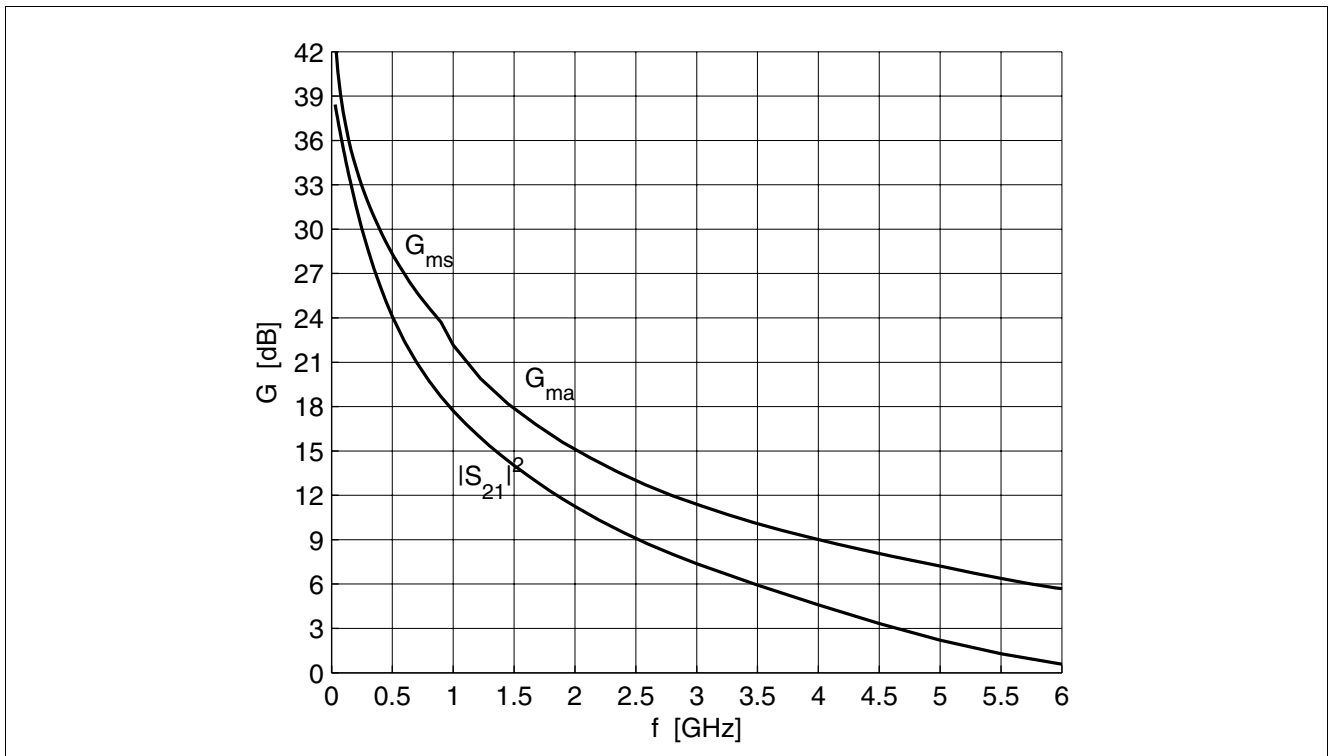


Figure 11 Gain $G_{ma}, G_{ms}, |S_{21}|^2 = f(f), V_{CE} = 3 \text{ V}, I_C = 90 \text{ mA}$

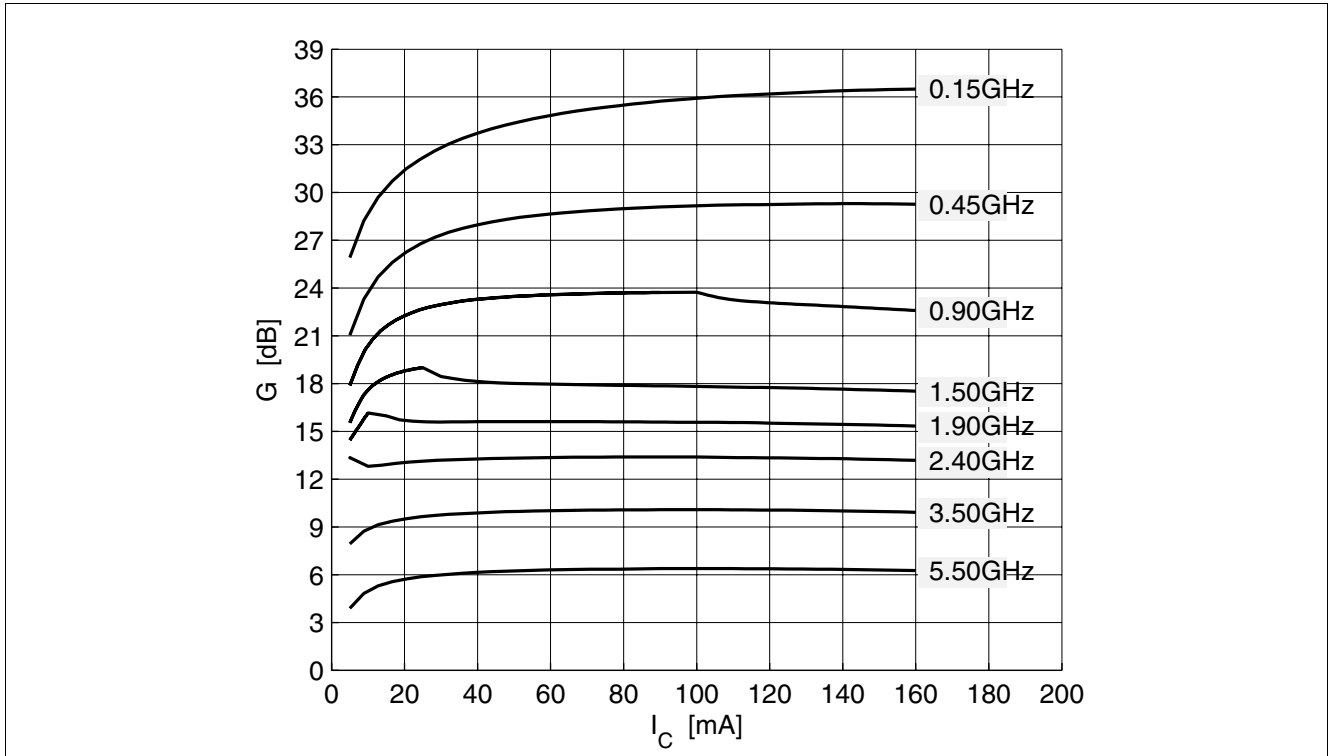


Figure 12 Maximum Power Gain $G_{\max} = f(I_C)$, $V_{CE} = 3\text{ V}$, $f = \text{Parameter in GHz}$

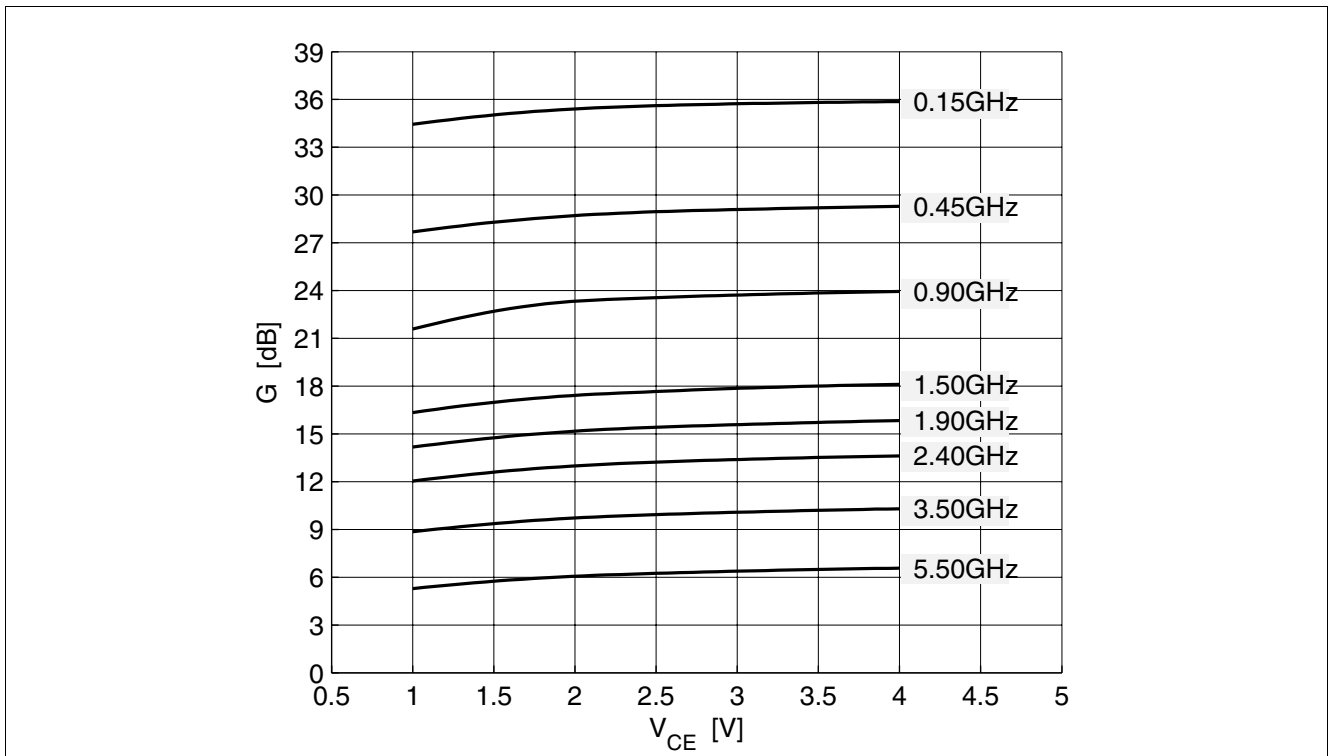


Figure 13 Maximum Power Gain $G_{\max} = f(V_{CE})$, $I_C = 90\text{ mA}$, $f = \text{Parameter in GHz}$

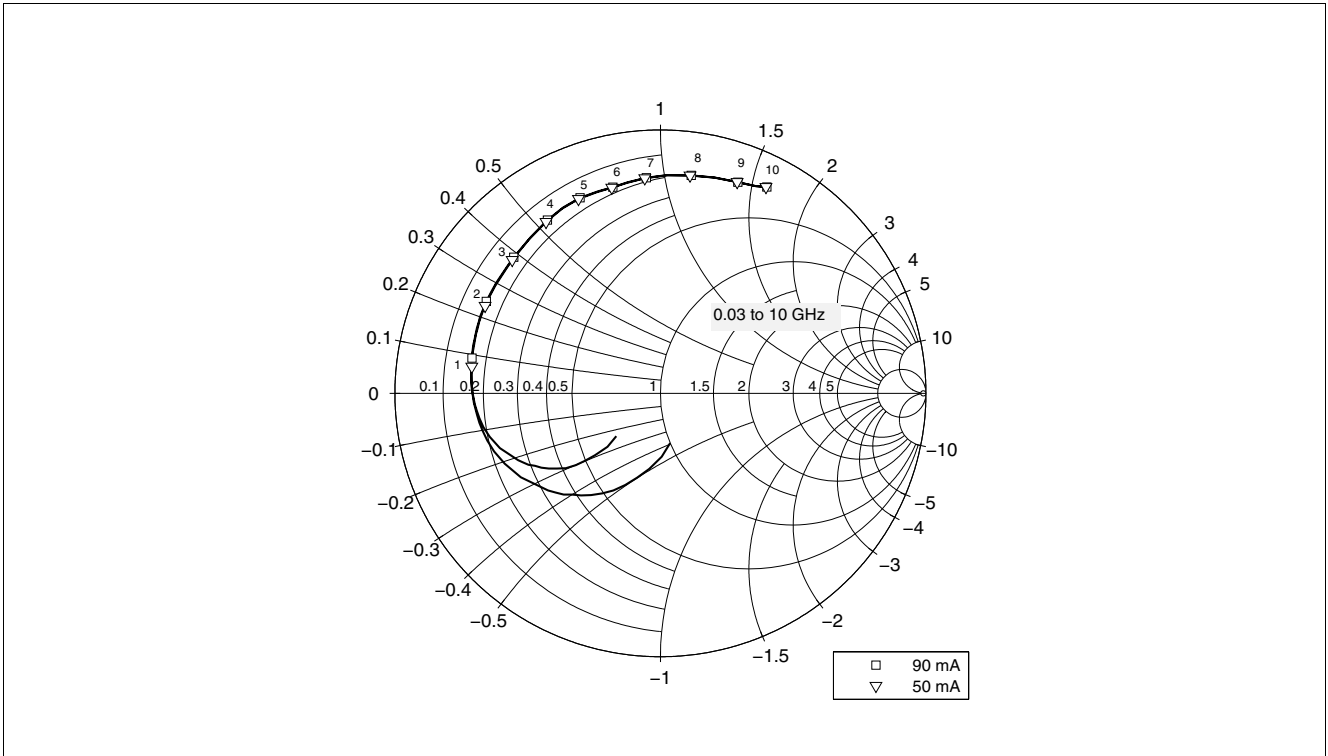


Figure 14 Input Matching $S_{11} = f(f)$, $V_{CE} = 3\text{ V}$, $I_C = 50 / 90\text{ mA}$

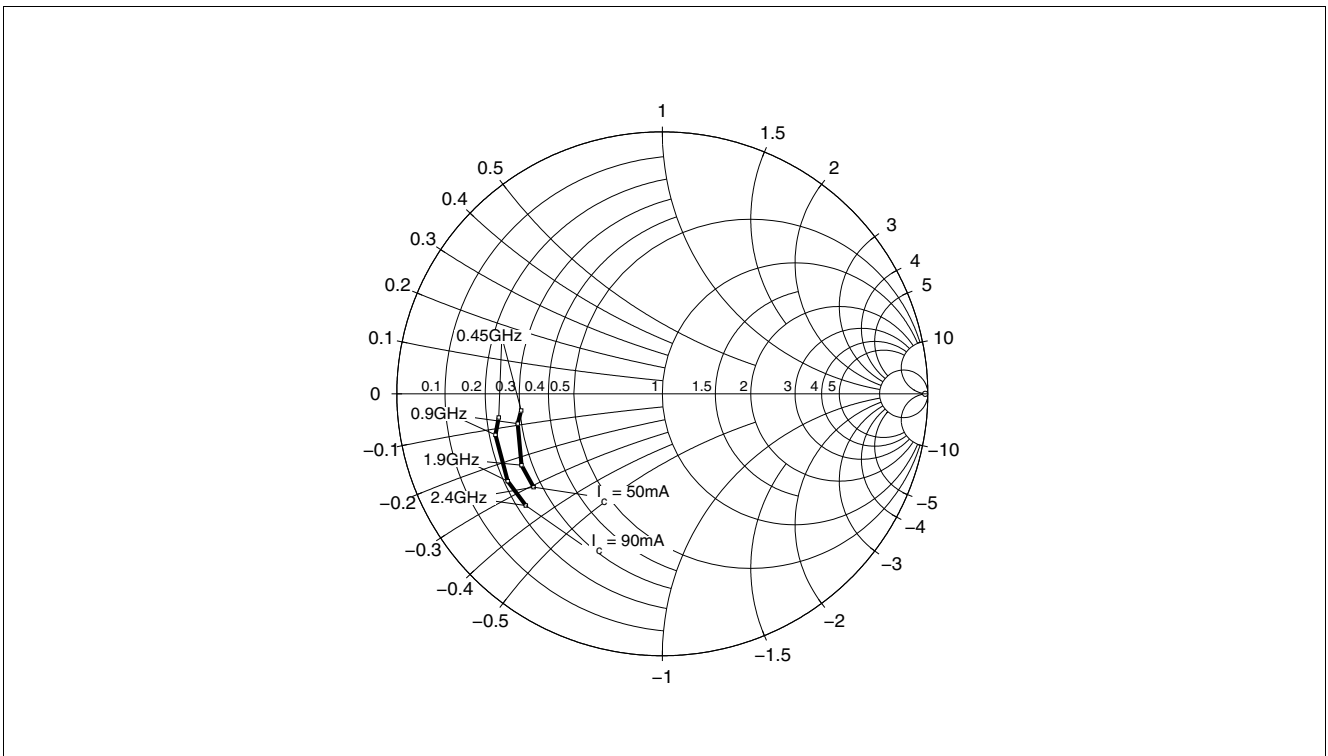


Figure 15 Source Impedance for Minimum Noise Figure $Z_{opt} = f(f)$, $V_{CE} = 3\text{ V}$, $I_C = 50 / 90\text{ mA}$

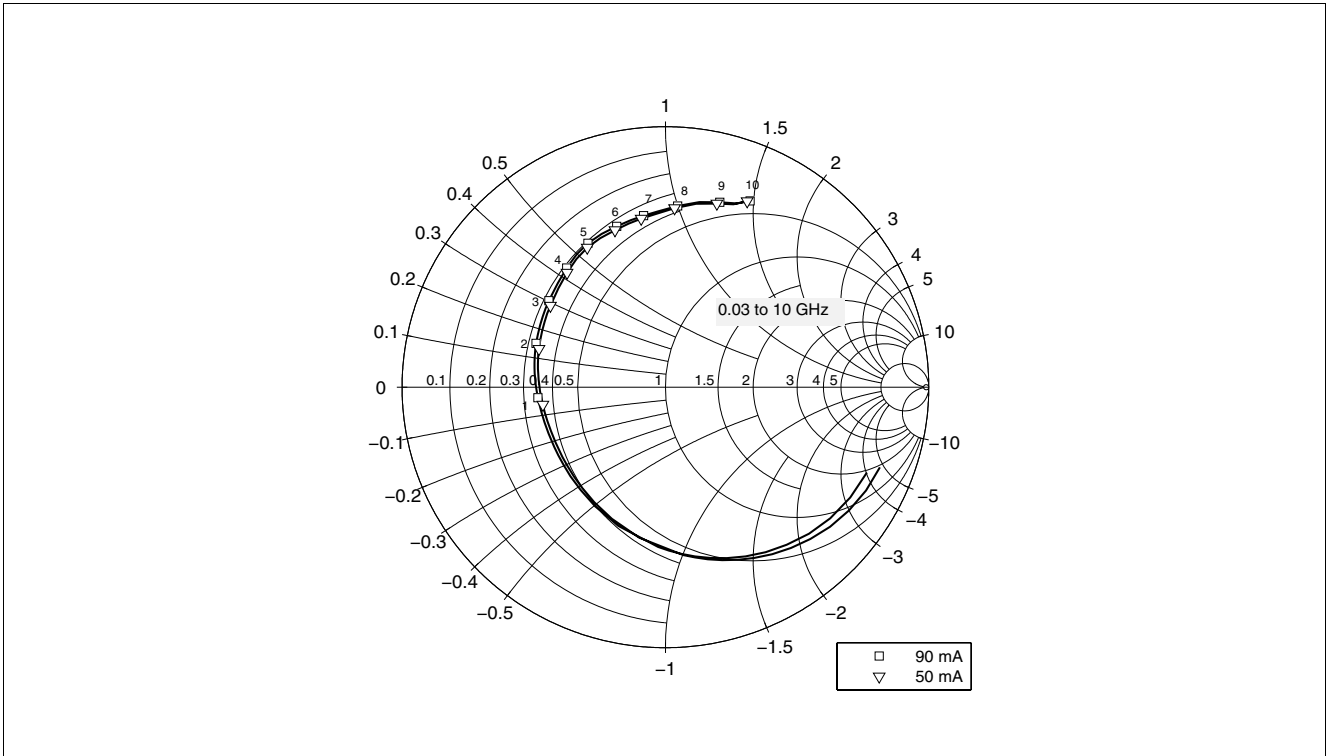


Figure 16 Output Matching $S_{22} = f(f)$, $V_{CE} = 3\text{ V}$, $I_C = 50 / 90\text{ mA}$

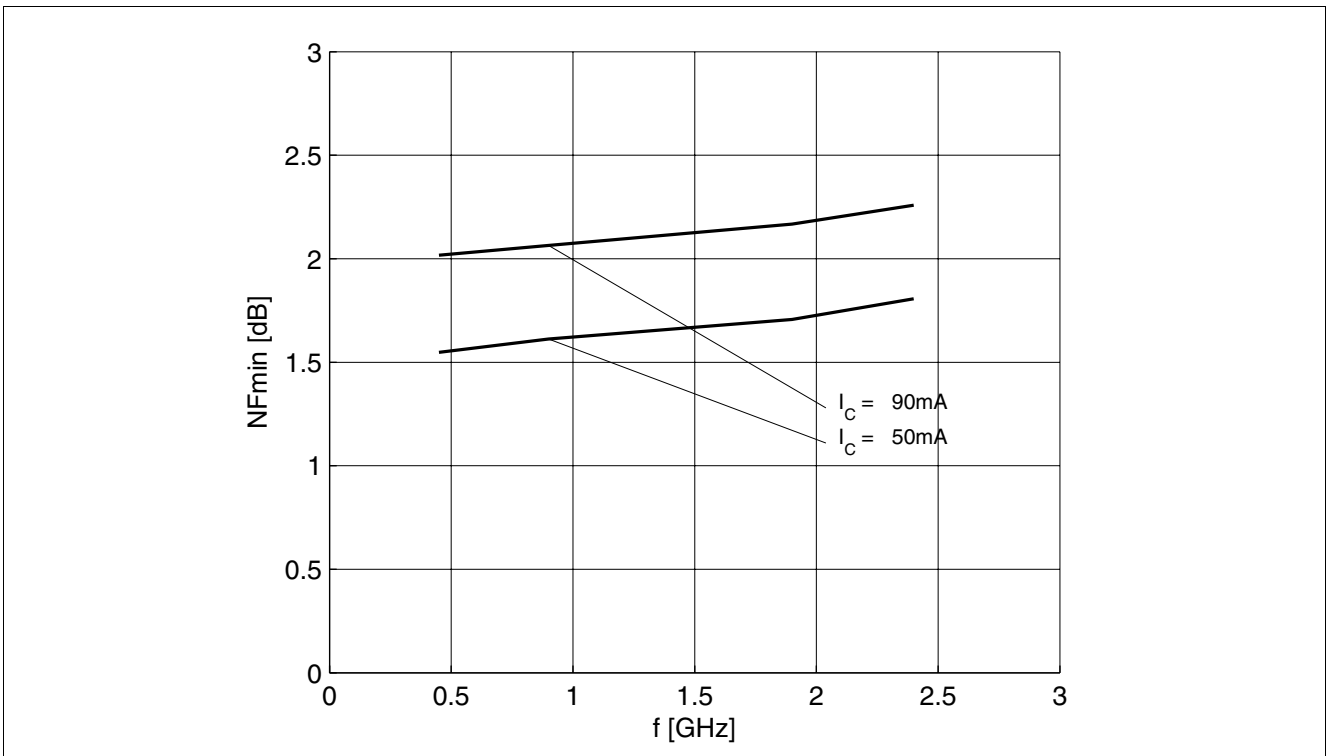


Figure 17 Noise Figure $NF_{min} = f(f)$, $V_{CE} = 3\text{ V}$, $I_C = 50 / 90\text{ mA}$, $Z_S = Z_{opt}$

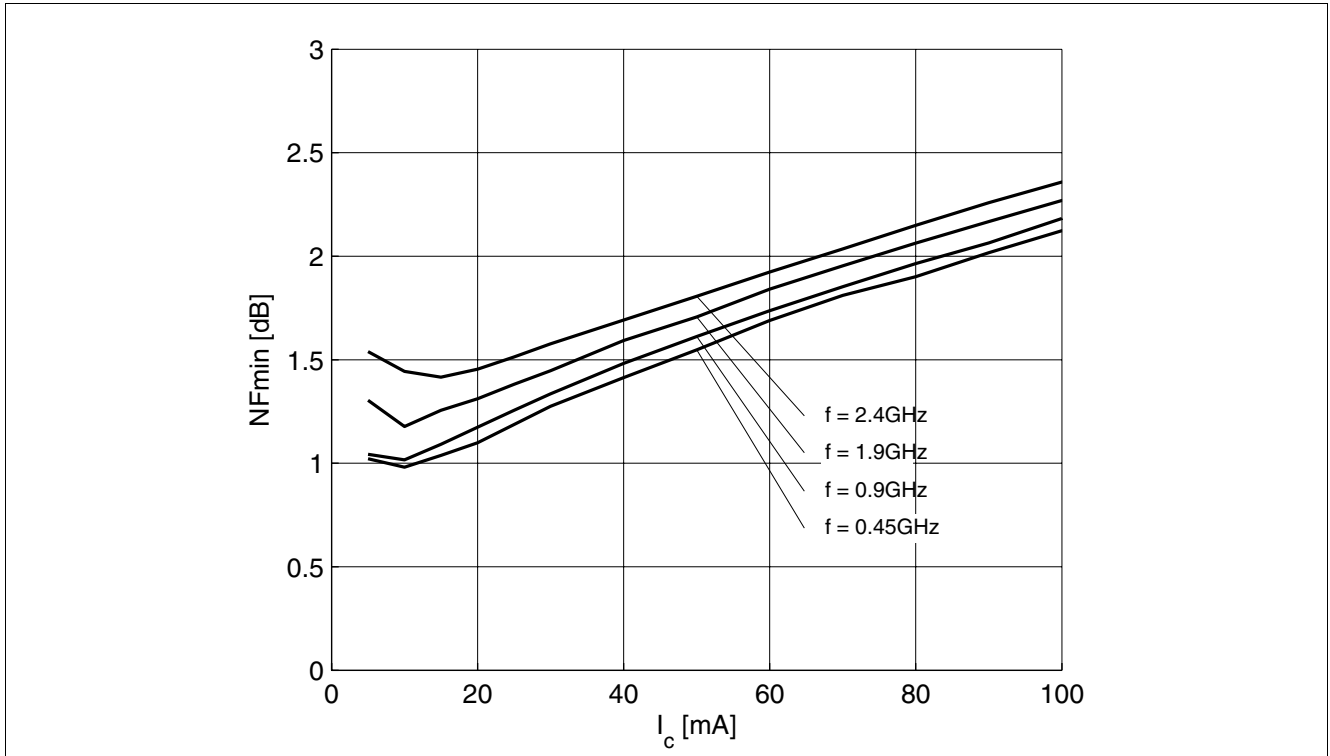


Figure 18 Noise Figure $NF_{min} = f(I_C)$, $V_{CE} = 3\text{ V}$, $Z_S = Z_{opt}$, $f = \text{Parameter in GHz}$

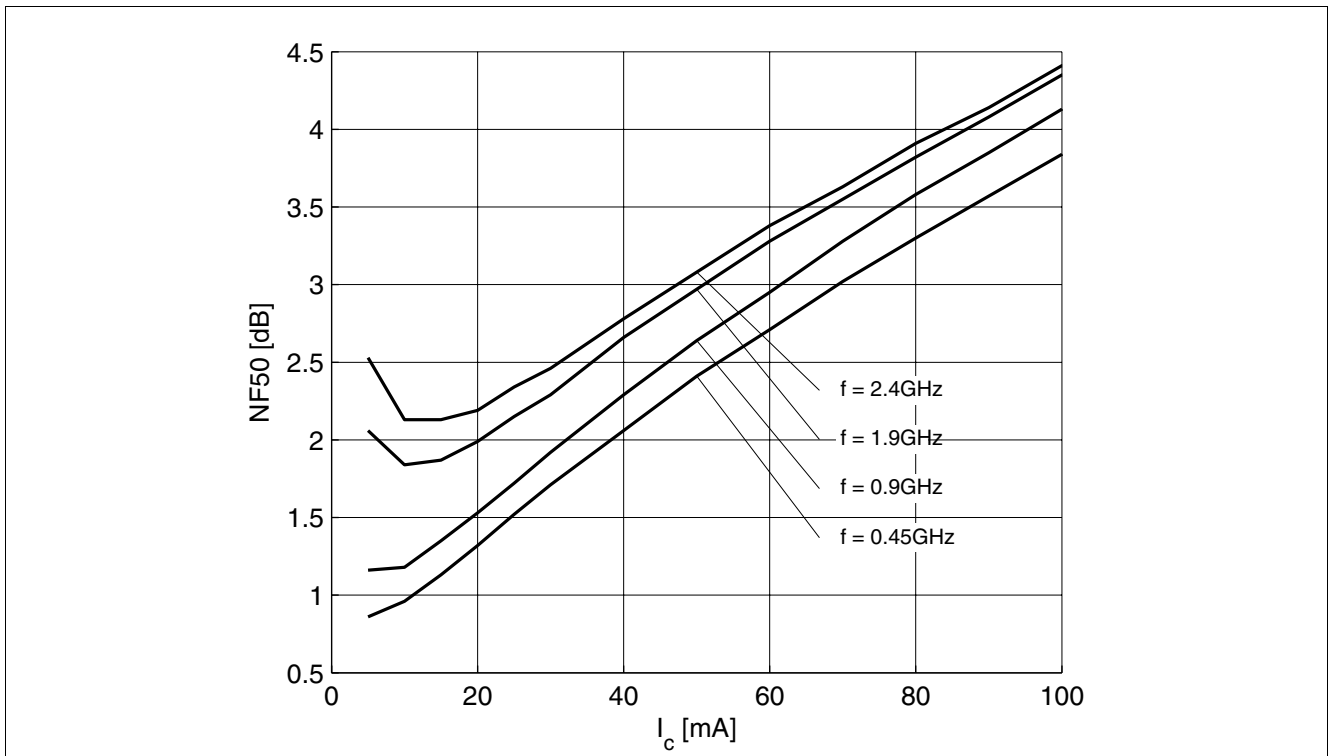


Figure 19 Noise Figure $NF_{50} = f(I_C)$, $V_{CE} = 3\text{ V}$, $Z_S = 50\ \Omega$, $f = \text{Parameter in GHz}$

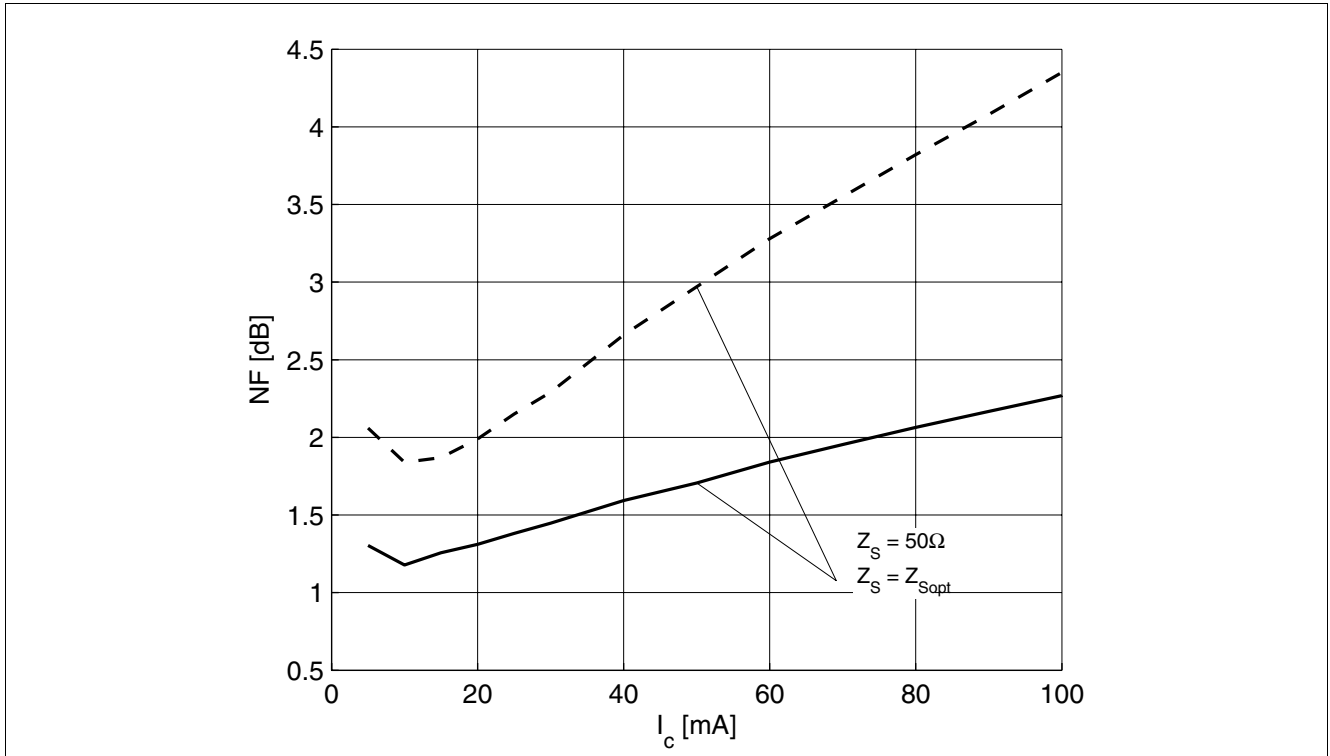


Figure 20 Comparison Noise Figure $NF_{50} / NF_{min} = f(I_C)$, $V_{CE} = 3\text{ V}$, $f = 1.9\text{ GHz}$

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

5 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: www.infineon.com/rf.models. Please consult our website and download the latest versions before actually starting your design.

You find the BFP450 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 10 GHz using typical devices. The BFP450 SPICE GP model reflects the typical DC- and RF-performance within the limitations which are given by the SPICE GP model itself.

6 Package Information SOT343

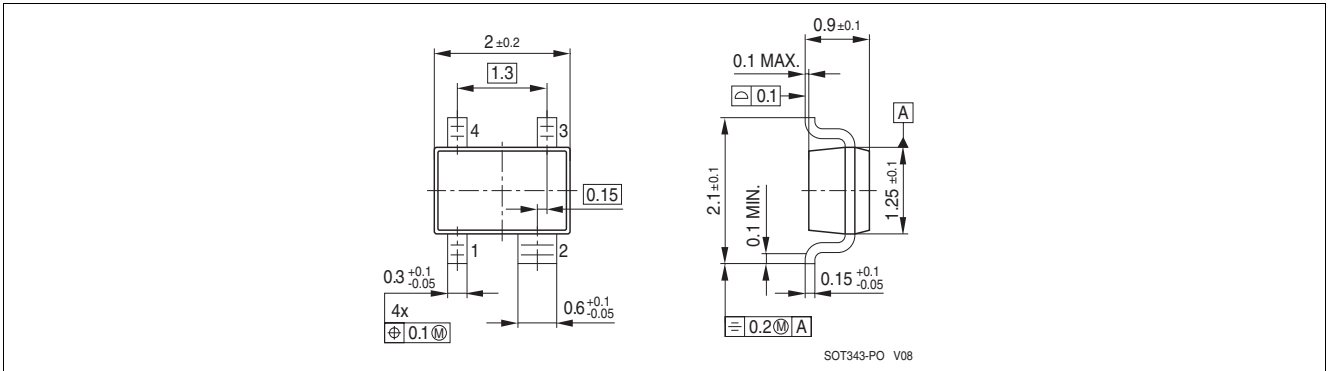


Figure 21 Package Outline

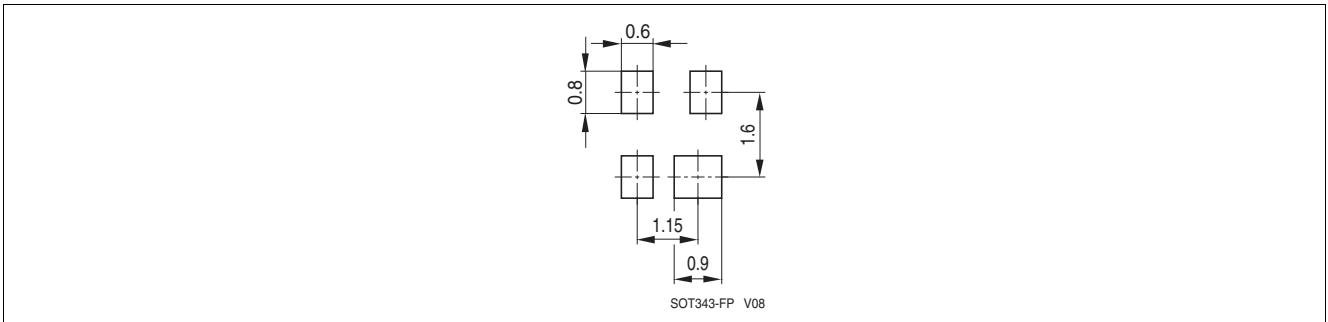


Figure 22 Package Foot Print

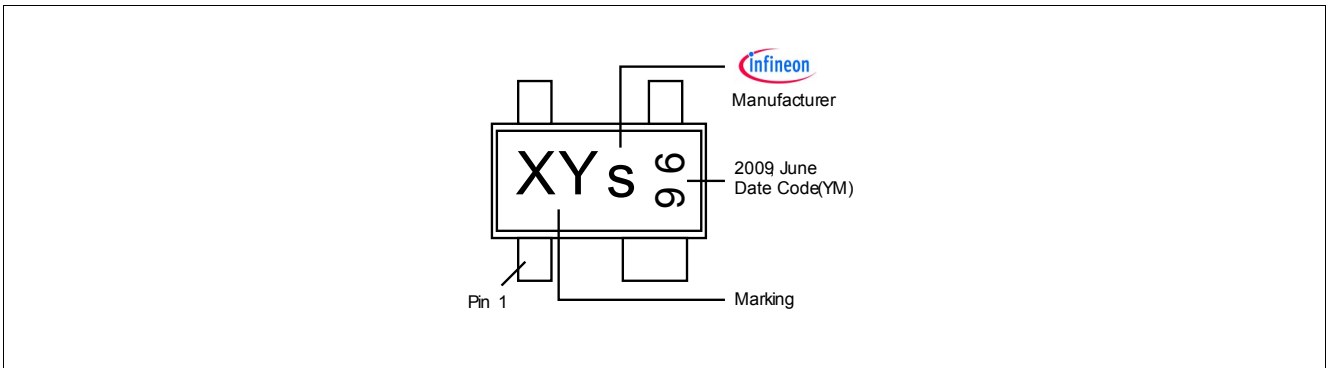


Figure 23 Marking Description (Marking BFP450: ANs)

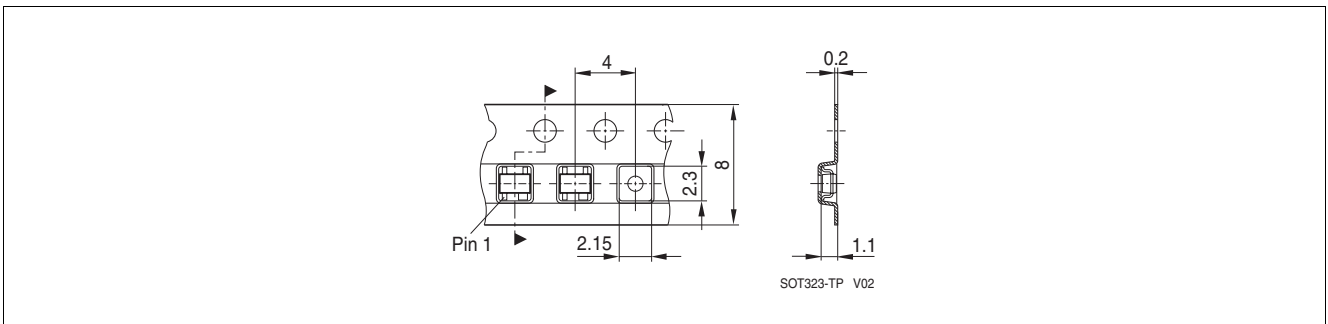


Figure 24 Tape Dimensions

www.infineon.com

Published by Infineon Technologies AG



Стандарт Электрон Связь

Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

Благодаря сотрудничеству с мировыми поставщиками мы осуществляем комплексные и плановые поставки широчайшего спектра электронных компонентов.

Собственная эффективная логистика и склад в обеспечивает надежную поставку продукции в точно указанные сроки по всей России.

Мы осуществляем техническую поддержку нашим клиентам и предпродажную проверку качества продукции. На все поставляемые продукты мы предоставляем гарантию .

Осуществляем поставки продукции под контролем ВП МО РФ на предприятия военно-промышленного комплекса России , а также работаем в рамках 275 ФЗ с открытием отдельных счетов в уполномоченном банке. Система менеджмента качества компании соответствует требованиям ГОСТ ISO 9001.

Минимальные сроки поставки, гибкие цены, неограниченный ассортимент и индивидуальный подход к клиентам являются основой для выстраивания долгосрочного и эффективного сотрудничества с предприятиями радиоэлектронной промышленности, предприятиями ВПК и научно-исследовательскими институтами России.

С нами вы становитесь еще успешнее!

Наши контакты:

Телефон: +7 812 627 14 35

Электронная почта: sales@st-electron.ru

Адрес: 198099, Санкт-Петербург,
Промышленная ул, дом № 19, литера Н,
помещение 100-Н Офис 331