# BGU8019

## SiGe:C Low Noise Amplifier MMIC for GPS, GLONASS, Galileo, and Compass

Rev. 5 — 21 May 2021 Product data sheet

# 1 Product profile

## 1.1 General description

The BGU8019 is, also known as the GPS1202M, a Low Noise Amplifier (LNA) for GNSS receiver applications, available in a small plastic 6-pin extremely thin leadless package. The BGU8019 requires one external matching inductor.

The BGU8019 adapts itself to the changing environment resulting from co-habitation of different radio systems in modern cellular handsets. It has been designed for low power consumption and optimal performance when jamming signals from co-existing cellular transmitters are present. At low jamming power levels it delivers 18.5 dB gain at a noise figure of 0.55 dB. During high jamming power levels, resulting for example from a cellular transmit burst, it temporarily increases its bias current to improve sensitivity.

## 1.2 Features and benefits

- Cover full GNSS L1 band, from 1559 MHz to 1610 MHz
- Noise figure (NF) = 0.55 dB
- Gain = 18.5 dB
- High input 1 dB compression point of -7 dBm
- High out of band $IP3_i$ of 6 dBm
- Supply voltage 1.5 V to 3.1 V
- Self-shielding package concept
- Integrated supply decoupling capacitor
- Optimized performance at a supply current of 4.6 mA
- Power-down mode current consumption < 1 µA
- Integrated temperature stabilized bias for easy design
- Require only one input matching inductor
- Input and output DC decoupled
- ESD protection on all pins (HBM > 2 kV)
- Integrated matching for the output
- Available in 6-pins leadless package 1.1 mm × 0.7 mm × 0.37 mm; 0.4 mm pitch: SOT1232
- 180 GHz transit frequency - SiGe:C technology
- Moisture sensitivity level of 1

## 1.3 Applications

LNA for GPS, GLONASS, Galileo, and Compass (BeiDou) in:

- smart phones
- feature phones,
- tablet PCs
- digital still cameras
- digital video cameras
- RF front-end modules
- complete GNSS modules
- personal health applications

## 1.4 Quick reference data

**Table 1. Quick reference data**

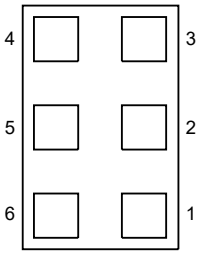
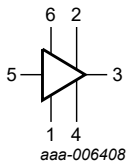
*$f$ = 1575 MHz; $V_{CC}$ = 2.85 V; $V_{I(ENABLE)} \geq$ 0.8 V; $P_i$ < -40 dBm; $T_{amb}$ = 25 °C; input matched to 50 Ω using a 6.8 nH inductor, see Figure 1; unless otherwise specified.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{CC}$ | supply voltage | | 1.5 | - | 3.1 | V |
| $I_{CC}$ | supply current | | - | 4.6 | 6.6 | mA |
| $G_p$ | power gain | no jammer | 16.5 | 18.5 | 20.5 | dB |
| NF | noise figure | $P_i$ = -40 dBm, no jammer [1] | - | 0.55 | 1.1 | dB |
| $P_{i(1dB)}$ | input power at 1 dB gain compression | | -11 | -7 | - | dBm |
| $IP3_i$ | input third-order intercept point | [2] | 0 | 6 | - | dBm |
| | | [3] | 0 | 6 | - | dBm |

[1] PCB losses are subtracted.
[2] $f_1$ = 1713 MHz; $f_2$ = 1851 MHz; $P_i$ = -20 dBm per carrier
[3] $f_1$ = 1713 MHz, $P_i$ = -20 dBm; $f_2$ = 1850 MHz, $P_i$ = -65 dBm

## 2 Pinning information

**Table 2. Pinning**

| Pin | Description | Simplified outline | Graphic symbol |
|---|---|---|---|
| 1 | GND |   Transparent top view |   |
| 2 | $V_{CC}$ | | |
| 3 | RF_OUT | | |
| 4 | GND_RF | | |
| 5 | RF_IN | | |
| 6 | ENABLE | | |

## 3 Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| BGU8019 | XSON6 | plastic extremely thin small outline package; no leads; 6 terminals; body 1.1 × 0.7 × 0.37 mm | SOT1232 |
| OM7848 | EVB | BGU8019 evaluation board, MMIC only | - |
| OM7849 | EVB | BGU8019 evaluation board, front-end EVB | - |

## 4 Marking code

**Table 4. Marking code**

| Type number | Marking code | Date code |
|---|---|---|
| BGU8019 | A | YWW |

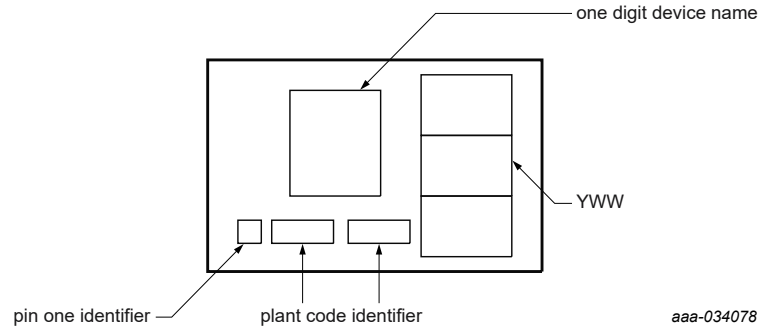



**Figure 1. Marking diagram**

# 5 Limiting values

**Table 5. Limiting values**

*In accordance with the Absolute Maximum Rating System (IEC 60134).*

*Absolute Maximum Ratings are given as Limiting Values of stress conditions during operation, that must not be exceeded under the worst probable conditions.*

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{CC}$ | supply voltage | RF input AC coupled | [1] | -0.5 | 5 | V |
| $V_{I(ENABLE)}$ | input voltage on pin ENABLE | $V_{I(ENABLE)} < V_{CC} + 0.6$ V | [1][2] | -0.5 | 5 | V |
| $V_{I(RF\_IN)}$ | input voltage on pin RF_IN | DC, $V_{I(RF\_IN)} < V_{CC} + 0.6$ V | [1][2][3] | -0.5 | 5 | V |
| $V_{I(RF\_OUT)}$ | input voltage on pin RF_OUT | DC, $V_{I(RF\_OUT)} < V_{CC} + 0.6$ V | [1][2][3] | -0.5 | 5 | V |
| $P_i$ | input power | | [1] | - | 10 | dBm |
| $P_{tot}$ | total power dissipation | $T_{sp} \leq 130$ °C | | - | 55 | mW |
| $T_{stg}$ | storage temperature | | | -65 | 150 | °C |
| $T_j$ | junction temperature | | | - | 150 | °C |
| $V_{ESD}$ | electrostatic discharge voltage | Human Body Model (HBM) According to ANSI/ESDA/JEDEC standard JS-001 | | - | ±2 | kV |
| | | Charged Device Model (CDM) According to JEDEC standard JESD22-C101C | | - | ±1 | kV |

[1] Stressed with pulses of 200 ms in duration, with application circuit as in Figure 1.

[2] Warning: due to internal ESD diode protection, the applied DC voltage shall not exceed $V_{CC}$ + 0.6 V and shall not exceed 5.0 V in order to avoid excess current.

[3] The RF input and RF output are AC coupled through internal DC blocking capacitors.

# 6 Recommended operating conditions

**Table 6. Operating conditions**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{CC}$ | supply voltage | | | 1.5 | - | 3.1 | V |
| $T_{amb}$ | ambient temperature | | | -40 | 25 | 85 | °C |
| $V_{I(ENABLE)}$ | input voltage on pin ENABLE | OFF state | | - | - | 0.3 | V |
| | | ON state | | 0.8 | - | - | V |

# 7 Thermal characteristics

**Table 7. Thermal characteristics**

| Symbol | Parameter | Conditions | | Typ | Unit |
|---|---|---|---|---|---|
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | | 225 | K/W |

# 8 Characteristics

**Table 8. Characteristics at $V_{CC}$ = 1.8 V**

*f = 1575 MHz; $V_{CC}$ = 1.8 V; $V_{I(ENABLE)}$ ≥ 0.8 V; $P_i$ < -40 dBm; $T_{amb}$ = 25 °C; input matched to 50 Ω using a 6.8 nH inductor, see Figure 1; unless otherwise specified.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $I_{CC}$ | supply current | $V_{I(ENABLE)}$ ≥ 0.8 V | | | | |
| | | $P_i$ < -40 dBm | - | 4.4 | 6.4 | mA |
| | | $P_i$ = -20 dBm | - | 9 | - | mA |
| | | $V_{I(ENABLE)}$ ≤ 0.3 V | - | - | 1 | µA |
| $G_p$ | power gain | no jammer | 16 | 18 | 20 | dB |
| | | $P_{jam}$ = -20 dBm; $f_{jam}$ = 850 MHz | - | 20 | - | dB |
| | | $P_{jam}$ = -20 dBm; $f_{jam}$ = 1850 MHz | - | 20 | - | dB |
| $RL_{in}$ | input return loss | $P_i$ < -40 dBm | 9 | 12 | - | dB |
| | | $P_i$ = -20 dBm | - | 20 | - | dB |
| $RL_{out}$ | output return loss | $P_i$ < -40 dBm | 8 | 13 | - | dB |
| | | $P_i$ = -20 dBm | - | 12 | - | dB |
| ISL | isolation | | 27 | 30 | - | dB |
| NF | noise figure | $P_i$ = -40 dBm, no jammer [1] | - | 0.55 | 1.1 | dB |
| | | $P_i$ = -40 dBm, no jammer [2] | - | 0.60 | 1.15 | dB |
| | | $P_{jam}$ = -20 dBm; $f_{jam}$ = 850 MHz [2] | - | 0.9 | - | dB |
| | | $P_{jam}$ = -20 dBm; $f_{jam}$ = 1850 MHz [2] | - | 1.3 | - | dB |
| $P_{i(1dB)}$ | input power at 1 dB gain compression | | -13 | -10 | - | dBm |
| $IP3_i$ | input third-order intercept point | [3] | -3 | 3 | - | dBm |
| | | [4] | -3 | 3 | - | dBm |
| IMD3 | third-order intermodulation distortion | measured at output pin [3] | - | -47 | - | dBm |
| | | measured at output pin [4] | - | -89 | - | dBm |
| $t_{on}$ | turn-on time | time from $V_{I(ENABLE)}$ ON, to 90 % of the gain | - | - | 2 | µs |
| $t_{off}$ | turn-off time | time from $V_{I(ENABLE)}$ OFF, to 10 % of the gain | - | - | 1 | µs |

[1] PCB losses are subtracted
[2] Including PCB losses
[3] $f_1$ = 1713 MHz; $f_2$ = 1851 MHz; $P_i$ = -20 dBm per carrier
[4] $f_1$ = 1713 MHz, $P_i$ = -20 dBm; $f_2$ = 1850 MHz, $P_i$ = -65 dBm

**Table 9. Characteristics at $V_{CC}$ = 2.85 V**

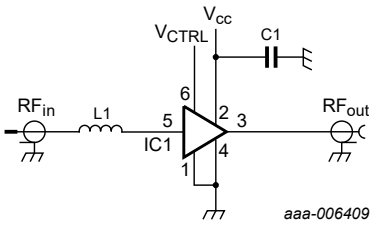
*f = 1575 MHz; $V_{CC}$ = 2.85 V; $V_{I(ENABLE)}$ ≥ 0.8 V; $P_i$ < -40 dBm; $T_{amb}$ = 25 °C; input matched to 50 Ω using a 6.8 nH inductor, see Figure 1; unless otherwise specified.*

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $I_{CC}$ | supply current | $V_{I(ENABLE)}$ ≥ 0.8 V | | | | | |
| | | $P_i$ < -40 dBm | | - | 4.6 | 6.6 | mA |
| | | $P_i$ = -20 dBm | | - | 10 | - | mA |
| | | $V_{I(ENABLE)}$ ≤ 0.3 V | | - | - | 1 | µA |
| $G_p$ | power gain | no jammer | | 16.5 | 18.5 | 20.5 | dB |
| | | $P_{jam}$ = -20 dBm; $f_{jam}$ = 850 MHz | | - | 20.0 | - | dB |
| | | $P_{jam}$ = -20 dBm; $f_{jam}$ = 1850 MHz | | - | 20.5 | - | dB |
| $RL_{in}$ | input return loss | $P_i$ < -40 dBm | | 8 | 13 | - | dB |
| | | $P_i$ = -20 dBm | | - | 22 | - | dB |
| $RL_{out}$ | output return loss | $P_i$ < -40 dBm | | 8 | 13 | - | dB |
| | | $P_i$ = -20 dBm | | - | 12 | - | dB |
| ISL | isolation | | | 27 | 30 | - | dB |
| NF | noise figure | $P_i$ = -40 dBm, no jammer | [1] | - | 0.55 | 1.1 | dB |
| | | $P_i$ = -40 dBm, no jammer | [2] | - | 0.60 | 1.15 | dB |
| | | $P_{jam}$ = -20 dBm; $f_{jam}$ = 850 MHz | [2] | - | 0.9 | - | dB |
| | | $P_{jam}$ = -20 dBm; $f_{jam}$ = 1850 MHz | [2] | - | 1.3 | - | dB |
| $P_{i(1dB)}$ | input power at 1 dB gain compression | | | -11 | -7 | - | dBm |
| $IP3_i$ | input third-order intercept point | | [3] | 0 | 6 | - | dBm |
| | | | [4] | 0 | 6 | - | dBm |
| IMD3 | third-order intermodulation distortion | measured at output pin | [3] | - | -53 | - | dBm |
| | | measured at output pin | [4] | - | -96 | - | dBm |
| $t_{on}$ | turn-on time | time from $V_{I(ENABLE)}$ ON, to 90 % of the gain | | - | - | 2 | µs |
| $t_{off}$ | turn-off time | time from $V_{I(ENABLE)}$ OFF, to 10 % of the gain | | - | - | 1 | µs |

[1] PCB losses are subtracted
[2] Including PCB losses
[3] $f_1$ = 1713 MHz; $f_2$ = 1851 MHz; $P_i$ = -20 dBm per carrier
[4] $f_1$ = 1713 MHz, $P_i$ = -20 dBm; $f_2$ = 1850 MHz, $P_i$ = -65 dBm

# 9 Application information

## 9.1 GNSS application




For a list of components see Table 10.

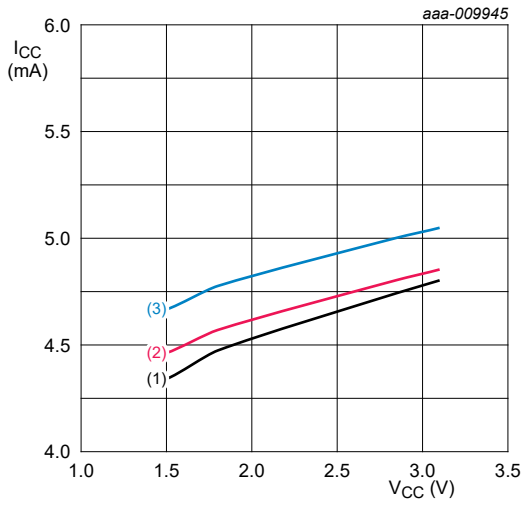
**Figure 2. Schematics GNSS evaluation board**

**Table 10. List of components**

*For schematics see Figure 1.*

| Component | Description | Value | | Remarks |
|---|---|---|---|---|
| C1 | decoupling capacitor | 1 nF | | to suppress power supply noise |
| IC1 | BGU8019 | - | | NXP |
| L1 | high-quality matching inductor | 6.8 nH | | Murata LQW15A |

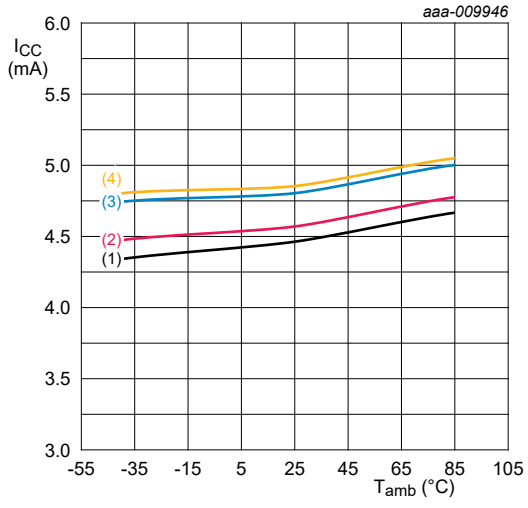
## 9.2 Graphs




$P_i$ = -45 dBm.

1. $T_{amb}$ = -40 °C
2. $T_{amb}$ = +25 °C
3. $T_{amb}$ = +85 °C

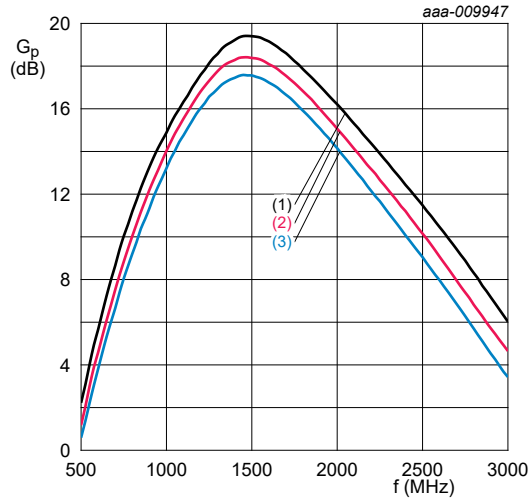
**Figure 3. Supply current as a function of supply voltage; typical values**




$P_i$ = -45 dBm.

1. $V_{CC}$ = 1.5 V
2. $V_{CC}$ = 1.8 V
3. $V_{CC}$ = 2.85 V
4. $V_{CC}$ = 3.1 V

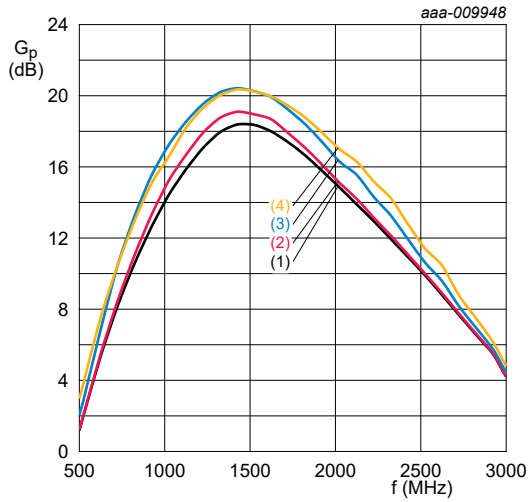
**Figure 4. Supply current as a function of ambient temperature; typical values**




$P_i$ = -45 dBm; $V_{CC}$ = 1.8 V.

1. $T_{amb}$ = -40 °C
2. $T_{amb}$ = +25 °C
3. $T_{amb}$ = +85 °C

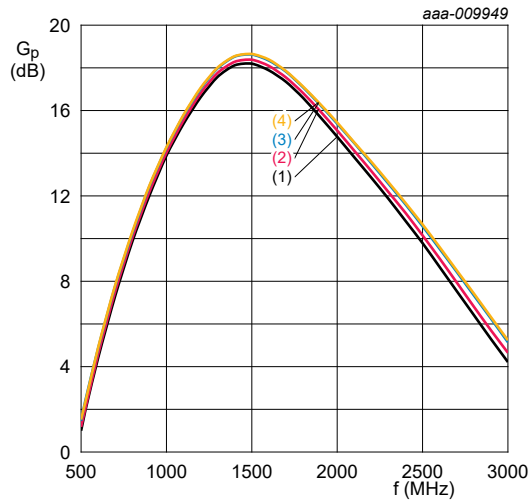
**Figure 5. Power gain as a function of frequency; typical values**




$T_{amb}$ = 25 °C; $V_{CC}$ = 1.8 V.

1. $P_i$ = -45 dBm
2. $P_i$ = -30 dBm
3. $P_i$ = -20 dBm
4. $P_i$ = -15 dBm

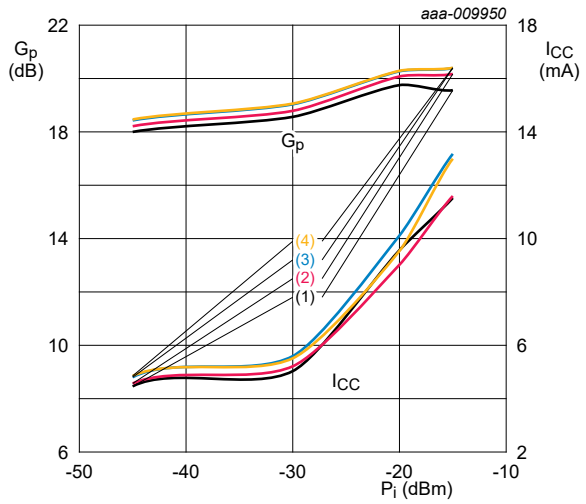
**Figure 6. Power gain as a function of frequency; typical values**




$P_i$ = -45 dBm; $T_{amb}$ = 25 °C.

1. $V_{CC}$ = 1.5 V
2. $V_{CC}$ = 1.8 V
3. $V_{CC}$ = 2.85 V
4. $V_{CC}$ = 3.1 V

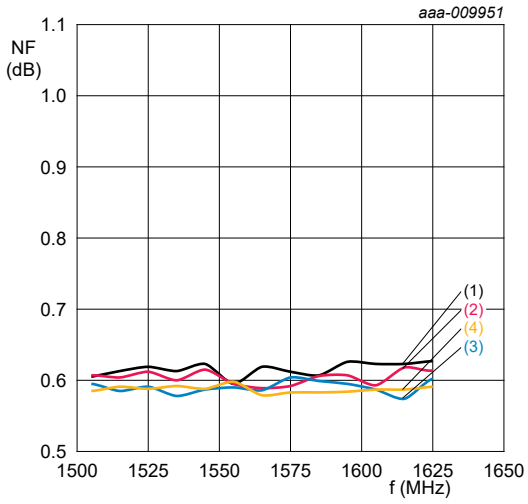
**Figure 7. Power gain as a function of frequency; typical values**




f = 1575 MHz; $T_{amb}$ = 25 °C.

1. $V_{CC}$ = 1.5 V
2. $V_{CC}$ = 1.8 V
3. $V_{CC}$ = 2.85 V
4. $V_{CC}$ = 3.1 V

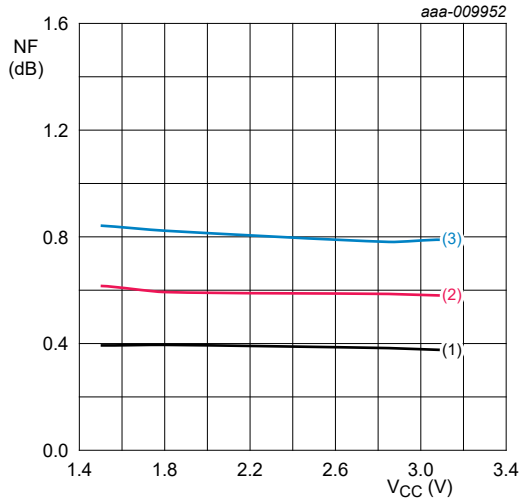
**Figure 8. Power gain and supply current as function of input power; typical values**




$T_{amb}$ = 25 °C; no jammer, including PCB losses.

1. $V_{CC}$ = 1.5 V
2. $V_{CC}$ = 1.8 V
3. $V_{CC}$ = 2.85 V
4. $V_{CC}$ = 3.1 V

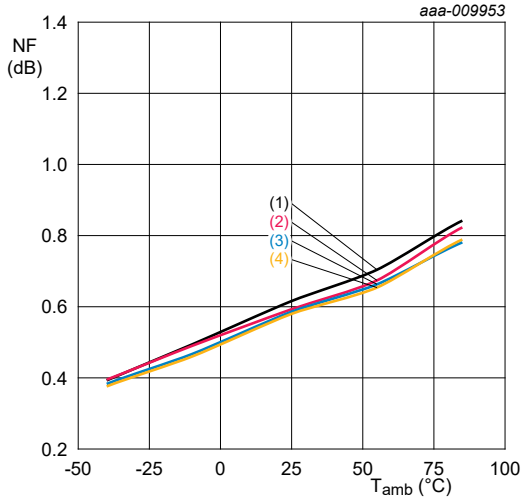
**Figure 9. Noise figure as a function of frequency; typical values**




f = 1575 MHz; no jammer, including PCB losses.

1. $T_{amb}$ = -40 °C
2. $T_{amb}$ = +25 °C
3. $T_{amb}$ = +85 °C

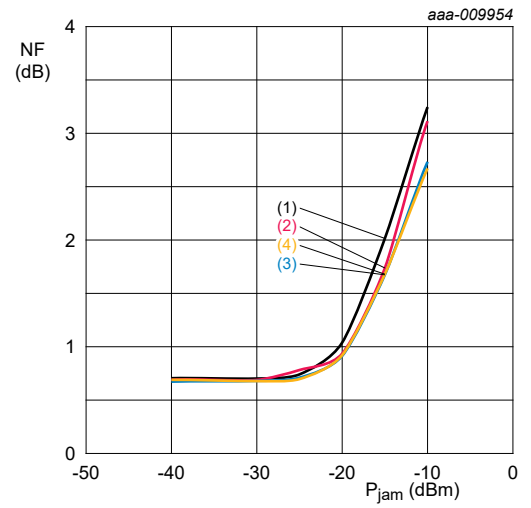
**Figure 10. Noise figure as a function of supply voltage; typical values**




f = 1575 MHz; no jammer, including PCB losses.

1. $V_{CC}$ = 1.5 V
2. $V_{CC}$ = 1.8 V
3. $V_{CC}$ = 2.85 V
4. $V_{CC}$ = 3.1 V

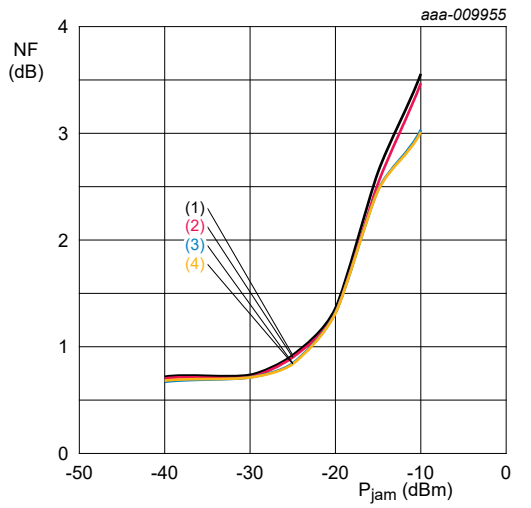
**Figure 11. Noise figure as a function of ambient temperature; typical values**




$f_{jam}$ = 850 MHz; $T_{amb}$ = 25 °C; f = 1575 MHz; including PCB losses.

1. $V_{CC}$ = 1.5 V
2. $V_{CC}$ = 1.8 V
3. $V_{CC}$ = 2.85 V
4. $V_{CC}$ = 3.1 V

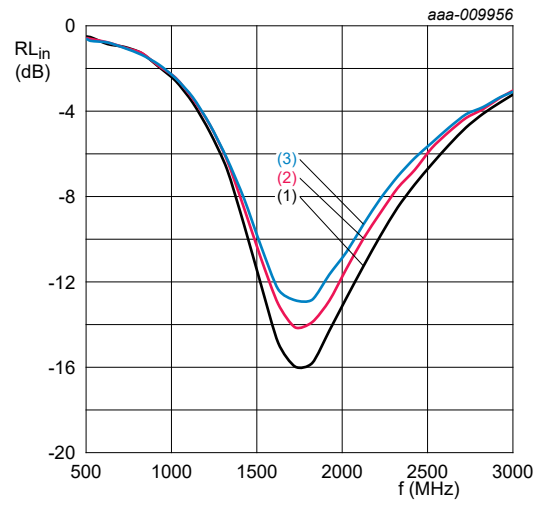
**Figure 12. Noise figure as a function of jamming power; typical values**




$f_{jam}$ = 1850 MHz; $T_{amb}$ = 25 °C; f = 1575 MHz; including PCB losses.

1. $V_{CC}$ = 1.5 V
2. $V_{CC}$ = 1.8 V
3. $V_{CC}$ = 2.85 V
4. $V_{CC}$ = 3.1 V

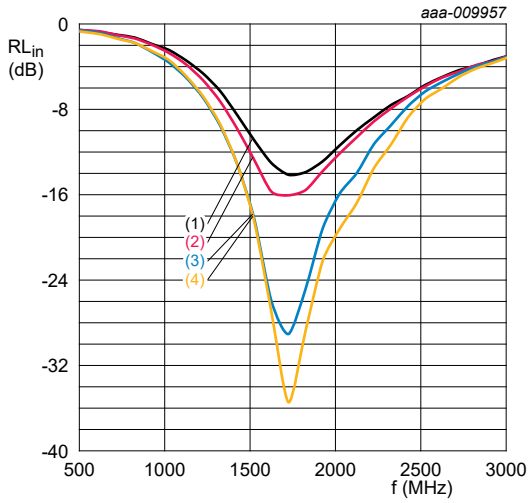
**Figure 13. Noise figure as a function of jamming power; typical values**




$P_i$ = -45 dBm; $V_{CC}$ = 1.8 V.

1. $T_{amb}$ = -40 °C
2. $T_{amb}$ = +25 °C
3. $T_{amb}$ = +85 °C

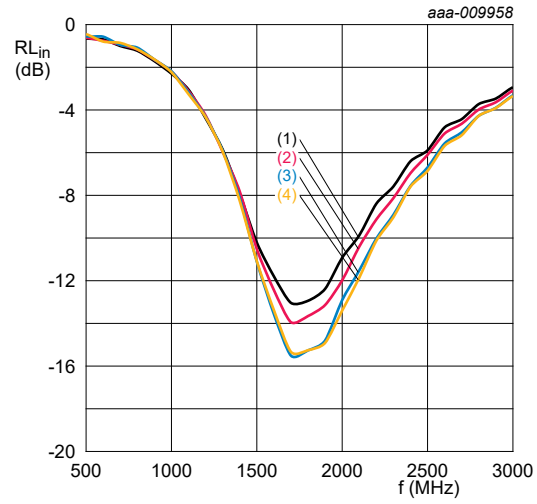
**Figure 14. Input return loss as a function of frequency; typical values**




$T_{amb}$ = 25 °C; $V_{CC}$ = 1.8 V.

1. $P_i$ = -45 dBm
2. $P_i$ = -30 dBm
3. $P_i$ = -20 dBm
4. $P_i$ = -15 dBm

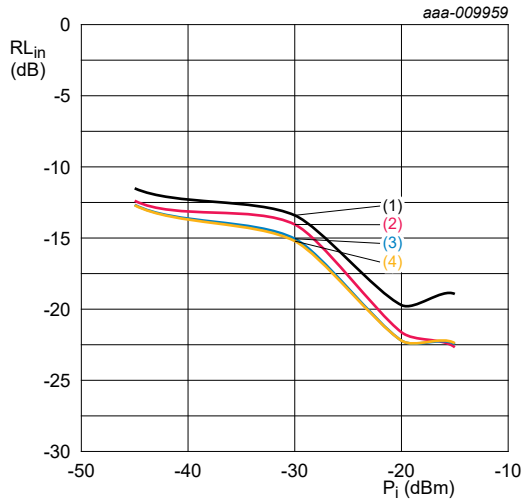
**Figure 15. Input return loss as a function of frequency; typical values**




$P_i$ = -45 dBm; $T_{amb}$ = 25 °C.

1. $V_{CC}$ = 1.5 V
2. $V_{CC}$ = 1.8 V
3. $V_{CC}$ = 2.85 V
4. $V_{CC}$ = 3.1 V

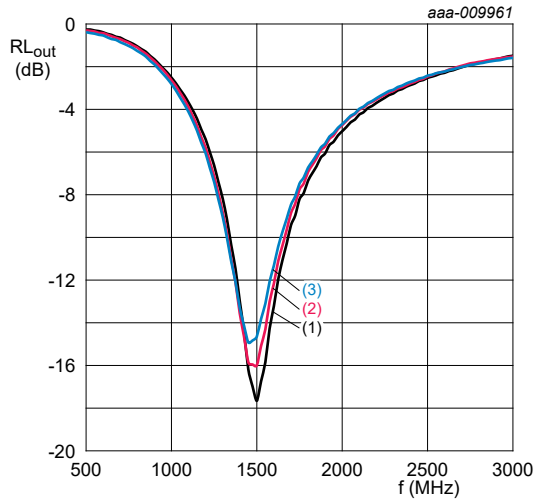
**Figure 16. Input return loss as a function of frequency; typical values**




f = 1575 MHz; $T_{amb}$ = 25 °C.

1. $V_{CC}$ = 1.5 V
2. $V_{CC}$ = 1.8 V
3. $V_{CC}$ = 2.85 V
4. $V_{CC}$ = 3.1 V

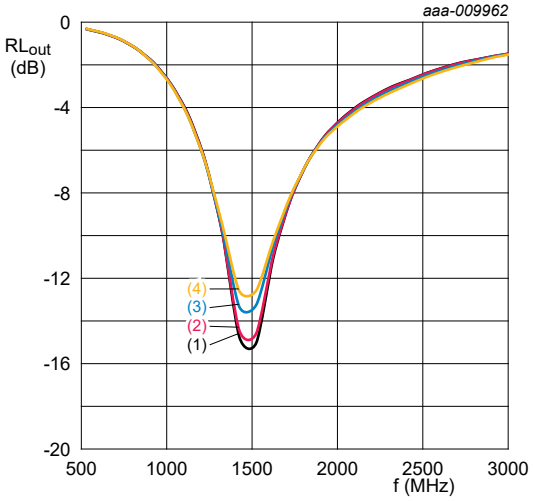
**Figure 17. Input return loss as a function of input power; typical values**




$P_i$ = -45 dBm; $V_{CC}$ = 1.8 V.

1. $T_{amb}$ = -40 °C
2. $T_{amb}$ = +25 °C
3. $T_{amb}$ = +85 °C

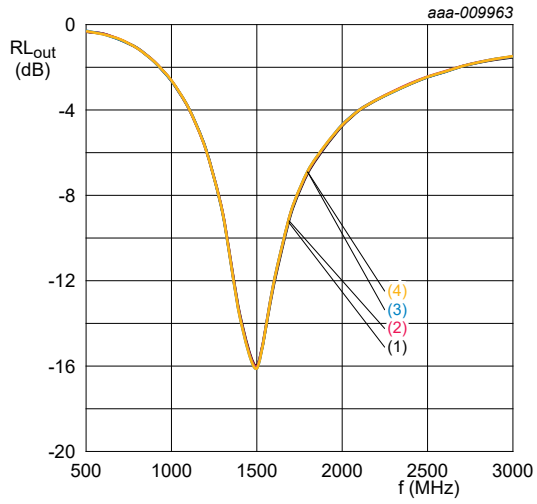
**Figure 18. Output return loss as a function of frequency; typical values**




$T_{amb}$ = 25 °C; $V_{CC}$ = 1.8 V.

1. $P_i$ = -45 dBm
2. $P_i$ = -30 dBm
3. $P_i$ = -20 dBm
4. $P_i$ = -15 dBm

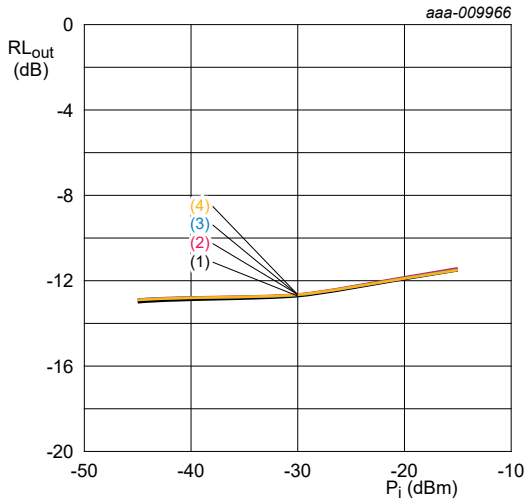
**Figure 19. Output return loss as a function of frequency; typical values**




$P_i$ = -45 dBm; $T_{amb}$ = 25 °C.

1. $V_{CC}$ = 1.5 V
2. $V_{CC}$ = 1.8 V
3. $V_{CC}$ = 2.85 V
4. $V_{CC}$ = 3.1 V

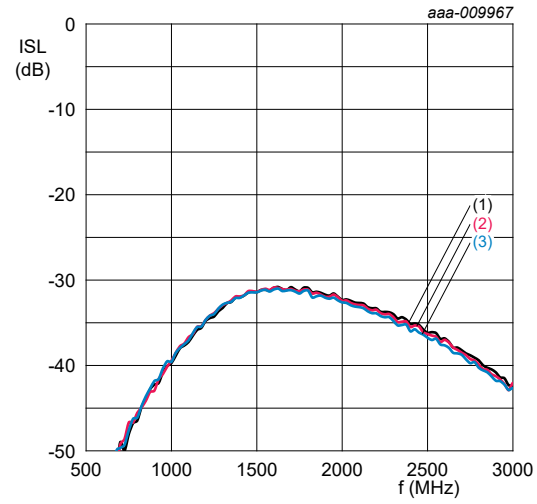
**Figure 20. Output return loss as a function of frequency; typical values**




f = 1575 MHz; $T_{amb}$ = 25 °C.

1. $V_{CC}$ = 1.5 V
2. $V_{CC}$ = 1.8 V
3. $V_{CC}$ = 2.85 V
4. $V_{CC}$ = 3.1 V

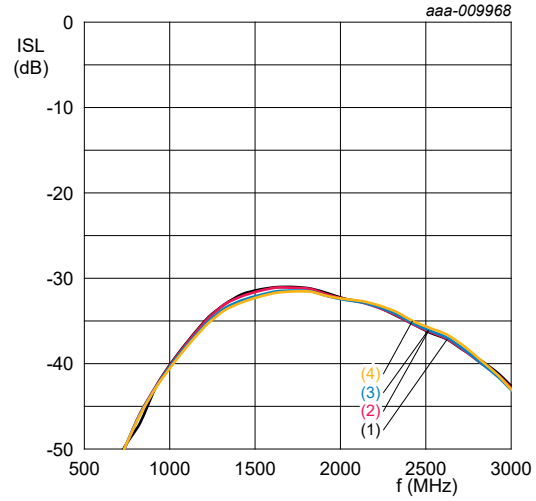
**Figure 21. Output return loss as a function of input power; typical values**




$P_i$ = -45 dBm; $V_{CC}$ = 1.8 V.

1. $T_{amb}$ = -40 °C
2. $T_{amb}$ = +25 °C
3. $T_{amb}$ = +85 °C

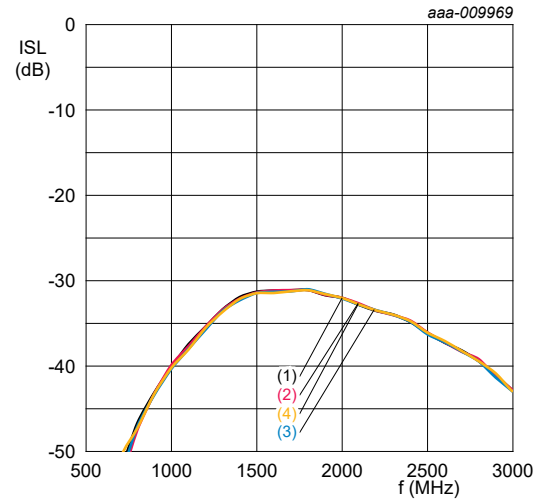
**Figure 22. Isolation as a function of frequency; typical values**




$T_{amb}$ = 25 °C; $V_{CC}$ = 1.8 V.

1. $P_i$ = -45 dBm
2. $P_i$ = -30 dBm
3. $P_i$ = -20 dBm
4. $P_i$ = -15 dBm

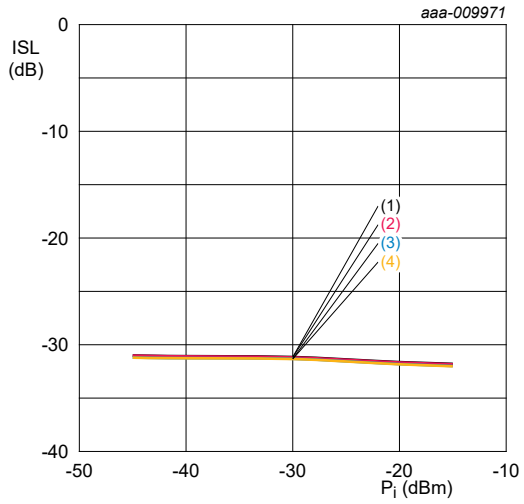
**Figure 23. Isolation as a function of frequency; typical values**




$P_i$ = -45 dBm; $T_{amb}$ = 25 °C.

1. $V_{CC}$ = 1.5 V
2. $V_{CC}$ = 1.8 V
3. $V_{CC}$ = 2.85 V
4. $V_{CC}$ = 3.1 V

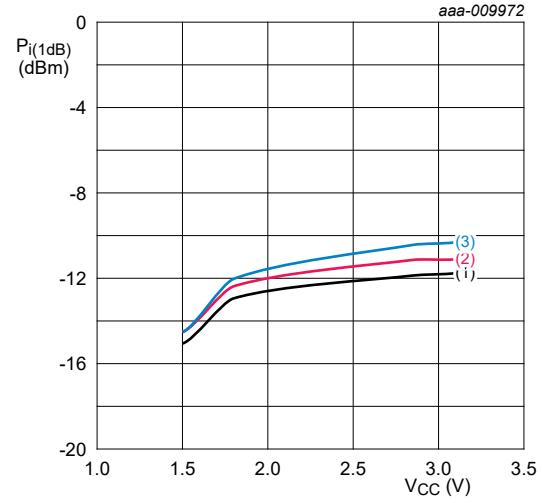
**Figure 24. Isolation as a function of frequency; typical values**




f = 1575 MHz; $T_{amb}$ = 25 °C.

1. $V_{CC}$ = 1.5 V
2. $V_{CC}$ = 1.8 V
3. $V_{CC}$ = 2.85 V
4. $V_{CC}$ = 3.1 V

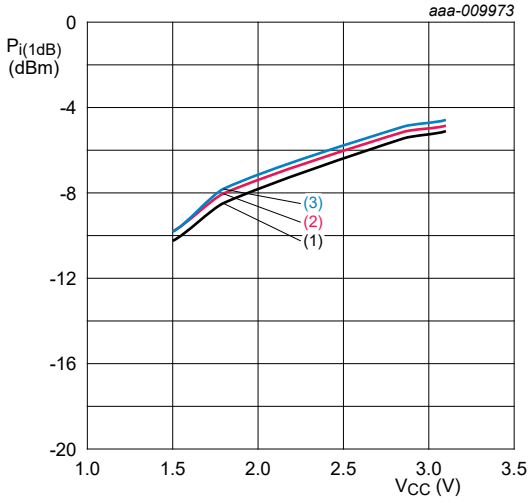
**Figure 25. Isolation as a function of input power; typical values**




f = 850 MHz.

1. $T_{amb}$ = -40 °C
2. $T_{amb}$ = +25 °C
3. $T_{amb}$ = +85 °C

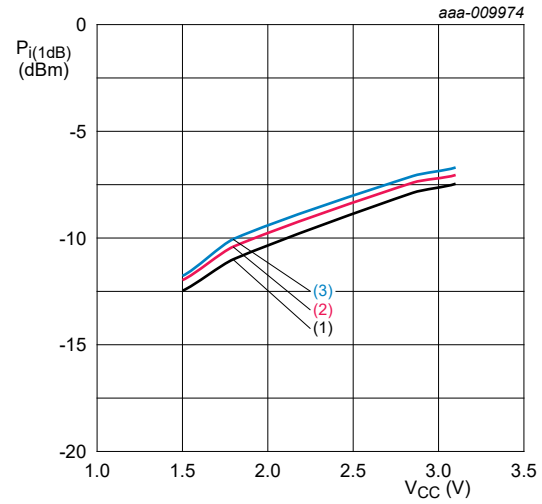
**Figure 26. Input power at 1 dB gain compression as a function of supply voltage; typical values**




f = 1850 MHz.

1. $T_{amb}$ = -40 °C
2. $T_{amb}$ = +25 °C
3. $T_{amb}$ = +85 °C

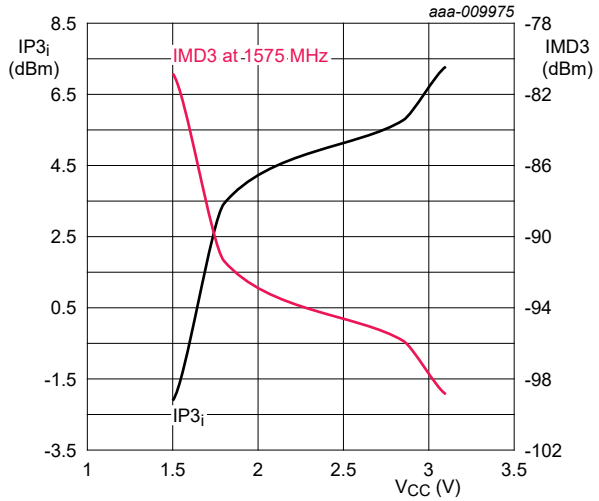
**Figure 27. Input power at 1 dB gain compression as a function of supply voltage; typical values**




f = 1575 MHz.

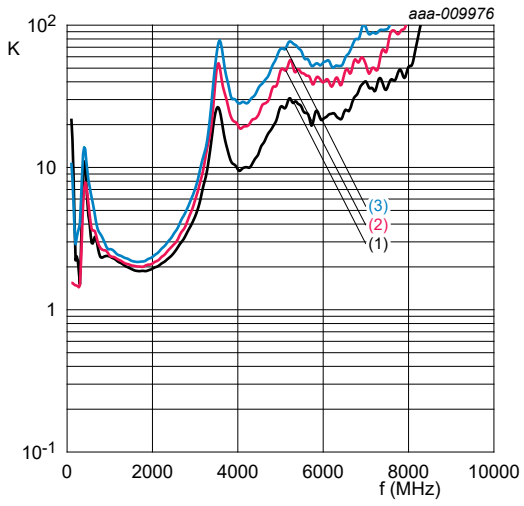
1. $T_{amb}$ = -40 °C
2. $T_{amb}$ = +25 °C
3. $T_{amb}$ = +85 °C

**Figure 28. Input power at 1 dB gain compression as a function of supply voltage; typical values**




$f_1$ = 1713 MHz; $f_2$ = 1851 MHz; Pi = -20 dBm at $f_1$; Pi = -65 dBm at $f_2$; $T_{amb}$ = 25 °C.

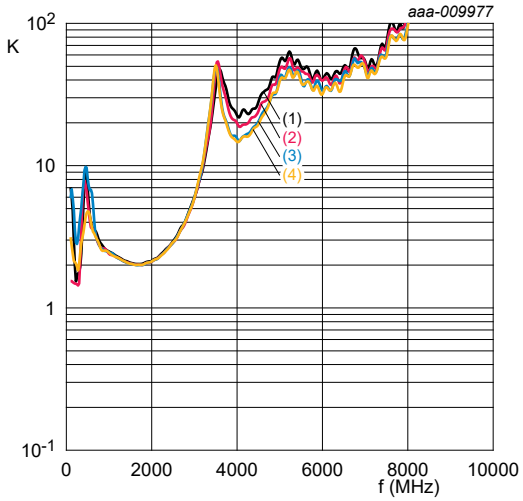
**Figure 29. Input third order intercept point and third order intermodulation distortion as function of supply voltage; typical values**




$P_i$ = -45 dBm; $V_{CC}$ = 1.8 V.

1. $T_{amb}$ = -40 °C
2. $T_{amb}$ = +25 °C
3. $T_{amb}$ = +85 °C

**Figure 30. Rollett stability factor as a function of frequency; typical values**



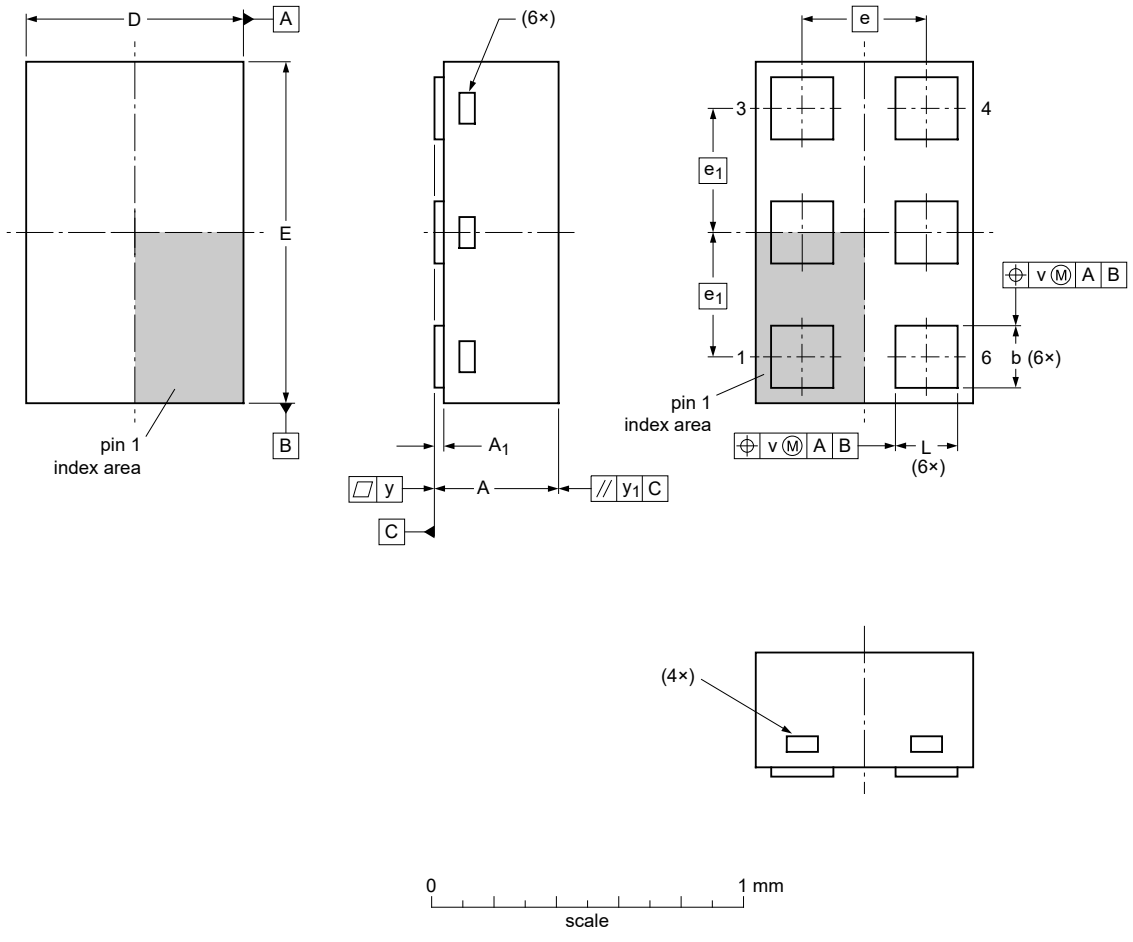

$P_i$ = -45 dBm; $T_{amb}$ = 25 °C.

1. $V_{CC}$ = 1.5 V
2. $V_{CC}$ = 1.8 V
3. $V_{CC}$ = 2.85 V
4. $V_{CC}$ = 3.1 V

**Figure 31. Rollett stability factor as a function of frequency; typical values**

## 10 Package outline

**XSON6: plastic extremely thin small outline package; no leads; 6 terminals; body 1.1 x 0.7 x 0.37 mm** **SOT1232**




Dimensions (mm are the original dimensions)

| Unit | | A | $A_1$ | D | E | $e_1$ | e | b | L | V | Y | $Y_1$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | min | 0.34 | | 0.65 | 1.05 | | | 0.17 | 0.17 | | | |
| mm | nom | 0.37 | | 0.70 | 1.10 | 0.4 | 0.4 | 0.20 | 0.20 | 0.1 | 0.05 | 0.1 |
| | max | 0.40 | 0.04 | 0.75 | 1.15 | | | 0.25 | 0.25 | | | |

Note
1. Dimension A is including plating thickness.

*sot1232_po*

| Outline version | References | | | | European projection | Issue date |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT1232 | | | | | | ~~13-04-12~~ 13-11-08 |

**Figure 32. Package outline SOT1232 (XSON6)**

## 11 Handling information

**CAUTION**

This device is sensitive to ElectroStatic Discharge (ESD). Observe precautions for handling electrostatic sensitive devices.
Such precautions are described in the *ANSI/ESD S20.20, IEC/ST 61340-5, JESD625-A* or equivalent standards.

## 12 Abbreviations

**Table 11. Abbreviations**

| Acronym | Description |
|---|---|
| ESD | electrostatic discharge |
| GLONASS | global navigation satellite system |
| GNSS | global navigation satellite system |
| GPS | global positioning system |
| HBM | human body model |
| MMIC | monolithic microwave-integrated circuit |
| PCB | printed circuit board |
| SiGe:C | silicon germanium carbon |

## 13 Revision history

**Table 12. Revision history**

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| BGU8019 v.5 | 20210521 | Product data sheet | 2021050321 | BGU8019 v.4.2 |
| Modifications: | • added Min, and or Max values to some characteristics at 2.85 V<br>• changed conditions, footnotes, and Minimum, and Typical values on $IP3_i$<br>• added extra Typical value, and footnote to IMD3 | | | |
| BGU8019 v.4.2 | 20190516 | Product data sheet | - | BGU8019 v.4.1 |
| Modifications: | • added general Marking diagram | | | |
| BGU8019 v.4.1 | 20190510 | Product data sheet | - | BGU8019 v.4 |
| Modifications: | • adapted date code notation to the Marking code table | | | |
| BGU8019 v.4 | 20181123 | Product data sheet | - | BGU8019 v.3 |
| Modifications: | • adapted different min and max values in the characteristics<br>• adapted in band, and out of band condition to $IP3_i$ parameter<br>• changed the name of the application into GNSS application | | | |
| BGU8019 v.3 | 20170118 | Product data sheet | - | BGU8019 v.2 |
| Modifications: | • Section 1: added GPS1202M according to our new naming convention | | | |
| BGU8019 v.2 | 20140603 | Product data sheet | - | BGU8019 v.1 |
| BGU8019 v.1 | 20131112 | Preliminary data sheet | - | - |

# 14 Legal information

## 14.1 Data sheet status

| Document status[1][2] | Product status[3] | Definition |
|---|---|---|
| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification | This document contains data from the preliminary specification. |
| Product [short] data sheet | Production | This document contains the product specification. |

[1] Please consult the most recently issued document before initiating or completing a design.
[2] The term 'short data sheet' is explained in section "Definitions".
[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

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