# BGU6102

## Wideband silicon low-noise amplifier MMIC

Rev. 1 — 21 September 2011 Preliminary data sheet

## 1. Product profile

### 1.1 General description

The BGU6102 MMIC is a wideband amplifier in Silicon technology for high speed, low-noise applications in a plastic, leadless 6 pin, small outline SOT1209 package.

### 1.2 Features and benefits

- Small 6-pin leadless package 1.3 mm × 2.0 mm × 0.35 mm
- Low noise high gain microwave MMIC
- Applicable between 40 MHz and 4 GHz
- Supply voltage 1.5 V to 5 V
- Integrated temperature stabilized bias for easy design
- Bias current configurable with external resistor
- 37 GHz transit frequency - Silicon technology
- Power-down mode current consumption < 6 μA
- ESD protection on all pins

### 1.3 Applications

- FM radio
- Mobile TV, CMMB
- ISM
- Wireless security
- RKE, TPMS
- AMR, ZigBee, Bluetooth
- WiFi, WLAN, WiMAX
- Low current applications

### 1.4 Quick reference data

**Table 1. Quick reference data**

*$T_{amb}$ = 25 °C; $V_{CC}$ = 3.0 V; $V_{ENABLE} \geq 1.2$ V; f = 100 MHz unless otherwise specified.*

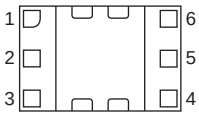
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $\|s_{21}\|^2$ | insertion power gain | | [1] | - | 13 | - | dB |
| MSG | maximum stable gain | | [2] | - | 31 | - | dB |
| $NF_{min}$ | minimum noise figure | | [2] | - | 0.7 | - | dB |
| $P_{i(1dB)}$ | input power at 1 dB gain compression | | [1] | - | −23 | - | dBm |
| $IP3_I$ | input third-order intercept point | | [1] | - | −15 | - | dBm |

[1] Measurements done on high-ohmic FM radio application board see Section 10.1; $I_{CC(tot)}$ = 3.1 mA.

[2] Measurements done on characterization board without matching, de-embedded up to the pins; $I_{CC(tot)}$ = 3 mA.

# 2. Pinning information

## 2.1 Pinning




Transparent top view

**Fig 1. Pin configuration**

## 2.2 Pin description

**Table 2. Pin description**

| Symbol | Pin | Description |
|---|---|---|
| $V_{CC}$ | 1 | supply current |
| n.c. | 2 | not connected |
| RF_IN | 3 | RF in |
| RF_OUT | 4 | RF out |
| ENABLE | 5 | enable control |
| CUR_ADJ | 6 | current adjust |
| GND | GND | ground pad; RF and DC ground |

# 3. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| BGU6102 | XSON7 | plastic extremely thin small outline package; no leads; 6 terminals; body 1.3 × 2.0 × 0.35 mm | SOT1209 |

# 4. Marking

**Table 4. Marking**

| Type number | Marking | Description |
|---|---|---|
| BGU6102 | 1B* | * = p : made in Hong Kong |
| | | * = t : made in Malaysia |
| | | * = W : made in China |

## 5. Limiting values

**Table 5. Limiting values**

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

| Symbol | Parameter | Conditions | Min | Max | Unit |
|---|---|---|---|---|---|
| $V_{CC}$ | supply voltage | RF input AC coupled | - | 5.5 | V |
| $I_{CC(tot)}$ | total supply current | $V_{CC}$ = 5.0 V | - | 40 | mA |
| $T_{stg}$ | storage temperature | | –55 | +150 | °C |
| $T_j$ | junction temperature | | - | 150 | °C |
| $V_{ESD}$ | electrostatic discharge voltage | Human Body Model (HBM); According JEDEC standard 22-A114E | | | |
| | | all pins | - | 2000 | V |
| | | pin 3 | - | 3000 | V |
| | | Charged Device Model (CDM); According JEDEC standard 22-C101B | - | 500 | V |

## 6. Thermal characteristics

**Table 6. Thermal characteristics**

| Symbol | Parameter | Conditions | Typ | Unit |
|---|---|---|---|---|
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | 110 | K/W |

## 7. Static characteristics

**Table 7. Static characteristics**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{CC}$ | supply voltage | RF input AC coupled | | 1.5 | - | 5.0 | V |
| $I_{CC(tot)}$ | total supply current | configurable with external resistor | [1] | 2.1 | - | 21 | mA |
| | | $V_{ENABLE} \leq 0.4$ V | [1] | - | - | 0.01 | mA |
| $T_{amb}$ | ambient temperature | | | –40 | +25 | +85 | °C |

[1] $I_{CC(tot)} = I_{CC} + I_{RF\_OUT} + I_{R\_BIAS}$.

# 8. Dynamic characteristics

**Table 8. Dynamic characteristics**

*$T_{amb}$ = 25 °C; $V_{CC}$ = 3.0 V; $V_{ENABLE} \geq 1.2$ V unless otherwise specified. All measurements done on characterization board without matching, de-embedded up to the pins.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **100 MHz frequency** | | | | | | |
| $\|s_{21}\|^2$ | insertion power gain | f = 100 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 16.0 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 19.5 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 14.5 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 28.0 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 31.5 | - | dB |
| MSG | maximum stable gain | f = 100 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 29.0 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 31.0 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 33.5 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 35.5 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 37.5 | - | dB |
| $NF_{min}$ | minimum noise figure | f = 100 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 0.8 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 0.7 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 0.8 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 0.8 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 1.0 | - | dB |
| $P_{L(1dB)}$ | output power at 1 dB gain compression | f = 100 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | –6.0 | - | dBm |
| | | $I_{CC(tot)}$ = 3 mA | - | –4.5 | - | dBm |
| | | $I_{CC(tot)}$ = 6 mA | - | 0.5 | - | dBm |
| | | $I_{CC(tot)}$ = 10 mA | - | 4.0 | - | dBm |
| | | $I_{CC(tot)}$ = 20 mA | - | 9.5 | - | dBm |
| $IP3_O$ | output third-order intercept point | f = 100 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 0.0 | - | dBm |
| | | $I_{CC(tot)}$ = 3 mA | - | 3.5 | - | dBm |
| | | $I_{CC(tot)}$ = 6 mA | - | 10.5 | - | dBm |
| | | $I_{CC(tot)}$ = 10 mA | - | 14.5 | - | dBm |
| | | $I_{CC(tot)}$ = 20 mA | - | 19.0 | - | dBm |

**Table 8. Dynamic characteristics** *...continued*

*$T_{amb}$ = 25 °C; $V_{CC}$ = 3.0 V; $V_{ENABLE} \geq$ 1.2 V unless otherwise specified. All measurements done on characterization board without matching, de-embedded up to the pins.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **150 MHz frequency** | | | | | | |
| $\|s_{21}\|^2$ | insertion power gain | f = 150 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 16.0 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 19.0 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 24.5 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 27.5 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 31.0 | - | dB |
| MSG | maximum stable gain | f = 150 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 27.5 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 29.0 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 32.0 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 34.0 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 36.0 | - | dB |
| $NF_{min}$ | minimum noise figure | f = 150 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 0.8 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 0.7 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 0.8 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 0.8 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 1.0 | - | dB |
| $P_{L(1dB)}$ | output power at 1 dB gain compression | f = 150 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | −6.5 | - | dBm |
| | | $I_{CC(tot)}$ = 3 mA | - | −4.5 | - | dBm |
| | | $I_{CC(tot)}$ = 6 mA | - | 0.0 | - | dBm |
| | | $I_{CC(tot)}$ = 10 mA | - | 3.5 | - | dBm |
| | | $I_{CC(tot)}$ = 20 mA | - | 9.0 | - | dBm |
| $IP3_O$ | output third-order intercept point | f = 150 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | −0.5 | - | dBm |
| | | $I_{CC(tot)}$ = 3 mA | - | 3.5 | - | dBm |
| | | $I_{CC(tot)}$ = 6 mA | - | 10.0 | - | dBm |
| | | $I_{CC(tot)}$ = 10 mA | - | 14.0 | - | dBm |
| | | $I_{CC(tot)}$ = 20 mA | - | 19.0 | - | dBm |

**Table 8. Dynamic characteristics** *...continued*

*$T_{amb}$ = 25 °C; $V_{CC}$ = 3.0 V; $V_{ENABLE} \geq$ 1.2 V unless otherwise specified. All measurements done on characterization board without matching, de-embedded up to the pins.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **450 MHz frequency** | | | | | | |
| $\|s_{21}\|^2$ | insertion power gain | f = 450 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 15.5 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 18.5 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 23.0 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 26.0 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 29.0 | - | dB |
| MSG | maximum stable gain | f = 450 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 22.5 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 24.5 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 27.0 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 29.0 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 31.0 | - | dB |
| $NF_{min}$ | minimum noise figure | f = 450 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 0.8 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 0.7 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 0.8 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 0.8 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 1.0 | - | dB |
| $P_{L(1dB)}$ | output power at 1 dB gain compression | f = 450 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | −7.0 | - | dBm |
| | | $I_{CC(tot)}$ = 3 mA | - | −5.0 | - | dBm |
| | | $I_{CC(tot)}$ = 6 mA | - | −0.5 | - | dBm |
| | | $I_{CC(tot)}$ = 10 mA | - | 3.0 | - | dBm |
| | | $I_{CC(tot)}$ = 20 mA | - | 9.0 | - | dBm |
| $IP3_O$ | output third-order intercept point | f = 450 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 0.0 | - | dBm |
| | | $I_{CC(tot)}$ = 3 mA | - | 4.0 | - | dBm |
| | | $I_{CC(tot)}$ = 6 mA | - | 10.5 | - | dBm |
| | | $I_{CC(tot)}$ = 10 mA | - | 14.0 | - | dBm |
| | | $I_{CC(tot)}$ = 20 mA | - | 19.5 | - | dBm |

**Table 8. Dynamic characteristics** *...continued*

*$T_{amb}$ = 25 °C; $V_{CC}$ = 3.0 V; $V_{ENABLE} \geq$ 1.2 V unless otherwise specified. All measurements done on characterization board without matching, de-embedded up to the pins.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **900 MHz frequency** | | | | | | |
| $\|s_{21}\|^2$ | insertion power gain | f = 900 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 14.0 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 16.5 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 20.5 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 23.0 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 25.0 | - | dB |
| MSG | maximum stable gain | f = 900 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 19.5 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 21.5 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 24.0 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 26.0 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 28.0 | - | dB |
| $NF_{min}$ | minimum noise figure | f = 900 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 0.8 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 0.8 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 0.7 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 0.8 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 1.0 | - | dB |
| $P_{L(1dB)}$ | output power at 1 dB gain compression | f = 900 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | −7.5 | - | dBm |
| | | $I_{CC(tot)}$ = 3 mA | - | −5.5 | - | dBm |
| | | $I_{CC(tot)}$ = 6 mA | - | −0.5 | - | dBm |
| | | $I_{CC(tot)}$ = 10 mA | - | 3.5 | - | dBm |
| | | $I_{CC(tot)}$ = 20 mA | - | 10.0 | - | dBm |
| $IP3_O$ | output third-order intercept point | f = 900 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 1.0 | - | dBm |
| | | $I_{CC(tot)}$ = 3 mA | - | 5.0 | - | dBm |
| | | $I_{CC(tot)}$ = 6 mA | - | 11.5 | - | dBm |
| | | $I_{CC(tot)}$ = 10 mA | - | 15.0 | - | dBm |
| | | $I_{CC(tot)}$ = 20 mA | - | 20.5 | - | dBm |

**Table 8. Dynamic characteristics** *...continued*

*$T_{amb}$ = 25 °C; $V_{CC}$ = 3.0 V; $V_{ENABLE} \geq$ 1.2 V unless otherwise specified. All measurements done on characterization board without matching, de-embedded up to the pins.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **1500 MHz frequency** | | | | | | |
| $\|s_{21}\|^2$ | insertion power gain | f = 1500 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 11.5 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 14.0 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 17.5 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 19.5 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 21.0 | - | dB |
| MSG | maximum stable gain | f = 1500 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 18.0 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 19.5 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 22.0 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 24.0 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 25.5 | - | dB |
| $NF_{min}$ | minimum noise figure | f = 1500 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 1.0 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 1.0 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 0.9 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 0.9 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 1.0 | - | dB |
| $P_{L(1dB)}$ | output power at 1 dB gain compression | f = 1500 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | −7.5 | - | dBm |
| | | $I_{CC(tot)}$ = 3 mA | - | −5.5 | - | dBm |
| | | $I_{CC(tot)}$ = 6 mA | - | 0.0 | - | dBm |
| | | $I_{CC(tot)}$ = 10 mA | - | 4.0 | - | dBm |
| | | $I_{CC(tot)}$ = 20 mA | - | 10.5 | - | dBm |
| $IP3_O$ | output third-order intercept point | f = 1500 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 2.0 | - | dBm |
| | | $I_{CC(tot)}$ = 3 mA | - | 6.5 | - | dBm |
| | | $I_{CC(tot)}$ = 6 mA | - | 12.5 | - | dBm |
| | | $I_{CC(tot)}$ = 10 mA | - | 16.5 | - | dBm |
| | | $I_{CC(tot)}$ = 20 mA | - | 22.5 | - | dBm |

**Table 8. Dynamic characteristics** *...continued*

*$T_{amb}$ = 25 °C; $V_{CC}$ = 3.0 V; $V_{ENABLE} \geq$ 1.2 V unless otherwise specified. All measurements done on characterization board without matching, de-embedded up to the pins.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **1900 MHz frequency** | | | | | | |
| $\|s_{21}\|^2$ | insertion power gain | f = 1900 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 10.5 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 12.5 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 16.0 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 17.5 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 19.0 | - | dB |
| MSG | maximum stable gain | f = 1900 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 17.0 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 18.5 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 21.5 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 23.0 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 24.5 | - | dB |
| $NF_{min}$ | minimum noise figure | f = 1900 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 1.1 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 1.1 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 1.0 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 1.0 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 1.1 | - | dB |
| $P_{L(1dB)}$ | output power at 1 dB gain compression | f = 1900 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | −7.5 | - | dBm |
| | | $I_{CC(tot)}$ = 3 mA | - | −5.5 | - | dBm |
| | | $I_{CC(tot)}$ = 6 mA | - | 0.0 | - | dBm |
| | | $I_{CC(tot)}$ = 10 mA | - | 4.5 | - | dBm |
| | | $I_{CC(tot)}$ = 20 mA | - | 10.5 | - | dBm |
| $IP3_O$ | output third-order intercept point | f = 1900 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 2.5 | - | dBm |
| | | $I_{CC(tot)}$ = 3 mA | - | 6.5 | - | dBm |
| | | $I_{CC(tot)}$ = 6 mA | - | 13.0 | - | dBm |
| | | $I_{CC(tot)}$ = 10 mA | - | 17.0 | - | dBm |
| | | $I_{CC(tot)}$ = 20 mA | - | 22.5 | - | dBm |

**Table 8. Dynamic characteristics** *...continued*

*$T_{amb}$ = 25 °C; $V_{CC}$ = 3.0 V; $V_{ENABLE} \geq$ 1.2 V unless otherwise specified. All measurements done on characterization board without matching, de-embedded up to the pins.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **2400 MHz frequency** | | | | | | |
| $\|s_{21}\|^2$ | insertion power gain | f = 2400 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 8.5 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 11.0 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 14.0 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 15.5 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 17.0 | - | dB |
| MSG | maximum stable gain | f = 2400 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 16.5 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 18.0 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 20.5 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 22.0 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 23.0 | - | dB |
| $NF_{min}$ | minimum noise figure | f = 2400 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 1.5 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 1.3 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 1.2 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 1.2 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 1.3 | - | dB |
| $P_{L(1dB)}$ | output power at 1 dB gain compression | f = 2400 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | −7.5 | - | dBm |
| | | $I_{CC(tot)}$ = 3 mA | - | −5.0 | - | dBm |
| | | $I_{CC(tot)}$ = 6 mA | - | 0.0 | - | dBm |
| | | $I_{CC(tot)}$ = 10 mA | - | 4.5 | - | dBm |
| | | $I_{CC(tot)}$ = 20 mA | - | 10.5 | - | dBm |
| $IP3_O$ | output third-order intercept point | f = 2400 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 2.5 | - | dBm |
| | | $I_{CC(tot)}$ = 3 mA | - | 7.0 | - | dBm |
| | | $I_{CC(tot)}$ = 6 mA | - | 13.0 | - | dBm |
| | | $I_{CC(tot)}$ = 10 mA | - | 17.5 | - | dBm |
| | | $I_{CC(tot)}$ = 20 mA | - | 23.0 | - | dBm |

**Table 8. Dynamic characteristics** *...continued*

*$T_{amb}$ = 25 °C; $V_{CC}$ = 3.0 V; $V_{ENABLE} \geq 1.2$ V unless otherwise specified. All measurements done on characterization board without matching, de-embedded up to the pins.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **3500 MHz frequency** | | | | | | |
| $\|s_{21}\|^2$ | insertion power gain | f = 3500 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 5.5 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 7.5 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 10.5 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 12.0 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 13.5 | - | dB |
| MSG | maximum stable gain | f = 3500 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 16.0 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 17.5 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 19.0 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 18.5 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 18.5 | - | dB |
| $NF_{min}$ | minimum noise figure | f = 3500 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 2.3 | - | dB |
| | | $I_{CC(tot)}$ = 3 mA | - | 2.2 | - | dB |
| | | $I_{CC(tot)}$ = 6 mA | - | 1.9 | - | dB |
| | | $I_{CC(tot)}$ = 10 mA | - | 1.8 | - | dB |
| | | $I_{CC(tot)}$ = 20 mA | - | 1.9 | - | dB |
| $P_{L(1dB)}$ | output power at 1 dB gain compression | f = 3500 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | −7.5 | - | dBm |
| | | $I_{CC(tot)}$ = 3 mA | - | −5.5 | - | dBm |
| | | $I_{CC(tot)}$ = 6 mA | - | −0.5 | - | dBm |
| | | $I_{CC(tot)}$ = 10 mA | - | 4.5 | - | dBm |
| | | $I_{CC(tot)}$ = 20 mA | - | 9.5 | - | dBm |
| $IP3_O$ | output third-order intercept point | f = 3500 MHz | | | | |
| | | $I_{CC(tot)}$ = 2 mA | - | 1.0 | - | dBm |
| | | $I_{CC(tot)}$ = 3 mA | - | 5.0 | - | dBm |
| | | $I_{CC(tot)}$ = 6 mA | - | 11.5 | - | dBm |
| | | $I_{CC(tot)}$ = 10 mA | - | 17.0 | - | dBm |
| | | $I_{CC(tot)}$ = 20 mA | - | 23.5 | - | dBm |

# 9. Enable control

**Table 9. ENABLE (pin 5)**

*−40 °C ≤ $T_{amb}$ ≤ +85 °C*

| $V_{ENABLE}$ (V) | State |
|---|---|
| ≤ 0.4 | OFF |
| ≥ 1.2 | ON |

# 10. Application information

Other applications available. Please contact your local sales representative for more information. Application note(s) available on the NXP website.

## 10.1 High-ohmic FM radio characteristics

**Table 10. AC characteristics[1]**

*$T_{amb}$ = 25 °C; $V_{CC}$ = 3.0 V; $I_{CC(tot)}$ = 3.1 mA; f = 100 MHz; measurements done on high-ohmic FM radio application board.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $\|s_{21}\|^2$ | insertion power gain | | - | 13 | - | dB |
| $RL_{in}$ | input return loss | | - | 1 | - | dB |
| $RL_{out}$ | output return loss | | - | 20 | - | dB |
| NF | noise figure | $Z_S$ = 50 Ω | - | 1.0 | - | dB |
| $P_{i(1dB)}$ | input power at 1 dB gain compression | | - | –23 | - | dBm |
| $IP3_I$ | input third-order intercept point | | - | –15 | - | dBm |

[1] See application note AN11091 for details.

## 10.2 50 ohm FM radio characteristics

**Table 11. AC characteristics[1]**

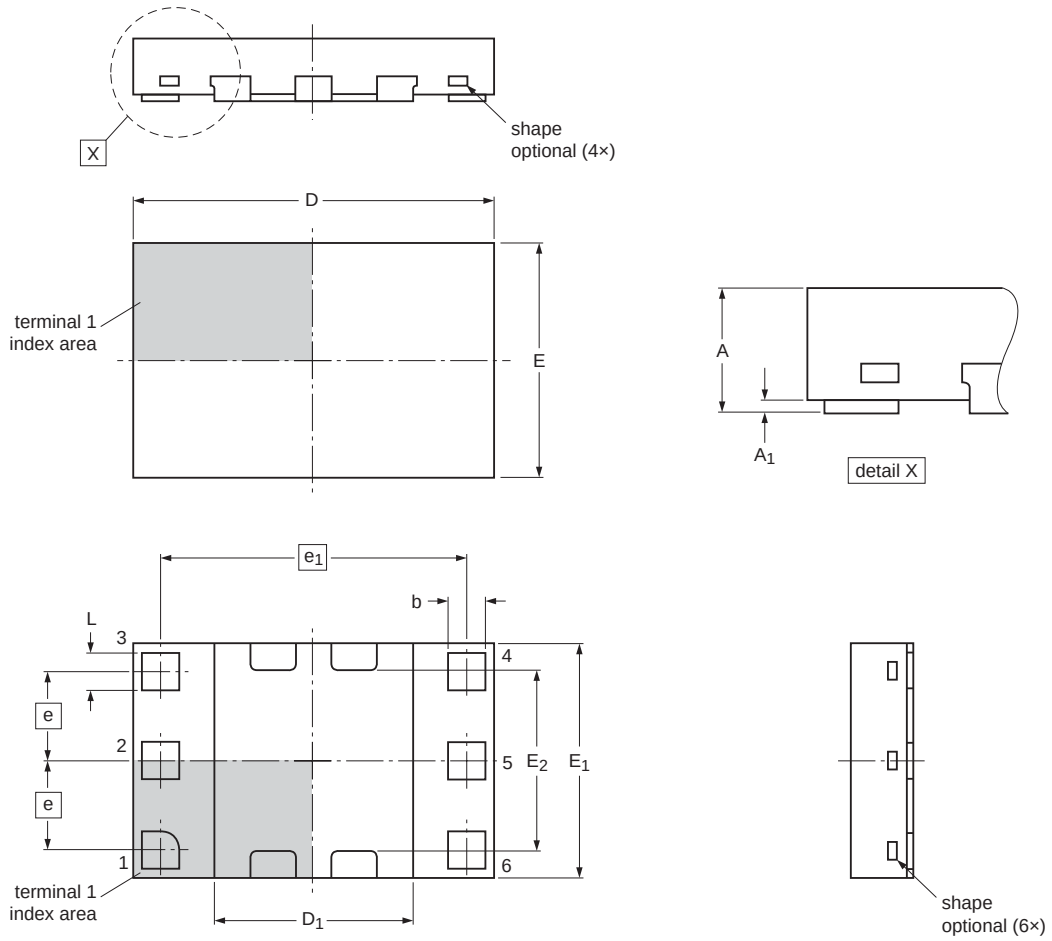
*$T_{amb}$ = 25 °C; $V_{CC}$ = 2.8 V; $I_{CC(tot)}$ = 4.3 mA; f = 100 MHz; measurements done on 50 Ω application board.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $\|s_{21}\|^2$ | insertion power gain | | - | 15 | - | dB |
| $RL_{in}$ | input return loss | | - | 10 | - | dB |
| $RL_{out}$ | output return loss | | - | 14 | - | dB |
| NF | noise figure | $Z_S$ = 50 Ω | - | 1.3 | 1.8 | dB |
| $P_{i(1dB)}$ | input power at 1 dB gain compression | | - | –20 | - | dBm |
| $IP3_I$ | input third-order intercept point | | - | –12 | - | dBm |

[1] See application note AN11090 for details.

## 11. Package outline

**HXSON6: plastic thermal enhanced super thin small outline package; no leads; 6 terminals; body 2 x 1.3 x 0.35 mm** **SOT1209**




Dimensions

| Unit | | A | $A_1$ | b | D | $D_1$ | E | $E_1$ | $E_2$ | e | $e_1$ | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | max | | | 0.15 | 1.9 | 1.0 | 1.2 | 1.2 | 1.0 | 0.5 | 1.7 | 0.15 |
| | nom | | | | | | | | | | | |
| | min | 0.35 | 0.04 | 0.25 | 2.1 | 1.2 | 1.4 | 1.4 | | | | 0.25 |

Note
1. Dimension A is including plating thickness.

*sot1209_po*

| Outline version | References | | | | European projection | Issue date |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT1209 | | | | | | ~~11-06-10~~ 11-09-15 |

**Fig 2. Package outline SOT1209**

## 12. Abbreviations

Table 12. Abbreviations

| Acronym | Description |
|---|---|
| AC | Alternating Current |
| AMR | Automated Meter Reading |
| CMMB | China Mobile Multimedia Broadcasting |
| DC | Direct Current |
| ESD | ElectroStatic Discharge |
| FM | Frequency Modulation |
| GLONASS | GLObal'naya NAvigatsionnaya Sputnikovaya Sistema |
| GPS | Global Positioning System |
| HBM | Human Body Model |
| ISM | Industrial Scientific Medical |
| LNA | Low-Noise Amplifier |
| LNB | Low-Noise Block |
| LTE | Long Term Evolution |
| MMIC | Monolithic Microwave Integrated Circuit |
| RF | Radio Frequency |
| RKE | Remote Keyless Entry |
| SDARS | Satellite Digital Audio Radio Service |
| TPMS | Tire-Pressure Monitoring System |
| UMTS | Universal Mobile Telecommunications System |
| UWB | Ultra-WideBand |
| WiMAX | Worldwide Interoperability for Microwave Access |
| WLAN | Wireless Local Area Network |

## 13. Revision history

Table 13. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| BGU6102 v.1 | 20110921 | 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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## 16. Contents





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