BGU6102

Wideband silicon low-noise amplifier MMIC

Rev. 3 — 13 July 2012 | Product data sheet

1. Product profile

1.1 General description

The BGU6102 MMIC is an unmatched wideband MMIC featuring an integrated bias, enable function and wide supply voltage. BGU6102 is part of a family of three products (BGU6101, BGU6102 and BGU6104) and is optimized for 2 mA operation.

1.2 Features and benefits

- Supply voltage range from 1.5 V to 5 V
- Current range up to 20 mA at 3 V and 40 mA at 5 V supply voltage
- NF_{min} of 0.7 dB
- Applicable between 40 MHz and 4 GHz
- Integrated temperature-stabilized bias for easy design
- Bias current configurable with external resistor
- Power-down mode current consumption < 6 μA
- ESD protection on all pins up to 3 kV HBM
- Small 6-pin leadless package 2.0 mm × 1.3 mm × 0.35 mm

1.3 Applications

- FM radio
- Mobile TV, CMMB
- ISM
- Wireless security
- RKE, TPMS
- AMR, ZigBee, Bluetooth
- WiFi, WLAN (2.4 GHz)
- Low current applications

1.4 Quick reference data

Table 1. Quick reference data

T_{amb} = 25 °C; V_{CC} = 3.0 V; $I_{CC(tot)}$ = 3.0 mA; V_{ENABLE} ≥ 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
$\|s_{21}\|^2$	insertion power gain	f = 450 MHz	-	18.5	-	dB
		f = 900 MHz	-	16.5	-	dB
		f = 2400 MHz; $I_{CC(tot)}$ = 6 mA	-	14.0	-	dB
NF_{min}	minimum noise figure	f = 450 MHz	-	0.7	-	dB
		f = 900 MHz	-	0.8	-	dB
		f = 2400 MHz; $I_{CC(tot)}$ = 6 mA	-	1.2	-	dB

Table 1. Quick reference data *...continued*

T_{amb} = 25 °C; V_{CC} = 3.0 V; $I_{CC(tot)}$ = 3.0 mA; $V_{ENABLE} \geq$ 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
$P_{L(1dB)}$	output power at 1 dB gain compression	f = 450 MHz	-	–5.0	-	dBm
		f = 900 MHz	-	–5.5	-	dBm
		f = 2400 MHz; $I_{CC(tot)}$ = 6 mA	-	0	-	dBm
$IP3_O$	output third-order intercept point	f = 450 MHz	-	5.5	-	dBm
		f = 900 MHz	-	6.0	-	dBm
		f = 2400 MHz; $I_{CC(tot)}$ = 6 mA	-	11.5	-	dBm

2. Pinning information

2.1 Pinning

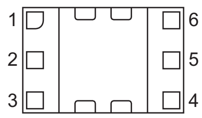


Fig 1. Pin configuration

2.2 Pin description

Table 2. Pin description

Symbol	Pin	Description
V_{CC}	1	supply voltage
n.c.	2	not connected
RF_IN	3	RF in
RF_OUT	4	RF out
ENABLE	5	enable
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	HXSON6	plastic thermal enhanced super thin small outline package; no leads; 6 terminals; body 2 x 1.3 x 0.35 mm	SOT1209
OM7809	-	50 Ω LNA evaluation board	-
OM7810	-	high-ohmic LNA evaluation board	-

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
V_{ENABLE}	voltage on pin ENABLE		[1]	−0.5	V_{CC} + 1.8	V
V_{RF_IN}	voltage on pin IN	DC	[2]	−0.5	+0.9	V
V_{RF_OUT}	voltage on pin RF_OUT	DC		−0.5	V_{CC} + 1.8	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 to JEDEC standard 22-A114E		-	3000	V
		Charged Device Model (CDM); according to JEDEC standard 22-C101B		-	500	V

[1] Due to internal ESD diode protection, the applied voltage should not exceed the specified maximum in order to avoid excess current.

[2] The RF input is directly coupled to the base of the RF transistor.

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	V_{CC} = 3.0 V	[1][2]	2.1	-	21	mA
		$V_{ENABLE} \leq 0.4$ V	[1]	-	-	0.01	mA
T_{amb}	ambient temperature			−40	+25	+85	°C

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

[2] Configurable with external resistor.

8. Dynamic characteristics

Table 8. Dynamic characteristics

T_{amb} = 25 °C; V_{CC} = 3.0 V; V_{ENABLE} ≥ 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	-	24.5	-	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	-	3.0	-	dBm
		$I_{CC(tot)}$ = 3 mA	-	5.5	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	10.5	-	dBm
		$I_{CC(tot)}$ = 10 mA	-	14.5	-	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} ≥ 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	-	3.0	-	dBm
		$I_{CC(tot)}$ = 3 mA	-	5.5	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	10.5	-	dBm
		$I_{CC(tot)}$ = 10 mA	-	14.5	-	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} ≥ 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	-	3.0	-	dBm
		$I_{CC(tot)}$ = 3 mA	-	5.5	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	10.5	-	dBm
		$I_{CC(tot)}$ = 10 mA	-	14.5	-	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} ≥ 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	-	3.5	-	dBm
		$I_{CC(tot)}$ = 3 mA	-	6.0	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	11.5	-	dBm
		$I_{CC(tot)}$ = 10 mA	-	15.0	-	dBm
		$I_{CC(tot)}$ = 20 mA	-	21.0	-	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
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	-	3.5	-	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	-	21.5	-	dBm

Table 8. Dynamic characteristics *…continued*

T_{amb} = 25 °C; V_{CC} = 3.0 V; V_{ENABLE} ≥ 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						
$\lvert s_{21}\rvert^2$	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	-	3.0	-	dBm
		$I_{CC(tot)}$ = 3 mA	-	6.5	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	12.0	-	dBm
		$I_{CC(tot)}$ = 10 mA	-	16.0	-	dBm
		$I_{CC(tot)}$ = 20 mA	-	21	-	dBm

Table 8. Dynamic characteristics *...continued*

T_{amb} = 25 °C; V_{CC} = 3.0 V; V_{ENABLE} ≥ 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						
$\lvert s_{21}\rvert^2$	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	-	6.0	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	11.5	-	dBm
		$I_{CC(tot)}$ = 10 mA	-	16.0	-	dBm
		$I_{CC(tot)}$ = 20 mA	-	20.0	-	dBm

Table 8. Dynamic characteristics *...continued*

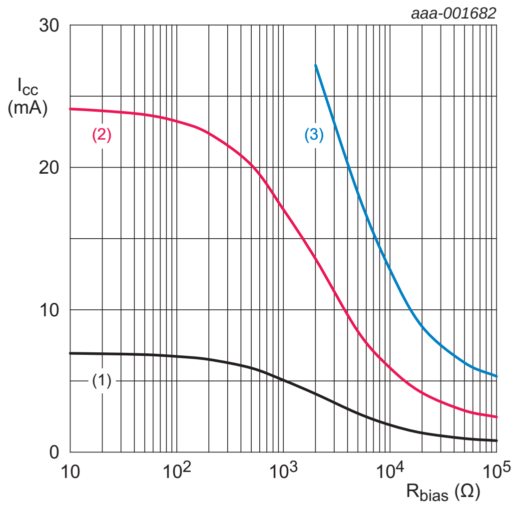
T_{amb} = 25 °C; V_{CC} = 3.0 V; V_{ENABLE} ≥ 1.2 V unless otherwise specified. All measurements done on characterization board without matching, de-embedded up to the pins.

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	-	2.5	-	dBm
		$I_{CC(tot)}$ = 3 mA	-	6.0	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	11.5	-	dBm
		$I_{CC(tot)}$ = 10 mA	-	16.5	-	dBm
		$I_{CC(tot)}$ = 20 mA	-	20.0	-	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



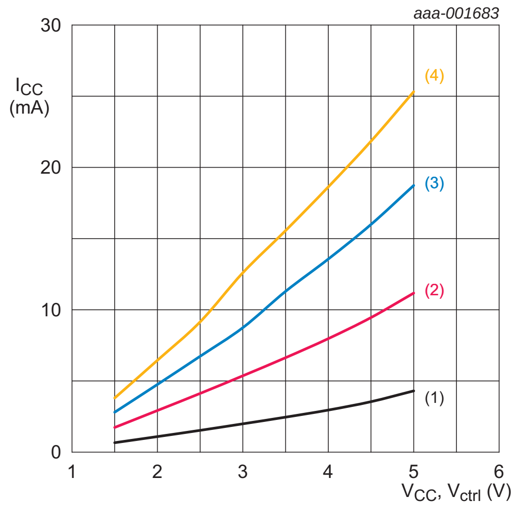
T_{amb} = 25 °C.

(1) V_{CC} = 1.5 V

(2) V_{CC} = 3 V

(3) V_{CC} = 5 V

Fig 2. Supply current as a function of bias resistor; typical values



T_{amb} = 25 °C.

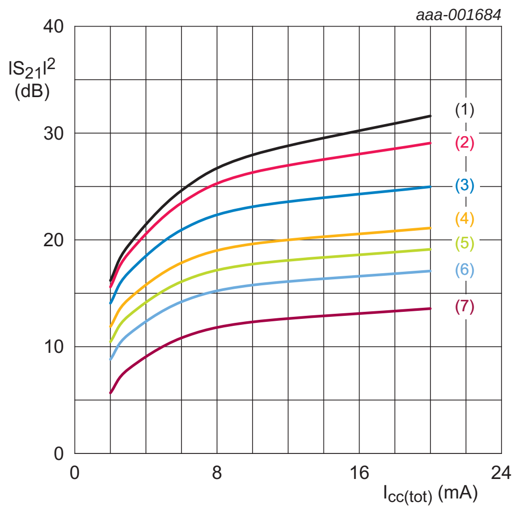
(1) R_{bias} = OPEN

(2) R_{bias} = 12 kΩ

(3) R_{bias} = 4.7 kΩ

(4) R_{bias} = 2.4 kΩ

Fig 3. Supply current as a function of supply voltage and control voltage; typical values



T_{amb} = 25 °C; V_{CC} = 3 V; P_i = –30 dBm.

(1) f = 150 MHz

(2) f = 450 MHz

(3) f = 900 MHz

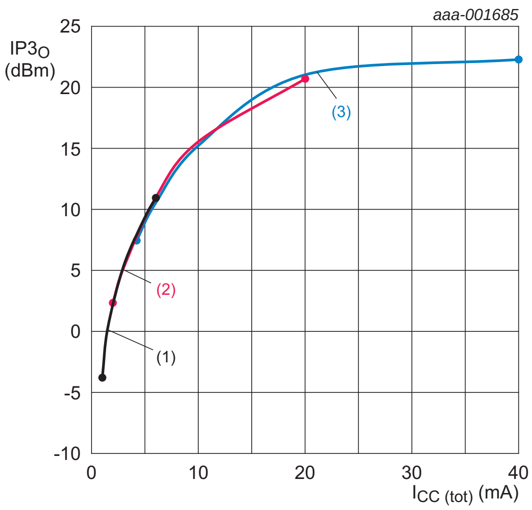
(4) f = 1500 MHz

(5) f = 1900 MHz

(6) f = 2400 MHz

(7) f = 3500 MHz

Fig 4. Insertion power gain ($|s_{21}|^2$) as a function of total supply current; typical values



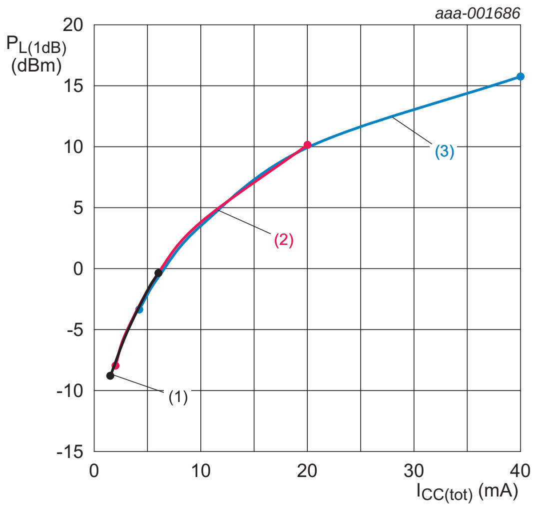
T_{amb} = 25 °C; f_1 = 900 MHz; f_2 = 900.2 MHz; P_i = –30 dBm.

(1) V_{CC} = 1.5 V

(2) V_{CC} = 3 V

(3) V_{CC} = 5 V

Fig 5. Output third-order intercept point as a function of total supply current; typical values



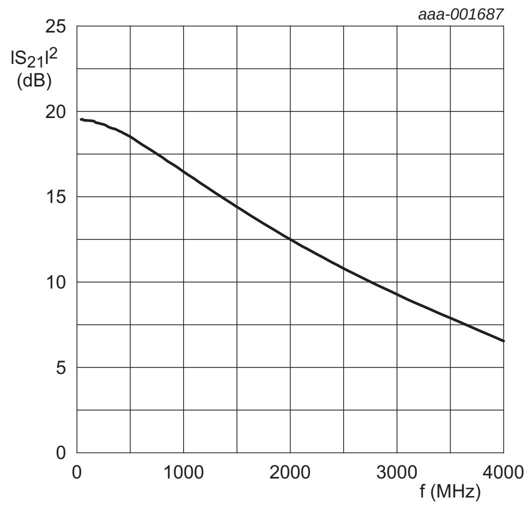
T_{amb} = 25 °C; f = 900 MHz.

(1) V_{CC} = 1.5 V

(2) V_{CC} = 3 V

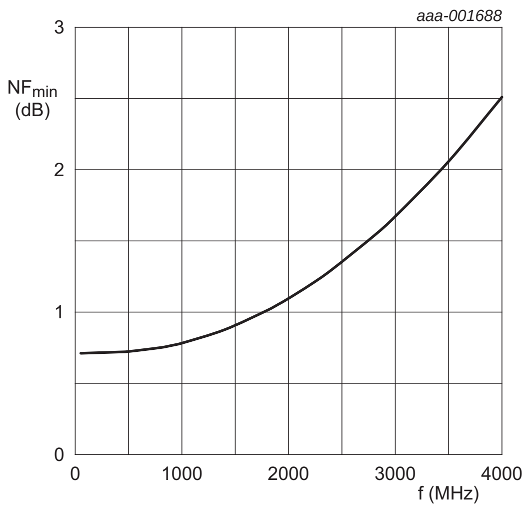
(3) V_{CC} = 5 V

Fig 6. Output power at 1 dB gain compression as a function of total supply current; typical values



T_{amb} = 25 °C; $I_{CC(tot)}$ = 3 mA; V_{CC} = 3 V; P_i = –30 dBm.

Fig 7. Insertion power gain ($|s_{21}|^2$) as a function of frequency; typical values



T_{amb} = 25 °C; $I_{CC(tot)}$ = 3 mA; V_{CC} = 3 V.

Fig 8. Minimum noise figure as a function of frequency; typical values

10. Application information

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

All measurements are done with the SAM connector as reference plane.

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]

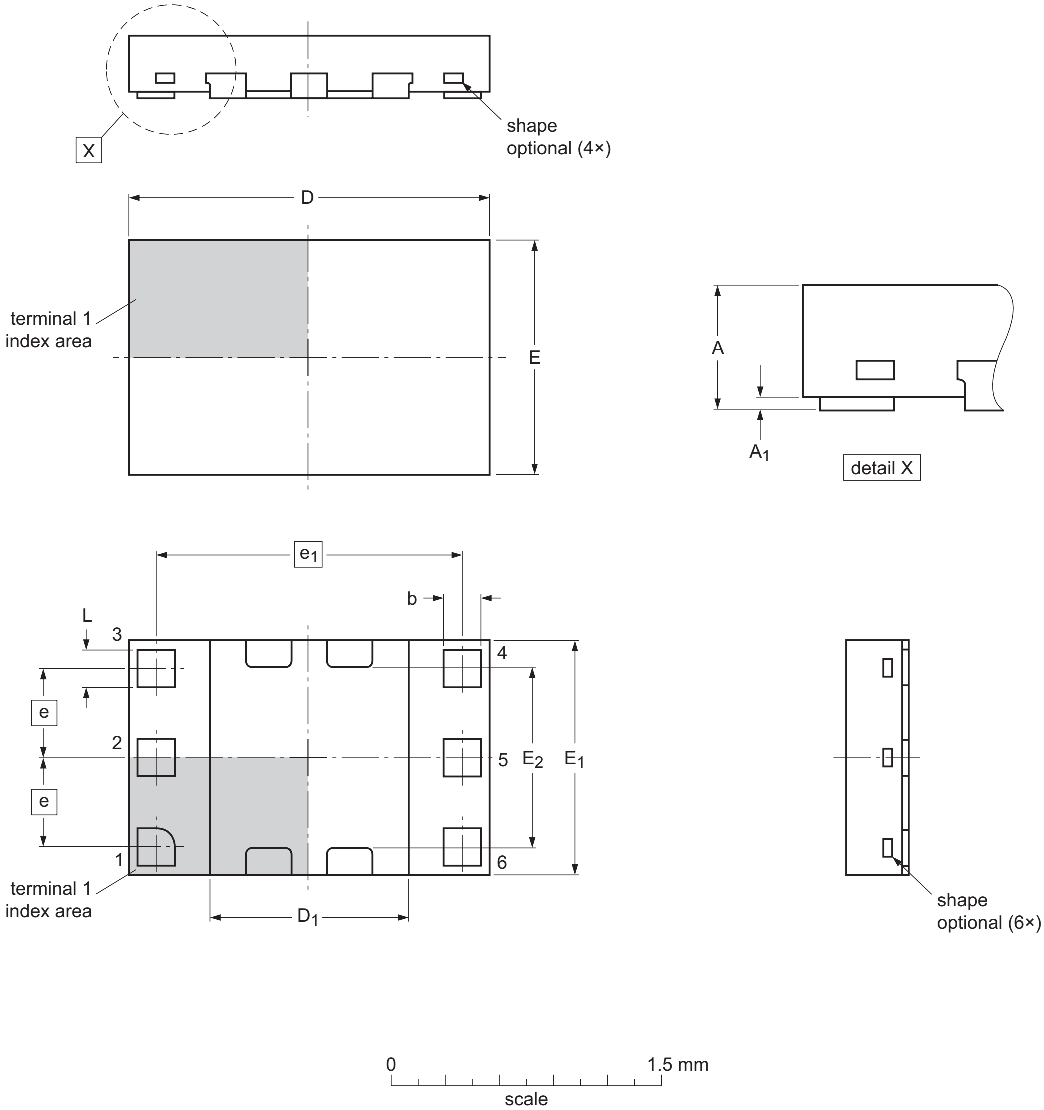
T_{amb} = 25 °C; V_{CC} = 2.8 V; $I_{CC(tot)}$ = 4.3 mA; f = 100 MHz; measurements done on 50 Ω application board.

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				0.15
	nom								1.0	0.5	1.7	
	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 9. Package outline SOT1209

12. Abbreviations

Table 12. Abbreviations

Acronym	Description
AMR	Automated Meter Reading
CMMB	China Mobile Multimedia Broadcasting
ESD	ElectroStatic Discharge
FM	Frequency Modulation
ISM	Industrial Scientific Medical
LNA	Low-Noise Amplifier
MMIC	Monolithic Microwave Integrated Circuit
RKE	Remote Keyless Entry
TPMS	Tire-Pressure Monitoring System
WLAN	Wireless Local Area Network

13. Revision history

Table 13. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BGU6102 v.3	20120713	Product data sheet	-	BGU6102 v.2
Modifications:	• Table 3 on page 2: swapped the descriptions of OM7809 and OM7810. • Table 5 on page 3: changed the layout in order to remove the white gap on the next page and to reduce the page count with one page.			
BGU6102 v.2	20120203	Product data sheet	-	BGU6102 v.1
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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