BGU6104

Wideband silicon low-noise amplifier MMIC

Rev. 2 — 3 February 2012 Product data sheet

1. Product profile

1.1 General description

The BGU6104 MMIC is an unmatched wideband MMIC featuring an integrated bias, enable function and wide supply voltage. BGU6104 is part of family of three products (BGU6101, BGU6102 and BGU6104) and is optimized for 4 mA operation.

1.2 Features and benefits

- Supply voltage range from 1.5 V to 5 V
- Current range up to 40 mA at 3 V and 50 mA at 5 V supply voltage
- NF_{min} of 0.8 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; $I_{CC(tot)}$ = 6.0 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
$\|s_{21}\|^2$	insertion power gain	f = 450 MHz	-	22.5	-	dB
		f = 900 MHz	-	18.5	-	dB
		f = 2400 MHz; $I_{CC(tot)}$ = 12 mA	-	12.8	-	dB
NF_{min}	minimum noise figure	f = 450 MHz	-	0.8	-	dB
		f = 900 MHz	-	0.8	-	dB
		f = 2400 MHz; $I_{CC(tot)}$ = 12 mA	-	1.1	-	dB

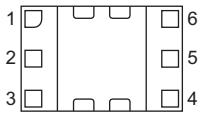
Table 1. Quick reference data *...continued*

T_{amb} = 25 °C; V_{CC} = 3.0 V; $I_{CC(tot)}$ = 6.0 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	-	0.5	-	dBm
		f = 900 MHz	-	0.5	-	dBm
		f = 2400 MHz; $I_{CC(tot)}$ = 12 mA	-	6.5	-	dBm
$IP3_O$	output third-order intercept point	f = 450 MHz	-	11	-	dBm
		f = 900 MHz	-	12	-	dBm
		f = 2400 MHz; $I_{CC(tot)}$ = 12 mA	-	18.5	-	dBm

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 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
BGU6104	HXSON6	plastic thermal enhanced super thin small outline package; no leads; 6 terminals; body 2 x 1.3 x 0.35 mm	SOT1209

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4. Marking

Table 4. Marking

Type number	Marking	Description
BGU6104	1C*	* = 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		-	50	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		-	3000	V
		Charged Device Model (CDM); According 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

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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]	3.7	-	40	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.

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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				
		$I_{CC(tot)}$ = 4 mA	-	21.5	-	dB
		$I_{CC(tot)}$ = 6 mA	-	25.0	-	dB
		$I_{CC(tot)}$ = 12 mA	-	29.5	-	dB
		$I_{CC(tot)}$ = 20 mA	-	32.0	-	dB
		$I_{CC(tot)}$ = 40 mA	-	35.0	-	dB
MSG	maximum stable gain	f = 100 MHz				
		$I_{CC(tot)}$ = 4 mA	-	29.5	-	dB
		$I_{CC(tot)}$ = 6 mA	-	31.0	-	dB
		$I_{CC(tot)}$ = 12 mA	-	33.5	-	dB
		$I_{CC(tot)}$ = 20 mA	-	35.5	-	dB
		$I_{CC(tot)}$ = 40 mA	-	37.5	-	dB
NF_{min}	minimum noise figure	f = 100 MHz				
		$I_{CC(tot)}$ = 4 mA	-	0.8	-	dB
		$I_{CC(tot)}$ = 6 mA	-	0.8	-	dB
		$I_{CC(tot)}$ = 12 mA	-	0.8	-	dB
		$I_{CC(tot)}$ = 20 mA	-	0.9	-	dB
		$I_{CC(tot)}$ = 40 mA	-	1.2	-	dB
$P_{L(1dB)}$	output power at 1 dB gain compression	f = 100 MHz				
		$I_{CC(tot)}$ = 4 mA	-	−1.0	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	1.0	-	dBm
		$I_{CC(tot)}$ = 12 mA	-	6.0	-	dBm
		$I_{CC(tot)}$ = 20 mA	-	9.5	-	dBm
		$I_{CC(tot)}$ = 40 mA	-	15.0	-	dBm
$IP3_O$	output third-order intercept point	f = 100 MHz				
		$I_{CC(tot)}$ = 4 mA	-	9.5	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	11.5	-	dBm
		$I_{CC(tot)}$ = 12 mA	-	16.0	-	dBm
		$I_{CC(tot)}$ = 20 mA	-	19.5	-	dBm
		$I_{CC(tot)}$ = 40 mA	-	26.0	-	dBm

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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				
		$I_{CC(tot)}$ = 4 mA	-	21.5	-	dB
		$I_{CC(tot)}$ = 6 mA	-	24.5	-	dB
		$I_{CC(tot)}$ = 12 mA	-	29.0	-	dB
		$I_{CC(tot)}$ = 20 mA	-	31.5	-	dB
		$I_{CC(tot)}$ = 40 mA	-	34.0	-	dB
MSG	maximum stable gain	f = 150 MHz				
		$I_{CC(tot)}$ = 4 mA	-	27.5	-	dB
		$I_{CC(tot)}$ = 6 mA	-	29.0	-	dB
		$I_{CC(tot)}$ = 12 mA	-	32.0	-	dB
		$I_{CC(tot)}$ = 20 mA	-	33.5	-	dB
		$I_{CC(tot)}$ = 40 mA	-	35.5	-	dB
NF_{min}	minimum noise figure	f = 150 MHz				
		$I_{CC(tot)}$ = 4 mA	-	0.8	-	dB
		$I_{CC(tot)}$ = 6 mA	-	0.8	-	dB
		$I_{CC(tot)}$ = 12 mA	-	0.8	-	dB
		$I_{CC(tot)}$ = 20 mA	-	0.9	-	dB
		$I_{CC(tot)}$ = 40 mA	-	1.2	-	dB
$P_{L(1dB)}$	output power at 1 dB gain compression	f = 150 MHz				
		$I_{CC(tot)}$ = 4 mA	-	−1.0	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	1.0	-	dBm
		$I_{CC(tot)}$ = 12 mA	-	5.5	-	dBm
		$I_{CC(tot)}$ = 20 mA	-	9.0	-	dBm
		$I_{CC(tot)}$ = 40 mA	-	15.0	-	dBm
$IP3_O$	output third-order intercept point	f = 150 MHz				
		$I_{CC(tot)}$ = 4 mA	-	9.5	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	11.5	-	dBm
		$I_{CC(tot)}$ = 12 mA	-	16.0	-	dBm
		$I_{CC(tot)}$ = 20 mA	-	19.5	-	dBm
		$I_{CC(tot)}$ = 40 mA	-	26.0	-	dBm

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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				
		$I_{CC(tot)}$ = 4 mA	-	20.0	-	dB
		$I_{CC(tot)}$ = 6 mA	-	22.5	-	dB
		$I_{CC(tot)}$ = 12 mA	-	25.5	-	dB
		$I_{CC(tot)}$ = 20 mA	-	27.5	-	dB
		$I_{CC(tot)}$ = 40 mA	-	28.5	-	dB
MSG	maximum stable gain	f = 450 MHz				
		$I_{CC(tot)}$ = 4 mA	-	23.0	-	dB
		$I_{CC(tot)}$ = 6 mA	-	24.5	-	dB
		$I_{CC(tot)}$ = 12 mA	-	27.0	-	dB
		$I_{CC(tot)}$ = 20 mA	-	29.0	-	dB
		$I_{CC(tot)}$ = 40 mA	-	30.5	-	dB
NF_{min}	minimum noise figure	f = 450 MHz				
		$I_{CC(tot)}$ = 4 mA	-	0.8	-	dB
		$I_{CC(tot)}$ = 6 mA	-	0.8	-	dB
		$I_{CC(tot)}$ = 12 mA	-	0.8	-	dB
		$I_{CC(tot)}$ = 20 mA	-	0.9	-	dB
		$I_{CC(tot)}$ = 40 mA	-	1.2	-	dB
$P_{L(1dB)}$	output power at 1 dB gain compression	f = 450 MHz				
		$I_{CC(tot)}$ = 4 mA	-	−2.0	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	0.5	-	dBm
		$I_{CC(tot)}$ = 12 mA	-	5.5	-	dBm
		$I_{CC(tot)}$ = 20 mA	-	10.0	-	dBm
		$I_{CC(tot)}$ = 40 mA	-	15.5	-	dBm
$IP3_O$	output third-order intercept point	f = 450 MHz				
		$I_{CC(tot)}$ = 4 mA	-	9.0	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	11.0	-	dBm
		$I_{CC(tot)}$ = 12 mA	-	17.0	-	dBm
		$I_{CC(tot)}$ = 20 mA	-	20.5	-	dBm
		$I_{CC(tot)}$ = 40 mA	-	26.0	-	dBm

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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				
		$I_{CC(tot)}$ = 4 mA	-	16.5	-	dB
		$I_{CC(tot)}$ = 6 mA	-	18.5	-	dB
		$I_{CC(tot)}$ = 12 mA	-	21.0	-	dB
		$I_{CC(tot)}$ = 20 mA	-	22.5	-	dB
		$I_{CC(tot)}$ = 40 mA	-	23.0	-	dB
MSG	maximum stable gain	f = 900 MHz				
		$I_{CC(tot)}$ = 4 mA	-	20.0	-	dB
		$I_{CC(tot)}$ = 6 mA	-	21.5	-	dB
		$I_{CC(tot)}$ = 12 mA	-	24.0	-	dB
		$I_{CC(tot)}$ = 20 mA	-	25.5	-	dB
		$I_{CC(tot)}$ = 40 mA	-	27.5	-	dB
NF_{min}	minimum noise figure	f = 900 MHz				
		$I_{CC(tot)}$ = 4 mA	-	0.9	-	dB
		$I_{CC(tot)}$ = 6 mA	-	0.8	-	dB
		$I_{CC(tot)}$ = 12 mA	-	0.8	-	dB
		$I_{CC(tot)}$ = 20 mA	-	0.9	-	dB
		$I_{CC(tot)}$ = 40 mA	-	1.1	-	dB
$P_{L(1dB)}$	output power at 1 dB gain compression	f = 900 MHz				
		$I_{CC(tot)}$ = 4 mA	-	−2.0	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	0.5	-	dBm
		$I_{CC(tot)}$ = 12 mA	-	6.0	-	dBm
		$I_{CC(tot)}$ = 20 mA	-	10.5	-	dBm
		$I_{CC(tot)}$ = 40 mA	-	16.0	-	dBm
$IP3_O$	output third-order intercept point	f = 900 MHz				
		$I_{CC(tot)}$ = 4 mA	-	9.5	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	12.0	-	dBm
		$I_{CC(tot)}$ = 12 mA	-	18.0	-	dBm
		$I_{CC(tot)}$ = 20 mA	-	21.5	-	dBm
		$I_{CC(tot)}$ = 40 mA	-	24.0	-	dBm

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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				
		$I_{CC(tot)}$ = 4 mA	-	13.0	-	dB
		$I_{CC(tot)}$ = 6 mA	-	14.5	-	dB
		$I_{CC(tot)}$ = 12 mA	-	17.0	-	dB
		$I_{CC(tot)}$ = 20 mA	-	18.0	-	dB
		$I_{CC(tot)}$ = 40 mA	-	19.0	-	dB
MSG	maximum stable gain	f = 1500 MHz				
		$I_{CC(tot)}$ = 4 mA	-	18.0	-	dB
		$I_{CC(tot)}$ = 6 mA	-	19.5	-	dB
		$I_{CC(tot)}$ = 12 mA	-	22.0	-	dB
		$I_{CC(tot)}$ = 20 mA	-	23.0	-	dB
		$I_{CC(tot)}$ = 40 mA	-	24.5	-	dB
NF_{min}	minimum noise figure	f = 1500 MHz				
		$I_{CC(tot)}$ = 4 mA	-	0.9	-	dB
		$I_{CC(tot)}$ = 6 mA	-	0.9	-	dB
		$I_{CC(tot)}$ = 12 mA	-	0.9	-	dB
		$I_{CC(tot)}$ = 20 mA	-	1.0	-	dB
		$I_{CC(tot)}$ = 40 mA	-	1.1	-	dB
$P_{L(1dB)}$	output power at 1 dB gain compression	f = 1500 MHz				
		$I_{CC(tot)}$ = 4 mA	-	−1.5	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	1.0	-	dBm
		$I_{CC(tot)}$ = 12 mA	-	6.5	-	dBm
		$I_{CC(tot)}$ = 20 mA	-	11.0	-	dBm
		$I_{CC(tot)}$ = 40 mA	-	16.5	-	dBm
$IP3_O$	output third-order intercept point	f = 1500 MHz				
		$I_{CC(tot)}$ = 4 mA	-	10.0	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	13.0	-	dBm
		$I_{CC(tot)}$ = 12 mA	-	18.5	-	dBm
		$I_{CC(tot)}$ = 20 mA	-	20.0	-	dBm
		$I_{CC(tot)}$ = 40 mA	-	22.0	-	dBm

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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				
		$I_{CC(tot)}$ = 4 mA	-	11.0	-	dB
		$I_{CC(tot)}$ = 6 mA	-	12.5	-	dB
		$I_{CC(tot)}$ = 12 mA	-	15.0	-	dB
		$I_{CC(tot)}$ = 20 mA	-	16.0	-	dB
		$I_{CC(tot)}$ = 40 mA	-	16.5	-	dB
MSG	maximum stable gain	f = 1900 MHz				
		$I_{CC(tot)}$ = 4 mA	-	17.0	-	dB
		$I_{CC(tot)}$ = 6 mA	-	18.5	-	dB
		$I_{CC(tot)}$ = 12 mA	-	20.5	-	dB
		$I_{CC(tot)}$ = 20 mA	-	22.0	-	dB
		$I_{CC(tot)}$ = 40 mA	-	23.0	-	dB
NF_{min}	minimum noise figure	f = 1900 MHz				
		$I_{CC(tot)}$ = 4 mA	-	1.1	-	dB
		$I_{CC(tot)}$ = 6 mA	-	1.0	-	dB
		$I_{CC(tot)}$ = 12 mA	-	1.0	-	dB
		$I_{CC(tot)}$ = 20 mA	-	1.0	-	dB
		$I_{CC(tot)}$ = 40 mA	-	1.2	-	dB
$P_{L(1dB)}$	output power at 1 dB gain compression	f = 1900 MHz				
		$I_{CC(tot)}$ = 4 mA	-	−1.5	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	1.5	-	dBm
		$I_{CC(tot)}$ = 12 mA	-	7.0	-	dBm
		$I_{CC(tot)}$ = 20 mA	-	11.5	-	dBm
		$I_{CC(tot)}$ = 40 mA	-	16.5	-	dBm
$IP3_O$	output third-order intercept point	f = 1900 MHz				
		$I_{CC(tot)}$ = 4 mA	-	9.5	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	12.5	-	dBm
		$I_{CC(tot)}$ = 12 mA	-	18.0	-	dBm
		$I_{CC(tot)}$ = 20 mA	-	20.0	-	dBm
		$I_{CC(tot)}$ = 40 mA	-	21.0	-	dBm

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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				
		$I_{CC(tot)}$ = 4 mA	-	9.0	-	dB
		$I_{CC(tot)}$ = 6 mA	-	10.5	-	dB
		$I_{CC(tot)}$ = 12 mA	-	12.5	-	dB
		$I_{CC(tot)}$ = 20 mA	-	13.5	-	dB
		$I_{CC(tot)}$ = 40 mA	-	14.5	-	dB
MSG	maximum stable gain	f = 2400 MHz				
		$I_{CC(tot)}$ = 4 mA	-	16.0	-	dB
		$I_{CC(tot)}$ = 6 mA	-	17.5	-	dB
		$I_{CC(tot)}$ = 12 mA	-	19.5	-	dB
		$I_{CC(tot)}$ = 20 mA	-	20.5	-	dB
		$I_{CC(tot)}$ = 40 mA	-	21.0	-	dB
NF_{min}	minimum noise figure	f = 2400 MHz				
		$I_{CC(tot)}$ = 4 mA	-	1.4	-	dB
		$I_{CC(tot)}$ = 6 mA	-	1.2	-	dB
		$I_{CC(tot)}$ = 12 mA	-	1.1	-	dB
		$I_{CC(tot)}$ = 20 mA	-	1.2	-	dB
		$I_{CC(tot)}$ = 40 mA	-	1.4	-	dB
$P_{L(1dB)}$	output power at 1 dB gain compression	f = 2400 MHz				
		$I_{CC(tot)}$ = 4 mA	-	−1.5	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	1.0	-	dBm
		$I_{CC(tot)}$ = 12 mA	-	6.5	-	dBm
		$I_{CC(tot)}$ = 20 mA	-	11.0	-	dBm
		$I_{CC(tot)}$ = 40 mA	-	16.0	-	dBm
$IP3_O$	output third-order intercept point	f = 2400 MHz				
		$I_{CC(tot)}$ = 4 mA	-	9.0	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	11.0	-	dBm
		$I_{CC(tot)}$ = 12 mA	-	18.5	-	dBm
		$I_{CC(tot)}$ = 20 mA	-	20.0	-	dBm
		$I_{CC(tot)}$ = 40 mA	-	21.0	-	dBm

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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				
		$I_{CC(tot)}$ = 4 mA	-	5.0	-	dB
		$I_{CC(tot)}$ = 6 mA	-	7.0	-	dB
		$I_{CC(tot)}$ = 12 mA	-	9.0	-	dB
		$I_{CC(tot)}$ = 20 mA	-	10.0	-	dB
		$I_{CC(tot)}$ = 40 mA	-	10.5	-	dB
MSG	maximum stable gain	f = 3500 MHz				
		$I_{CC(tot)}$ = 4 mA	-	15.0	-	dB
		$I_{CC(tot)}$ = 6 mA	-	16.0	-	dB
		$I_{CC(tot)}$ = 12 mA	-	16.0	-	dB
		$I_{CC(tot)}$ = 20 mA	-	16.0	-	dB
		$I_{CC(tot)}$ = 40 mA	-	16.5	-	dB
NF_{min}	minimum noise figure	f = 3500 MHz				
		$I_{CC(tot)}$ = 4 mA	-	2.2	-	dB
		$I_{CC(tot)}$ = 6 mA	-	2.1	-	dB
		$I_{CC(tot)}$ = 12 mA	-	1.9	-	dB
		$I_{CC(tot)}$ = 20 mA	-	1.9	-	dB
		$I_{CC(tot)}$ = 40 mA	-	2.0	-	dB
$P_{L(1dB)}$	output power at 1 dB gain compression	f = 3500 MHz				
		$I_{CC(tot)}$ = 4 mA	-	−2.5	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	0.0	-	dBm
		$I_{CC(tot)}$ = 12 mA	-	5.0	-	dBm
		$I_{CC(tot)}$ = 20 mA	-	9.0	-	dBm
		$I_{CC(tot)}$ = 40 mA	-	13.0	-	dBm
$IP3_O$	output third-order intercept point	f = 3500 MHz				
		$I_{CC(tot)}$ = 4 mA	-	9.0	-	dBm
		$I_{CC(tot)}$ = 6 mA	-	12.0	-	dBm
		$I_{CC(tot)}$ = 12 mA	-	17.0	-	dBm
		$I_{CC(tot)}$ = 20 mA	-	18.0	-	dBm
		$I_{CC(tot)}$ = 40 mA	-	22.0	-	dBm

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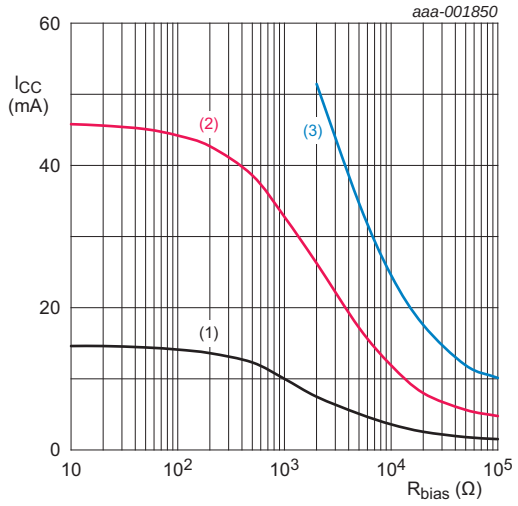
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9. Enable control

Table 9. ENABLE (pin 5)

−40 °C ≤ T_{amb} ≤ +85 °C

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



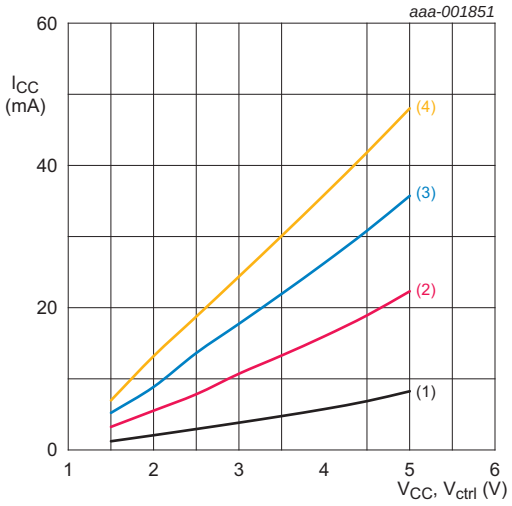
T_{amb} = 25 °C.

(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

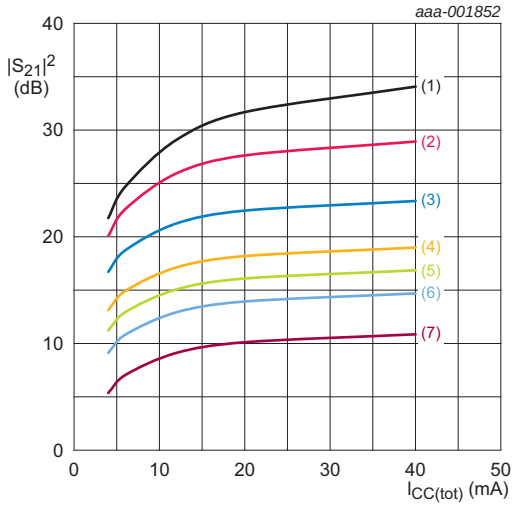
(3) R_{bias} = 4.7 kΩ

(4) R_{bias} = 2.4 kΩ

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

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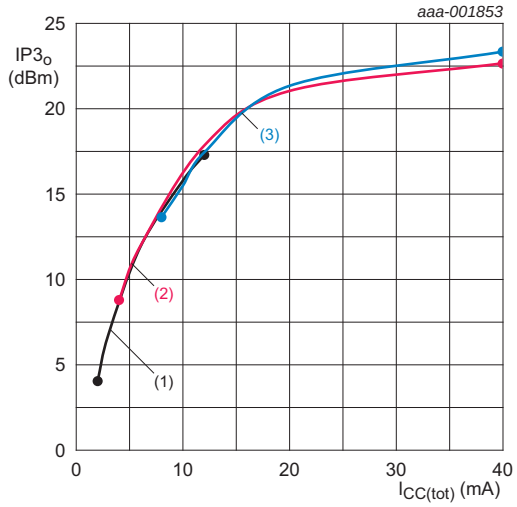
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T_{amb} = 25 °C; V_{CC} = 3 V; P_i = −30 dBm.

(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



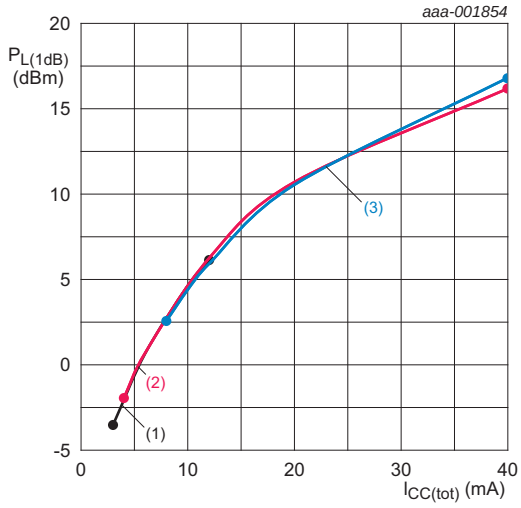
T_{amb} = 25 °C; f_1 = 900 MHz; f_2 = 900.2 MHz; P_i = −30 dBm.

(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

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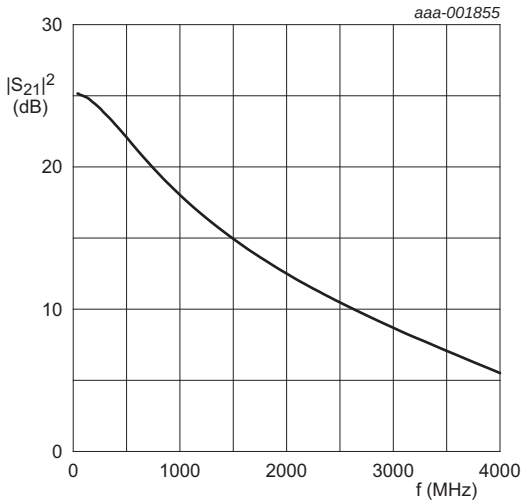
T_{amb} = 25 °C; f = 900 MHz.

(1) V_{CC} = 1.5 V

(2) V_{CC} = 3 V

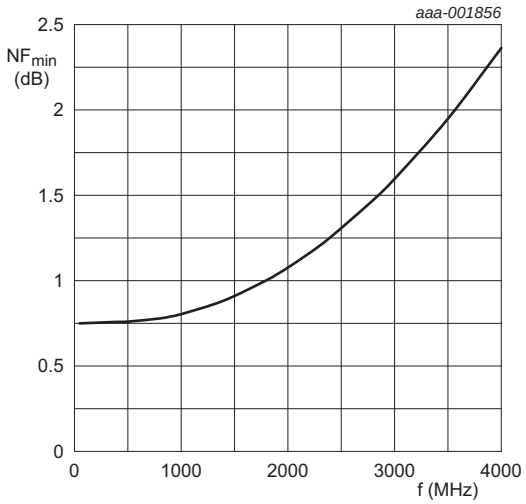
(3) V_{CC} = 5 V

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



T_{amb} = 25 °C; $I_{CC(tot)}$ = 6 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; $I_{CC(tot)}$ = 6 mA; V_{CC} = 3 V.

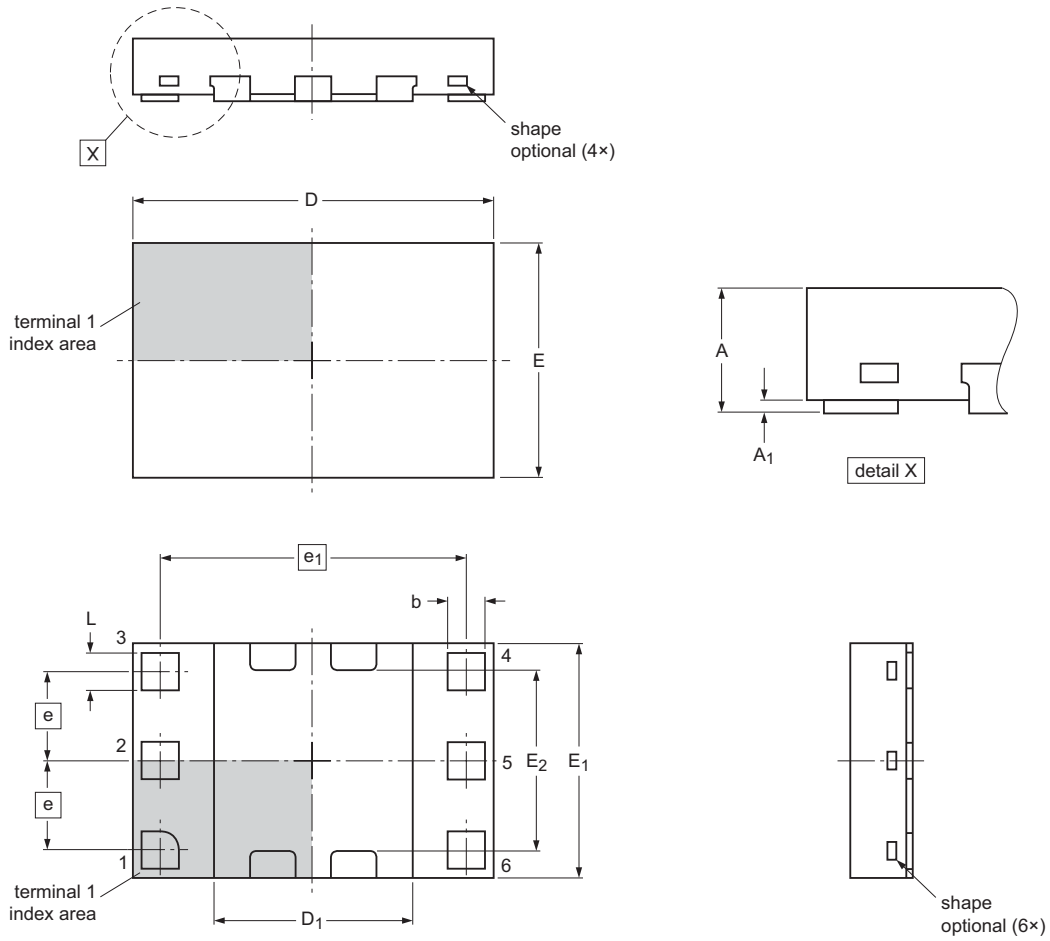
Fig 8. Minimum noise figure as a function of frequency; typical values

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10. 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

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11. Abbreviations

Table 10. Abbreviations

Acronym	Description
AC	Alternating Current
AMR	Automated Meter Reading
CMMB	China Mobile Multimedia Broadcasting
DC	Direct Current
ESD	ElectroStatic Discharge
FM	Frequency Modulation
ISM	Industrial Scientific Medical
MMIC	Monolithic Microwave Integrated Circuit
RF	Radio Frequency
RKE	Remote Keyless Entry
TPMS	Tire-Pressure Monitoring System
WLAN	Wireless Local Area Network

12. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BGU6104 v.2	20120203	Product data sheet	-	BGU6104 v.1
Modifications:	• Section 1 on page 1, Table 2 on page 2, Table 3 on page 2, Table 5 on page 3, Table 8 on page 5: Updated • Section 9 on page 13: Added figures			
BGU6104 v.1	20110921	Preliminary data sheet	-	-

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13.1 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".

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