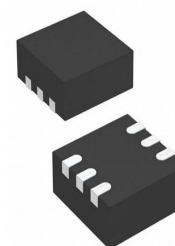


GNSS Low Noise Amplifier

PRODUCT DESCRIPTION

The MS2659F is high-gain, low-noise amplifier (LNA), supporting for GPS, BD2, GALILEO, and GLONASS applications. The MS2659F operates from a +1.5V to +3.6V single supply and consumes only 4.2mA. The MS2659F has lead LGA6 package.



LGA6

FEATURES

- Support for BDS, GPS, GALILEO, GLONASS Global Navigation Satellite Systems in L1 Frequency Band
- Typical Noise Figure : 0.80dB
- Typical Power Gain: 21.5dB
- Typical Input P1dB : -14dBm
- Operating Frequency : 1550MHz to 1615MHz
- Consume Current : 4.2mA
- Wide Power Supply : 1.5V to 3.6V
- ESD(HBM) : 2kV
- Integrated 50Ω Output Match Circuit
- Operating Temperature for External Circuit : -40°C to 120°C
- Storage Temperature : -40°C to 150°C

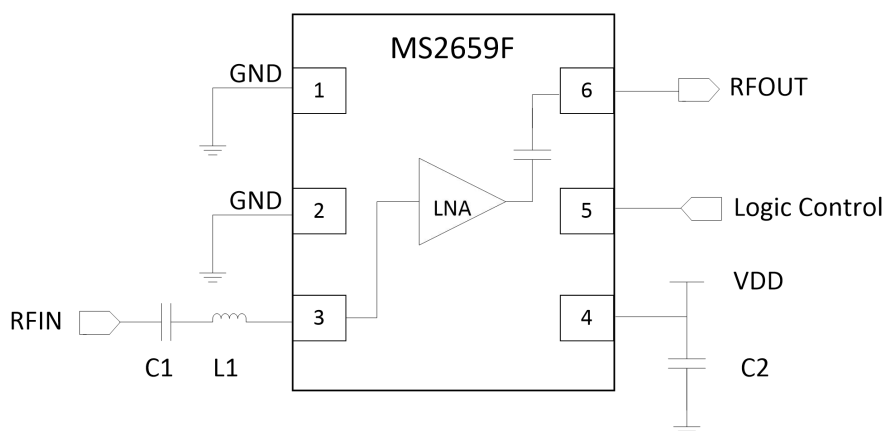
APPLICATIONS

- Automatic Navigation
- Location Mobile Device
- Personal Navigation Device
- Phone with GPS
- Notebook/Pad
- Underwater Navigation
- Aviation Device

PRODUCT SPECIFICATION

Part Number	Package	Marking
MS2659F	LGA6	69F

PIN CONFIGURATION



PIN DESCRIPTION

Pin	Name	Type	Description
1, 2	GND	-	Ground
3	RFIN	I	RF Input
4	VDD	-	Power Supply
5	$\overline{\text{SHDN}}$	I	Operation (High-level), Sleep (Low-level)
6	RFOUT	O	RF Output

External Component Description

Component	Description
C1	LNA Input Block Capacitance, 470pF
C2	Power Bypass Capacitance, 33nF
L1	5.6nH

ABSOLUTE MAXIMUM RATINGS

Any exceeding absolute maximum rating application causes permanent damage to device. Because long-time absolute operation state affects device reliability. Absolute ratings just conclude from a series of extreme tests. It doesn't represent chip can operate normally in these extreme conditions.

Parameter	Ratings	Unit
VDD to GND	-0.3~5.0	V
RFIN to GND	-0.3~2.0	V
RFOUT to GND	-0.3~5.0	V
$\overline{\text{SHDN}}$ to GND	-0.3~5.0	V
RF Input Power	+20	dBm
Operating Temperature Range	-40~+120	°C
Lead Temperature(Soldering,10s)	+260	°C

ELECTRICAL CHARACTERISTICS

DC Characteristics

At room temperature

Parameter	Condition	Min	Typ	Max	Unit
Power Supply		1.5	3.0	3.6	V
Power Supply Current	$\overline{\text{SHDN}} = 1$		4.2		mA
	$\overline{\text{SHDN}} = 0$			1	uA
Digital Input Logic High Level		1.1			V
Digital Input Logic Low Level				0.4	V
RFIN DC Bias Voltage	$\overline{\text{SHDN}} = 1$		0.83		V

AC Characteristics 1

1575.42MHz center frequency, 3V power supply, at room temperature.

Parameter	Condition	Min	Typ	Max	Unit
Operating Frequency		1550	1575.42	1615	MHz
Power Gain			21.5		dB
Noise Figure			0.80	0.93	dB
Input Return Loss			16		dB
Output Return Loss			19		dB
Reverse Isolation			30		
Input IP3	Note 1		-5		dBm
Input P1dB			-14		dBm

Note 1: Adopt two signals with 5MHz and 10MHz deviating from center frequency(1575.42MHz) respectively, and the signal intensity is - 40dBm.

AC Characteristics 2

1561.098MHz center frequency, 3V power supply, at room temperature.

Parameter	Condition	Min	Typ	Max	Unit
Operating Frequency		1550	1561.098	1615	MHz
Power Gain			21.5		dB
Noise Figure			0.80	0.93	dB
Input Return Loss			15		dB
Output Return Loss			21		dB
Reverse Isolation			32		
Input IP3	Note 2		-5		dBm
Input P1dB			-14		dBm

Note 2: Adopt two signals with 5MHz and 10MHz deviating from center frequency (1561.098MHz) respectively, and the signal intensity is - 40dBm.

AC Characteristics 3

1602MHz center frequency, 3V power supply, at room temperature.

Parameter	Condition	Min	Typ	Max	Unit
Operating Frequency		1550	1602	1615	MHz
Power Gain			21.5		dB
Noise Figure			0.80	0.93	dB
Input Return Loss			19		dB
Output Return Loss			15		dB
Reverse Isolation			31		
Input IP3	Note 3		-5		dBm
Input P1dB			-14		dBm

Note 3: Adopt two signals with 5MHz and 10MHz deviating from center frequency (1602MHz) respectively, and the signal intensity is -40dBm.

TYPICAL OPERATION CHARACTERISTICS

The typical operating conditions: evaluation board test, 25°C temperature, 3V power supply, input center frequency signal, unless otherwise noted.

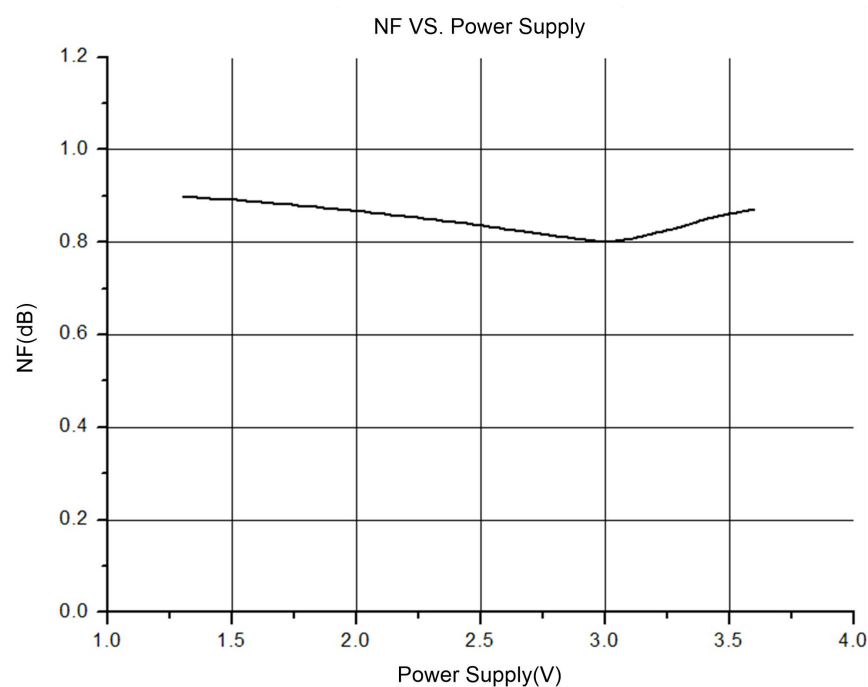


Figure 1. Noise Figure VS. Power Supply

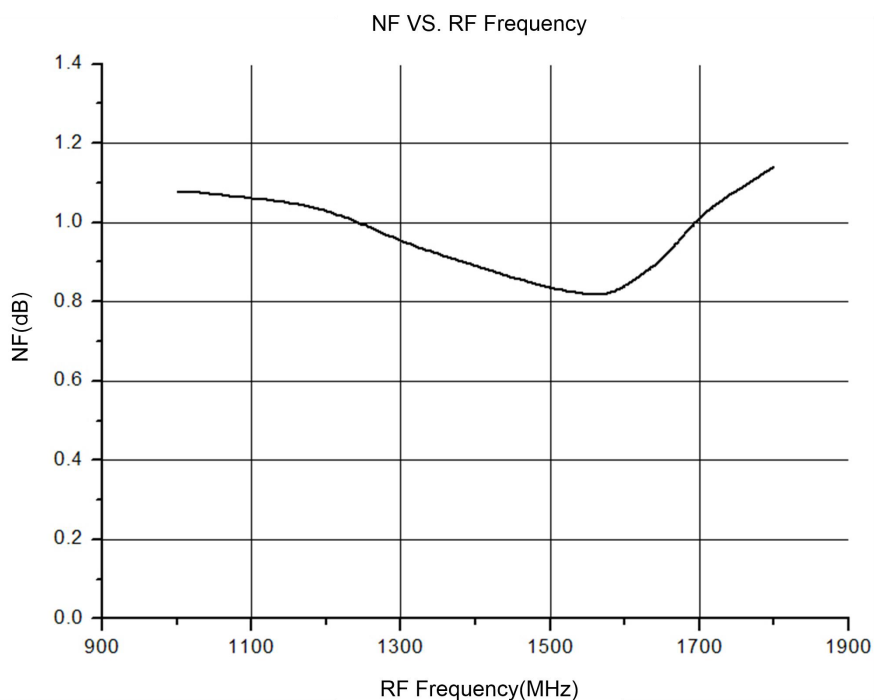


Figure 2. Noise Figure VS. RF Frequency

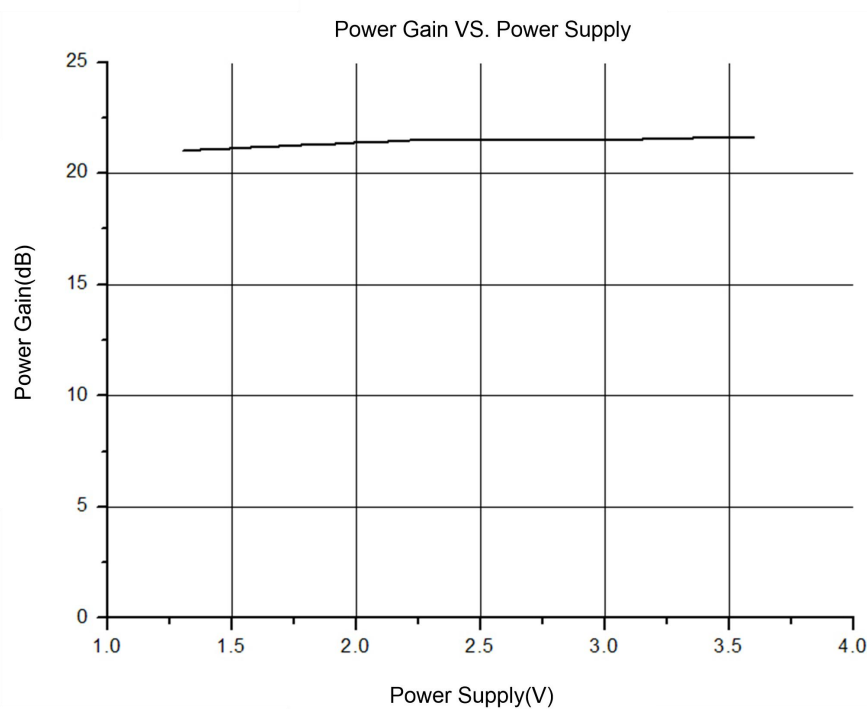


Figure 3. Power Gain VS. Power Supply

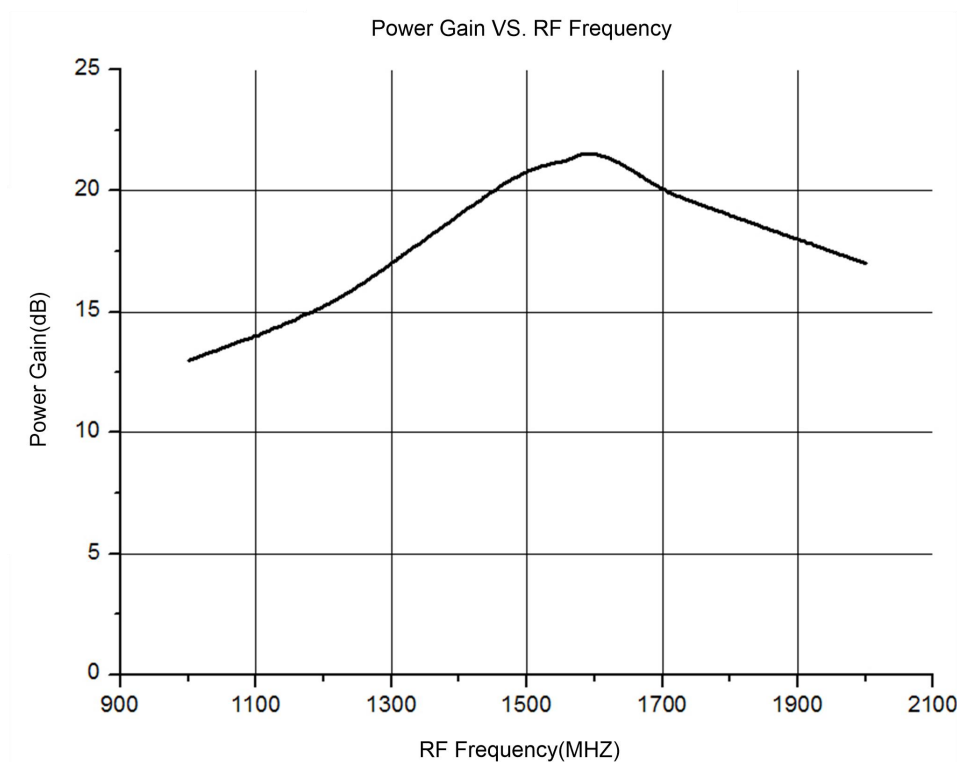


Figure 4. Power Gain VS. RF Frequency

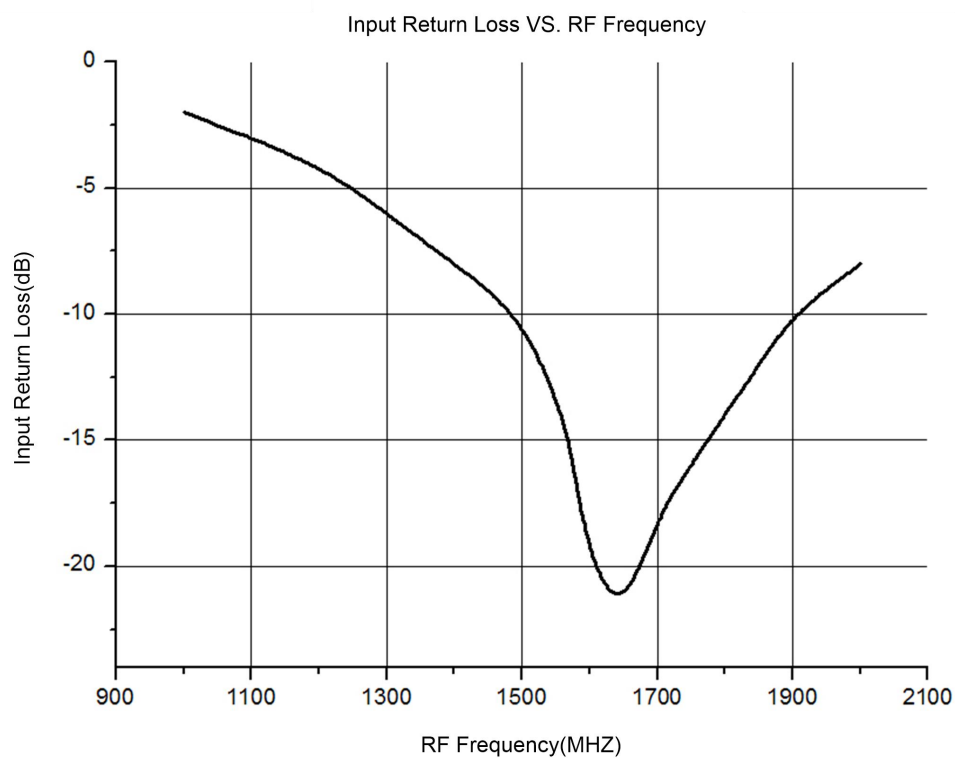


Figure 5. Input Return Loss VS. RF Frequency

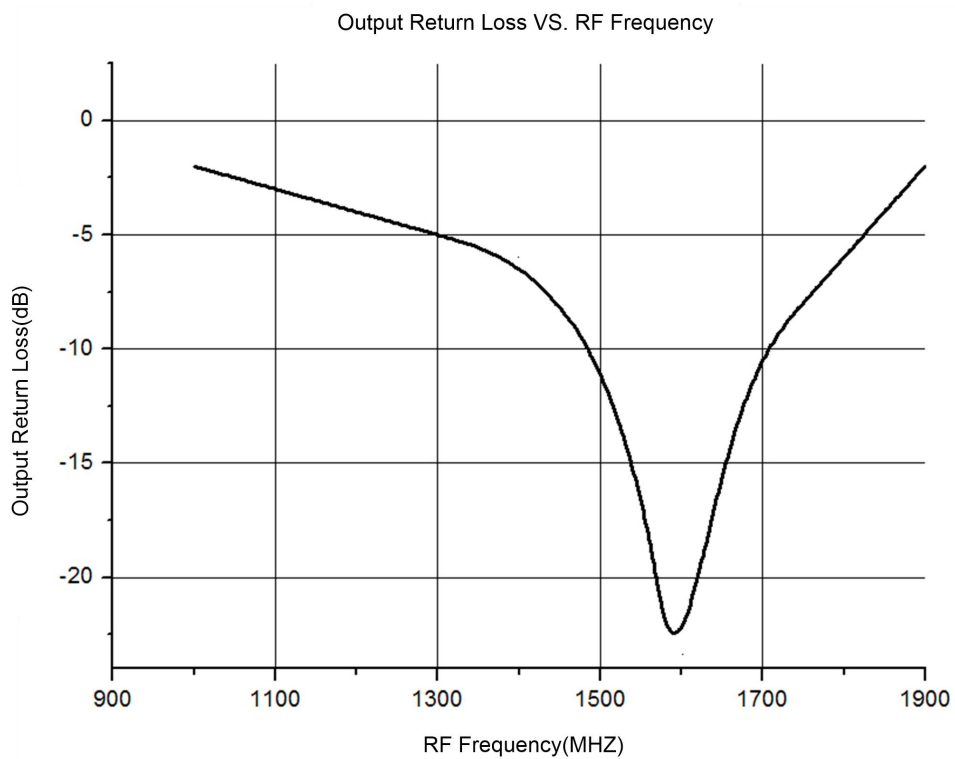
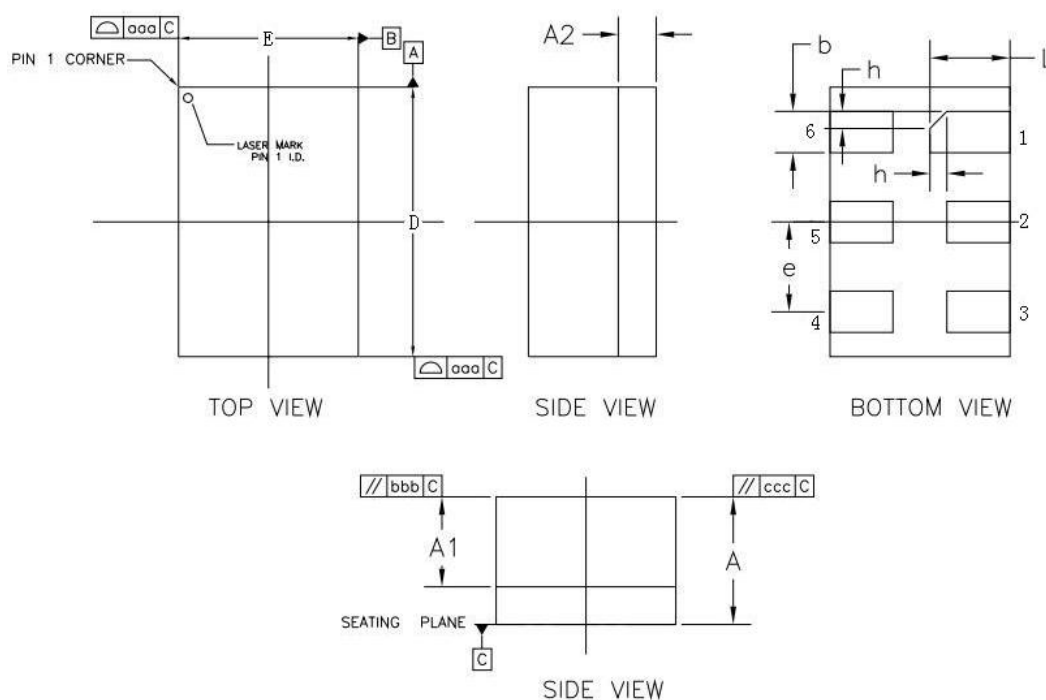


Figure 6. Output Return Loss VS. RF Frequency

PACKAGE OUTLINE DIMENSIONS

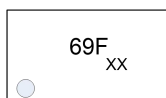
LGA6



Symbol	Millimeter		
	Min	Typ	Max
A			0.80
A2	0.17	0.21	0.25
A1	0.50BSC		
D	1.40	1.50	1.60
E	0.90	1.00	1.10
b	0.18	0.23	0.28
e	0.45	0.50	0.55
L	0.345	0.445	0.545
h	0.045	0.095	0.145
aaa	0.15		
bbb	0.25		
ccc	0.20		

MARKING and PACKAGING SPECIFICATIONS

1. Marking Drawing Description



Product Name : 69F

Product Code : XX

2. Marking Drawing Demand

Laser printing, contents in the middle, font type Arial.

3. Packaging Specifications

Device	Package	Piece/Reel	Reel/Box	Piece /Box	Box/Carton	Piece/Carton
MS2659F	LGA6	2500	10	25000	4	100000

STATEMENT

- All Revision Rights of Datasheets Reserved for Ruimeng. Don't release additional notice.
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- When using Ruimeng products to design and produce, purchaser has the responsibility to observe safety standard and adopt corresponding precautions, in order to avoid personal injury and property loss caused by potential failure risk.
- The process of improving product is endless. And our company would sincerely provide more excellent product for customer.

**MOS CIRCUIT OPERATION PRECAUTIONS**

Static electricity can be generated in many places. The following precautions can be taken to effectively prevent the damage of MOS circuit caused by electrostatic discharge:

1. The operator shall ground through the anti-static wristband.
2. The equipment shell must be grounded.
3. The tools used in the assembly process must be grounded.
4. Must use conductor packaging or anti-static materials packaging or transportation.



+86-571-89966911



Rm701, No.9 Building, No. 1 WeiYe Road, Puyan Street, Binjiang District, Hangzhou, Zhejiang



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