

SGM13001C Low Noise Amplifier for GNSS

GENERAL DESCRIPTION

The SGM13001C high gain, low noise amplifier (LNA) is dedicated to GPS, GLONASS Galileo and Beidou standards. This product has an extremely low noise figure of 0.83dB, 19.1dB gain and excellent linearity.

The SGM13001C works under a 1.6V to 3.1V single power supply while consumes 6.4mA current, in power down (PD) mode, the power consumption will be reduced to less than 1μ A.

The SGM13001C is available in a Green TDFN-1.5×1.0-6L package, RoHS compliant and halogen free. When no external DC is applied, there is no need for external DC blocking capacitors, thus saving PCB area and cost.

FEATURES

- High Gain: 19.1dB
- Low Noise Figure 0.83dB at 1575.42MHz
- Low Operation Current: 6.4mA and PD Current Less than 1µA
- Operating Frequency Range: 1550MHz to 1615MHz
- Single Supply Voltage Range: 1.6V to 3.1V
- Low Cost BOM
- Lead-Free and RoHS Compliant
- Available in a Green TDFN-1.5×1.0-6L Package

APPLICATIONS

Automotive Navigation
Personal Navigation Device (PND)
Cell Phone with GPS
MID/PAD with GPS

BLOCK DIAGRAM

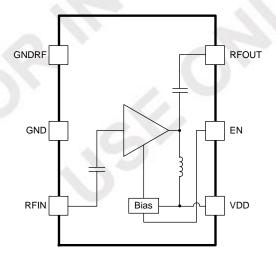


Figure 1. SGM13001C Block Diagram

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM13001C	TDFN-1.5×1.0-6L	-40°C to +85°C	SGM13001CYTEQ6G/TR	0G XX	Tape and Reel, 4000

MARKING INFORMATION

NOTE: XX = Date Code.

YY — Serial Number

X X

Date Code - Week

Date Code - Year

Green (RoHS & HSF): PS Micro Corp defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your PSMICRO representative directly.

ABSOLUTE MAXIMUM RATINGS

Supply Voltage, VDD	0.3V to 3.6V
Other Pin to GND	0.3V to V _{DD} + 0.3V
RF Input Power, PIN	10dBm
Junction Temperature	+150°C
Storage Temperature Range	55°C to +150°C
Lead Temperature (Soldering, 10s)	+260°C
ESD Susceptibility	
HBM	3000V
MM	150V
CDM	500V

RECOMMENDED OPERATING CONDITIONS

Operating Temperature Range-40°C to +85°C

OVERSTRESS CAUTION

Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Functional operation of the device at any conditions beyond those indicated in the Recommended Operating Conditions section is not implied.

ESD SENSITIVITY CAUTION

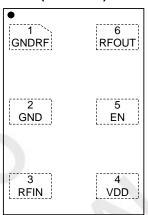
This integrated circuit can be damaged if ESD protections are not considered carefully. PSMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because even small parametric changes could cause the device not to meet the published specifications.

DISCLAIMER

PS Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

PIN CONFIGURATION

(TOP VIEW)



TDFN-1.5×1.0-6L

PIN DESCRIPTION

PIN	NAME	FUNCTION		
1	GNDRF	RF Ground.		
2	GND	Analog Ground.		
3	RFIN	LNA Input from Antenna.		
4	VDD	Power Supply.		
5	EN	Active High Enable Input for the Device. Pull high enable, pull low into power down mode.		
6	RFOUT	LNA Output.		

ELECTRICAL CHARACTERISTICS

 $(V_{DD} = 1.6V \text{ to } 3.1V, T_A = -40^{\circ}\text{C} \text{ to } +85^{\circ}\text{C}, f = 1550\text{MHz} \text{ to } 1615\text{MHz}, \text{ typical values are at } V_{DD} = 2.8V, T_A = +25^{\circ}\text{C}, f = 1575.42\text{MHz}, \text{ unless otherwise noted.})$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
DC Specifications						<u> </u>
Supply Voltage	V_{DD}	1.6			3.1	V
Cupply Current	I _{DD}	EN = High		6.4		mA
Supply Current	I _{SD}	EN = Low 0		0.2	1	μA
EN Input High	V _{IH}		1.35	1.8	V_{DD}	V
EN Input Low V _{IL}			0	0	0.45	_ v
AC Specifications						
RF Frequency Range	f_0	None		1575.42		MHz
Power Gain	S21	S21		19.1		dB
Noise Figure	NF		0.83		dB	
Input Return Loss	S11	S11		-4		dB
Output Return Loss	S22			-11		dB
Reverse Isolation	S12	Sweep Power -30dBm, 1575.42MHz		-27		dB
Desense		Jammed signal @ 1463MHz and 1712MHz, - 20dBm	1	0.25		dB
Stability	Kf	Frequency range from 500MHz to 5GHz	1			
Input Power 1dB Compression Point	P1dB	P1dB 1575MHz		-12		dBm
Input In-Band IP3	IIP3_inb	$f_1 = 1574.5$ MHz, $f_2 = 1575.5$ MHz, -30dBm		1		dBm
put Out-Band IP3 IIP3_outb $f_1 = 1712.7MHz$, -20dBm, $f_2 = 1850MHz$, -65dBm, IP3 = $(2 \times P1 + P2 + Gain1575MHz - IM3)/2$			3		dBm	

ELECTRICAL CHARACTERISTICS (continued)

 $(V_{DD} = 1.6V \text{ to } 3.1V, T_A = -40^{\circ}\text{C} \text{ to } +85^{\circ}\text{C}, f = 1550\text{MHz} \text{ to } 1615\text{MHz}, \text{ typical values are at } V_{DD} = 1.8V, T_A = +25^{\circ}\text{C}, f = 1575.42\text{MHz}, \text{ unless otherwise noted.})$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
DC Specifications						
Supply Voltage	V_{DD}	1.6			3.1	V
Cupply Current	I _{DD}	EN = High		6.3		mA
Supply Current	I _{SD}	EN = Low 0		0.1	1	μA
EN Input High	V _{IH}		1.35	1.8	V_{DD}	V
EN Input Low V _L			0	0	0.45	_ v
AC Specifications						
RF Frequency Range	f_0	f ₀ None		1575.42		MHz
Power Gain	S21			18.6		dB
Noise Figure	ure NF			0.84		dB
Input Return Loss	Loss S11		-4		dB	
Output Return Loss	S22			-11		dB
Reverse Isolation	S12	Sweep Power -30dBm, 1575.42MHz		-27		dB
Desense ΔNF Jammed signal @ 1463MHz a 20dBm		Jammed signal @ 1463MHz and 1712MHz, - 20dBm	1	0.25		dB
Stability	Kf	Frequency range from 500MHz to 5GHz	1			
Input Power 1dB Compression Point	P1dB		V	-17		dBm
Input In-Band IP3	IIP3_inb	$f_1 = 1574.5 \text{MHz}, f_2 = 1575.5 \text{MHz}, -30 \text{dBm}$		-1		dBm
put Out-Band IP3 IIP3_outb $f_1 = 1712.7MHz$, -20dBm, $f_2 = 1850MHz$, -65dBm, IP3 = $(2 \times P1 + P2 + Gain1575MHz - IM3)/2$			1		dBm	

TYPICAL APPLICATION CIRCUIT

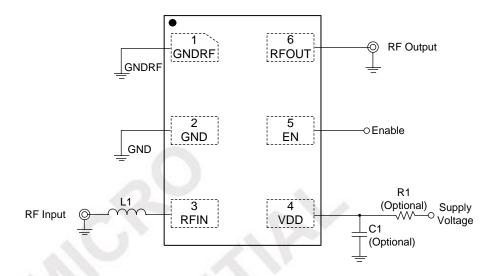


Figure 2. SGM13001C Typical Application Circuit

Table 1. SGM13001C Function Table

Component Vendor		Туре	Part Number & value		
L1	Murata	Wired inductor, high Q	LQW15AN9N1, 9.1nH		

EVALUATION BOARD LAYOUT

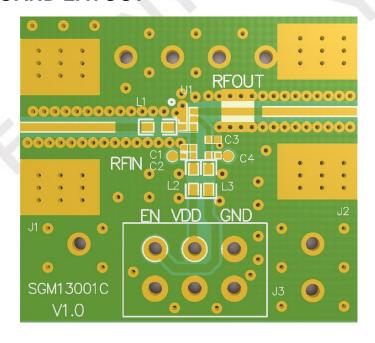


Figure 3. SGM13001C Evaluation Board Layout



For the latest specifications or product information:

Website: www.ps-micro.com.cn

Phone: 86-21-50772230

Email: info@ps-micro.com.cn

THE INFORMATION CONTAINED HEREIN IS BELIEVED TO BE RELIABLE. PSMICRO MAKES NO WARRANTIES REGARDING INFORMATION CONTAINED HEREIN. PSMICRO ASSUMES NO RESPONSIBILITIES OR LIABILITIES FOR THE USE OF THE INFORMATION CONTAINED HEREIN. THE INFORMATION CONTAINED HEREIN IS PROVIDED "AS IS, WHERE IS", AND THE ENTIRE RISK ASSOCIATED WITH SUCH INFORMATION IS ENTIRELY WITH THE USER. ALL INFORMATION CONTAINED HEREIN IS SUBJECT TO CHANGE WITHOUT NOTICE. THE INFORMATION CONTAINED HEREIN OR ANY USE OF SUCH INFORMATION DOES NOT GRANT, EXPLICITLY OR IMPLICITLY TO ANY PARTY ANY PATENT RIGHTS, LICENSES, OR ANY OTHER INTELLECTUAL PROPERTY RIGHTS, WHETHER WITH REGARD TO SUCH INFORMATION ITSELF OR ANYTHING DESCRIBED BY SUCH INFORMATION.

PSMICRO products are not warranted or authorized for use as critical components in medical, life-saving, or life-sustaining applications, or other applications where a failure would reasonably be expected to cause severe personal injury or death.

Copyright 2021, 2022 © PS Micro Corp | All rights reserved | Weedspread is a registered trademark of PS Micro Corp