

SK5119S

LNA for Global Navigation Satellite System (GNSS)

GENERAL DESCRIPTION

SK5119S high gain, low noise amplifier (LNA) is dedicated to GPS, GLONASS and Galileo standards. This product has an extremely low noise figure of 0.8dB, 19.5dB gain and excellent linearity.

SK5119S works under a 1.6V to 3.0V single power supply while consumes 7.5 mA current, in power down (PD) mode, the power consumption will be reduced to less than 1 μ A.

SK5119S uses a small 1mm $\times$ 1.5mm $\times$ 0.5mm DFN 6-pin package.

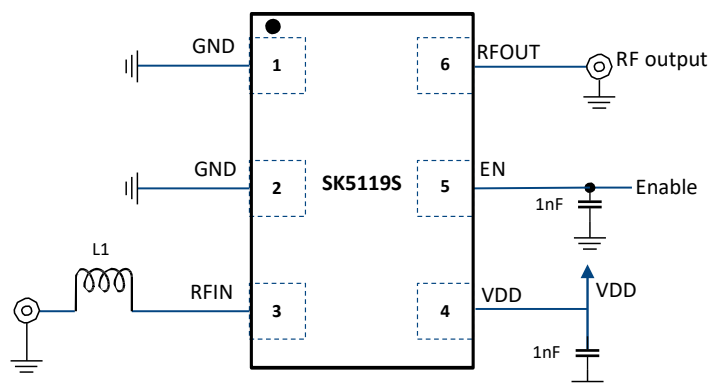
FEATURES

- High Gain: 19.5dB
- Low noise figure 0.8dB@1575.42MHz
- 4mA current under 1.8V power supply & PD current less than 1 μ A
- Single supply voltage range 1.6V to 3V
- Small package 1.0mm $\times$ 1.5mm $\times$ 0.5mm
- Low cost BOM
- Lead-Free and RoHS-Compliant

APPLICATIONS

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

TYPICAL APPLICATION CIRCUIT

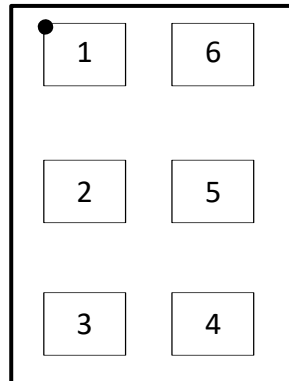


Recommend component

Number	Vendor	Type	Part Number
L1	Murata	Wired inductor, high Q	LQW15AN9N1, 9.1nH

PIN CONFIGURATION

TOP VIEW



DFN6

PIN DESCRIPTIONS

Pin #	Name	I/O	Description
1	GND	AG	Analog VSS
2	GND	AG	Analog VSS
3	RFIN	AI	LNA input from antenna
4	VDD	AP	Power supply, 1.6~3.0V
5	EN	DI	Pull high enable, pull low into power down mode
6	RFOUT	AO	LNA output

Note: DI (digital input), DO (digital output), DIO (digital bidirectional), AI (analog input), AO (analog output), AIO (analog bidirectional), AP (analog power), AG (analog ground)

ORDERING INFORMATION

Part Number	Package	Tape and Reel
SK5119S	1.5mm x 1.0 mm x 0.5mm DFN-6 pin	3000

ABSOLUTE MAXIMUM RATINGS

Parameters	Minimum	Maximum	Units
Power Supply	-0.3	3.3	V
Other Pin to GND	-0.3	VDD+0.3	V
RF input power		+15	dBm
Device Operating Temperature	-40	+85	°C
Soldering Temperature (reflow)		+260	°C
Human Body Model ESD	-2000	+2000	V
Charge Device Mode ESD	-500	+500	V

Note: Exposure to maximum rating conditions for extended periods may reduce device reliability. There is no damage to device with only one parameter set at the limit and all other parameters set at or below their nominal value. Exceeding any of the limits listed here may result in permanent damage to the device.

DC CHARACTERISTICS

Parameters	Test Condition	Min	Typ	Max	Units
Supply voltage		1.6	2.8	3.0	V
Supply current	EN=High, VDD=2.8	5	7.5	13	mA
	EN=High, VDD=1.8	3.0	4.0	6.0	
	EN=Low	0	0.1	1	μA
EN Input High		1.6	1.8	VDD	V
EN Input Low		0	0	0.3	V

AC CHARACTERISTICS

TA=-40~+85°C, typically TA=25°C,VDD=2.8V, all data measured on Suntek's EVB, unless otherwise noted.

Parameters	Test Condition	Min.	Typ.	Max.	Units
RF Operating frequency	None		1575.42		MHz
Power Gain		18	19.5		dB
	Note8	18	19.5		
Noise Figure		0.6	0.8		dB
Input Return Loss	Note1	-15	-10		dB
	Note8	-15	-10		
Output Return Loss	Note1		-10		dB
	Note8		-10		
Reverse Isolation	Note1		-25		dB
VSWR	Note1		1.9		
De-sense	Note2		0.25		dB
700M Harmonic	Note4		-46		dBm
Input Power 1-dB Compression Point	900MHz		-8		dBm
	1575MHz		-12		
	2400MHz		-6		
Input Out-Band IP2	Note7		42		dBm
Input In-Band IP3	Note4		-5		dBm
Input Out-Band IP3	Note5		+2		dBm
Stability	Note3	1.0			

Note1: sweep power -30dBm, 1575.42MHz

Note2: jammed signal @ 1463MHz & 1712MHz, -20dBm

Note3: frequency range 500MHz-5GHz

Note4: f1 = 787.76MHz, -25dBm, Input referred 2nd Harmonics

Note5: f1 = 1574.5 MHz, f2 = 1575.5 MHz, -30dBm

Note6: f1 = 1712.7 MHz, -20dBm, f2 = 1850 MHz, -65dBm, IP3= $(2 \cdot P1 + P2 + \text{Gain}_{1575\text{MHz}} - \text{IM3})/2$

Note7: f1 = 824.6 MHz, -25dBm, f2 = 2400 MHz, -32dBm, IP2 = $\text{Pin}_{\text{avg}} - (\text{IM2} - \text{Gain}_{1575\text{MHz}})$

Note8: Beidou frequency range B1: 1559.052MHz---1591.788MHz

AC CHARACTERISTICS

TA=-40~+85°C, typically TA=25°C, VDD=1.8V, all data measured on Suntek's EVB, unless otherwise noted.

Parameters	Test Condition	Min.	Typ.	Max.	Units
RF Operating frequency	None		1575.42		MHz
Power Gain		16	17.5		dB
	Note8	16	17.5		
Noise Figure		0.8	0.9		dB
Input Return Loss	Note1	-15	-10		dB
	Note8	-15	-10		
Output Return Loss	Note1		-10		dB
	Note8		-10		
Reverse Isolation	Note1		-23		dB
VSWR	Note1		1.9		
De-sense	Note2		0.35		dB
700M Harmonic	Note4		-44		dBm
Input Power 1-dB Compression Point	900MHz		1		dBm
	1575MHz		-10		
	2400MHz		-4		
Input Out-Band IP2	Note7		31		dBm
Input In-Band IP3	Note5		-5.5		dBm
Input Out-Band IP3	Note6		+1		dBm
Stability	Note3	1.0			

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ESD Sensitivity

Integrated circuits are ESD sensitive and can be damaged by static electric charge. Proper ESD protection techniques should be applied when devices are operated.

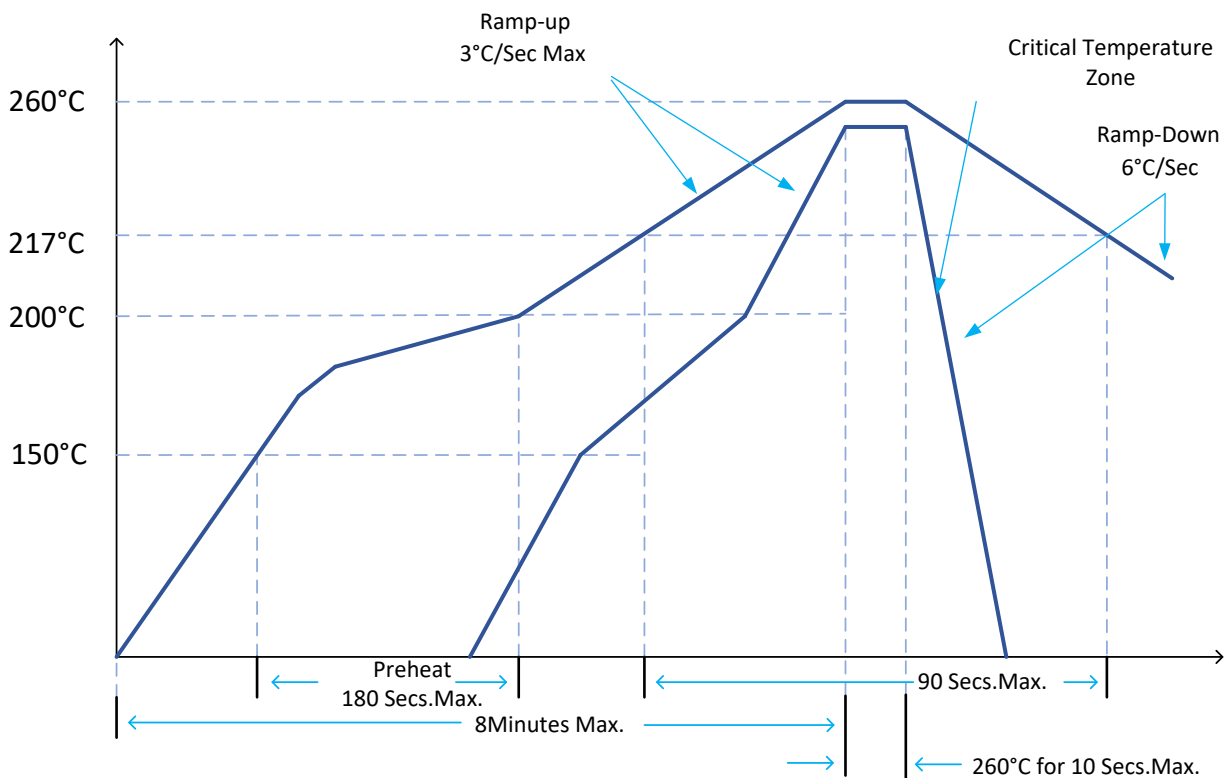
Temperature Sensitivity

Integrated circuits are recommended to be used within -40°C to 85°C , If used beyond 85°C , may result in permanent damage to the device.

RoHS Compliant

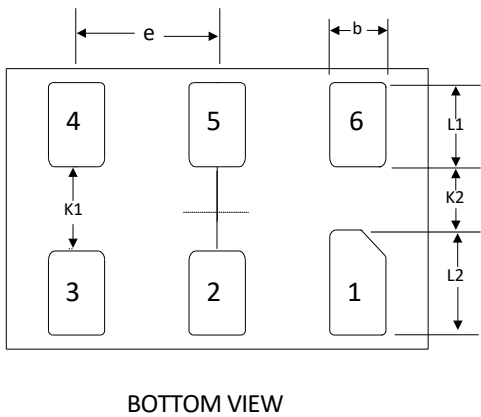
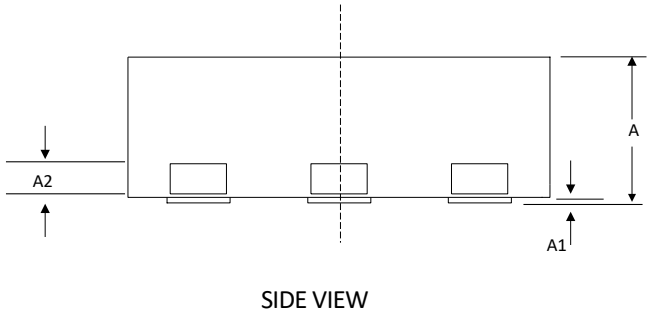
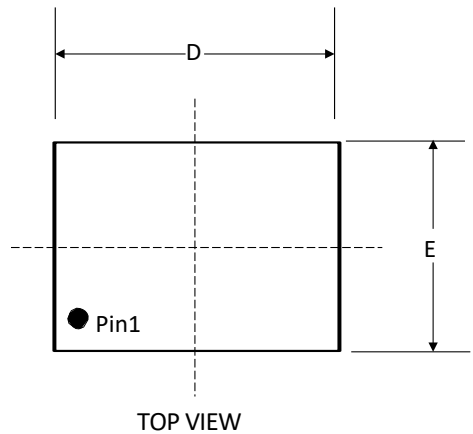
This product does not contain lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE) , and are considered RoHS compliant.

Reflow Chart



NOTE: Reflow Profile with 240°C peak also acceptable.

SK5119S



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.45	0.50	0.55
A1	0.00	0.02	0.05
A2	0.127REF		
b	0.17	0.20	0.23
D	1.45	1.50	1.55
E	0.95	1.00	1.05
e	0.45	0.50	0.55
K1	0.27	0.30	0.33
K2	0.195	0.225	0.255
L1	0.27	0.30	0.33
L2	0.345	0.375	0.405