WS7919S

CMOS high Gain GPS LNA

http//:www.sh-willsemi.com

Descriptions

The WS7919S is a low noise amplifier (LNA) for GNSS receiver applications (including GPS, GLONASS, BeiDou and Galileo), available in a small 6-pin DFN package. The WS7919S requires only one external inductor for input matching.
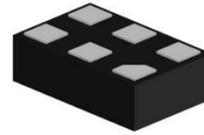
The WS7919S is designed to achieve low power dissipation and good performance.

DFN1107-6L (Bottom view)

Features

- Operating frequency: 1550 MHz to 1615 MHz
- Noise figure = 0.6 dB
- Gain = 17.0 dB
- Input 1 dB compression point = -6.5 dBm
- In-band input IP3 = +7 dBm
- Supply voltage: 1.8 V to 3.1 V
- Integrated supply decoupling capacitor
- Supply current: 5.9 mA
- Power-down mode leakage current < 3µA
- One external matching inductor required
- ESD protection: HBM > 2.0kV for all pins
- Integrated output matching
- Package: 6-pin DFN, 1.1 x 0.7 x 0.55 mm^3
- Process: CMOS
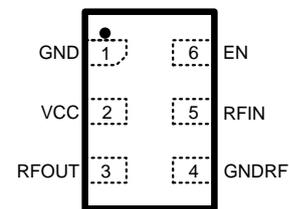
Pin configuration (Top view)

GND	1	6	EN
VCC	2	5	RFIN
RFOUT	3	4	GNDRF

S*
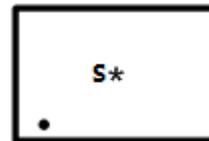
S = Device code

* = Month code（A~Z）

Marking (Top view)

Applications

- Cell phones
- Tablets
- Other RF front-end modules

Order information

Device	Package	Shipping
WS7919S-6/TR	DFN1107-6L	10000/Reel&Tape

Pinning information

Pin	Description	Transparent top view	Symbol view
1	GND		
2	VCC		
3	RFOUT		
4	GNDRF		
5	RFIN		
6	EN		
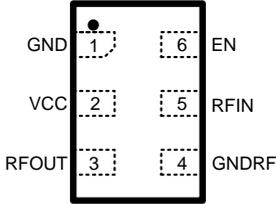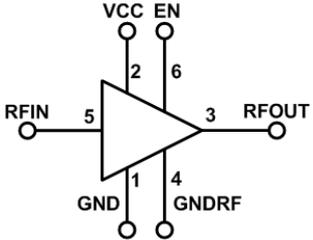
Application information
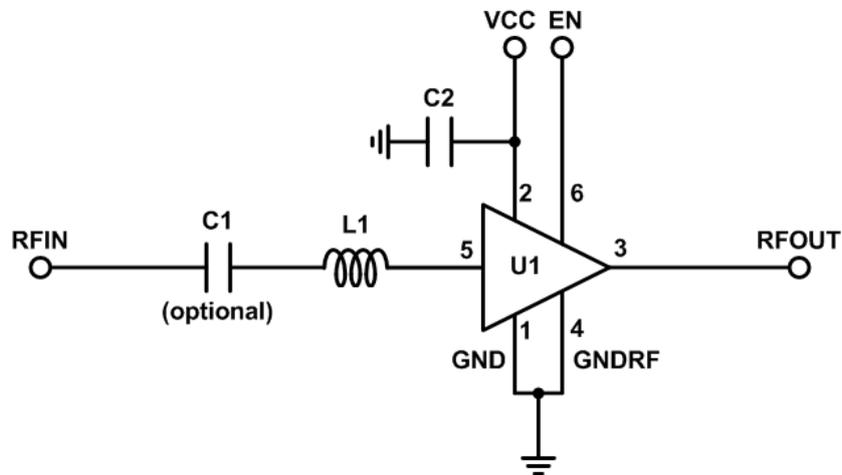
Symbol	Description	Footprint	Value	Supplier	Comment
U1	WS7919S	1.1x0.7x0.55 mm^3	N/A	Will-Semi	DUT
C1	Capacitor	0402	1 nF	Various	DC blocking
C2	Capacitor	0402	1 nF	Various	Supply decoupling
L1	Inductor	0402	10 nH	Murata LQW15	Input matching

Quick reference data

Freq = 1575.42 MHz; V_{CC} = 2.8 V; V_{EN} > 1.2 V; Temp = 25°C; input matched to 50 Ω with a 10 nH inductor. The condition is applied unless otherwise specified.

Symbol	Parameter	Condition	Min	Typ	Max	Unit
V_{CC}	Supply voltage		1.8	2.8	3.1	V
I_{CC}	Supply current			5.9		mA
G_p	Power gain			17.0		dB
NF	Noise figure			0.6		dB
IP_{1dB}	Input power at 1dB gain compression			-6.5		dBm
IIP_3	Input third-order intercept point			+7.0		dBm

Recommended operating conditions

Symbol	Parameter	Condition	Min	Typ	Max	Unit
V_{CC}	Supply voltage		1.8	2.8	3.1	V
Temp	Ambient temperature		-40	+25	+85	°C
V_{EN}	Input voltage on pin 6 (EN)	OFF state		0	0.3	V
		ON state	1.2	V_{CC}		V

Absolute maximum ratings

Maximum ratings are absolute ratings, exceeding only one of these values may cause irreversible damage to the integrated circuit.

| Symbol	Parameter	Condition	Min	Max	Unit
V_{CC}	Supply voltage		-0.3	3.1	V
V_{EN}	Input voltage on pin EN		-0.3	3.1	V
V_{RFIN}	Input voltage on pin RFIN		-0.3	3.1	V
V_{RFOUT}	Input voltage on pin RFOUT		-0.3	3.1	V
P_{in}	RF input power			0	dBm
T_{STG}	Storage temperature		-65	+150	°C
T_J	Junction temperature			150	°C
V_{ESD}	ESD capability all pins	Human Body Model (HBM)		±2000	V

Characteristics

1550 MHz ≤ f ≤ 1615 MHz; V_{CC} = 2.8 V; V_{EN} > 1.2 V; Temp = 25°C; input matched to 50 Ω with a 10 nH inductor. The condition is applied unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CC}	Supply current	On state		5.9		mA
		Off state			3	µA
G_p	Power gain	f = 1575 MHz		17.0		dB
RL_{in}	Input return loss	f = 1575 MHz		7.0		dB
RL_{out}	Output return loss	f = 1575 MHz		20.0		dB
ISL	Reverse isolation	f = 1575 MHz		30.0		dB
NF	Noise figure	f = 1575 MHz		0.6		dB
IP_{1dB}	Input power at 1 dB gain compression	f = 1575 MHz		-6.5		dBm
$O\text{-}IIP_3$	Out-of-band Input third-order intercept point [1]			+7.0		dBm
K	Rollett stability factor[2]		1			
t_{on}	Turn-on time				5	µs
t_{off}	Turn-off time				5	µs

[1] f_1 = 1713 MHz, f_2 = 1851 MHz, P_{in} = -20 dBm

[2] 10M~20GHz

Package outline dimensions

DFN1107-6L
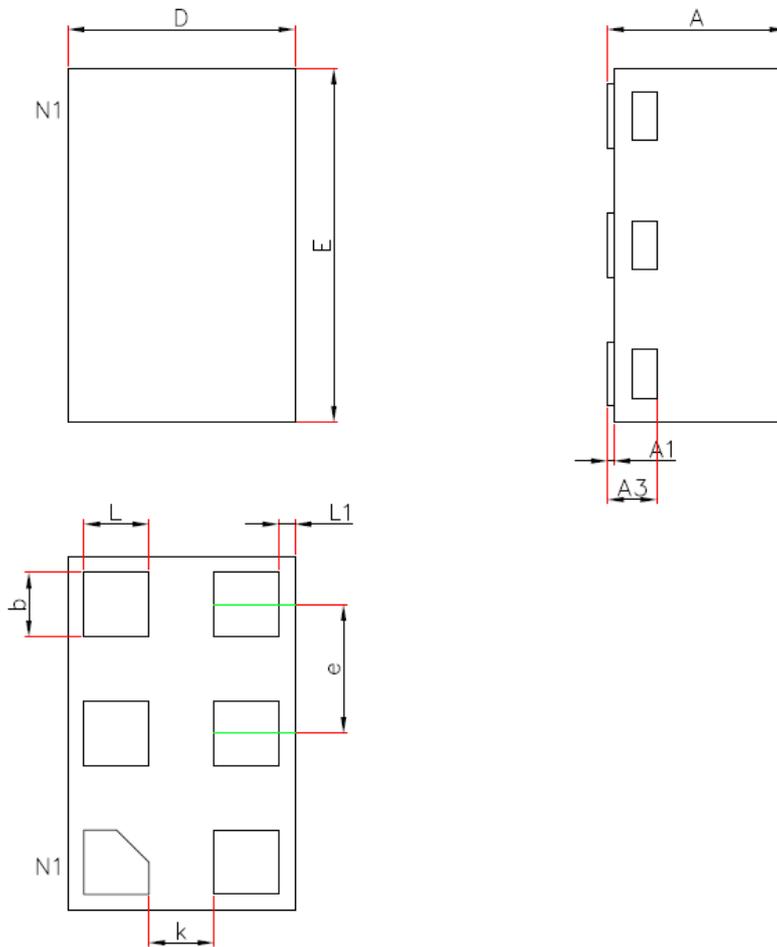
Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	0.500	0.550	0.600
A1	0.000	0.025	0.050
A3	0.152REF		
b	0.150	0.200	0.250
D	0.600	0.700	0.800
E	1.000	1.100	1.200
e	0.400BSC		
k	0.200REF		
L	0.124	0.200	0.276
L1	0.050REF		

Tape & Reel dimensions
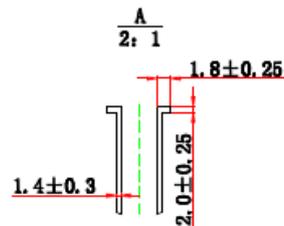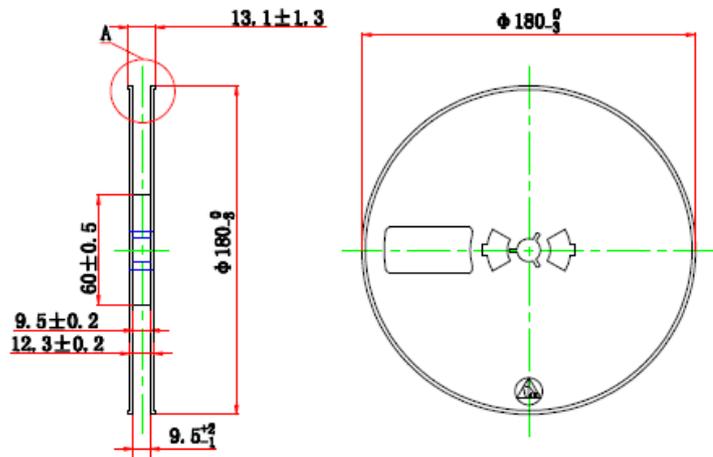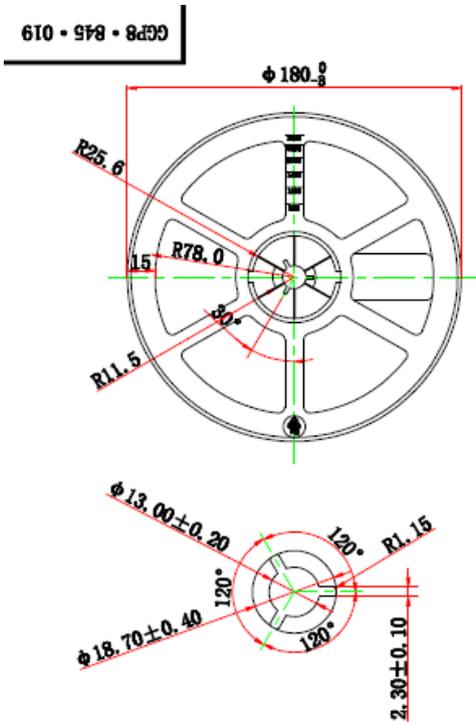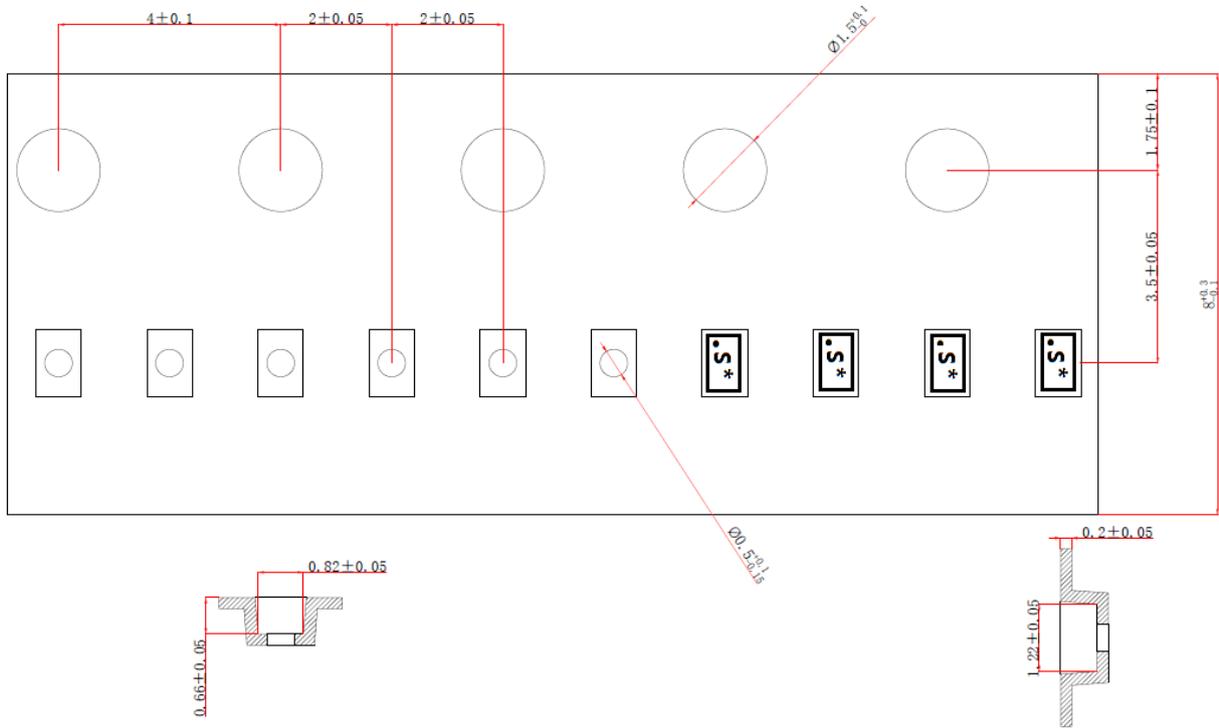
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