WS7918DC

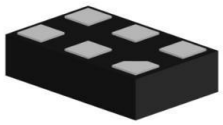
CMOS High Gain GPS LNA

http//:www.sh-willsemi.com

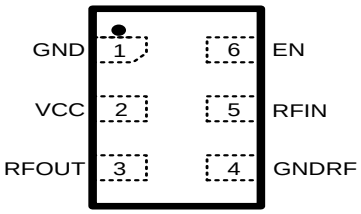
Descriptions

The WS7918DC is a low noise amplifier (LNA) for GPS receiver applications, available in a small 6-pin DFN package. The WS7918DC requires only one external inductor for input matching.

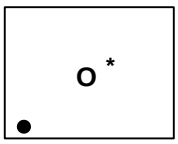
The WS7918DC is designed to achieve low power dissipation and good performance.



DFN1109-6L (Bottom view)



Pin configuration (Top view)



O = Device code

* = Month code（A~Z）

Marking (Top view)

Features

- Operating frequency: 1550 MHz to 1615 MHz
- Noise figure = 0.65 dB
- Gain = 16.5 dB
- Input 1 dB compression point = -5.0 dBm
- Out-band input IP3 = +5.0 dBm
- Supply voltage: 1.6 V to 3.1 V
- Integrated supply decoupling capacitor
- Supply current: 7.5 mA
- Power-down mode leakage current < 10μA
- One external matching inductor required
- Output decoupled to ground
- ESD protection: HBM > 2.0kV for all pins
- Integrated input/output DC block capacitor
- Integrated output matching
- Package: 6-pin DFN, 1.1 x 0.9 x 0.45 mm^3
- Process: CMOS

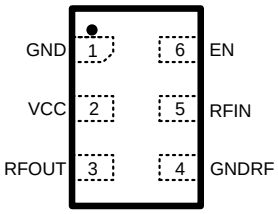
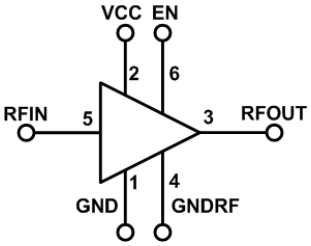
Applications

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

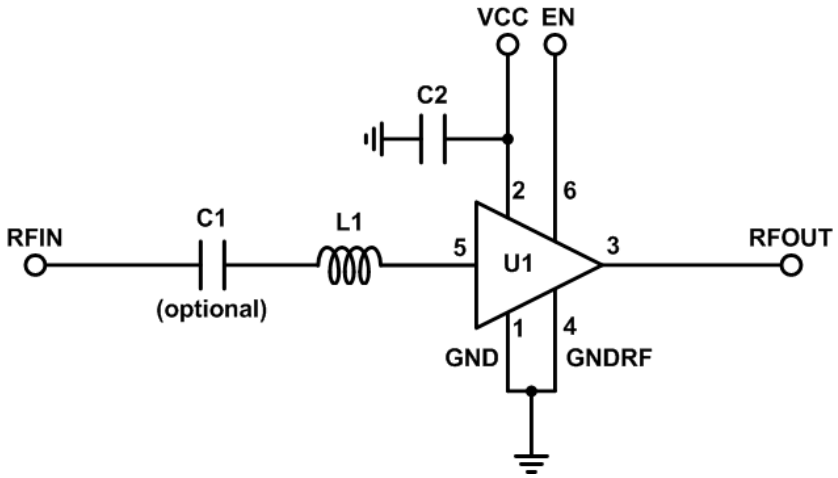
Order information

Device	Package	Shipping
WS7918DC-6/TR	DFN1109-6L	3000/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	WS7918DC	1.1x0.9x0.45 mm^3	NA	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		1.6	2.8	3.1	V
I_{CC}	Supply current			7.5		mA
G_p	Power gain			16.5		dB
NF	Noise figure			0.65		dB
IP_{1dB}	Input power at 1dBgain compression			-5.0		dBm
IIP_3	Input third-order intercept point			+5.0		dBm

Recommended Operating Conditions

Symbol	Parameter	Condition	Min	Typ	Max	Unit
V_{CC}	Supply voltage		1.6	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	3.3	V
V_{EN}	Input voltage on pin EN		-0.3	3.3	V
V_{RFIN}	Input voltage on pin RFIN		-0.3	3.3	V
V_{RFOUT}	Input voltage on pin RFOUT		-0.3	3.3	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 mated 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		7.5		mA
		Off state		8.0	10.0	μA
G_p	Power gain	f = 1575 MHz		16.5		dB
RL_{in}	Input return loss	f = 1575 MHz		6.5		dB
RL_{out}	Output return loss	f = 1575 MHz		18.0		dB
ISL	Reverse isolation	f = 1575 MHz		27.0		dB
NF	Noise figure	f = 1575 MHz		0.65		dB
IP_{1dB}	Input power at 1 dB gain compression	f = 1575 MHz		-5.0		dBm
IIP_3	Input third-order intercept point [1]			+5.0		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

1550 MHz ≤ f ≤ 1615 MHz; V_{CC} = 1.8 V; V_{EN} > 1.2 V; Temp = 25°C; input mated to 50 Ω with a 10 nH inductor; The condition is applied unless otherwise specified.

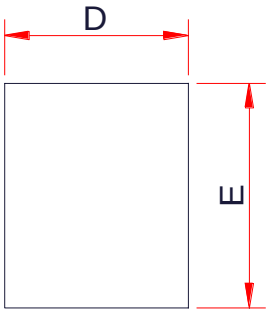
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CC}	Supply current	On state		8.0		mA
		Off state		4.5	5.5	μA
G_p	Power gain	f = 1575 MHz		16.0		dB
RL_{in}	Input return loss	f = 1575 MHz		6.3		dB
RL_{out}	Output return loss	f = 1575 MHz		18.0		dB
ISL	Reverse isolation	f = 1575 MHz		26.0		dB
NF	Noise figure	f = 1575 MHz		0.65		dB
IP_{1dB}	Input power at 1 dB gain compression	f = 1575 MHz		-7.0		dBm
IIP_3	Input third-order intercept point [1]			+3.0		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

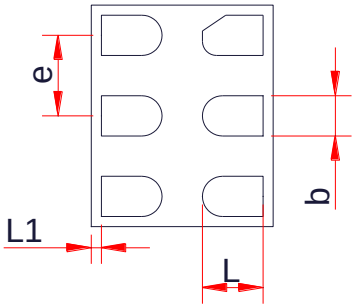
[2] 10M~20GHz

Package Outline Dimensions

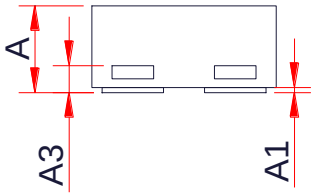
DFN1109-6L



TOP VIEW



BOTTOM VIEW

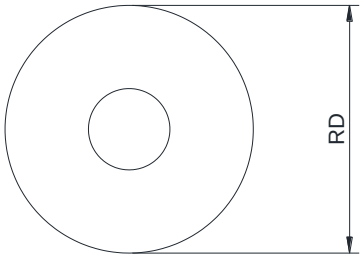


SIDE VIEW

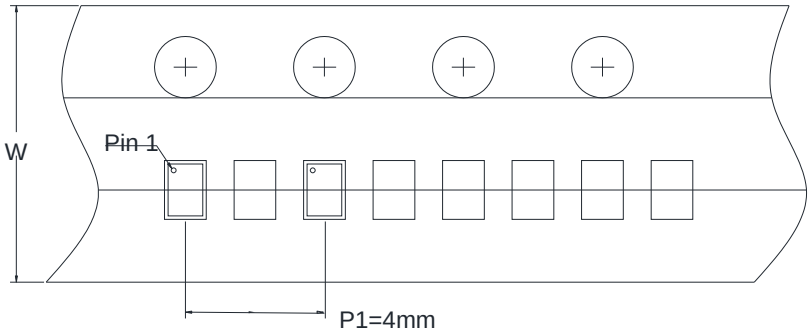
Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.40	0.45	0.50
A1	0.00	0.02	0.05
A3	0.15 Ref.		
b	0.15	0.20	0.25
D	0.80	0.90	1.00
E	1.00	1.10	1.20
e	0.40 BSC		
L	0.22	-	0.35
L1	0.05 Ref.		

Tape & Reel Dimensions

Reel Dimensions

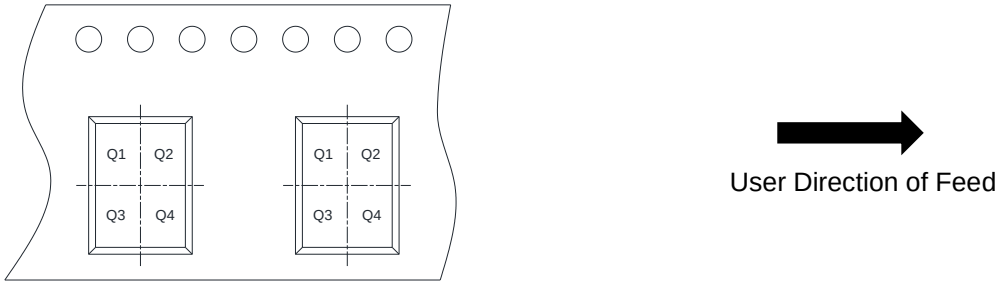


Tape Dimensions



Note：Tape material is plastic. Pitch between successive cavity centers is 2mm.

Quadrant Assignments For PIN1 Orientation In Tape



RD	Reel Dimension	☑ 7inch ☐ 13inch
W	Overall width of the carrier tape	☑ 8mm ☐ 12mm ☐ 16mm
P1	Pitch between successive chip centers	☐ 2mm ☑ 4mm ☐ 8mm
Pin1	Pin1 Quadrant	☑ Q1 ☐ Q2 ☐ Q3 ☐ Q4