WS7930D

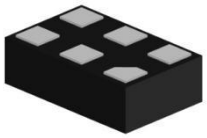
CMOS low band LTE LNA

http//:www.sh-willsemi.com

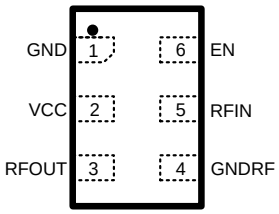
Descriptions

The WS7930D is a low noise amplifier (LNA) for LTE receiver applications, available in a small 6-pin DFN package. The WS7930D requires only one external inductor for input matching.

The WS7930D is designed to achieve low power dissipation and good performance. It is designed and optimized for the LTE low band: 728MHz to 960MHz.



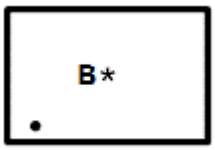
DFN1107-6L (Bottom view)



Pin configuration (Top view)

Features

- Operating frequency: 728 MHz to 960 MHz
- Noise figure = 1.0 dB
- Gain = 14.0 dB
- Input 1 dB compression point = 0 dBm
- In-band input IP3 = 0 dBm
- Supply voltage: 1.8 V to 3.1 V
- Integrated supply decoupling capacitor
- Supply current: 6.0 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



B = Device code

* = Month code（A~Z）

Marking (Top view)

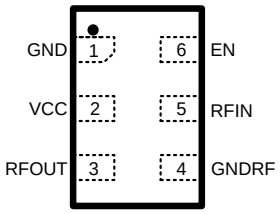
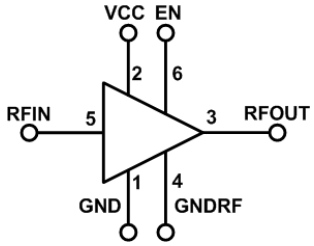
Applications

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

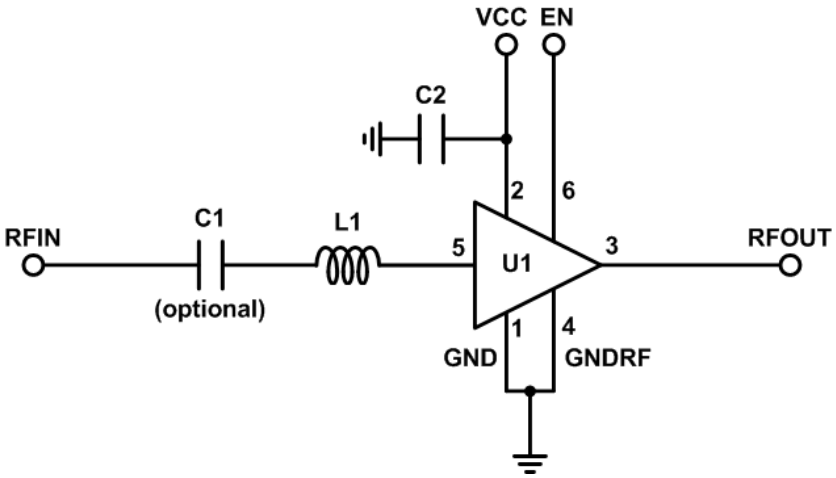
Order information

Device	Package	Shipping
WS7930D-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	WS7930D	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	22 nH	Murata LQW15	Input matching

Quick reference data

Freq = 882 MHz; V_{CC} = 2.8 V; V_{EN} > 1.2 V; Temp = 25°C; input matched to 50 Ω with a 22 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			6.0		mA
G_p	Power gain			14.0		dB
NF	Noise figure			1.0		dB
IP_{1dB}	Input power at 1 dB gain compression			0		dBm
IIP_3	Input third-order intercept point			0		dBm

Recommended operating conditions

Symbol	Parameter	Condition	Min	Typ	Max	Unit
V_{CC}	Supply voltage		1.8		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

728 MHz ≤ f ≤ 960 MHz; V_{CC} = 2.8 V; V_{EN} > 1.2 V; Temp = 25°C; input matched to 50 Ω with a 22 nH inductor; The condition is applied unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CC}	Supply current	On state		6.0		mA
		Off state			3	μA
G_p	Power gain	f = 740 MHz		13.5		dB
		f = 882 MHz		14.0		dB
		f = 943 MHz		13.5		dB
RL_{in}	Input return loss	f = 740 MHz		7.0		dB
		f = 882 MHz		13.5		dB
		f = 943 MHz		12.0		dB
RL_{out}	Output return loss	f = 740 MHz		11.0		dB
		f = 882 MHz		18.0		dB
		f = 943 MHz		11.0		dB
ISL	Reverse isolation	f = 740 MHz		34.0		dB
		f = 882 MHz		32.0		dB
		f = 943 MHz		32.0		dB
NF	Noise figure	f = 740 MHz		1.1		dB
		f = 882 MHz		1.0		dB
		f = 943 MHz		1.1		dB
IP_{1dB}	Input power at 1 dB gain compression	f = 740 MHz		0		dBm
		f = 882 MHz		0		dBm
		f = 943 MHz		0		dBm
IIP_3	Input third-order intercept point	f = 740 MHz[1]		1		dBm
		f = 882 MHz[2]		0		dBm
		f = 943 MHz[3]		1		dBm
K	Rollett stability factor[4]		1			
t_{on}	Turn-on time				5	μs
t_{off}	Turn-off time				5	μs

[1] f_1= 739 MHz, f_2 = 740 MHz, P_{in} = -30 dBm

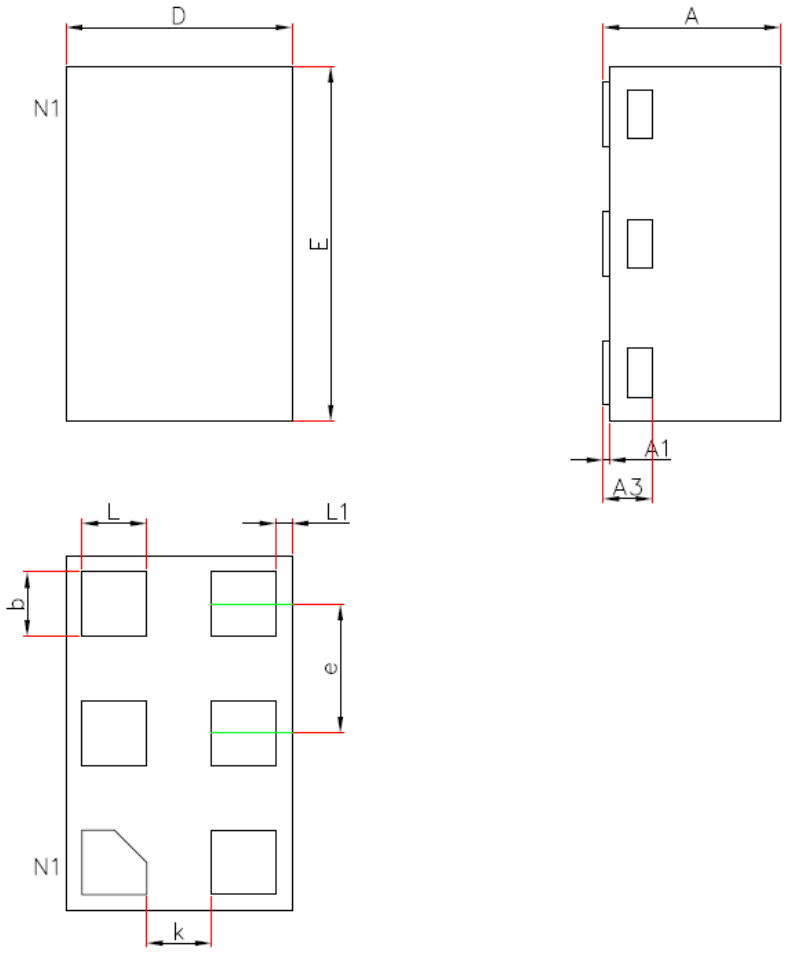
[2] f_1= 881 MHz, f_2 = 882 MHz, P_{in} = -30 dBm

[3] f_1= 942 MHz, f_2 = 943 MHz, P_{in} = -30 dBm

[4] 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