

## WS7932D

<http://www.sh-willsemi.com>

### CMOS high band LTE LNA

#### Descriptions

The WS7932D is a low noise amplifier (LNA) for LTE receiver applications, available in a small 6-pin DFN package. The WS7932D requires only one external inductor for input matching.

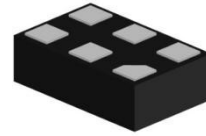
The WS7932D is designed to achieve low power dissipation and good performance. It is designed and optimized for the LTE high band: 2300MHz to 2690MHz.

#### Features

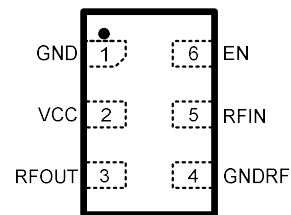
- Operating frequency: 2300 MHz to 2690 MHz
- Noise figure = 1.0 dB
- Gain = 12.5 dB
- Input 1 dB compression point = -3.0 dBm
- In-band input IP3 = +6.0 dBm
- Supply voltage: 1.8 V to 3.1 V
- Integrated supply decoupling capacitor
- Supply current: 5.8 mA
- Power-down mode leakage current < 1μA
- One external matching inductor required
- Output decoupled to ground
- ESD protection: HBM > 2.0kV for all pins
- Integrated output matching
- Package: 6-pin DFN, 1.1 x 0.7 x 0.55 mm<sup>3</sup>
- Process: CMOS

#### Applications

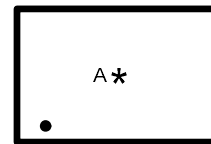
- Cell phones
- Tablets
- Other RF front-end modules



**DFN1107-6L (Bottom view)**



**Pin configuration (Top view)**



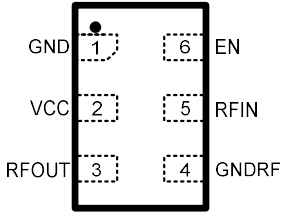
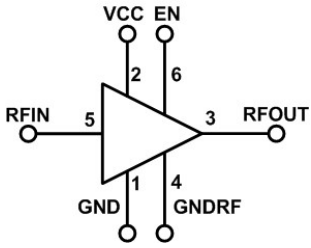
A = Device code  
\* = Month code (A~Z)

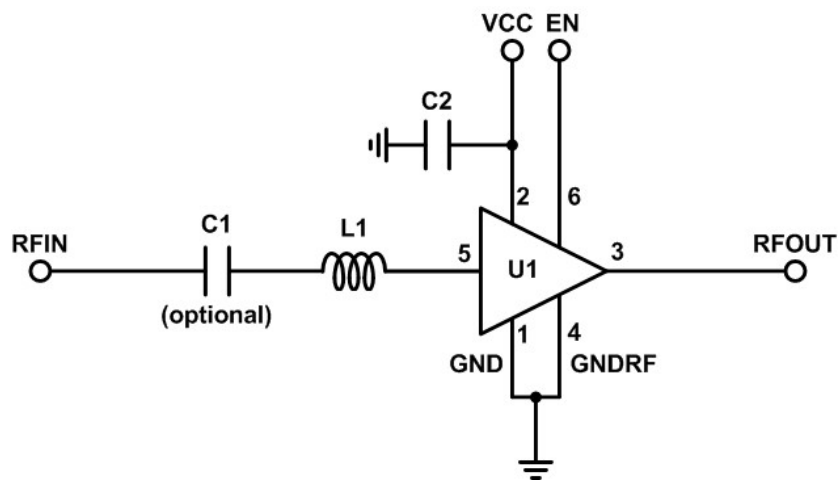
**Marking (Top view)**

#### Order information

Device	Package	Shipping
WS7932D-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	WS7932D	1.1x0.7x0.55 mm <sup>3</sup>	NA	Will-Semi	DUT
C1	Capacitor	0402	1 nF	Various	DC blocking
C2	Capacitor	0402	1 nF	Various	Supply decoupling
L1	Inductor	0402	5.6 nH	Murata LQW15	Input matching

### Quick reference data

freq = 2650 MHz;  $V_{CC} = 2.8\text{ V}$ ;  $V_{EN} > 2V_{CC}/3$ ; Temp = 25°C; input matched to 50  $\Omega$  with a 5.8 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			5.8		mA
$G_p$	Power gain			12.5		dB
NF	Noise figure			1.0		dB
$IP_{1dB}$	Input power at 1dB gain compression			-3.0		dBm
$IIP_3$	Input third-order intercept point			+6.0		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	$V_{CC}/3$	V
		ON state	$2V_{CC}/3$	$V_{CC}$		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)		$\pm 2000$	V

**Characteristics**

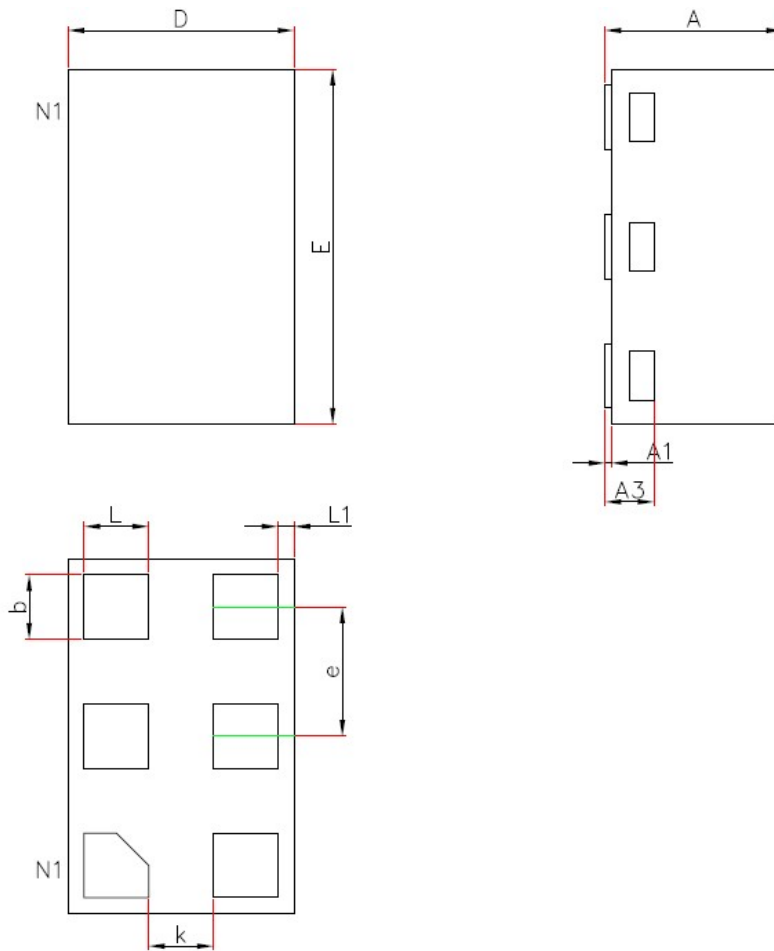
2300 MHz ≤ f ≤ 2690 MHz; V<sub>CC</sub> = 2.8 V; V<sub>EN</sub> > 2V<sub>CC</sub>/3; Temp = 25°C; input mated to 50 Ω with a 5.8 nH inductor; The condition is applied unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I <sub>CC</sub>	Supply current	On state		5.8		mA
		Off state			1	μA
G <sub>p</sub>	Power gain	f = 2350 MHz		12.5		dB
		f = 2650 MHz		12.0		dB
RL <sub>in</sub>	Input return loss	f = 2350 MHz		8.5		dB
		f = 2650 MHz		7.5		dB
RL <sub>out</sub>	Output return loss	f = 2350 MHz		10.0		dB
		f = 2650 MHz		14.5		dB
ISL	Reverse isolation	f = 2350 MHz		31.5		dB
		f = 2650 MHz		34.5		dB
NF	Noise figure	f = 2350 MHz		1.0		dB
		f = 2650 MHz		1.2		dB
IP <sub>1dB</sub>	Input power at 1 dB gain compression	f = 2350 MHz		-3.5		dBm
		f = 2650 MHz		-2.5		dBm
IIP <sub>3</sub>	Input third-order intercept point	f = 2350 MHz <sup>[1]</sup>		+5.0		dBm
		f = 2650 MHz <sup>[2]</sup>		+6.0		dBm
K	Rollett stability factor <sup>[3]</sup>		1			
t <sub>on</sub>	Turn-on time				5	μs
t <sub>off</sub>	Turn-off time				5	μs

[1] f<sub>1</sub> = 2340 MHz, f<sub>2</sub> = 2350 MHz, P<sub>in</sub> = -25 dBm

[2] f<sub>1</sub> = 2640 MHz, f<sub>2</sub> = 2650 MHz, P<sub>in</sub> = -25 dBm

[3] 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**
