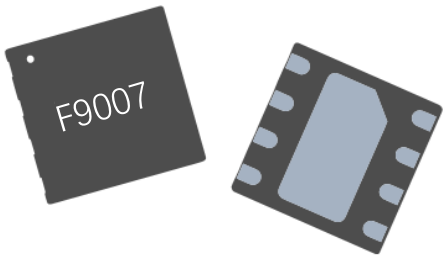
1. Description

- The F9007 is a linear LNA designed for SDARS, GPS, small cell and other high performance RF applications requiring ultra-low NF, high gain and linearity.
- The F9007 is an ideal LNA solution for high performance, multistage SDARS LNA designs offering a drop-in alternative to legacy SDARS LNA solutions.



F9007-PDS-F01

Figure 1. F9007 Package Outline

2. Applications

- SDARS LNA
- Cellular Boosters (Compensator)
- Cellular Infrastructure
- High Performance GPS/BDS

3. Features[1]

- Operating Frequency: 700-2700MHz
- Small Signal Gain: 22.0dB
- Output P1dB: 20.0dBm
- Output IP3: 39.0dBm
- Noise Figure: 0.3dB
- Operating Voltage/Current: 5V/75mA
- Package Size: 2.0 x 2.0 x 0.75mm

[1]. Measured in Raytron DEMO @1561MHz

4. Brief Typical Performance

Table 1. Brief Typical Performance

Parameter[1]	1268MHz	1561MHz	Units
Small Signal Gain	24.1	22.3	dB
Output P1dB[2]	18.7	20.0	dBm
Output IP3[3]	39.1	39.0	dBm
Noise Figure[4]	0.30	0.30	dB

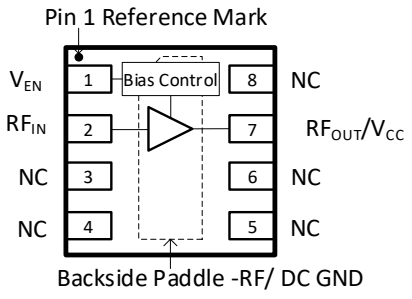
[1]. V_{DD}=5V, I_{DQ}=75mA,I_{EN}=3mA, Temp=25℃, 50Ω test system

[2]. Input signal: CW

[3]. Input signal: 2-tone, P_{OUT}=2dBm/tone, Δf=1MHz @ 1200MHz and 1500MHz

[4]. SMA to SMA data

5. Block Diagram



F9007-PDS-F02

Figure 2. F9007 Block Diagram TOP View

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6. Absolute Maximum Ratings

Table 2. Absolute Maximum Ratings

Parameter	Symbol	Rating	Units
Operating Voltage	V_{DD}	5.5	V
Storage Temperature Range	T_{STG}	- 55 ~ +125	°C
Operating Junction Temperature	T_J	150	°C

7. Recommended Operating Conditions

Table 3. Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Units
Operating Temperature Range	-40	25	105	°C
Operating Voltage (V_{DD}, V_{EN})	3	5.0	5.25	V
Operating Frequency	700	-	2700	MHz

8. Typical Performance

8.1 Typical Performance at 1200-1600MHz

8.1.1 Electronic Characteristics

Table 4. Electrical Characteristics (V_{DD}=V_{EN}=5V, I_{DQ}=75mA, I_{EN}=3mA, T_C=25℃, 50Ω test system)

Parameter	Conditions	Typical Values		Units
Frequency	-	1268	1561	MHz
Small Signal Gain	-	24.1	22.3	dB
Input Return Loss (S11)	-			dB
Output Return Loss (S22)	-			dB
Output P1dB	-	20.7	20.5	dBm
Output IP3	P_{OUT}=2dBm/tone, Δf=1MHz	39	39	dBm
Noise Figure	DEMO SMA to SMA	0.3	0.3	dB
Device Operating Current	-	75		mA

8.1.2 Performance Plot C

(V_{DD}=V_{EN}=5V, I_{DQ}=75mA, I_{EN}=3mA, T=25℃, 50Ω test system)

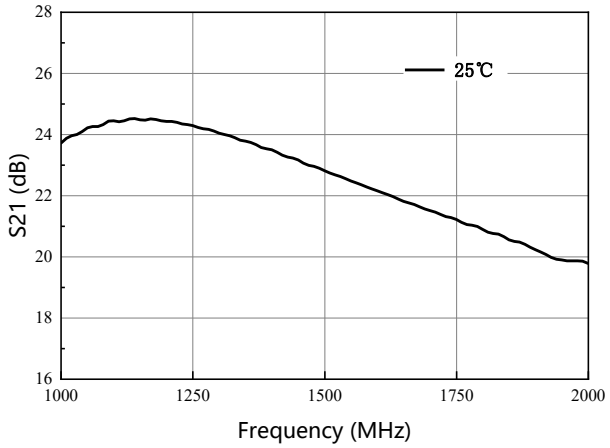


Figure 3. S21 vs. Freq. F9007-PDS-F03

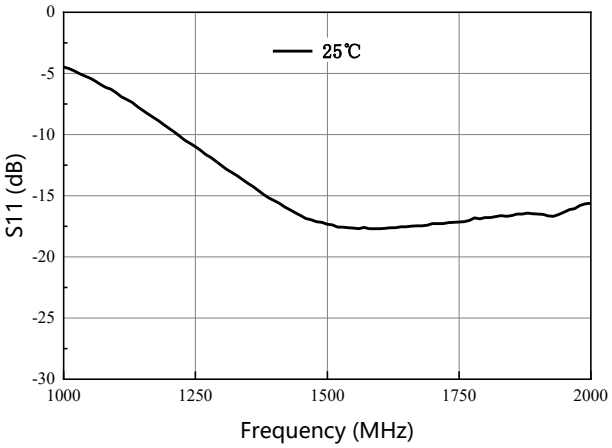


Figure 4. S11 vs. Freq. F9007-PDS-F04

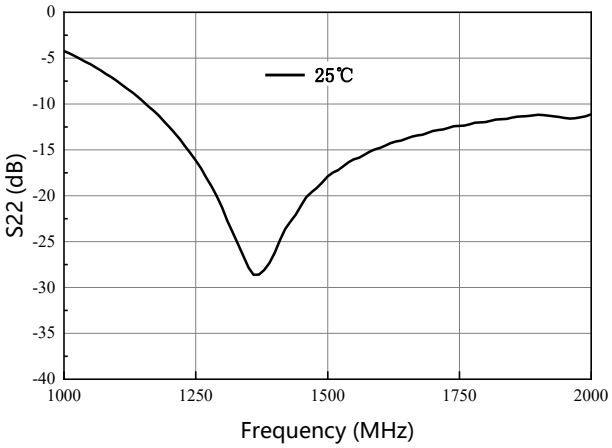


Figure 5. S22 vs. Freq. F9007-PDS-F05

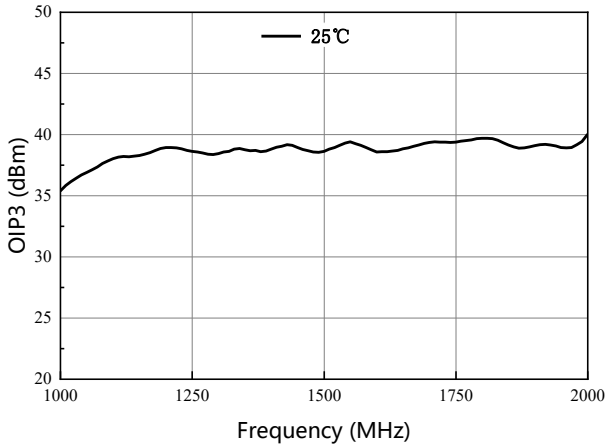
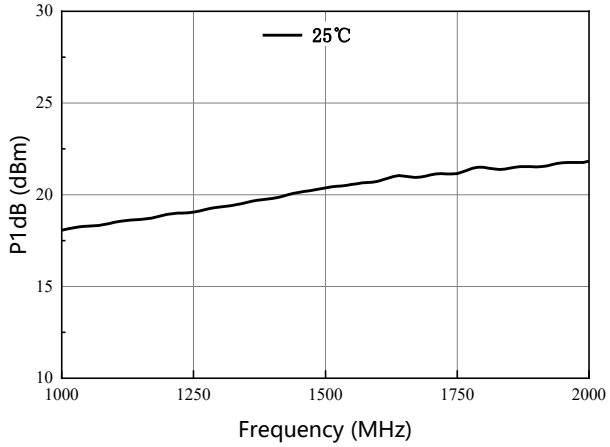
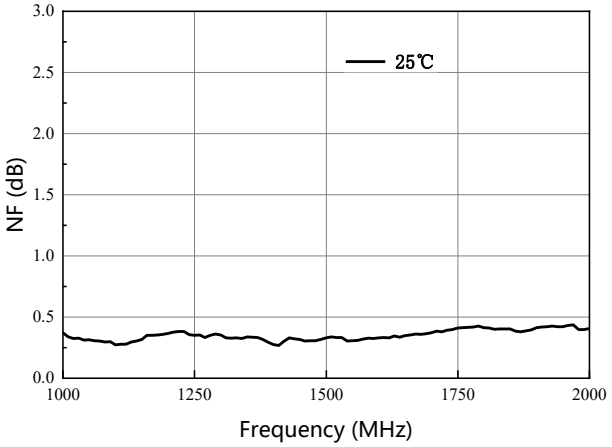


Figure 6. P1dB vs. Freq. F9007-PDS-F06



F9007-PDS-F07

Figure 7. OIP3 vs. Freq.



F9007-PDS-F8

Figure 8. Noise Figure vs. Freq.

9. Package Outline

■ Pin Layout

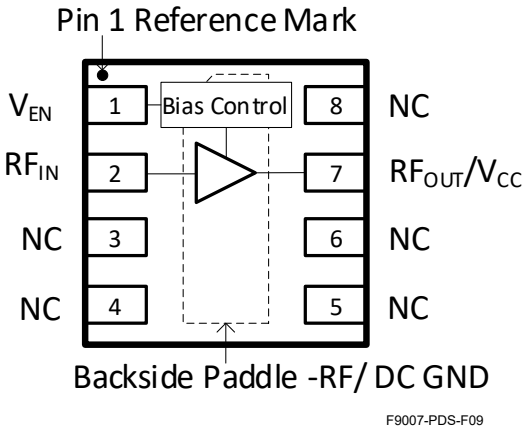


Figure 9. F9007 Pin Layout

Table 5. Pin Description

Pin	Symbol	Description
1	V_{EN}	V_{EN} and series resistor set $I_{DQ.}$ V_{EN}≤0.2V disables device.
2	RF_{IN}	RF Input. External DC Block capacitor required.
7	RF_{OUT}/V_{DD}	RF Output and DC supply input. External DC Block capacitor required.
3,4,5,6,8	NC	Not Connected
Backside Paddle	GND	RF/DC ground

■ Mechanical Drawing

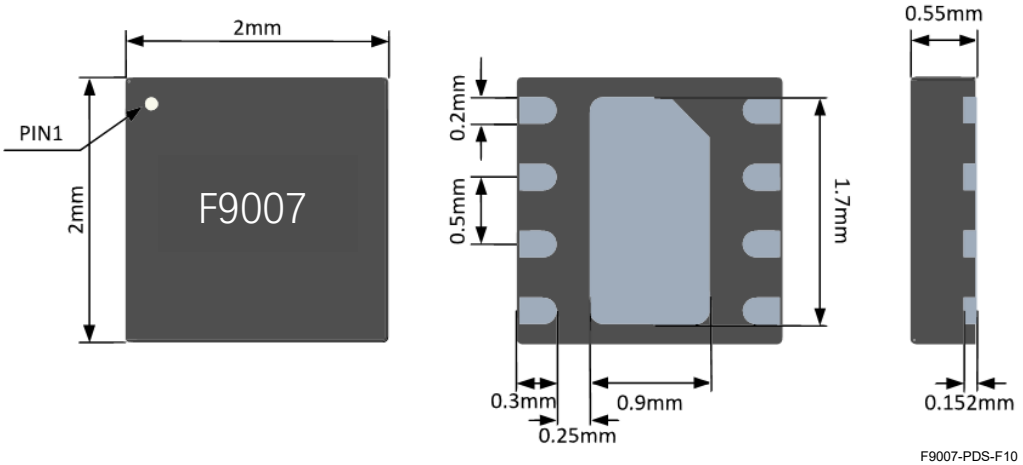


Figure 10. F9007 Mechanical Drawing

10. Application Circuit

■ Schematic

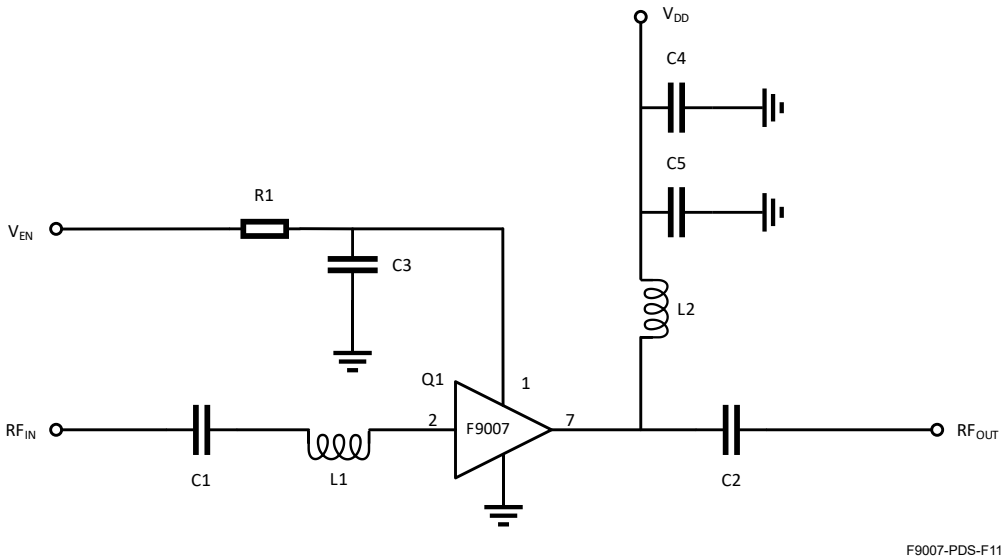


Figure 11. F9007 Application Circuit Schematic

■ Layout

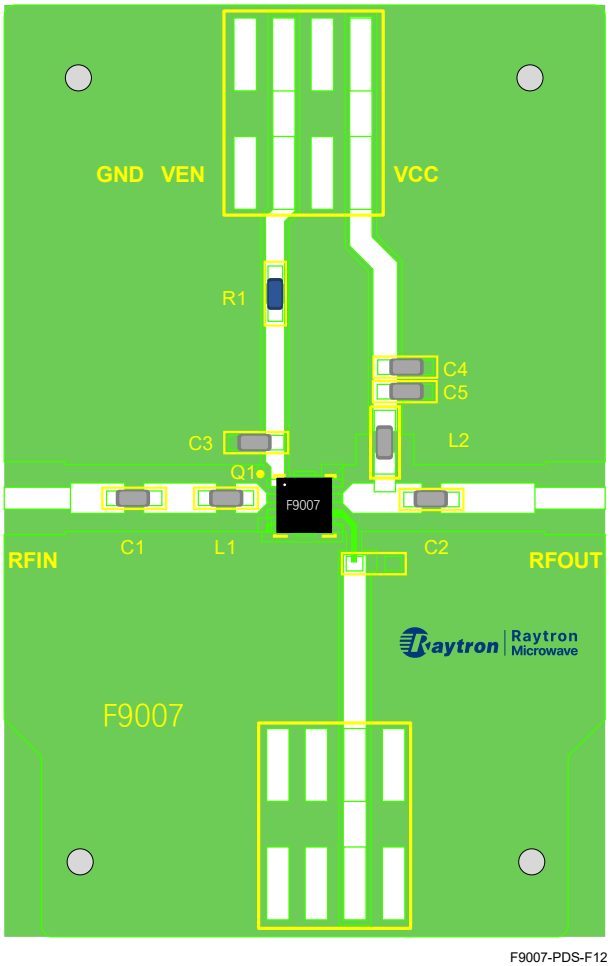


Figure 12. F9007 Application Circuit Layout

Table 6. Bill of Materials (1200-1600MHz Reference Design)

Component	Value	Description	Manufacturer	Part Number
PCB	20mil	N/A	Rogers	RO4350B
Q1	N/A	F9007, DFN-8 package	Raytron	F9007
C1	15pF	C0G 250V 0603 Capacitor	Murata	GQM1875C2E150GB12
C2	2pF	C0G 250V 0603 Capacitor	Murata	GQM1875C2E2R0BB12
C3	1000pF	0603 Capacitor	Various	N/A
C4	0.1uF	0603 Capacitor	Various	N/A
C5	82pF	C0G 250V 0603 Capacitor	Various	GQM1875C2E820GB12
L1	4.3nH	High Q 0603 Inductance	Murata	LQW18AN4N3C80D
L2	6nH	High Q 0603 Inductance	Murata	LQW18AN6N0C80D
R1	3kΩ	1/4W 0603 Resistor	Various	N/A

11. Handling Precautions

- **ESD Caution**

Table 7. ESD/MSL Rating

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	TBD	ESDA / JEDEC JS-001-2014
ESD – Charged Device Model (CDM)	TBD	ESDA / JEDEC JS-002-2014
MSL – Moisture Sensitivity Level	TBD	IPCJEDEC J-STD-020

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore proper ESD precautions should be taken to avoid performance degradation or loss of functionality.



12. Contact Information

For the latest specifications, additional product information, technical support and sales support, please contact:

- **Email:** RF.support@raytrontek.com
- **Web:** www.raytrontek.com

13. Disclaimer

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