

QPL9504 – 4.5-4.6GHz Reference Design

Product Overview

The QPL9504 is a flat gain, high-linearity, ultra-low noise amplifier in a small 2 x 2 mm surface-mount package. At 5.5 GHz, the amplifier provides 0.76 dB noise figure with 21.6 dB gain and +34 dBm OIP3 while drawing 55 mA bias current. The LNA can be biased from a single positive supply ranging from 3.3 to 5 volts. The device is housed in a green/RoHS-compliant industry-standard 2x2 mm DFN package.

The QPL9504 is bias adjustable and requires minimal external components to operate. It also has a power down control capability integrated into the die for TDD applications.

Referenced Documents

The reference documents below take precedence over the contents of this application note and should always be consulted for the latest information.

QPL9504 Data Sheet.

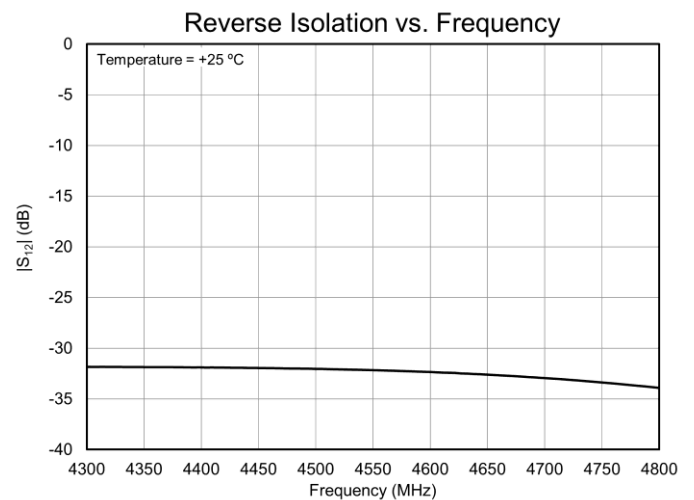
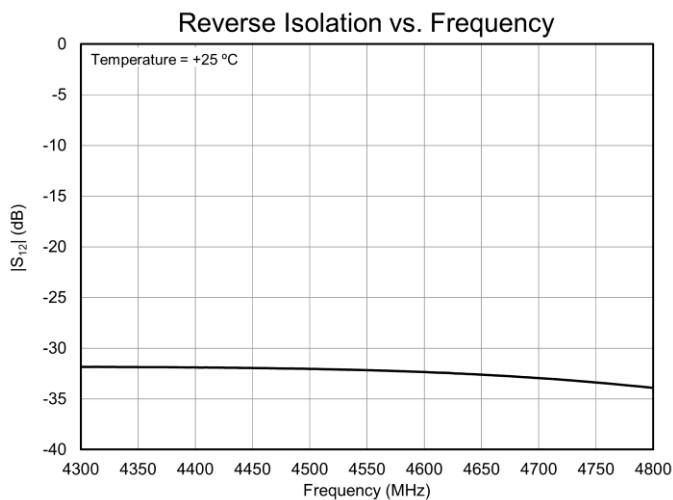
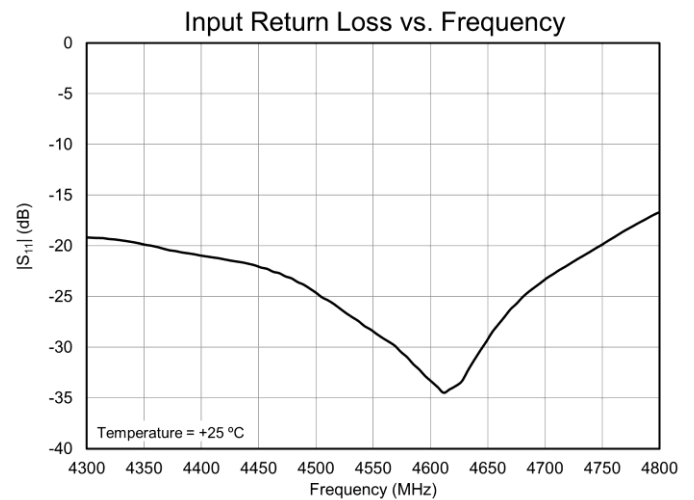
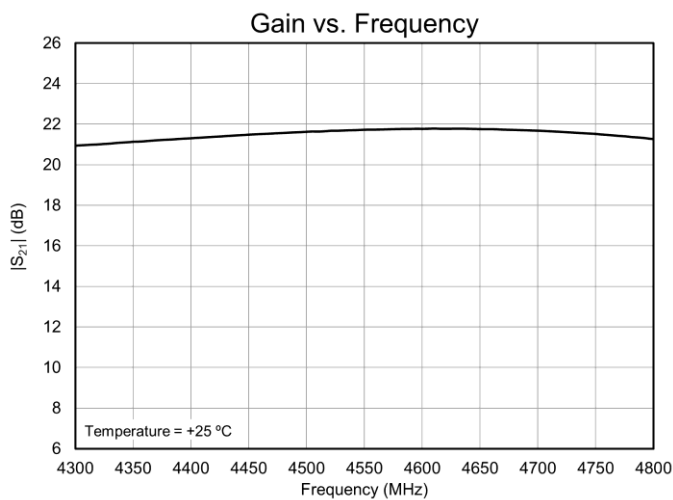
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Application Electrical Performance

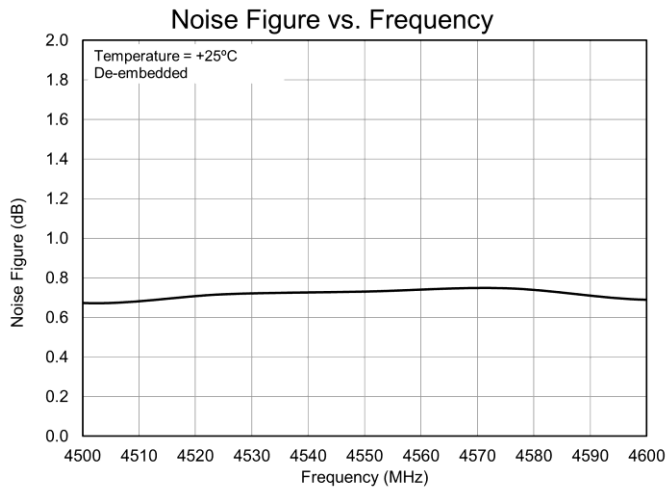
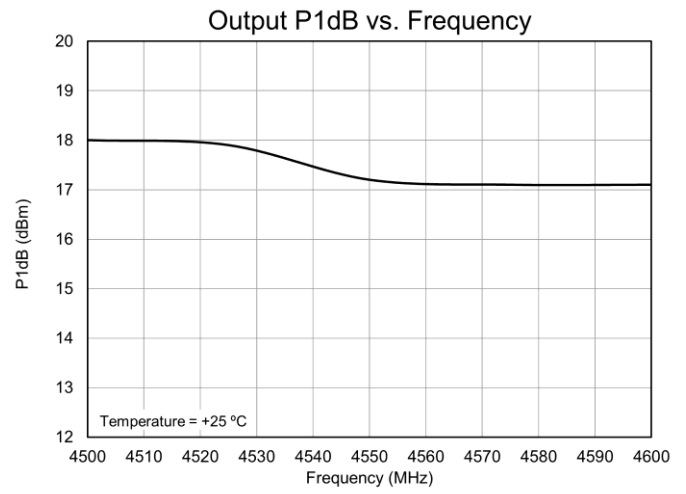
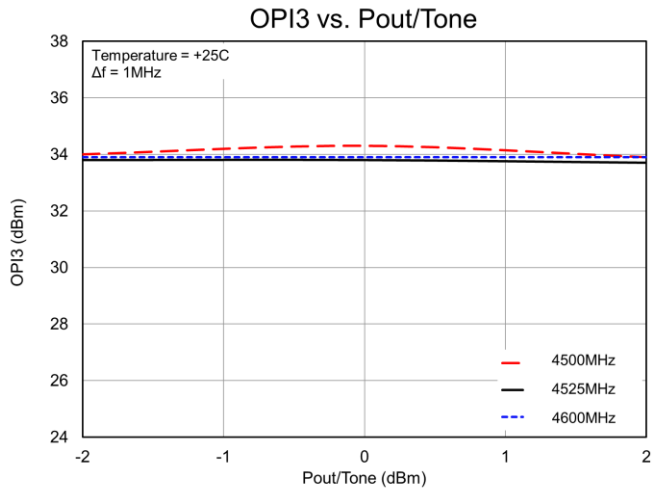
Qorvo Field and Factory Applications Engineers are available to provide technical assistance for determining appropriate matching networks for a particular application.

Parameter	Conditions	Typical Value			Units
		4500	4550	4600	
Frequency		4500	4550	4600	MHz
Gain		20.9	21.07	21.3	dB
Input Return Loss		24.6	28.7	33.4	dB
Output Return Loss		26.1	33.3	21.4	dB
Noise Figure	EVB Trace Loss De-embedded	0.67	0.73	0.68	dB
Output P1dB		18.0	17.2	17.1	dBm
OIP3	Pout = +0dBm/tone, $\Delta f = 1$ MHz	34.3	33.9	33.8	dBm
Device Current, I _{DD}	On State	55			mA
	Off State	4.2			mA

Test conditions unless otherwise noted: V_{DD} = +5V, Temp = +25 °C, 50 Ω system.



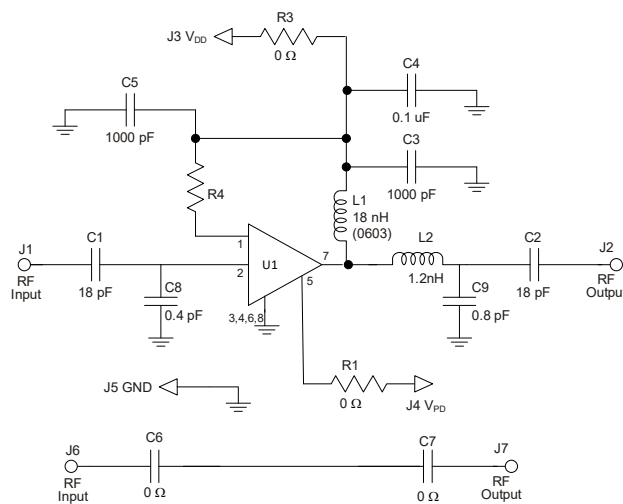
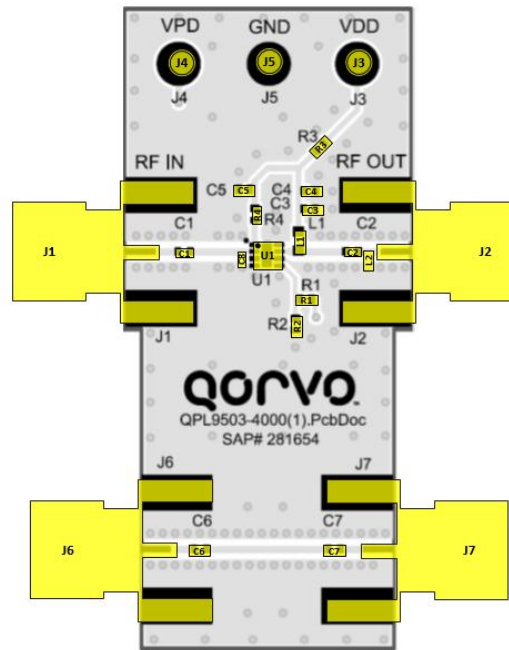
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Evaluation Board Information

Evaluation Board and Schematic



Notes:

1. See Evaluation Board PCB Information section for material and stack-up.
2. All components are of 0402 size unless stated on the schematic.
3. Distance from right edge of C8 to left edge of U1 is 120mils.
4. Distance from left edge of L2 to right edge of U1 is mils.
5. Distance from left edge of C9 to right edge of U1 is 180 mils.
6. R4 = 3.9KOhm

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Evaluation Board – Bill of Material

Reference Des.	Value	Description	Manuf.	Part Number
n/a	n/a	Printed Circuit Board		
U1	n/a	Low Noise QPL9504 LNA	Qorvo	QPL9504
R4	3.9K	RES, 1%, 1/16W, 0402	various	
R1, R3, C6, C7	0 Ω	RES, 1/10W, 0402	various	
C1, C2	18 pF	CAP, ± 0.1 pF, 50V, COG, 0402	various	
C3, C5	1000 pF	CAP, 10%, 50V, X7R, 0402	various	
C4	0.1 μ F	CAP, 10%, 10V, X5R, 0402	various	
C8	0.4 pF	CAP, ± 0.05 pF, 50V, HI-Q, 0402	various	
C9	0.8 pF	CAP, ± 0.05 pF, 50V, HI-Q, 0402	various	
L1	18 nH	IND, 5%, WW, 0603	Coilcraft	0603CS-18NXJRU
L2	1.2 nH	IND, 5%, WW, 0402	various	

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Additional Information

For information on ESD, Soldering Profiles, Packaging Standards, Handling and Assembly, please contact Qorvo for general guidelines.

Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations:

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