

# QPL9096 – 2.5-2.7GHz Reference Design

## Product Overview

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The QPL9096 is a high-linearity, ultra-low noise gain block amplifier with a bypass mode functionality integrated in the product. At 2.5 GHz, the amplifier typically provides 25 dB gain, +33.5 dBm OIP3, and 0.75 dB noise figure while drawing 60mA current from a +4.2V supply.

The QPL9096 is internally matched using a high performance E-pHEMT process and only requires four external components for operation from a single positive supply: an external RF choke and blocking/bypass capacitors. This low noise amplifier contains an internal active bias to maintain high performance over temperature.

The QPL9096 is optimized for the 1.7 – 2.7 GHz frequency band and is targeted for wireless infrastructure. The QPL9096 is packaged in a 2x2 mm DFN.

## Referenced Documents

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

QPL9096 Data Sheet.

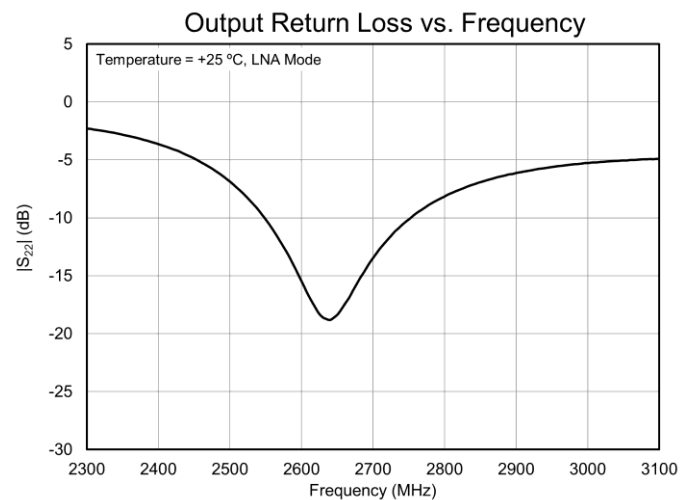
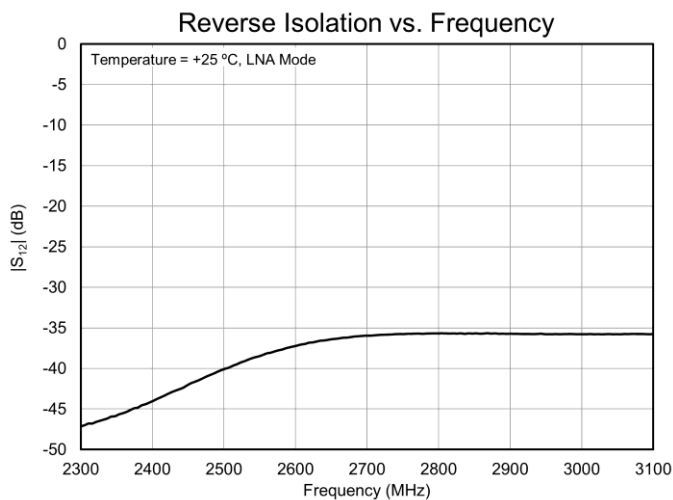
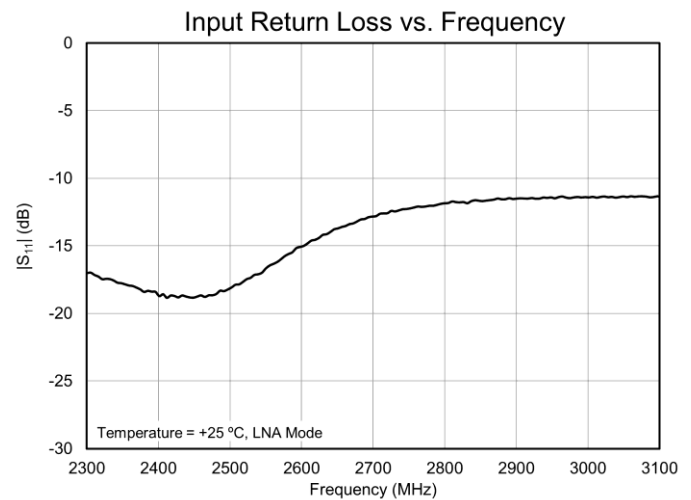
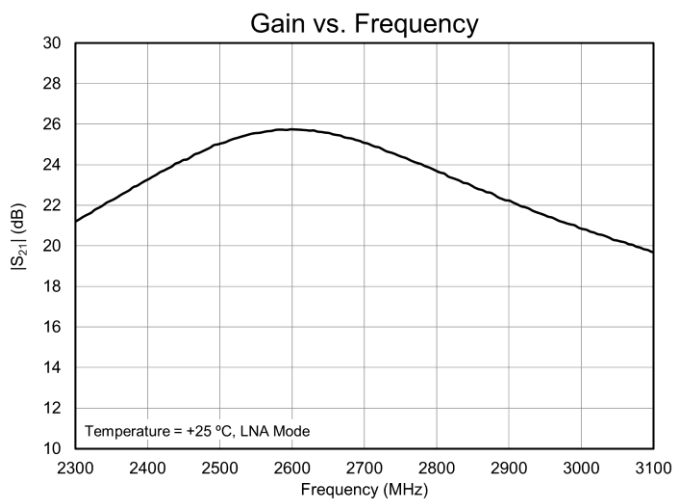
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## Application Electrical Performance

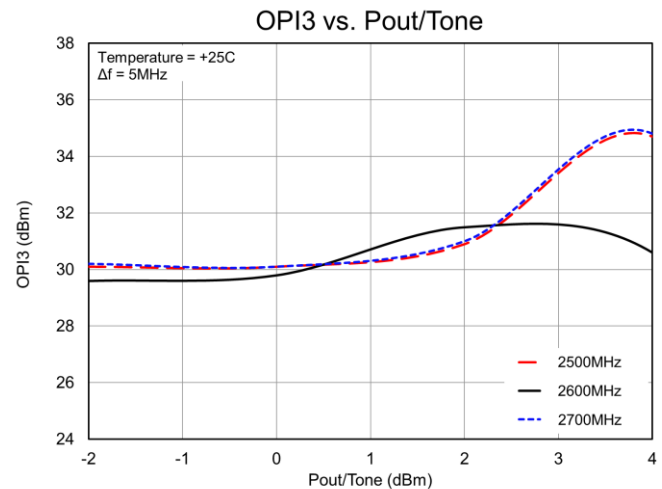
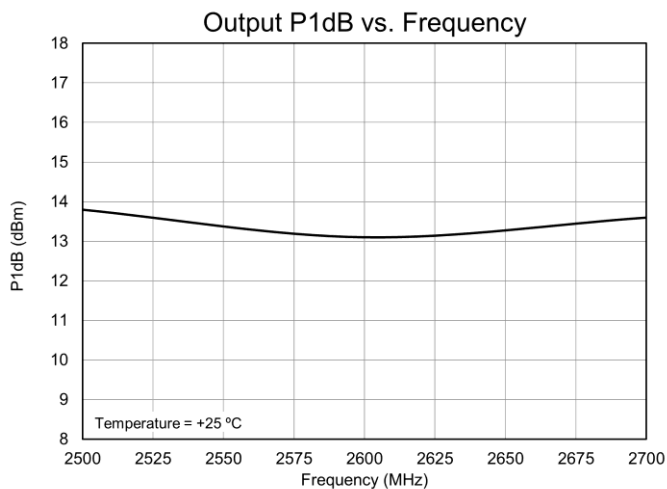
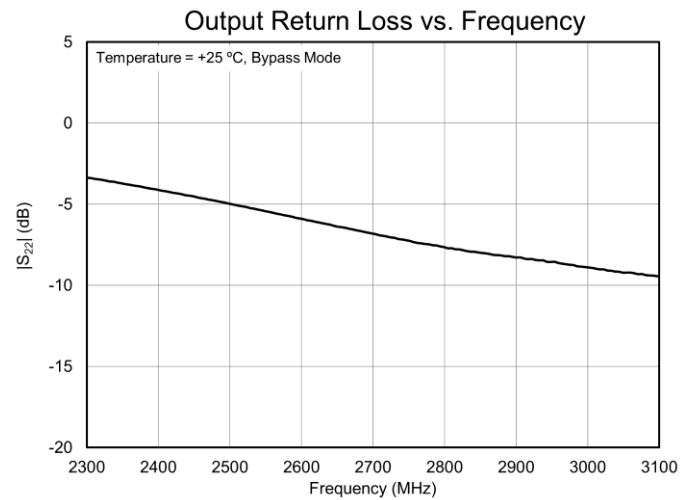
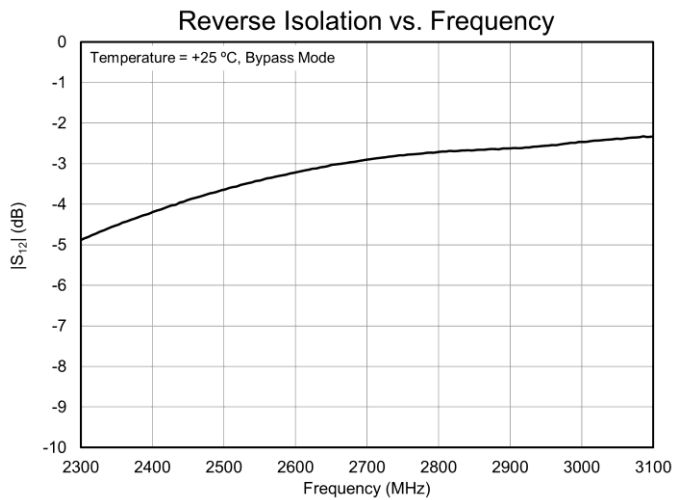
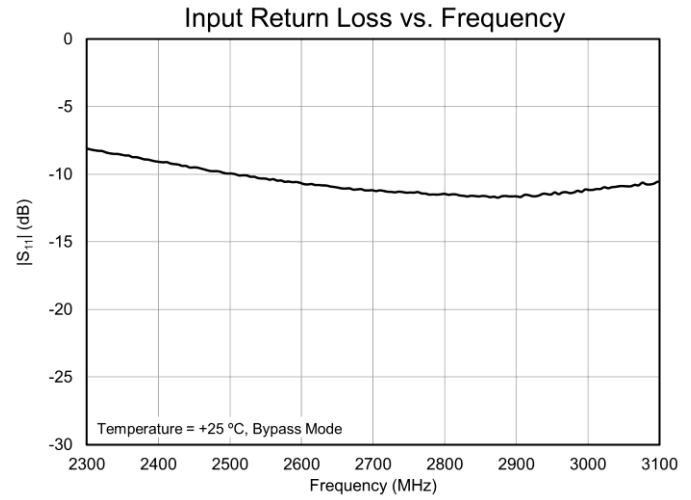
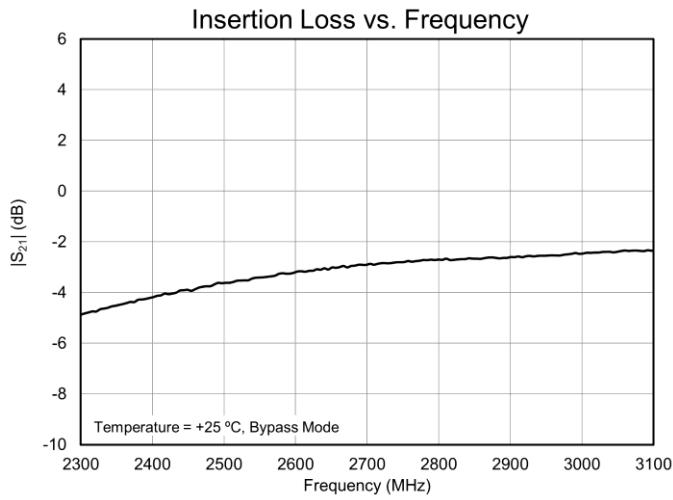
Qorvo Field and Factory Applications Engineers are available to provide technical assistance for determining appropriate matching networks for a particular application.

Parameter	Conditions	Typical Value			Units
Frequency		2500	2600	2700	MHz
Gain		25.1	25.7	25.1	dB
Input Return Loss		18.1	15.0	12.8	dB
Output Return Loss		6.9	15.8	13.6	dB
Noise Figure	Not De-embedded	0.7	0.8	0.8	
Output P1dB		13.8	13.1	13.6	dBm
OIP3	Pout = +0dBm/tone, $\Delta f = 5$ MHz	30.1	29.8	30.1	
Device Current, I <sub>D</sub>	Bypass OFF	55			mA
	Bypass ON	3.5			mA

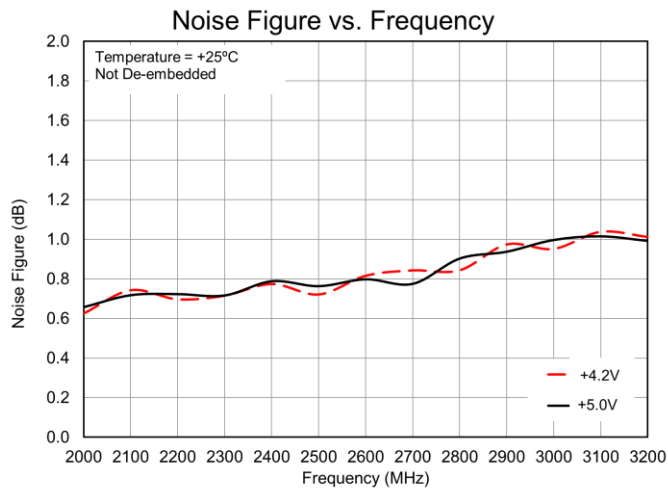
Test conditions unless otherwise noted: V<sub>DD</sub> = +4.2V, Temp = +25 °C, 50 Ω system. LNA ON, Bypass OFF



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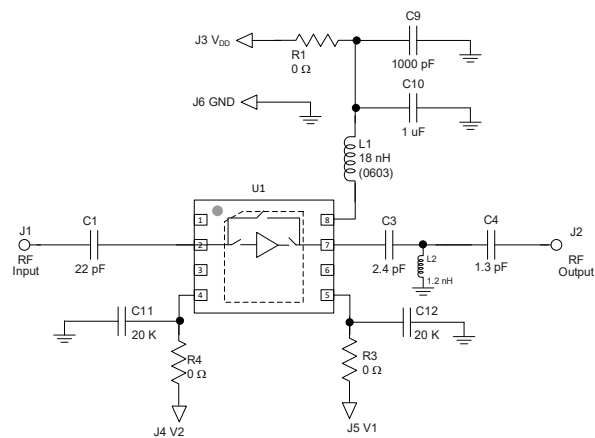
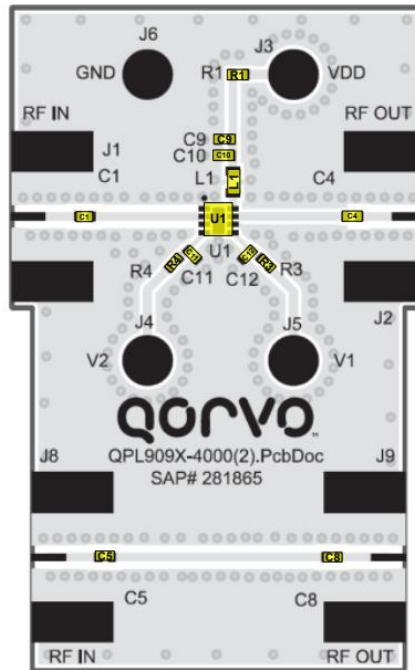
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## Evaluation Board Information

### Evaluation Board and Schematic



**Notes:**

1. Components shown on PCB layout but not on the schematic are not used.

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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	Ultra Low Noise, Bypass LNA	Qorvo	QPL9096
C1, C5, C8	22 pF	CAP, 0402, +/-0.1pF, 25V	Various	
C3	2.4 pF	CAP, 0402, +/-0.1pF, 25V	Various	
C4	1.3 pF	CAP, 0402, +/-0.1pF, 25V	Various	
C9	1000 pF	CAP, 0402, 10%, 50V, X7R	Murata	GRM155R71H102KA01D
C10	1.0 uF	CAP, 0402, 10%, 6.3V, X5R	Murata	GRM155R60J105KE19D
C11, C12	20K	RES, 0402, 5%	Various	
R1, R3, R4	0 $\Omega$	RES, 0402, 5%, 1/16W	Various	
L1	18 nH	IND, 0402, 5%	Coilcraft	0402CS-18NXJL
L2	1.2 nH	Various	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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