

QPL9065 - 3700MHz-4100MHz Reference Design

Product Overview

The QPL9065 is a high-linearity, ultra-low noise 2-stage gain block amplifier module with a bypass mode functionality integrated to the second stage in the product. At 1.95GHz, the amplifier, under high gain mode, typically provides 37.5dB gain, +36dBm OIP3, and 0.55dB noise figure while drawing 160mA current from a +5V supply. The component also provides high performance in the low gain mode with 17.5dB gain, 0.55dB noise figure and +33dBm OIP3 while drawing 70mA current.

The QPL9065 uses a high-performance E-pHEMT process. This low noise amplifier contains an internal active bias to maintain high performance over temperature.

The QPL9065 covers the 0.45 – 3.8GHz frequency band and is targeted for wireless infrastructure. The QPL9065 is housed in a 3.5x3.5mm SMT package

Referenced Documents

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

QPL9065 Data Sheet.

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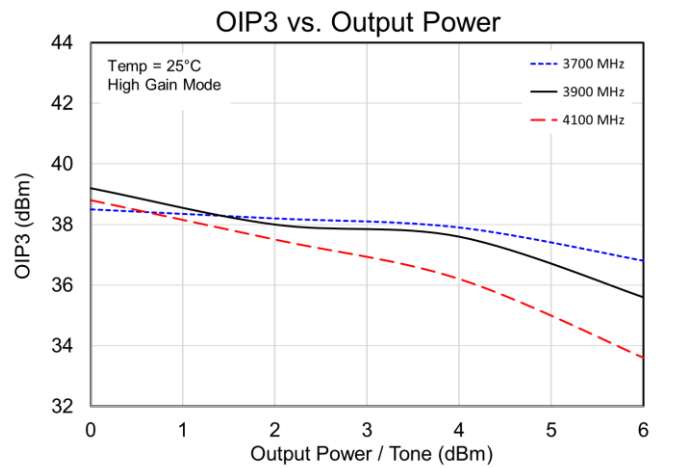
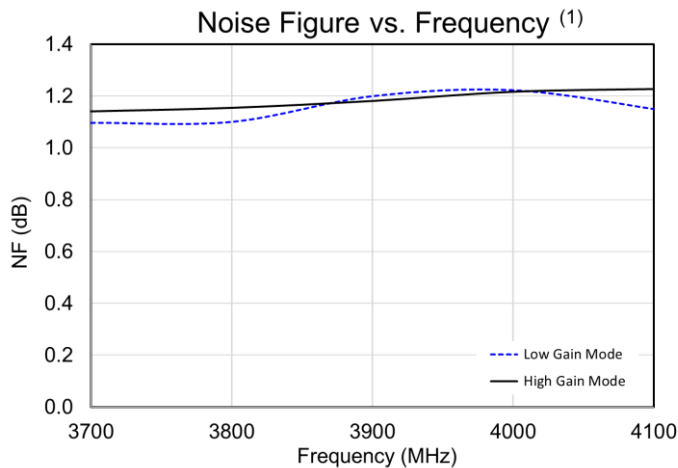
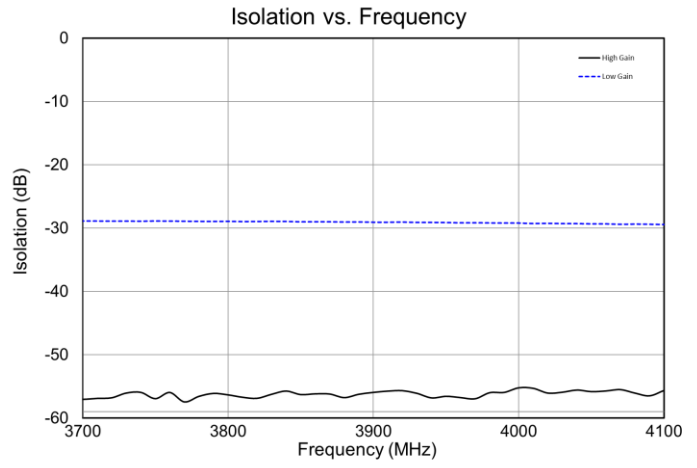
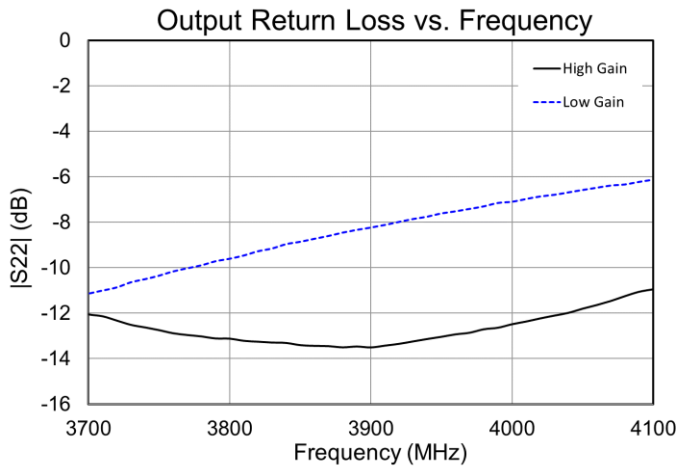
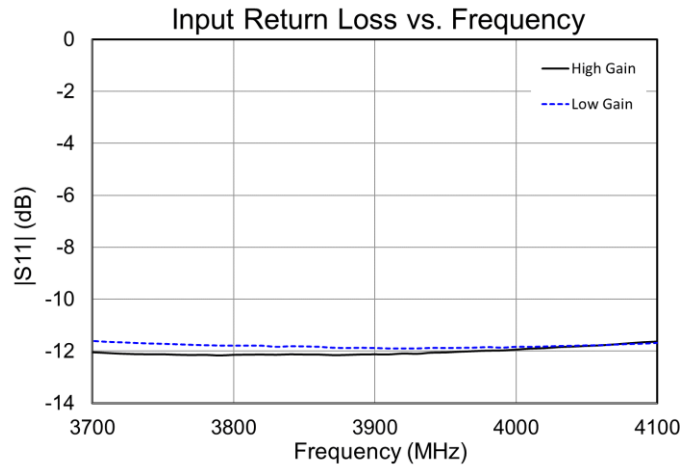
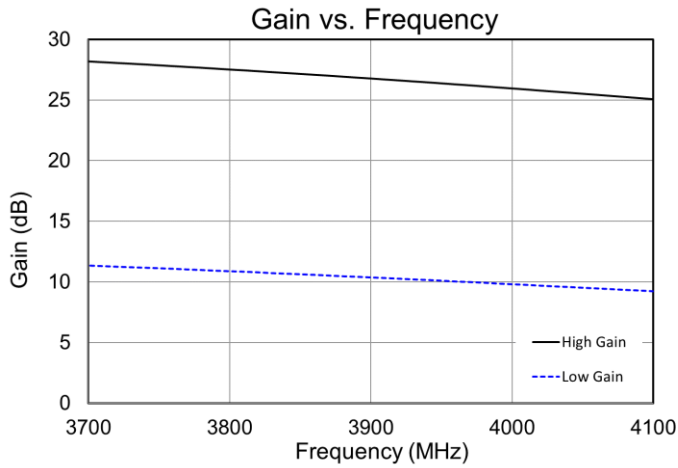
Application Electrical Performance

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		3700	3900	4100	MHz
Gain	High Gain Mode	28.1	26.7	25.1	dB
Input Return Loss		12.0	12.1	11.7	dB
Output Return Loss		12.0	13.5	11.0	dB
Noise Figure		1.14	1.18	1.23	dB
Output IP3	Pout= +3dBm/tone, Δf= 1 MHz	37.9	37.6	36.2	dBm
Gain	Low Gain Mode	11.3	10.3	9.2	dB
Input Return Loss		11.6	11.8	11.7	dB
Output Return Loss		11.1	8.2	6.2	dB
Noise Figure		1.10	1.20	1.15	dB
Output IP3	Pout= +3dBm/tone, Δf= 1 MHz	27.1	26.5	25.7	dBm

Test conditions unless otherwise noted: VDD = +5.0 V, Temp = +25 °C, 50 Ω system. Input trace loss de-embedded from NF data.

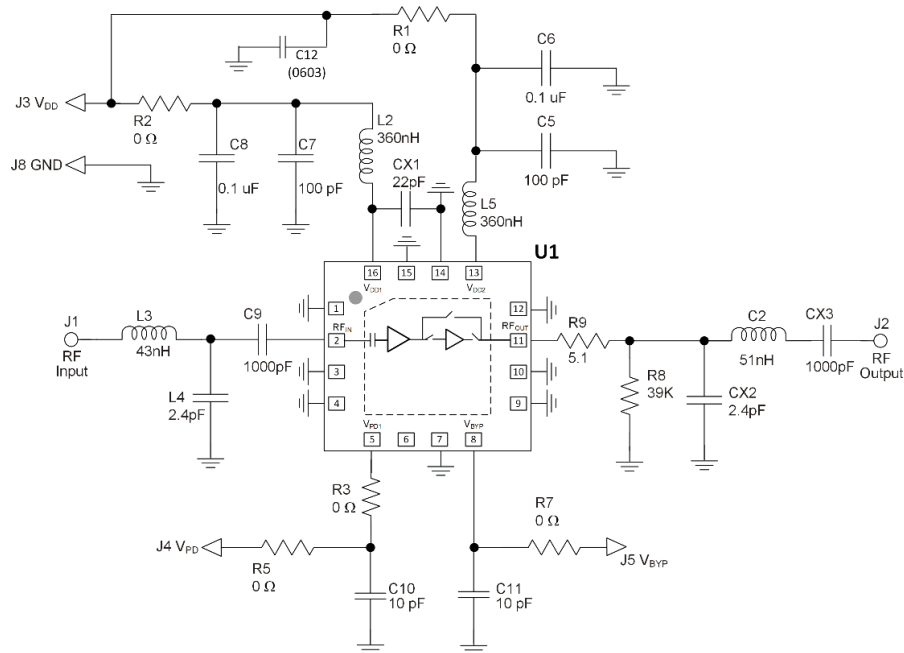
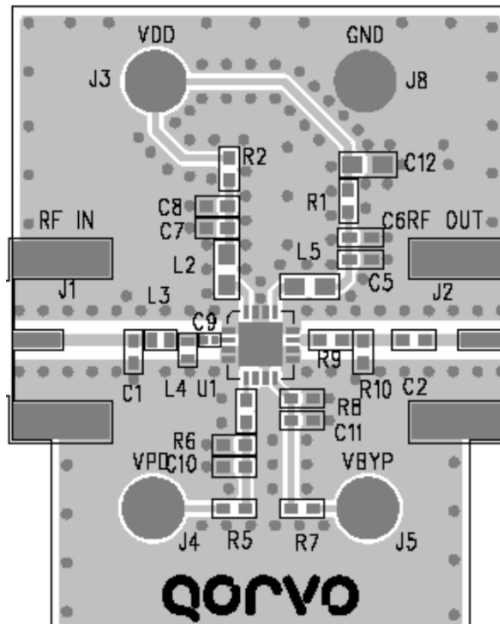
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Evaluation Board Information

Evaluation Board and Schematic



Notes:

1. See Evaluation Board PCB Information section for PCB material and stack-up.

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Evaluation Board – Bill of Material

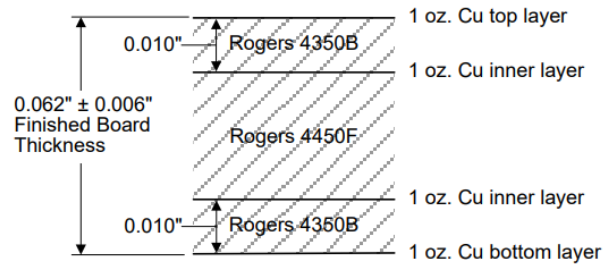
Reference Des.	Value	Description	Manuf.	Part Number
U1	n/a	2-Stage Bypass LNA	Qorvo	QPL9065
R1, 2, 3, 5, 7	0 Ω	RES, 0402, +/-5%, 1/16W	Various	
R10	39K	RES, 0402, +/-5%, 1/16W	Various	
C1, C2	27 pF	CAP, 0402, +/-5%pF, 50V	Various	
C9	10 pF	CAP, 0201, 2%, 50V	Murata	GRM0335C1H100GA01
C13	0.55 pF	CAP, 0402, +/-0.02pF, 100V	AVX	
L6	1.8 nH	IND, 0402, +/-1%	AVX	
C3, 4, 5, 7	100 pF	CAP, 0402, +/-5%, 50V	Various	
C6, 8	0.1 uF	CAP, 0402, 20%, 16V, Y5V	Various	
C12	4.7 uF	CAP, 0603, 20%, 10V, Y5V	Various	
C10, 11	10 pF	CAP, 0402, 2%, 50V	various	
L2	2.2 nH	IND, 0402, +/-0.2nH, 1000mA	Murata	LQW15AN2N2C10
L5	18 nH	IND, 0603, 5%	Coilcraft	0603CS-18NXJL

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Evaluation Board PCB Board Layers

PC Board Layout

PCB 1123139 Material (stack up)



50-ohm line dimensions: width = 0.020", spacing = 0.032"

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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:

Web: www.qorvo.com

Tel: 1-844-890-8163

Email: customer.support@qorvo.com

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