APPLICATION NOTE

Classification | PRIVATE

QPA9121 - 1.805GHz-1.86GHz Reference Design

Product Overview

The QPA9121 is a wideband, high gain, and high linearity driver amplifier in a low-cost, RoHS compliant 3x3 mm laminate. With Qorvo's GaAs HBT process, this amplifier delivers exceptional performance with 35 dBm OIP3 and 24 dBm output P1dB while consuming less than 90 mA quiescent current with single 5V supply.

The QPA9121 incorporates on-chip features with fast DC power shutdown, externally configurable device DC operation current, and 50 ohms matching at all RF ports.

The QPA9121 is targeted for use as a driver amplifier for wireless infrastructure where high linearity, high power and efficient DC power operation are required. The device is an excellent choice for 5G dense-array m-MIMO radio 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.

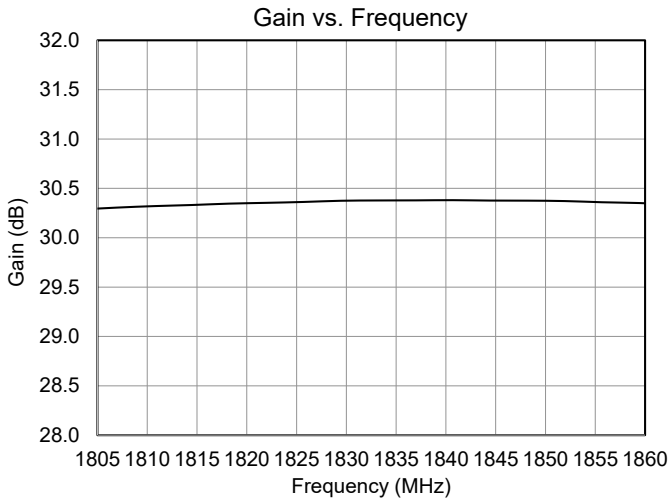
QPA9121 Data Sheet.

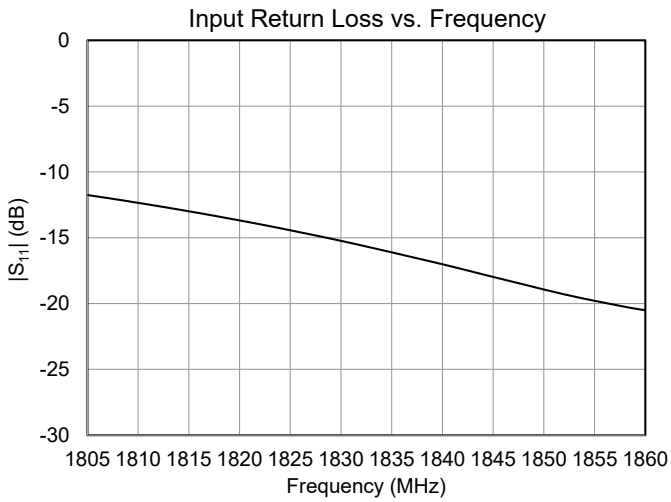
Application Electrical Performance

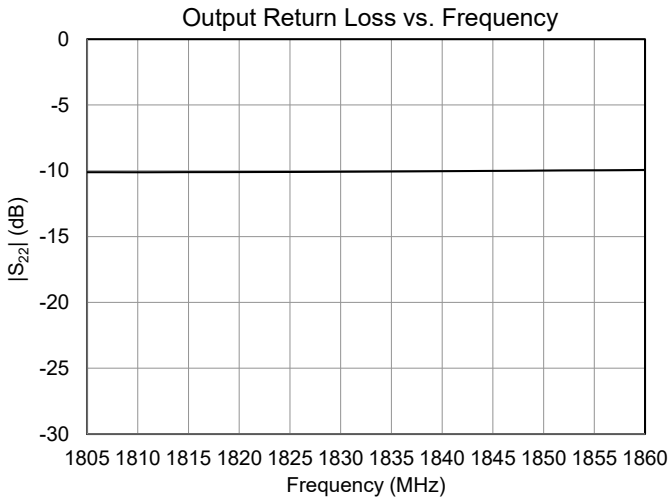
Qorvo Field and Factory Applications Engineers are available to provide technical assistance for determining appropriate matching networks for a particular application.

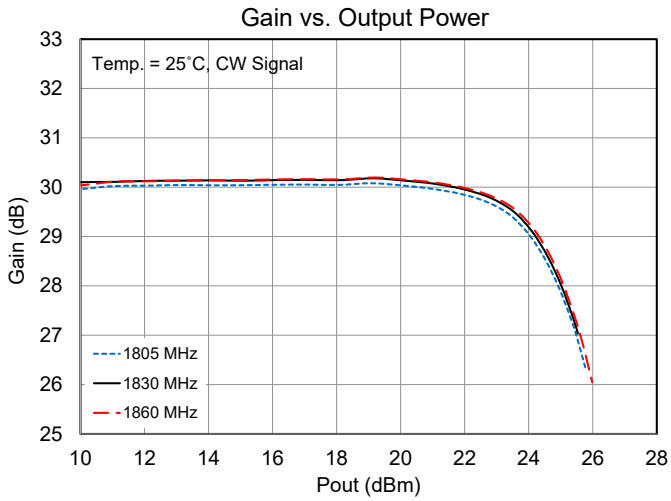
Parameter	Conditions	Typical Value			Units
Frequency		1805	1830	1860	MHz
Gain		30.3	30.4	30.4	dB
Input Return Loss		11.8	15.2	20.5	dB
Output Return Loss		10.1	10.1	10.0	dB
Output P1dB		25.8	25.5	25.9	dBm
Device Current	V_{CC} and V_{CC1}	95			mA

Test conditions unless otherwise noted: Vcc = Vcc1 = +5V, Icc = 95mA, VPD = +1.8 V, Temp = +25 °C, 50 Ω system.



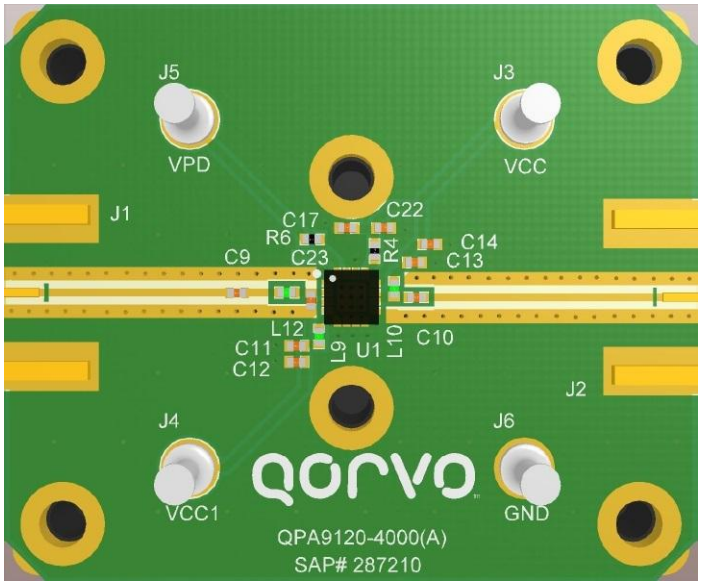


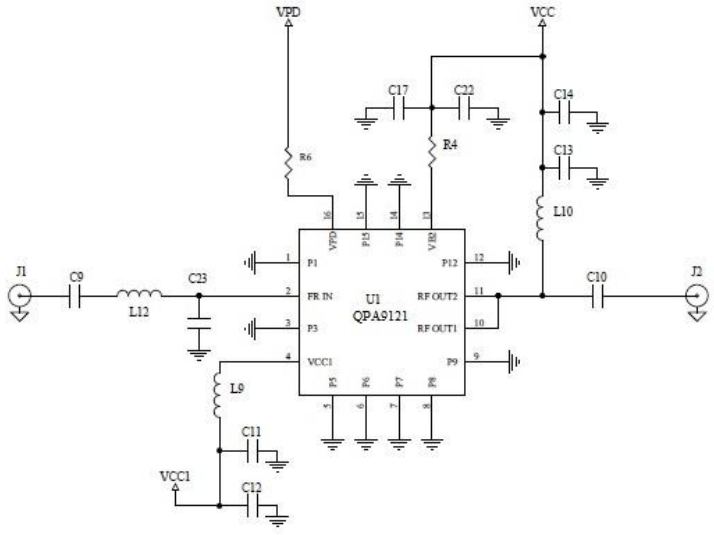




Evaluation Board Information

Evaluation Board and Schematic





Notes:

1. Components shown on PCB layout but not on the schematic are not used.
2. Critical component placement locations:
   - Distance between U1 (left edge) to C23 (right edge): 0.50 mm
   - Distance between U1 (left edge) to L12 (right edge): 1.55 mm
   - Distance between U1 (left edge) to C9 (right edge): 4.65 mm

Evaluation Board – Bill of Material

Reference Des.	Value	Description	Manuf.	Part Number
n/a	-	Printed Circuit Board	Qorvo	
U1	-	High Gain Driver Amplifier	Qorvo	QPA9121
C9, C10	18 pF	CAP, 5%, 50V, C0G, 0402	Murata	GRM1555C1H180JA01D
C12, C14	1 µF	CAP, 10V, X5R, CER, 0402	Various	
C11, C13, C17, C22	100 pF	CAP, 5%, 50V, C0G, 0402	Murata	GRM1555C1H101JA01D
R4	51 Ω	RES, 5%, 1/16W, 0402	Various	
R6	0 Ω	RES, 1/10W, 0402	Various	
L9	8.2 Ω	RES, 5%, 1/16W, 0402	Various	
L10	12 nH	IND, 5%, 0402	Coilcraft	0402CS-12NXJLW
R5, R7	DNP	n/a	n/a	n/a
L12	6.8 nH	IND, 5%, 0402	Coilcraft	0402CS-6N8XJW
C23	1.8 pF	CAP, ±0.1pF, 50V, C0G, 0402	Murata	GRM1555C1H1R8BZ01E
J1, J2	-	Conn, SMA F STRT .062”	Cinch Connectivity	142-0701-851

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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