APPLICATION NOTE

Classification | PRIVATE

QPA9442 - 1.6-2.5GHz Reference Design

Product Overview

The QPA9442 is a wideband, high linearity driver amplifier. With optimized tuning, this device can provide up to 19dB of gain and achieve an output P1dB of 1W. The amplifier can provide excellent linearity performance with +46dBm output 3rd order intercept (OIP3), making it perfectly suited for 5G base station applications.

The QPA9442 is tunable over all cellular bands in the entire operating frequency band of 0.6 – 5.0 GHz and incorporates a shut-down function through the V_{PD} pin.

The QPA9442 is housed in a 20-pin 4X4mm 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.

QPA9442 Data Sheet.

Typical Performance, 1600 – 2500 MHz Reference Design

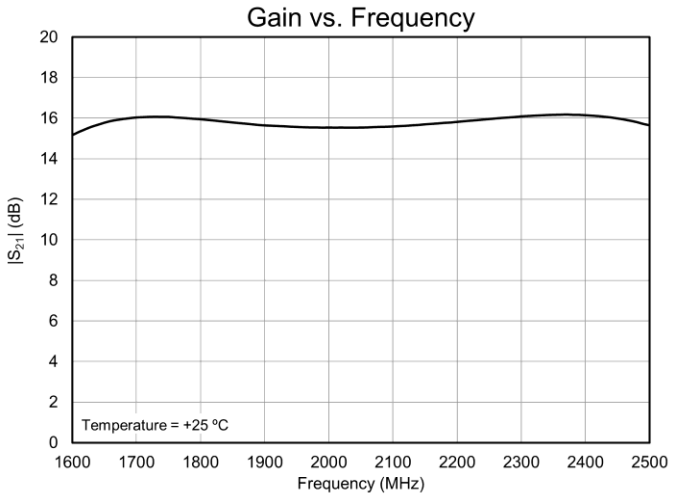
Parameter	Conditions	Typical Value			Units
Frequency		1600	2000	2500	MHz
Gain		15.2	15.5	15.6	dB
Input Return Loss		6.0	5.9	7.5	dB
Output Return Loss		10.7	10.6	21.1	dB
Output P1dB		+29.4	+29.7	+29.7	dB
Output P3dB		+30.9	+31.9	+30.4	dBm
Output IP3	Pout = +18dBm/tone, Δf = 1MHz	TBD	TBD	TBD	dBm
ACPR	Pout=+18 dBm, LTE 1C 20MHz, 8.5dB PAR	-47.8	-45.2	-46.5	dBc
Device Current	V_{CC} and V_{BIAS} combined	240			mA

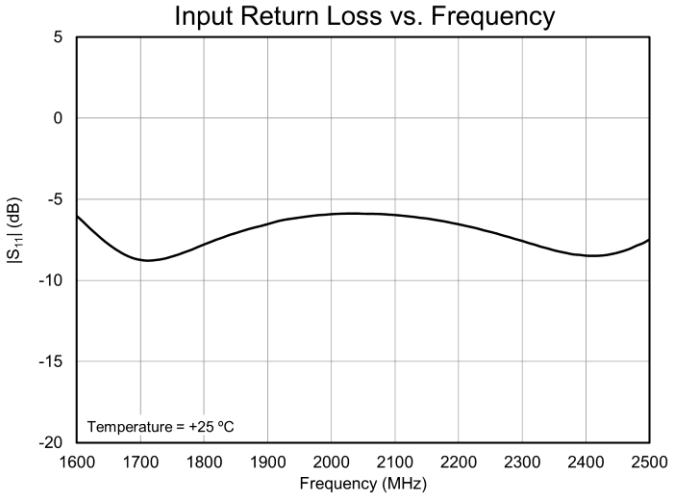
Notes:

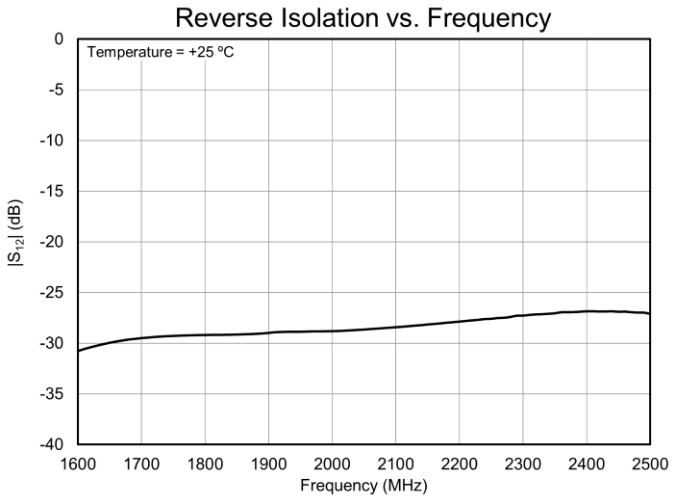
1. Test Conditions unless otherwise noted: V_{CC} = V_{BIAS} = +5.0 V, V_{PD} = +1.8 V, I_{CQ} = 235 mA, Temp = +25 °C, 50 Ω system.

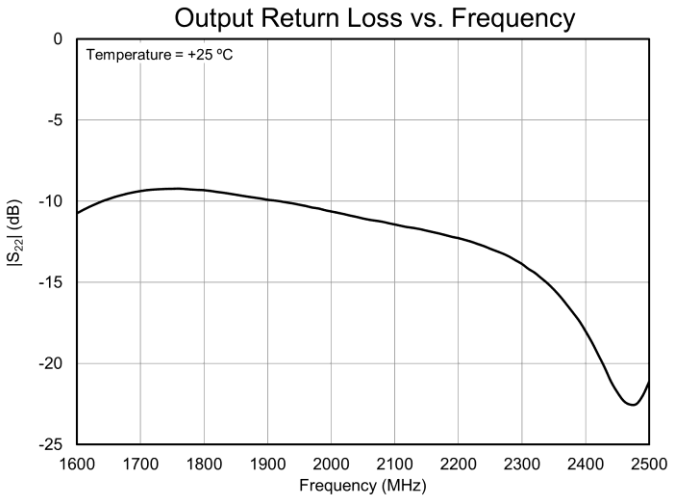
Performance Plots

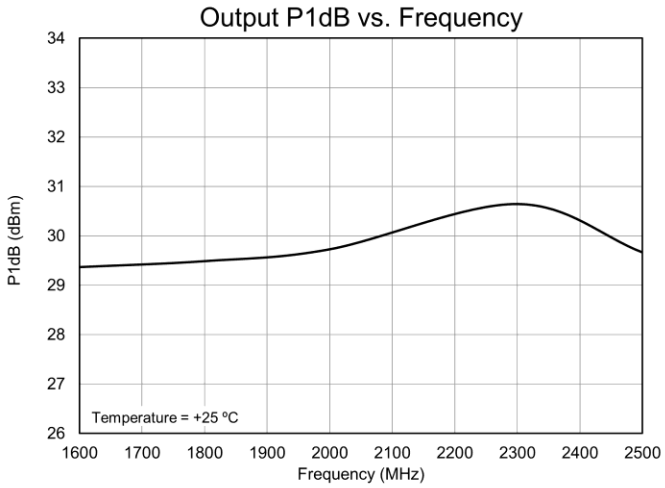
Qorvo Field and Factory Applications Engineers are available to provide technical assistance for determining appropriate matching networks for a particular application.

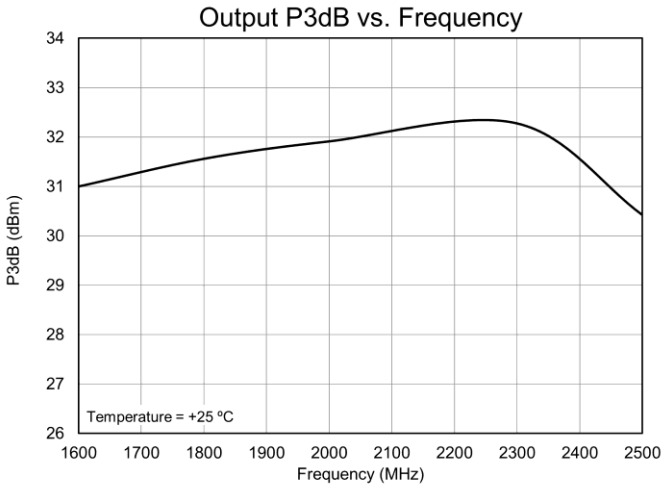


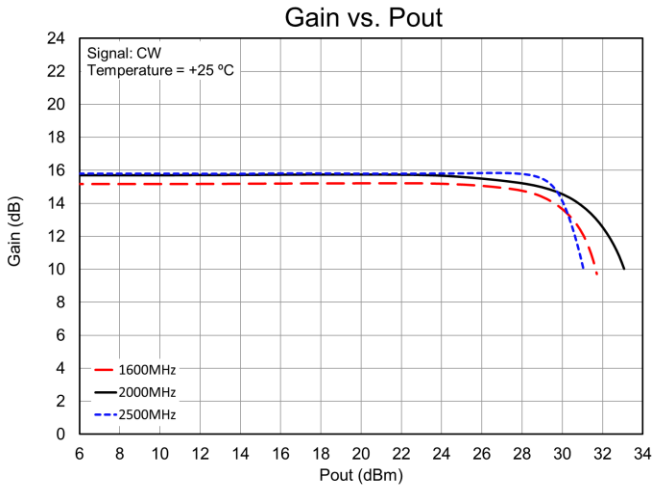


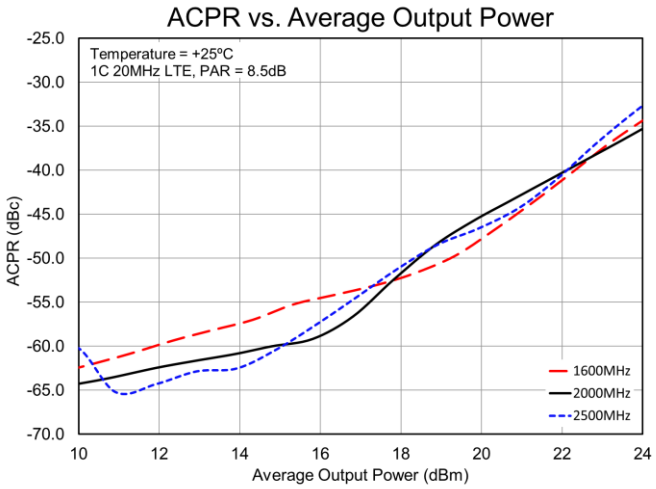


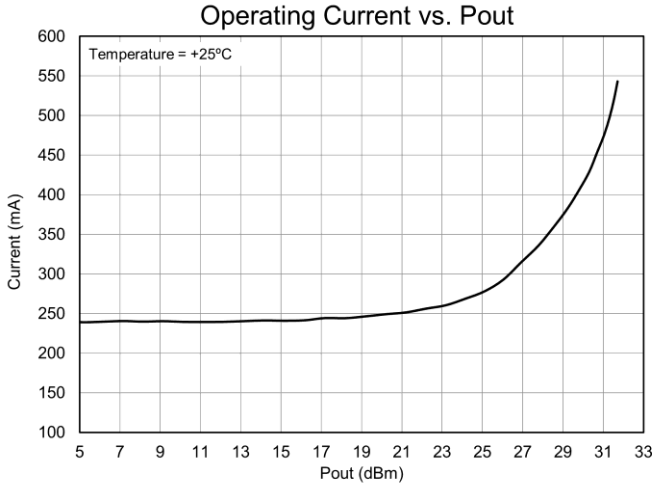



Output P1dB vs. Frequency
P1dB (dBm)
Frequency (MHz)
Temperature = +25 °C


Output P3dB vs. Frequency
P3dB (dBm)
Frequency (MHz)
Temperature = +25 °C

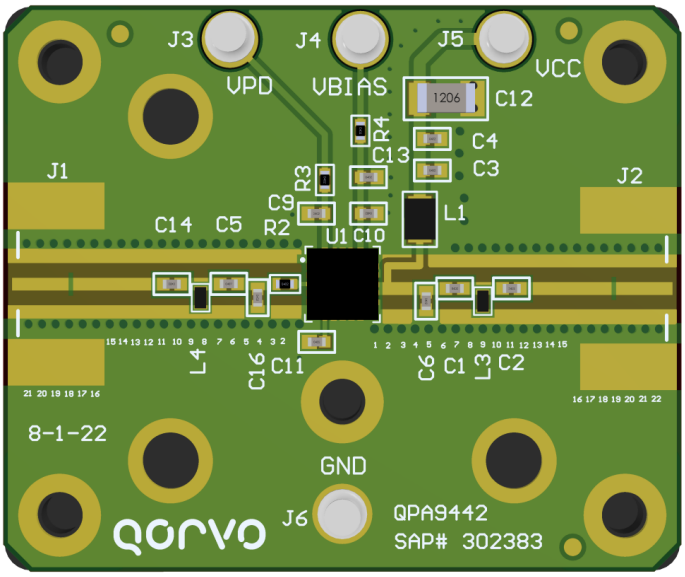

Gain vs. Pout
Signal: CW
Temperature = +25 °C
Gain (dB)
Pout (dBm)
1600MHz
2000MHz
2500MHz

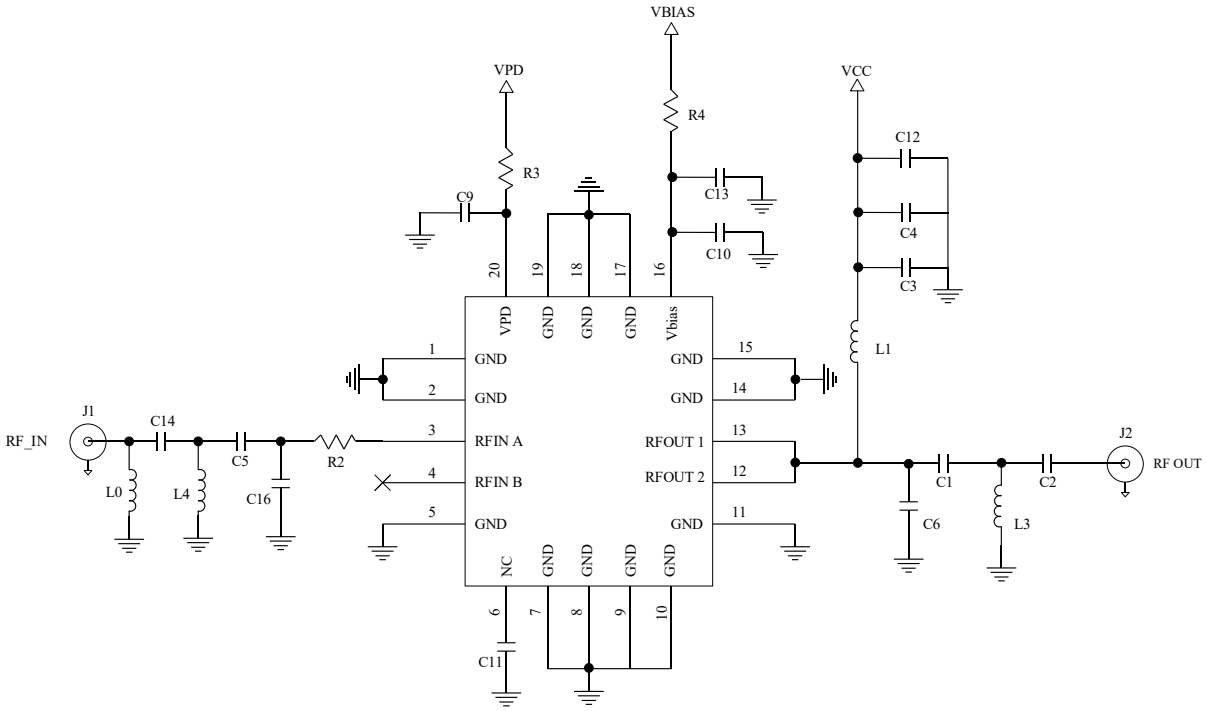

ACPR vs. Average Output Power
Temperature = +25°C
1C 20MHz LTE, PAR = 8.5dB
ACPR (dBc)
Average Output Power (dBm)
1600MHz
2000MHz
2500MHz


Operating Current vs. Pout
Temperature = +25°C
Current (mA)
Pout (dBm)

Evaluation Board Information

Evaluation Board (EVB) Layout Assembly and Schematic





Notes:

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

Evaluation Board Bill of Material

Reference Des.	Value	Description	Manuf.	Part Number
n/a	n/a	Printed Circuit Board	Qorvo	
U1	n/a	1 W High Linearity Amplifier	Qorvo	QPA9442
C1	2.7 pF	CAP, 0402, 5%, 50V, HI-Q	Various	
C2	22 pF	CAP, 0402, 5%, 50V, HI-Q	Various	
C3, C9, C10	220 pF	CAP, 0402, 5%, 50V, C0G	Various	
C5	0.9 pF	CAP, 0402, 5%, 50V, HI-Q	Various	
C6	2.4 pF	CAP, 0402, 5%, 50V, HI-Q	Various	
C11	DNP	n/a	n/a	
C4, C13	1 uF	CAP, 0402, 10%, 10V, X7S	Various	
C12	10 µF	CAP, 1206, 10%, 25V, X7R	Various	
C14, C16	1 pF	CAP, 0402, 5%, 50V, HI-Q	Various	
L0	27 nH	IND, 0402, ±0.1nH, W/W	Various	
L1	5.6 nH	IND, 0805, 2%, W/W	Murata	
L3	5.6 nH	IND, 0402, ±0.1nH, W/W	Murata	
L4	3.3 nH	IND, 0402, ±0.1nH, W/W	Murata	
R2	1.5 Ω	RES, 0402, 5%, 1/16W	Various	
C5, R3, R4	0 Ω	RES, 0402, 1/10W	Various	

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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