APPLICATION NOTE

Classification | PRIVATE

QPA9442 - 3.7-3.98GHz 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, 3.7 – 3.98 GHz Reference Design

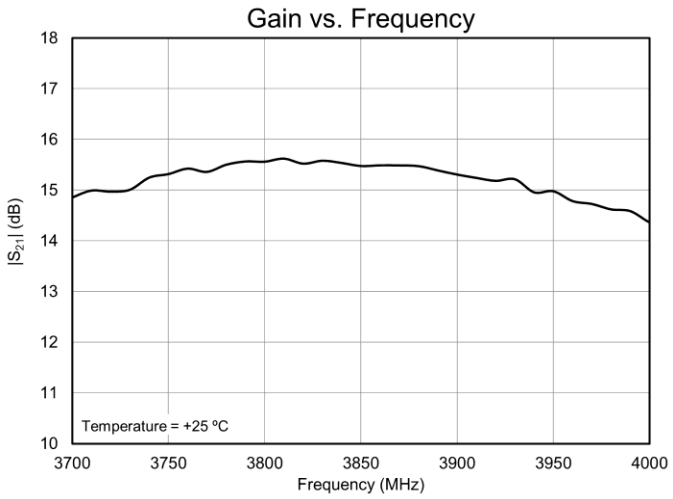
Parameter	Conditions	Typical Value			Units
Frequency		3700	3800	4000	MHz
Gain		14.8	15.5	14.3	dB
Input Return Loss		7.7	18.2	7.3	dB
Output Return Loss		10.3	9.1	9.1	dB
Output P1dB		28.1	28.9	29.9	dB
ACPR	Pout=+17 dBm, 1C LTE, 5MHz, 9.8dB PAR	-50.0	-49.3	-46.8	dBc
Device Current	V_{CC} and V_{BIAS} combined		240		mA

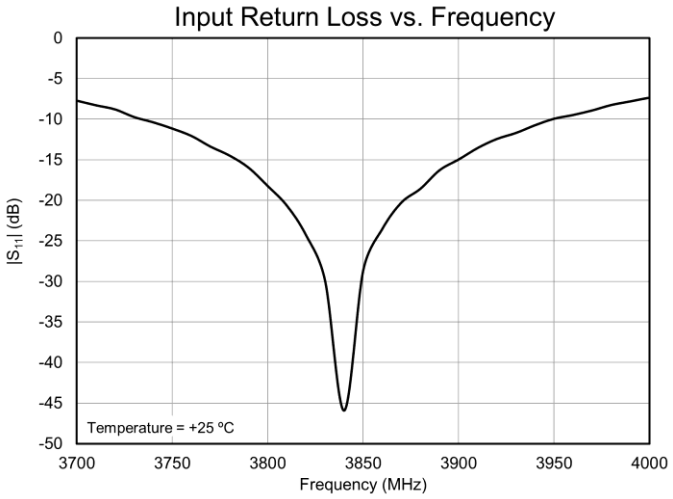
Notes:

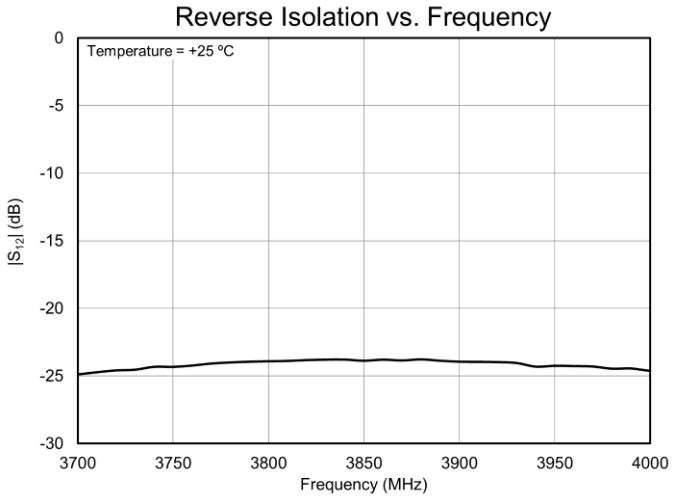
1. Test Conditions unless otherwise noted: V_{CC} = V_{BIAS} = +5.0 V, V_{PD} = +1.8 V, I_{CQ} = 235 mA, Temp = +25 °C, 50 Ω system.

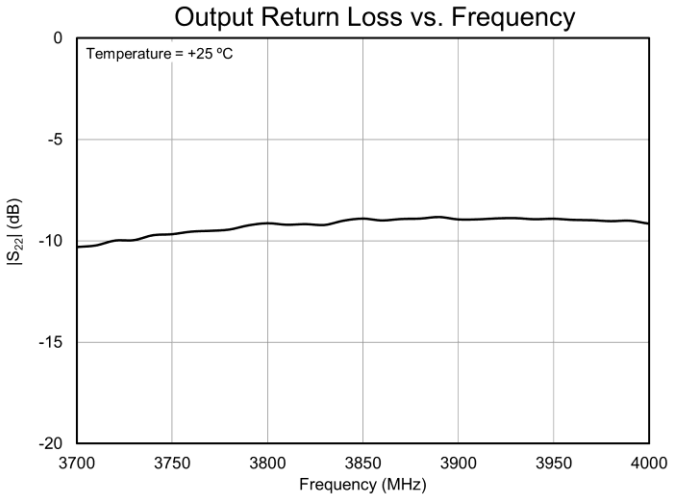
Performance Plots

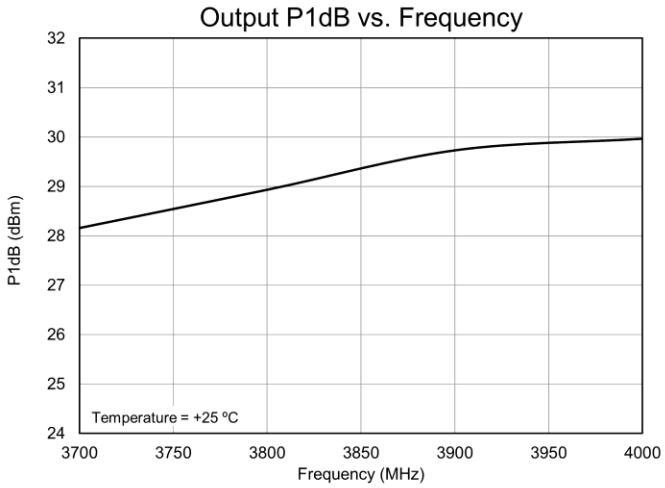
Qorvo Field and Factory Applications Engineers are available to provide technical assistance for determining appropriate matching networks for a particular application.

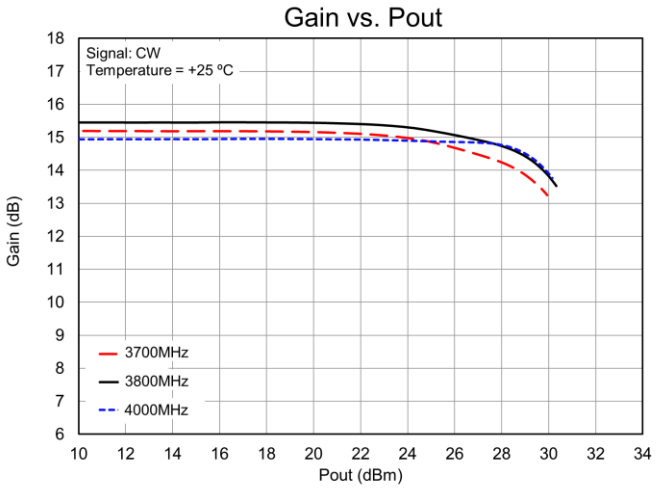









Output P1dB vs. Frequency
P1dB (dBm)
Frequency (MHz)
Temperature = +25 ºC
32
31
30
29
28
27
26
25
24
3700
3750
3800
3850
3900
3950
4000


Gain vs. Pout
Gain (dB)
Pout (dBm)
Signal: CW
Temperature = +25 ºC
3700MHz
3800MHz
4000MHz
18
17
16
15
14
13
12
11
10
9
8
7
6
10
12
14
16
18
20
22
24
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28
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32
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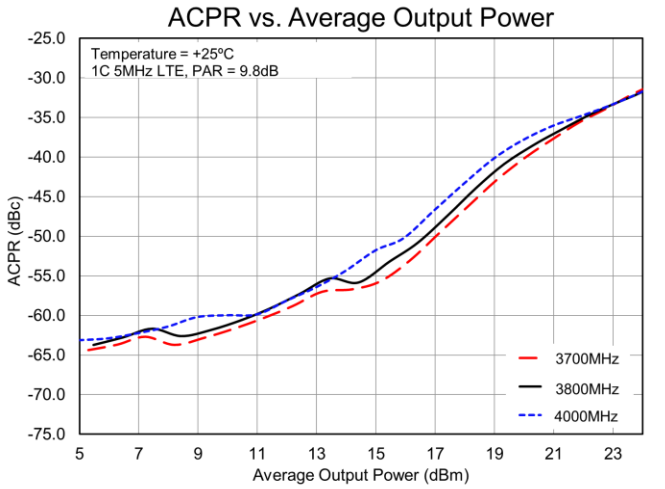
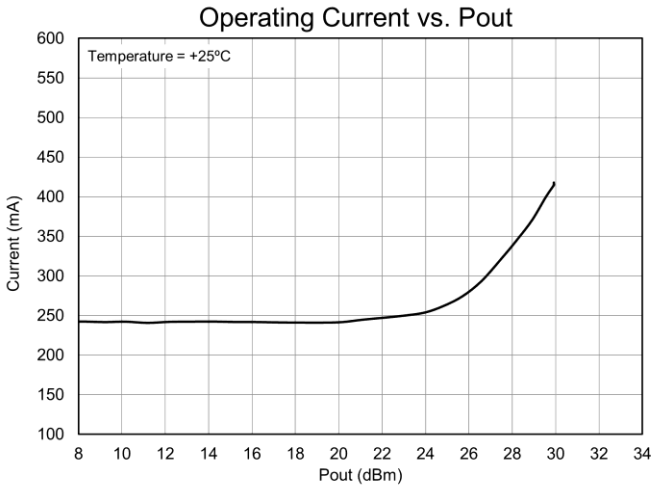
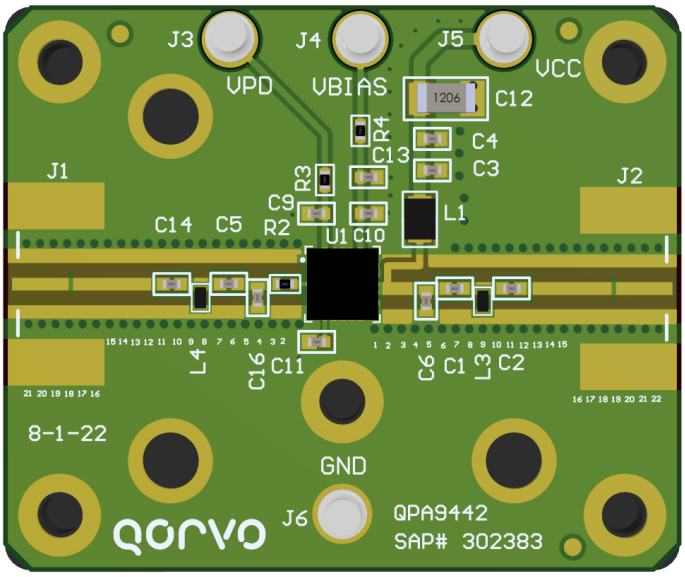
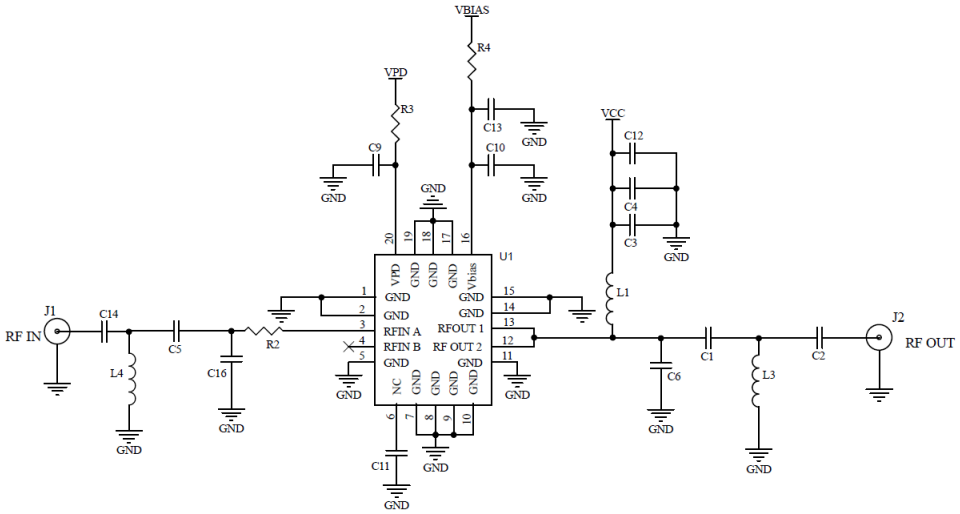

ACPR vs. Average Output Power
ACPR (dBc)
Average Output Power (dBm)
Temperature = +25ºC
1C 5MHz LTE, PAR = 9.8dB
3700MHz
3800MHz
4000MHz
-25.0
-30.0
-35.0
-40.0
-45.0
-50.0
-55.0
-60.0
-65.0
-70.0
-75.0
5
7
9
11
13
15
17
19
21
23


Operating Current vs. Pout
Current (mA)
Pout (dBm)
Temperature = +25ºC
600
550
500
450
400
350
300
250
200
150
100
8
10
12
14
16
18
20
22
24
26
28
30
32
34

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	1.5 pF	CAP, 0402, ±0.1pF, 50V, HI-Q	Various	
C2, C14	22 pF	CAP, 0402, 5%, 50V, HI-Q	Various	
C3, C9, C10	220 pF	CAP, 0402, 5%, 50V, C0G	Various	
C5	2.0 nH	IND, 0402, ±0.1nH, W/W	Various	
C4, C13	1 uF	CAP, 0402, 10%, 10V, X7S	Various	
C6, C11, C16, L3, L4	DNP	n/a	n/a	
C12	10 µF	CAP, 1206, 10%, 25V, X7R	Various	
L1	6.8 nH	IND, 0805, 2%, W/W	Murata	
R2	1.5 pF	CAP, 0402, ±0.1pF, 50V, HI-Q	Various	
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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