

# QPA9442 - 694-960MHz Reference Design

## Product Overview

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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 3<sup>rd</sup> 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<sub>PD</sub> 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.

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## Typical Performance, 694 – 960 MHz Reference Design

| Parameter          | Conditions   | Typical Value |       |       | Units |
|--------------------|--|---------------|-------|-------|-------|
| Frequency          |  | 694           | 827   | 960   | MHz   |
| Gain               |  | 19.1          | 19.4  | 19.0  | dB    |
| Input Return Loss  |  | 11.5          | 20.9  | 15.6  | dB    |
| Output Return Loss |  | 10.8          | 13.9  | 18.9  | dB    |
| Output P1dB        |  | +29.3         | +30.3 | +29.8 | dB    |
| Output P3dB        |  | +30.7         | +31.5 | +30.8 | dBm   |
| Output IP3         | P <sub>out</sub> = +15dBm/tone, Δf = 1MHz          | +38.3         | +38.5 | +39.1 | dBm   |
| ACPR               | P <sub>out</sub> =+17 dBm, 1C LTE, 5MHz, 9.8dB PAR | -51.5         | -52.0 | -53.0 | dBc   |
| Device Current     | V <sub>CC</sub> and V <sub>BIAS</sub> combined     | 240           |       |       | mA    |

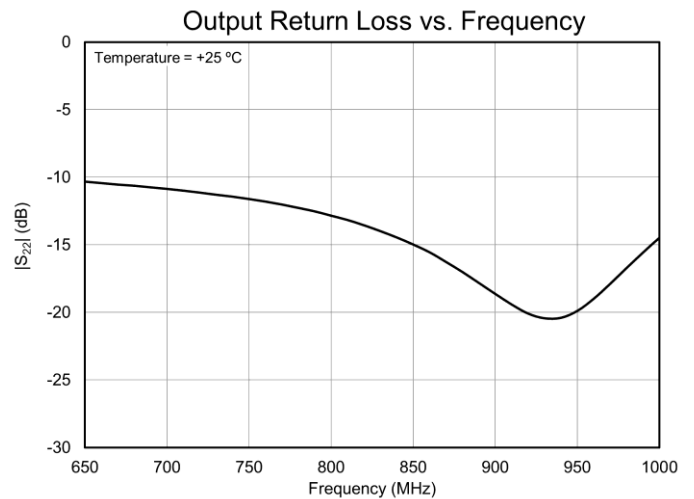
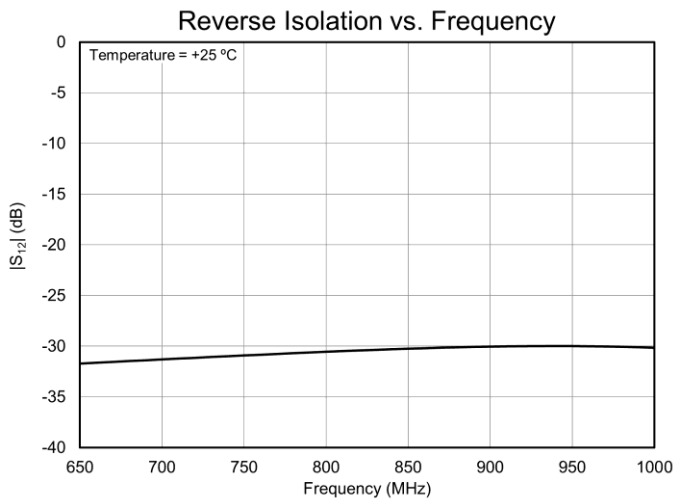
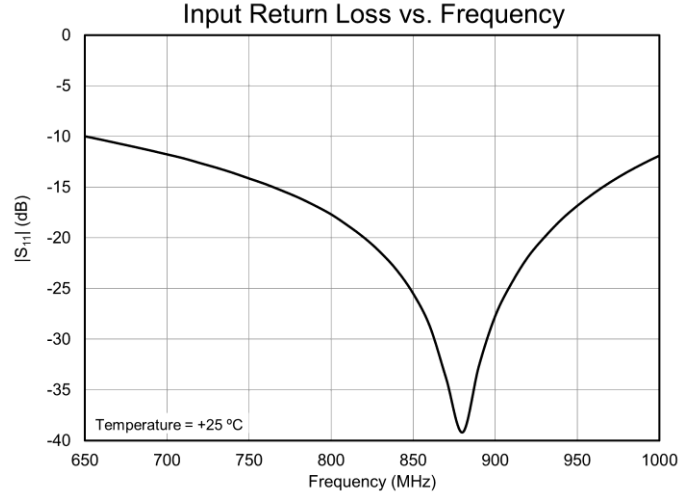
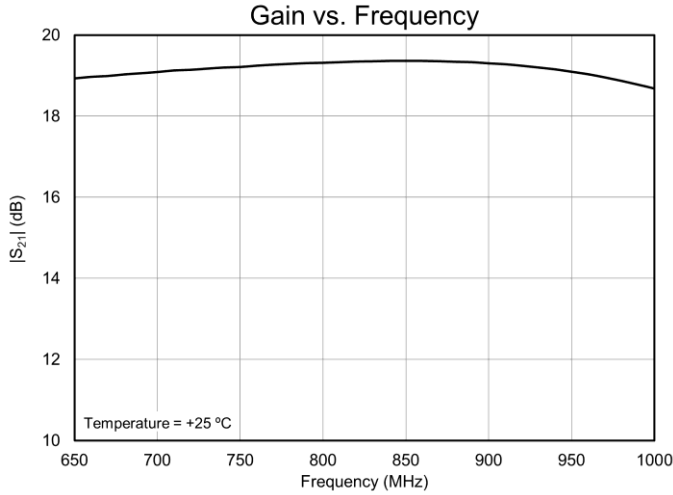
## Notes:

1. Test Conditions unless otherwise noted: V<sub>CC</sub> = V<sub>BIAS</sub> = +5.0 V, V<sub>PD</sub> = +1.8 V, I<sub>OQ</sub> = 235 mA, Temp = +25 °C, 50 Ω system.

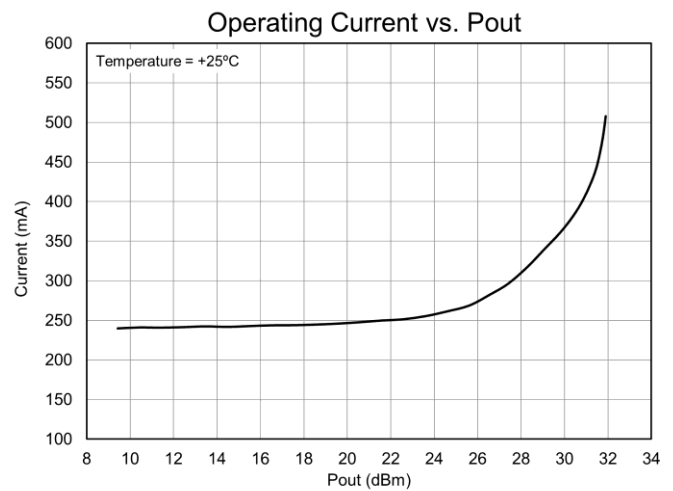
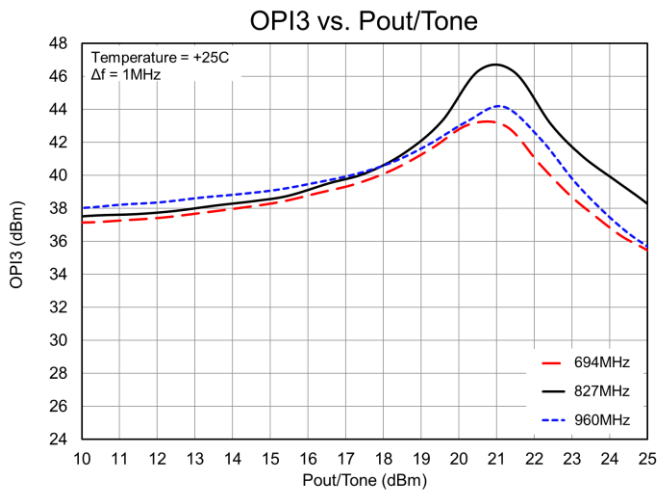
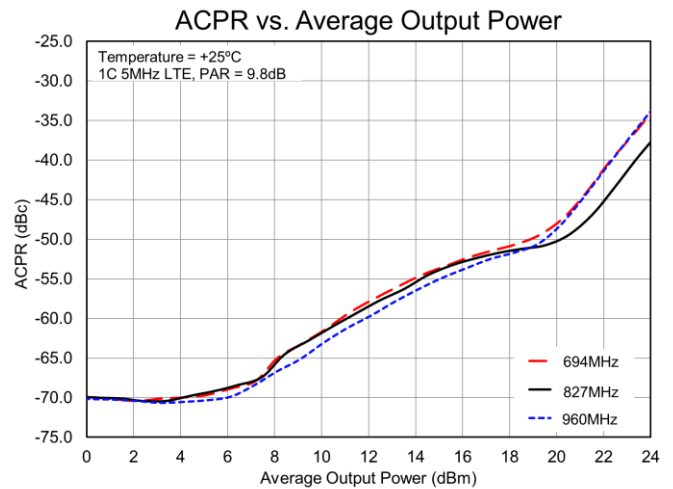
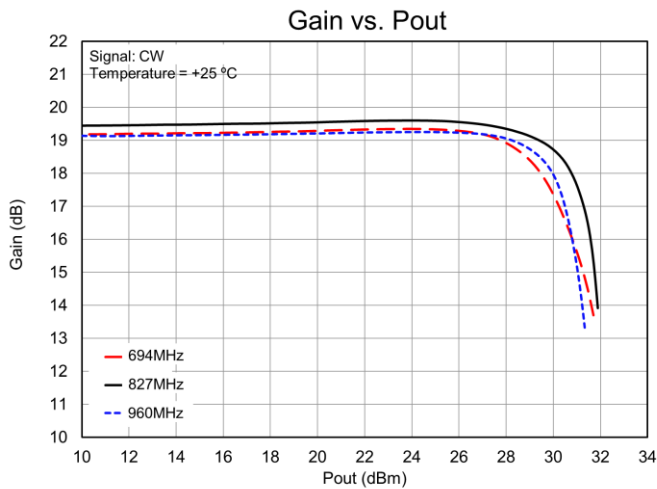
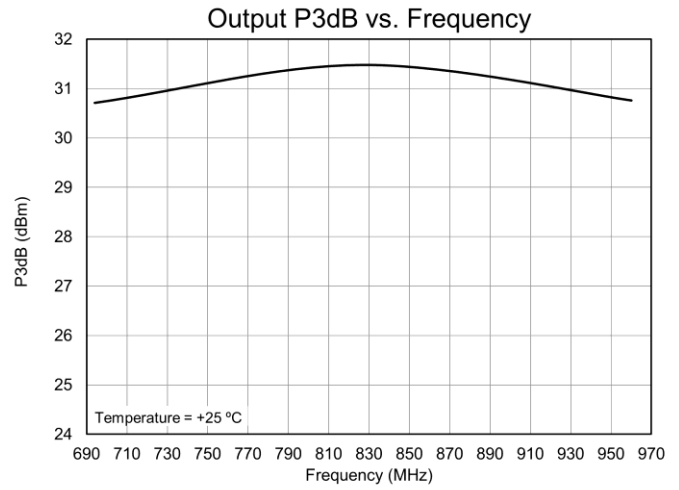
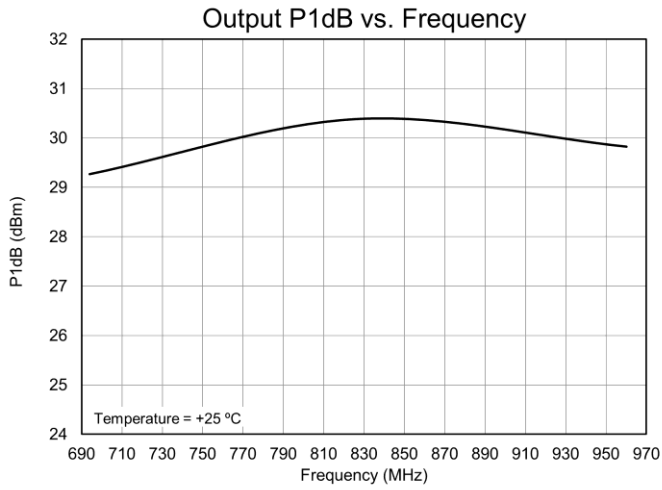
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## Performance Plots

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



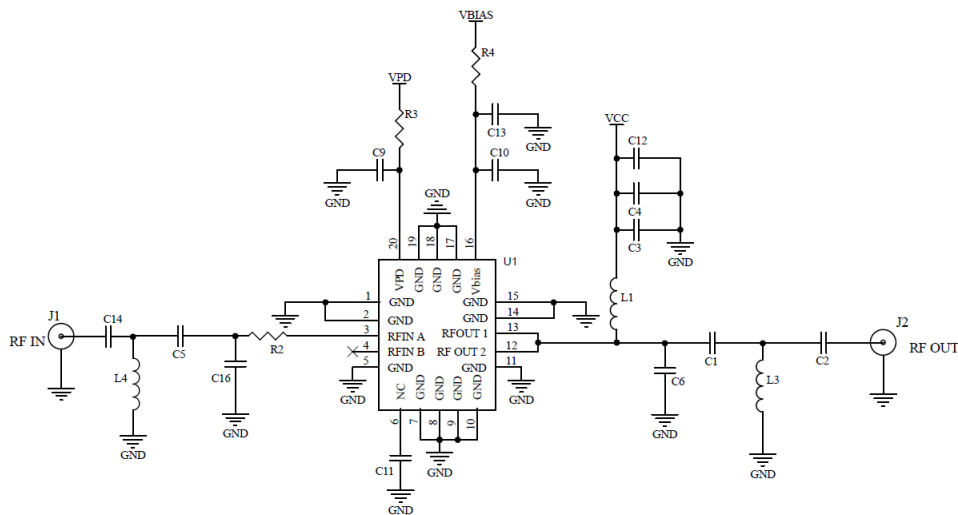
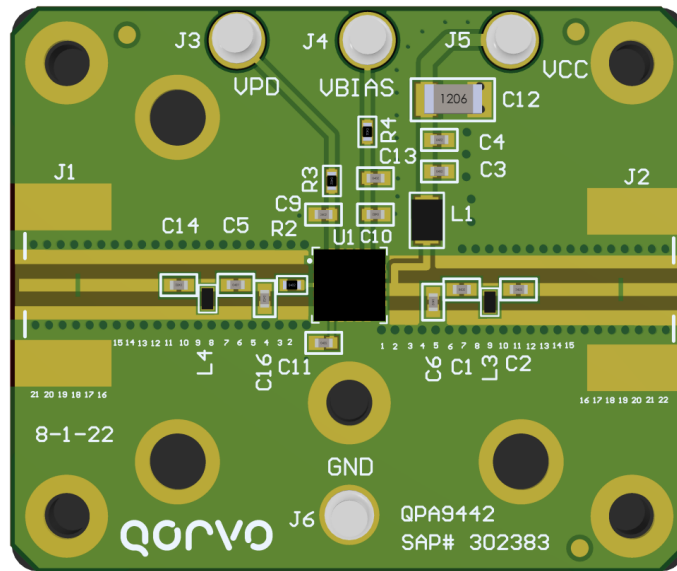
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## Evaluation Board Information

### Evaluation Board (EVB) Layout Assembly and Schematic



#### Notes:

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

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## 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             | 3.6 nH       | IND, 0402, $\pm 0.1$ nH, W/W       | Various |             |
| C2, C14        | 22 pF        | CAP, 0402, 5%, 50V, HI-Q           | Various |             |
| C3, C9, C10    | 220 pF       | CAP, 0402, 5%, 50V, C0G            | Various |             |
| C5             | 3.0 nH       | IND, 0402, $\pm 0.1$ nH, W/W       | Various |             |
| C6             | 1.2 pF       | CAP, 0402, $\pm 0.1$ pF, 50V, HI-Q | Various |             |
| C16            | 8.2 pF       | CAP, 0402, $\pm 0.1$ pF, 50V, HI-Q | Various |             |
| C4, C13        | 1 uF         | CAP, 0402, 10%, 10V, X7S           | Various |             |
| C11            | DNP          | n/a                                | n/a     |             |
| C12            | 10 $\mu$ F   | CAP, 1206, 10%, 25V, X7R           | Various |             |
| L1             | 22 nH        | IND, 0805, 2%, W/W                 | Murata  |             |
| L3             | 4.7 pF       | CAP, 0402, $\pm 0.1$ pF, 50V, HI-Q | Murata  |             |
| L4             | 3.6 pF       | CAP, 0402, $\pm 0.1$ pF, 50V, HI-Q | Murata  |             |
| R2             | 3.9 $\Omega$ | RES, 0402, 5%, 1/16W               | Various |             |
| R3, R4         | 0 $\Omega$   | RES, 0402, 1/10W                   | 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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