

TQP3M9037 –2.3-2.4GHz Reference Design

Product Overview

The TQP3M9037 is a high-linearity, ultra-low noise gain block amplifier in a small 2 x 2 mm surface-mount package. At 1.95 GHz, the amplifier typically provides 20 dB gain, +35 dBm OIP3, and 0.4 dB noise figure while drawing 70 mA current from a +5 V supply. This amplifier does not require a negative supply for operation and can be biased from a single positive supply ranging from +3.3 to +5 volts. The device is housed in a green/RoHS-compliant industrystandard 2 x 2 mm package.

The TQP3M9037 is internally matched using a high performance E-pHEMT process and only requires four external components for operation from a single positive supply: an external RF choke and blocking/bypass capacitors. This low noise amplifier contains an internal active bias to maintain high performance over temperature and integrates a shut-down biasing capability to allow for operation for TDD applications.

The TQP3M9037 covers the 0.7–6.0 GHz frequency band and is targeted for wireless infrastructure. It is pin compatible with the low-band, 0.4–2.0 GHz TQP3M9036.

Referenced Documents

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

TQP3M9037 Data Sheet.

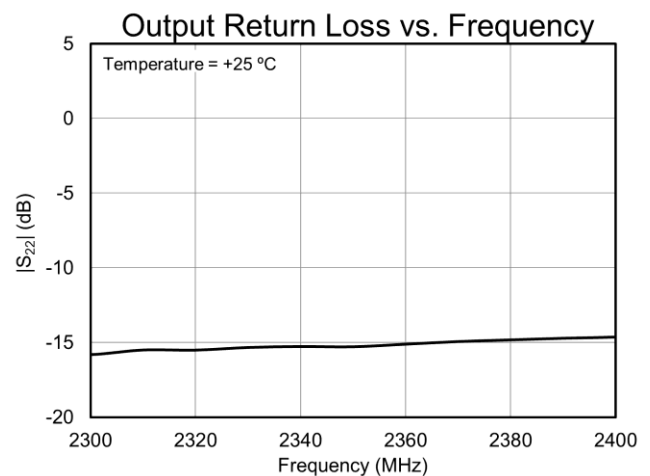
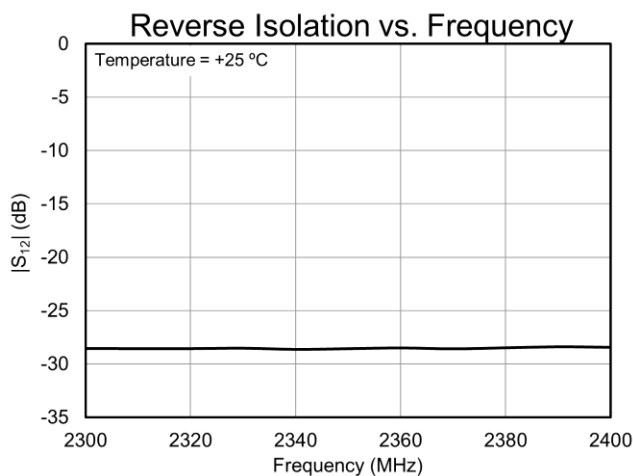
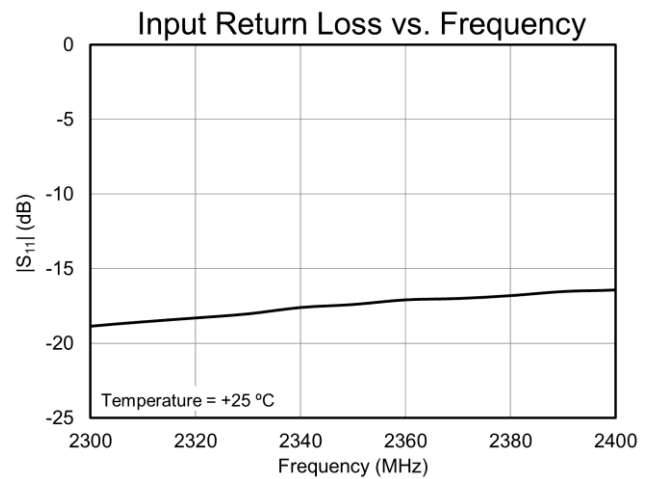
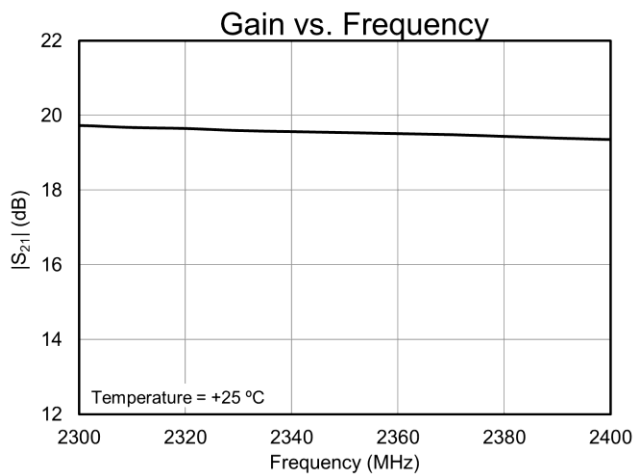
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Application Electrical Performance

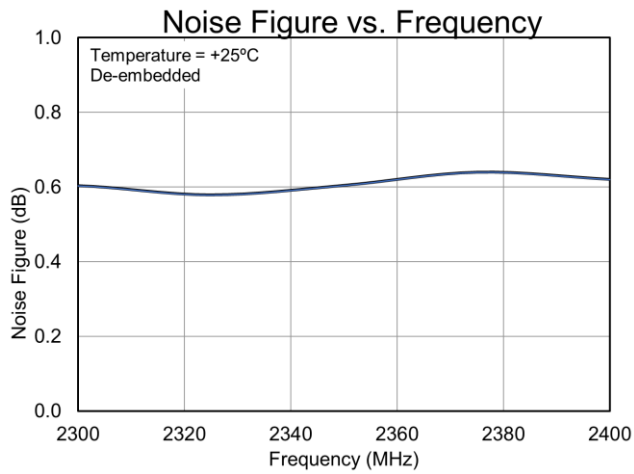
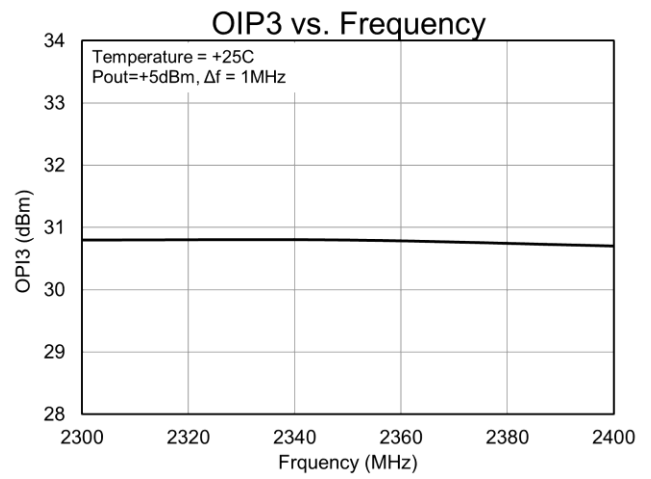
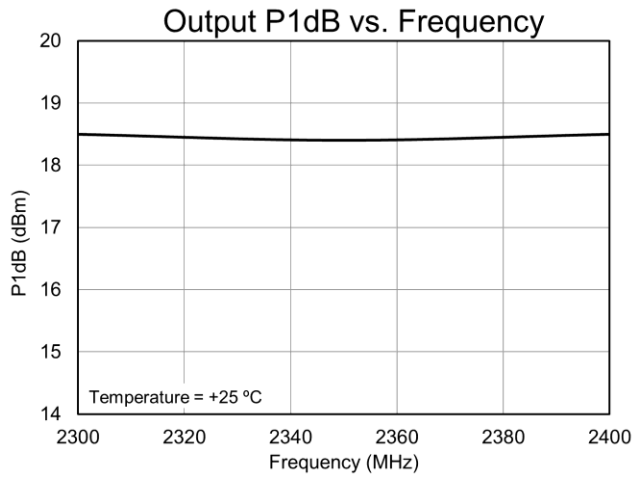
Qorvo Field and Factory Applications Engineers are available to provide technical assistance for determining appropriate matching networks for a particular application.

| Parameter | Conditions | Typical Value | | | Units |
|---------------------------------|----------------------------|---------------|------|------|-------|
| | | 2300 | 2350 | 2400 | |
| Frequency | | 2300 | 2350 | 2400 | MHz |
| Gain | | 19.7 | 19.5 | 19.4 | dB |
| Input Return Loss | | 18.9 | 17.4 | 16.4 | dB |
| Output Return Loss | | 15.8 | 15.3 | 14.6 | dB |
| Output P1dB | | 18.5 | 18.4 | 18.5 | dBm |
| OIP3 | Pout=+5 dBm/tone, Δf=1 MHz | 30.8 | 30.8 | 30.7 | dBm |
| Noise Figure | De-embedded | 0.60 | 0.60 | 0.62 | dB |
| Device Current, I _{DD} | | 65 | | | mA |

Test conditions unless otherwise noted: V_{cc} = +5 V, Temp = +25°C, 50 Ω system.



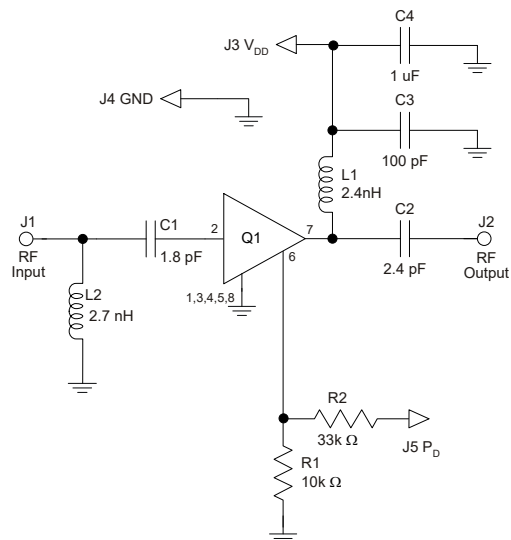
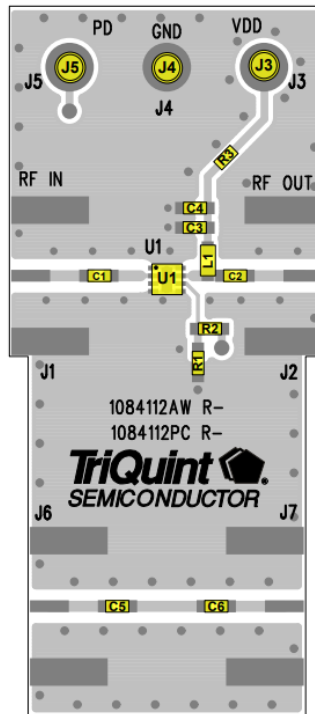
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Evaluation Board Information

Evaluation Board and Schematic



Notes:

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

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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 | High Linearity LNA Gain Block | Qorvo | TQP3M9037 |
| R1 | 10 K Ω | Resistor, Chip, 0402, 5%, 1/16W | Various | |
| R2 | 33 K Ω | Resistor, Chip, 0402, 5%, 1/16W | Various | |
| R3 | 0 Ω | Resistor, Chip, 0402, 5%, 1/16W | Various | |
| L1 | 2.4 nH | Inductor, 0603, 5%, Ceramic | Various | |
| L2 | 3.9 nH | Inductor, 0402, 5%, Ceramic | Various | |
| C1 | 1.8 pF | Cap., Chip, 0402, 5%, 50V, NPO/COG | Various | |
| C2 | 2.4 pF | Cap., Chip, 0402, 5%, 50V, NPO/COG | | |
| C4 | 1.0 uF | Cap., Chip, 0402, 10%, 10V, X5R | Various | |
| C6 | 100 pF | Cap., Chip, 0402, 5%, 50V, NPO/COG | Various | |
| C3 | 8.2 pF | Cap., Chip, 0402, 5%, 50V, NPO/COG | Various | |
| C5 | DNP | - | - | |

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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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