



Preliminary

GRF2374

**Low Current LNA w/Bypass
Tuning Range: 0.1 to 3.8 GHz**



Product Description

GRF2374 is a low noise amplifier (LNA) with bypass designed for high-performance WLAN/ISM and other applications up to 3.8 GHz. Ideal for low power, cost sensitive bypass amplifier applications.

The LNA is operated from a single positive supply of 2.7 to 5.0 V with typical bias condition of 3.3 volts and 15 mA.

Consult with the GRF applications engineering team for custom tuning/evaluation board data and device s-parameters.

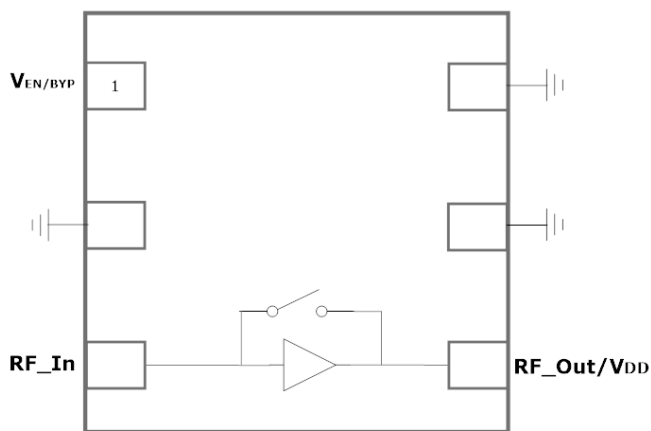
Features

Reference: 3.3V/15mA/2.4 GHz

- EVB NF: 1.4 dB
- Gain: 14.0 dB
- Bypass Gain: -2.0 dB
- OP1dB: 10.0 dBm
- Flexible voltage: 2.7 to 5.0 volts
- Simple matching to 50 ohms
- Process: InGaP HBT

Applications

- WiFi Access Points
- Mobile WiFi Devices
- Cellular Boosters
- Drones
- Set Top Boxes
- VHF/UHF/900/2400 ISM



1.5 x 1.5 mm DFN-6



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Absolute Ratings:

| Parameter | Symbol | Min. | Max. | Unit |
|---|-----------------------|------|------|------|
| Supply Voltage | V _{DD} | 0 | 5.5 | V |
| RF Input Power: (Load VSWR < 2:1; V _C : 5.0 volts) | P _{IN MAX} | | 20 | dBm |
| Operating Temperature (Package Heat Sink) | T _{AMB} | -40 | 85 | °C |
| Maximum Channel Temperature (MTTF > 10 ⁶ Hours) | T _{MAX} | | 150 | °C |
| Maximum Dissipated Power | P _{DISS MAX} | | 100 | mW |
| Electrostatic Discharge: | | | | |
| Charged Device Model: (TBD) | CDM | 1500 | | V |
| Human Body Model: (TBD) | HBM | 250 | | V |
| Storage: | | | | |
| Storage Temperature | T _{STG} | -65 | 150 | °C |
| Moisture Sensitivity Level | MSL | | 1 | -- |



Caution! ESD Sensitive Device

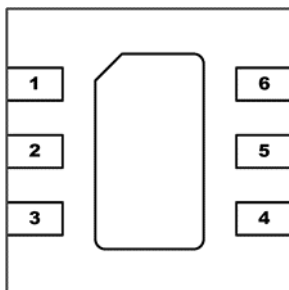


Exceeding Absolute Maximum Rating conditions may cause permanent damage to the device.

Note: For package dimensions and manufacturing information, see the Guerrilla-RF.com website for the following document located on the GRF2374 landing page (coming soon): **Manufacturing Note—MN-001 Product Tape and Reel, Solderability and Package Outline Specification.**

[Link to manufacturing note](#)

Pin Out (Top View)



Pin Assignments:

| Pin | Name | Description | Note |
|-----------------|----------------------------------|---------------------------|---|
| 1 | V_{ENABLE}/BYPASS | LNA enable/Bypass Control | V _{ENABLE} and series resistor set I _{DDQ} . V _{ENABLE} < 0.2 volts disables device. On-die pull-down resistor will turn the part off if this node is allowed to float. |
| 2 | NC | No Connect or Ground | No internal connections to die |
| 3 | RF_In | LNA RF input | Requires external DC block. |
| 4 | RF_Out/V_{CC} | LNA RF output | Requires external bias inductor followed by DC block. |
| 5 | NC | No Connect or Ground | No internal connections to die |
| 6 | NC | No Connect or Ground | No internal connections to die |
| PKG BASE | GND | Ground | Provides DC and RF ground for LNA, as well as thermal heat sink. Recommend multiple 8 mil vias beneath the package for optimal RF and thermal performance. Refer to evaluation board top layer graphic on schematic page. |

V_{ENABLE} Truth Table:

| Mode | Description | V _{ENABLE} /BYPASS |
|-----------------|-----------------------|-----------------------------|
| High Gain | High LNA Gain | 1 |
| Bypass | High Linearity Bypass | 0 |
| Logic Level "0" | Logic Low | 0.0V to 0.3V |
| Logic Level "1" | Logic High | 1.5V to V _{CC} |



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Nominal Operating Parameters:

| Parameter | Symbol | Specification | | | Unit | Condition |
|---|----------------------|---------------|------|------|------|--|
| | | Min. | Typ. | Max. | | |
| High Gain Mode | | | | | | V _{CC} = 3.3 V; V _{ENABLE} : High |
| Test Frequency | F _{TEST} | | 2.4 | | GHz | |
| Gain | S ₂₁ | | 14.0 | | dB | |
| Noise Figure (Evaluation Board) | NF | | 1.4 | | dB | |
| Input Power for 1.0% EVM (Gain Mode) | IP1% | | TBD | | dBm | Waveform: 802.11g;/n PAR: 11.6 dB |
| Input Power for 1.0% EVM (Bypass Mode) | IP1% | | TBD | | dBm | Waveform: 802.11g;/n PAR: 11.6 dB |
| Output 1dB Compression Point | OP1dB | | 10.0 | | dBm | |
| Output Intercept Point | OIP3 | | 19.5 | | dBm | -5.0 dBm P _{OUT} per tone (2399 and |
| Supply Current | I _{CC} | | 15 | | mA | |
| Enable Current | I _{ENABLE} | | 1.7 | | mA | |
| Bypass Mode | | | | | | V _{CC} : 3.3 V; Ven: 0.0 V |
| Gain | S(2,1) | | -2.0 | | dB | |
| Supply Current | I _{CC} | | 4.0 | | mA | |
| Thermal Data | | | | | | |
| Thermal Resistance (Infra-Red Scan) | Θ _{Jc} | | 700 | | °C/W | |
| Channel Temperature @ +85 C reference (Package heat sink) | T _{CHANNEL} | | 120 | | °C | V _{CC} : 3.3 V; I _{CCQ} : 15 mA; No RF; Dissi- pated Power: 50 mW |

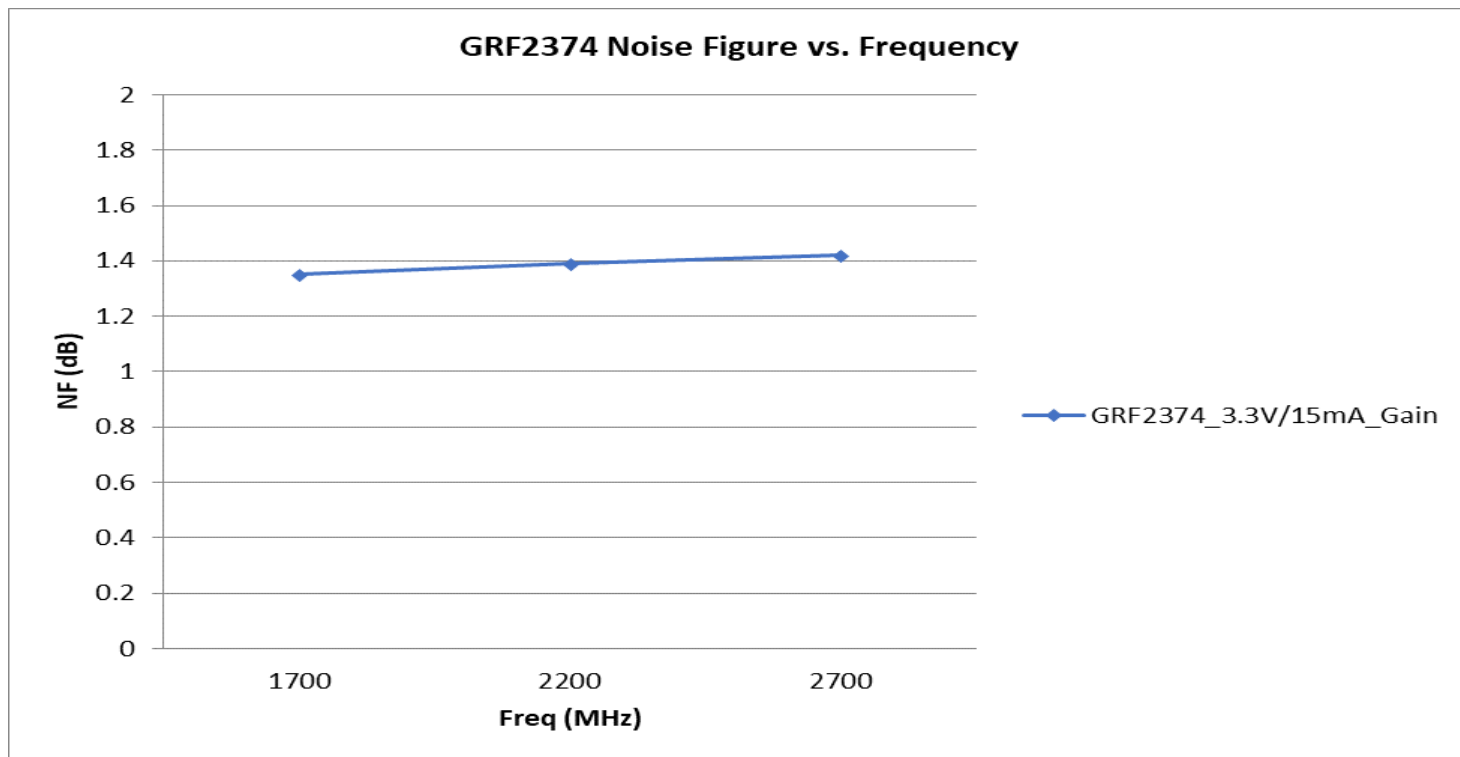
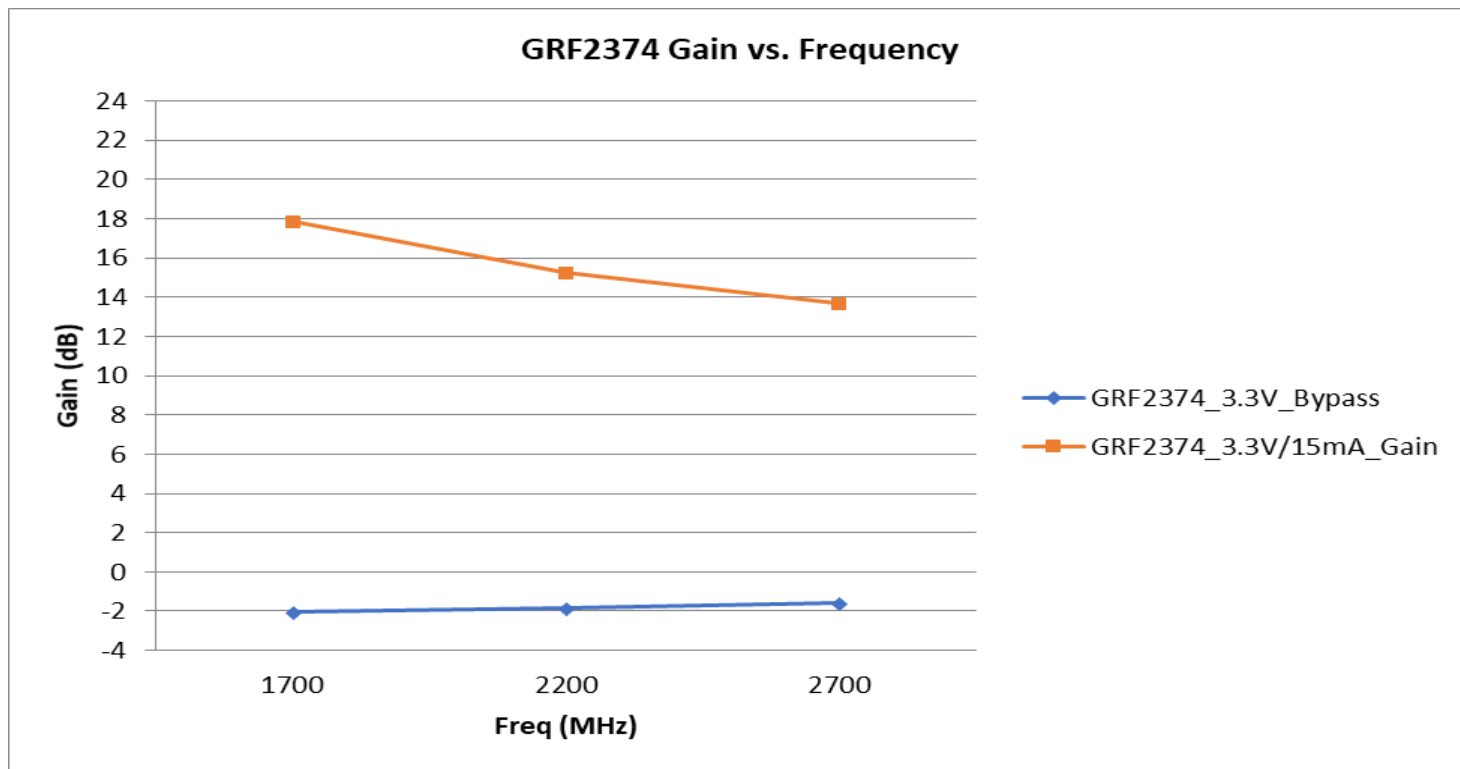


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GRF2374 Evaluation Board Measured Data (Gain and Bypass Modes)



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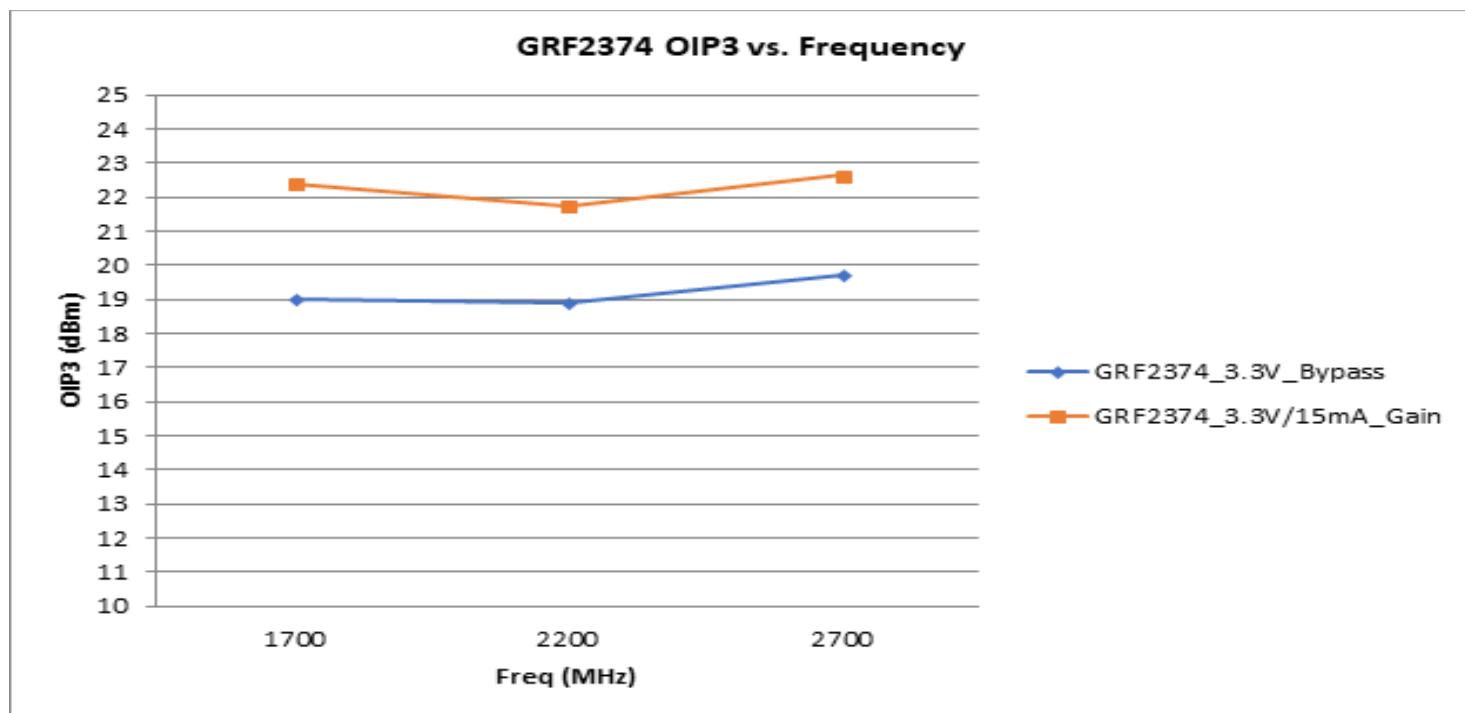
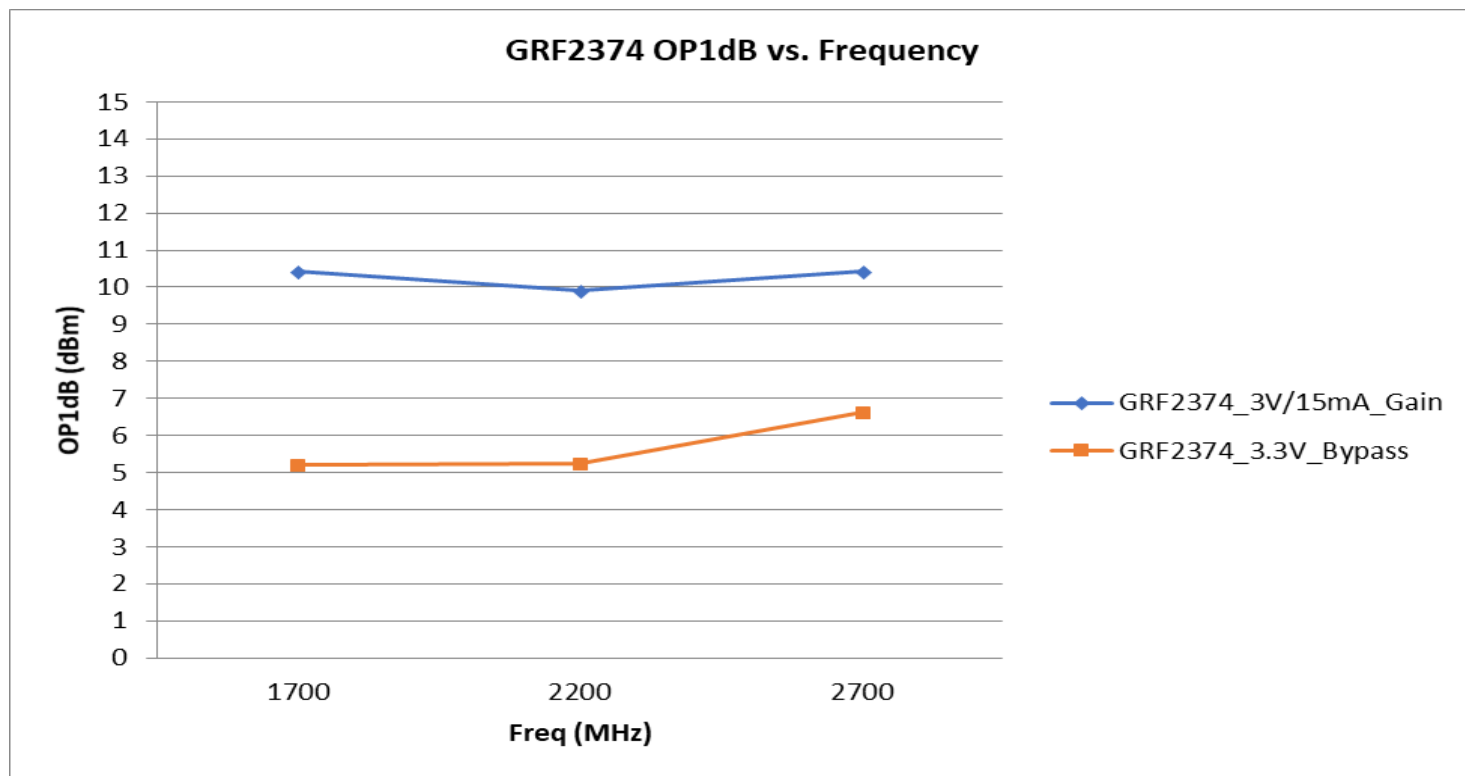


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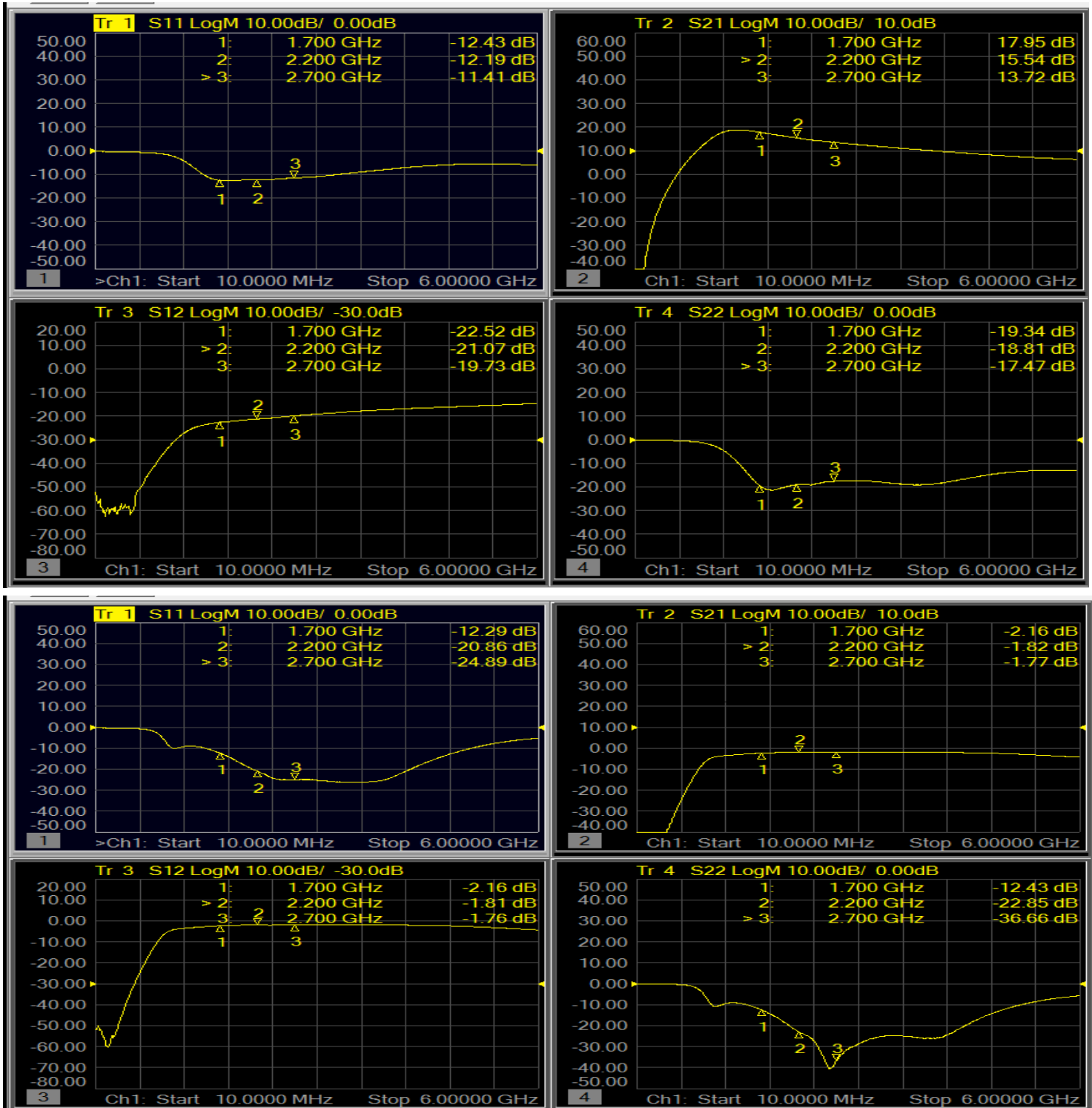


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GRF2370 Evaluation Board S-Pars and Stability Mu Factor (Gain/Bypass Modes)



Note: $\mu \geq 1.0$ implies unconditional stability

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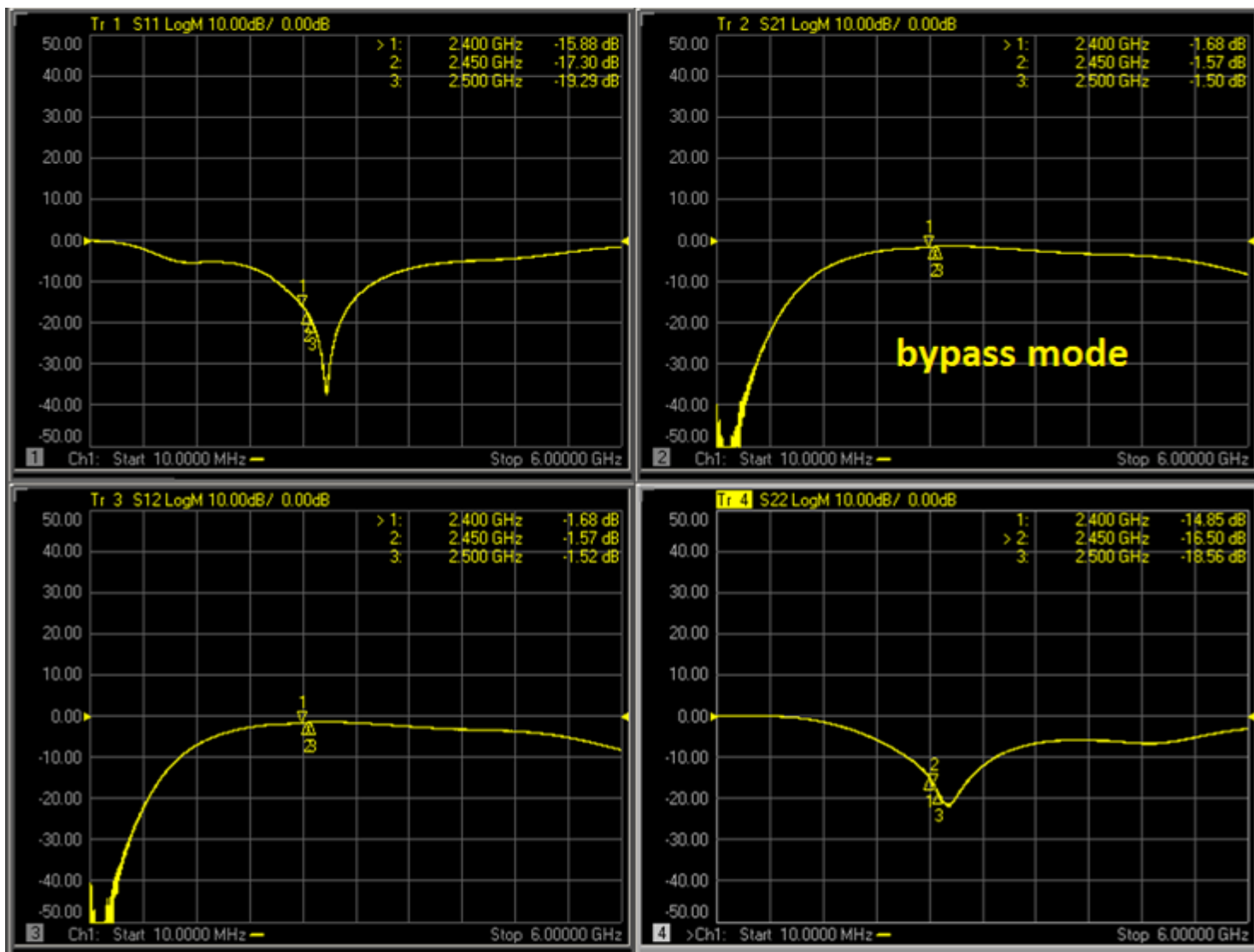


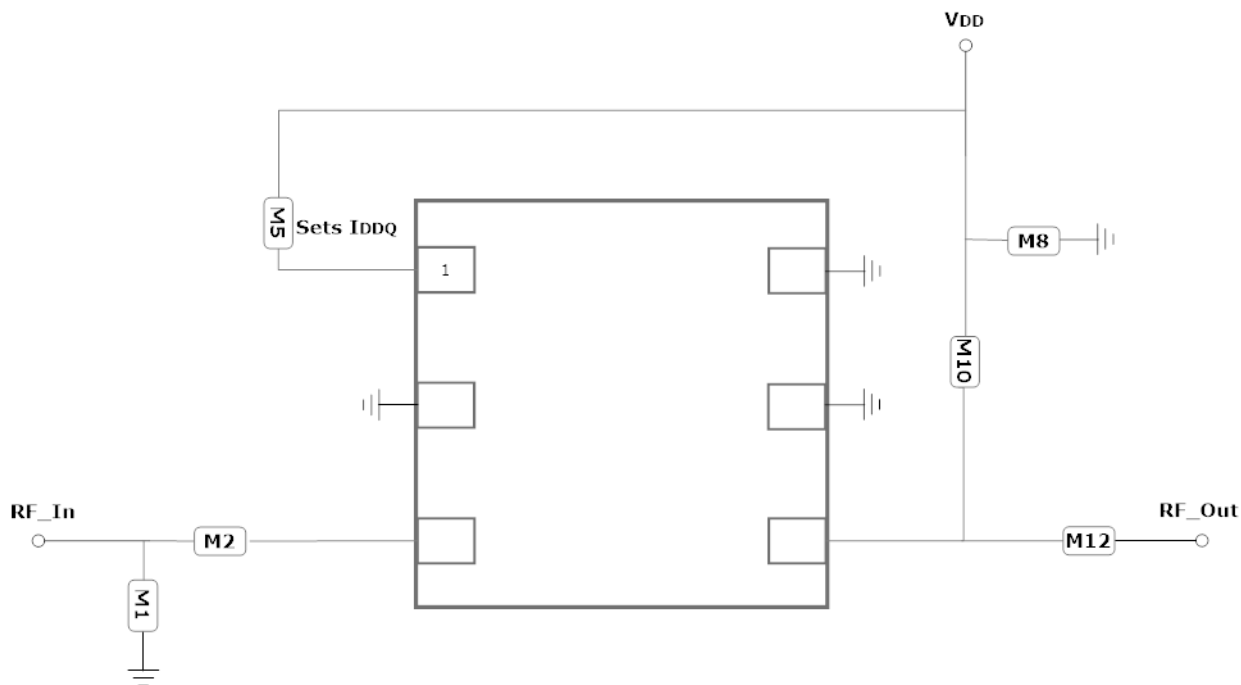
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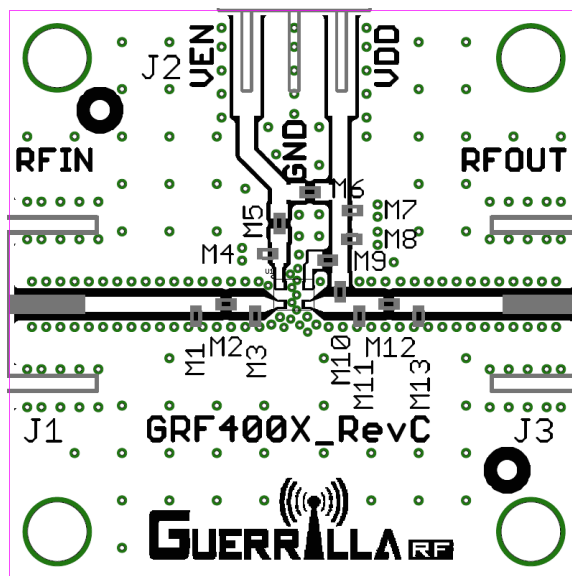
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GRF2370 Evaluation Board S-Pars (Bypass Mode): (1500-3800 MHz Tune)





GRF2374 Application Schematic



GRF2374 Evaluation Board Assembly Diagram



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GRF2374 Standard Evaluation Board BOM: (1.7 to 2.7 GHz Tune)

| Component | Type | Manufacturer | Family | Value | Package Size | Substitution |
|-------------------|---------------|--------------|--------|--------|--------------|--------------|
| M1 | Inductor | Murata | LQG | 5.1 nH | 0402 | Yes |
| M2 | Capacitor | Murata | GJM | 3.0 pF | 0402 | Yes |
| M5 (Sets Iddq) | Resistor | Various | — | TBD | 0402 | Yes |
| M9 | Capacitor | Murata | GRM | 0.1 uF | 0402 | Yes |
| M10 | Inductor | Murata | LQG | 3.0 nH | 0402 | Yes |
| M12 | Capacitor | Murata | GJM | 2.7 pF | 0402 | Yes |
| Evaluation Board: | GRF400X_Rev C | | | | | |



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| Data Sheet Release Status: | Notes |
|----------------------------|---|
| Advance | S-parameter and NF data based on EM simulations for the fully packaged device using foundry supplied transistor s-parameters. Linearity estimates based on device size, bias condition and experience with related devices. |
| Preliminary | All data based on evaluation board measurements in the Guerrilla RF Applications Lab. |
| Released | All data based on device qualification data. Typically, this data is nearly identical to the data found in the preliminary version. Max and min values for key RF parameters are included. |

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