



## 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.

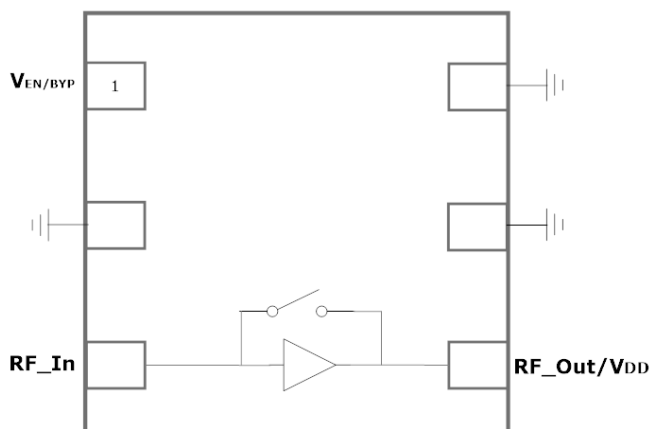
## Features

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

## Absolute Ratings:

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



**Caution!** ESD Sensitive Device

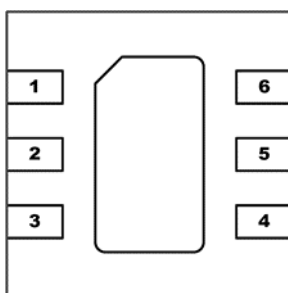


Exceeding Absolute Maximum Rating conditions may cause permanent damage to the device.

**Note:** For package dimensions and manufacturing information, see the [Guerrilla-RF.com](http://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 <sub>ENABLE</sub> /BYPASS	LNA enable/Bypass Control	V <sub>ENABLE</sub> and series resistor set I <sub>DDQ</sub> . V <sub>ENABLE</sub> < 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 <sub>CC</sub>	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<sub>ENABLE</sub> Truth Table:

Mode	Description	V <sub>ENABLE</sub> /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 <sub>CC</sub>



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

## Nominal Operating Parameters:

Parameter	Symbol	Specification			Unit	Condition
		Min.	Typ.	Max.		
<b>High Gain Mode</b>						$V_{CC} = 3.3\text{ V}; V_{ENABLE}: \text{High}$
Test Frequency	$F_{TEST}$		2.4		GHz	
Gain	S21		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	
<b>Bypass Mode</b>						$V_{CC}: 3.3\text{ V}; V_{EN}: 0.0\text{ V}$
Gain	S(2,1)		-2.0		dB	
Supply Current	$I_{CC}$		4.0		mA	
<b>Thermal Data</b>						
Thermal Resistance (Infra-Red Scan)	$\Theta_{JC}$		700		$^{\circ}\text{C}/\text{W}$	
Channel Temperature @ +85 C reference (Package heat sink)	$T_{CHANNEL}$		120		$^{\circ}\text{C}$	$V_{CC}: 3.3\text{ V}; I_{CC}: 15\text{ mA}; \text{No RF}; \text{Dissipated Power}: 50\text{ mW}$

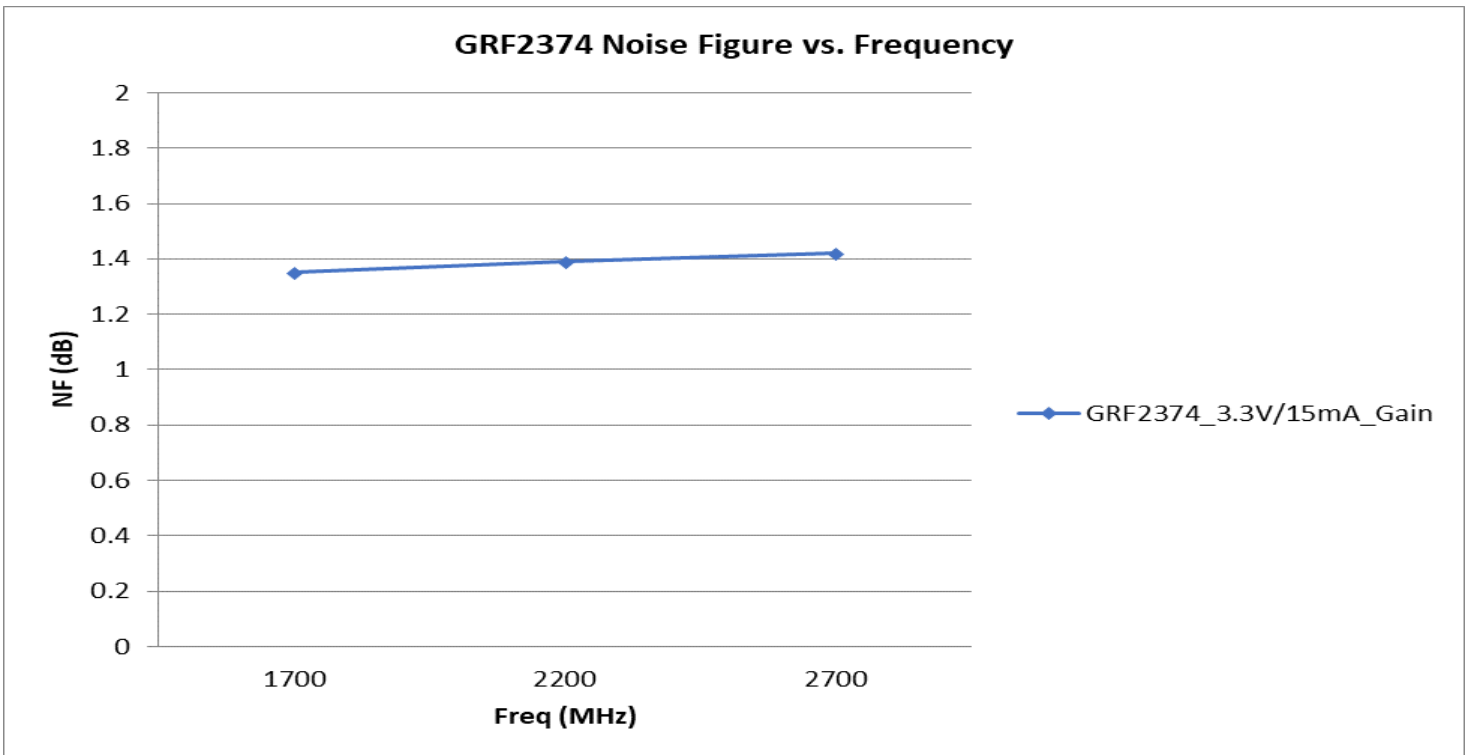
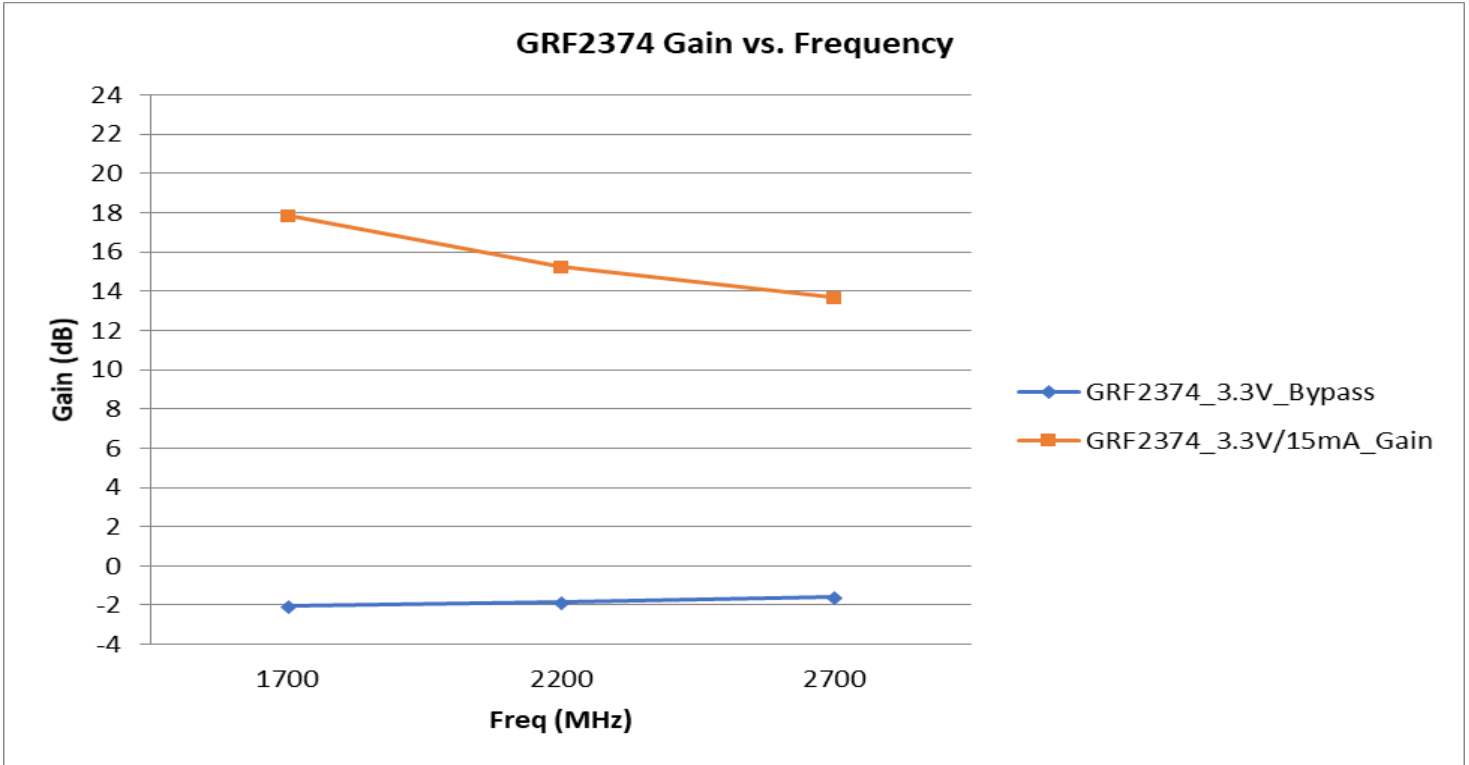


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Tuning Range: 0.1 to 3.8 GHz

## GRF2374 Evaluation Board Measured Data (Gain and Bypass Modes)



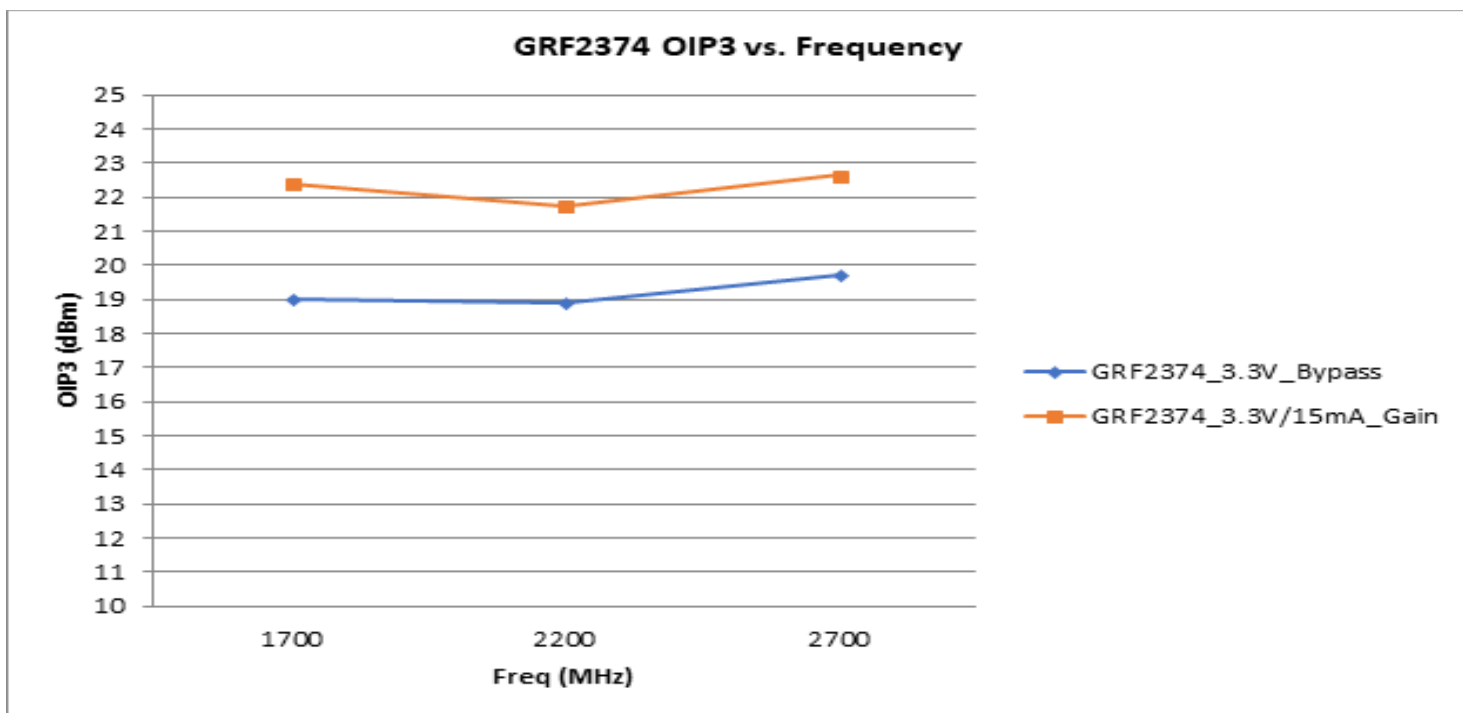
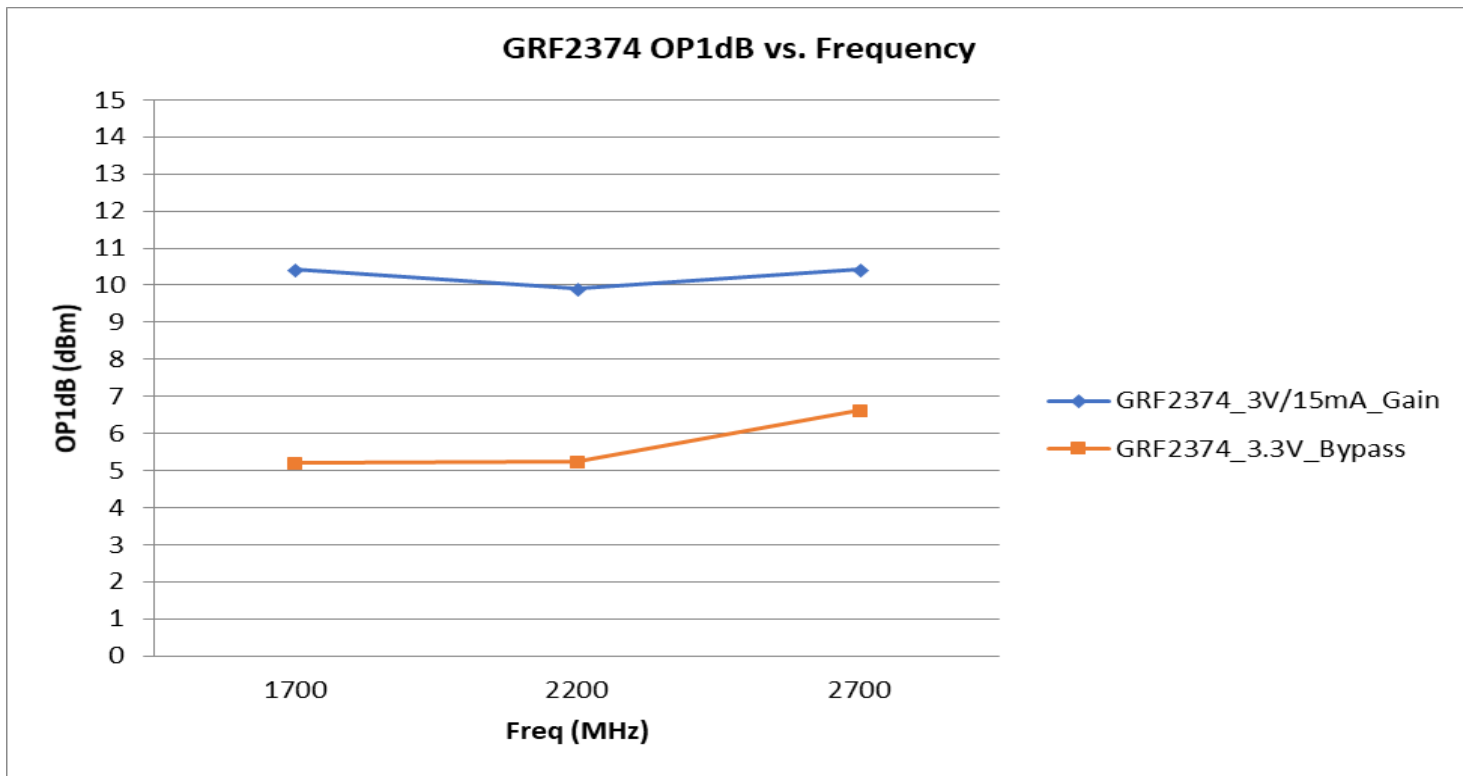


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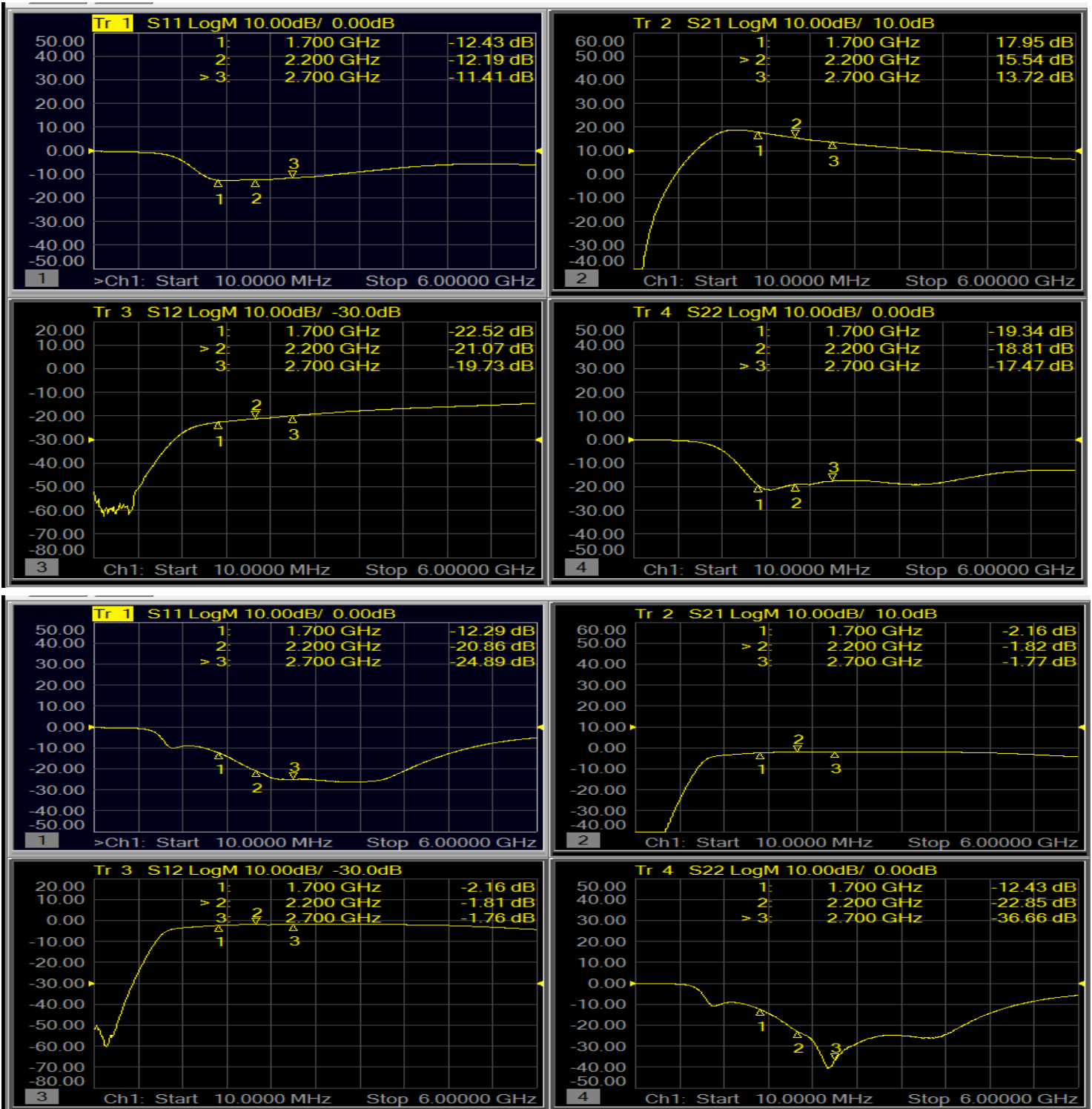


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# GRF2374

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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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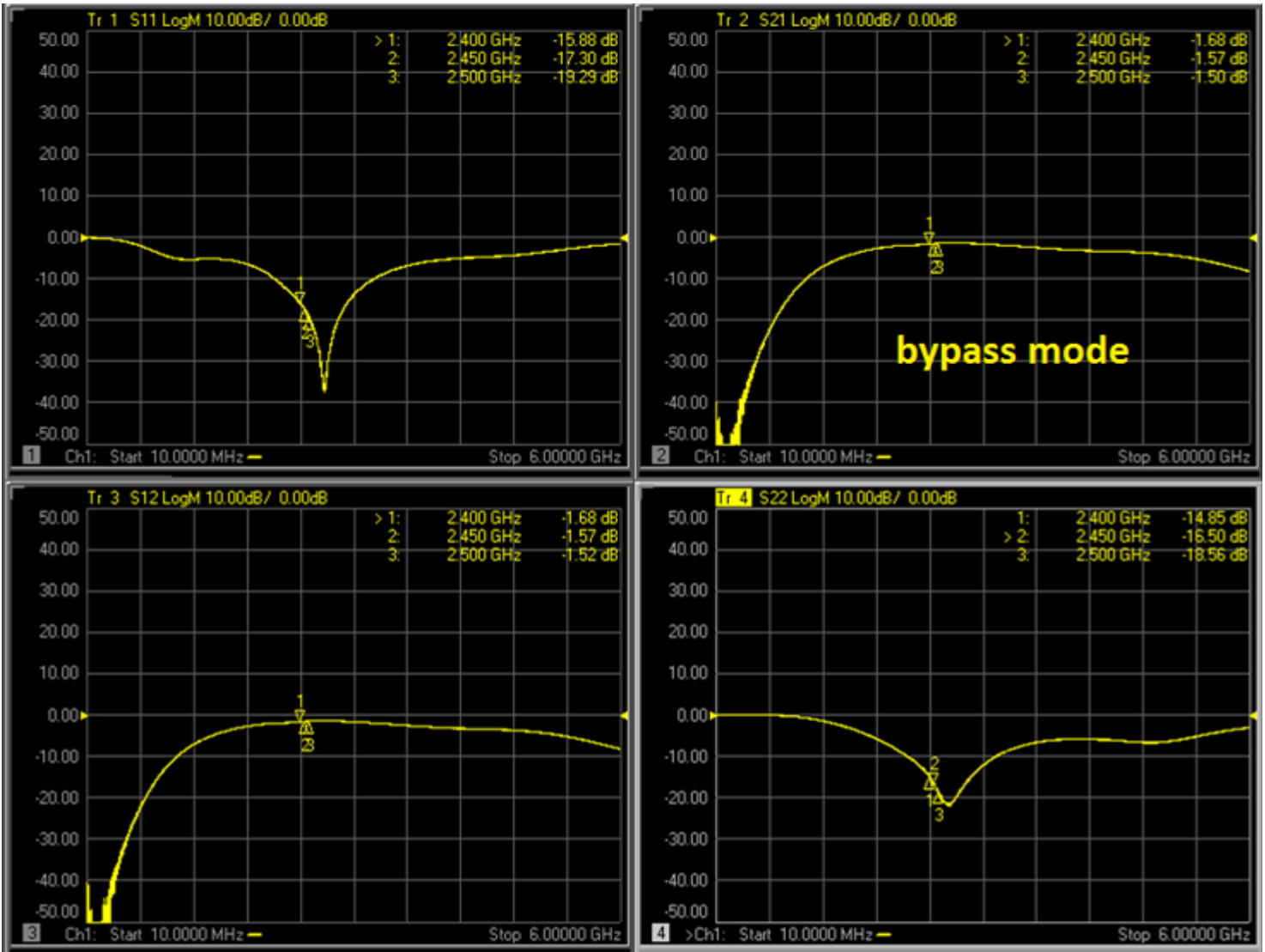


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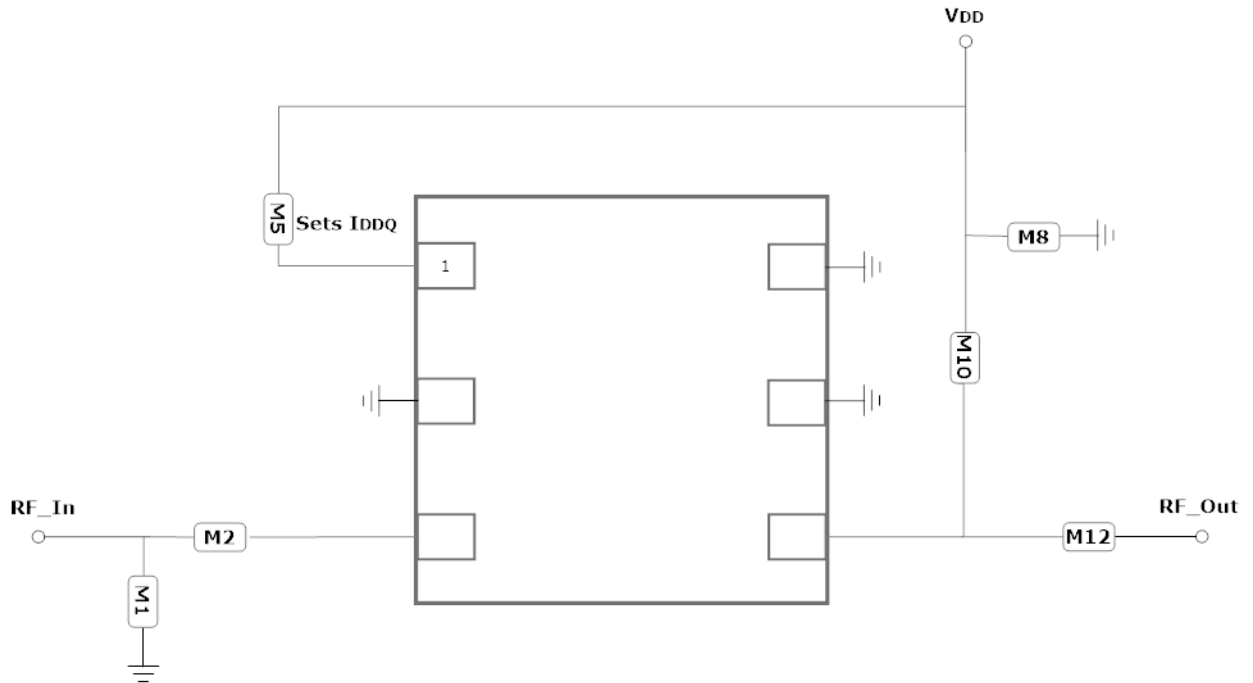
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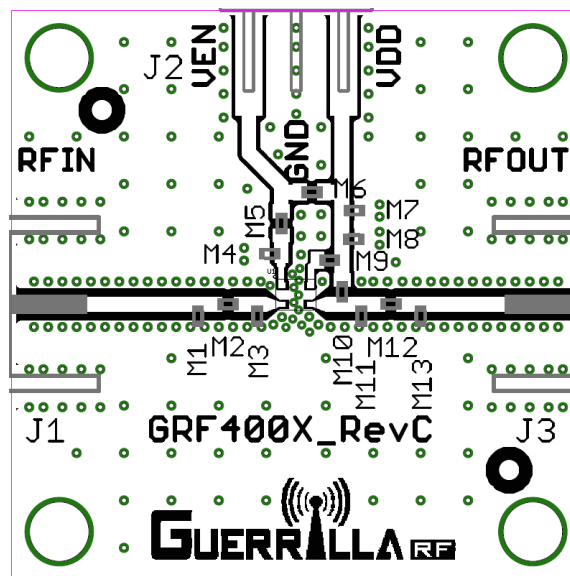
## GRF2370 Evaluation Board S-Pars (Bypass Mode): (1500-3800 MHz Tune)







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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