GRF3010

Preliminary

Ultra-broadband Gain Block
Near DC to 15.0 GHz

Features

Reference: 5V/22mA/5.0 GHz

- Gain: 14.3 dB
- OP1dB: 5.0 dBm
- OIP3: 17.5 dBm
- NF: 5.0 dB
- Internally Matched: 50Ω
- Process: InGaP HBT

Applications

- Microwave Backhaul
- C/X/Ku-Band Amplifiers
- General Purpose Amplifiers
- Instrumentation

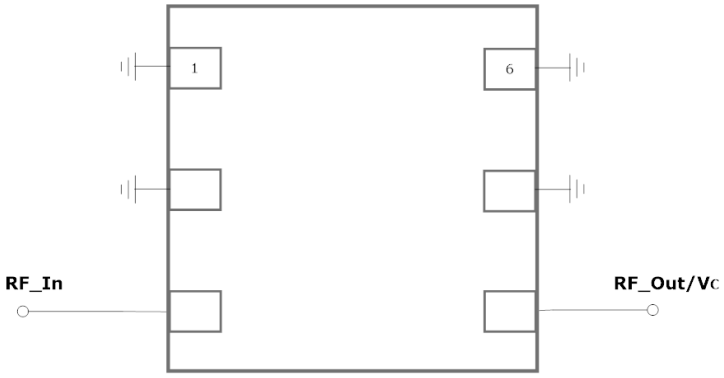
Product Description

The GRF3010 is a broadband gain block designed for RF applications from near DC up to Ku band.

This resistively biased device employs an external resistor in series with V_{CC} to set a nominal I_{CCQ} of 22 mA. GRF3010 is internally matched to 50Ω at the input and output ports.

The device can be operated down to low frequency via the selection of suitably large input/output caps and bias inductor.

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



1.5 x 1.5 mm DFN-6

Absolute Ratings:

Parameter	Symbol	Min.	Max.	Unit
Supply Voltage	V_{CC}	0	6.0	V
RF Input Power: (Load VSWR < 2:1; V_C: 5.0 volts)	$P_{IN\ MAX}$		10.0	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	$P_{DISS\ MAX}$		TBD	mW
Electrostatic Discharge:				
Charged Device Model:	CDM		TBD	V
Human Body Model:	HBM		TBD	V
Storage:				
Storage Temperature	T_{STG}	-65	150	°C
Moisture Sensitivity Level	MSL		1	--

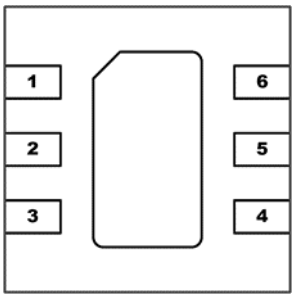
Caution! ESD Sensitive Device

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 GRF3010 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)



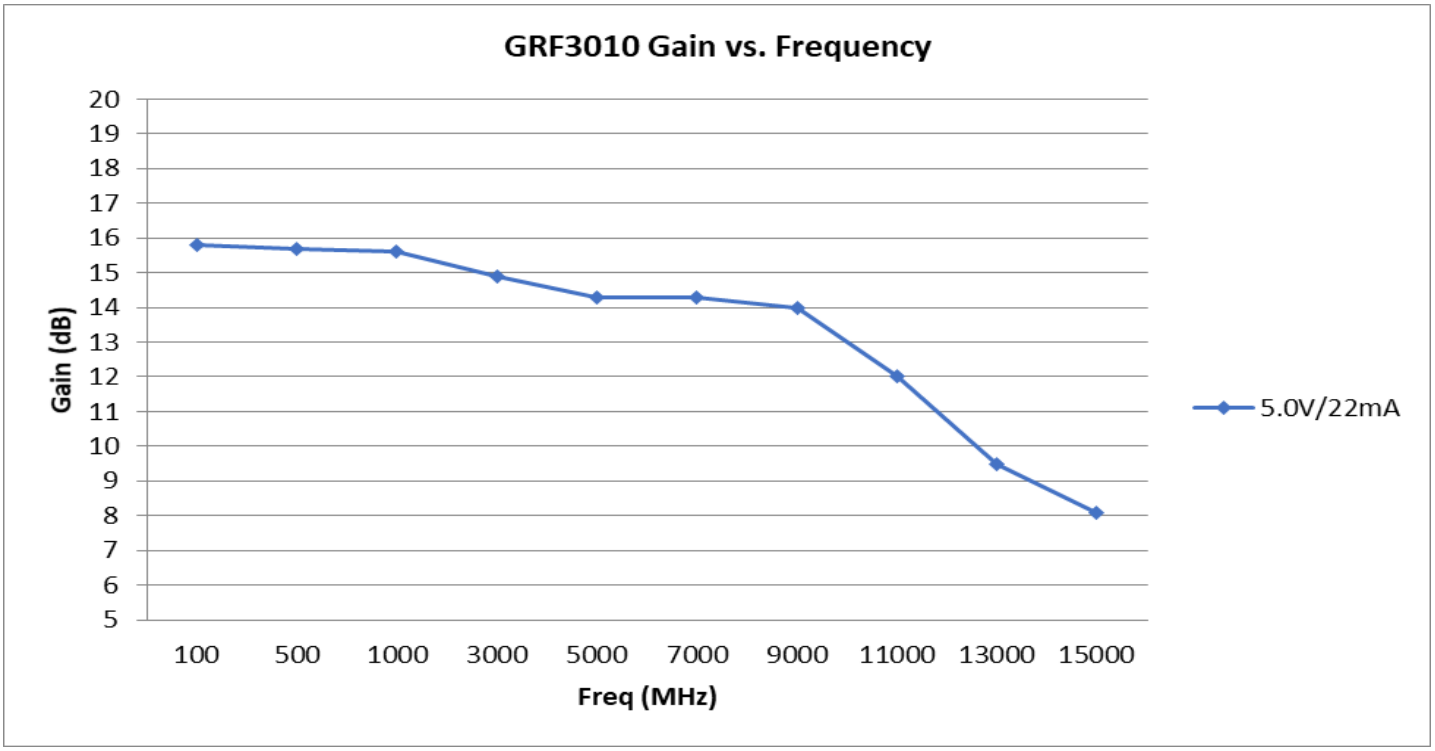
Pin Assignments:

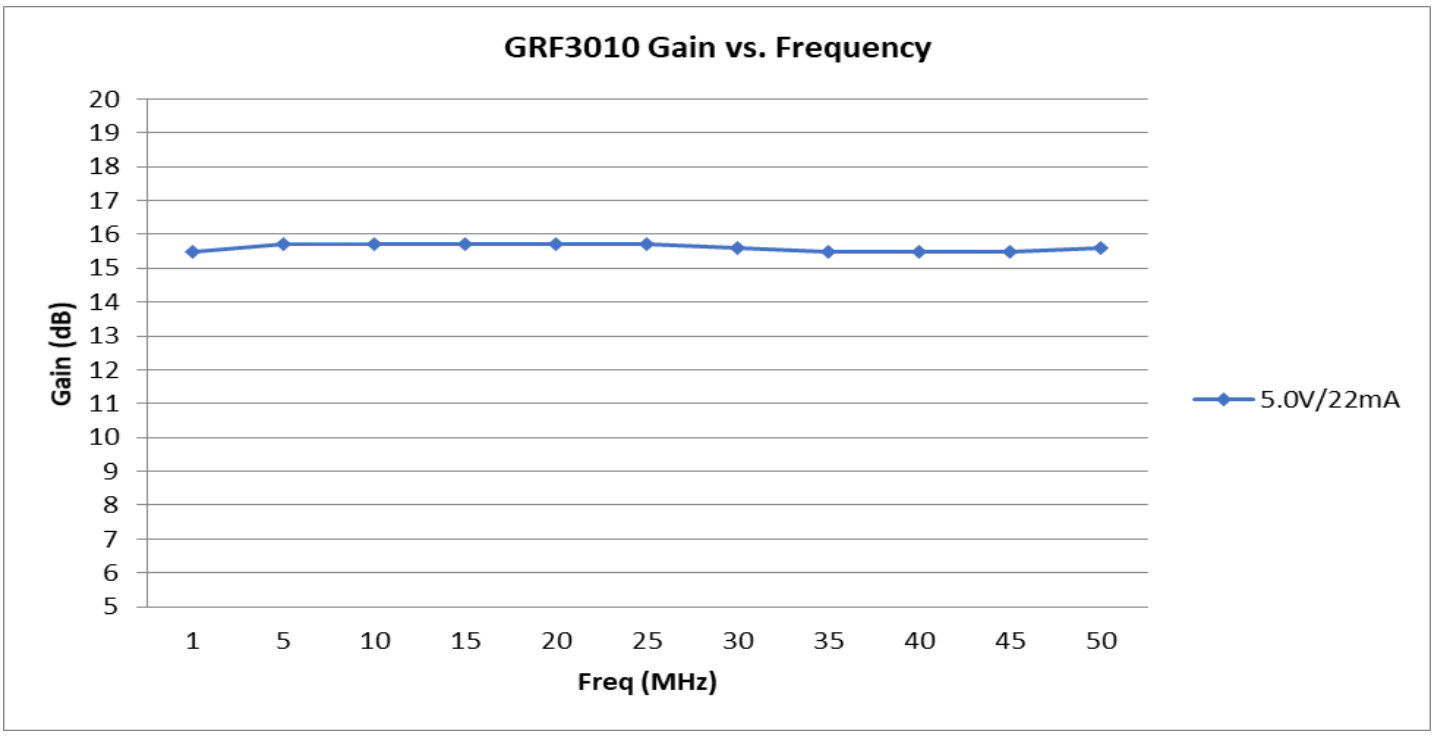
Pin	Name	Description	Note
1	NC	No Connect or Ground	No internal connection to die
2	NC	No Connect or Ground	No internal connection to die
3	RF_In	LNA RF input	Internally matched 50Ω. An external DC blocking cap must be used.
4	RF_Out/V_{CC}	LNA RF output	Internally matched 50Ω. V_{CC} must be applied through a choke to this pin
5	NC	No Connect or Ground	No internal connection to die
6	NC	No Connect or Ground	No internal connection to die
PKG BASE	GND	Ground	Provides DC and RF ground for LNA, as well as thermal heat sink. Use multiple ground vias beneath the package for optimal RF and thermal performance

Nominal Operating Parameters:

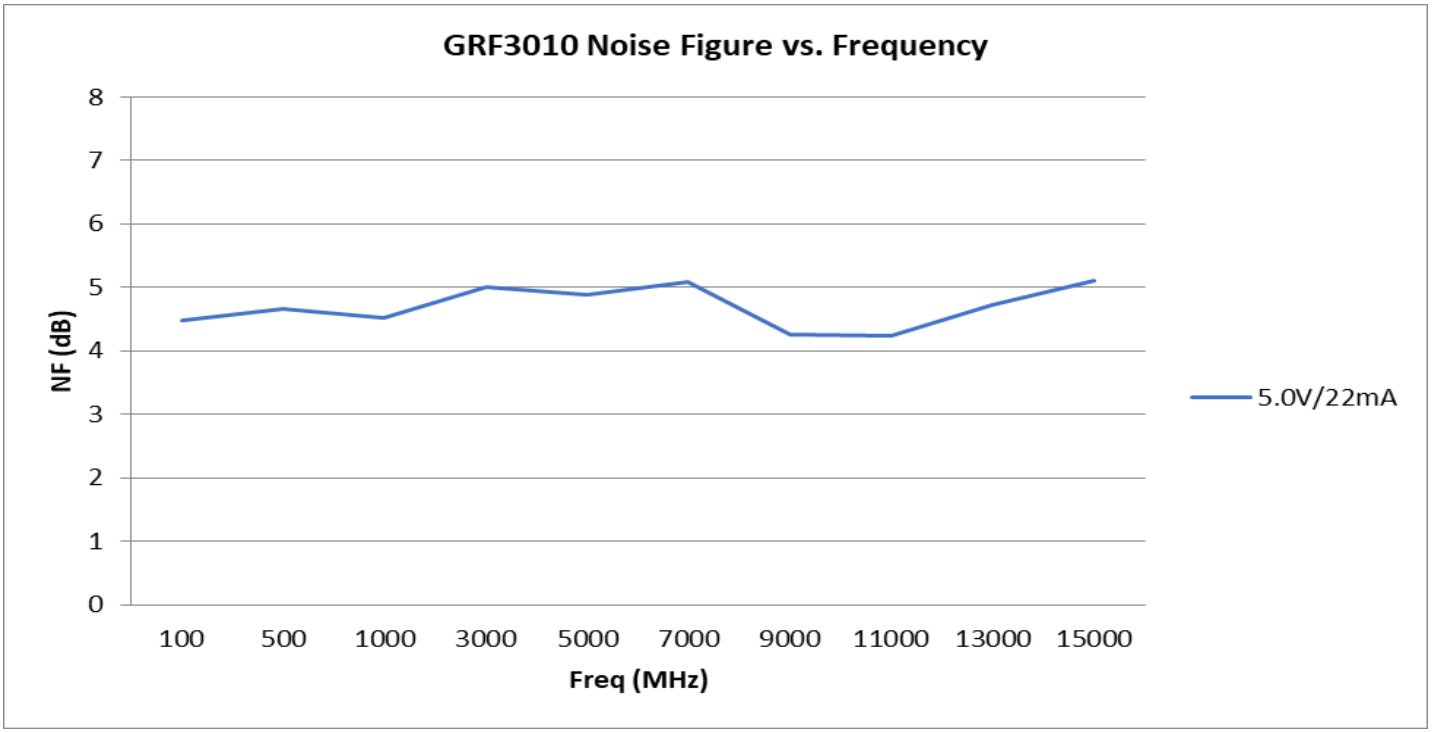
Parameter	Symbol	Specification			Unit	Condition
		Min.	Typ.	Max.		
Test Frequency	F_{TEST}		5.0		GHz	V_{DD} = 5.0 V, T_A = 25°C
Gain	S21		14.3		dB	
Noise Figure	NF		5.0		dB	
Output 3rd Order Intercept	OIP3		17.5		dBm	-10 dBm P_{OUT} per tone at 2 MHz Spacing (4999 and 5001 MHz)
Output 1dB Compression Point	OP1dB		5.0		dBm	
Switching Rise Time	T_{RISE}		TBD		ns	
Switching Fall Time	T_{FALL}		TBD		ns	
Supply Current	I_{DD}		22		mA	V_{DD}: 5.0V; Rbias: 45 ohms
Thermal Data						
Thermal Resistance: (Infra-Red Scan) (TBD)	Θjc		—		°C/W	On standard Evaluation Board
Channel Temperature @ +85 C Reference (Package heat sink)	$T_{CHANNEL}$		—		°C	V_{DD}: 5.0 V; I_{DDQ}: 22 mA; No RF; P_{DISS}: 110 mW

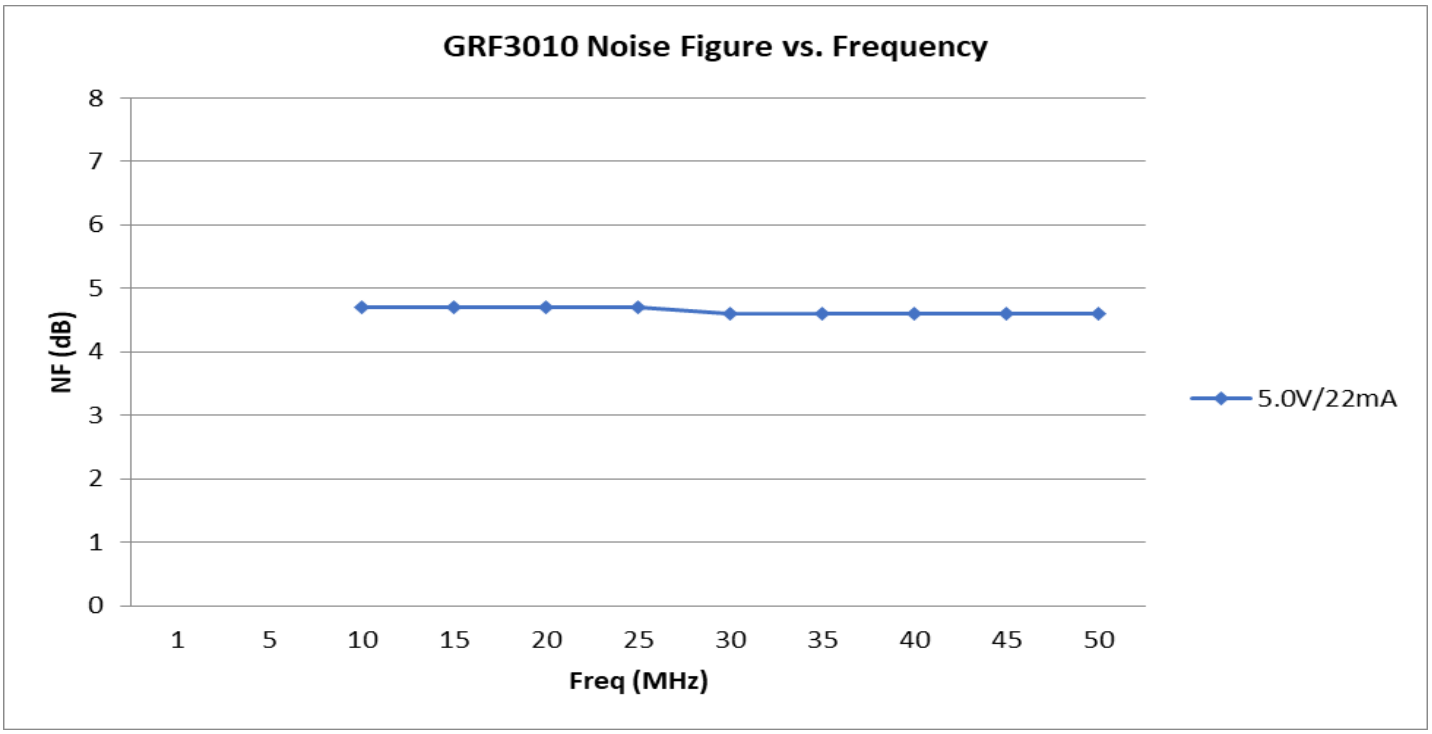
GRF3010 Evaluation Board Measured Data:



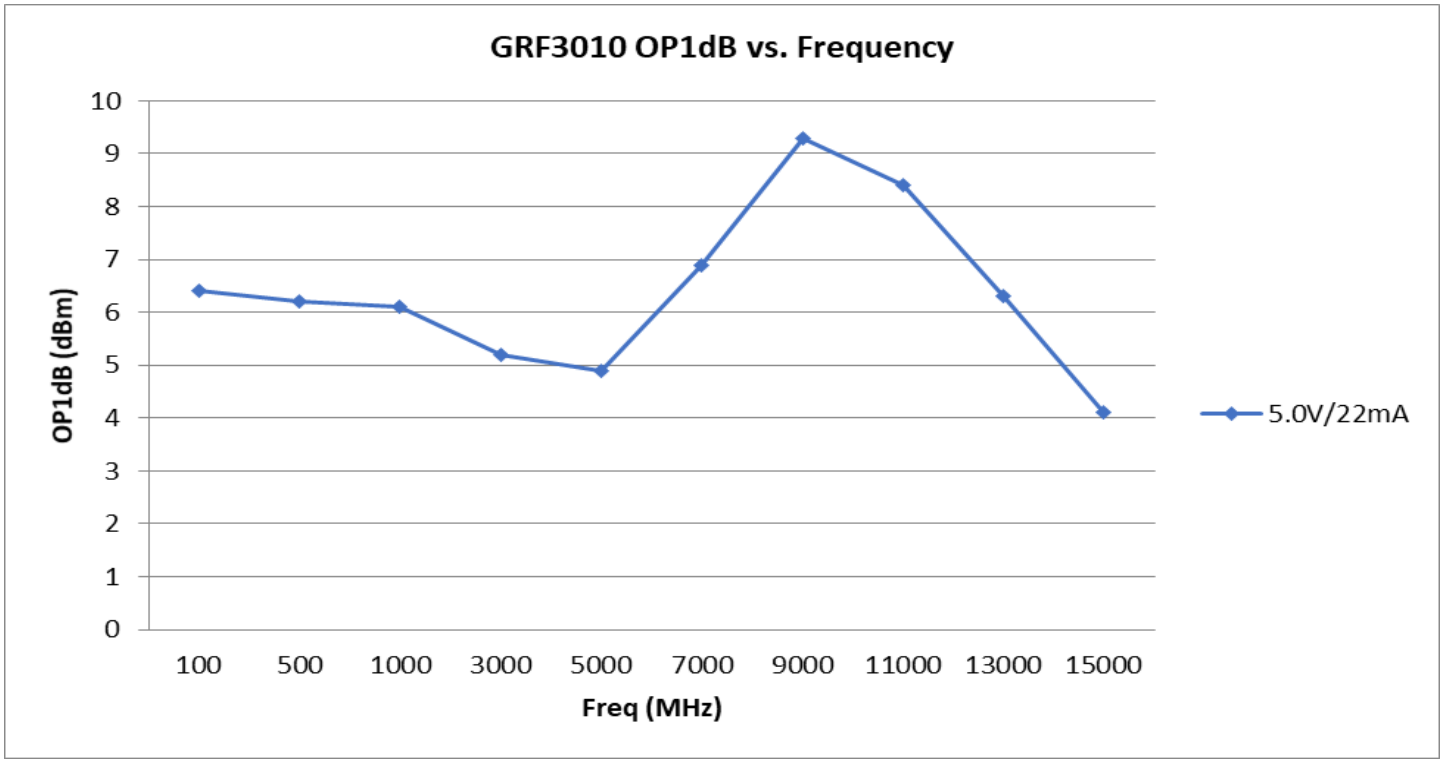


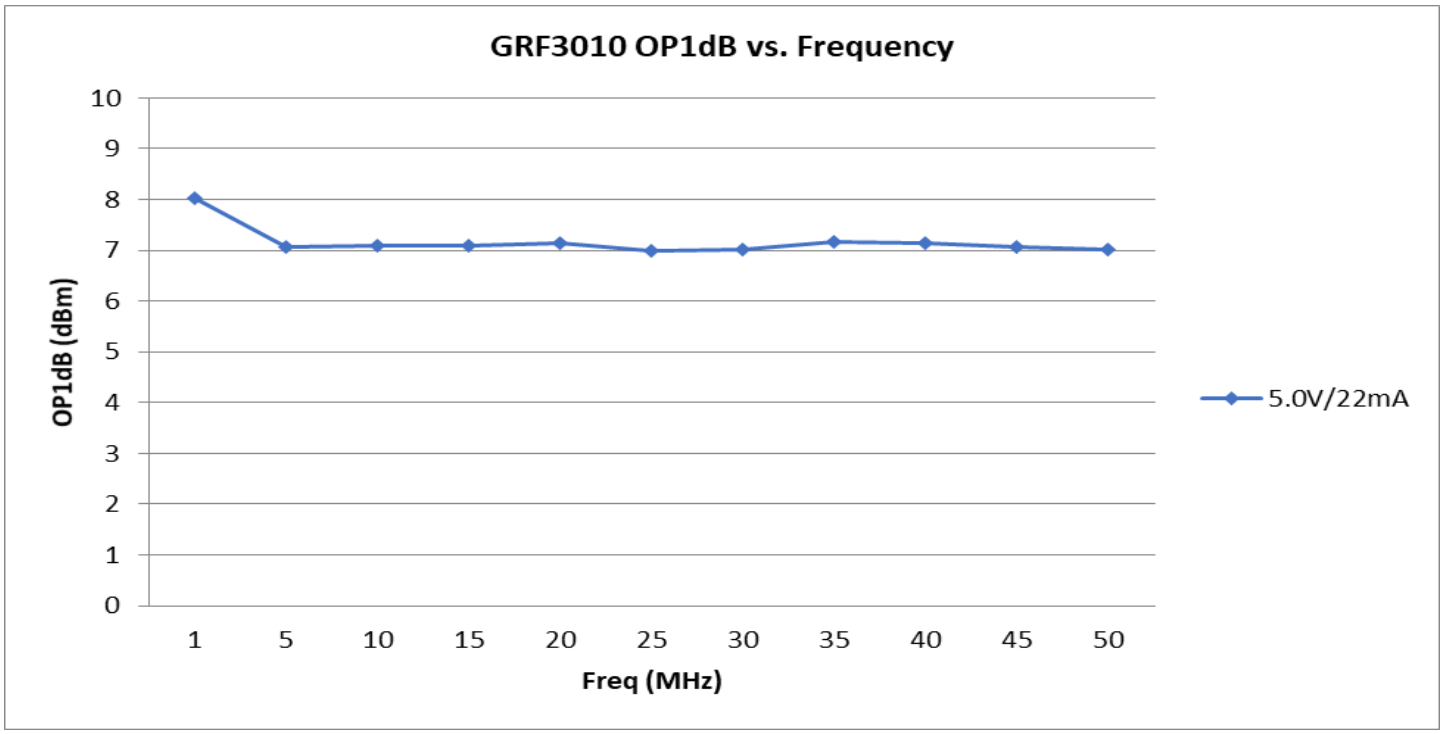
GRF3010 Evaluation Board Measured Data:



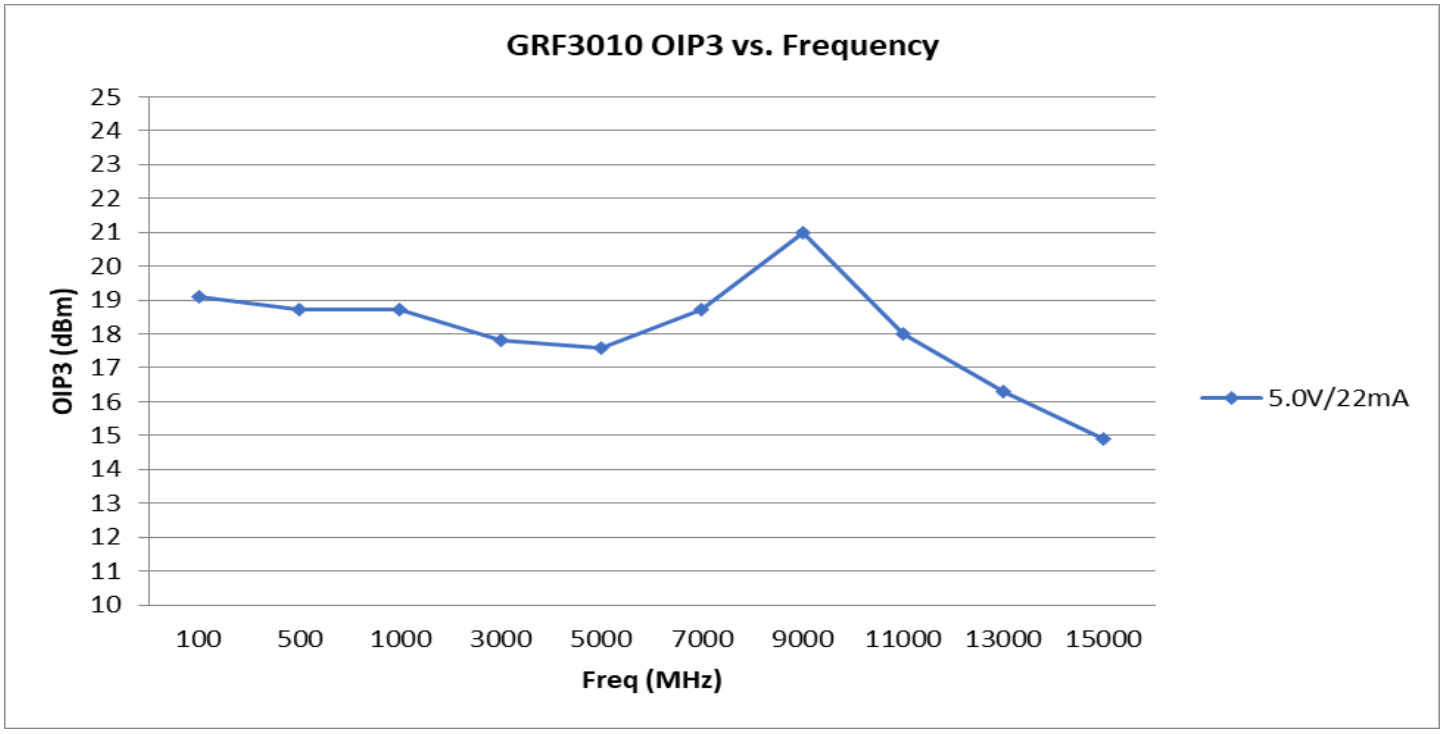


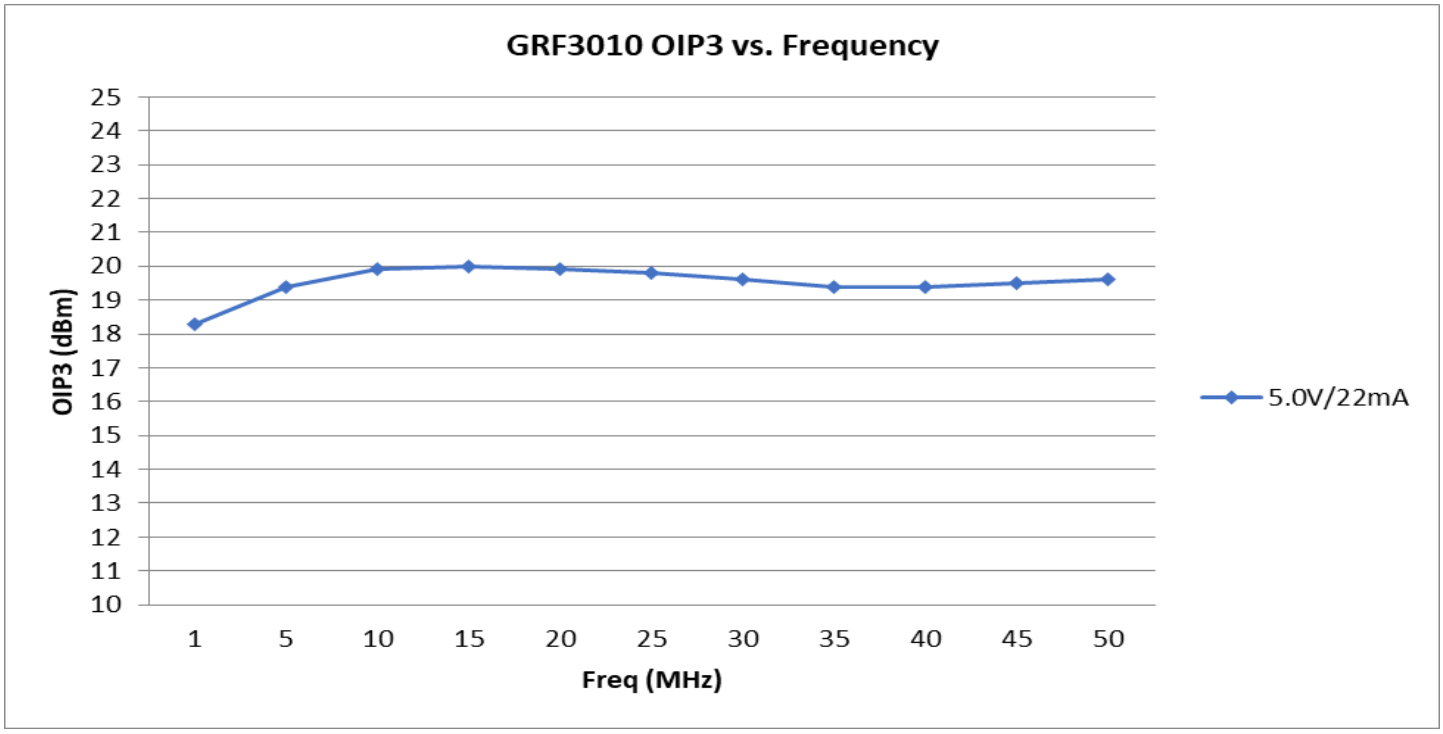
GRF3010 Evaluation Board Measured Data:



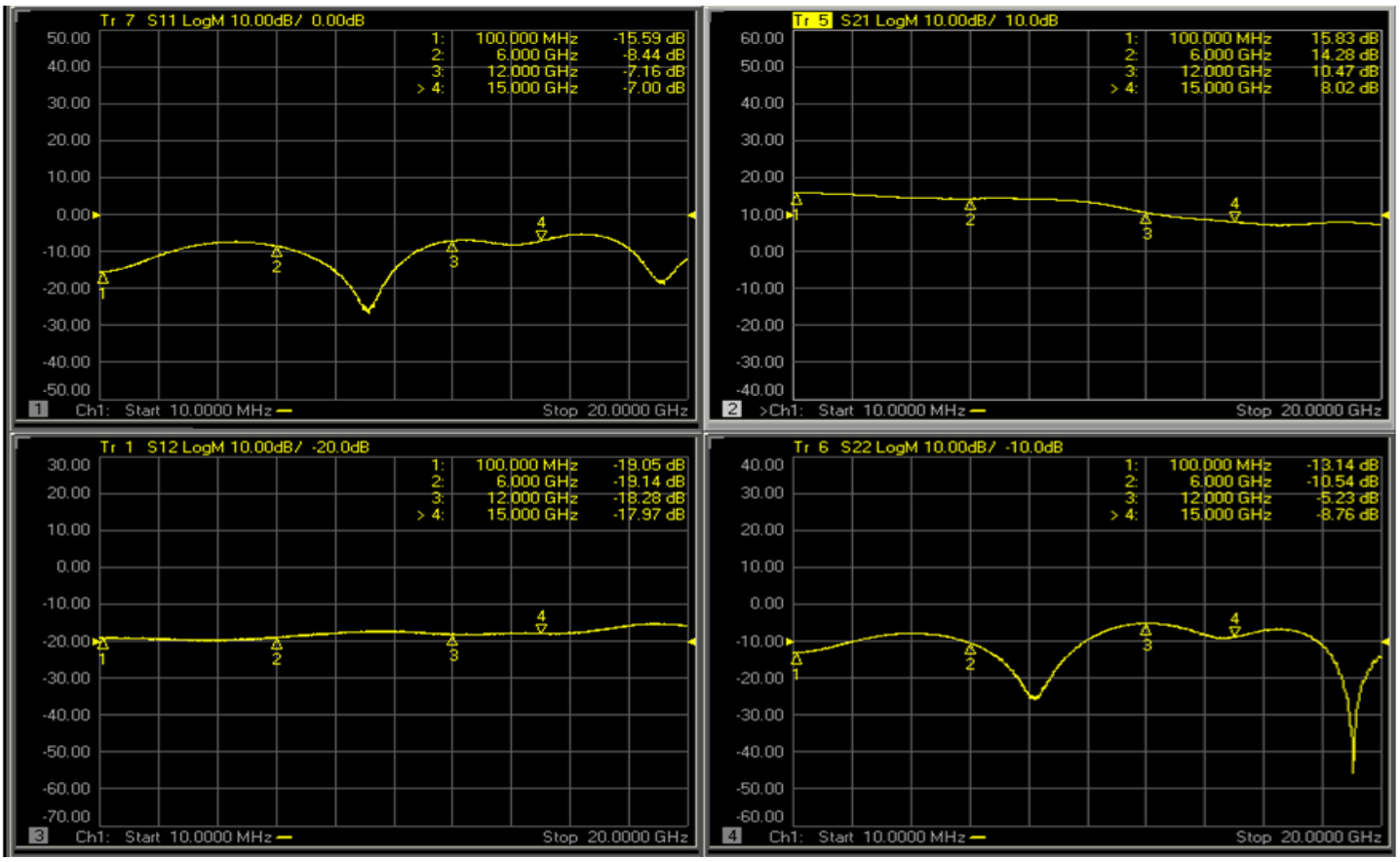


GRF3010 Evaluation Board Measured Data:

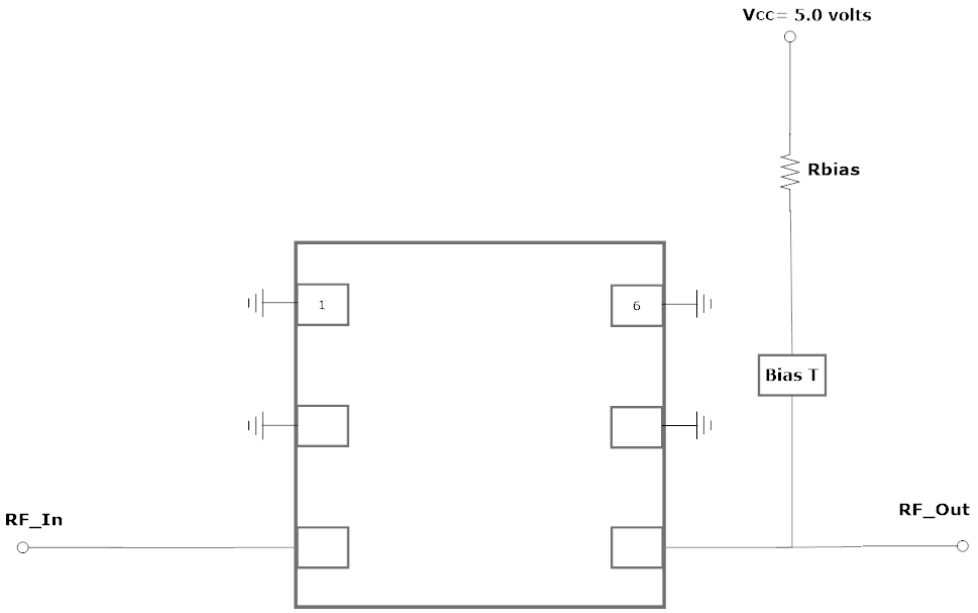




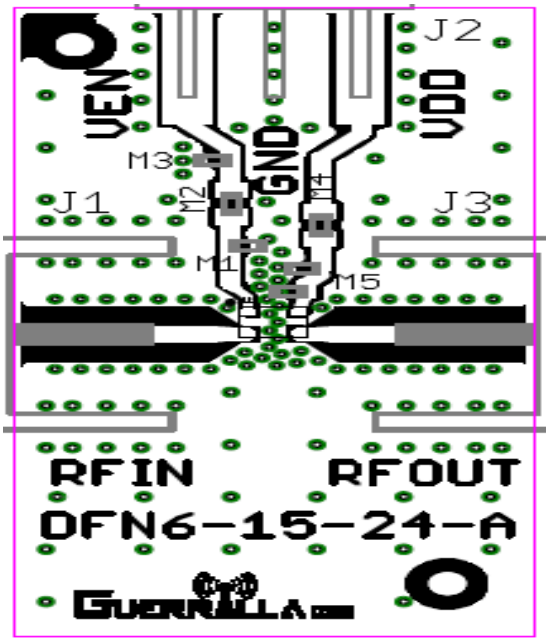
GRF3010 Evaluation Board S-Pars and Stability Mu Factor



Note: Mu factor >= 1.0 implies unconditional stability.



GRF3010 Standard 5-Volt Test Schematic



GRF3010 Evaluation Board Assembly Diagram

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.