GRF5020

Released

30.5 dBm Power-LNA™
Tuning Range: 0.1 – 6.0 GHz

Features

Reference: 8.0V/95mA/2.5GHz

- Gain: 18.0 dB
- NF: 0.85 dB
- OP1dB: 29.0 dBm
- OIP3: 43.0 dBm

Reference: 5.0V/65mA/2.5GHz

- Gain: 17.3 dB
- NF: 0.80 dB
- OP1dB: 24.5 dBm
- OIP3: 37.2 dBm

- Flexible Bias Voltage and Current
- Process: GaAs pHEMT

Applications

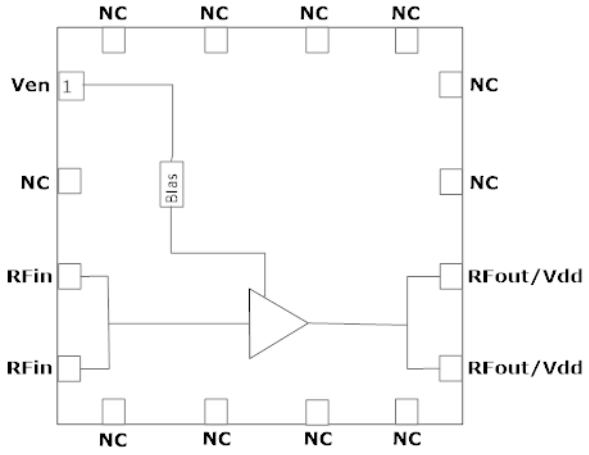
- Multi-stage LNA
- Linear Driver Amplifier for High PAR Waveforms
- Distributed Antenna Systems
- Microwave Backhaul

Product Description

GRF5020 is a high linearity PA with ultra-low noise figure (NF). The primary tune for this device covers 1.7 to 2.7 GHz and it achieves outstanding P1dB, IP3 and NF over the band. The device can be tuned to deliver outstanding performance over 0.1 GHz. to 6.0 GHz with fractional bandwidths >30%. With a 10.0 Volt supply, the device can deliver broadband OP1dB values >30.0 dBm.

In addition to use as a PA or linear driver, GRF5020 is well suited to demanding first, second or third stage LNA applications requiring high linearity, ruggedness and low NF.

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



3.0 x 3.0 mm QFN-16

Absolute Ratings:

Parameter	Symbol	Min.	Max.	Unit
Drain Voltage	V_{DD}		12.0	V
Transient Average RF Input Power CW: (Load VSWR < 2:1; Duration: <1 hour)	$P_{IN\ MAX}$		22.0	dBm
Average RF Output Power: (Load VSWR < 2:1; V_D: > 8.0 volts; Duration: Continuous)	$P_{OUT\ MAX}$		26.0	dBm
Average RF Output Power: (Load VSWR < 2:1; V_D: <= 8.0 volts; Duration: Continuous)	$P_{OUT\ MAX}$		NA	dBm
Operating Temperature (Package Heat Sink)	T_{AMB}	-40	105	°C
Maximum Channel Temperature (MTTF > 10^6 Hours)	T_{MAX}		170	°C
Maximum Dissipated Power	$P_{DISS\ MAX}$		1.9	W
Electrostatic Discharge:				
Charged Device Model: (TBD)	CDM	1500		V
Human Body Model:	HBM	250		V
Storage:				
Storage Temperature	T_{STG}	-65	150	°C
Moisture Sensitivity Level	MSL		1	–

RoHS Compliant

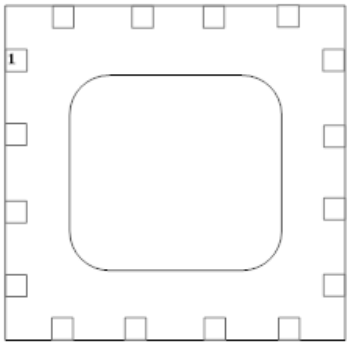
Caution! ESD Sensitive Device

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 GRF5020 landing page: Manufacturing Note—MN-001 Product Tape and Reel, Solderability and Package Outline Specification.

Link to manufacturing note

Pin Out (Top View)



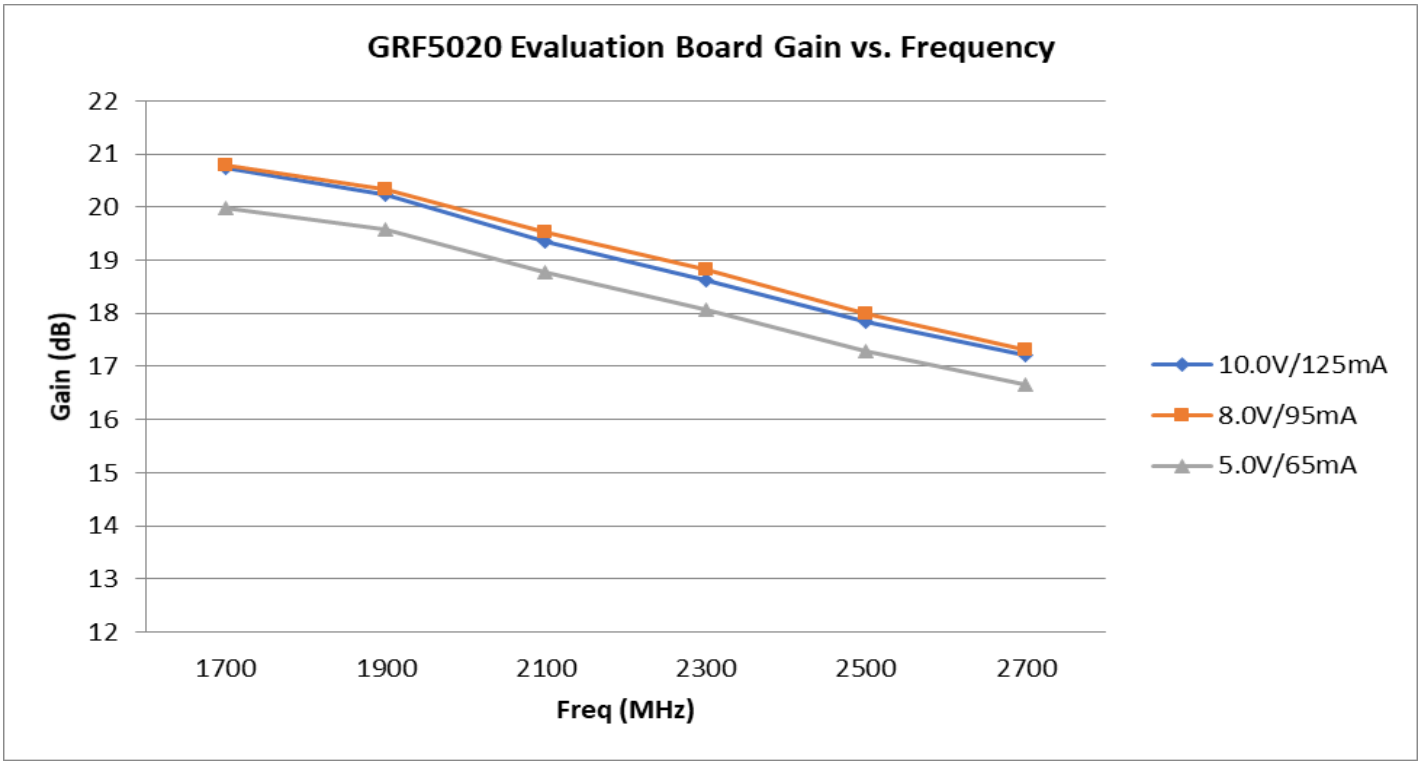
Pin Assignments:

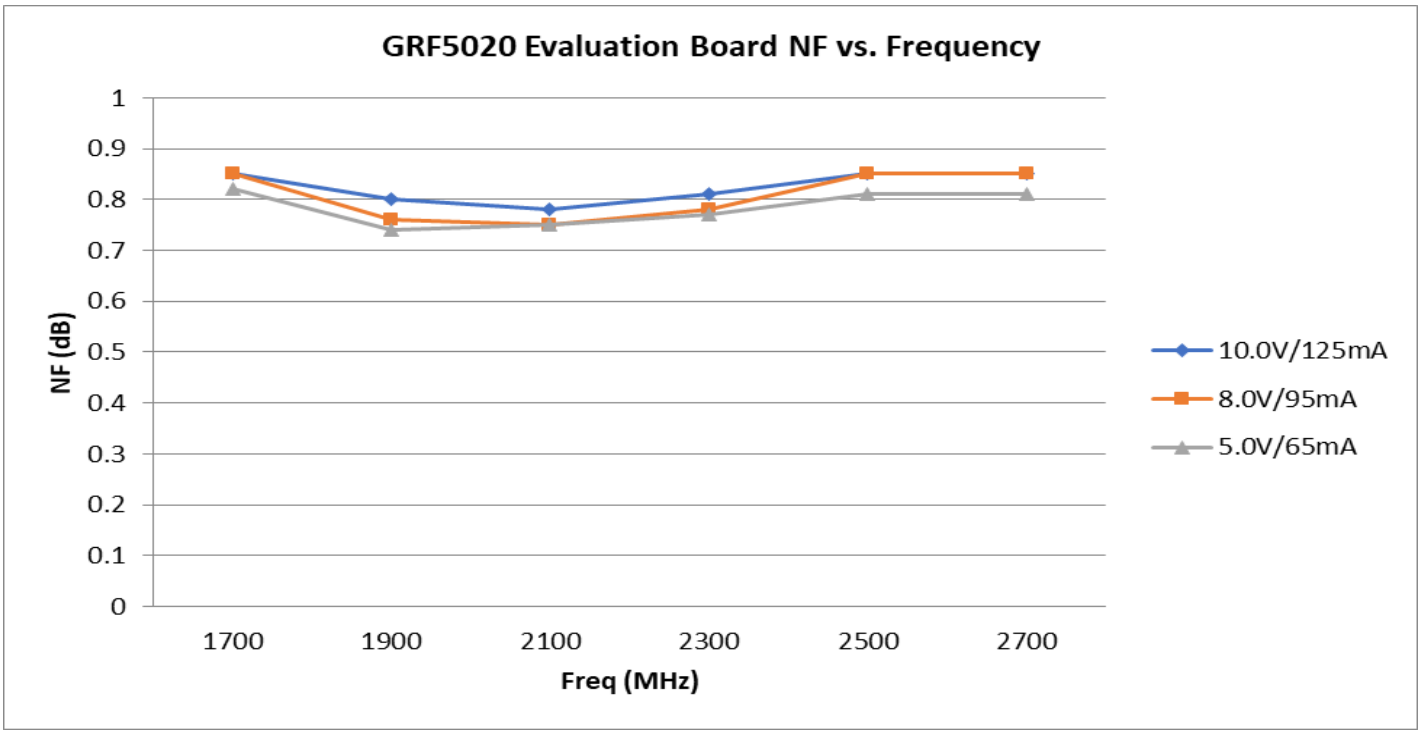
Pin	Name	Description	Note
1	V_{ENABLE}	Enable Voltage Input	V_{ENABLE} and series resistor set I_{DDQ}. V_{ENABLE} < =0.2 volts disables device. On-die pull-down resistor will turn the part off if this node is allowed to float.
2	NC	No Connect or Ground	No internal connection to die
3	RF_In	RF Input	Pins 3-4 tied together on system board
4	RF_In	RF Input	Pins 3-4 tied together on system board
5	NC	No Connect or Ground	No internal connection to die
6	NC	No Connect or Ground	No internal connection to die
7	NC	No Connect or Ground	No internal connection to die
8	NC	No Connect or Ground	No internal connection to die
9	RF_Out/V_{DD}	PA Output/Bias	Pins 9-10 tied together on system board. Supply Vdd here.
10	RF_Out/V_{DD}	PA Output/Bias	Pins 9-10 tied together on system board. Supply Vdd here.
11	NC	No Connect or Ground	No internal connection to die
12	NC	No Connect or Ground	No internal connection to die
13	NC	No Connect or Ground	No internal connection to die
14	NC	No Connect or Ground	No internal connection to die
15	NC	No Connect or Ground	No internal connection to die
16	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. Recommend multiple 8 mil vias beneath the package for optimal RF and thermal performance. Refer to evaluation board top layer graphic on schematic page.

Nominal Operating Parameters:

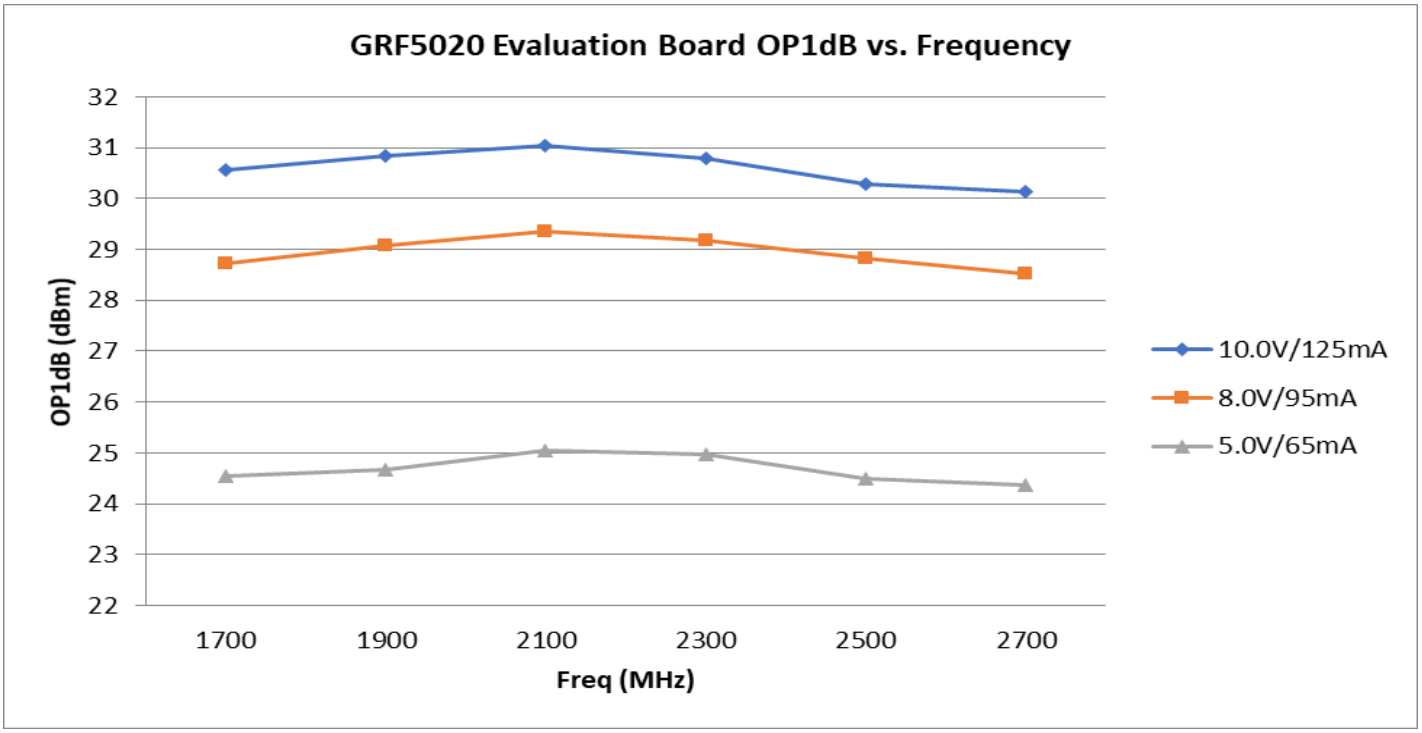
Parameter	Symbol	Specification			Unit	Condition
		Min.	Typ.	Max.		
Target Performance (1.7-3.8 GHz Tune)						**Bias: 8.0 V and 95 mA unless otherwise noted. (+25C)**
Test Frequency	F_{TEST}		2.5		GHz	
Gain	S(2,1)	16.0	17.5		dB	
Noise Figure (Evaluation Board)	NF		0.85	1.05	dB	
Output 1dB Compression Point	OP1dB	27.5	29.0		dBm	
Output Third Order Intercept Point	OIP3		43.0		dBm	Tones: 2499 and 2501 MHz at 8.0 dBm per tone
Switching Rise Time	T_{RISE}		200		ns	
Switching Fall Time	T_{FALL}		200		ns	
Quiescent Supply Current	I_{DDQ}		95		mA	
Enable Current	I_{ENABLE}		2.0		mA	
Disabled Mode						V_{DD}: 8.0 volts; V_{ENABLE}: 0.0 volts
Supply Current (Leakage)	I_{DD}		300	600	uA	
Thermal Data						
Thermal Resistance: (IR Scan Method)	Θjc		43		°C/W	
Channel Temperature @ +85C Reference (package heat sink)	$T_{CHANNEL}$		118		°C	V_{DD}: 8.0 volts; I_{DDQ}: 95 mA P_{DISS}: 0.76 W; No RF

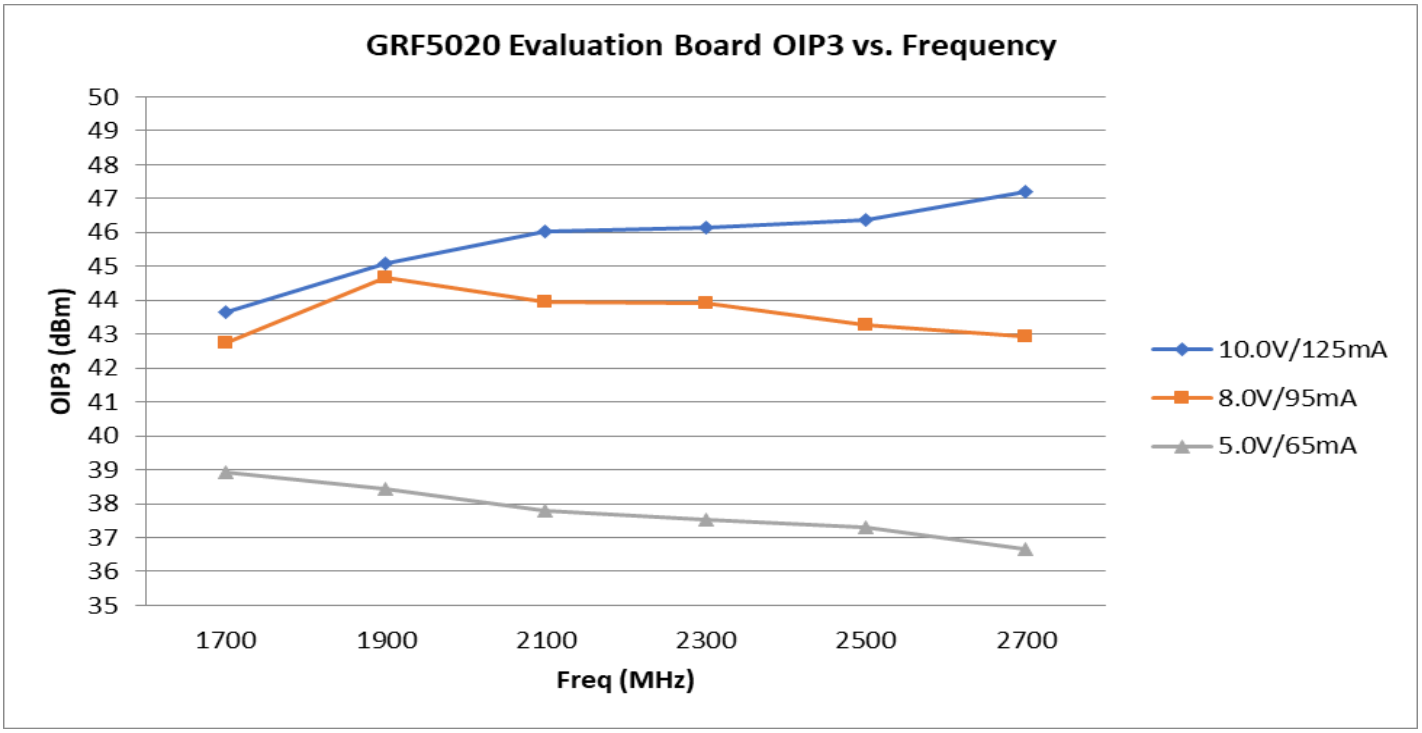
GRF5020 Evaluation Board Data vs. Supply Voltage (1.7 to 2.7GHz Tune)



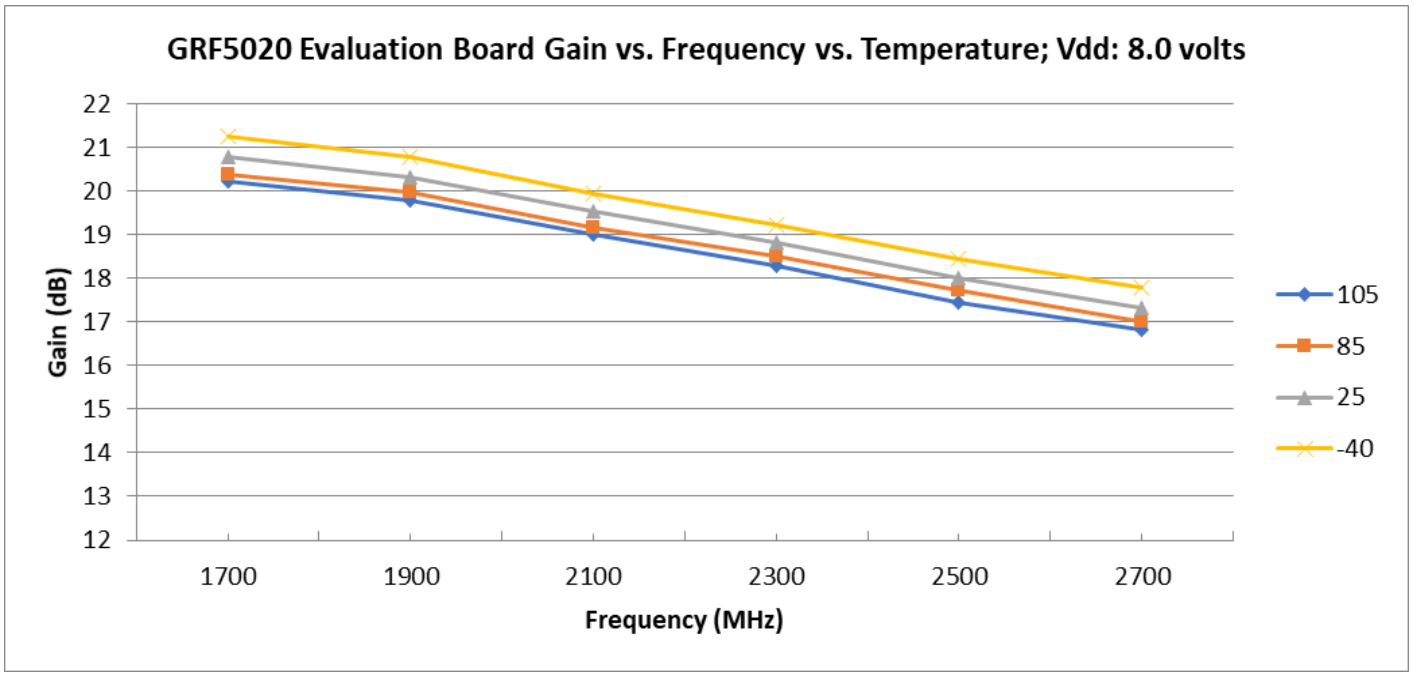


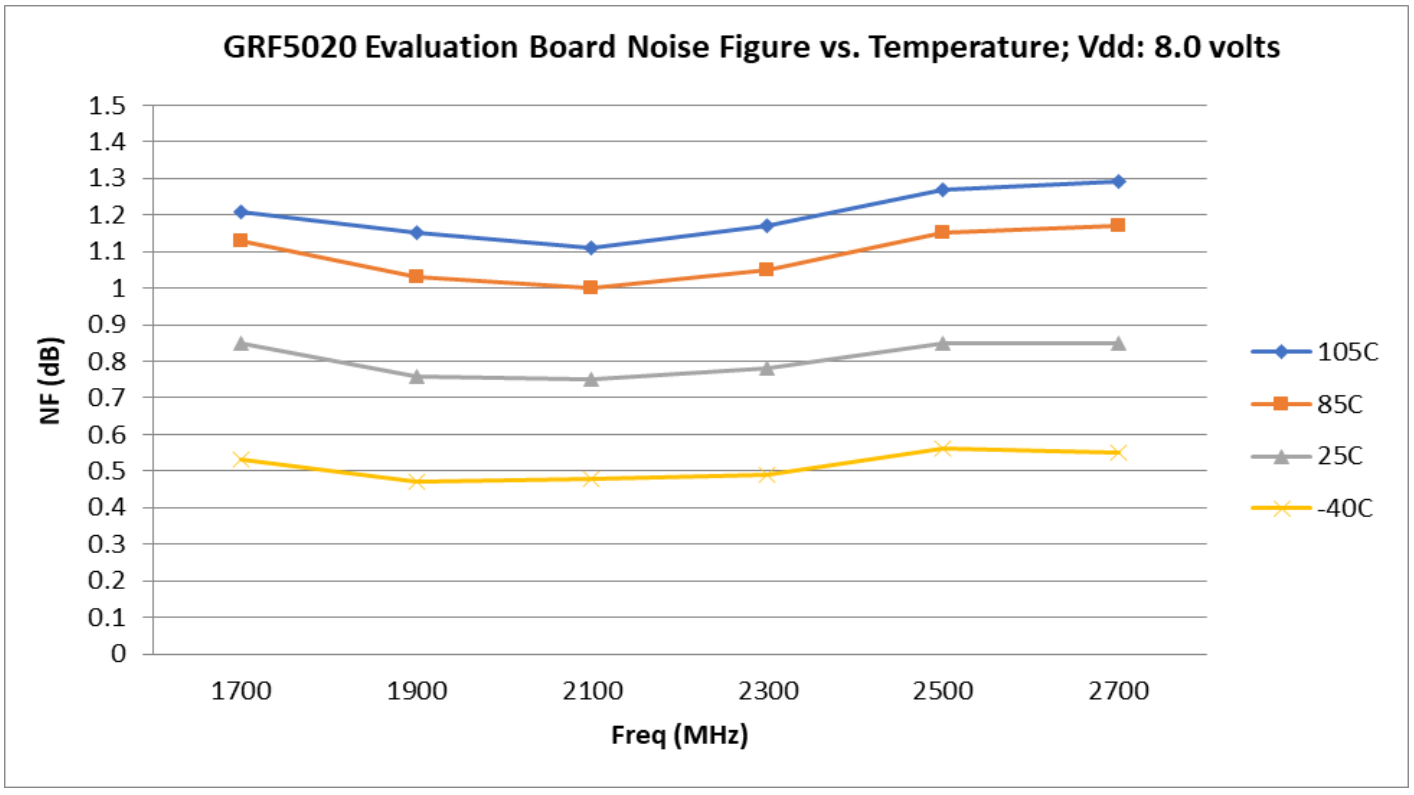
GRF5020 Evaluation Board Data vs. Supply Voltage (1.7 to 2.7GHz Tune)



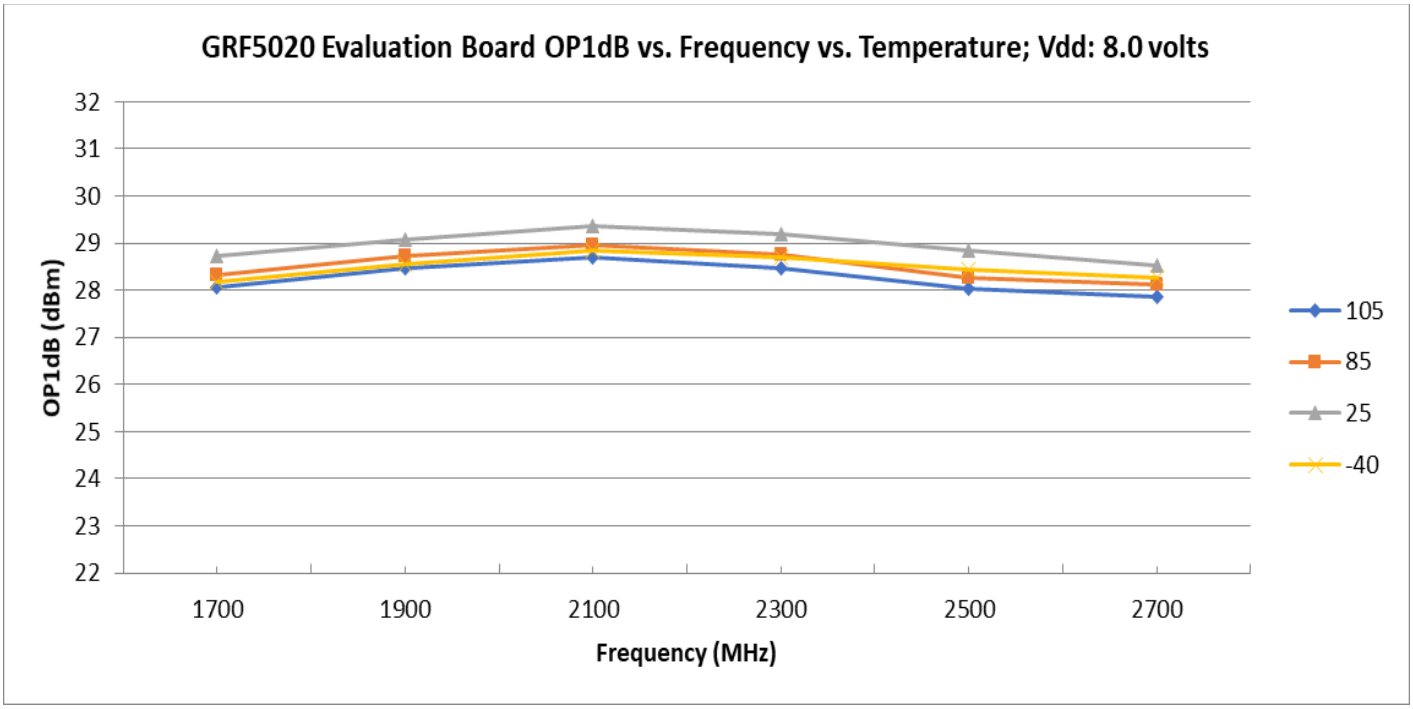


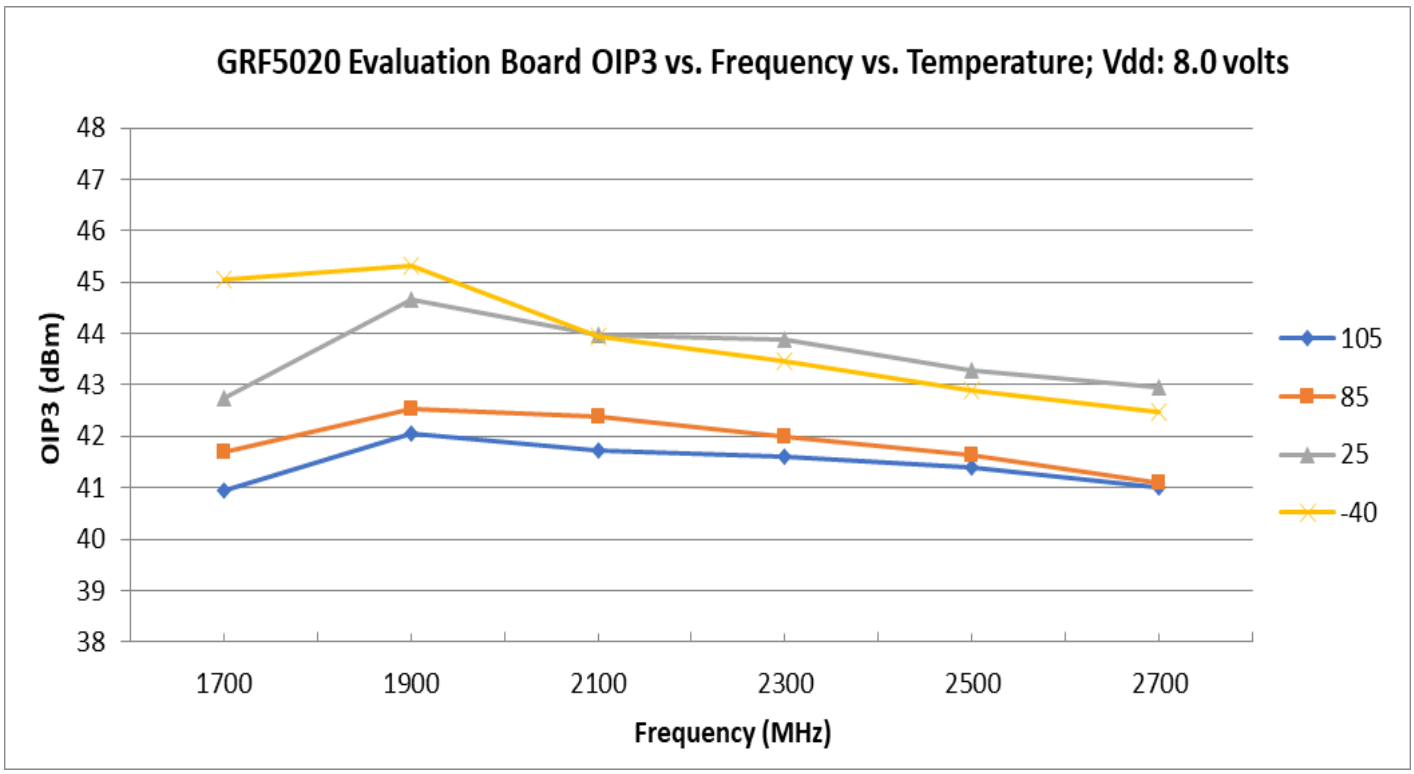
GRF5020 Evaluation Board Data vs. Temperature; Bias: 8.0 volts (1.7 to 2.7GHz Tune)



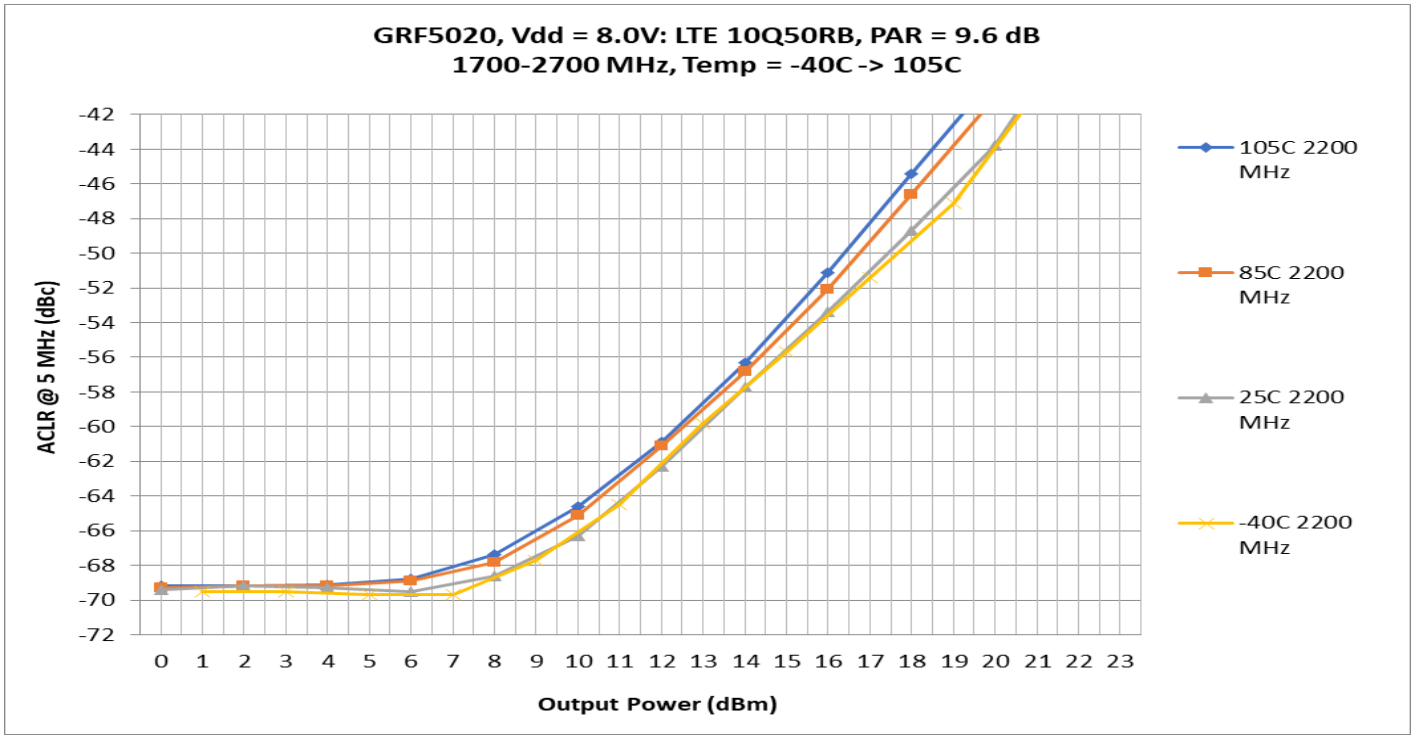


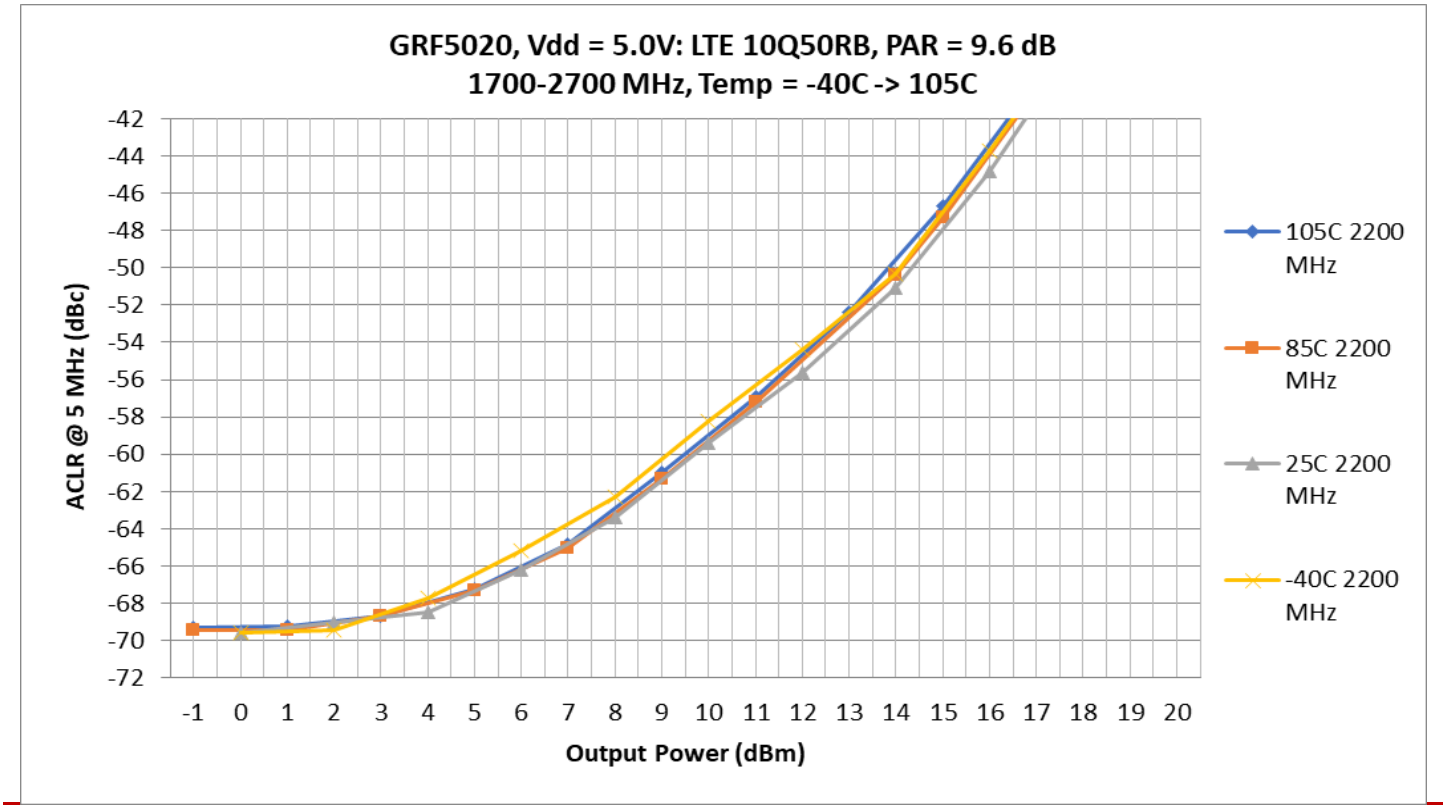
GRF5020 Evaluation Board Data vs. Temperature; Bias: 8.0 volts (1.7 to 2.7GHz Tune)



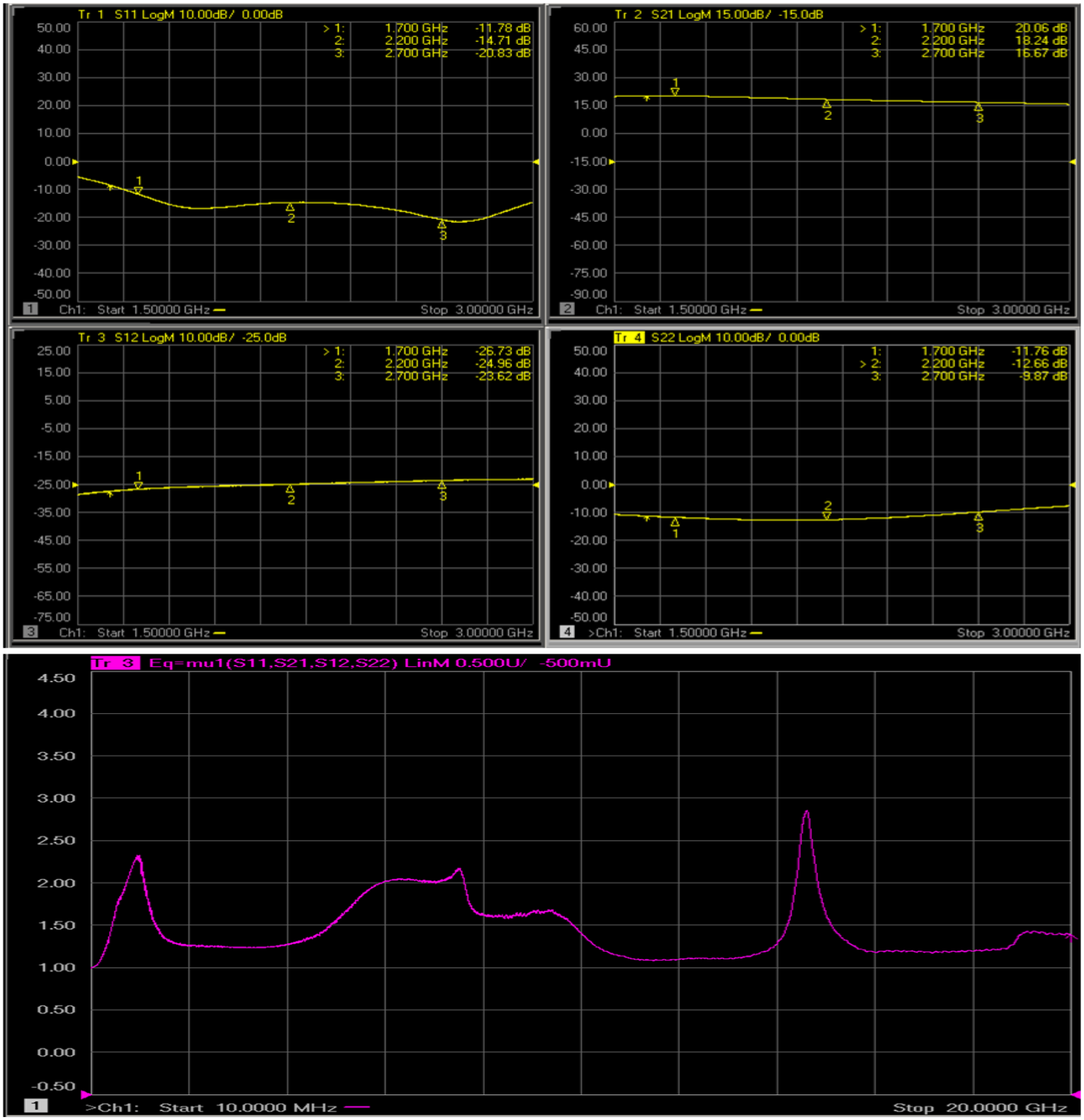


GRF5020 Evaluation Board Data vs. Temperature; (1.7 to 2.7GHz Tune)

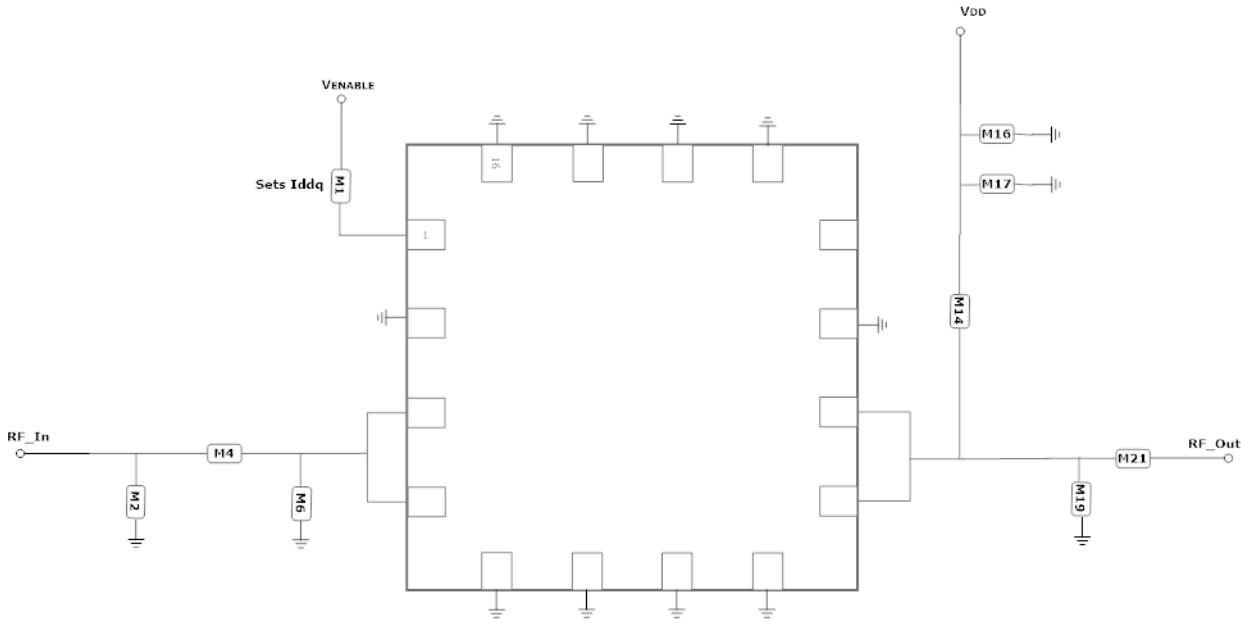




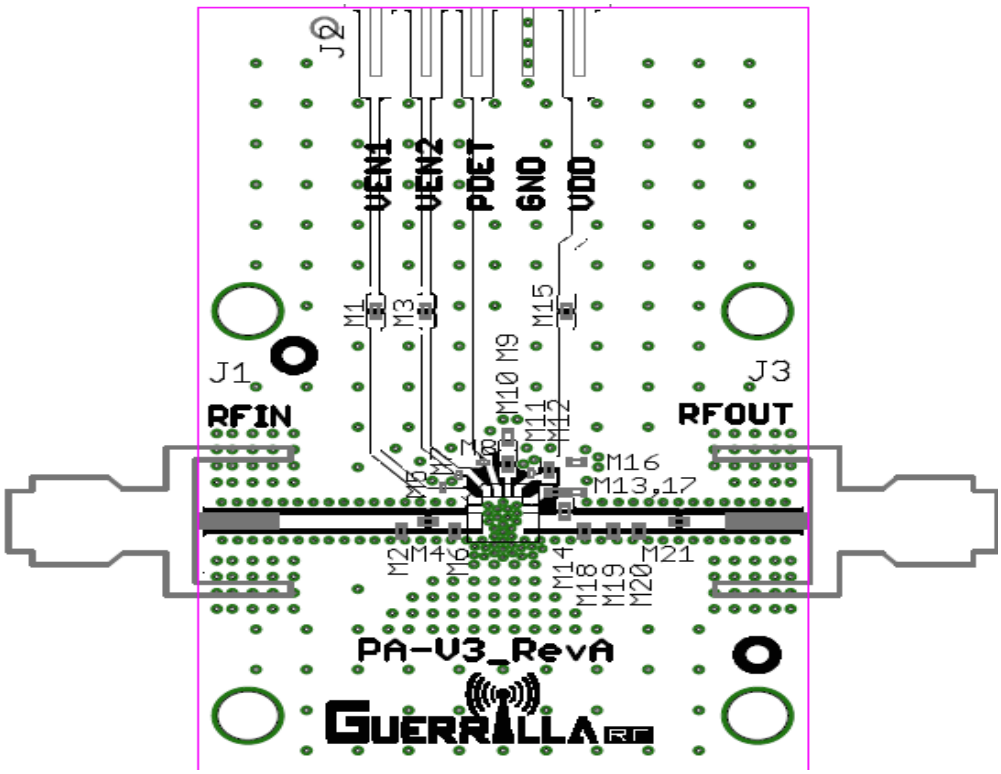
GRF5020 Evaluation Board S-Pars; 5V/95 mA: (1.7 to 2.7 GHz Tune)



Note: Mu factor >= 1.0 implies unconditional stability.



GRF5020 Application Schematic: (1.7 to 2.7 GHz)



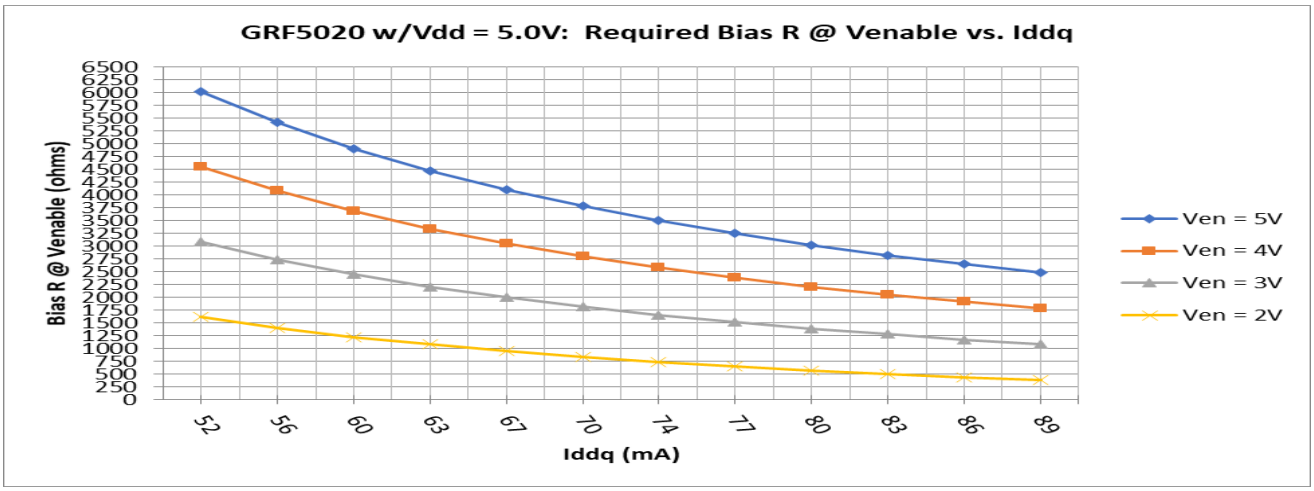
GRF50XX Evaluation Board Assembly Drawing

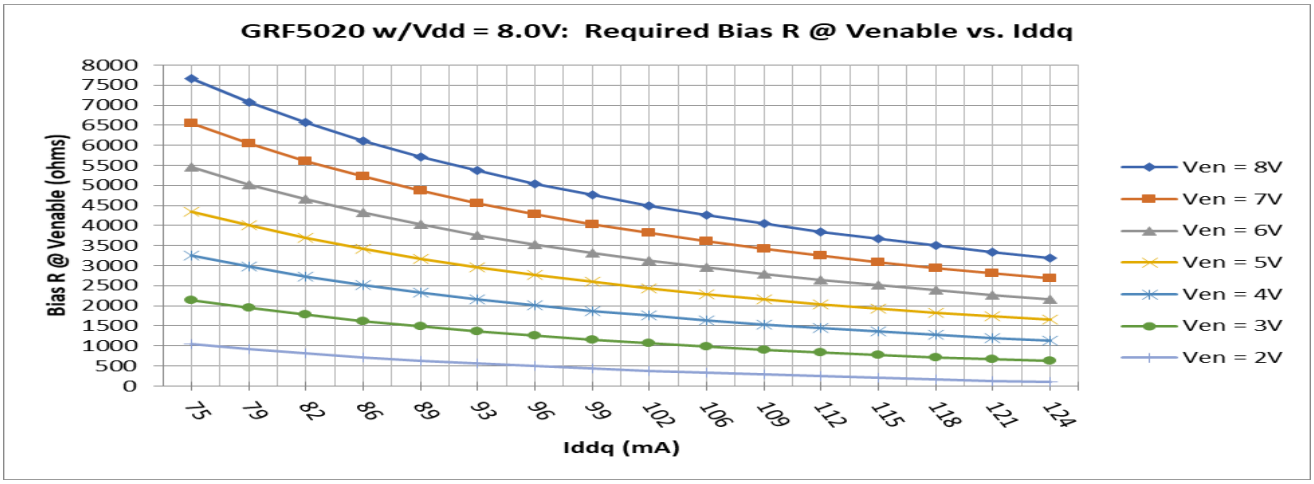
GRF5020 Evaluation Board BOM: (1.7—2.7GHz)

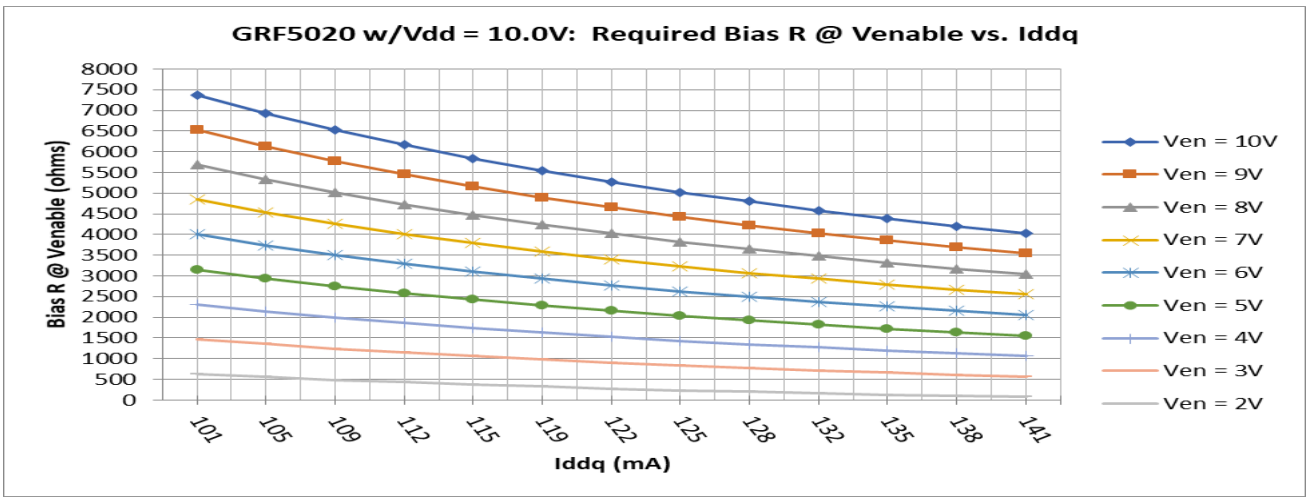
Component	Type	Manufacturer	Family	Value	Package Size	Substitution
M1 (See curves)	Resistor	Various	5%	Sets Iddq	0402	ok
M2	Inductor: High Q	Coilcraft	HP	3.3 nH	0402	ok
M4	Capacitor: High Q	Murata	GJM	2.0 pF	0402	ok
M6	Capacitor: High Q	Murata	GJM	1.8 pF	0402	ok
M13	Capacitor	Murata	GRM	100 pF	0402	ok
M14	Inductor: High Q	Coilcraft	HP	15 nH	0402	ok
M16	Capacitor	Murata	GRM	0.1 uF	0402	ok
M19	DNP	—	—	—	—	—
M21	Capacitor	Murata	GJM	18 pF	0402	ok
Evaluation Board	PA-V3_RevA					

Note: Standard evaluation board bias: Vdd: 8.0V; Venable: 5.0V; M1:

GRF5020 Bias Resistor (M1) Selection Curves:







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.

Стандарт Электрон Связь

Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

Благодаря сотрудничеству с мировыми поставщиками мы осуществляем комплексные и плановые поставки широчайшего спектра электронных компонентов.

Собственная эффективная логистика и склад в обеспечивает надежную поставку продукции в точно указанные сроки по всей России.

Мы осуществляем техническую поддержку нашим клиентам и предпродажную проверку качества продукции. На все поставляемые продукты мы предоставляем гарантию .

Осуществляем поставки продукции под контролем ВП МО РФ на предприятия военно-промышленного комплекса России , а также работаем в рамках 275 ФЗ с открытием отдельных счетов в уполномоченном банке. Система менеджмента качества компании соответствует требованиям ГОСТ ISO 9001.

Минимальные сроки поставки, гибкие цены, неограниченный ассортимент и индивидуальный подход к клиентам являются основой для выстраивания долгосрочного и эффективного сотрудничества с предприятиями радиоэлектронной промышленности, предприятиями ВПК и научно-исследовательскими институтами России.

С нами вы становитесь еще успешнее!

Наши контакты:

Телефон: +7 812 627 14 35

Электронная почта: sales@st-electron.ru

Адрес: 198099, Санкт-Петербург, Промышленная ул, дом № 19, литера Н, помещение 100-Н Офис 331