



Preliminary

GRF7001

**High Linearity Mixer with
Integrated LO Buffer**



Product Description

GRF7001 is a broadband, high-linearity mixer with integrated LO buffer that can be used as either an up or down converter.

The device inputs and outputs are single-ended and internally matched to 50 ohms. The device implementation requires an external image-reject filter on the RF port and an IF bandpass filter on the IF port. Pins 4 and 6 can be used for either RF or IF with appropriate filtering in place.

The integrated LO buffer is operated from a single positive supply of 3.0 to 5.0 V with a selectable I_{DDQ} range of 10 to 30 mA.

Consult with the GRF applications engineering team for custom tuning/evaluation board data.

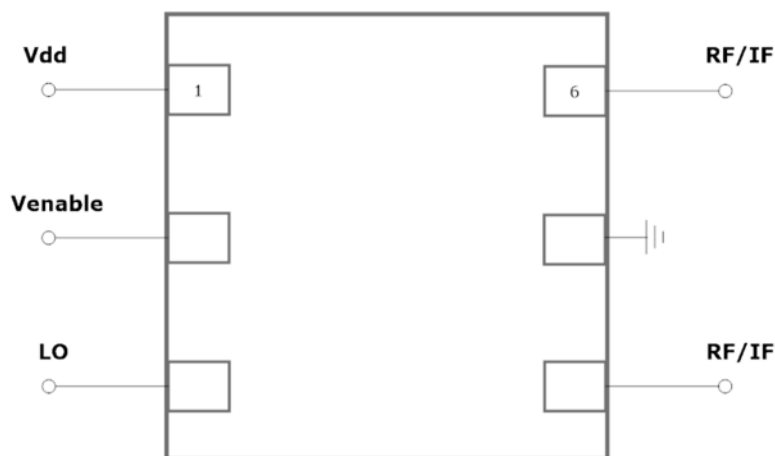
Features

Reference: RF: 808 MHz; LO: 965 MHz;
IF: 157 MHz

- Conversion Loss: 6.0 dB
- SSB NF: 7.1 dB
- IIP3: 25.4 dBm
- IP1dB: >17.0 dBm
- RF/IF Range: 0.1 to 5.0 GHz
- LO Range: 0.1 to 4.0 GHz
- Flexible Bias Voltage and Current
- Internally Matched to 50 Ω
- Process: GaAs pHEMT

Applications

- Bi-directional Mixer for High-linearity Transmit/Receive Chains





Preliminary

GRF7001

High Linearity Mixer with
Integrated LO Buffer

Absolute Ratings:

Parameter	Symbol	Min.	Max.	Unit
Supply Voltage	V _{DD}	0	6.0	V
RF/IF/LO Input Power: (Load VSWR < 2:1; V _D : 5.0	P _{IN MAX}		15	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}		100	mW
Electrostatic Discharge:				
Charged Device Model:	CDM	1500		V
Human Body Model:	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 GRF7001 landing page (pending): Manufacturing

Note—MN-001 Product Tape and Reel, Solderability and Package Outline Specification.

[Link to manufacturing note](#)

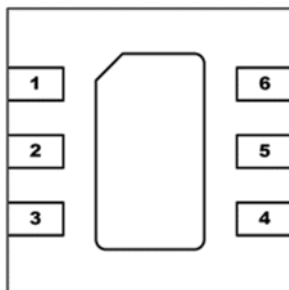


Preliminary

GRF7001

High Linearity Mixer with
Integrated LO Buffer

Pin Out (Top View)



Pin Assignments:

Pin	Name	Description	Note
1	V _{DD}	LO buffer voltage input	Vdd: 3.0 to 5.0 volts
2	V _{ENABLE}	Iddq control input	Venable and external resistor set Iddq for LO buffer. Venable < =0.2 volts disables the device
3	LO	Input to LO buffer	Target LO input power: 0 dBm
4	RF/IF	RF/IF input or output	External filtering required
5	NC/GND	No Connect or Ground	No internal connection to die
6	RF/IF	RF/IF input or output	External filtering required
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.



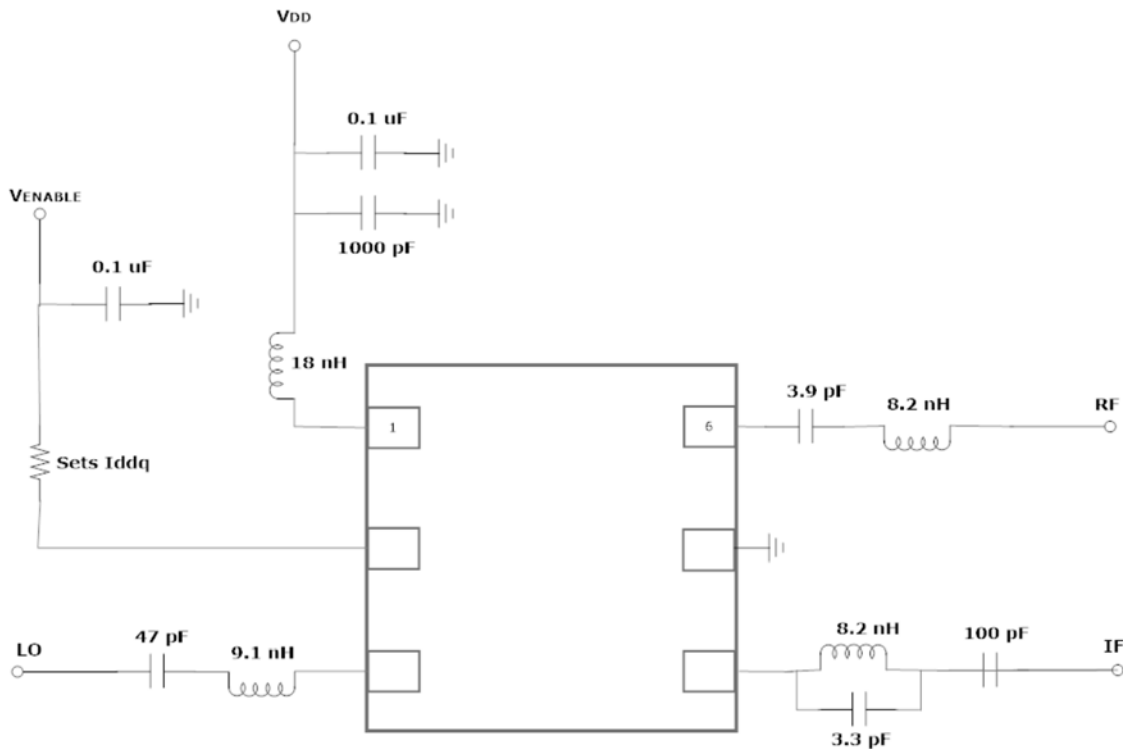
Preliminary

GRF7001

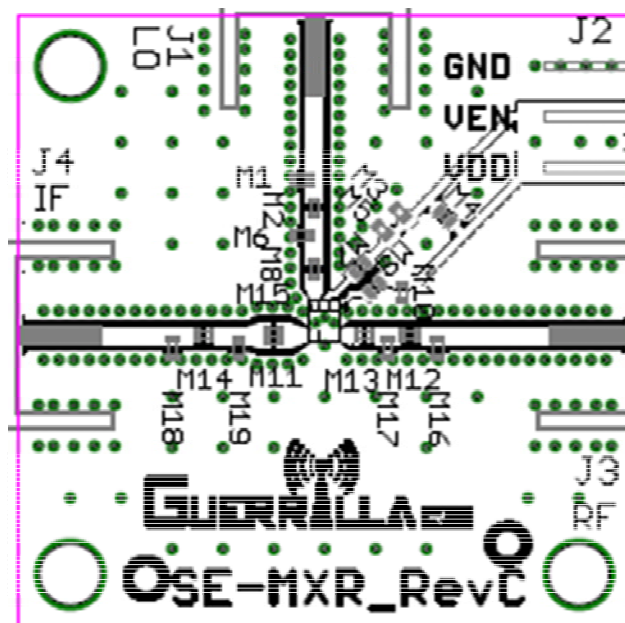
High Linearity Mixer with
Integrated LO Buffer

Nominal Operating Parameters:

Parameter	Symbol	Specification			Unit	Condition
		Min.	Typ.	Max.		
						Vdd = 3.0 V, T _A = 25 °C
RF Frequency (Down conversion)	F _{RF}		808		MHz	
LO Frequency:	F _{LO}		965		MHz	
IF Frequency:	F _{IF}		157		MHz	
Evaluation Board Conversion Gain	S21		-6.0		dB	
Evaluation Board SSB Noise Figure	NF		7.1		dB	
Input 3rd Order Intercept Point	IIP3		25.4		dBm	
Input 1dB Compression Point	IP1dB		>17.0		dBm	
LO Drive Level	LO_IN		0		dBm	
Buffer Supply Current	I _{dd}		10		mA	Adjustable for optimal mixer performance and efficiency
Enable Current	I _{ENABLE}		1.0		mA	
Thermal Data						
Thermal Resistance (measured via IR scan)	Θ _{jc}		TBD		°C/W	On standard evaluation board
Channel Temperature @ +85 C Reference (Package Heat Sink)	T _{CHANNEL}		TBD		°C	Vdd: 3.0 V; I _{ddq} :10 mA; No RF; P _{diss} :30 mW



GRF7001 Standard Application Schematic



GRF7001 Evaluation Board Assembly Drawing



Preliminary

GRF7001

**High Linearity Mixer with
Integrated LO Buffer**

GRF7001 Standard Evaluation Board BOM:

Component	Type	Manufacturer	Family	Value	Package Size	Substitution
M2	Capacitor	Murata	GJM	47 pF	0402	Ok
M5	Capacitor	Murata	GRM	0.1 uF	0402	Ok
M7	Resistor	Various	—	0 Ohm	0402	ok
M8	Inductor	Murata	LQP	9.1 nH	0402	ok
M9	Inductor	Murata	LQG	18 nH	0402	ok
M10	Capacitor	Murata	GRF	1000 pF//0.1 uF	0402	Ok
M11	Inductor/Capacitor	Murata	LQG//GJM	8.2 nH//3.3 pF	0402	ok
M12	Inductor	Murata	LQG	8.2 nH	0402	ok
M13	Capacitor	Murata	GRM	3.9 pF	0402	Ok
M14	Capacitor	Murata	GRM	100 pF	0402	Ok
Evaluation Board:	SE-MXR_RevC					



Preliminary

GRF7001

High Linearity Mixer with Integrated LO Buffer

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.

Information in this datasheet is specific to the Guerrilla RF, Inc. ("Guerrilla RF") product identified.

This datasheet, including the information contained in it, is provided by Guerrilla RF as a service to its customers and may be used for informational purposes only by the customer. Guerrilla RF assumes no responsibility for errors or omissions on this datasheet or the information contained herein. Information provided is believed to be accurate and reliable, however, no responsibility is assumed by Guerrilla RF for its use, nor for any infringement of patents, or other rights of third parties, resulting from its use. Guerrilla RF assumes no liability for any datasheet, datasheet information, materials, products, product information, or other information provided hereunder, including the sale, distribution, reproduction or use of Guerrilla RF products, information or materials.

No license, whether express, implied, by estoppel, by implication or otherwise is granted by this datasheet for any intellectual property of Guerrilla RF, or any third party, including without limitation, patents, patent rights, copyrights, trademarks and trade secrets. All rights are reserved by Guerrilla RF.

All information herein, products, product information, datasheets, and datasheet information are subject to change and availability without notice. Guerrilla RF reserves the right to change component circuitry, recommended application circuitry and specifications at any time without prior notice. Guerrilla RF may further change its datasheet, product information, documentation, products, services, specifications or product descriptions at any time, without notice. Guerrilla RF makes no commitment to update any materials or information and shall have no responsibility whatsoever for conflicts, incompatibilities, or other difficulties arising from any future changes.

GUERRILLA RF INFORMATION, PRODUCTS, PRODUCT INFORMATION, DATASHEETS AND DATASHEET INFORMATION ARE PROVIDED "AS IS" AND WITHOUT WARRANTY OF ANY KIND, WHETHER EXPRESS, IMPLIED, STATUTORY, OR OTHERWISE, INCLUDING FITNESS FOR A PARTICULAR PURPOSE OR USE, MERCHANTABILITY, PERFORMANCE, QUALITY OR NON-INFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHT; ALL SUCH WARRANTIES ARE HEREBY EXPRESSLY DISCLAIMED. GUERRILLA RF DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. GUERRILLA RF SHALL NOT BE LIABLE FOR ANY DAMAGES, INCLUDING BUT NOT LIMITED TO ANY SPECIAL, INDIRECT, INCIDENTAL, STATUTORY, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS THAT MAY RESULT FROM THE USE OF THE MATERIALS OR INFORMATION, WHETHER OR NOT THE RECIPIENT OF MATERIALS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Customers are solely responsible for their use of Guerrilla RF products in the Customer's products and applications or in ways which deviate from Guerrilla RF's published specifications, either intentionally or as a result of design defects, errors, or operation of products outside of published parameters or design specifications. Customers should include design and operating safeguards to minimize these and other risks. Guerrilla RF assumes no liability or responsibility for applications assistance, customer product design, or damage to any equipment resulting from the use of Guerrilla RF products outside of stated published specifications or parameters.



**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