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RF3867

DUAL-CHANNEL, WIDE BANDWIDTH, HIGH LINEARITY LOW NOISE AMPLIFIER

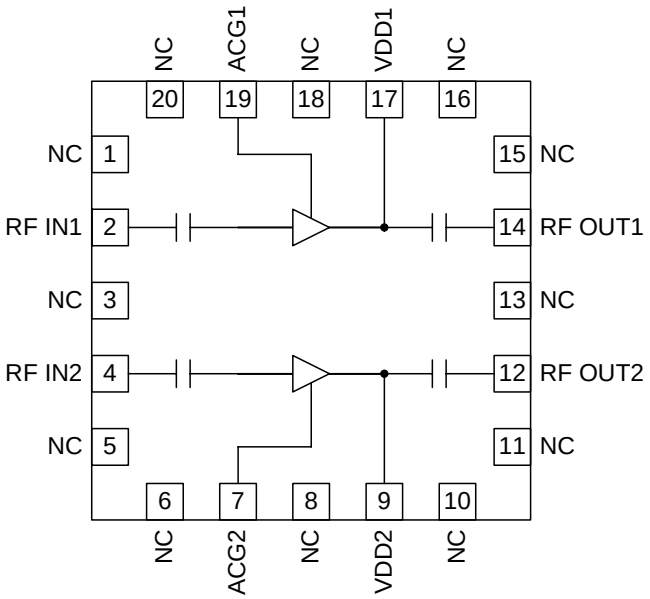
Package Style: QFN, 20-Pin, 5mmx5mm

Features

- Dual-Channel
- Low Noise and High Intercept Point
- Adjustable Bias Current
- Single 2.5V to 6.0V Power Supply
- 700MHz to 3800MHz Operation
- Small QFN20 5mmx5mm Package

Applications

- CDMA, PCS, DCS, UMTS LNA
- WLAN LNA
- General Purpose Amplification



Functional Block Diagram

Product Description

The RF3867 is a dual-channel version of the RF3863 with a low noise amplifier and a high output IP3. The amplifier is self-biased from a single voltage supply with 50Ω input and output ports. The useful frequency range is from 700MHz to 3800MHz. A 0.8dB noise figure and 36dBm OIP3 performance is achieved with a 5V V_{DD}, 180mA. Current can be increased to raise OIP3 while having minimal effect on noise figure. The IC is featured in a standard QFN, 20-pin, 5mmx5mm package.

Ordering Information

RF3867	Dual-Channel, Wide Bandwidth, High Linearity Low Noise Amplifier
RF3867PCK-410	Fully Assembled Evaluation Board with 5 Sample Parts 1.5GHz to 2.7GHz
RF3867PCK-411	3.3GHz to 3.8GHz
RF3867PCK-412	700MHz to 1100MHz

Optimum Technology Matching® Applied

☐ GaAs HBT	☐ SiGe BiCMOS	☑ GaAs pHEMT	☐ GaN HEMT
☐ GaAs MESFET	☐ Si BiCMOS	☐ Si CMOS	
☐ InGaP HBT	☐ SiGe HBT	☐ Si BJT	

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Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage	0 to +7.0	V_{DC}
Input RF Level	+10	dBm
Current Drain, I_{DD}	150 per Channel	mA
Operating Ambient Temperature	-40 to +85	°C
Storage Temperature	-40 to +150	°C

Note 1: Max continous RF IN is +10dBm. The max transient RF IN is +20dBm.

Caution! ESD sensitive device.

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability. Specified typical performance or functional operation of the device under Absolute Maximum Rating conditions is not implied.

RoHS status based on EUDirective2002/95/EC (at time of this document revision).

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Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
High Band					
Frequency	3.3		3.8	GHz	
Current		180		mA	V_{DD}=5V
Gain		10		dB	Temp=+25°C, V_{DD}=5V, I_{DD}=180mA, 3500MHz unless specified
Noise Figure		0.8		dB	
OIP3		36		dBm	f_1=3500MHz, f_2=3501MHz
OP1dB		21		dBm	
S11		-10		dB	
S22		-12		dB	
Mid Band					
Frequency	1500		2700	MHz	
Current		180		mA	V_{DD}=5V
Gain	13.5	15.0	16.5	dB	+25°C, V_{DD}=5V, I_{DD}=180mA, 2000MHz unless specified
Noise Figure		0.8	1.1	dB	
OIP3	33.0	35.5		dBm	f_1=2000MHz, f_2=2001MHz
OP1dB	21.0	22.5	25.0	dBm	
S11		-10		dB	
S22		-14		dB	
Low Band					
Frequency	700		1100	MHz	
Current		180		mA	V_{DD}=5V
Gain		18.5		dB	+25°C, V_{DD}=5V, I_{DD}=180mA, 850MHz unless specified
Noise Figure		1		dB	
OIP3		35		dBm	f_1=850MHz, f_2=851MHz
OP1dB		22		dBm	
S11		-10		dB	
S22		-10		dB	

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Pin	Function	Description	Interface Schematic
1	NC	Not connected.	
2	RF IN1	Channel 1 RF input pin. 50Ω matched. This pin is DC-blocked.	
3	NC	Not connected.	
4	RF IN2	Channel 2 RF input pin. 50Ω matched. This pin is DC-blocked.	
5	NC	Not connected.	
6	NC	Not connected.	
7	ACG2	Channel 2 AC ground. Shunt cap may be added for tuning. Shunt resistor may be added to increase I_{DD}.	
8	NC	Not connected.	
9	VDD2	Channel 2 bias voltage. 2.5V to 6.0V applied through bias inductor.	
10	NC	Not connected.	
11	NC	Not connected.	
12	RF OUT2	Channel 2 RF output pin. 50Ω matched. This pin is DC-blocked.	
13	NC	Not connected.	
14	RF OUT1	Channel 1 RF output pin. 50Ω matched. This pin is DC-blocked.	
15	NC	Not connected.	
16	NC	Not connected.	
17	VDD1	Channel 1 bias voltage. 2.5V to 6.0V applied through bias inductor.	
18	NC	Not connected.	
19	ACG1	Channel 1 AC ground. Shunt cap may be added for tuning. Shunt resistor may be added to increase I_{DD}.	
20	NC	Not connected.	
Pkg Base	GND	Ground connection.	

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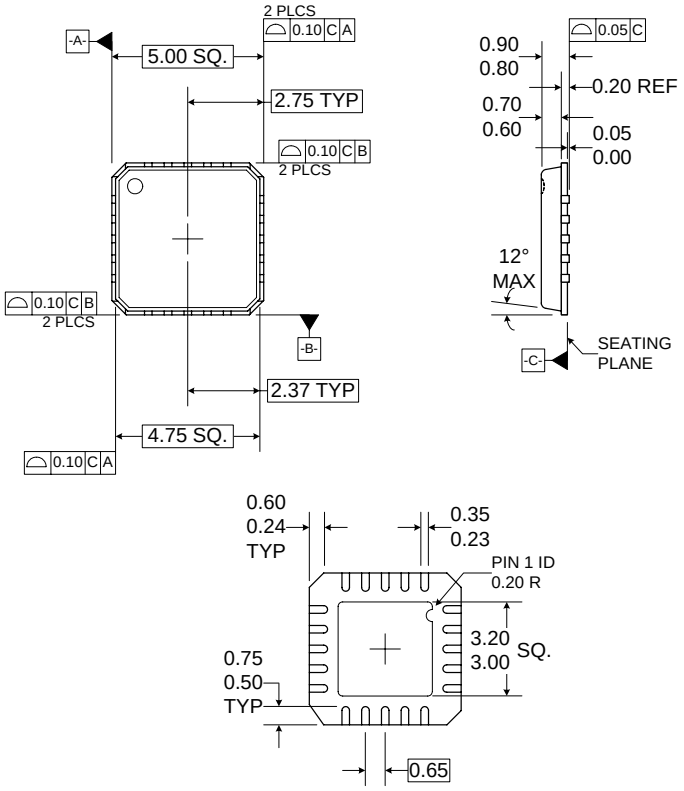
Package Drawing



Dimensions in mm.

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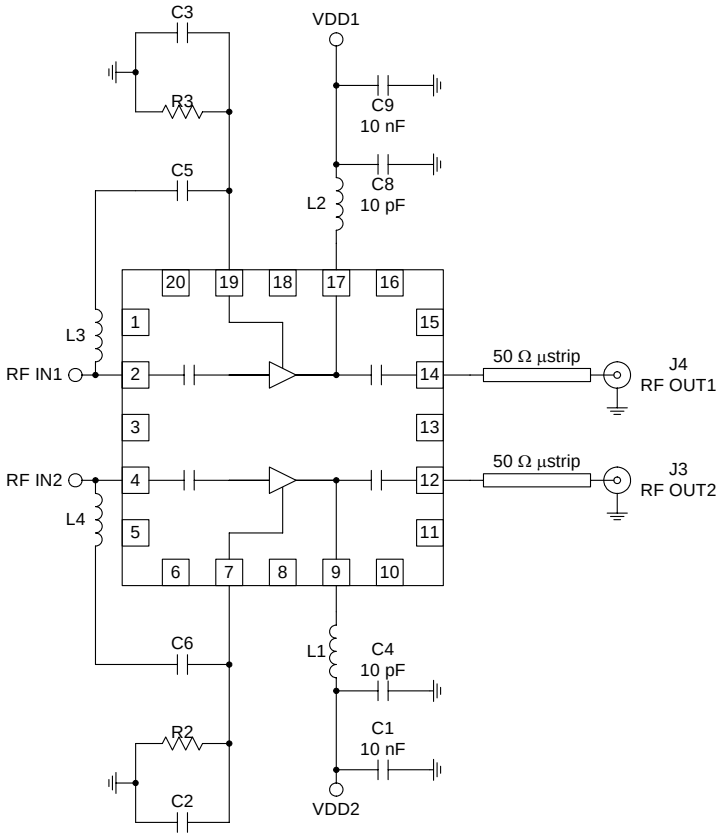
Evaluation Board Schematic
700MHz to 1100MHz, 1500MHz to 2700MHz, and 3300MHz to 3800MHz



Component	High Band 3300 MHz to 3800 MHz	Mid Band 1500 MHz to 2700 MHz	Low Band 700 MHz to 1100 MHz
L1, L2 (nH)	1.5	12	56
L4, L3 (nH)	100 pF	100 pF	22
C5, C6 (pF)	12 nH	4.7 nH	100
C2, C3 (pF)	DNP	12	6.8
R2, R3 (Ω)	DNP	DNP	DNP
R1 (Ω)	0	0	0
			See note 1

R2 and R3 are DNP for typical 90 mA per channel current draw. If R2 or R3 is added, the channel I_{DD} will increase. A 10 Ω R2 or R3 will raise the current of a channel to achieve higher linearity.

Note 1: For low band add a series 6.8 nH inductor on RF IN, and a shunt 15 nH inductor on RF OUT. Inductors should be placed as close as possible to the part.

Note 2: The topology of L3, L4, C5, and C6 in the mid and high bands. They must be as shown in the chart.

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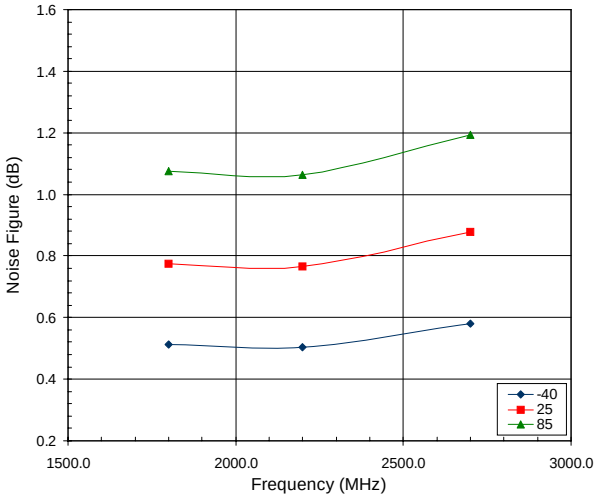
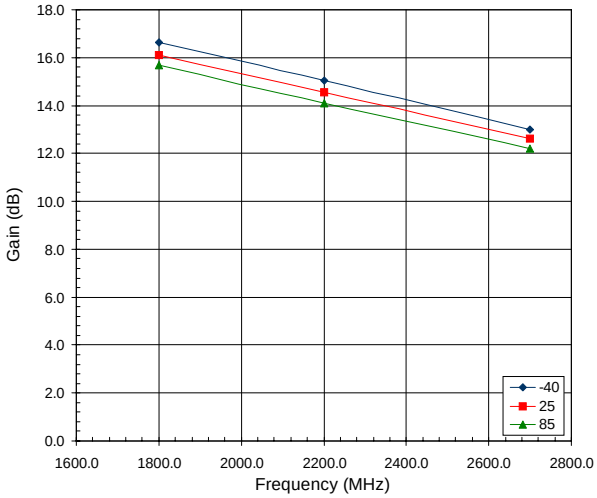
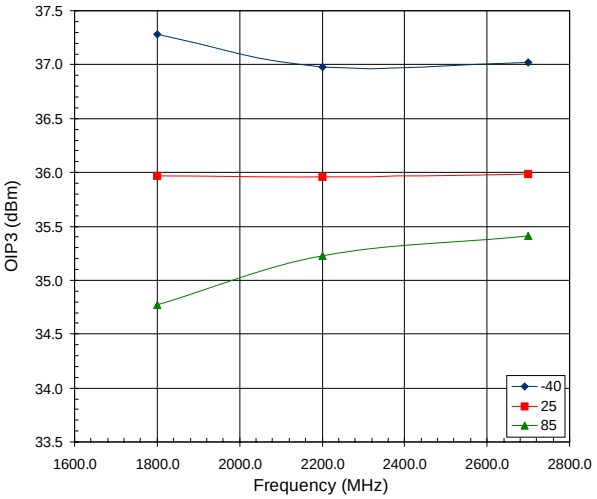
5V Noise Figure versus Temperature



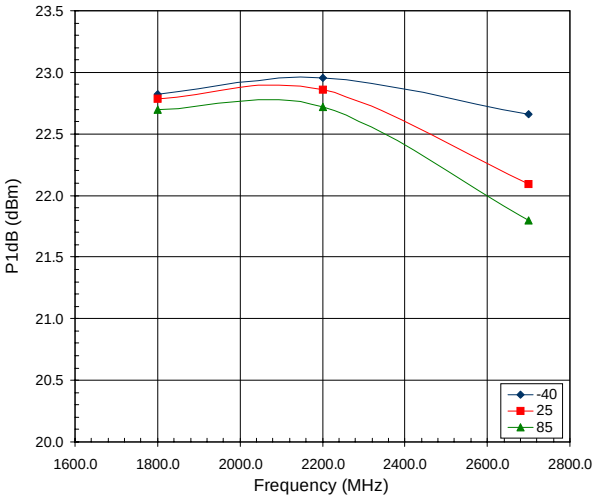
5V Gain versus Temperature



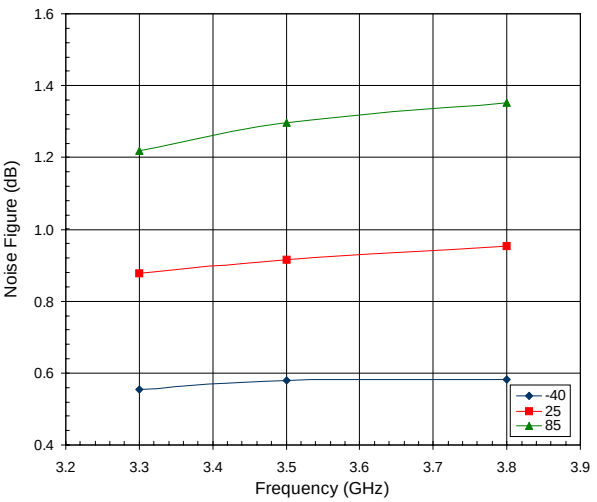
5V OIP3 versus Temperature



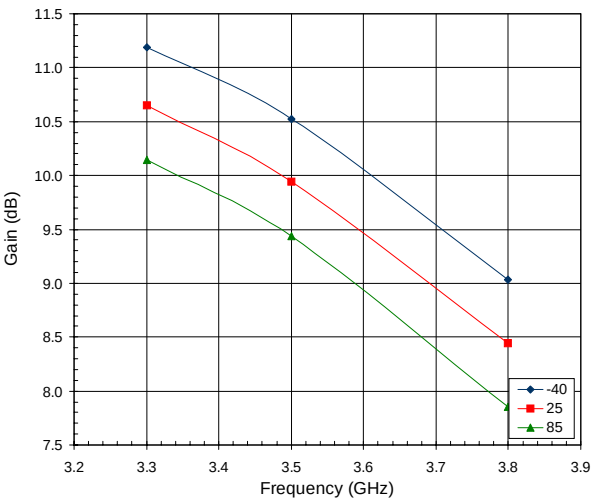
5V P1dB versus Temperature



5V Noise Figure versus Temperature



5V Gain versus Temperature



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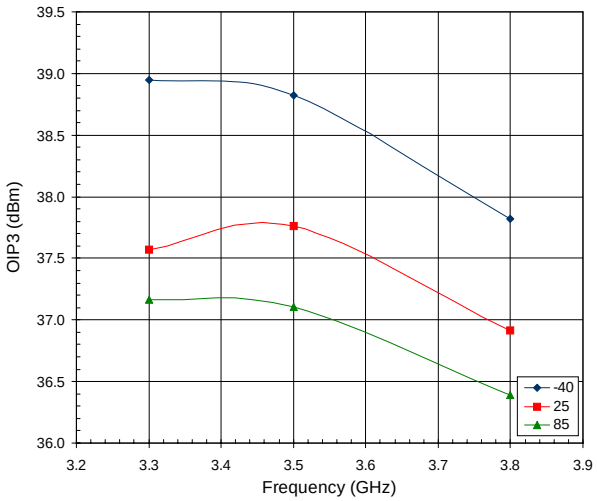
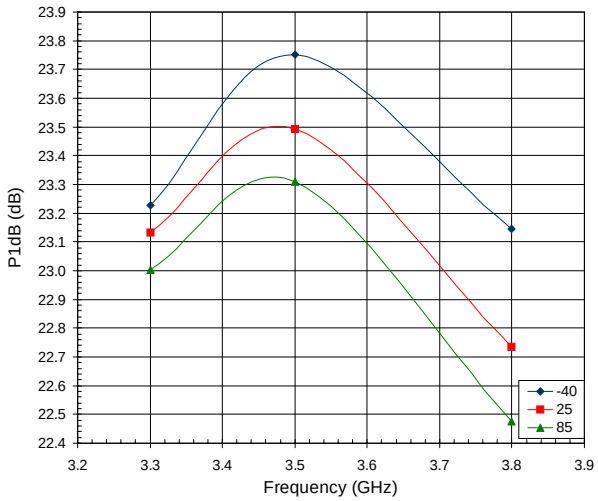
5V OIP3 versus Temperature



5V P1dB versus Temperature



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