

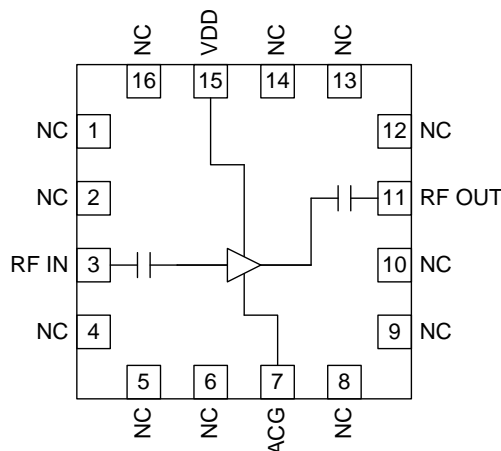


**Features**

- Low Noise and High Intercept Point
- Adjustable Bias Current
- Single 2.5V to 6.0V Power Supply
- 700MHz to 3800MHz Operation
- Extremely Small QFN16 3mmx3mm Package

**Applications**

- First Stage CDMA, PCS, ECS, UMTS LNA/Linear Driver
- First Stage WLAN LNA/Linear Driver
- First Stage WiMAX LNA/Linear Driver
- General Purpose Amplification



Functional Block Diagram

**Product Description**

The RF3863 is a low noise amplifier with 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<sub>DD</sub>, 90mA. Current can be increased to raise OIP3 while having minimal effect on noise figure. The IC is featured in a standard QFN, 16-pin, 3mmx3mm package.

**Ordering Information**

RF3863	Wide Bandwidth, High Linearity Low Noise Amplifier
RF3863PCK-410	Fully Assembled Evaluation Board with 5 Sample Parts 1.5GHz to 2.7 GHz
RF3863PCK-411	3.3GHz to 3.8GHz
RF3863PCK-412	700MHz to 1100MHz

**Optimum Technology Matching® Applied**

- |                                      |                                      |  |                                   |
|--------------------------------------|--------------------------------------|--|-----------------------------------|
| <input type="checkbox"/> GaAs HBT    | <input type="checkbox"/> SiGe BiCMOS | <input checked="" type="checkbox"/> GaAs pHEMT | <input type="checkbox"/> GaN HEMT |
| <input type="checkbox"/> GaAs MESFET | <input type="checkbox"/> Si BiCMOS   | <input type="checkbox"/> Si CMOS               |                                   |
| <input type="checkbox"/> InGaP HBT   | <input type="checkbox"/> SiGe HBT    | <input type="checkbox"/> Si BJT                |                                   |

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## Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage	0 to +7	V <sub>DC</sub>
Input RF Level	+10	dBm
Current Drain, I <sub>DD</sub>	150	mA
Operating Ambient Temperature	-40 to +85	°C
Storage Temperature	-40 to +150	°C

Note 1: Max continuous 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.

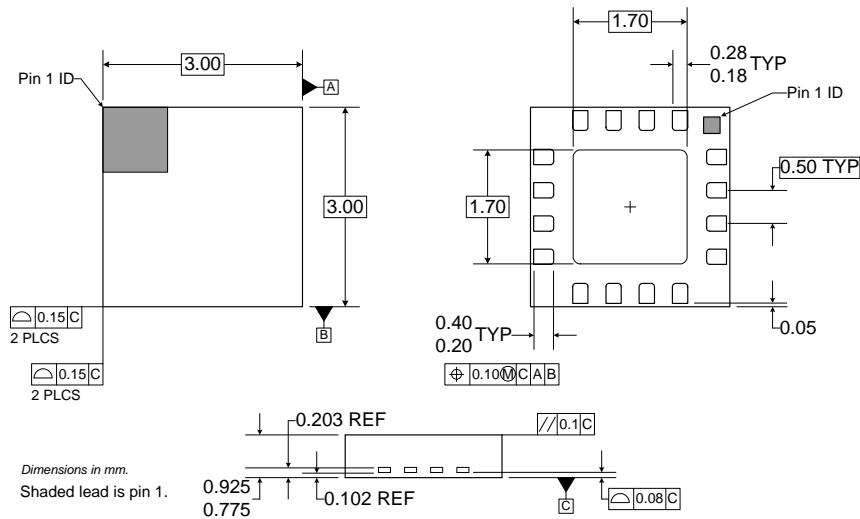
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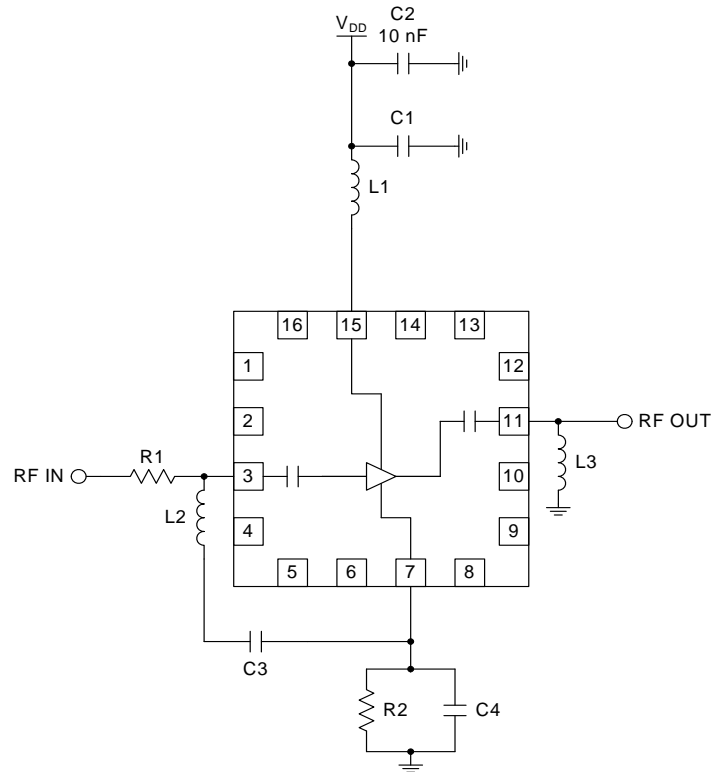
Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
<b>High Band</b>					
Frequency	3.3		3.8	GHz	V <sub>DD</sub> = 5V
Current		90	110	mA	
Gain		10		dB	
Noise Figure		0.9		dB	
OIP3		37.0		dBm	+25 °C, V <sub>DD</sub> = 5V, I <sub>DD</sub> = 90mA, 3500MHz unless specified
OP1dB		22.0		dBm	
S11		-11		dB	
S22		-18		dB	f <sub>1</sub> = 3500MHz, f <sub>2</sub> = 3501MHz
<b>Mid Band</b>					
Frequency	1.5		2.7	GHz	
Current		90	110	mA	V <sub>DD</sub> = 5V
Gain	14	15	16.5	dB	+25 °C, V <sub>DD</sub> = 5V, I <sub>DD</sub> = 90mA, 2000MHz unless specified
Noise Figure		0.8	1.0	dB	
OIP3	33.0	35.5		dBm	f <sub>1</sub> = 2000MHz, f <sub>2</sub> = 2001MHz
OP1dB	21.0	22.5	25.0	dBm	
S11		-10		dB	
S22		-17		dB	
<b>Low Band</b>					
Frequency	700		1100	MHz	
Current		90	110	mA	V <sub>DD</sub> = 5V
Gain		18		dB	+25 °C, V <sub>DD</sub> = 5V, I <sub>DD</sub> = 90mA, 850MHz unless specified
Noise Figure		0.9		dB	
OIP3		35		dBm	f <sub>1</sub> = 850MHz, f <sub>2</sub> = 851MHz
OP1dB		22		dBm	
S11		-10		dB	
S22		-17		dB	

Pin	Function	Description	Interface Schematic
1	NC	Not connected.	
2	NC	Not connected.	
3	RF IN	RF input pin. 50Ω matched. This pin is DC-blocked.	
4	NC	Not connected.	
5	NC	Not connected.	
6	NC	Not connected.	
7	ACG	AC ground. Shunt cap may be added for tuning. Shunt resistor may be added to increase I <sub>DD</sub> .	
8	NC	Not connected.	
9	NC	Not connected.	
10	NC	Not connected.	
11	RF OUT	RF output pin. 50Ω matched. This pin is DC-blocked.	
12	NC	Not connected.	
13	NC	Not connected.	
14	NC	Not connected.	
15	VD	Bias voltage. 2.5V to 6.0V applied through bias inductor.	
16	NC	Not connected.	
Pkg Base	GND	Ground connection.	

**Package Drawing**



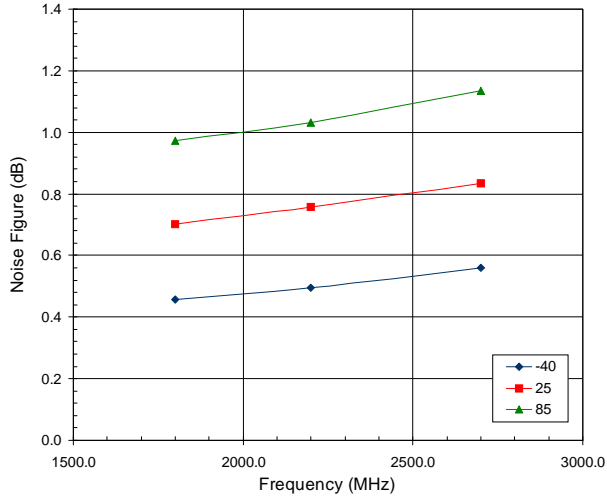
## Evaluation Board Schematic 700MHz to 3800MHz



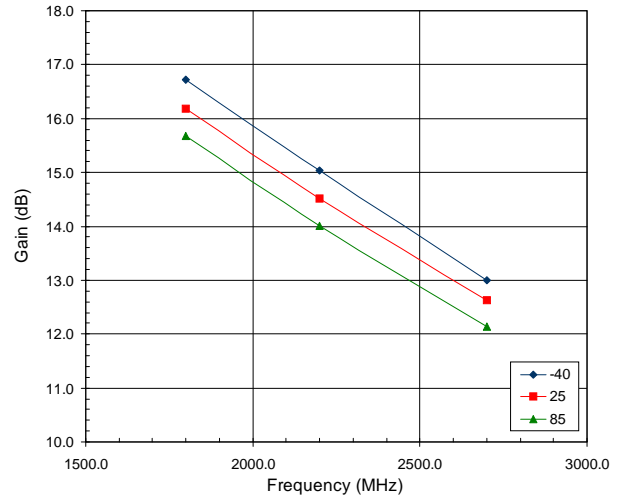
Component	700-1100 MHz	1.5-2.7 GHz	3.3-3.8 GHz
C1 (pF)	10	10	10
C3 (pF)	100	100	100
C4 (pF)	10	DNP	DNP
L1 (nH)	56	5.6	2.2
L2 (nH)	18	4.7	4.7
R1 (ohm)	5.6 nH	0	0
R2 (ohm)	DNP	DNP	DNP
L3 (nH)	15	DNP	DNP

R2 is DNP for standard 90 mA current draw. If R2 is added, the  $I_{DD}$  will increase. A 20  $\Omega$  R2 will raise the current to achieve higher linearity.

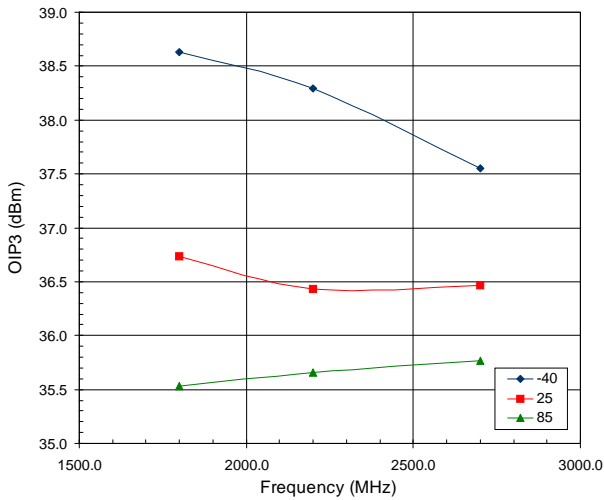
5V Noise Figure versus Temperature



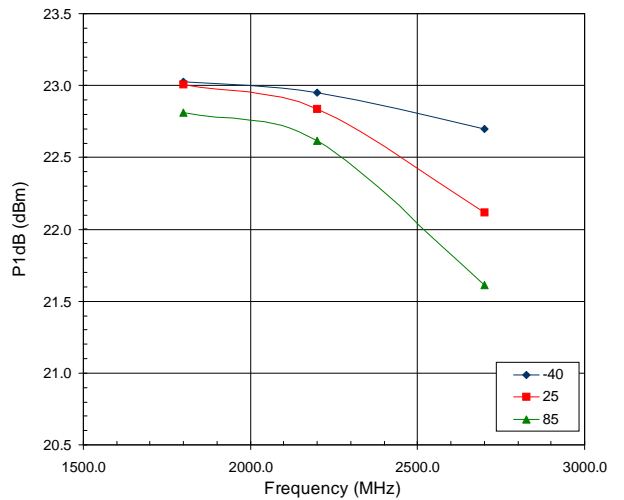
5V Gain versus Temperature



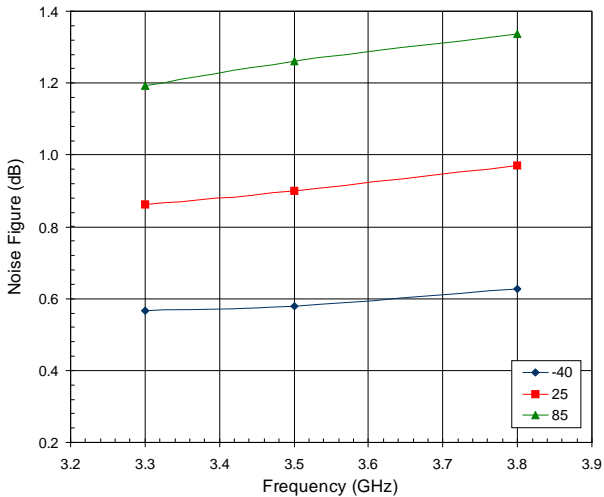
5V OIP3 versus Temperature



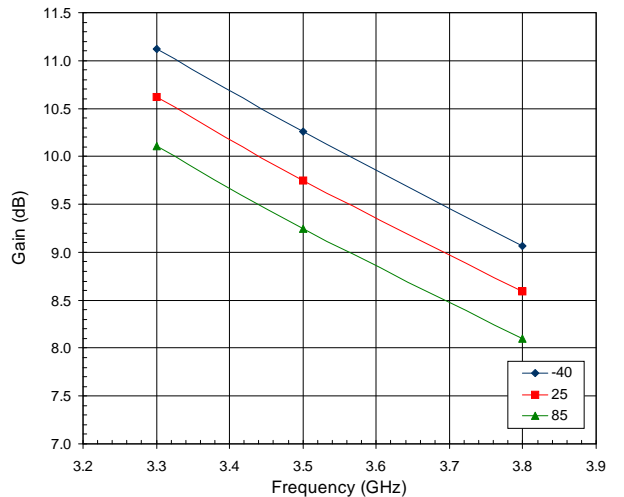
5V P1dB versus Temperature



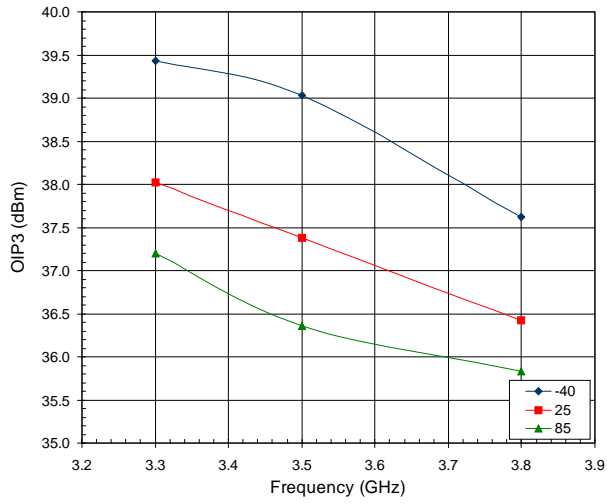
5V Noise Figure versus Temperature



5V Gain versus Temperature



5V OIP3 versus Temperature



5V P1dB versus Temperature

