RF2360

Preliminary

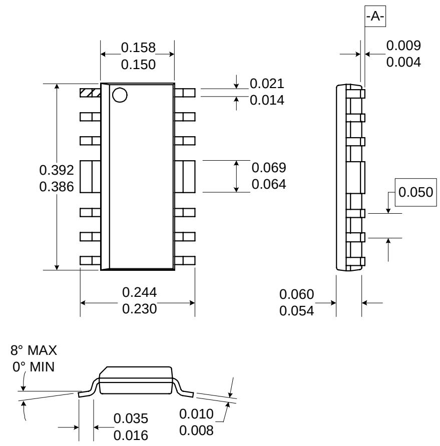
LINEAR GENERAL PURPOSE AMPLIFIER

Typical Applications

- CATV Distribution Amplifiers
- Cable Modems
- Broadband Gain Blocks
- Laser Diode Driver
- Return Channel Amplifier
- Base Stations

Product Description

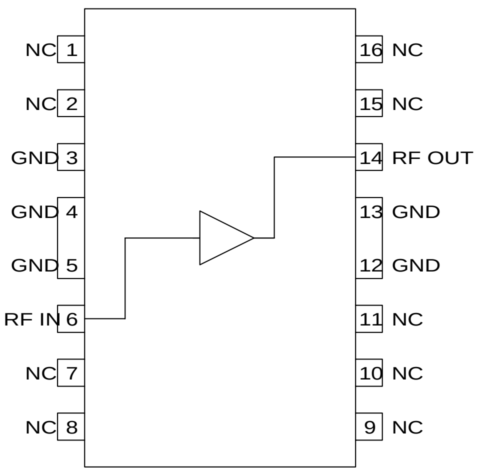
The RF2360 is a general purpose, low-cost, high-linearity RF amplifier IC. The device is manufactured on a Gallium Arsenide process and is featured in an SOP-16 batwing package. It has been designed for use as an easily cascadable 75Ω gain block with a Noise Figure of less than 2dB. Gain flatness better than 0.5dB from 5MHz to 1000MHz, and high linearity make this part ideal for cable TV applications. Other applications include IF and RF amplification in wireless voice and data communication products operating in frequency bands up to 1000MHz. The device is self-contained with 75Ω input and output impedances providing less than 2:1 VSWR matching. For higher input and output return losses, see the evaluation schematic.



Package Style: Standard Batwing

Optimum Technology Matching® Applied

- ☐ Si BJT
- ☐ GaAs HBT
- ☑ GaAs MESFET
- ☐ Si Bi-CMOS
- ☐ SiGe HBT
- ☐ Si CMOS



Functional Block Diagram

Features

- 5MHz to 1500MHz Operation
- Internally Matched Input and Output
- 20dB Small Signal Gain
- 1.2dB Noise Figure
- +24dBm Output Power
- Single 6V to 9V Positive Power Supply

Ordering Information

RF2360	Linear General Purpose Amplifier
RF2360 PCBA	Fully Assembled Evaluation Board 50Ω
RF2360 411	Fully Assembled Evaluation Board 75H
RF2360 412	Fully Assembled Evaluation Board 75L

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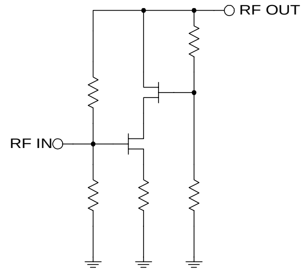
Absolute Maximum Ratings

Parameter	Rating	Unit
Device Current	175	mA
Device Voltage	9	V
Input RF Power	+13	dBm
Output Load VSWR	20:1	
Ambient Operating Temperature	-40 to +85	°C
Storage Temperature	-40 to +150	°C

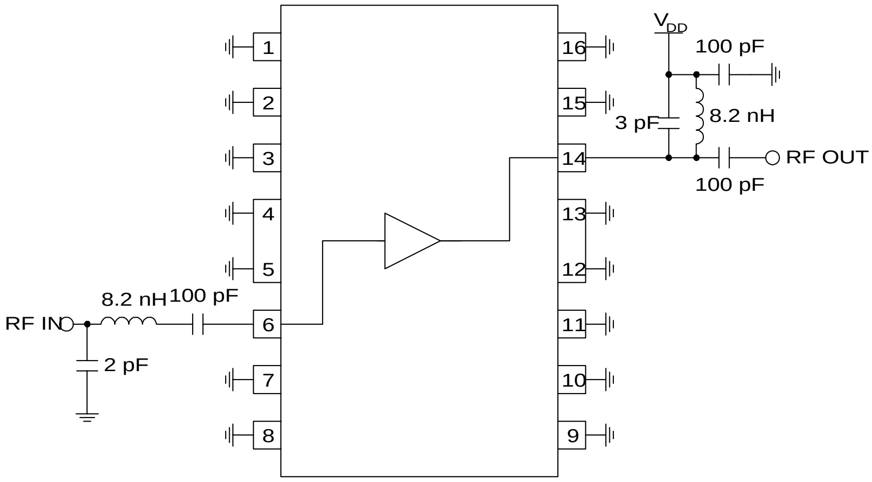
Caution! ESD sensitive device.

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Overall (50Ω)					T=25°C, V_{DD}=7V, 50Ω System, P_{IN}=-8dBm
Frequency Range	5		1500	MHz	3dB Bandwidth
Input VSWR		1.6:1			Appropriate values for the output DC blocking capacitor and bias inductor are required to maintain this VSWR over the intended operating frequency range.
Output VSWR		1.2:1			See note for Input VSWR.
Gain		20		dB	At 500MHz
Gain Flatness		+/-0.9		dB	5MHz to 1000MHz
Noise Figure		1.2		dB	At 500MHz
Noise Figure		1.5		dB	From 5MHz to 1000MHz
Output IP_3		33.7		dBm	At 10MHz, Delta F1 and F2 = 1MHz
Output IP_3		37.2		dBm	At 500MHz
Output IP_3		36.4		dBm	At 1000MHz
Output IP_2		46.3		dBm	At 100MHz, Delta F1 and F2 = 156MHz
Output IP_2		44.4		dBm	At 1000MHz
Output P_{1dB}		21		dBm	At 10MHz
Output P_{1dB}		24		dBm	At 500MHz
Output P_{1dB}		23.7		dBm	At 1000MHz
Reverse Isolation		24		dB	At 500MHz
					T=25°C, V_{DD}=9V, P_{IN}=-8dBm
Gain		20		dB	At 500MHz
Gain Flatness		+/-0.9		dB	5MHz to 1000MHz
Noise Figure		1.1		dB	At 500MHz
Noise Figure		1.5		dB	From 5MHz to 1000MHz,
Output IP_3		34.8		dBm	At 10MHz, Delta F1 and F2 = 1MHz
Output IP_3		38.1		dBm	At 500MHz
Output IP_3		38.7		dBm	At 1000MHz
Output IP_2		44.1		dBm	At 100MHz, Delta F1 and F2 = 156MHz
Output IP_2		48.6		dBm	At 1000MHz
Output P_{1dB}		22.5		dBm	At 10MHz
Output P_{1dB}		25.1		dBm	At 500MHz
Output P_{1dB}		25.3		dBm	At 1000MHz
Power Supply					
Supply Voltage (V_{DD})	6	7	9	V	

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Overall (75Ω)					T=25°C, V_{DD}=7V, 75Ω System, P_{IN}=-8dBm
Frequency Range	5		1500	MHz	3dB Bandwidth
Input VSWR		1.6:1			Appropriate values for the output DC blocking capacitor and bias inductor are required to maintain this VSWR over the intended operating frequency range.
Output VSWR		1.3:1			See note for input VSWR.
Gain		20		dB	At 500MHz
Gain Flatness		±0.5		dB	5MHz to 1000MHz
Output IP_3		36.8		dBm	At 50MHz, Delta F1 and F2 = 1MHz
		36.0		dBm	At 500MHz
Output IP_2		50.1		dBm	At 500MHz, Delta F1 and F2 = 55.25MHz
Output IP_{1dB}		21		dBm	At 10MHz
		23		dBm	At 500MHz
		22		dBm	At 1000MHz
Operating Current Range	100	104	109	mA	
110 Channels					10dBmV per channel, flat, at the input of the amplifier; V_{CC}=7V, I_{CC}=120mA
CTB		-75		dBc	At 55.25MHz
		-77		dBc	At 331.25MHz
		-75		dBc	At 547.25MHz
CSO+1.25MHz		-91		dBc	At 55.25MHz
		-60		dBc	At 331.25MHz
		-57		dBc	At 547.25MHz
CSO-1.25MHz		-55		dBc	At 55.25MHz
		-54		dBc	At 331.25MHz
		-56		dBc	At 547.25MHz
CNR		+66		dB	At 55.25MHz
		+65		dB	At 331.25MHz
		+65		dB	At 547.25MHz
Power Supply					
Supply Voltage (V_{DD})	6	7	9	V	
Operating Current Range	115	120	130	mA	

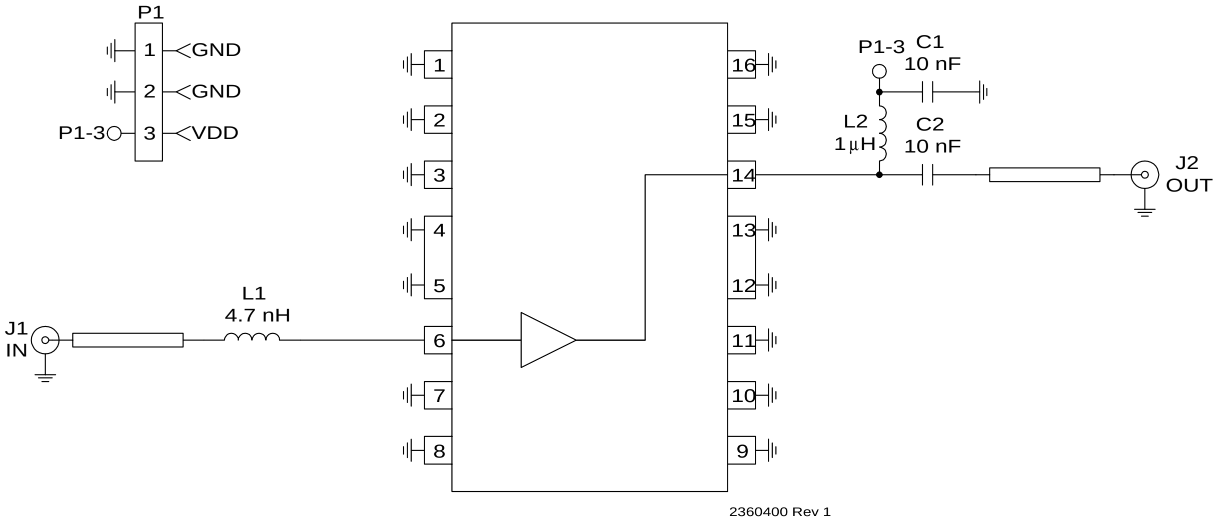
Pin	Function	Description	Interface Schematic
1	NC	No connection. This pin should be connected to the ground plane.	
2	NC	Same as pin 1.	
3	GND	Ground connection. Keep traces physically short and connect immediately to ground plane for best performance. Each ground pin should have a via to the ground plane.	
4	GND	Same as pin 3.	
5	GND	Same as pin 3.	
6	RF IN	RF input pin. This pin is internally DC blocked. An external DC blocking capacitor is not required.	
7	NC	Same as pin 1.	
8	NC	Same as pin 1.	
9	NC	Same as pin 1.	
10	NC	Same as pin 1.	
11	NC	Same as pin 1.	
12	GND	Same as pin 3.	
13	GND	Same as pin 3.	
14	RF OUT	RF output and bias pin. Because DC is present on this pin, a DC blocking capacitor, suitable for the frequency of operation, should be used in most applications. For biasing, only an RF choke is needed.	
15	NC	Same as pin 1.	
16	NC	Same as pin 1.	

Application Schematic
869-894 MHz Narrowband Operation

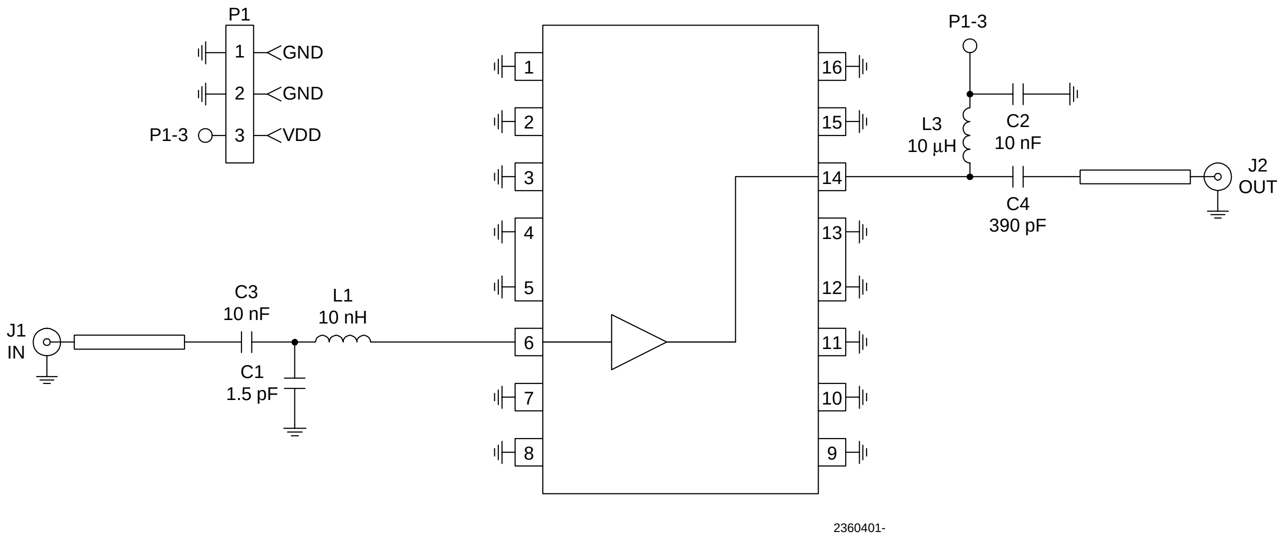


Evaluation Board Schematic - 50Ω

(Download Bill of Materials from www.rfmd.com.)

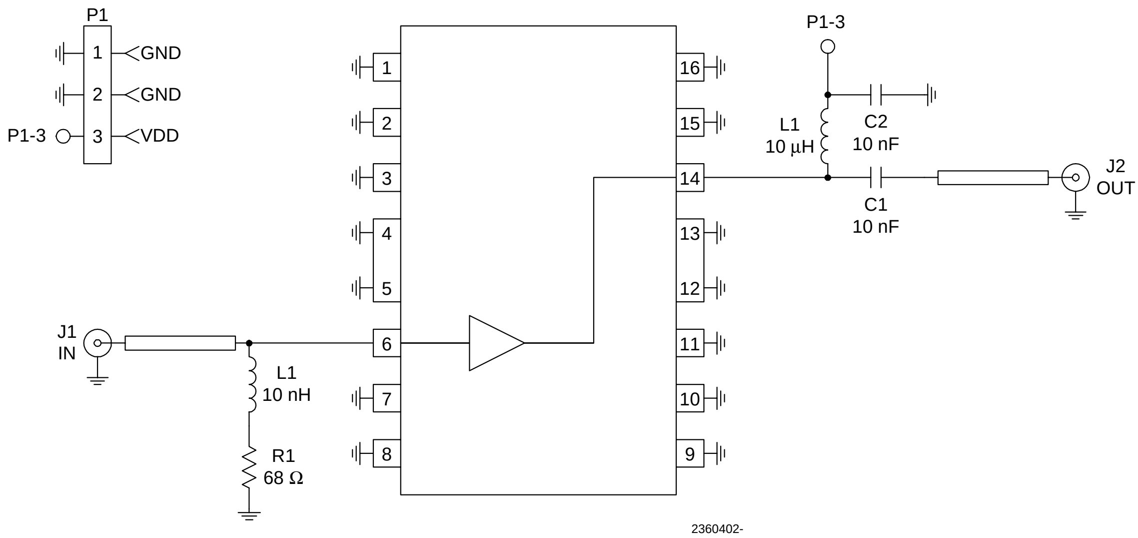


Evaluation Board Schematic - 75Ω High Frequency (50 MHz to 2000 MHz)



NOTES:
J1 and J2 are 75 Ω F connectors.

Evaluation Board Schematic - 75Ω Low Frequency (5 MHz to 200 MHz)



NOTES:
J1 and J2 are 75 Ω F connectors.

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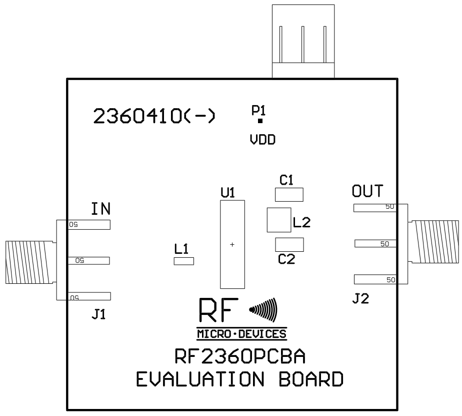
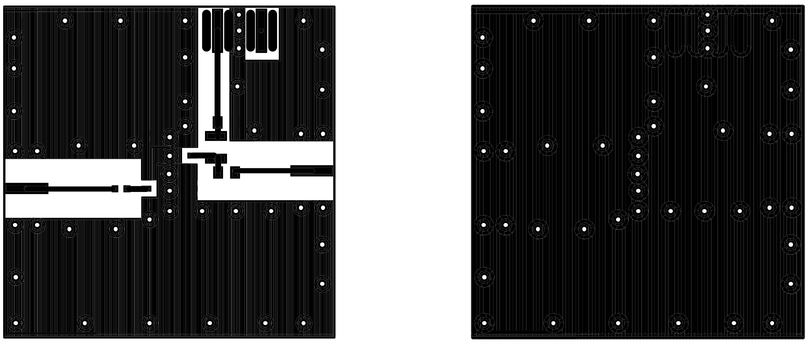
LINEAR CATV AMPLIFIERS

Evaluation Board Layout - 50Ω
Board Size 1.5” x 1.5”

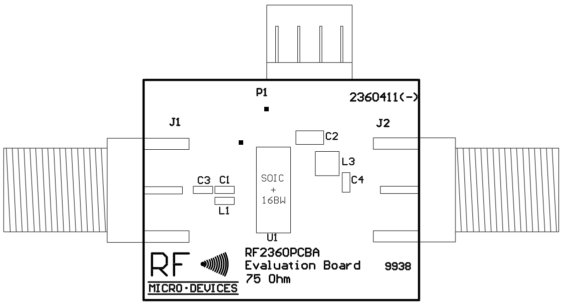
Board Thickness 0.031”, Board Material FR-4

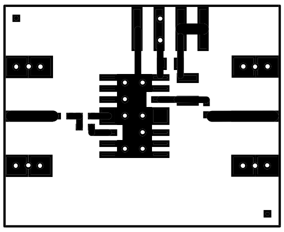


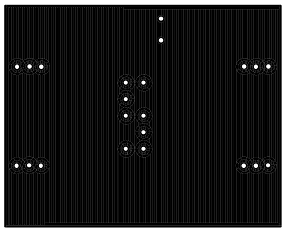


Evaluation Board Layout - 75Ω High Frequency (50 MHz to 2000 MHz) Board Size 1.25” x 1.0”

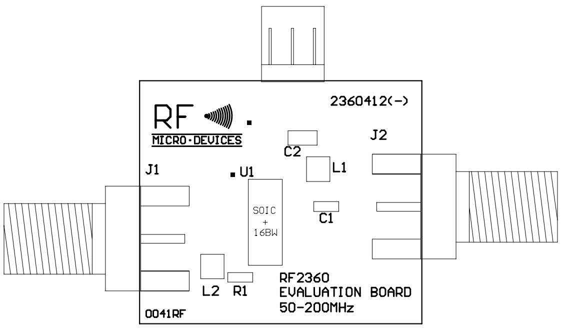
Board Thickness 0.062”, Board Material FR-4

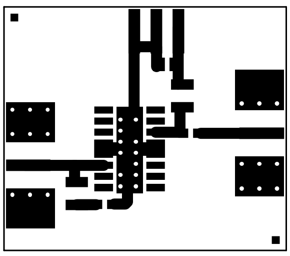


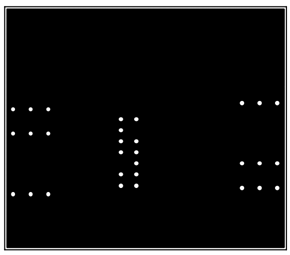


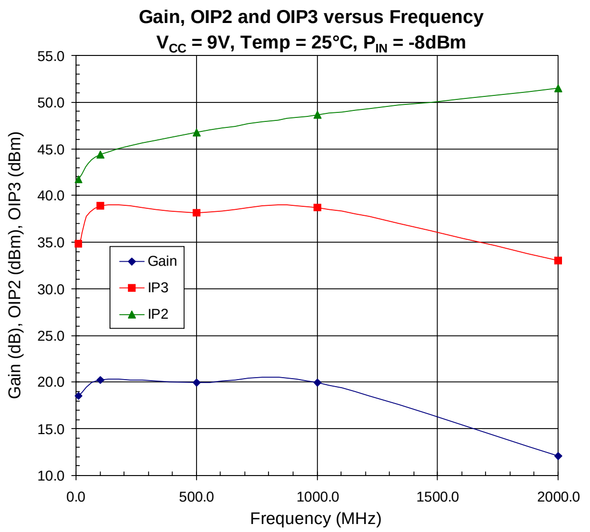


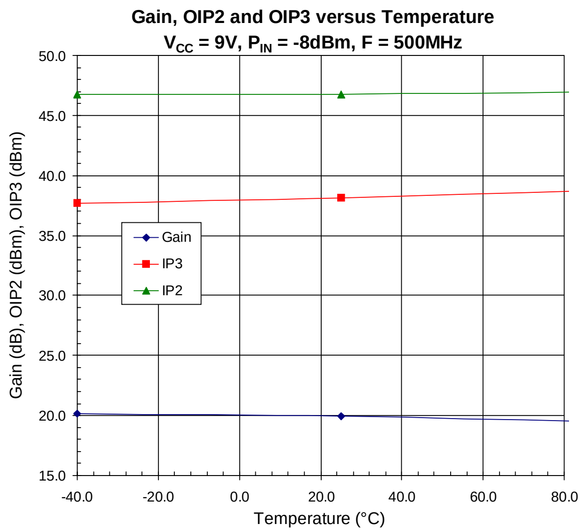
Evaluation Board Layout - 75Ω Low Frequency (5 MHz to 200 MHz)

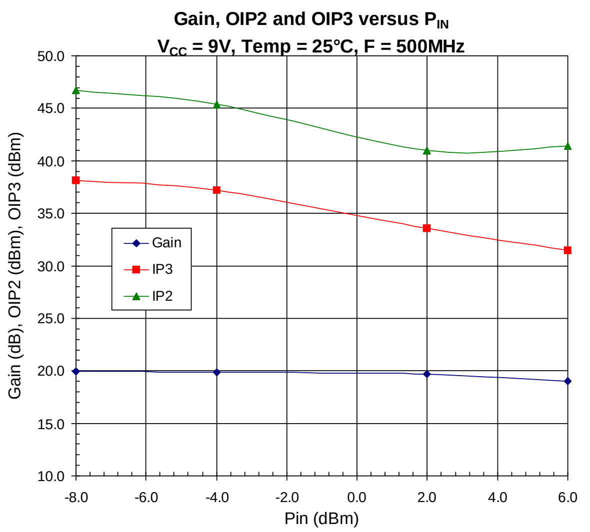




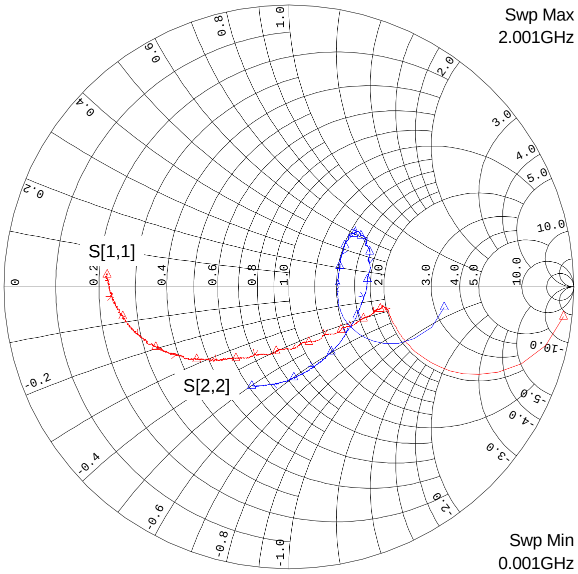



Gain, OIP2 and OIP3 versus Frequency
VCC = 9V, Temp = 25°C, PIN = -8dBm
Gain (dB), OIP2 (dBm), OIP3 (dBm)
Frequency (MHz)
Gain
IP3
IP2

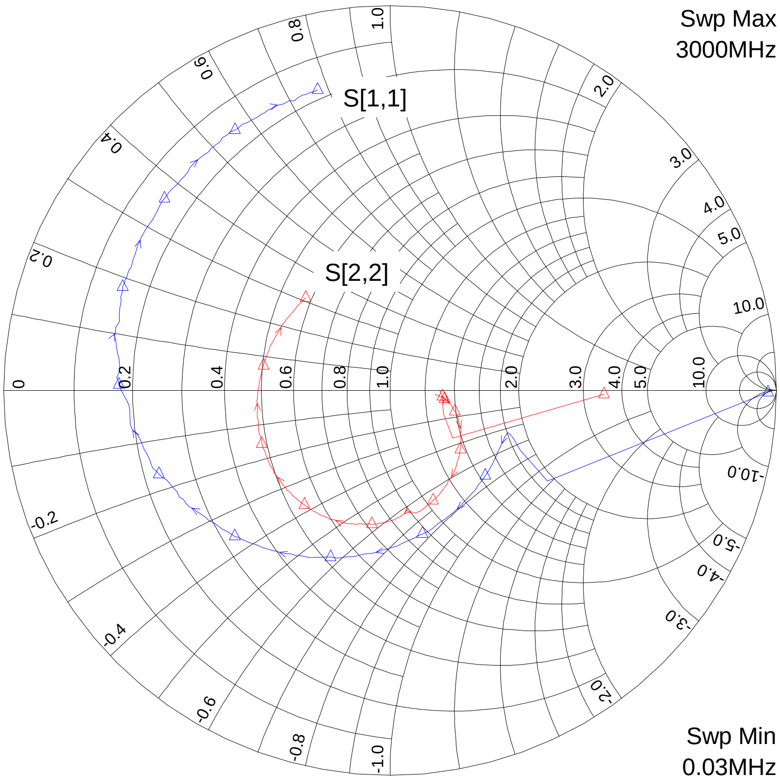

Gain, OIP2 and OIP3 versus Temperature
VCC = 9V, PIN = -8dBm, F = 500MHz
Gain (dB), OIP2 (dBm), OIP3 (dBm)
Temperature (°C)
Gain
IP3
IP2


Gain, OIP2 and OIP3 versus PIN
VCC = 9V, Temp = 25°C, F = 500MHz
Gain (dB), OIP2 (dBm), OIP3 (dBm)
Pin (dBm)
Gain
IP3
IP2

75 Ohm, 8V, 25°C



50 Ohm, 8V - Return Loss



75 Ohm, 8V - Return Loss