

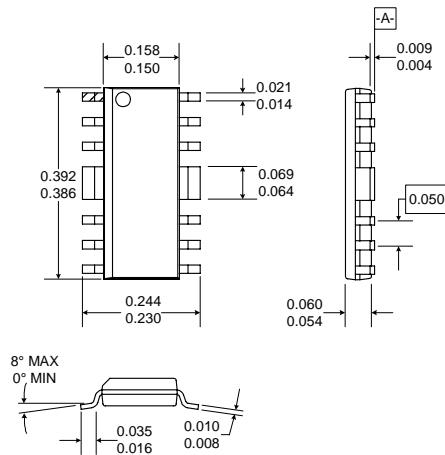
Typical Applications

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

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LINEAR CATV AMPLIFIERS

Product Description

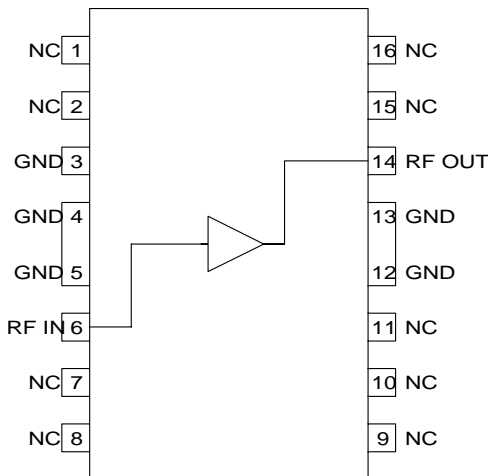
The RF2360 is a general purpose, low-cost, high-linearity RF amplifier IC. The device is manufactured on a Gallium Arsenide process and is featured in an SOP-16 batwing package. It has been designed for use as an easily cascaded 75Ω gain block with a Noise Figure of less than 2dB. Gain flatness better 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.



Optimum Technology Matching® Applied

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

Package Style: Standard Batwing



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

RF Micro Devices, Inc.      Tel (336) 664 1233  
 7625 Thorndike Road      Fax (336) 664 0454  
 Greensboro, NC 27409, USA      <http://www.rfmd.com>

### 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.

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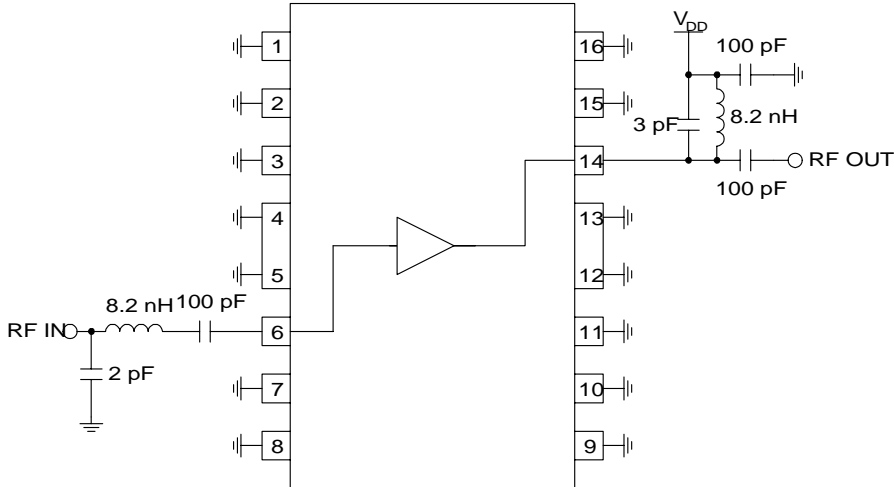
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Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
<b>Overall (50Ω)</b>					T=25 °C, V <sub>DD</sub> =7V, 50Ω System, P <sub>IN</sub> =-8dBm
Frequency Range	5		1500	MHz	3dB Bandwidth
Input VSWR		1.6:1			Appropriate values for the output DC 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 <sub>3</sub>		33.7		dBm	At 10MHz, Delta F1 and F2 = 1MHz
Output IP <sub>3</sub>		37.2		dBm	At 500MHz
Output IP <sub>3</sub>		36.4		dBm	At 1000MHz
Output IP <sub>2</sub>		46.3		dBm	At 100MHz, Delta F1 and F2 = 156MHz
Output IP <sub>2</sub>		44.4		dBm	At 1000MHz
Output P <sub>1dB</sub>		21		dBm	At 10MHz
Output P <sub>1dB</sub>		24		dBm	At 500MHz
Output P <sub>1dB</sub>		23.7		dBm	At 1000MHz
Reverse Isolation		24		dB	At 500MHz
					T=25 °C, V <sub>DD</sub> =9V, P <sub>IN</sub> =-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 <sub>3</sub>		34.8		dBm	At 10MHz, Delta F1 and F2 = 1MHz
Output IP <sub>3</sub>		38.1		dBm	At 500MHz
Output IP <sub>3</sub>		38.7		dBm	At 1000MHz
Output IP <sub>2</sub>		44.1		dBm	At 100MHz, Delta F1 and F2 = 156MHz
Output IP <sub>2</sub>		48.6		dBm	At 1000MHz
Output P <sub>1dB</sub>		22.5		dBm	At 10MHz
Output P <sub>1dB</sub>		25.1		dBm	At 500MHz
Output P <sub>1dB</sub>		25.3		dBm	At 1000MHz
<b>Power Supply</b>					
Supply Voltage (V <sub>DD</sub> )	6	7	9	V	

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
<b>Overall (75Ω)</b>					
Frequency Range	5		1500	MHz	T=25°C, V <sub>DD</sub> =7V, 75Ω System, P <sub>IN</sub> =-8dBm
Input VSWR		1.6:1			3dB Bandwidth
Output VSWR		1.3:1			Appropriate values for the output DC blocking capacitor and bias inductor are required to maintain this VSWR over the intended operating frequency range.
Gain		20		dB	See note for input VSWR.
Gain Flatness		±0.5		dB	At 500MHz
Output IP <sub>3</sub>		36.8		dBm	5MHz to 1000MHz
		36.0		dBm	At 50MHz, Delta F1 and F2 = 1MHz
Output IP <sub>2</sub>		50.1		dBm	At 500MHz
Output IP <sub>1dB</sub>		21		dBm	At 500MHz, Delta F1 and F2 = 55.25MHz
		23		dBm	At 10MHz
		22		dBm	At 500MHz
Operating Current Range	100	104	109	mA	At 1000MHz
<b>110 Channels</b>					10dBmV per channel, flat, at the input of the amplifier; V <sub>CC</sub> =7V, I <sub>CC</sub> =120mA
CTB		-75		dBc	At 55.25MHz
		-77		dBc	At 331.25MHz
CSO+1.25MHz		-75		dBc	At 547.25MHz
		-91		dBc	At 55.25MHz
		-60		dBc	At 331.25MHz
CSO-1.25MHz		-57		dBc	At 547.25MHz
		-55		dBc	At 55.25MHz
		-54		dBc	At 331.25MHz
CNR		-56		dBc	At 547.25MHz
		+66		dB	At 55.25MHz
		+65		dB	At 331.25MHz
		+65		dB	At 547.25MHz
<b>Power Supply</b>					
Supply Voltage (V <sub>DD</sub> )	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.	

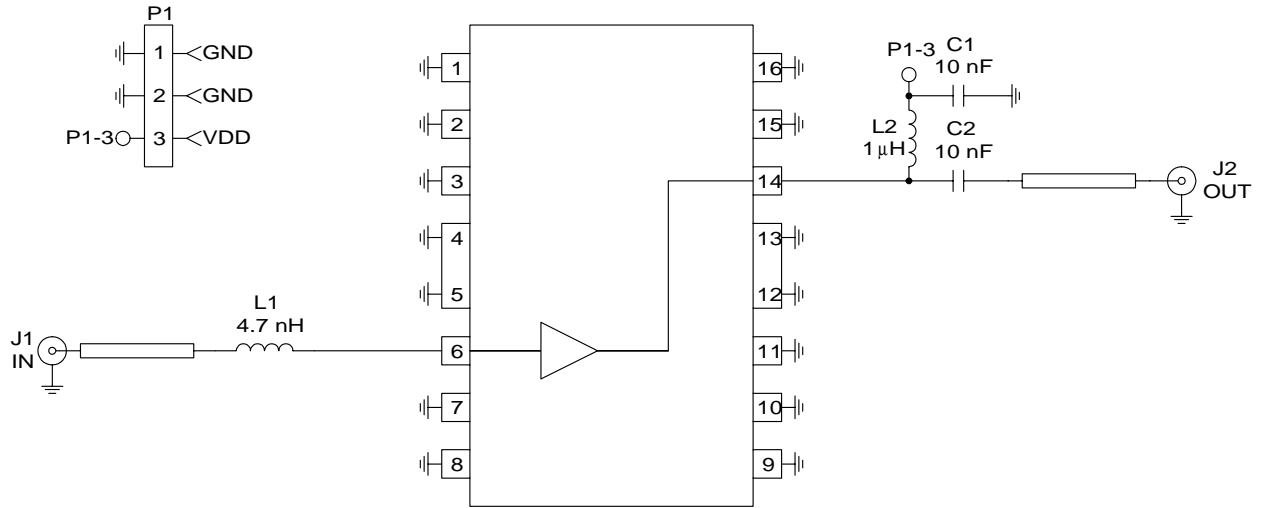
### Application Schematic 869-894 MHz Narrowband Operation



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## Evaluation Board Schematic - 50Ω

(Download [Bill of Materials](http://www.rfmd.com) from [www.rfmd.com](http://www.rfmd.com).)

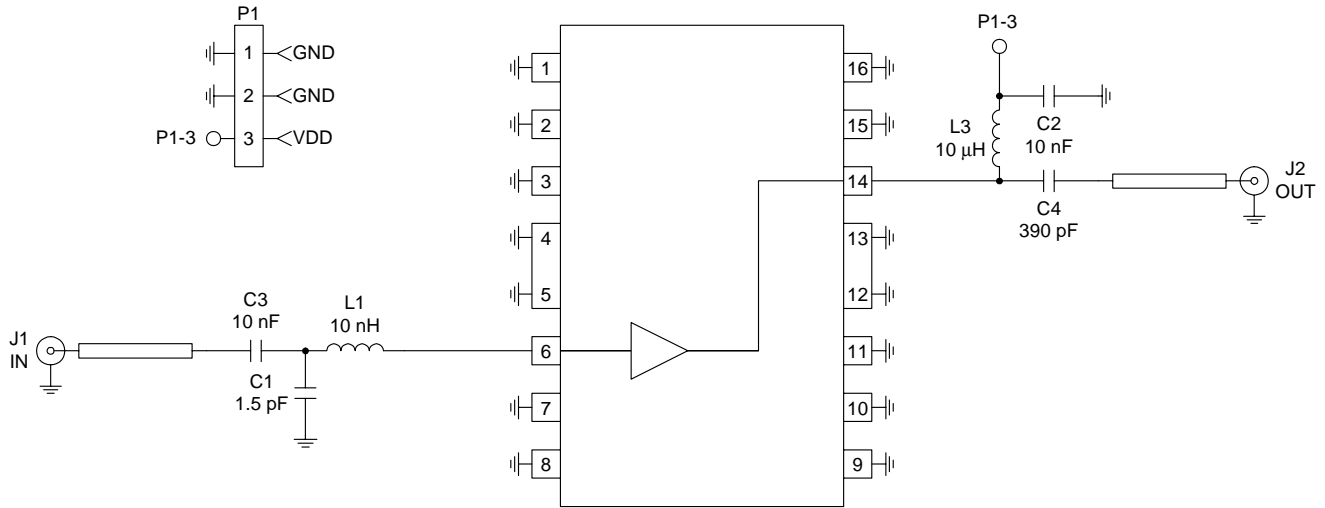


2360400 Rev 1

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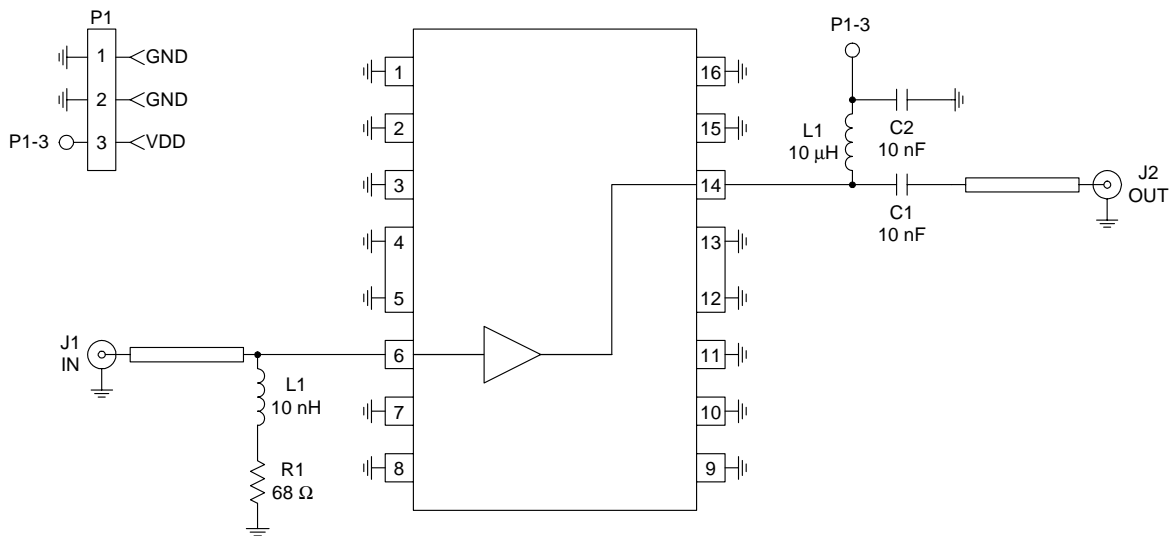
### Evaluation Board Schematic - 75Ω High Frequency (50MHz to 2000MHz)



2360401-

**NOTES:**  
J1 and J2 are 75 Ω F connectors.

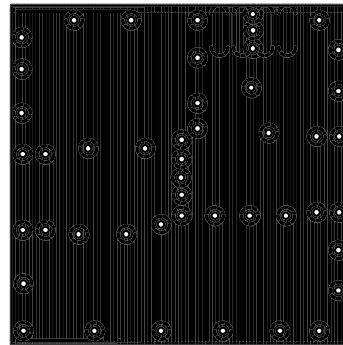
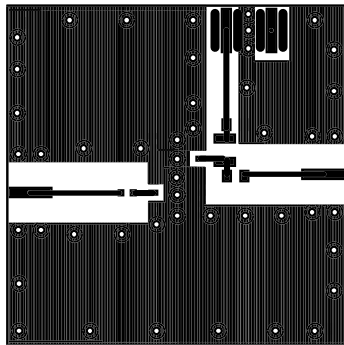
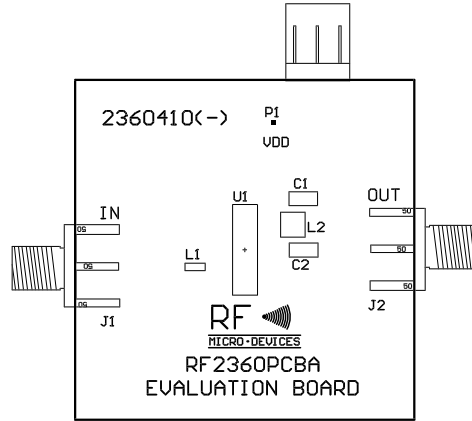
### Evaluation Board Schematic - 75Ω Low Frequency (5MHz to 200MHz)



2360402-

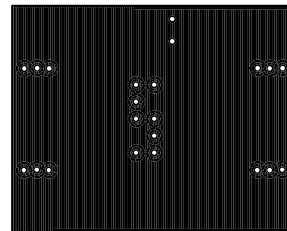
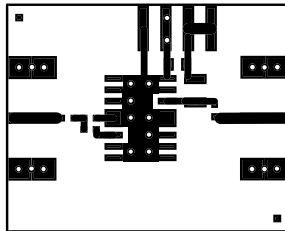
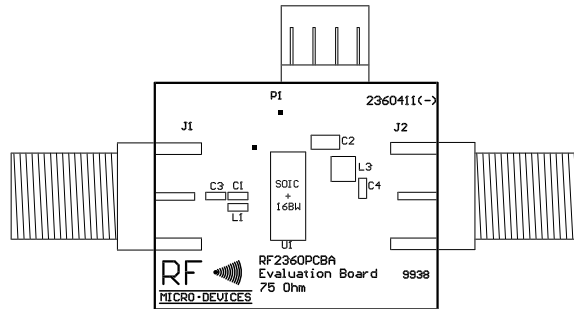
**NOTES:**  
J1 and J2 are 75 Ω F connectors.

Evaluation Board Layout - 50Ω  
Board Size 1.5" x 1.5"  
Board Thickness 0.031", Board Material FR-4

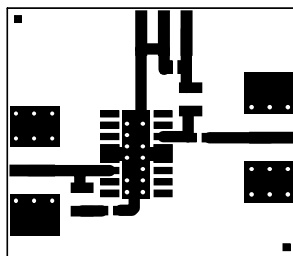
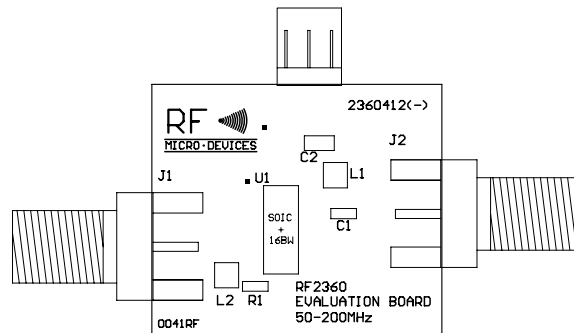




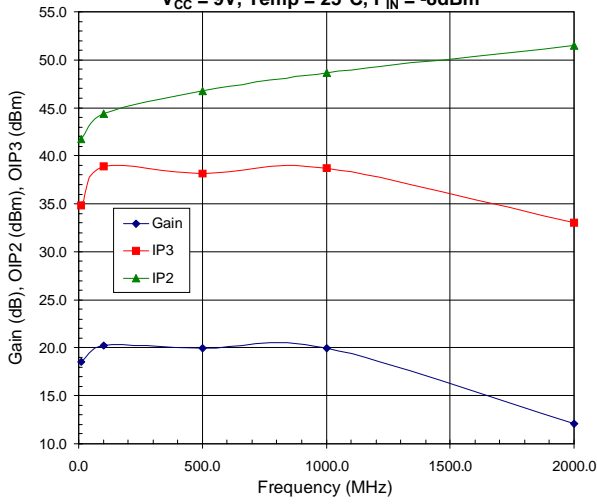
Evaluation Board Layout - 75Ω High Frequency  
(50MHz to 2000MHz)  
Board Size 1.25" x 1.0"  
Board Thickness 0.062", Board Material FR-4



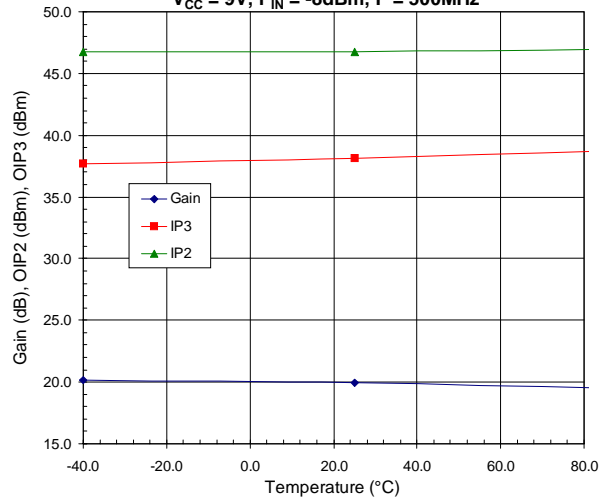
Evaluation Board Layout - 75Ω Low Frequency  
(5MHz to 200MHz)



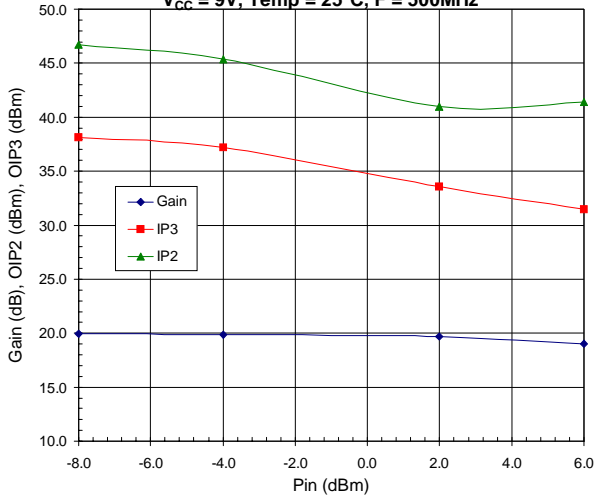
Gain, OIP2 and OIP3 versus Frequency  
 $V_{CC} = 9V$ , Temp = 25°C,  $P_{IN} = -8dBm$



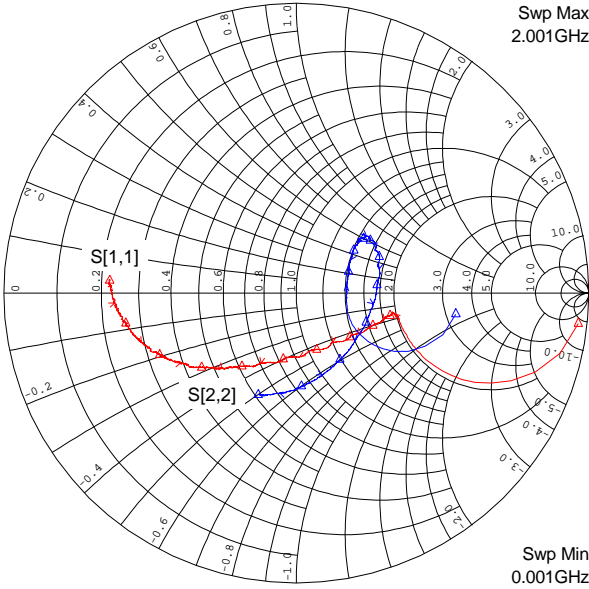
Gain, OIP2 and OIP3 versus Temperature  
 $V_{CC} = 9V$ ,  $P_{IN} = -8dBm$ , F = 500MHz



Gain, OIP2 and OIP3 versus  $P_{IN}$   
 $V_{CC} = 9V$ , Temp = 25°C, F = 500MHz

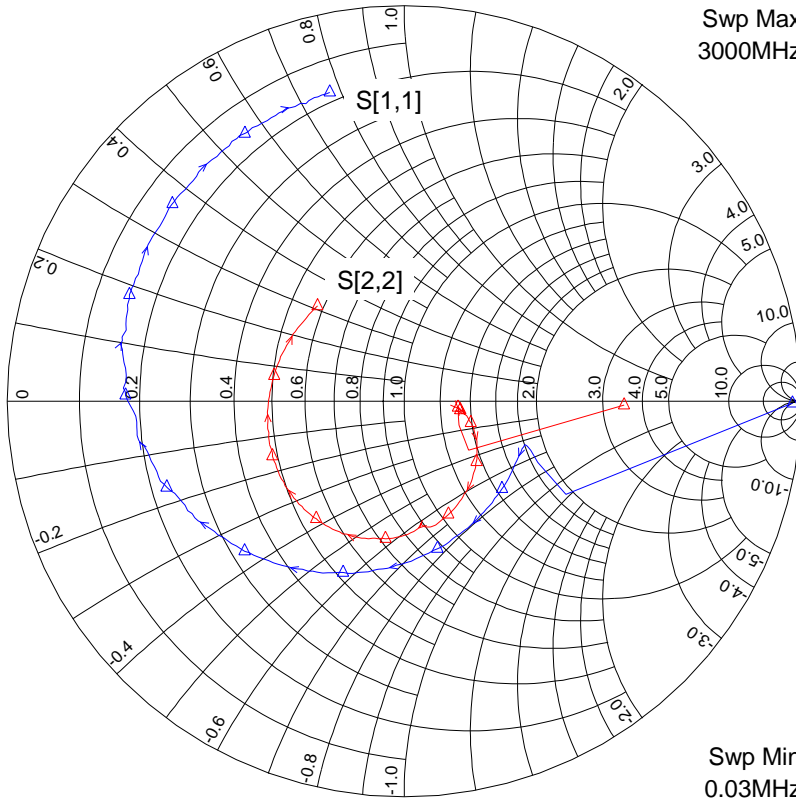


75 Ohm, 8V, 25°C



50 Ohm, 8V - Return Loss

Swp Max  
3000MHz



Swp Min  
0.03MHz

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75 Ohm, 8V - Return Loss

