

RF2312

Absolute Maximum Ratings

| Parameter | Rating | Unit |
|-------------------------------|-------------|------|
| Input RF Power | +18 | 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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| Parameter | Specification | | | Unit | Condition |
|----------------------------------|---------------|------------|------|-------|---|
| | Min. | Typ. | Max. | | |
| Overall (50Ω) | | | | | T=25°C, V _{CC} =9V, Freq=900 MHz, R _C =30Ω, 50Ω System, P _{IN} =-4dBm 3dB Bandwidth |
| Frequency Range | | DC to 2500 | | MHz | |
| Gain | 14.5 | 15.1 | | dB | |
| Noise Figure | | 3.8 | 4.3 | dB | From 50MHz to 300MHz, -30 to +70 °C |
| Input VSWR | | 1.7:1 | 2:1 | dB | From 300MHz to 1000MHz, -30 to +70 °C |
| Output VSWR | | 1.4:1 | 2:1 | | Appropriate values for the DC blocking capacitors and bias inductor are required to maintain this VSWR at the intended operating frequency range. |
| Output IP ₃ | +40 | +42 | | dBm | Appropriate values for the DC blocking capacitors and bias inductor are required to maintain this VSWR at the intended operating frequency range. |
| Output IP ₃ | +33 | +36 | | dBm | At 100MHz |
| Output IP ₃ | +30 | +33 | | dBm | At 500MHz |
| Output P _{1dB} | +21 | +22 | | dBm | At 900MHz |
| Output P _{1dB} | +20 | +21 | | dBm | At 100MHz |
| Output P _{1dB} | +17 | +18.5 | | dBm | At 500MHz |
| Saturated Output Power | | +23 | | dBm | At 900MHz |
| Saturated Output Power | | +22.5 | | dBm | At 100MHz |
| Saturated Output Power | | +20.5 | | dBm | At 500MHz |
| Reverse Isolation | | 20 | | dB | At 900MHz |
| Thermal | | | | | |
| Theta _{JC} | | 114.9 | | °C/W | I _{CC} =100mA, P _{DISS} =0.555W, T _{AMB} =85°C, T _J =149°C No RF Input/Output |
| Mean Time To Failure | | 2170 | | years | T _{AMB} =+85°C |
| Theta _{JC} | | 114.05 | | °C/W | I _{CC} =120mA, P _{DISS} =0.702W, T _{AMB} =85°C, T _J =165°C No RF Input/Output |
| Mean Time To Failure | | 2170 | | years | T _{AMB} =+85°C |
| Power Supply | | | | | |
| Device Voltage (V _D) | | 5.5 | | V | On pin 8, I _{CC} =100mA |
| | | 5.0 | | V | On pin 8, I _{CC} =40mA |
| Operating Current Range | 40 | 100 | 120 | mA | V _{CC} =9.0V, R _C =30Ω |

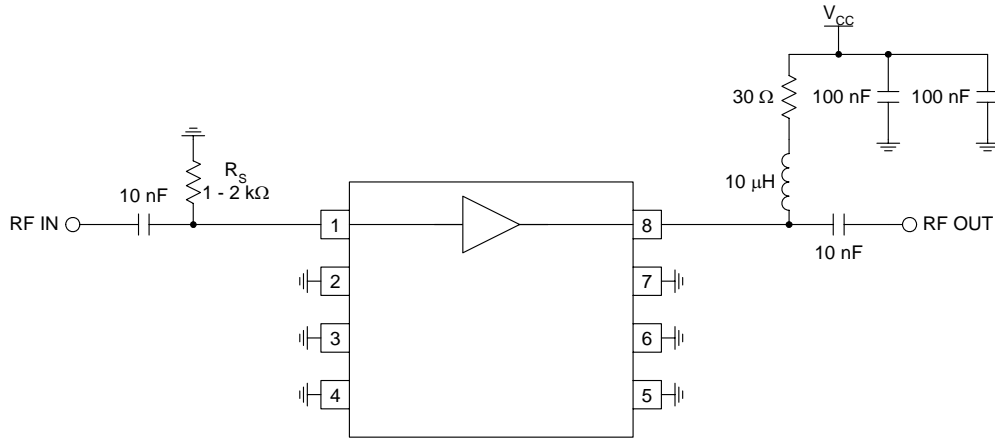
| Parameter | Specification | | | Unit | Condition |
|-------------------------|---------------|------------|--------|------|--|
| | Min. | Typ. | Max. | | |
| Overall (75Ω) | | | | | T=25°C, V _{CC} =9V, Freq=900MHz, R _C =30Ω, 75Ω System |
| Frequency Range | | DC to 2500 | | MHz | 3dB Bandwidth |
| Gain | 14.5 | 16 | | dB | |
| Noise Figure | | 3.8 | 4.3 | dB | From 50MHz to 300MHz, -30°C to +70°C. |
| | | 4.2 | 4.8 | dB | From 300MHz to 1000MHz, -30°C to +70°C. |
| Input VSWR | | 1.3:1 | 2:1 | | From 50MHz to 900MHz, -30°C to +70°C. Appropriate values for the DC blocking capacitors and bias inductor are required to maintain this VSWR at the intended operating frequency range. |
| Output VSWR | | 1.2:1 | 1.75:1 | | From 50MHz to 300MHz, -30°C to +70°C. Appropriate values for the DC blocking capacitors and bias inductor are required to maintain this VSWR at the intended operating frequency range. |
| | | 1.4:1 | 2:1 | | From 300MHz to 500MHz, -30°C to +70°C. |
| | | 1.5:1 | 2:1 | | From 500MHz to 900MHz, -30°C to +70°C. |
| Output IP ₃ | +36 | +38 | | dBm | At 100MHz |
| Output IP ₃ | +33 | +36 | | dBm | At 500MHz |
| Output IP ₃ | +28 | +30 | | dBm | At 900MHz |
| Output P _{1dB} | +21 | +22 | | dBm | At 100MHz |
| Output P _{1dB} | +20 | +21 | | dBm | At 500MHz |
| Output P _{1dB} | +17 | +18.5 | | dBm | At 900MHz |
| Saturated Output Power | | +23 | | dBm | At 100MHz |
| Saturated Output Power | | +22.5 | | dBm | At 500MHz |
| Saturated Output Power | | +20.5 | | dBm | At 900MHz |
| Reverse Isolation | | 20 | | dB | |
| 77 Channels | | | | | 77 Channels to 550MHz at 10dBmV, 33 channels to 760MHz at 0dBmV flat at DUT input |
| CSO | | >86 | | dBc | 61.25MHz |
| | | >86 | | dBc | 83.25MHz |
| | | 76 | | dBc | 193.25MHz |
| | | 72 | | dBc | 313.2625MHz |
| | | 64 | | dBc | 547.25MHz |
| CTB | | >86 | | dBc | 61.25MHz |
| | | >86 | | dBc | 83.25MHz |
| | | 86 | | dBc | 193.25MHz |
| | | 84 | | dBc | 313.2625MHz |
| | | 83 | | dBc | 547.25MHz |
| CNR | 65 | 66 | | dB | |
| 110 Channels | | | | | 110 Channels, 10dBmV/channel at input |
| CSO | | >86 | | dBc | 61.25MHz |
| | | >86 | | dBc | 83.25MHz |
| | | 76 | | dBc | 193.25MHz |
| | | 70 | | dBc | 313.2625MHz |
| | | 64 | | dBc | 547.25MHz |
| CTB | | 84 | | dBc | 61.25MHz |
| | | 86 | | dBc | 83.25MHz |
| | | 85 | | dBc | 193.25MHz |
| | | 81 | | dBc | 313.2625MHz |
| | | 80 | | dBc | 547.25MHz |
| Cross Modulation | | 77 | | dBc | 61.25MHz |
| | | 74 | | dBc | 445.25MHz |
| CNR | 65 | 66 | | dB | |

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| Parameter | Specification | | | Unit | Condition |
|--------------------------------|---------------|-----------|------|------|--|
| | Min. | Typ. | Max. | | |
| Overall (75Ω Push-Pull) | | | | | T=25°C, V _{CC} =9V or 24V, 75Ω System, RF _{IN} =-10dBm |
| Frequency Range | | DC to 150 | | MHz | |
| Gain | | 15 | | dB | |
| Noise Figure | | 5.0 | | dB | From 5MHz to 150MHz, -30°C to +70°C. |
| Input VSWR | | 1.1:1 | | | |
| Output VSWR | | 1.2:1 | | | |
| Output IP ₂ | | +71 | | dBm | At 10MHz |
| | | +72 | | dBm | At 30MHz |
| | | +74 | | dBm | At 50MHz |
| Output IP ₃ | | +40 | | dBm | At 10MHz |
| | | +40 | | dBm | At 30MHz |
| | | +40 | | dBm | At 50MHz |
| Second Harmonic | | -73 | | dBc | At 10MHz |
| | | -65 | | dBc | At 30MHz |
| | | -65 | | dBc | At 50MHz |

| Pin | Function | Description | Interface Schematic |
|-----|----------|---|---------------------|
| 1 | RF IN | RF input pin. This pin is NOT internally DC-blocked. A DC-blocking capacitor, suitable for the frequency of operation, should be used in all applications. The device has internal feedback, and not using a DC-blocking capacitor will disable the temperature compensation. The bias of the device can be controlled by this pin. Adding an optional 1 k Ω resistor to ground on this pin reduces the bias level, which may be compensated for by a higher supply voltage to maintain the appropriate bias level. The net effect of this is an increased output power capability, as well as higher linearity for signals with high crest factors. DC-coupling of the input is not allowed, because this will override the internal feedback loop and cause temperature instability. | |
| 2 | GND | Ground connection. For best performance, keep traces physically short and connect immediately to ground plane. Each ground pin should have a via to the ground plane. | |
| 3 | GND | Same as pin 2. | |
| 4 | GND | Same as pin 2. | |
| 5 | GND | Same as pin 2. | |
| 6 | GND | Same as pin 2. | |
| 7 | GND | Same as pin 2. | |
| 8 | 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, an RF choke in series with a resistor is needed. The value for the resistor R_C is 30 Ω (0.5W) for $V_{CC}=9V$ and 21 Ω for $V_{CC}=8V$. The DC voltage on this pin is typically 6.0V with a current of 100mA. In lower power applications the value of R_C can be increased to lower the current and V_D on this pin. | |

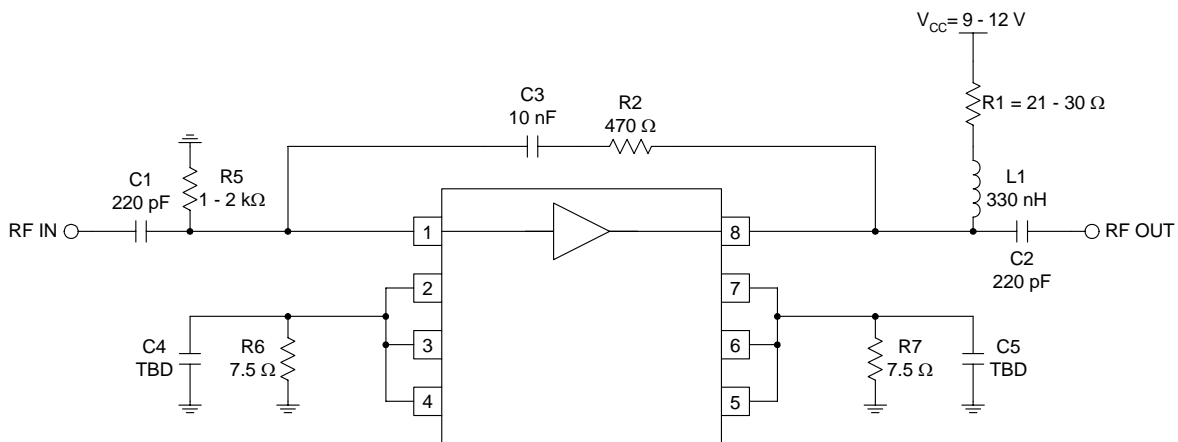
Application Schematic 5MHz to 50MHz Reverse Path



NOTE 1:

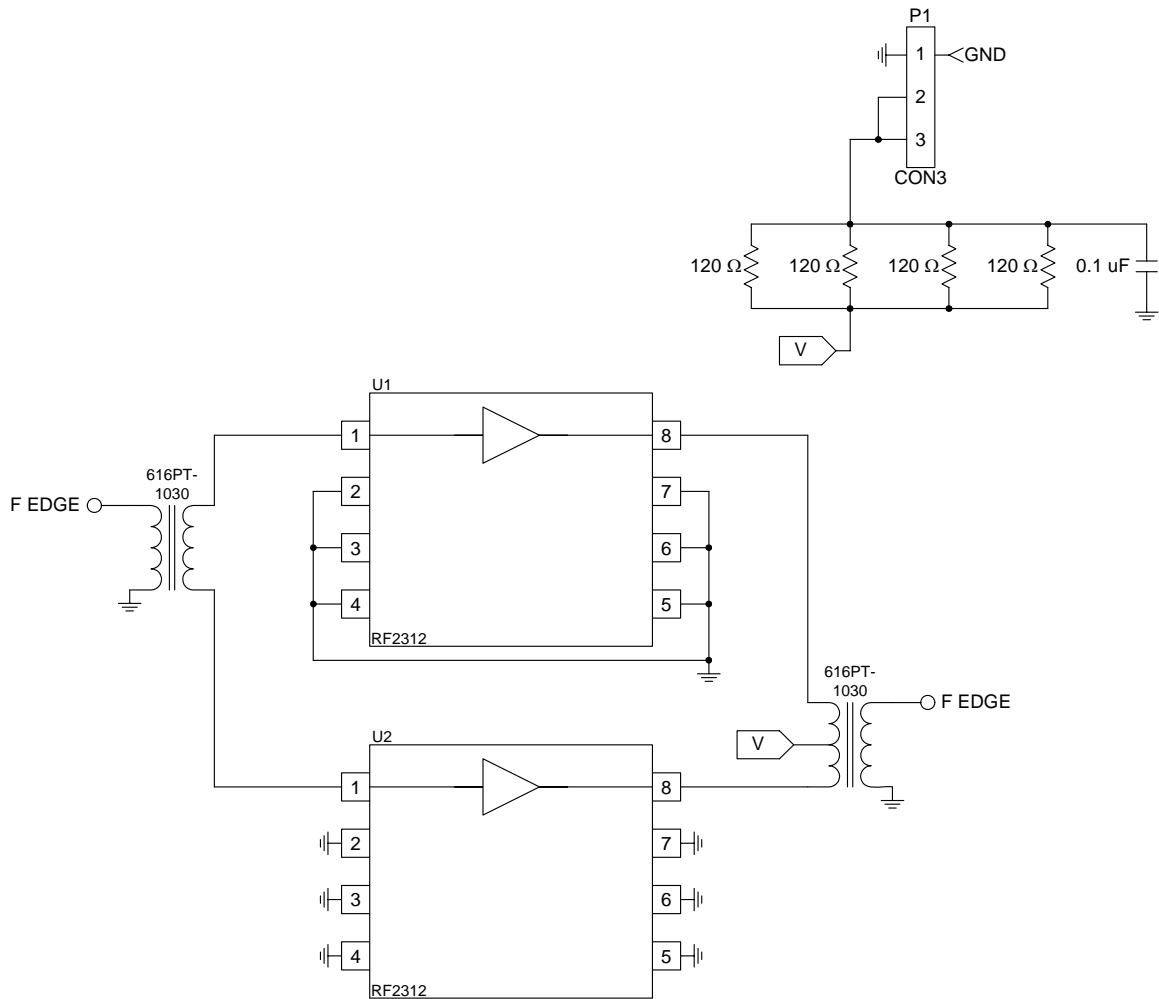
Optional resistor R_S can be used to maintain the correct bias level at higher supply voltages. This is used to increase output capability or linearity for signals with high crest factors.

Application Schematic 10dB Gain

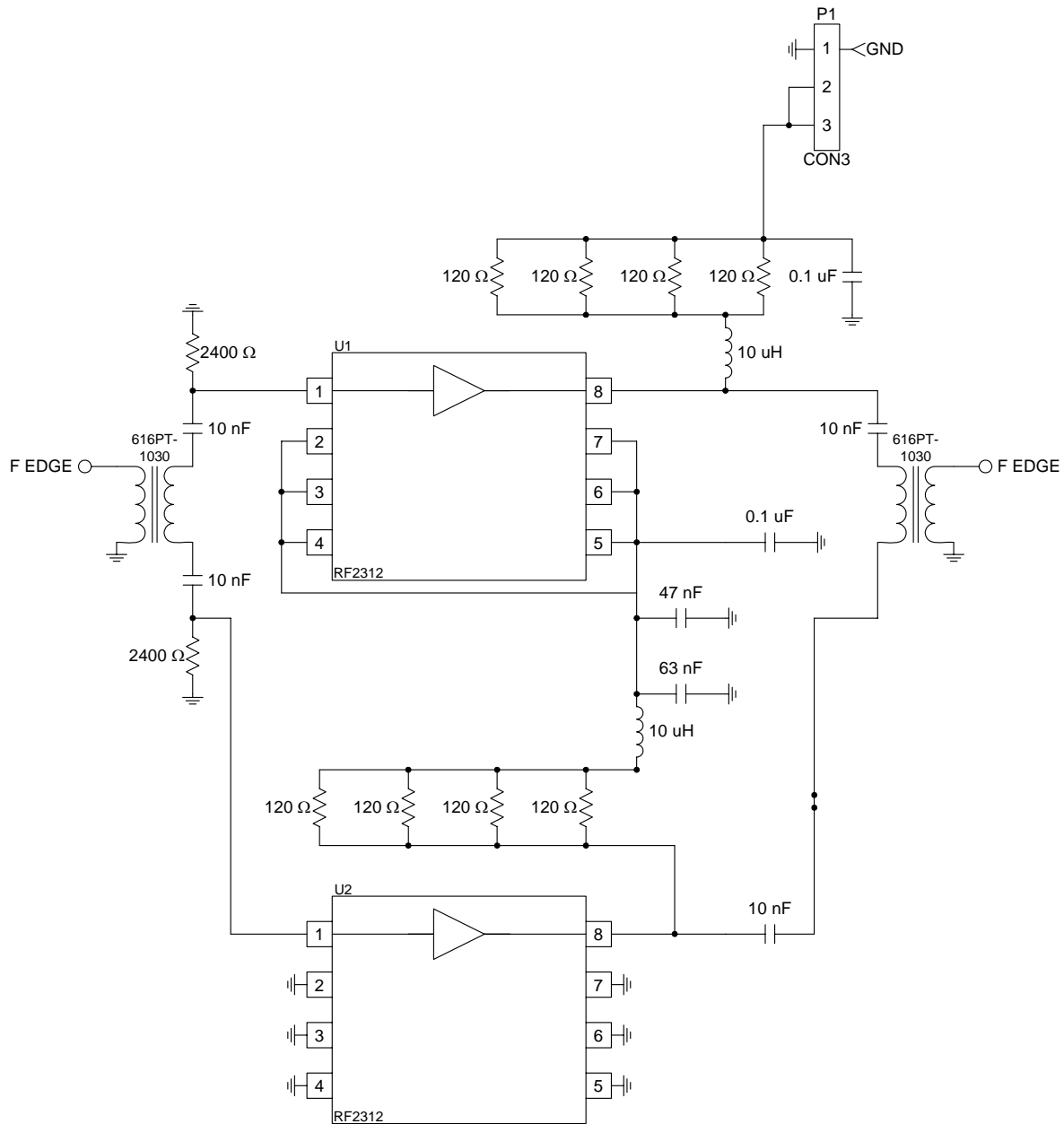


R_5 is used to maintain the correct bias level at higher supply voltages and is also required in this configuration. The RC network of R_2 and C_3 should be kept physically as short as possible. R_2 can be adjusted as required to improve the impedance matching. R_6 and R_7 reduce the typical gain by increasing the emitter resistance. L_1 should be at least 200Ω reactive at the lowest operating frequency. C_1 and C_2 should be less than 10Ω at the lowest operating frequency. C_4 and C_5 improve gain flatness.

Application Schematic Push-Pull Standard Voltage

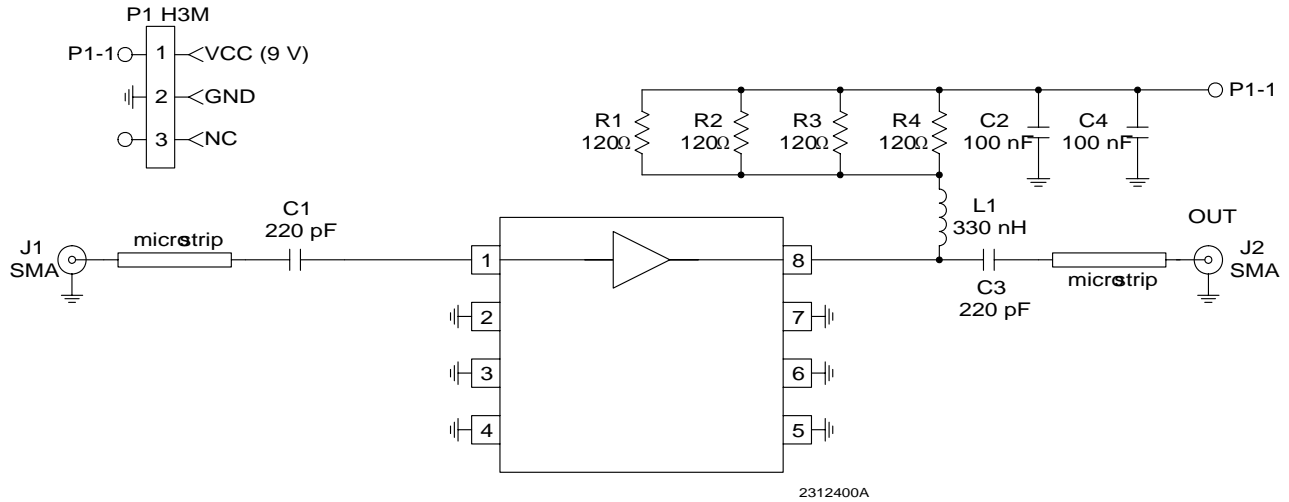


Application Schematic Push-Pull 24V

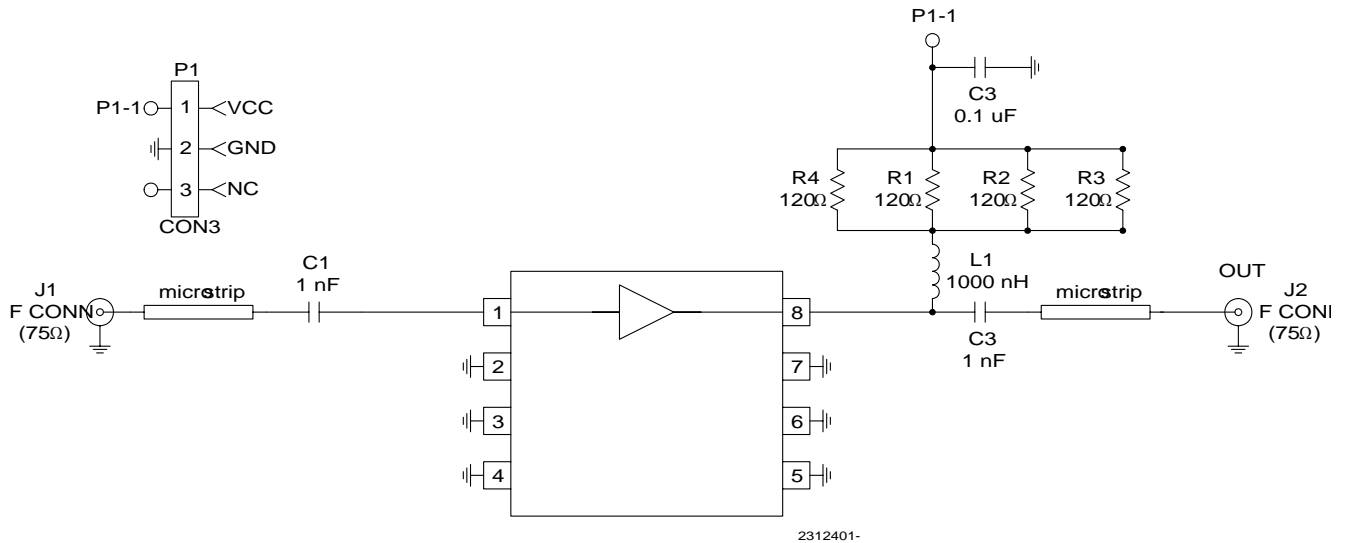


Evaluation Board Schematic - 50Ω

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

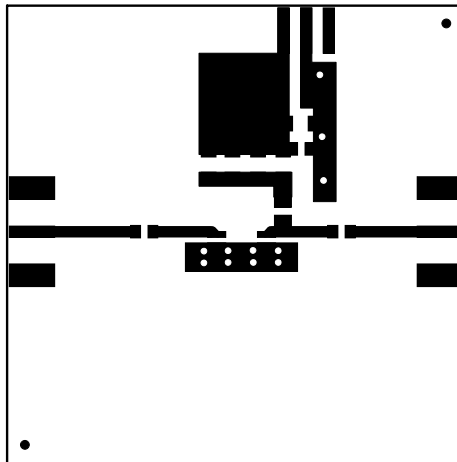
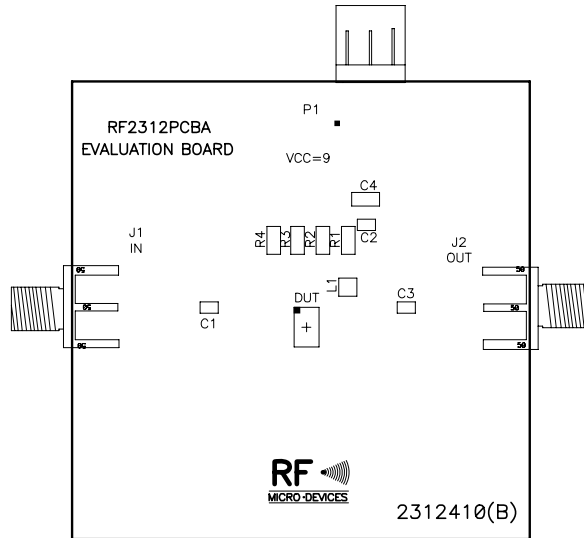


Evaluation Board Schematic - 75Ω

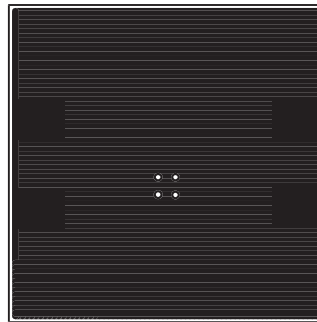
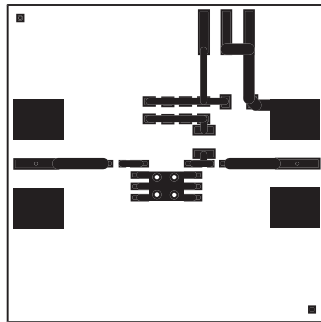
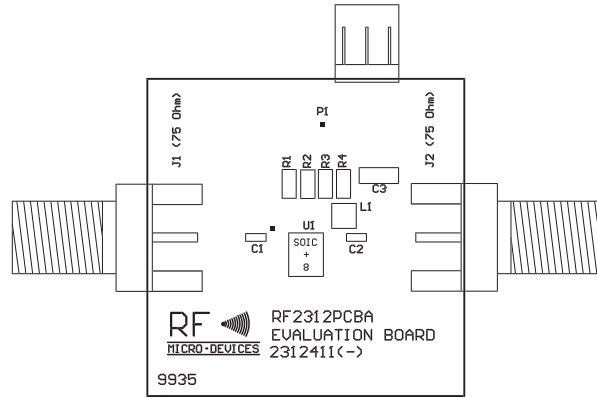


NOTE: For 5V applications, R1 to R4 may be removed (shorted). This will result in degraded distortion performance.

Evaluation Board Layout - 50Ω 2.02" x 2.02" Board Thickness 0.031", Board Material FR-4

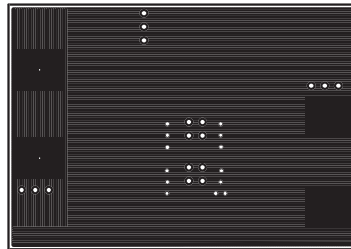
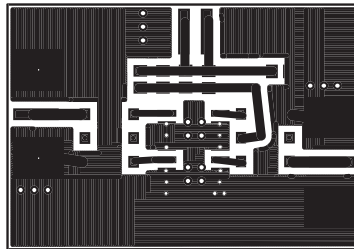
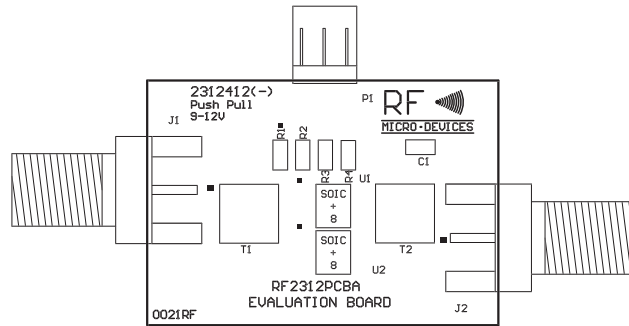


Evaluation Board Layout - 75Ω
Standard Voltage
1.40" x 1.40"
Board Thickness 0.062", Board Material FR-4

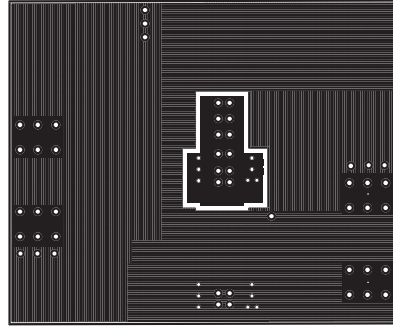
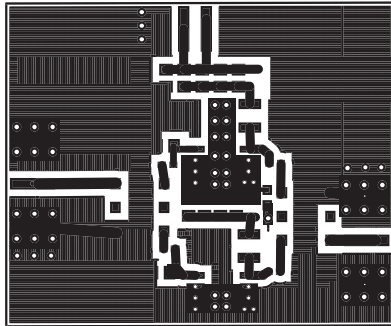
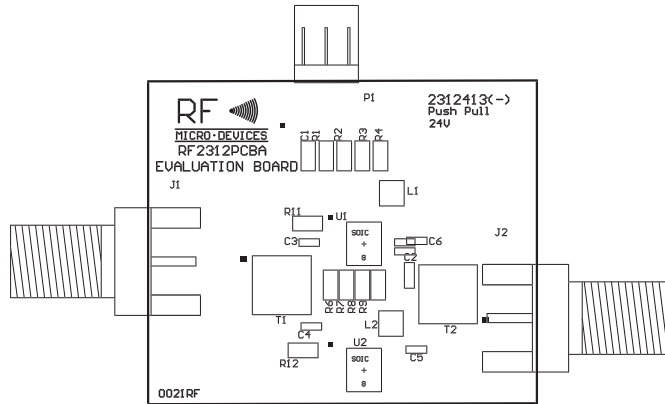


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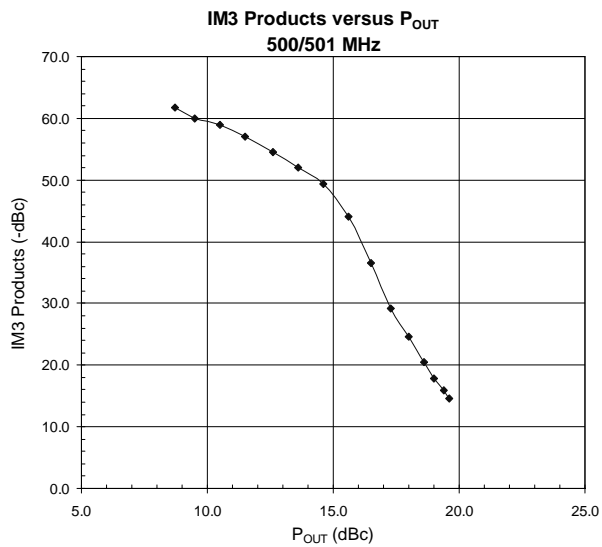
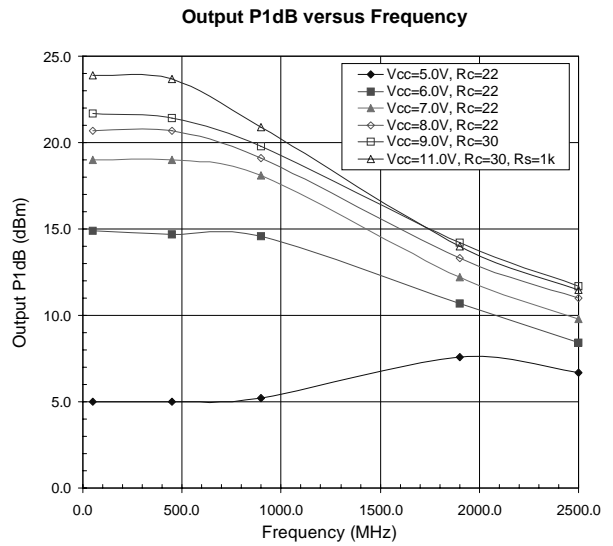
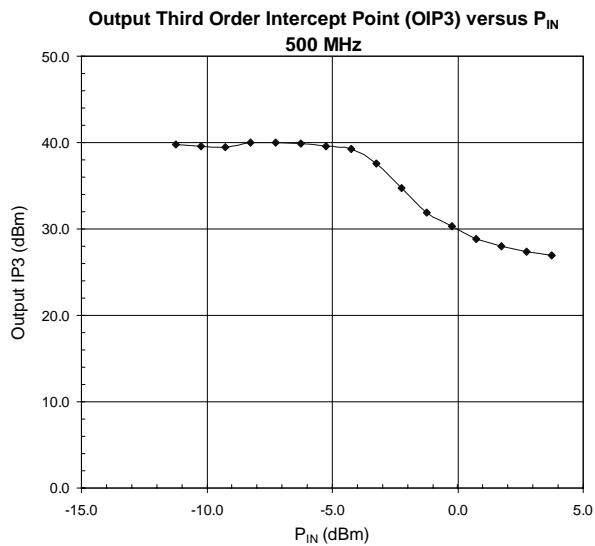
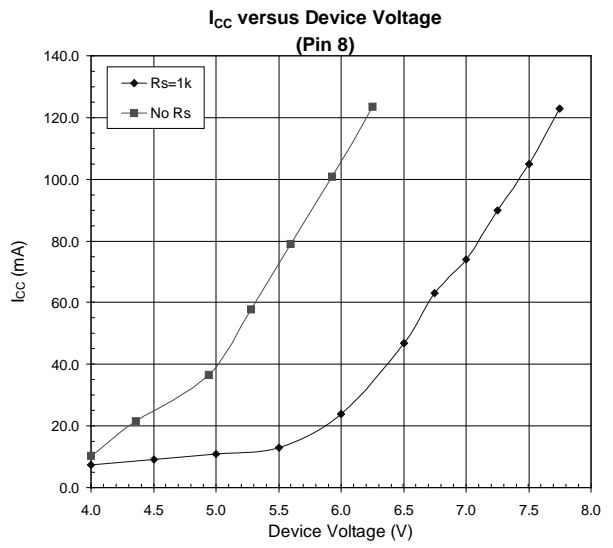
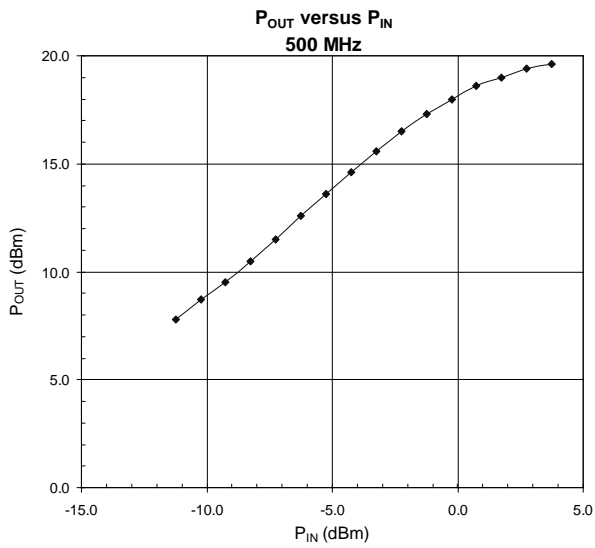
Evaluation Board Layout - 75Ω
Push-Pull, Standard Voltage
1.70" x 1.50"
Board Thickness 0.062", Board Material FR-4

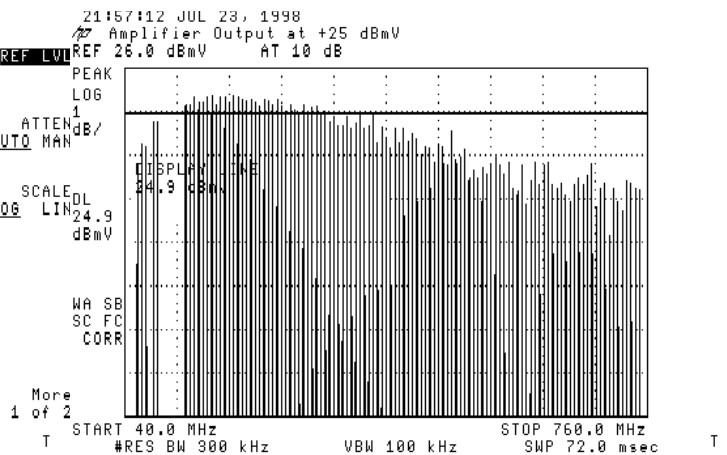
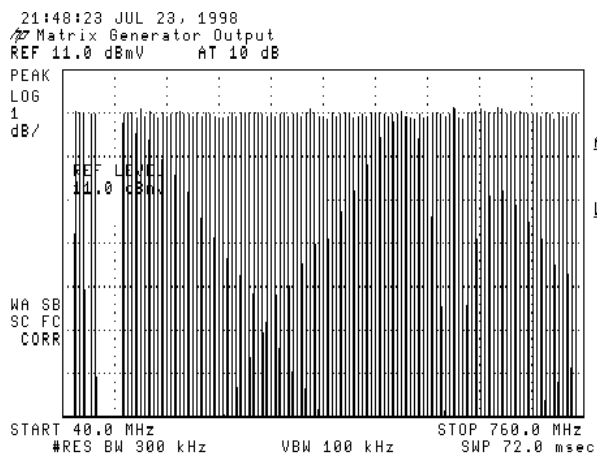
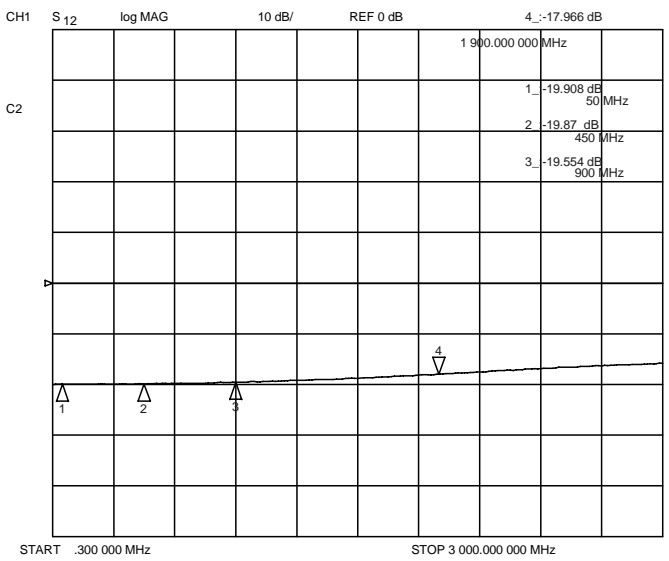
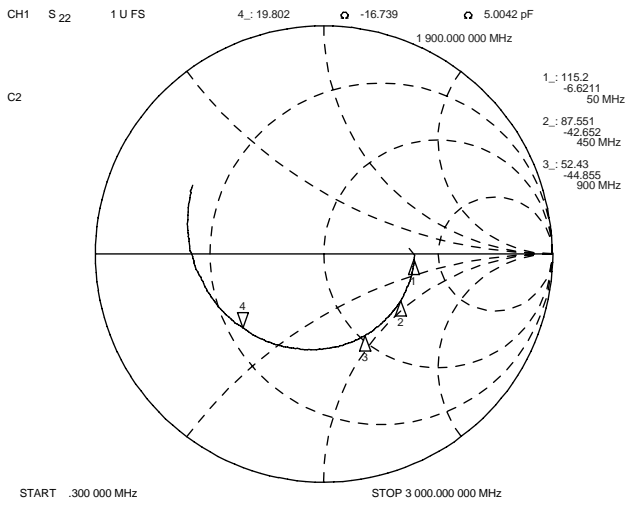
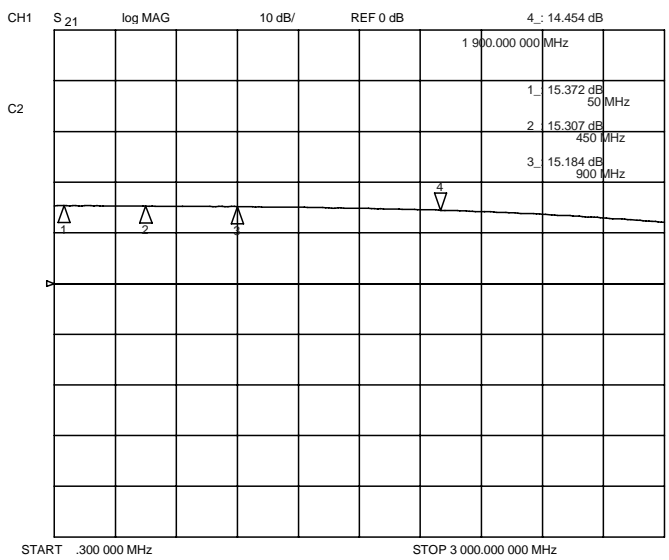
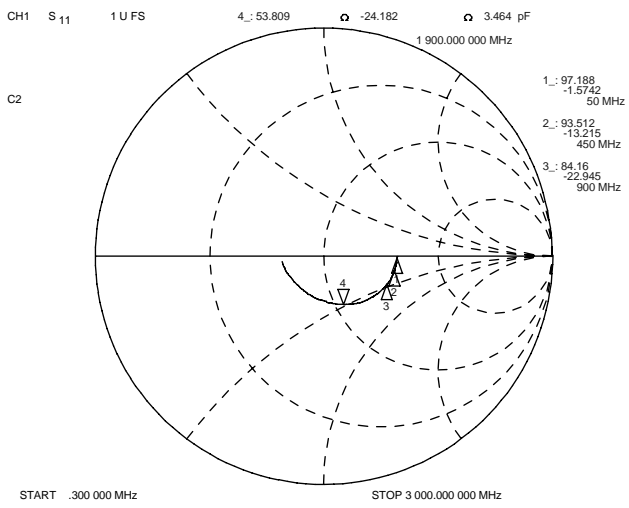


Evaluation Board Layout - 75Ω
Push-Pull, 24V
1.70" x 1.50"
Board Thickness 0.062", Board Material FR-4



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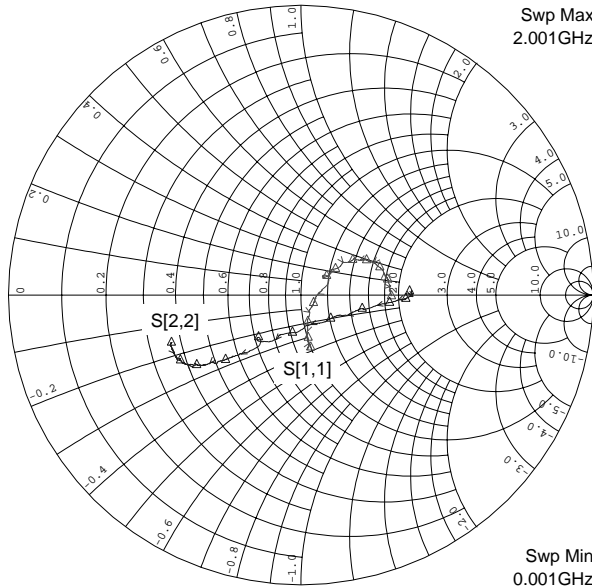




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75 Ohms, ICC = 100 mA, Temp = 25°C

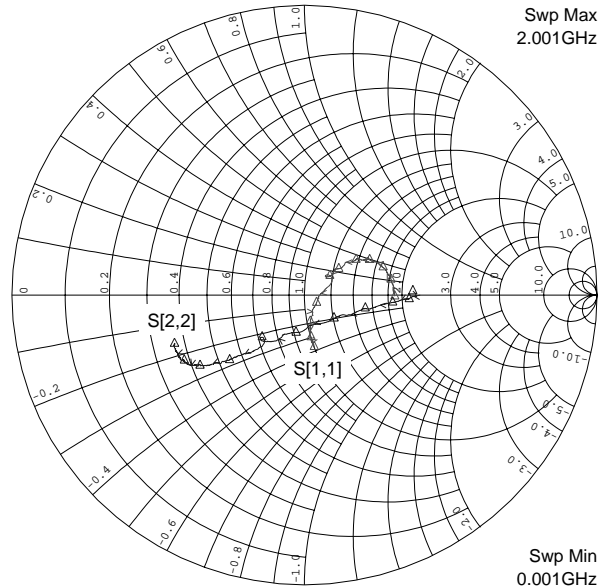
Swp Max
2.001GHz



Swp Min
0.001GHz

75 Ohms, ICC = 110 mA, Temp = 25°C

Swp Max
2.001GHz



Swp Min
0.001GHz