

RoHS Compliant & Pb-Free Product  
Package Style: Standard Batwing

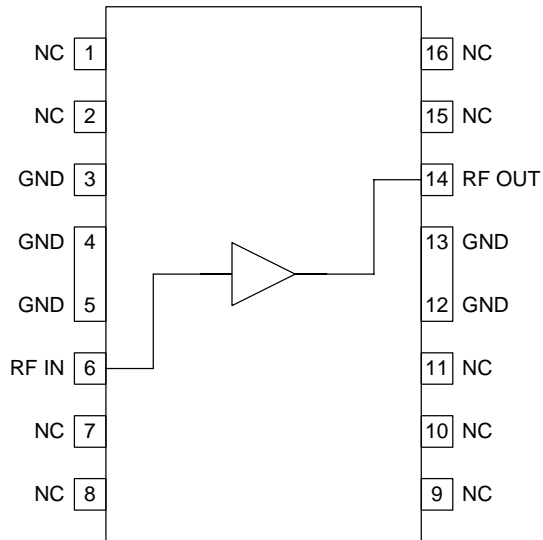


**Features**

- 5 MHz to 2500MHz Operation
- Internally Matched Input and Output
- 16dB Small Signal Gain
- 1.6dB Noise Figure
- +22dBm Output Power
- Single 6V to 9V Positive Power Supply

**Applications**

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



Functional Block Diagram

**Product Description**

The RF2320 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 2500MHz. The device is self-contained with 75Ω input and output impedances providing 2:1 VSWR matching. For higher input and output return losses, see the evaluation schematic.

**Ordering Information**

RF2320                      Linear General Purpose Amplifier  
RF2320PCBA-41X       Fully Assembled Evaluation Board

**Optimum Technology Matching® Applied**

- |   |                                      |                                     |                                   |
|---|--------------------------------------|-------------------------------------|-----------------------------------|
| <input type="checkbox"/> GaAs HBT               | <input type="checkbox"/> SiGe BiCMOS | <input type="checkbox"/> GaAs pHEMT | <input type="checkbox"/> GaN HEMT |
| <input checked="" 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
Device Current	175	mA
Device Voltage	9	V
Input RF Power	+10	dBm
Output Load VSWR	20:1	
Ambient Operating Temperature	-40 to +85	°C
Storage Temperature	-40 to +150	°C



**Caution!** ESD sensitive device.

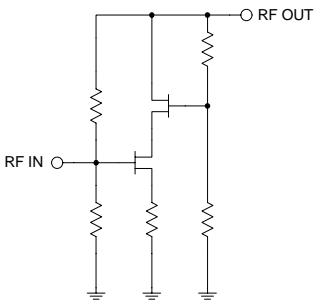
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RoHS status based on EU Directive 2002/95/EC (at time of this document revision).

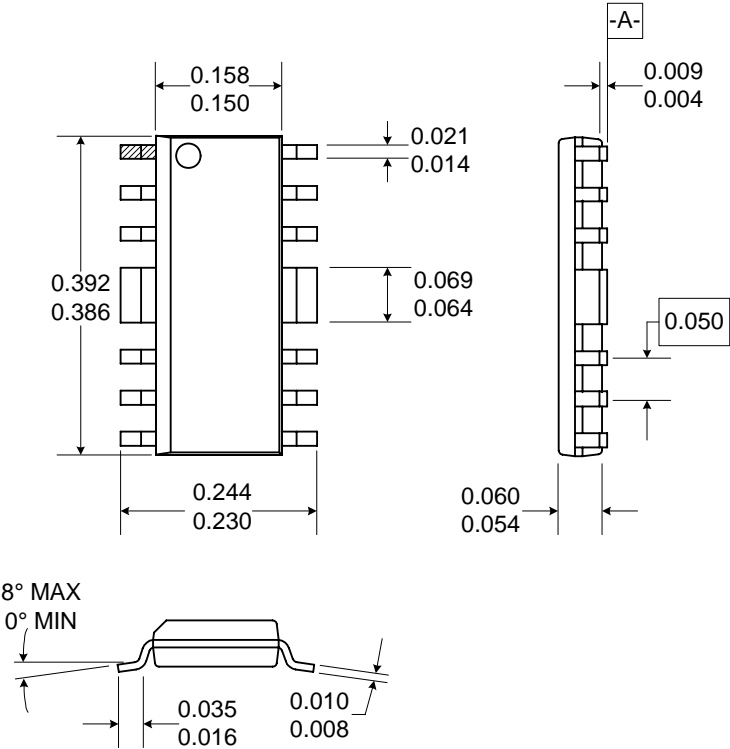
Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
<b>Overall</b>					T = 25 °C, P <sub>IN</sub> = -8dBm, Freq = 1000MHz unless otherwise specified
Frequency Range		5 to 2500		MHz	
Input VSWR		1.7:1	2:1		
Output VSWR		1.3:1	1.7:1		
Reverse Isolation	20	22		dB	
Supply Voltage (V <sub>DD</sub> )	6	7	9	V	
<b>50Ω Board</b>					
<b>V<sub>DD</sub> = 6V</b>					
Gain	14.5	15.6	17.0	dB	At 100MHz
	15.0	17.0	19.0	dB	At 2000MHz
Noise Figure		1.8	2.0	dB	
Output IP <sub>3</sub>	30	33		dBm	At 100MHz
	29	32		dBm	At 1000MHz
Output IP <sub>2</sub>	40	43		dBm	At 1000MHz
Output P <sub>1dB</sub>	20	21.5		dBm	At 100MHz
	20	22		dBm	At 1000MHz
Current	68	78	88	mA	
<b>V<sub>DD</sub> = 7V</b>					
Gain	14	16	18	dB	At 100MHz
	15	17	19	dB	At 1000MHz
Noise Figure		1.8	2.0	dB	
Output IP <sub>3</sub>	32	34		dBm	At 100MHz
	31	33		dBm	At 1000MHz
Output IP <sub>2</sub>	41	43		dBm	At 1000MHz
Output P <sub>1dB</sub>	20	22		dBm	At 100MHz
	21	23		dBm	At 1000MHz
Current	70	80	90	dB	
Gain Flatness		±0.5	±0.9	dB	40MHz, 1000MHz and 1500MHz relative to 500MHz

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
<b>V<sub>DD</sub> = 9V</b>					
Gain	14	16	18	dB	At 100MHz
	15	17	19	dB	At 1000MHz
Noise Figure		1.8	2.0	dB	
Output IP <sub>3</sub>	30	35		dBm	At 100MHz
	32	34		dBm	At 1000MHz
Output IP <sub>2</sub>	41	43		dBm	At 1000MHz
Output P <sub>1dB</sub>	21	23		dBm	At 100MHz
	23	25		dBm	At 1000MHz
Current	75	85	95	mA	
<b>75Ω Board</b>					
<b>V<sub>DD</sub> = 6V</b>					
Gain	13.8	15.3	16.8	dB	At 100MHz
	14.5	16	17.5	dB	At 2000MHz
Noise Figure		2.0	2.5	dB	
Output IP <sub>3</sub>	32	34		dBm	At 100MHz
	27.5	29.5		dBm	At 1000MHz
Output IP <sub>2</sub>	38	40		dBm	At 1000MHz
Output P <sub>1dB</sub>	19	20.5		dBm	At 100MHz
	18.5	20		dBm	At 1000MHz
Current	65	75	85	mA	
<b>V<sub>DD</sub> = 7V</b>					
Gain	14	15.5	17	dB	At 100MHz
	14.5	16	17.5	dB	At 1000MHz
Noise Figure		2.0	2.5	dB	
Output IP <sub>3</sub>	32	36		dBm	At 100MHz
	28	30		dBm	At 1000MHz
Output IP <sub>2</sub>	38	41		dBm	At 1000MHz
Output P <sub>1dB</sub>	20	21.5		dBm	At 100MHz
	19.5	21		dBm	At 1000MHz
Current	67	77	87	dB	
<b>V<sub>DD</sub> = 9V</b>					
Gain	14	15.5	17.0	dB	At 100MHz
	14.5	16	17.5	dB	At 1000MHz
Noise Figure		2.0	2.5	dB	
Output IP <sub>3</sub>	34	36		dBm	At 100MHz
	29.5	31.5		dBm	At 1000MHz
Output IP <sub>2</sub>	39	41		dBm	At 1000MHz
Output P <sub>1dB</sub>	21.5	23		dBm	At 100MHz
	19.5	21		dBm	At 1000MHz
Current	70	80	90	mA	

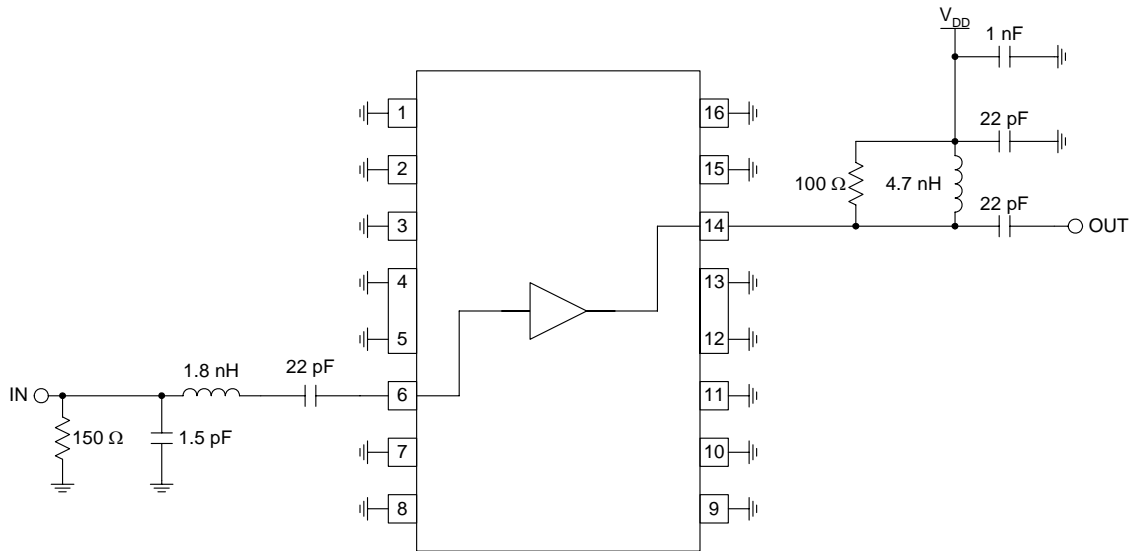
Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
<b>110 Channels</b>					10 dBmV per channel, flat, at the input of the amplifier; $V_{CC} = 7\text{ V}$ , $I_{CC} = 75\text{ mA}$
XMOD		-71		dBc	At 55.25 MHz
		-72		dBc	At 331.25 MHz
		-72		dBc	At 547.25 MHz
CTB		-79		dBc	At 55.25 MHz
		-78		dBc	At 331.25 MHz
		-78		dBc	At 547.25 MHz
CSO+1.25 MHz		-91		dBc	At 55.25 MHz
		-58		dBc	At 331.25 MHz
		-56		dBc	At 547.25 MHz
CSO-1.25 MHz		-51		dBc	At 55.25 MHz
		-53		dBc	At 331.25 MHz
		-58		dBc	At 547.25 MHz
CNR		+65		dB	At 55.25 MHz
		+64		dB	At 331.25 MHz
		+64		dB	At 547.25 MHz

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 not internally DC blocked. A DC blocking capacitor suitable for the frequency of operation is required if DC is present from the previous stage. The gate voltage is nominally 0V but can be raised externally to increase the bias level. This will increase the current drain but improve linearity.	
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.	

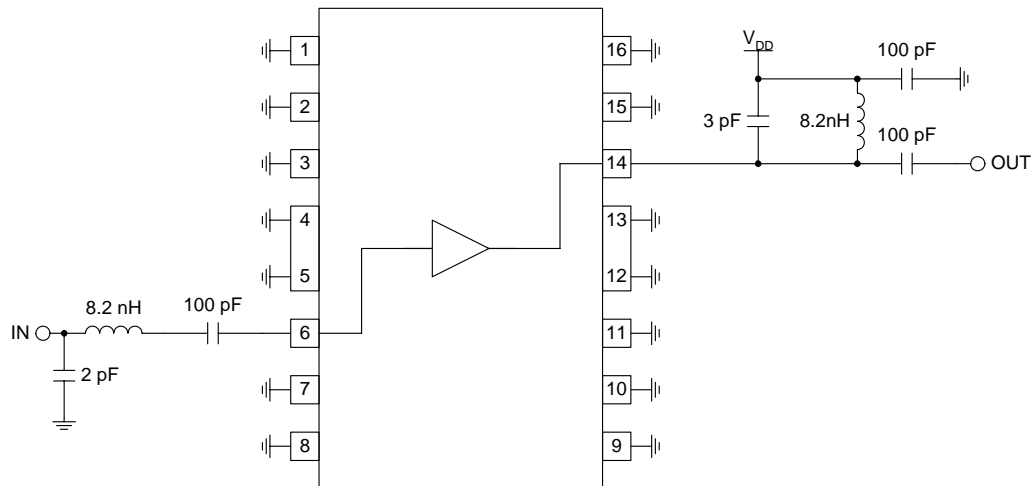
## Package Drawing



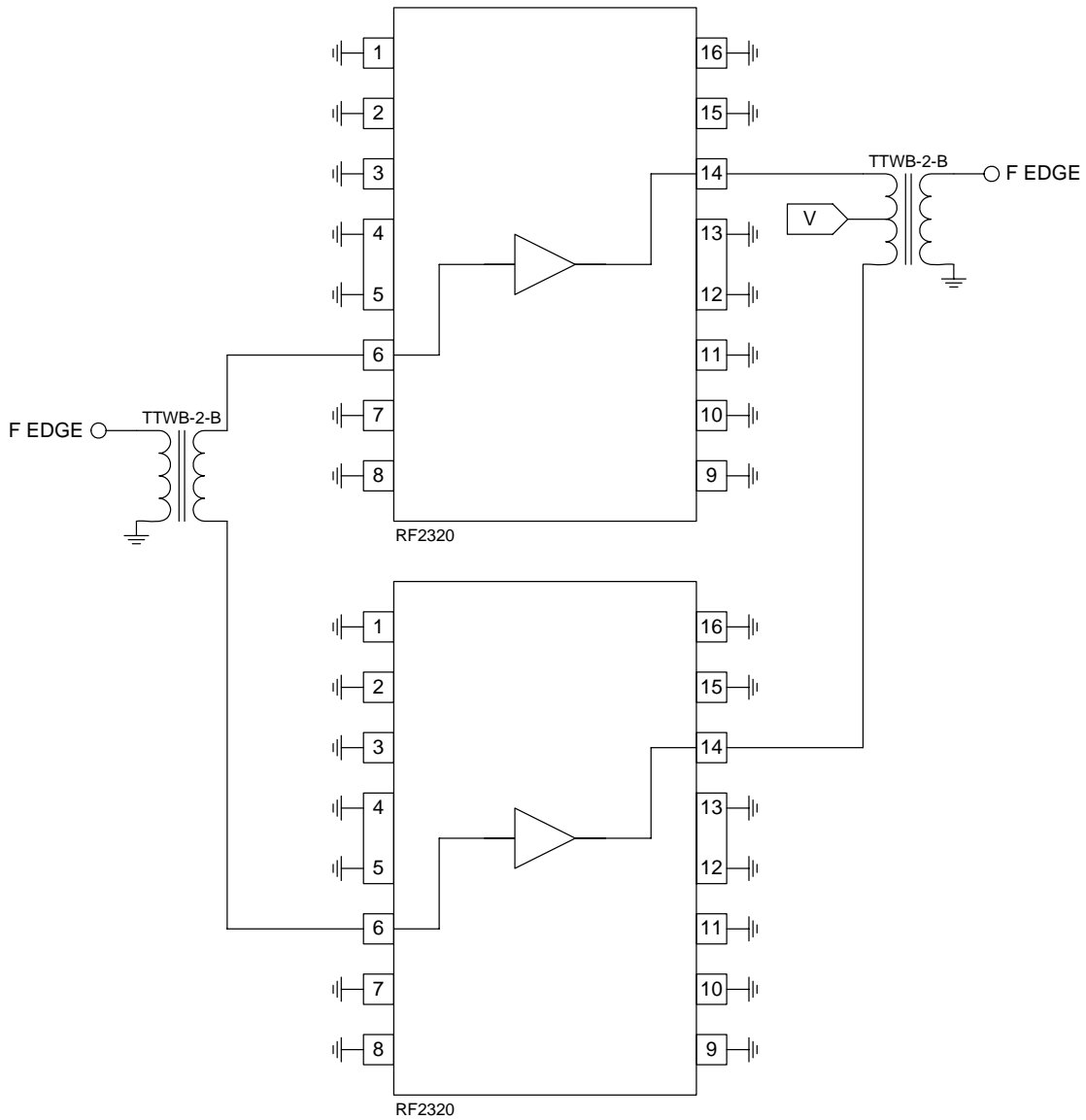
**Application Schematic  
1930-1990 MHz Narrowband Operation**



**Application Schematic  
869-894 MHz Narrowband Operation**

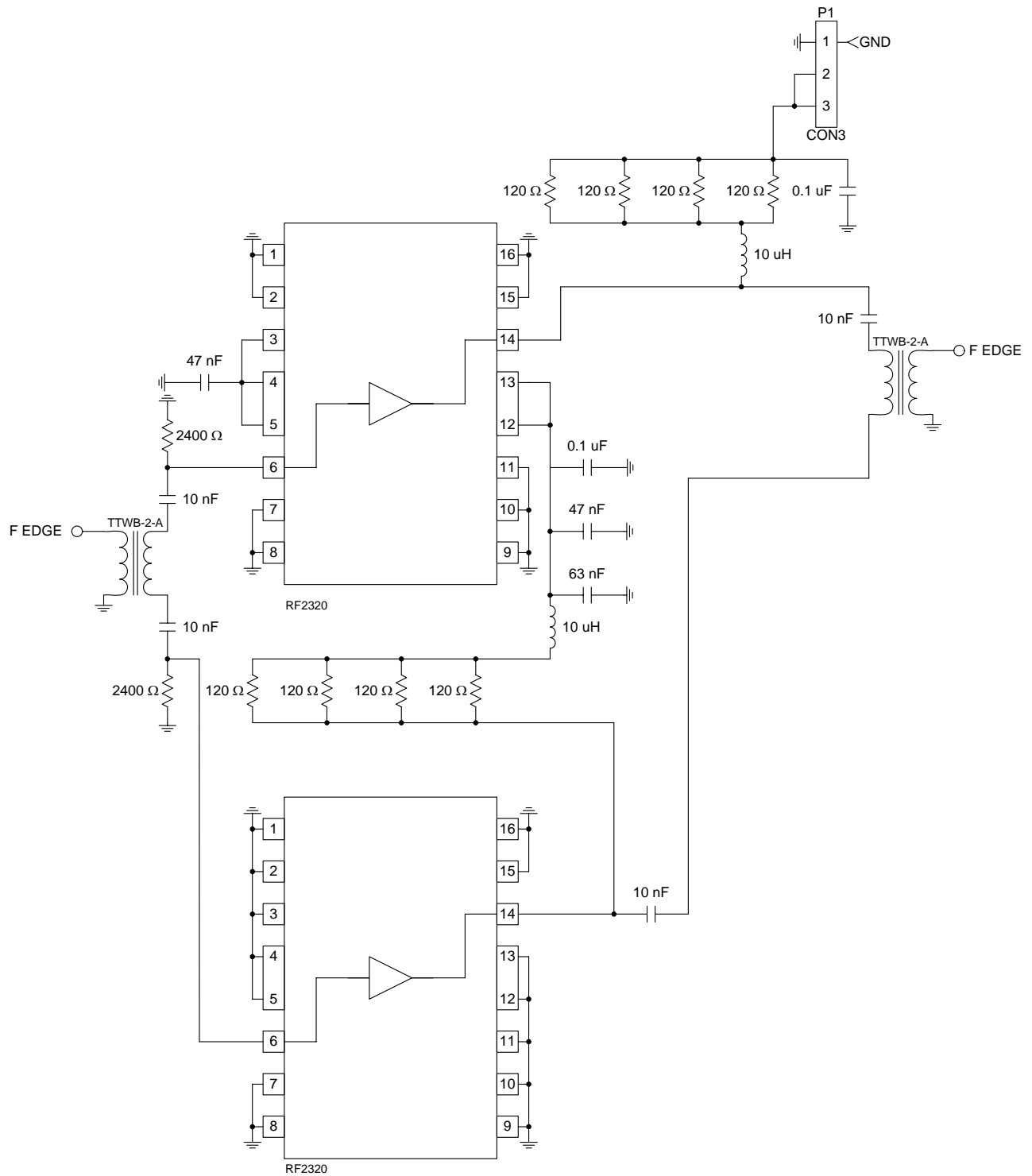


## Application Schematic Push-Pull Standard Voltage

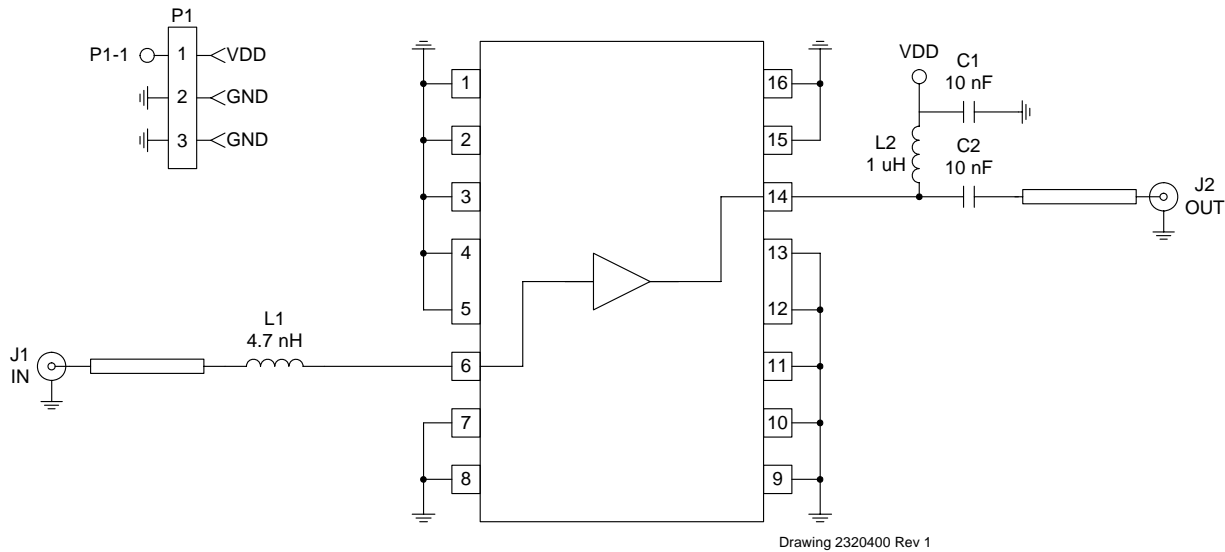




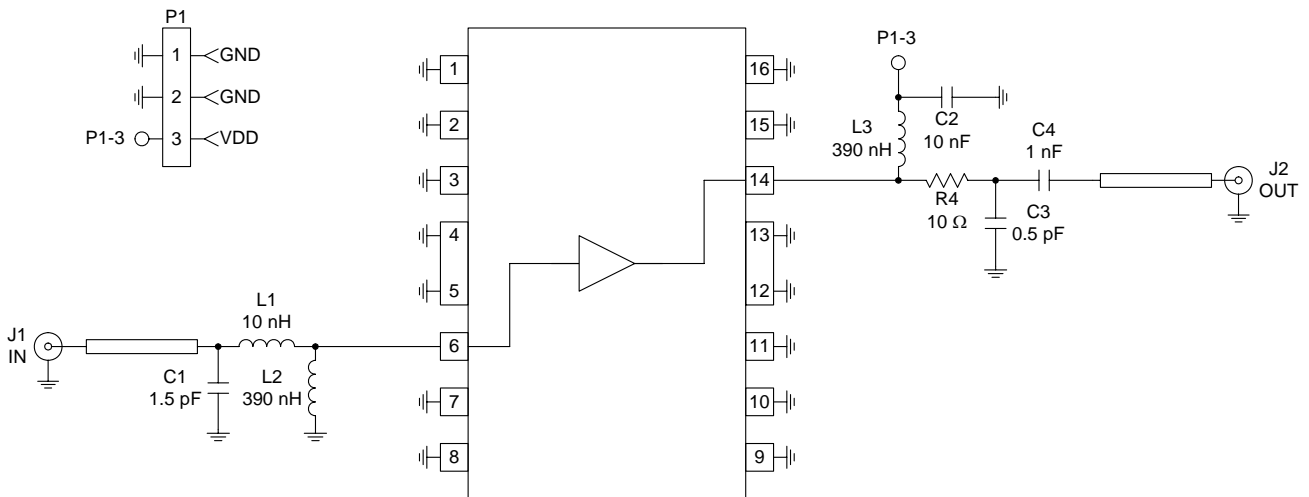
**Application Schematic  
Push-Pull 24V**



## Evaluation Board Schematic - 50Ω



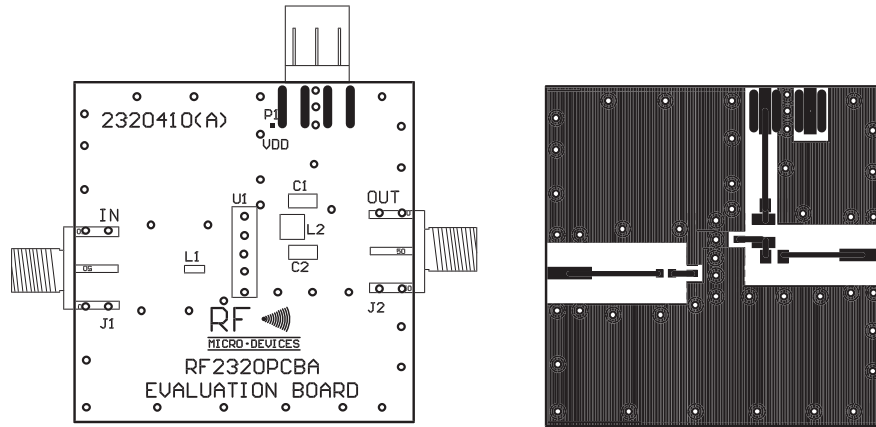
## Evaluation Board Schematic - 75Ω



**NOTES:**  
J1 and J2 are 75 ΩF connectors.

Drawing 2320401 Rev -

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



**Evaluation Board Layout - 75Ω**  
**Board Thickness 0.062", Board Material FR-4**

