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RF2162

3V 900MHz LINEAR AMPLIFIER

Package Style: QFN, 16-Pin, 4x4

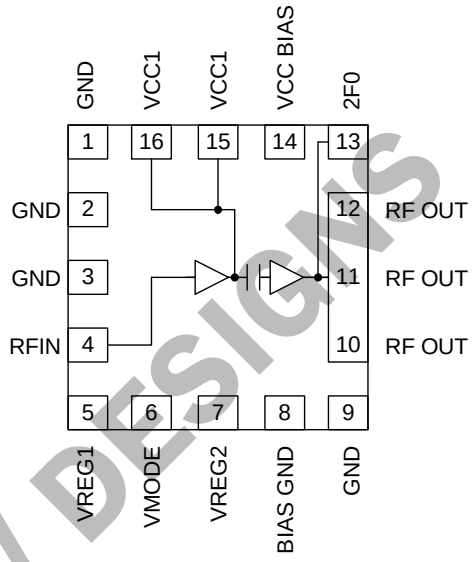
RoHS

Features

- Single 3V Supply
- 29dBm Linear Output Power
- 29dB Linear Gain
- 35% Linear Efficiency
- Onboard Power Down Mode
- 800MHz to 960MHz Operation

Applications

- 3V CDMA/AMPS Cellular Handsets
- 3V J-CDMA/TACS Cellular Handsets
- 3V TDMA/AMPS Cellular Handsets
- Spread-Spectrum Systems
- CDPD Portable Data Cards
- Portable Battery-Powered Equipment



Functional Block Diagram

Product Description

The RF2162 is a high-power, high-efficiency linear amplifier IC targeting 3V hand-held systems. The device is manufactured on an advanced Gallium Arsenide Heterojunction Bipolar Transistor (HBT) process, and has been designed for use as the final RF amplifier in dual-mode 3V CDMA/AMPS hand-held digital cellular equipment, spread-spectrum systems, and other applications in the 800MHz to 960MHz band. The RF2162 has an analog bias control voltage to maximize efficiency. The device is self-contained with 50Ω input and the output can be easily matched to obtain optimum power, efficiency, and linearity characteristics. The device is packaged in a compact 4mmx4mm, 16-pin, leadless chip carrier.

Ordering Information

RF2162 PCBA	Fully Assembled Evaluation Board

Optimum Technology Matching® Applied

☑ GaAs HBT	☐ SiGe BiCMOS	☐ GaAs pHEMT	☐ GaN HEMT
☐ GaAs MESFET	☐ Si BiCMOS	☐ Si CMOS	☐ RF MEMS
☐ InGaP HBT	☐ SiGe HBT	☐ Si BJT	☐ LDMOS

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Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage (RF off)	+8.0	V_{DC}
Supply Voltage ($P_{OUT} \leq 31$dBm)	+4.5	V_{DC}
Mode Voltage (V_{MODE})	+3.0	V_{DC}
Control Voltage (V_{PD})	+3.0	V_{DC}
Input RF Power	+12	dBm
Operating Case Temperature	-30 to +110	°C
Storage Temperature	-30 to +150	°C
Moisture Sensitivity	Modified JEDEC Level 2	

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.

RoHS status based on EUDirective2002/95/EC (at time of this document revision).

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Overall					T=25°C, V_{CC}=3.4V, Freq=824MHz to 849MHz unless otherwise specified
Usable Frequency Range	800		960	MHz	
Typical Frequency Range		824-849		MHz	
Linear Gain	28	29	31	dB	
Second Harmonic (including second harmonic trap)		-30		dBc	
Max CW Output Power		31.5		dBm	
Total Efficiency (AMPS mode)		50		%	
Maximum Linear Output Power (CDMA Modulation)		29		dBm	
Total Linear Efficiency	30	35		%	
Adjacent Channel Power Rejection		-46	-44	dBc	ACPR @ 885kHz
		-58	-56	dBc	ACPR @1980kHz
Noise Power		-90	-89	dBm	V_{CC}=3.4V; BW=30kHz; RX Band NF measure from TX center band to RX center band.
Maximum Linear Output Power (CDMA Modulation)		29		dBm	V_{CC}=3.0V
Total Efficiency (AMPS mode)		50		%	
Max CW Output Power	30	30.5	31	dBm	
Total Linear Efficiency	30	36		%	
Adjacent Channel Power Rejection		-46	-44	dBc	ACPR @ 885kHz
		-58	-56	dBc	ACPR @ 1980kHz
Input VSWR		<2:1			
Output Load VSWR			10:1		No damage.
TDMA					
Linear Output Power		30		dBm	
Linear ACP		-29	-28		30kHZ offset
Linear ALT CP		-49	-48		60kHZ offset
Efficiency	45	46			O/P=30dBm
Power Supply					
Power Supply Voltage	3.0	3.4	4.5	V	
Idle Current		135	200	mA	V_{MODE}=0V to 0.5V
V_{REG} Current		10	15	mA	Total pins 6 and 7, V_{REG}=2.8V
Turn On/Off time			<100	ns	

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Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Power Supply, cont.					
Total Current (Power down)			10	µA	V_{PD}=Low
V_{REG} "Low" Voltage		0	0.2	V	
V_{REG} "High" Voltage	2.7	2.8	2.9	V	
VMODE Bias Control Voltage Range		0 to 2.5		V	

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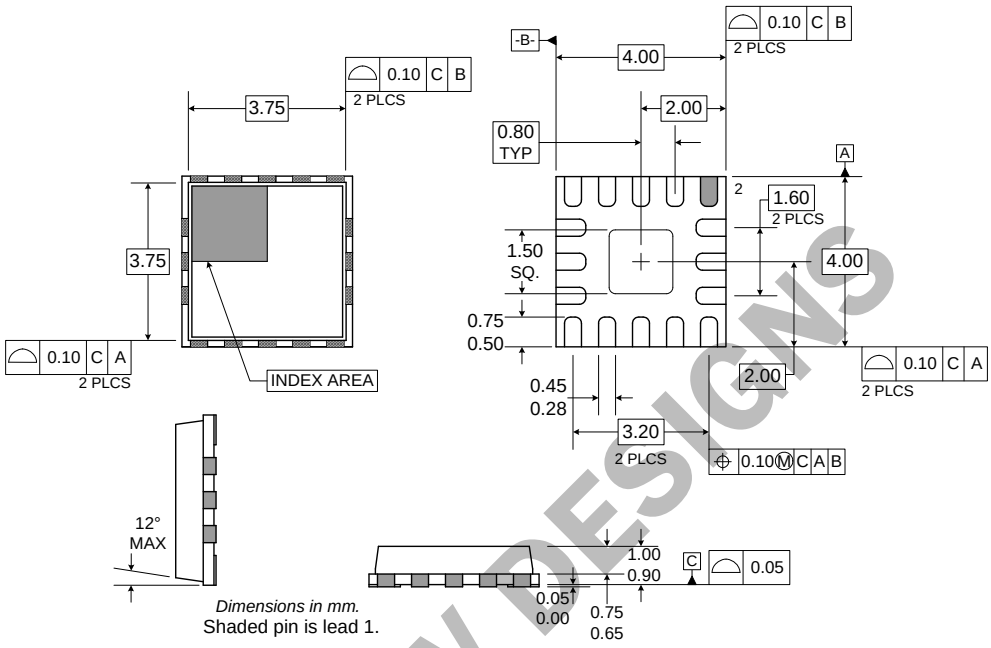
Package Drawing
QFN, 16-pin, 4x4



Dimensions in mm.
Shaded pin is lead 1.

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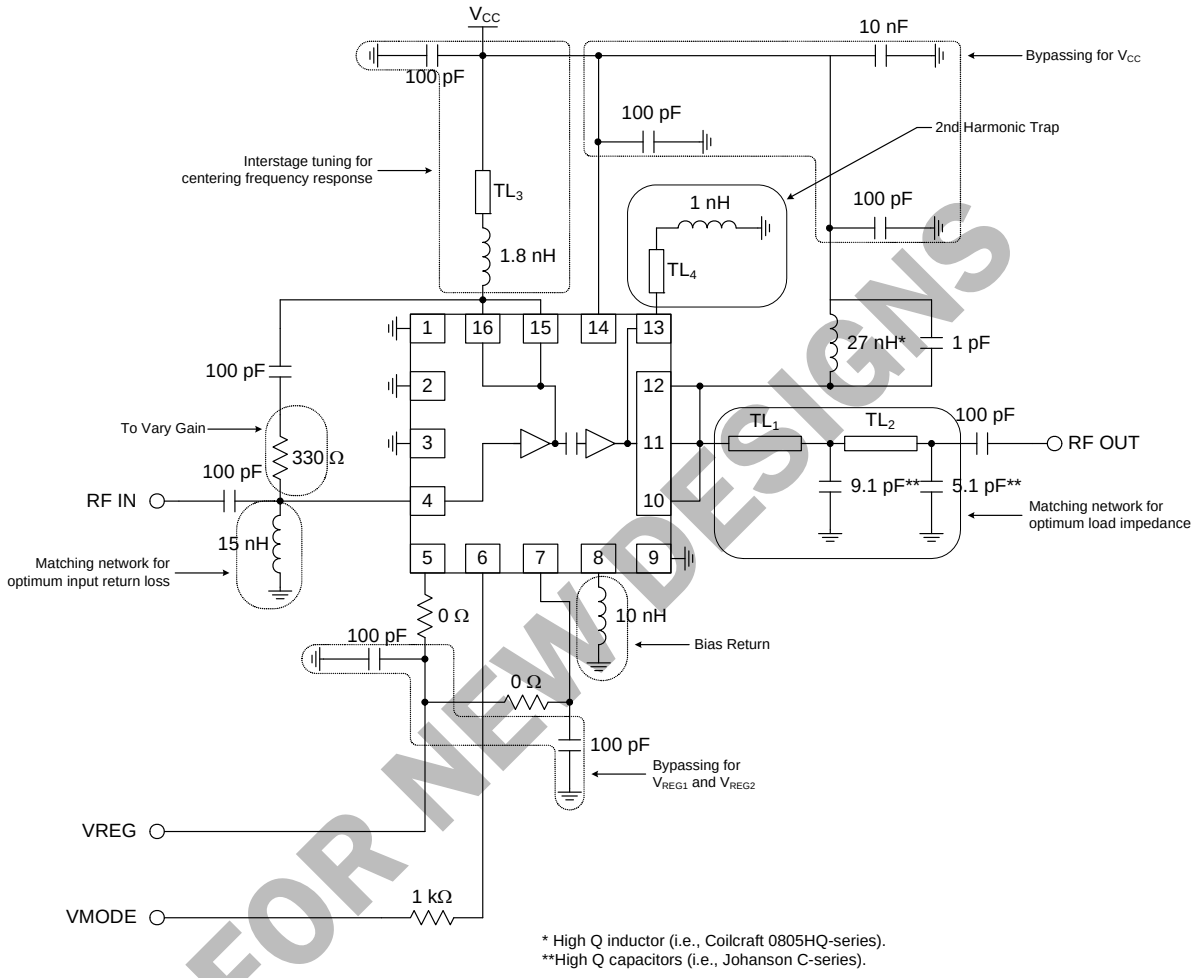
Application Schematic - US CDMA



* High Q inductor (i.e., Coilcraft 0805HQ-series).
**High Q capacitors (i.e., Johanson C-series).

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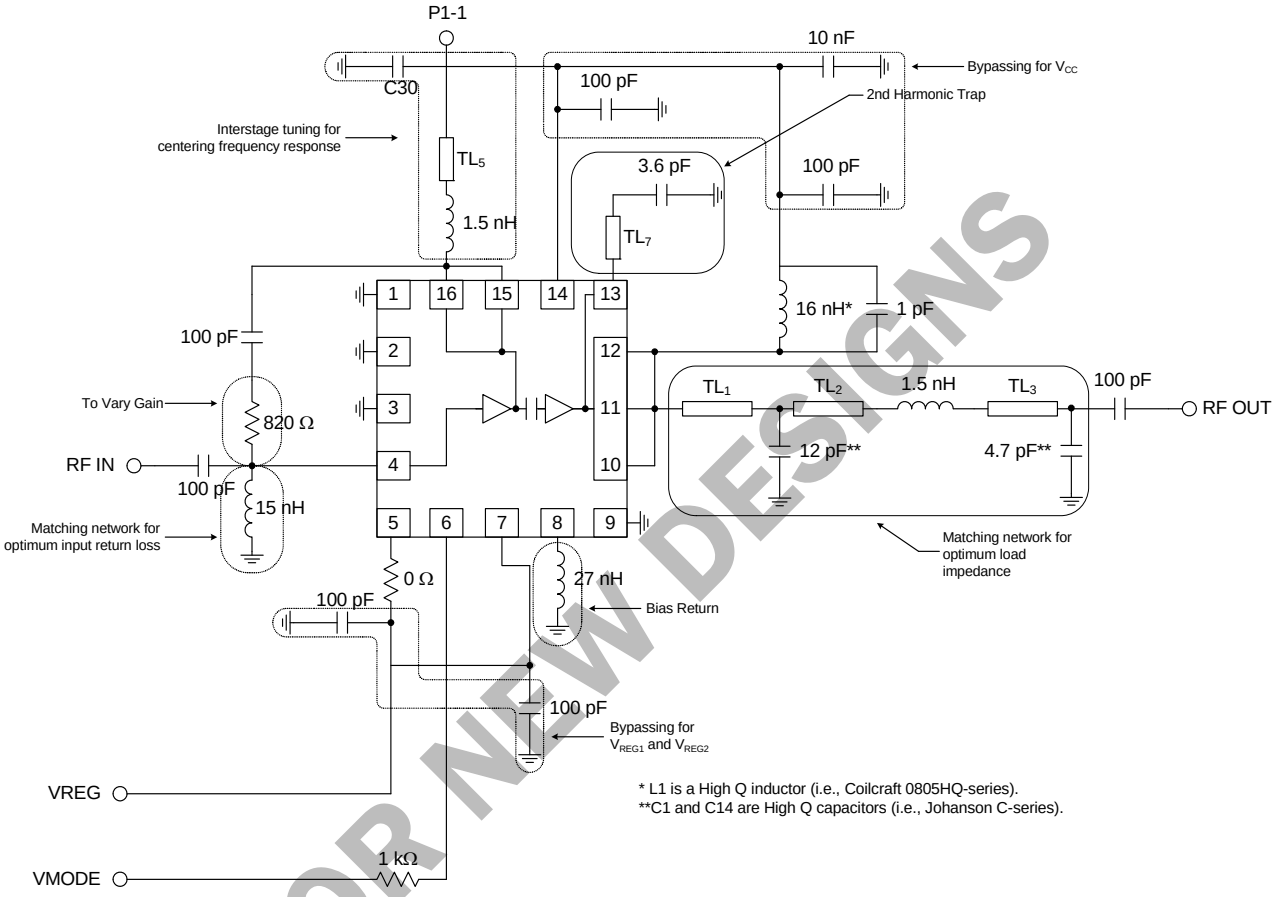
Application Schematic - US TDMA



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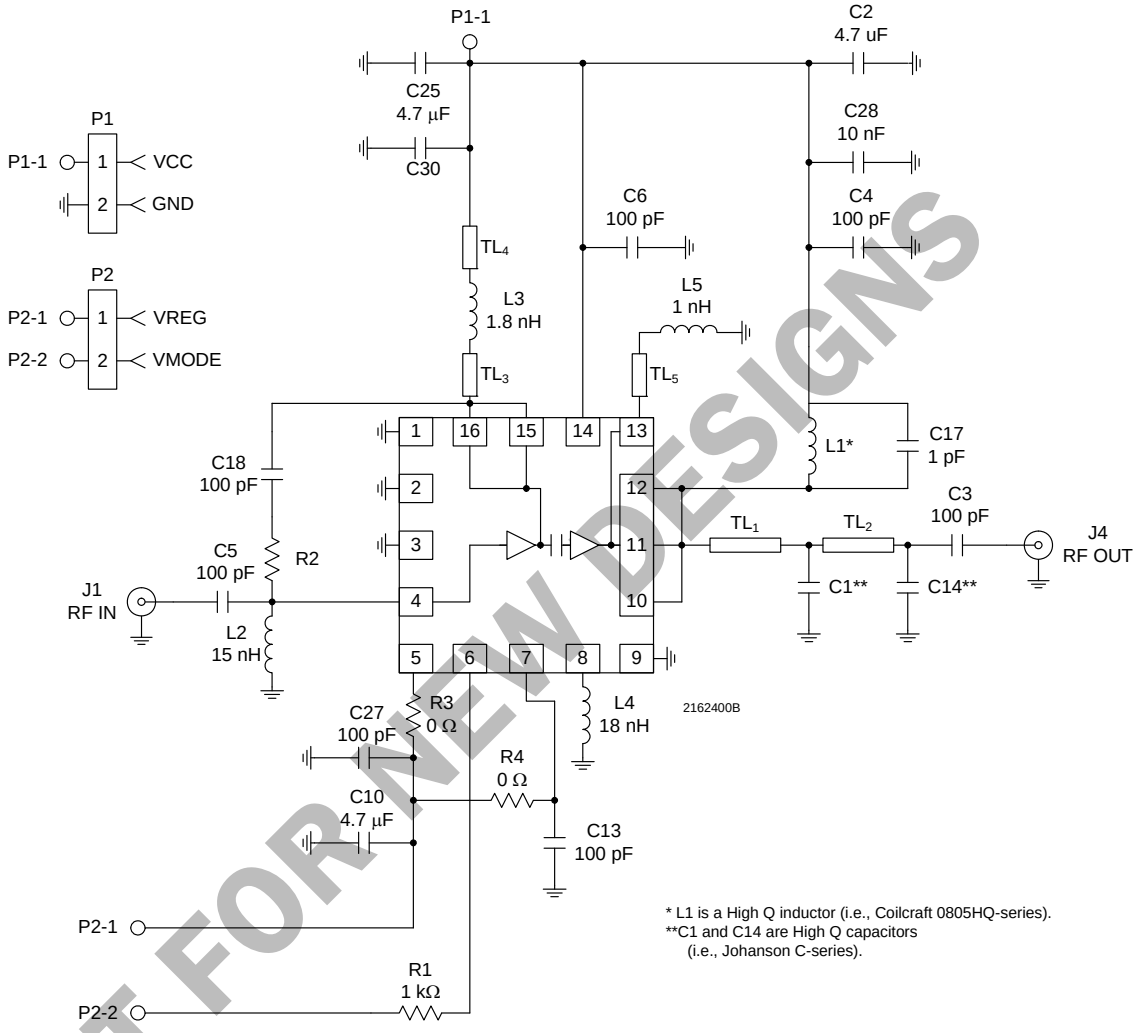
Evaluation Board Schematic - US CDMA

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

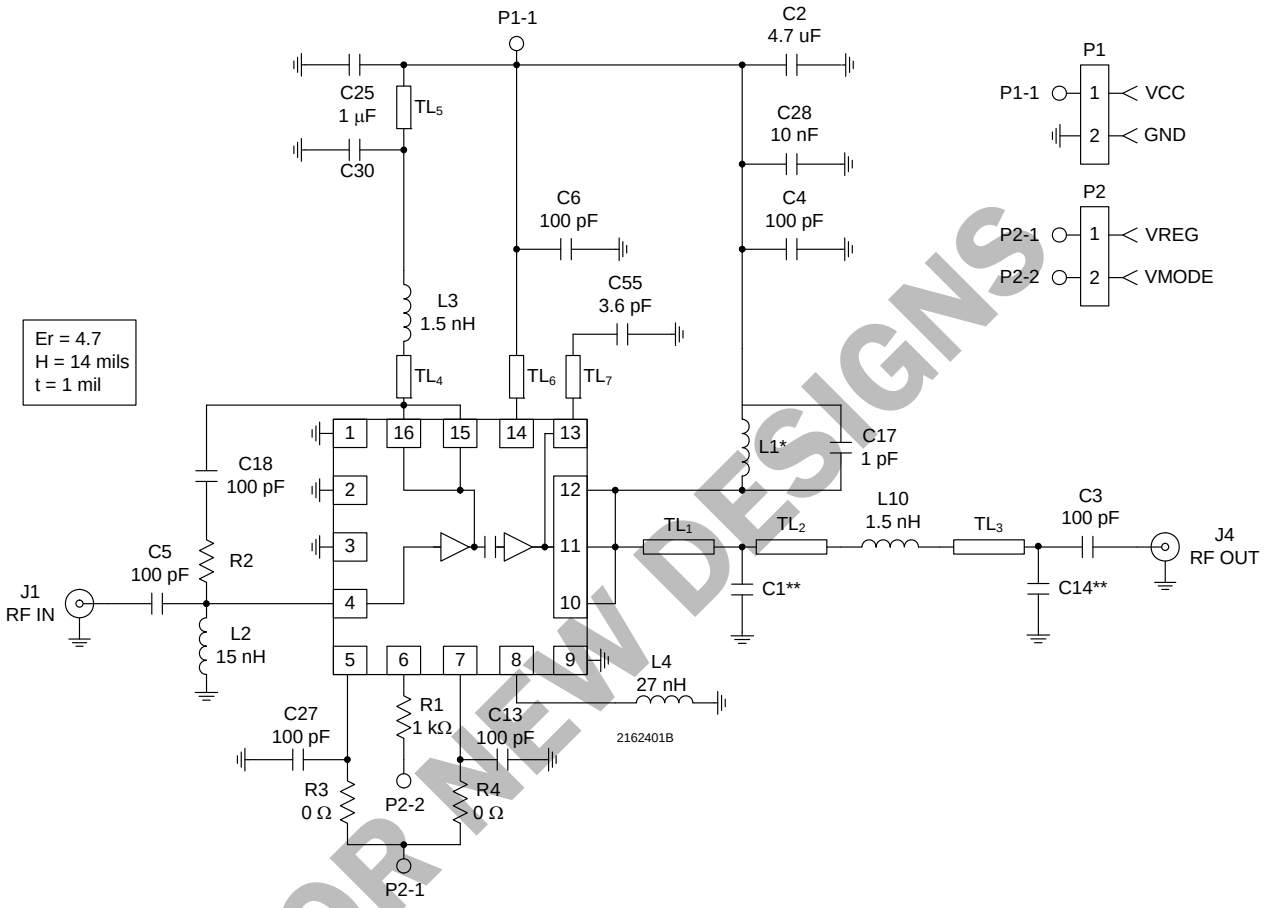


* L1 is a High Q inductor (i.e., Coilcraft 0805HQ-series).
**C1 and C14 are High Q capacitors
(i.e., Johanson C-series).

Board	R2 (Ω)	C30 (pF)	C1 (pF)	L1 (nH)	C14 (pF)
CDMA (US)	330	100	9.1	27	5.1

Transmission Line Length	TL_1	TL_2	TL_3	TL_4	TL_5
CDMA (US)	175 mils	165 mils	L=15 mils W=16 mils	L=40-45 mils from L3 W=16 mils	L=15-20 mils W=14 mils

Evaluation Board Schematic - US TDMA



* L1 is a High Q inductor (i.e., Coilcraft 0805HQ-series).
**C1 and C14 are High Q capacitors (i.e., Johanson C-series).

Board	R2 (Ω)	C30 (pF)	C1 (pF)	L1 (nH)	C14 (pF)
TDMA (US)	820	56	12	16	5.6

Transmission Line Length	TL_1	TL_2	TL_3	TL_4	TL_5	TL_6	TL_7
TDMA (US)	90 mils	82 mils	135 mils	L=12 mils W=16 mils	L=49 mils W=16 mils	L=12 mils	L=12 mils W=14 mils

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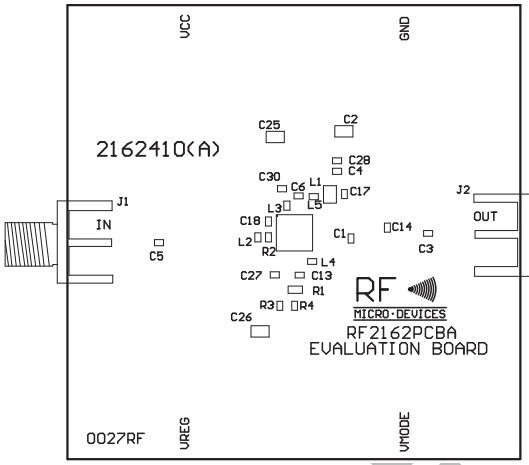
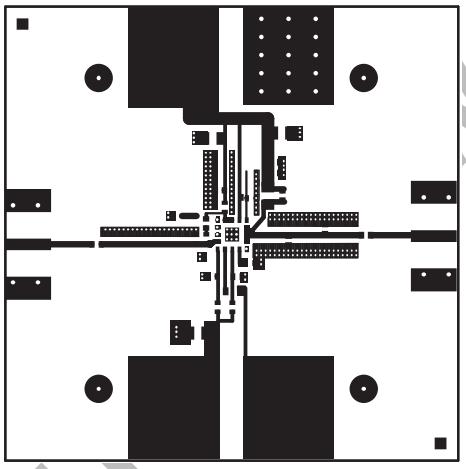
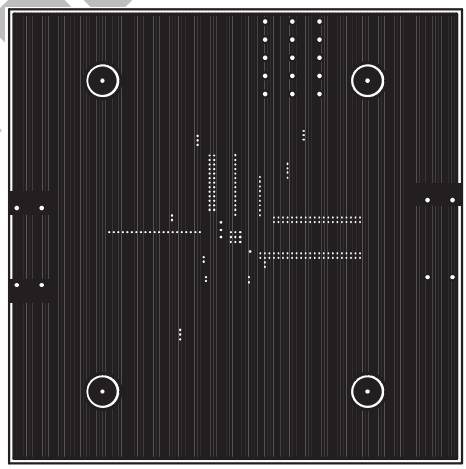
Evaluation Board Layout - CDMA
Board Size 2.0" x 2.0"
Board Thickness 0.031", Board Material FR-4







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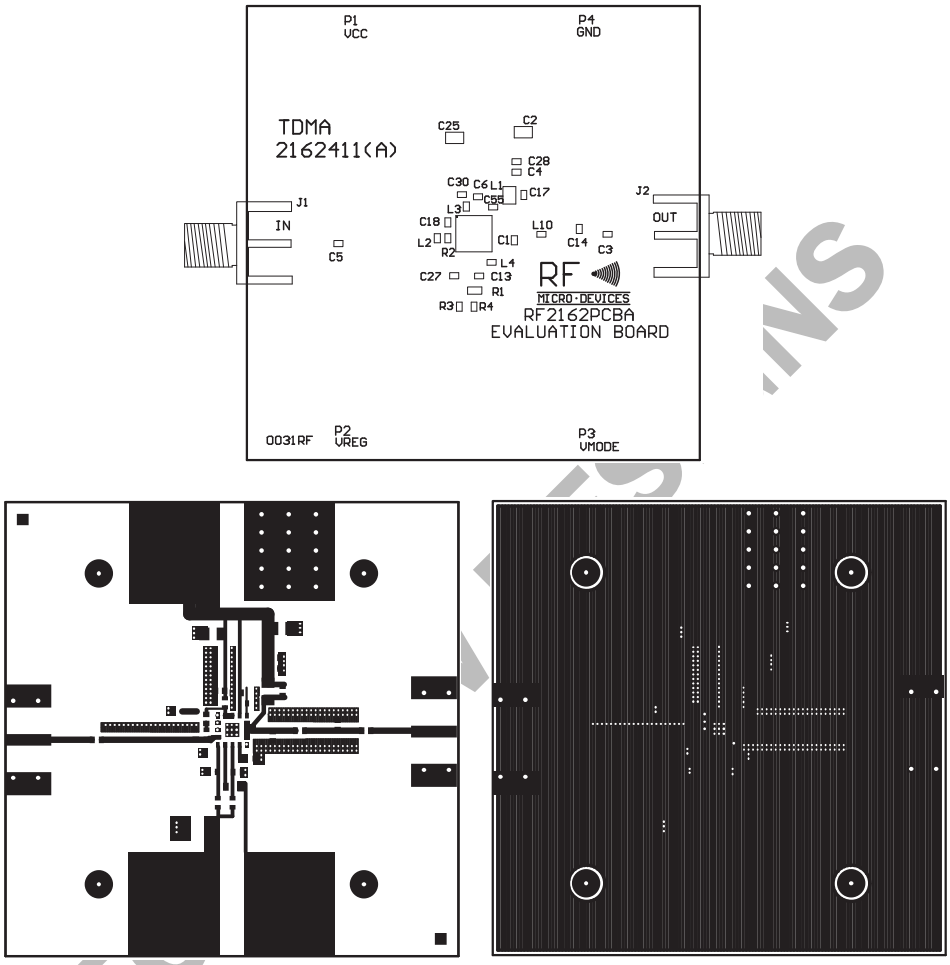
Evaluation Board Layout - TDMA



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