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RF2817

GPS LOW NOISE AMPLIFIER WITH INTEGRATED INPUT/OUTPUT SAW FILTERS

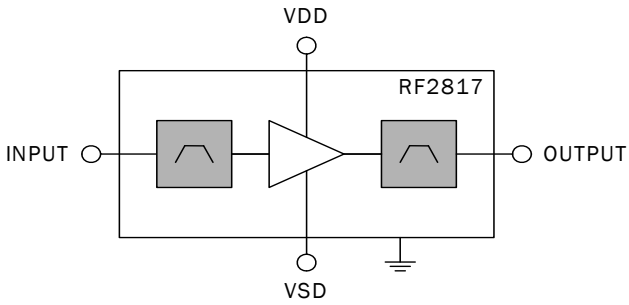
Package: Module, 4.5mmx2.2mmx0.975mm

Features

- Low Noise Figure: 1.80dB (Typ)
- High Gain: 13.8dB (Typ)
- High IIP3: +4.5dBm (Typ)
- Excellent Out-of-Band Rejection:
  Cell: 86dBc
  PCS: 82dBc
- Operable Over Wide Supply Voltage Range: 1V to 3.6V
- CMOS Compatible Shutdown Function (<0.1uA)
- Adjustable Bias Using External Resistor
- No External DC-Blocking Capacitor Required - Lowest BOM Cost and Small Solution Size
- 1kV HBM On All Pins
- Compact Footprint: 4.5mmx2.2mmx0.975mm

Applications

- Cellular and Non-Cellular GPS Receivers



Functional Block Diagram

Product Description

The RF2817 is a GPS Low Noise Amplifier with an integrated SAW filters at the input and output. Low noise figure, along with high gain, achieved by the RF2817 makes it ideal for GPS recievers requiring high sensitivity. This module builds upon RFMD's leading edge pHEMT process and integrates input matching and low loss high rejection SAW filters at both the input and output. This results in high performance and a reduced solution size. The ease of implementation simplifies the receiver design.

The RF2817 is packaged in a compact 4.5mmx2.2mmx0.975mm package with low external component count required to achieve the best-in-class performance.

Ordering Information

RF2817	GPS Low Noise Amplifier with Integrated Input/Output SAW Filters
RF2817PCBA-410	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
V_{DD}	3.6	V
I_{DD}	20	mA
Maximum Input Power - CW, V_{DD}=2.85V, I_{DD}=9mA	+15	dBm
P_{DISS}	72	mW
Max Voltage on RF Output (Pin 8)	+5	V
T_J (Junction Temperature)	150	°C
Storage Temperature	-65 to +150	°C
Operating Temperature	-40 to +85	°C

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.		
High Current Mode					V_{DD}= V_{SD}=2.7V, I_{DD}=8mA, R2=3.3kΩ. Nominal Operating Conditions (unless otherwise specified)
Gain (G)	12	13.8		dB	
Noise Figure (NF)*		1.80	2.3	dB	
Input P1dB Compressed Power (P1dB)		-4.0		dBm	
Input 3rd Order Intercept Point (2-tone at fc±2.5Hz)		4.5		dBm	
Input Return Loss (S11)		-8		dB	
Output Return Loss (S22)		-16		dB	
Reverse Isolation (S12)		-24		dB	
Cell Band Rejection (Relative to 1575GHz at 827.5Hz	70	86		dBc	
PCS Band Rejection (Relative to 1575GHz at 1885MHz)	70	82		dBc	
Supply DC Current at Shutdown (SD) Voltage VSD=2.6V (I_{DD})		8	15	mA	
ISH (Shutdown Current)		0.1		uA	
Low Current Mode					V_{DD}=V_{SD}=1.8V, I_{DD}=4mA, R2=3.9kΩ. Nominal Operating Conditions (unless otherwise specified)
Gain (G)		12.8		dB	
Noise Figure (NF)*		1.90		dB	
Input P1dB Compressed Power (P1dB)		-7		dBm	
Input 3rd Order Intercept Point (2-tone @ fc±2.5Hz)		0		dBm	
Input Return Loss (S11)		-8		dB	
Output Return Loss (S22)		-14		dB	
Reverse Isolation (S12)		-22		dB	
Cell Band Rejection (Relative to 1575GHz at 827.5Hz		86		dBc	
PCS Band Rejection (Relative to 1575GHz at 1885MHz)		82		dBc	

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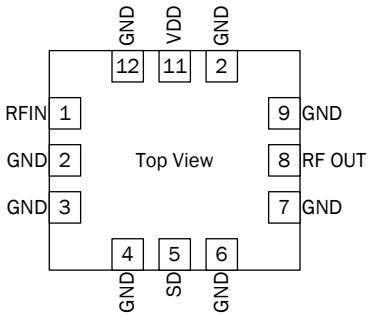
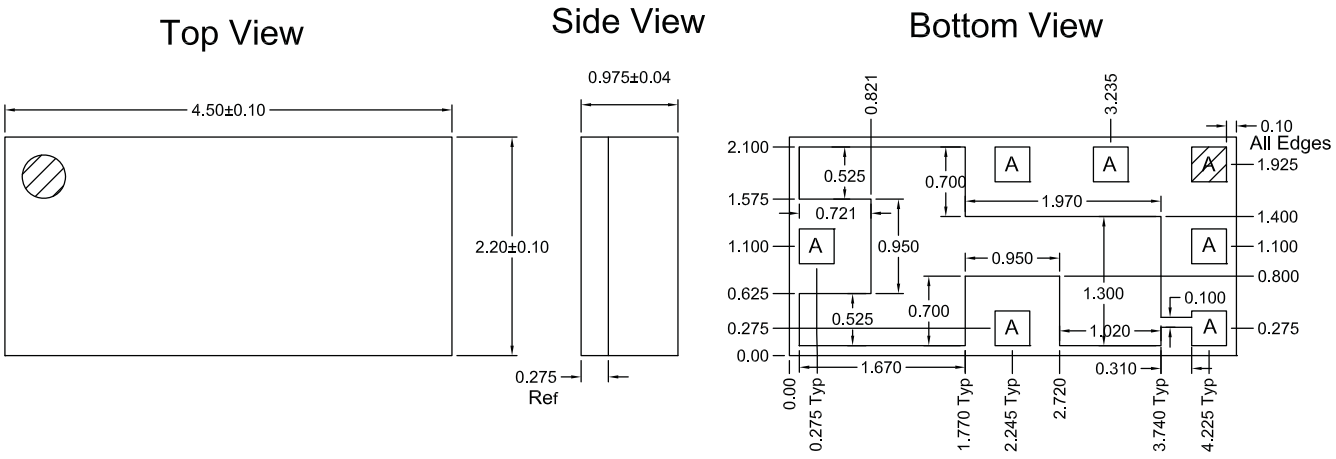
Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Low Current Mode (cont.)					V_{DD}=VSD=1.8V, I_{DD}=4mA, R2=3.9kΩ. Nominal Operating Conditions (unless otherwise specified)
Supply DC Current at Shutdown (SD) Voltage VSD=1.67V (I_{DD})		4		mA	
ISH (Shutdown Current)		0.1		uA	

Pin	Function	Description
1	RF IN	RF input
2	GND	Ground
3	GND	Ground
4	GND	Ground
5	SD	Shutdown
6	GND	Ground
7	GND	Ground
8	RF OUT	RF output
9	GND	Ground
10	GND	Ground
11	VDD	DC Voltage Supply
12	GND	Ground

Pin Out



Package Outline Drawing



A = 0.35 mm Sq Typ

Notes:
1. Shaded area represents Pin 1 location
2. Defining I/O Pad Center:
   To define center of the I/O pad opening, draw a right triangle in one corner of the I/O pad
   Then take the center of the hypotenuse to determine center of I/O pad

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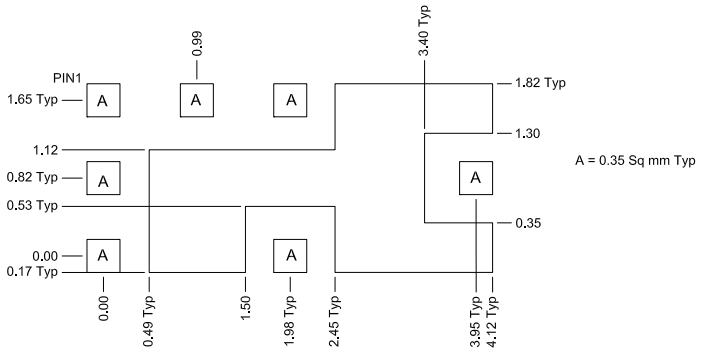
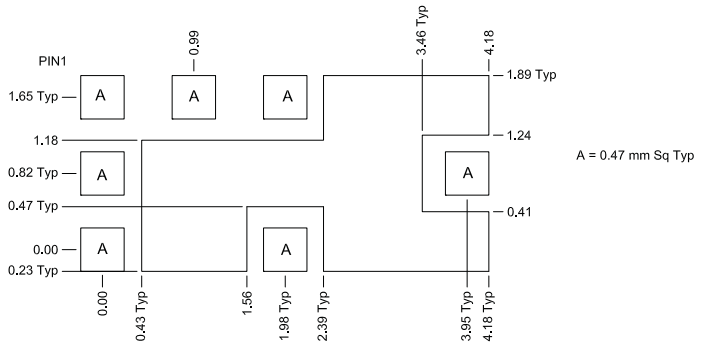
PCB Metal Land Pattern



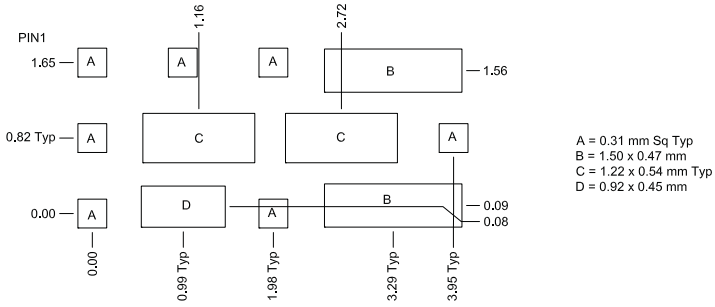
PCB METAL LAND PATTERN

PCB Solder Mask Pattern



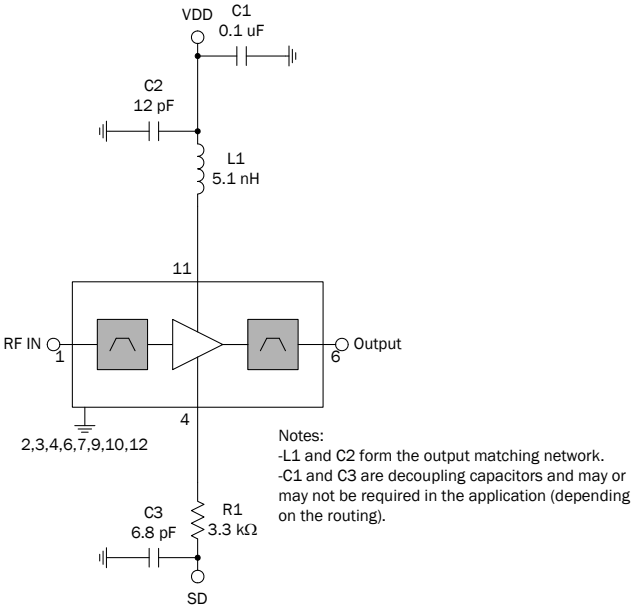
PCB SOLDER MASK LAND PATTERN

PCB Stencil Pattern



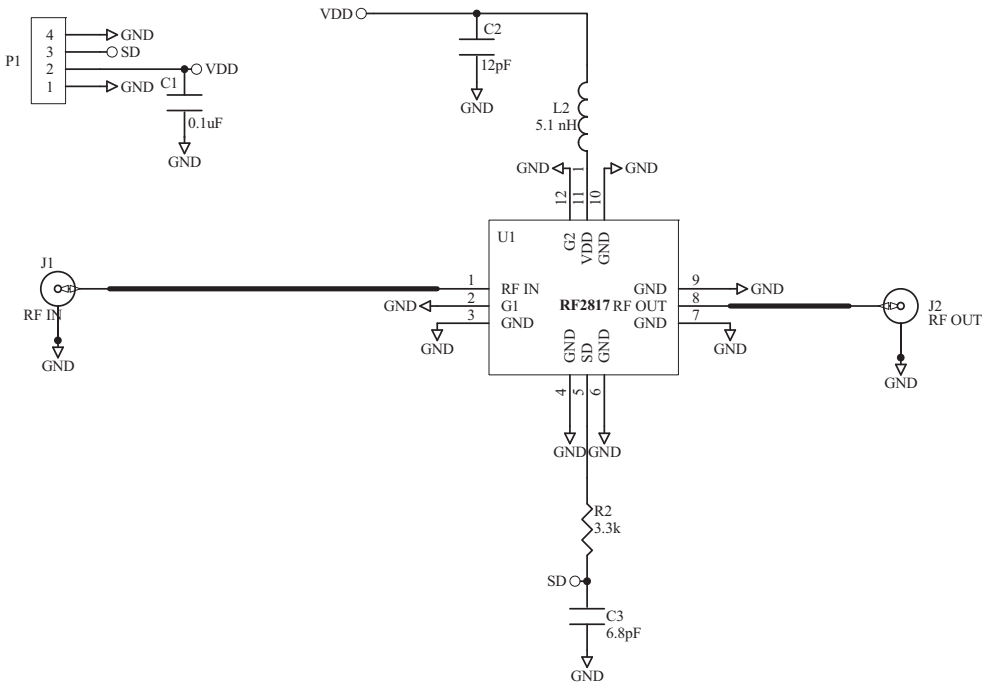
PCB STENCIL LAND PATTERN

Application Schematic



Notes:
-L1 and C2 form the output matching network.
-C1 and C3 are decoupling capacitors and may or may not be required in the application (depending on the routing).

Evaluation Board Schematic



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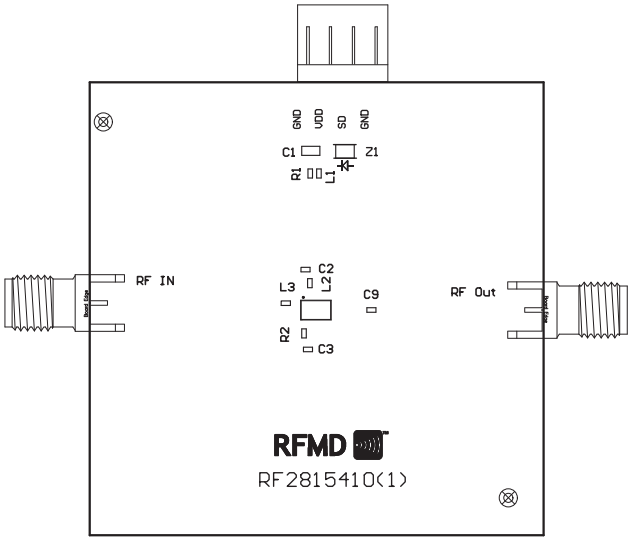
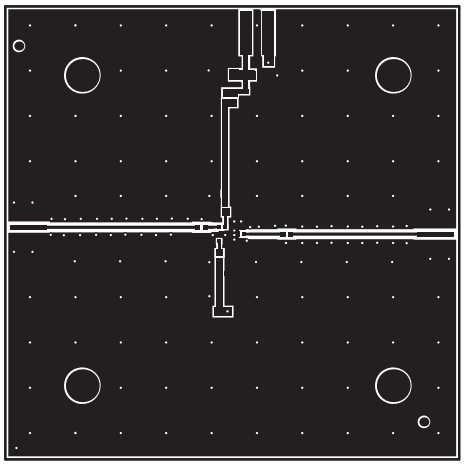
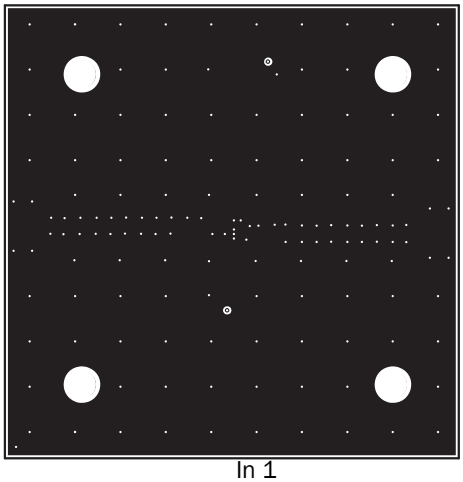
Evaluation Board Layout



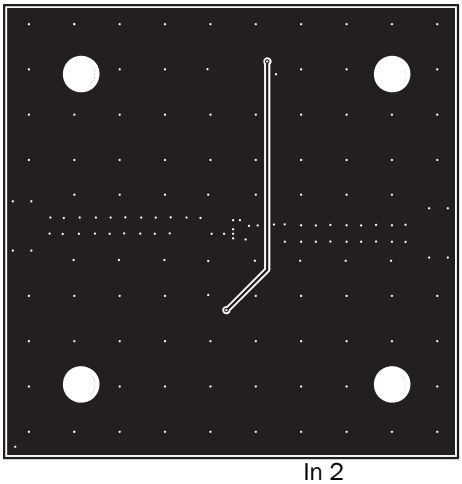
Assembly



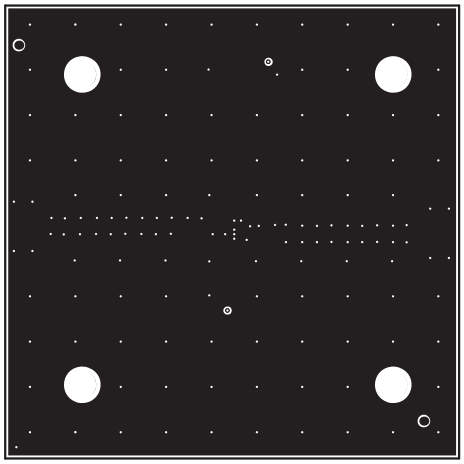
Top



In 1



In 2



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