

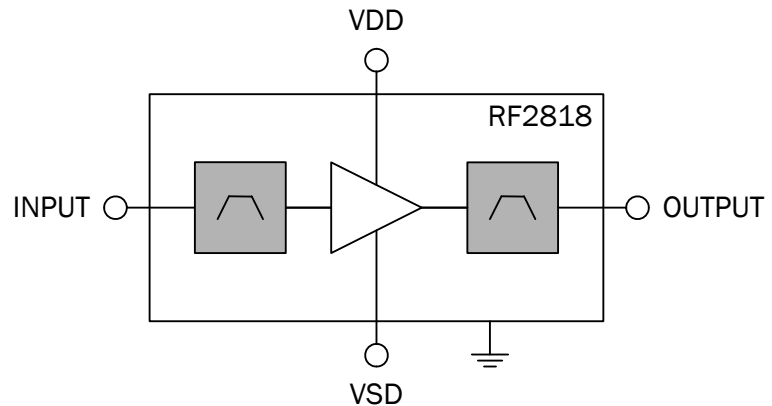


### Features

- Compact Footprint: 3.0mmx2.5mmx1.0mm
- Only Two External Components Required
- No External DC Blocking Capacitors Required - Lowest BOM Cost and Small Solution Size
- Low Noise Figure: 1.55dB (Typ)
- High Gain: 14dB (Typ)
- Excellent Linearity IIP3: +6dBm (Typ)
- Integrated Input and Output SAW Filters for Optimum PCS and Cell Band Rejection:
  - Cell: 101dBc (Typ)
  - PCS: 74dBc (Typ)
- Operable Over Wide Supply Voltage Range: 1V to 3.6V
- Adjustable Bias and Shutdown Capability

### Applications

- Cellular Handsets
- Personal Navigation Devices



Functional Block Diagram

### Product Description

The RF2818 is a GPS Low Noise Amplifier with integrated SAW filters at the input and output. Low noise figure, along with high gain, achieved by the RF2818 makes it very suitable for compact GPS receivers requiring reduced front-end noise and 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 RF2818 is packaged in a compact 3.0mmx2.5mmx1.0mm package with only two external components required to achieve the best-in-class performance.

### Ordering Information

RF2818	GPS Low Noise Amplifier with Integrated Input/Output SAW Filters
RF2818PCBA-410	Fully Assembled Evaluation Board

### Optimum Technology Matching® Applied

- |                                      |                                      |  |                                   |
|--------------------------------------|--------------------------------------|--|-----------------------------------|
| <input type="checkbox"/> GaAs HBT    | <input type="checkbox"/> SiGe BiCMOS | <input checked="" type="checkbox"/> GaAs pHEMT | <input type="checkbox"/> GaN HEMT |
| <input type="checkbox"/> GaAs MESFET | <input type="checkbox"/> Si BiCMOS   | <input type="checkbox"/> Si CMOS               | <input type="checkbox"/> RF MEMS  |
| <input type="checkbox"/> InGaP HBT   | <input type="checkbox"/> SiGe HBT    | <input type="checkbox"/> Si BJT                | <input type="checkbox"/> LDMOS    |

## Absolute Maximum Ratings

Parameter	Rating	Unit
V <sub>DD</sub>	3.6	V
I <sub>DD</sub>	20	mA
Maximum Input Power - CW, V <sub>DD</sub> =2.7V, I <sub>DD</sub> =8.4mA	+15	dBm
P <sub>Diss</sub>	72	mW
Max Voltage on RF Output (Pin 8)	+5	V
T <sub>j</sub> (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 EU Directive 2002/95/EC (at time of this document revision).

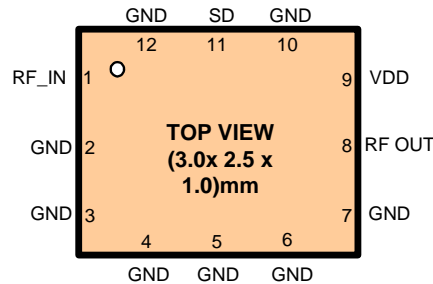
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Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
<b>High Current Mode</b>					V <sub>DD</sub> = V <sub>SD</sub> = 2.7V, I <sub>DD</sub> = 7mA, Temp = 25°C Nominal Operating Conditions (unless otherwise specified)
Gain (G)	12.5	14		dB	
Noise Figure (NF)*		1.55	1.95	dB	
Input P1dB Compressed Power (IP1dB)		-6.0		dBm	
Input 3rd Order Intercept Point (2-tone at f <sub>c</sub> ± 2.5MHz)		+6		dBm	
Input Return Loss (S11)		-7.5		dB	
Output Return Loss (S22)		-14		dB	
Reverse Isolation (S12)		-24		dB	
Cell Band Rejection (Relative to 1575GHz at 827.5MHz)	80	101		dBc	
PCS Band Rejection (Relative to 1575MHz at 1885MHz)	70	74		dBc	
Supply DC Current at Shutdown (SD) Voltage V <sub>SD</sub> = 2.7V (I <sub>DD</sub> )		7	10	mA	
ISH (Shutdown Current)		0.40		uA	

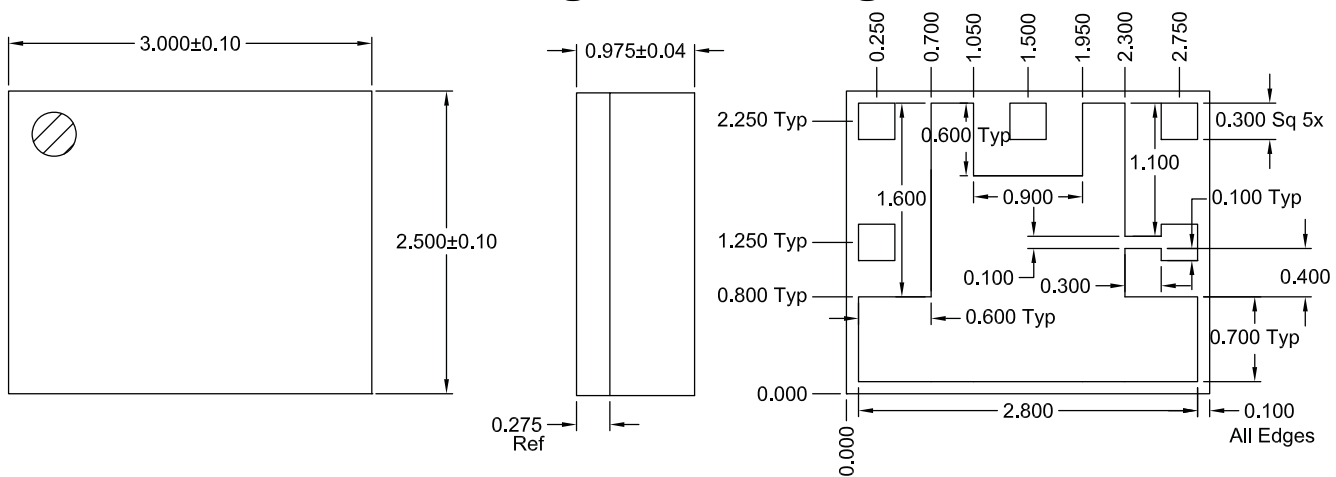
Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
<b>Low Current Mode</b>					$V_{DD} = V_{SD} = 1.76V$ , $I_{DD} = 4\text{ mA}$ , Temp = 25 °C Nominal Operating Conditions (unless otherwise specified)
Gain (G)		13.1		dB	
Noise Figure (NF)*		1.7		dB	
Input P1dB Compressed Power (IP1dB)		-6.5		dBm	
Input 3rd Order Intercept Point (2-tone at $f_c \pm 2.5\text{MHz}$ )		+5.7		dBm	
Input Return Loss (S11)		-7.2		dB	
Output Return Loss (S22)		-13		dB	
Reverse Isolation (S12)		-23		dB	
Cell Band Rejection (Relative to 1575MHz at 827.5MHz)		100		dBc	
PCS Band Rejection (Relative to 1575MHz at 1885MHz)		72		dBc	
Supply DC Current at Shutdown (SD) Voltage VSD=2.7V ( $I_{DD}$ )		4		mA	
ISH (Shutdown Current)		0.40		uA	

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

### Pin Out

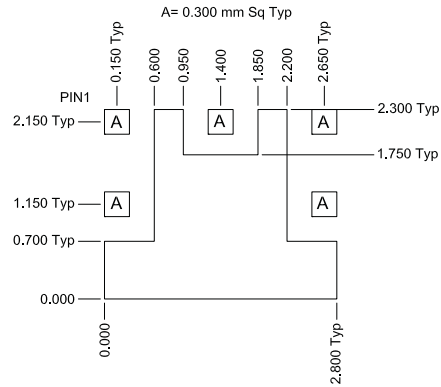


### Package Outline Drawing

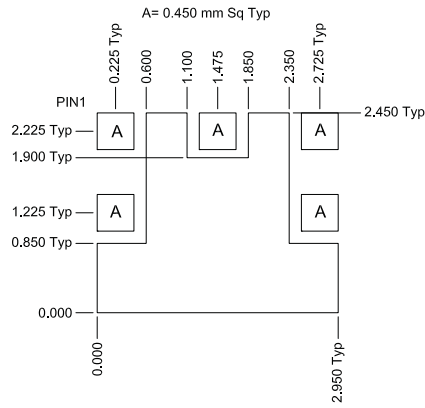


- Notes:
- Shaded area represents Pin 1 location
  - Defining I/O Pad Center:  
To define center of the I/O pad opening, draw a right triangle in one corner of the I/O pad  
Then take the center of the hypotenuse to determine center of I/O pad

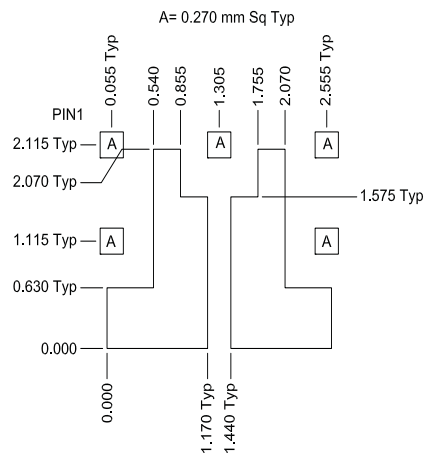
**PCB Metal Land Pattern**



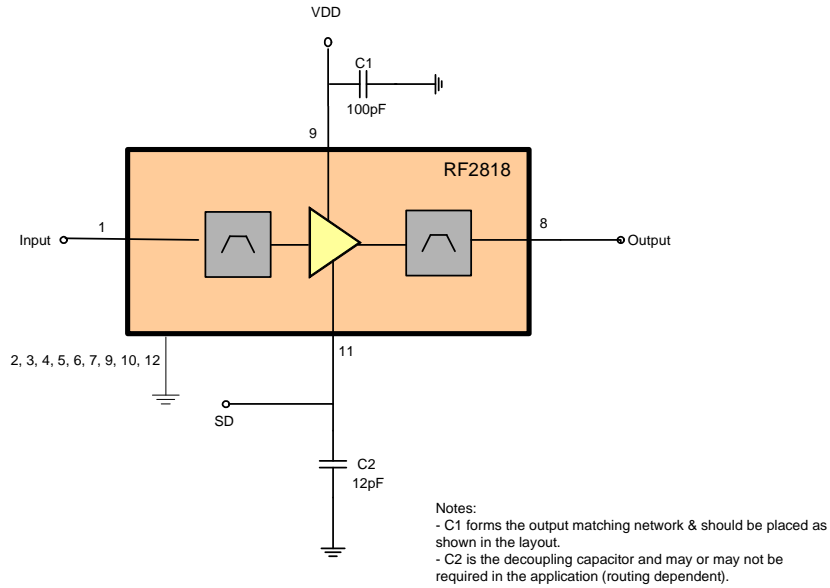
**PCB Solder Mask Pattern**



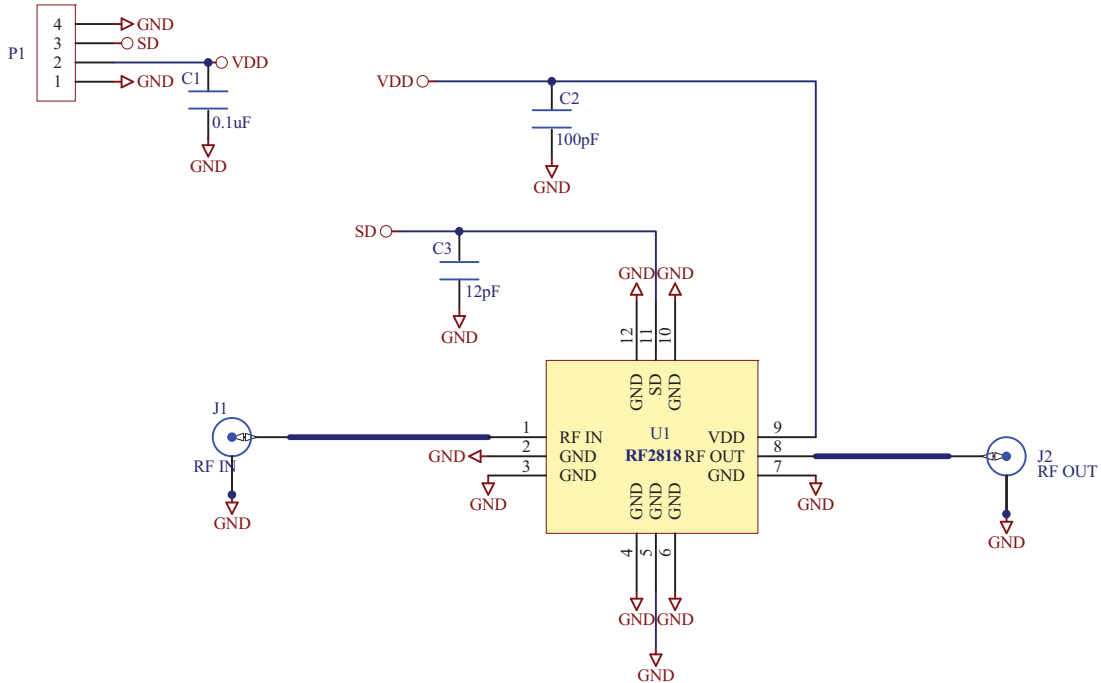
**PCB Stencil Pattern**



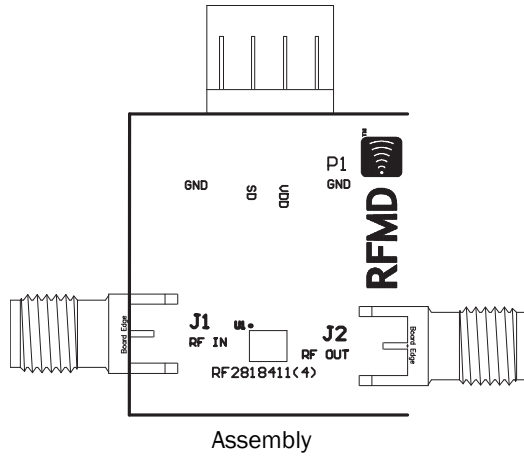
## Application Schematic



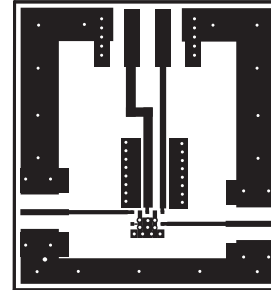
## Evaluation Board Schematic



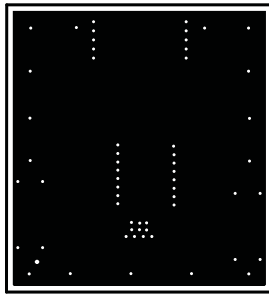
**Evaluation Board Layout**



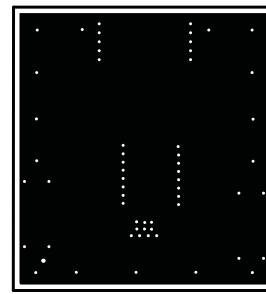
Assembly



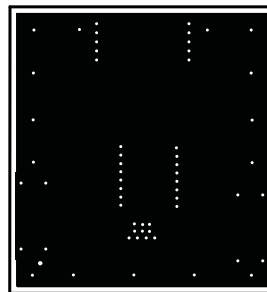
Top



In 1



In 2



Back

**Layout Recommendations:**

C1 forms a part of the output match and placement of C1 is critical to achieving the best performance. Place C1 as shown on the EVB to achieve the performance specified in this data sheet.

