

Product Description

The RFFM4527 is a low noise amplifier (LNA) designed for Wi-Fi 802.11a/n/ac systems. The integrated input and output 50Ω match minimizes layout area in the customer's application, reduces the bill of materials and manufacturability cost. Performance is focused on a balance of low noise and gain that increases the receive sensitivity. The RFFM4527 integrates a bypass path that enables a defined gain step. The device is provided in a 1.6mm x 1.6mm x 0.5mm, 6-pin DFN package.



Package: DFN, 6-pin,  
1.6mm x 1.6mm x 0.5mm max

Features

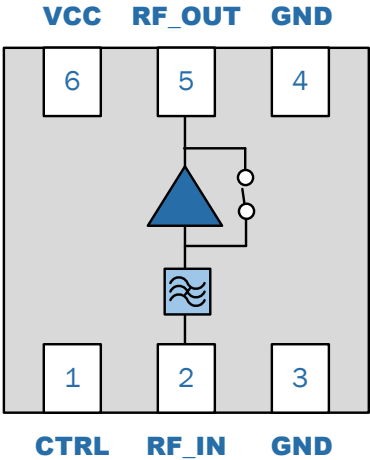
- Noise Figure = 1.6dB
- LNA Gain = 16dB
- Bypass Loss = 6dB
- Input and Output Matched to 50Ω
- Integrated 2.4GHz Rejection Filter

Applications

- Wireless Routers
- Access Points
- Residential Gateways
- Consumer Premise Equipment
- Small Cell
- Internet of Things

Ordering Information

| PART NUMBER     | DESCRIPTION                           |
|-----------------|---------------------------------------|
| RFFM4527SB      | Sample bag with 5 pieces              |
| RFFM4527SQ      | Sample bag with 25 pieces             |
| RFFM4527SR      | 7" Reel with 100 pieces               |
| RFFM4527TR7     | 7" Reel with 2500 pieces              |
| RFFM4527PCK-410 | Assembled Evaluation Board + 5 pieces |



Functional Block Diagram

## Absolute Maximum Ratings

| PARAMETER                                                     | RATING      | UNIT            |
|---------------------------------------------------------------|-------------|-----------------|
| DC Supply Voltage (No RF Applied)                             | -0.3 to +6  | V <sub>DC</sub> |
| Control Voltage                                               | -0.5 to 6   | V <sub>DC</sub> |
| DC Supply Current                                             | 50          | mA              |
| Storage Temperature                                           | -40 to +150 | °C              |
| Maximum RX Input Power into 50Ω Load for 11a,n,ac (No Damage) | +10         | dBm             |
| Moisture Sensitivity                                          | MSL2        |                 |

## Nominal Operating Parameters

| PARAMETER             | MIN | TYP | MAX      | UNIT | CONDITION                                  |
|-----------------------|-----|-----|----------|------|--------------------------------------------|
| <b>COMPLIANCE</b>     |     |     |          |      | <b>802.11A, 802.11N, 802.11AC, 802.11P</b> |
| Operating Frequency   | 4.9 |     | 5.925    | GHz  |                                            |
| Operating Temperature | -40 |     | +85      | °C   |                                            |
| Power Supply $V_{DD}$ | 3   | 3.3 | 6        | V    |                                            |
| Control Voltage-High  | 2.5 | 3   | $V_{DD}$ | V    | CTRL                                       |
| Control Voltage-Low   | 0   |     | 0.5      | V    | CTRL                                       |

|                                  |      |     |      |     |                                                           |
|----------------------------------|------|-----|------|-----|-----------------------------------------------------------|
| <b>LNA Mode</b>                  |      |     |      |     | $V_{DD}=3.3V$ , $T=+25^{\circ}C$ ; Unless otherwise noted |
| Noise Figure                     |      | 1.6 | 2.0  | dB  |                                                           |
| Small Signal Gain                | 14   | 17  |      | dB  | $f = 5100MHz$                                             |
|                                  | 13   | 16  |      | dB  | $f = 5900MHz$                                             |
| Gain Flatness                    | -0.2 |     | +0.2 | dB  | Across any 80MHz Channel                                  |
| Gain Variation                   | -1.6 |     | +1.6 | dB  | $T = -40$ to $85^{\circ}C$                                |
| Out of Band Gain                 |      | -28 |      | dB  | $f = 2400-2500MHz$                                        |
| Input Return Loss                |      | 8   |      | dB  |                                                           |
| Output Return loss               |      | 15  |      | dB  |                                                           |
| Output $P_{1dB}$                 |      | +8  |      | dBm |                                                           |
| Output IP3                       |      | +22 |      | dBm | Two tone 5MHz spacing; $P_{IN} = -20dBm$                  |
| RF_OUT to RF_IN (S12)            |      | -28 |      | dB  |                                                           |
| RX Operating Current( $I_{DD}$ ) |      | 15  | 20   | mA  |                                                           |

|                                        |      |     |     |         |                                                           |
|----------------------------------------|------|-----|-----|---------|-----------------------------------------------------------|
| <b>Bypass Mode</b>                     |      |     |     |         | $V_{DD}=3.3V$ , $T=+25^{\circ}C$ ; Unless otherwise noted |
| Small Signal Gain                      |      | -6  |     | dB      |                                                           |
| Gain Flatness Across any 80MHz Channel | -0.2 |     | 0.2 | dB      |                                                           |
| Out of Band Gain                       |      | -28 |     | dB      | $f = 2400-2500MHz$                                        |
| Input Return Loss                      |      | 12  |     | dB      |                                                           |
| Output Return loss                     |      | 12  |     | dB      |                                                           |
| Input $P_{1dB}$                        |      | +20 |     | dBm     |                                                           |
| Input IP3                              |      | +28 |     | dBm     | Two tone 5MHz spacing; $P_{IN} = +2dBm$                   |
| RX Operating Current                   |      | 20  |     | $\mu A$ |                                                           |

Nominal Operating Parameters (cont.)

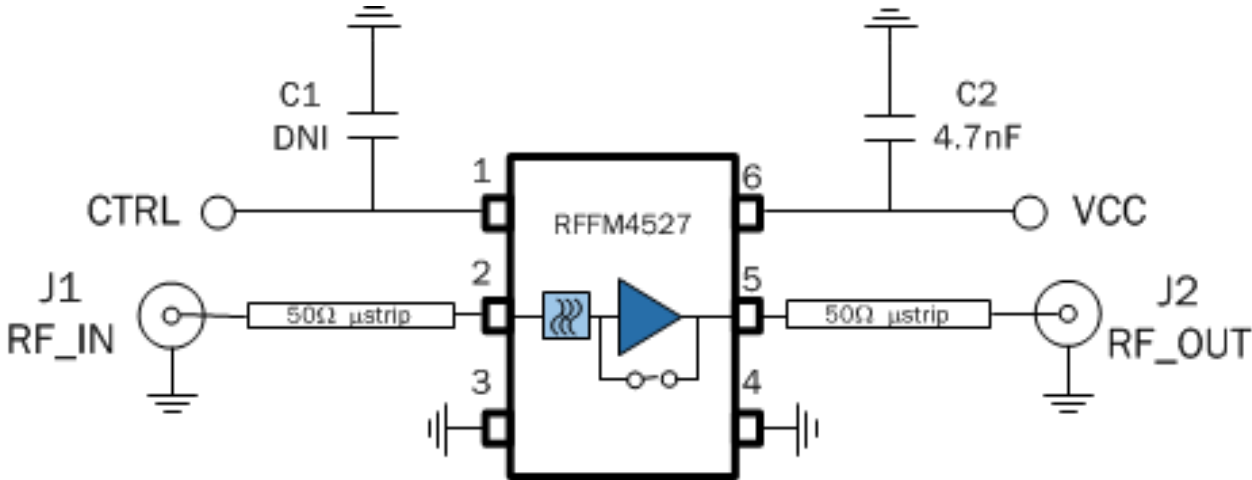
| PARAMETER                              | MIN | TYP | MAX | UNIT | CONDITION                         |
|----------------------------------------|-----|-----|-----|------|-----------------------------------|
| General Specifications                 |     |     |     |      |                                   |
| I <sub>CONTROL</sub> Current           |     | 150 | 200 | μA   | CTRL = High                       |
|                                        |     | 5   |     | μA   | CTRL = Low                        |
| Gain Switch Time - 50 to 90% RF Output |     | 200 |     | ns   | Switching from Bypass to LNA mode |
| Gain Switch Time - 50 to 10% RF Output |     | 200 |     | ns   | Switching from LNA Mode to Bypass |

Switch Control Logic Truth Table

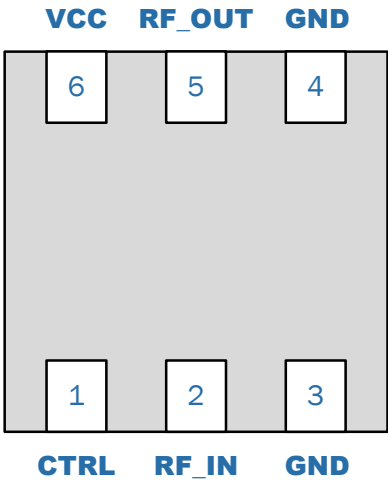
| OPERATING MODE | CTRL |
|----------------|------|
| LNA Mode       | High |
| Bypass Mode    | Low  |

Note: High = 2.5 to V<sub>DD</sub>. Low = 0V to 0.5V.

Evaluation Board Schematic



Pin Out



Pin Names and Descriptions

| PIN      | NAME   | DESCRIPTION                                                                                                                                                   |
|----------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | CTRL   | Control voltage for switch to toggle LNA or Bypass modes.                                                                                                     |
| 2        | RF_IN  | RF input port. This port is matched to 50Ω and DC blocked.                                                                                                    |
| 3        | GND    | Not connected internally and can be left floating or connected to ground. Connecting this pin to ground is recommended.                                       |
| 4        | GND    | Not connected internally and can be left floating or connected to ground. Connecting this pin to ground is recommended.                                       |
| 5        | RF_OUT | RF output port. This port is matched to 50Ω and DC blocked.                                                                                                   |
| 6        | VCC    | Supply voltage for LNA                                                                                                                                        |
| Pkg Base | GND    | Ground connection. The backside of the package should be connected to the ground plane through a short path, i.e., PCB vias under the device are recommended. |

PCB METAL LAND PATTERN

PCB SOLDER MASK PATTERN

PCB STENCIL PATTERN

DETAIL A  
PAD  
SCALE:2X  
6X THIS ROTATION

DETAIL A  
PAD  
SCALE:2X  
6X THIS ROTATION

DETAIL A  
PAD  
SCALE:2X  
6X THIS ROTATION

Disclaimer: Subject to change without notice  
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## Product Compliance Information

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**Caution! ESD-Sensitive Device**

### ESD Sensitivity Ratings

ESD Rating: Class 1C

Voltage: Passes  $\geq 1000V$  to  $< 2000V$

Test: Human Body Model (HBM)

Standard: JEDEC Standard JESD22-A114

ESD Rating: Class C3

Voltage: Passes  $\geq 1000V$

Test: Charged Device Model (CDM)

Standard: JEDEC Standard JESD22-C101

### MSL Rating

MSL Rating: Level 2

Test:  $260^{\circ}C$  convection reflow

Standard: JEDEC Standard IPC/JEDEC J-STD-020

### Solderability

Compatible with both lead-free ( $260^{\circ}C$  max. reflow temperature) and tin/lead ( $245^{\circ}C$  max. reflow temperature) soldering processes.

Package contact plating: NiPdAu

### RoHS Compliance

This part is compliant with EU 2002/95/EC RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment).

- Lead Free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A (C<sub>15</sub>H<sub>12</sub>Br<sub>4</sub>O<sub>2</sub>) Free
- PFOS Free
- SVHC Free

## Contact Information

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For the latest specifications, additional product information, worldwide sales and distribution locations, and information about Qorvo:

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