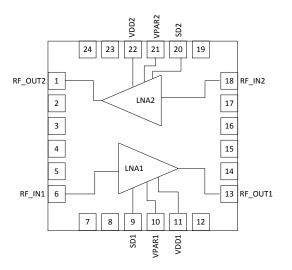


RFLA9003

Dual Low Noise Amplifier Module 1710MHz to 2180MHz

RFMD's RFLA9003 is a dual Low Noise Amplifier module with external connections to both LNAs. These LNAs feature a shutdown mode to turn off the LNA and provide up to 15dBm drive level without gain expansion and self-biasing in shutdown mode. Noise figure of 1.2dB and input P1dB of -3.5dBm make this component ideal for receiver input lineups. The RFLA9003 is packaged in a small 4.0mm x 4.0mm leadless laminate MCM. This module is internally matched to 50Ω on all RF ports making it easy to use with no external matching components required.



Functional Block Diagram

Ordering Information

| RFLA9003SQ | Sample bag with 25 pieces |
|-----------------|---|
| RFLA9003SR | 7" Reel with 100 pieces |
| RFLA9003TR13 | 13" Reel with 2500 pieces |
| RFLA9003PCK-410 | 1710MHz to 2180MHz PCBA with 5-piece sample bag |



Package: MCM, 24-pin, 4.0mm x 4.0mm

Features

- Frequency Range 1710MHz to 2180MHz
- Internally Matched to 50Ω on all RF Ports
- Shutdown Mode with +40dB Isolation
- Gain = >15dB per LNA
- Noise Figure of 1.2dB Typical
- Single +4.0V Supply
- Small 24-Pin, 4.0mm x 4.0mm, Multi-Chip Module (MCM)

Applications

- Cellular Repeaters
- General Purpose LNA

RF Micro Devices Inc. 7628 Thorndike Road, Greensboro, NC 27409-9421 For sales or technical support, contact RFMD at +1.336.678.5570 or customerservice@rfmd.com. DS131114

RF MICRO DEVICES[®] and RFMD[®] are trademarks of RFMD, LLC. BLUETOOTH is a trademark owned by Bluetooth SIG, Inc., U.S.A. and licensed for use by RFMD. All other trade names, trademarks, and registered trademarks are the property of their respective owners. ©2013, RF Micro Devices, Inc.



Absolute Maximum Ratings

| Parameter | Rating | Unit |
|--|-----------------|-----------------|
| Supply Voltage | +5.5 | V _{DC} |
| Control Voltage | +5.5 | V _{DC} |
| DC Supply Current | 130 | mA |
| Power Dissipation | 770 | mW |
| Max RF Input Power | 15 | dBm |
| Operating Temperature (T _{CASE}) | -40 to +85 | °C |
| Storage Temperature Range | -40 to +150 | °C |
| Junction Temperature (T _J) | 150 | °C |
| ESD Rating - Human Body Model (HBM) | 1000 (Class 1C) | V |
| Moisture Sensitivity Level | MSL3 | |





RFMD Green: RoHS status based on EU Directive 2011/65/EU (at time of this document revision), halogen free per IEC 61249-2-21, < 1000pm each of antimony trioxide in polymeric materials and red phosphorus as a flame retardant, and <2% antimony in solder.

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.

Nominal Operating Parameters

| Description | Specification | | | | | |
|---------------------------------|---------------|------|------|------|---|--|
| Parameter | Min | Тур | Max | Unit | Condition | |
| Individual LNA Performance | | | | | Temp = 25°C, V _{CC} = 4V, Standard Application Circuit | |
| Frequency Range | 1710 | | 2180 | MHz | | |
| Gain (On Mode) | 15 | 18 | 21 | dB | SD = 0V | |
| Noise Figure | | 1.2 | 1.6 | dB | | |
| Input P1dB | -6.5 | -3.5 | | dBm | | |
| Input IP3 | 6.6 | 9 | | dBm | | |
| Gain (Off Mode) | | -39 | | dB | SD = 4V | |
| Gain Delta | >40 | | | dB | Gain LNA (on mode) – Gain LNA (off mode), 1950MHz | |
| Input Return Loss | | 9.7 | | dB | | |
| Output Return Loss | | 12.5 | | dB | | |
| Isolation (LNA1 OUT to LNA2 IN) | 35 | 47.5 | | dB | | |
| Gain Compression Slope | -1.1 | -1 | -0.1 | dB | Gain compresses monotonically with increased input power once saturated | |
| Overall Power Supply | | | | | Temp = 25°C, V _{CC} = 4V, Standard Application Circuit | |
| Supply Voltage | 3.5 | 4 | 5 | V | | |
| SD Voltage | 0 | | VCC | V | | |
| Logic High | 1.7 | | VCC | V | | |
| Logic Low | 0 | | 0.6 | V | | |
| Thermal Resistance | | 118 | | °C/W | 85°C at 4.5V at 35mA | |
| Current | 14 | 29 | 36 | mA | On Mode, SD = 0V | |
| | 0.5 | 3.5 | 6 | mA | Off Mode, SD = 4V | |

RF Micro Devices Inc. 7628 Thorndike Road, Greensboro, NC 27409-9421

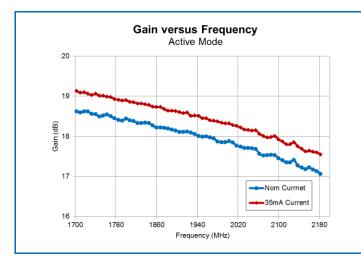
For sales or technical support, contact RFMD at +1.336.678.5570 or customerservice@rfmd.com.

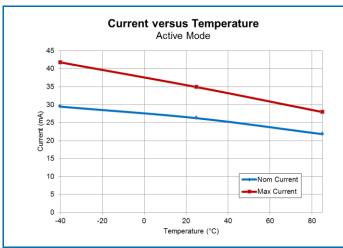
The information in this publication is believed to be accurate. However, no responsibility is assumed by RF Micro Devices, Inc. ("RFMD") for its use, nor for any infringement of patents or other rights of third parties resulting from its use. No license is granted by implication or otherwise under any patent or patent rights of RFMD. RFMD reserves the right to change component circuitry, recommended application circuitry and specifications at any time without prior notice.

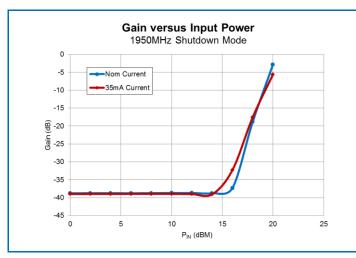
DS131114

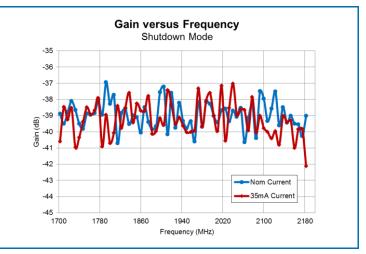


Typical Performance: T=25°C, VDD = 4V unless otherwise noted

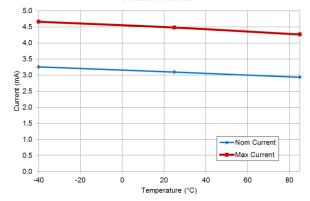


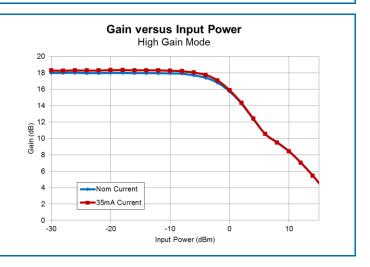






Current versus Temperature Shutdown Mode



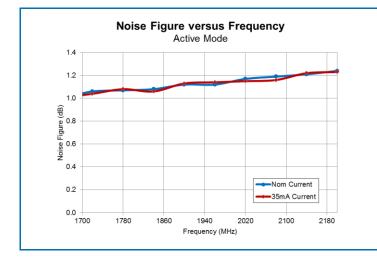


RF Micro Devices Inc. 7628 Thorndike Road, Greensboro, NC 27409-9421

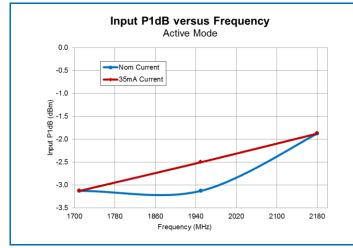
DS131114

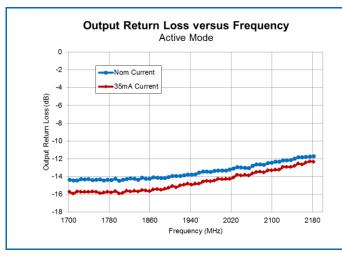
For sales or technical support, contact RFMD at +1.336.679.5570 or customerservice@rfmd.com. The information in this publication is believed to be accurate. However, no responsibility is assumed by RF Micro Devices, Inc. ("RFMD") for its use, nor for any infringement of patents or other rights of third parties resulting from its use. No license is granted by implication or otherwise under any patent or patent rights of RFMD. RFMD reserves the right to change component circuitry, recommended application circuitry and specifications at any time without prior notice.

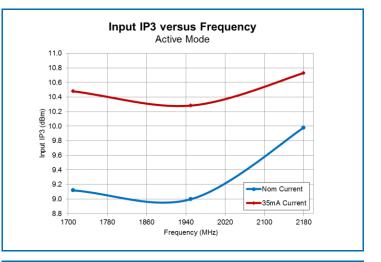




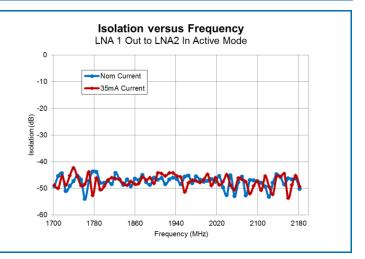








Input Return Loss versus Frequency Active Mode 0 Nom Current -2 35mA Current -4 Return Loss (dB) -6 -8 Input -10 -12 -14 1700 1780 1860 2180 1940 2020 2100 Frequency (MHz)



RF Micro Devices Inc. 7628 Thorndike Road, Greensboro, NC 27409-9421

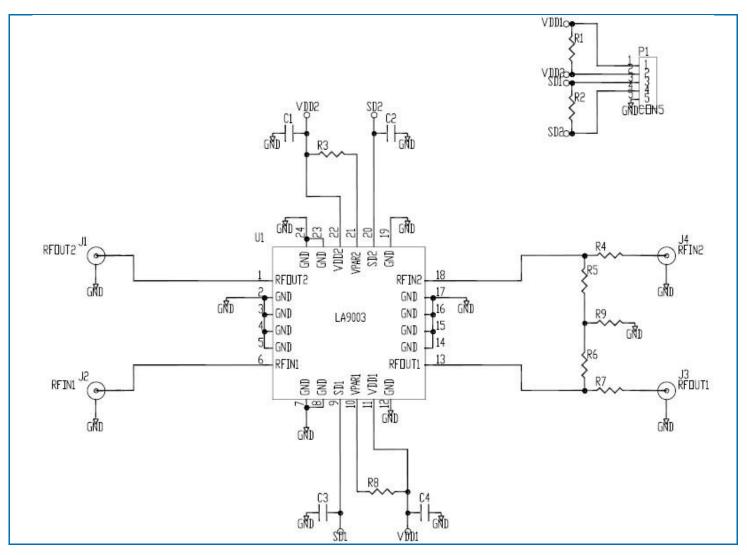
For sales or technical support, contact RFMD at +1.336.678.5570 or customerservice@rfmd.com.

The information in this publication is believed to be accurate. However, no responsibility is assumed by RF Micro Devices, Inc. ("RFMD") for its use, nor for any infringement of patents or other rights of third parties resulting from its use. No license is granted by implication or otherwise under any patent or patent rights of RFMD. RFMD reserves the right to change component circuitry, recommended application circuitry and specifications at any time without prior notice.

DS131114



Evaluation Board Schematic



DS131114

The information in this publication is believed to be accurate. However, no responsibility is assumed by RF Micro Devices, Inc. ("RFMD") for its use, nor for any infringement of patents or other rights of third parties resulting from its use. No license is granted by implication or otherwise under any patent or patent rights of RFMD. RFMD reserves the right to change component circuitry, recommended application circuitry and specifications at any time without prior notice.



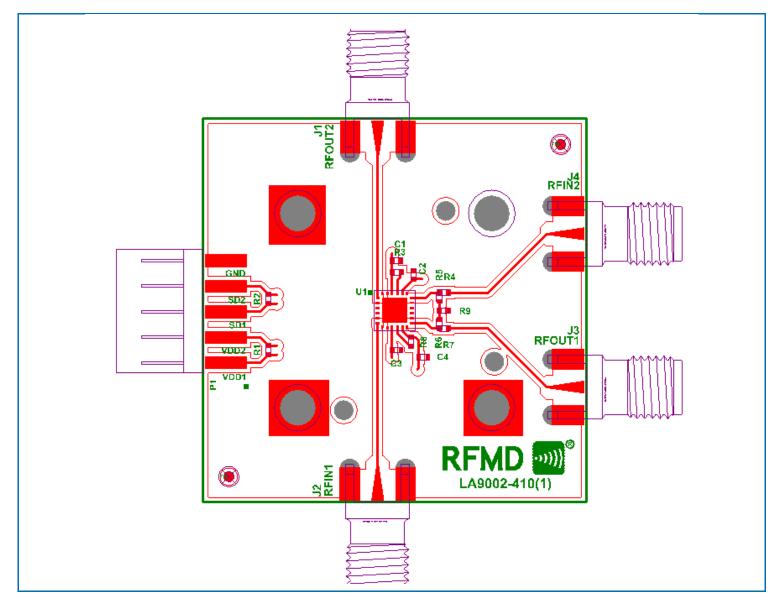
Evaluation Board Bill of Materials (BOM)

| Description | Reference Designator | Manufacturer | Manufacturer's P/N |
|--|----------------------|---------------------|--------------------|
| Evaluation Board | | DDI | LA9002-410(1) |
| RFLA9003 Module | U1 | RFMD | RFLA9003 |
| CAP, 0.1µF, 10% 16V, X7R, 0402 | C1-C4 | Murata Electronics | GRM155R71C104KA88D |
| CONN, SMA, END LNCH, UNIV, HYB MNT, FLT | J1-J4 | Heilind Electronics | PER MAT-21-9003 |
| RES, 0Ω, 0402 | R5-R6 | Kamaya, Inc. | RMC1/16SJPTH |
| CONN, HDR, ST, PLRZD, 9-PIN | P1 | ITW Pancon | MPSS100-5C |
| DNP | R1-R4*, R7-R9* | | |

Note: Parts with * following the Reference Designators should not be populated on PCBA.



Evaluation Board Assembly Drawing





Pin Names and Descriptions

| Pin | Name | Description | |
|-----|---------|---|--|
| 1 | RF_OUT2 | RF Output ; Internally 50 Ω matched and DC blocked | |
| 2 | GND | Connect to low inductance path to ground | |
| 3 | GND | Connect to low inductance path to ground | |
| 4 | GND | Connect to low inductance path to ground | |
| 5 | GND | Connect to low inductance path to ground | |
| 6 | RF_IN1 | RF Input; Internally 50Ω matched and DC blocked | |
| 7 | GND | Connect to low inductance path to ground | |
| 8 | GND | Connect to low inductance path to ground | |
| 9 | SD1 | Shut down pin for LNA1 | |
| 10 | VPAR1 | Connection for external resistor to raise current when connected from this pad to V_{DD} and to lower current when connected from this pad to ground | |
| 11 | VDD1 | VDD Supply, 10nF decoupling internal, supply for LNA1 | |
| 12 | GND | Connect to low inductance path to ground | |
| 13 | RF_OUT1 | RF Output; Internally 50Ω matched and DC blocked | |
| 14 | GND | Connect to low inductance path to ground | |
| 15 | GND | Connect to low inductance path to ground | |
| 16 | GND | Connect to low inductance path to ground | |
| 17 | GND | Connect to low inductance path to ground | |
| 18 | RF_IN1 | RF Input; Internally 50Ω matched and DC blocked | |
| 19 | GND | Connect to low inductance path to ground | |
| 20 | SD2 | Shut down pin for LNA2 | |
| 21 | VPAR2 | Connection for external resistor to raise current when connected from this pad to V_{DD} and to lower current when connected from this pad to ground | |
| 22 | VDD2 | VDD Supply, 10nF decoupling internal, supply for LNA2 | |
| 23 | GND | Connect to low inductance path to ground | |
| 24 | GND | Connect to low inductance path to ground | |

Truth Table

| | SD1 | SD2 |
|----------|-----|-----|
| LNA1 On | 0 | Х |
| LNA1 Off | 1 | Х |
| LNA2 On | х | 0 |
| LNA2 Off | Х | 1 |

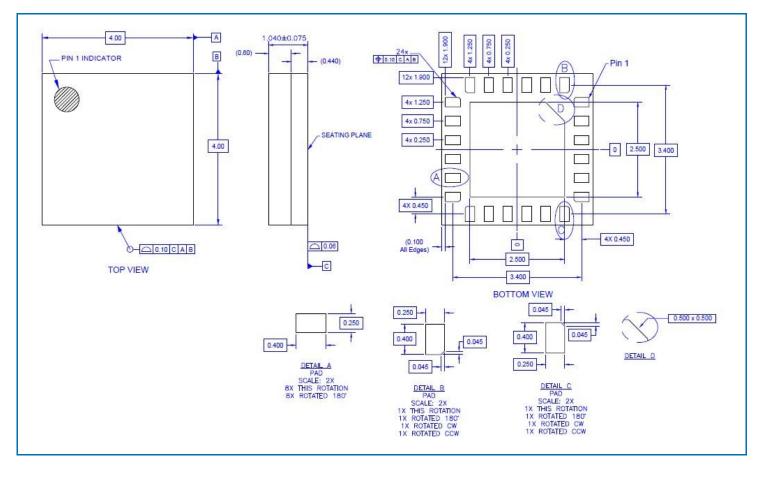
RF Micro Devices Inc. 7628 Thorndike Road, Greensboro, NC 27409-9421

DS131114

For sales or technical support, contact RFMD at +1.336.678.5570 or customerservice@fmd.com. The information in this publication is believed to be accurate. However, no responsibility is assumed by RF Micro Devices, Inc. ("RFMD") for its use, nor for any infringement of patents or other rights of third parties resulting from its use. No license is granted by implication or otherwise under any patent or patent sof patents of RFMD. RFMD reserves the right to change component circuitry, recommended application circuitry and specifications at any time without prior notice.

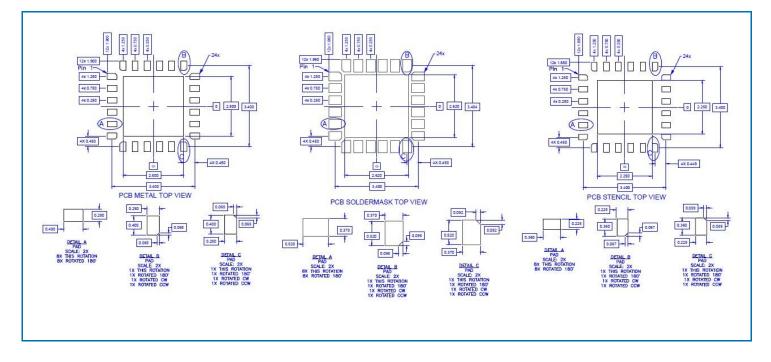


Package Outline Drawing (Dimensions in millimeters)

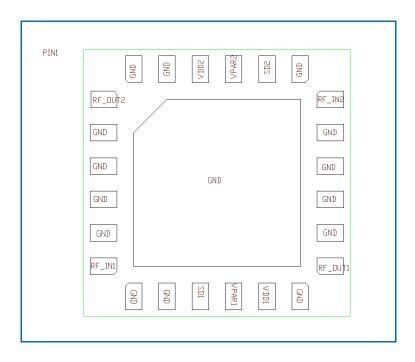




Stencil Drawing (Dimensions in millimeters)



IO Pattern Label

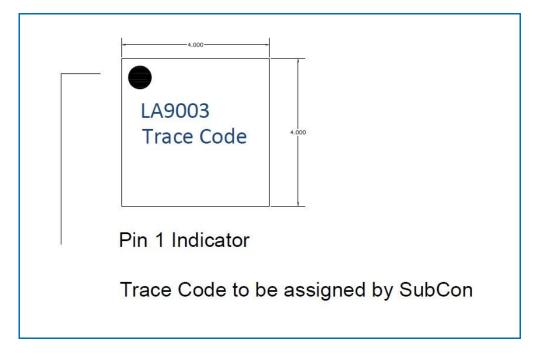


RF Micro Devices Inc. 7628 Thorndike Road, Greensboro, NC 27409-9421 For sales or technical support, contact RFMD at +1.336.678.5570 or customerservice@rfmd.com. DS131114

The information in this publication is believed to be accurate. However, no responsibility is assumed by RF Micro Devices, Inc. ("RFMD") for its use, nor for any infringement of patents or other rights of third parties resulting from its use. No license is granted by implication or otherwise under any patent or patent rights of RFMD. RFMD reserves the right to change component circuitry, recommended application circuitry and specifications at any time without prior notice.



Branding Diagram







Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001 Адрес: 105318, г.Москва, ул.Щербаковская д.З, офис 1107

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж: moschip.ru moschip.ru_4

moschip.ru_6 moschip.ru_9