
nRF24L01 Reference Modules nRF24L01-REFMOD

GENERAL DESCRIPTION

This document describes the nRF24L01 REFMOD with the Nordic Semiconductor nRF24L01 Single Chip 2.4 GHz RF transceiver.



Figure 1: The nRF24L01 Reference Module with PCB antenna and a HC49 crystal

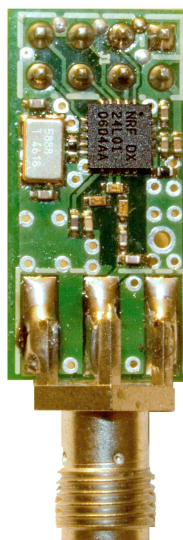


Figure 2: The nRF24L01 Reference Module with SMA connector and SMD crystal



INTRODUCTION

The Reference Modules for the nRF24L01 Single Chip 2.4 GHz RF Transceiver has been developed to enable customers to test functionality, run communication and verify the performance parameters of the device. The nRF24L01 Reference Modules comes with the nRF24L01 EVKIT, but can also be ordered as a separate product from Nordic Semiconductor ASA. The modules come in two versions; one with a SMA connector and one with a quarter wave PCB antenna. The module with SMA connector is intended for conducted measurements.

This document describes the hardware of the nRF24L01 Reference Modules.

The nRF24L01 Reference Modules are intended for evaluation purposes and can be used as a module in an end product.

nRF24L01 REFERENCE MODULE DESCRIPTION

Appendix 1 shows the nRF24L01 REFMOD circuit diagram and PCB layout. The component list is given in Appendix 2.

Figure 3 shows the block diagram of the nRF24L01 REFMOD.

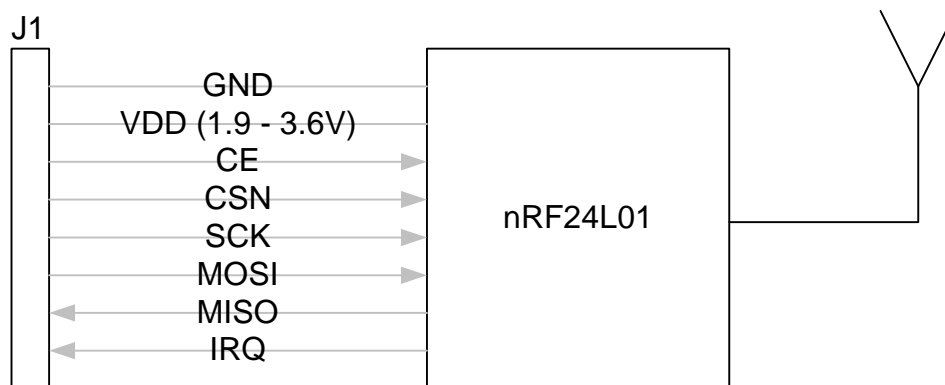


Figure 3: Block diagram of the nRF24L01 REFMOD

All digital signals are routed through one connector (J1, pin out: Table 1) for easy connection to the nRF24L01 EVSYSTEM, MCU evaluation boards or other control circuitry. To operate the nRF24L01, a MCU must be present for device configuration and control.



Pin #	Signal name
1	GND
2	VDD (1.9V – 3.6V)
3	CE
4	CSN
5	SCK
6	MOSI
7	MISO
8	IRQ

Table 1: nRF24L01 REFMOD, J1 pin out

For convenient connection of the differential antenna output/input pins to a single-ended antenna or 50Ω test equipment, a version of the nRF24L01 REFMOD with differential to single ended matching network and a SMA connector is included. This network matches the 50Ω single end antenna or 50Ω test equipment impedance at the SMA connector, J2, to the recommended differential load impedance at the nRF24L01’s RF I/O stage (pins ANT1 & ANT2). The employed matching network introduces an insertion loss of approximately 1dB at 2.4 GHz.



APPENDIX 1: CIRCUIT DIAGRAM AND PCB LAYOUT

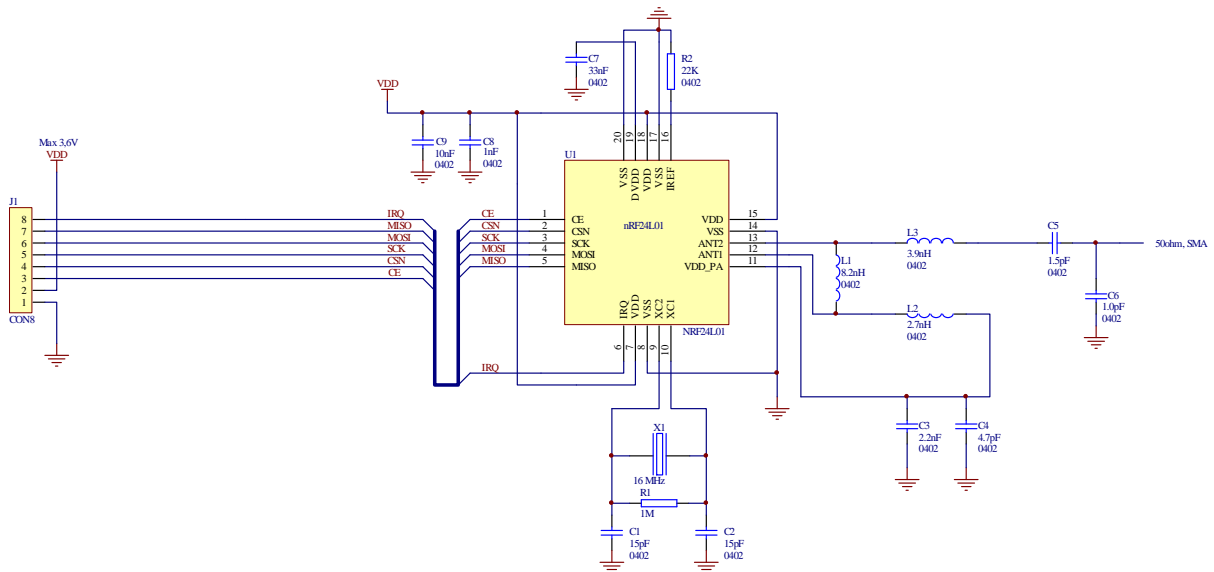


Figure 4: Schematics of the nRF24L01 REFMOD

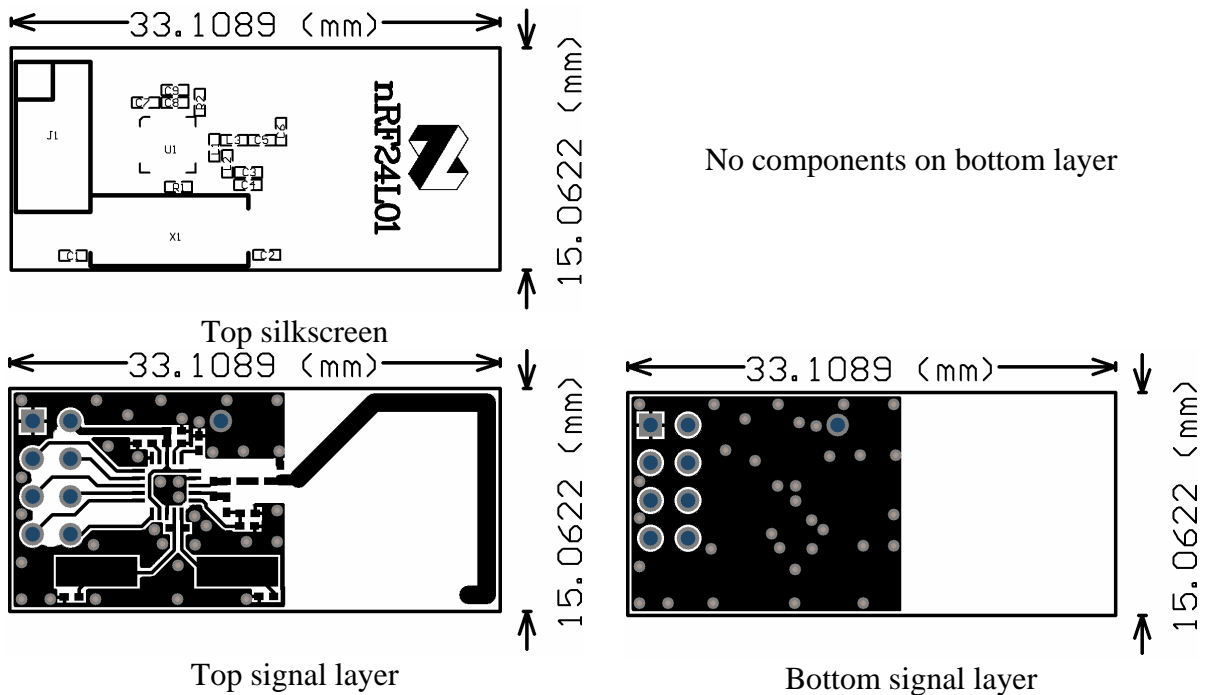


Figure 5: nRF2401 REFMOD with PCB antenna PCB layout

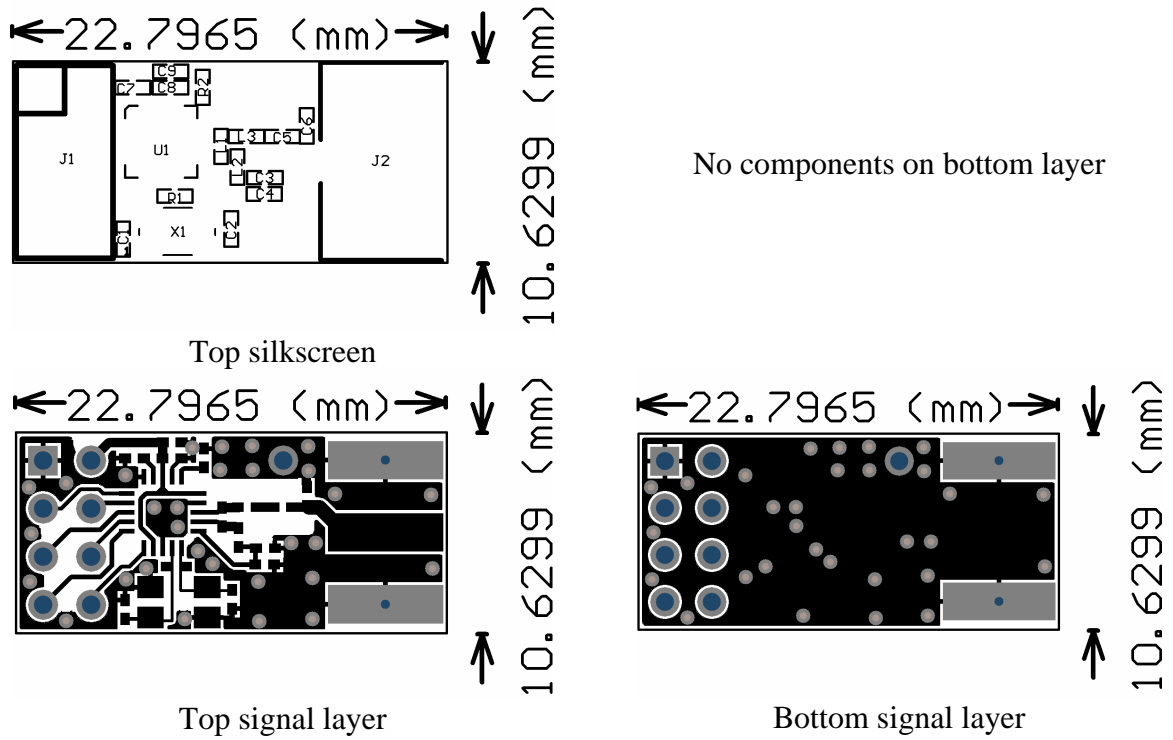


Figure 6: nRF2401 REFMOD with SMA connector PCB layout



APPENDIX 2: COMPONENT LIST

Component list nRF24L01 REFMOD			
Designator	Value	Footprint	Description
C1 ¹	22pF	0402	NPO, +/- 5%, 50V
C2 ¹	22pF	0402	NPO, +/- 5%, 50V
C3	2.2nF	0402	X7R, +/- 10%, 50V
C4	4.7pF	0402	NPO, +/- 0.25 pF, 50V
C5	1.5pF	0402	NPO, +/- 0.1 pF, 50V
C6	1.0pF	0402	NPO, +/- 0.1 pF, 50V
C7	33nF	0402	X7R, +/- 10%, 50V
C8	1nF	0402	X7R, +/- 10%, 50V
C9	10nF	0402	X7R, +/- 10%, 50V
J1	CON8		
L1	8.2nH	0402	chip inductor +/- 5%
L2	2.7nH	0402	chip inductor +/- 5%
L3	3.9nH	0402	chip inductor +/- 5%
R1	1M	0402	+/-5%
R2	22K	0402	+/- 1 %
U1	NRF24L01	QFN20L/5x5	
X1	16MHz	HC49	+/-60ppm, See nRF24L01 Product Specification for full specification

Table 2: nRF24L01 REFMOD component list, common to both versions

The nRF24L01 REFMOD is manufactured on a 1.6mm thick, 2 layer FR4 substrate.

¹ C1 and C2 must have values that match the crystals load capacitance, Cl.



LIABILITY DISCLAIMER

Nordic Semiconductor ASA reserves the right to make changes without further notice to the product to improve reliability, function or design. Nordic Semiconductor does not assume any liability arising out of the application or use of any product or circuits described herein.

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Nordic Semiconductor ASA customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Nordic Semiconductor ASA for any damages resulting from such improper use or sale.

All rights reserved ®. Reproduction in whole or in part is prohibited without the prior written permission of the copyright holder.



YOUR NOTES



Nordic Semiconductor ASA – World Wide Distributors

For Your nearest dealer, please see <http://www.nordicsemi.no>



Main Office:

Vestre Rosten 81, N-7075 Tiller, Norway
Phone: +47 72 89 89 00, Fax: +47 72 89 89 89

Visit the Nordic Semiconductor ASA website at <http://www.nordicsemi.no>

