



**ML7670RD3-EVK-001**  
**ML7671RD3-EVK-001**  
**User's Guide**

---

**REF68022**

# Notice

## Precaution on using ROHM Products

- 1) When using ROHM Products, refer to the latest product information and ensure that usage conditions (absolute maximum ratings<sup>\*1</sup>, recommended operating conditions, etc.) are within the ranges specified. ROHM disclaims any and all liability for any malfunctions, failure or accident arising out of or in connection with the use of ROHM Products outside of such usage conditions specified ranges, or without observing precautions. Even if it is used within such usage conditions specified ranges, semiconductors can break down and malfunction due to various factors. Therefore, in order to prevent personal injury, fire or the other damage from break down or malfunction of ROHM Products, please take safety at your own risk measures such as complying with the derating characteristics, implementing redundant and fire prevention designs, and utilizing backups and fail-safe procedures.
  - **\*1: Absolute maximum ratings: a limit value that must not be exceeded even momentarily.**
- 2) The Products specified in this document are not designed to be radiation tolerant.
- 3) Descriptions of circuits, software and other related information in this document are provided only to illustrate the standard operation of semiconductor products and application examples. You are fully responsible for the incorporation or any other use of the circuits, software, and information in the design of your product or system. And the peripheral conditions must be taken into account when designing circuits for mass production. ROHM disclaims any and all liability for any losses and damages incurred by you or third parties arising from the use of these circuits, software, and other related information.
- 4) No license, expressly or implied, is granted hereby under any intellectual property rights or other rights of ROHM or any third party with respect to ROHM Products or the information contained in this document (including but not limited to, the Product data, drawings, charts, programs, algorithms, and application examples, etc.). Therefore, ROHM shall have no responsibility whatsoever for any dispute, concerning such rights owned by third parties, arising out of the use of such technical information.
- 5) ROHM intends our Products to be used in a way indicated in this document. Please be sure to contact a ROHM sales office if you consider the use of our Products in different way from original use indicated in this document. For use of our Products in medical systems, please be sure to contact a ROHM representative and must obtain written agreement. Do not use our Products in applications which may directly cause injuries to human life, and which require extremely high reliability, such as aerospace equipment, nuclear power control systems, and submarine repeaters, etc. ROHM disclaims any and all liability for any losses and damages incurred by you or third parties arising by using the Product for purposes not intended by us without our prior written consent.
- 6) Please use the Products in accordance with any applicable environmental laws and regulations, such as the RoHS Directive. ROHM shall have no responsibility for any damages or losses resulting non-compliance with any applicable laws or regulations.
- 7) **When providing our Products and technologies contained in this document to other countries, you must abide by the procedures and provisions stipulated in all applicable export laws and regulations, including without limitation the US Export Administration Regulations and the Foreign Exchange and Foreign Trade Act.**
- 8) Please contact a ROHM sales office if you have any questions regarding the information contained in this document or ROHM's Products.
- 9) This document, in part or in whole, may not be reprinted or reproduced without prior consent of ROHM.

**(Note) "ROHM" as used in this document means ROHM Co., Ltd.**

**Other Precaution**

- 1) All information contained in this document is subject to change for the purpose of improvement, etc. without any prior notice. Before purchasing or using ROHM Products, please confirm the latest information with a ROHM sales office.
- 2) ROHM has used reasonable care to ensure the accuracy of the information contained in this document, however, ROHM shall have no responsibility for any damages, expenses or losses arising from inaccuracy or errors of such information.

# Preface

The ML7670RD3-EVK-001/ML7671RD3-EVK-001 is a lightweight, compact reference design using a flexible Printed Circuit (FPC) for NFC wireless power supply and communication of wearable devices.

This reference design was created for the purpose of helping to design small wearable devices such as rings, smart watches, and smart bands. The charging capacity is designed to be approximately 100mW ( $4.8\text{V} \times 22\text{mA}$ ). Since it is possible to provide wireless power supply and communication with a single antenna, it is possible to achieve this with a simple circuit configuration. Since it uses a FPC, it is possible to gently curve the board, and it is also compatible with curved cases such as rings.

This User's Guide describes the ML7670RD3-EVK-001/ML7671RD3-EVK-001.

# Notation

Classification	Notation	Description
Numeric value	XXh, XXH, 0xXX	Indicates a hexadecimal number.
Unit	word, W	1 word = 16 bits
	byte, B	1 byte = 8 bits
	nibble, N	1 nibble = 4 bits
	mega-, M	$10^6$
	kilo-, K	$2^{10} = 1024$
	kilo-, k	$10^3 = 1000$
	milli-, m	$10^{-3}$
	micro-, $\mu$	$10^{-6}$
	nano-, n	$10^{-9}$
	second, s (lower case)	second
Terminology	"H" level	Indicates high level voltage $V_{IH}$ and $V_{OH}$ as specified by the electrical characteristics in the data-sheet.
	"L" level	Indicates low level voltage $V_{IL}$ and $V_{OL}$ as specified by the electrical characteristics in the data-sheet.
	SFR	Special function register. It is control register for system or peripherals.

# Table of Contents

Preface.....	3
Notation.....	4
Table of Contents .....	5
<b>1. Overview .....</b>	<b>6</b>
1.1 Overview .....	6
1.2 Features .....	6
1.3 Reference Design Specifications .....	7
1.4 Example configuration .....	8
1.5 Schematic specifications .....	8
1.5.1 ML7670RD3-EVK-001 Board Schematic Specifications .....	8
1.5.2 ML7671RD3-EVK-001 Board Schematic Specifications .....	9
<b>2. Features .....</b>	<b>9</b>
2.1 Power Circuit.....	9
2.2 Antenna.....	10
2.3 Connecting to a Host Microcontroller (ML7671 CN1).....	10
2.4 Connection with FTDI Board (ML7671 FTDI-IF).....	11
2.5 Connection with batteries .....	11
2.6 Connecting with a Debug Terminal Monitor .....	12
<b>3. Hardware Information .....</b>	<b>13</b>
3.1 ML7670RD3-EVK-001 .....	13
3.1.1 Substrate Information.....	13
3.1.2 Schematic .....	13
3.1.3 Bill of Materials.....	14
3.1.4 Layout .....	15
3.1.5 External Interface Information.....	15
3.2 ML7671RD3-EVK-001 .....	17
3.2.1 Substrate Information.....	17
3.2.2 Schematic .....	17
3.2.3 Bill of Materials.....	18
3.2.4 Layout .....	19
3.2.5 External Interface Information.....	19
<b>4. Reference evaluation data .....</b>	<b>20</b>
4.1 Charging profile.....	20
4.2 Substrate temperature .....	21
4.3 Temperature .....	21
<b>Revision history .....</b>	<b>22</b>

## 1. Overview

### 1.1 Overview

The ML7671RD3-EVK-001 is equipped with the transmitting LSI ML7671, and the ML7670RD3-EVK-001 is equipped with the LSI ML7670 on the receiving side.

By facing the antenna, you can charge the battery connected to the receiving side.

The ML7671RD3-EVK-001 is equipped with an I2C interface, allowing system control and data acquisition from the host microcontroller. In addition, since both the LSI on the transmission side and the LSI on the receiving side have built-in protocols, it is possible to start operation and acquire data with a simple command from the host microcontroller.

### 1.2 Features

- It uses a thin and light FPC, which can be bent lightly and placed in a small space.
- Wireless power supply can be realized by applying this reference design to wearable devices.
- Wireless power supply and communication to the receiving side are realized with a single antenna.
- Built-in power supply and communication protocols, no software development of the radio part is required.
- TX board is equipped with an I2C interface and can be controlled from the host microcontroller

## 1.3 Reference Design Specifications

The specifications of the ML7670RD3-EVK-001 and ML7671RD3-EVK-001 are shown in Table 1.

Table 1 ML7670RD3-EVK-001/ ML7671RD3-EVK-001 Hardware Specifications

<b>ML7670RD3-EVK-001</b>	
Built-in LSI	U1: ML7670-61XHB (*)
Mounted Parts	C1-C10, C12, C13: Capacitors
	D1-D4 : Rectifier Diode
	Q: FET
	R1, R2, R19, R20: Resistance
	RX-coil: Powered Antenna
Component Mounting Pad	C14: Filter Capacitors
Operating voltage	CN2: For Debugger Connection: 6 Pins, 1.27mm pitch
Charging capacity	Powered by a magnetic field
Charging Voltage/Current	100mW (at 2mm antenna distance with ML7671RD3-EVK-001)
External dimensions, board thickness	4.2V, 20mAh
	Dimensions: 50mm x 7.2mm, Substrate Thickness: 0.2mm
<b>ML7671RD3-EVK-001</b>	
Built-in LSI	U1 : ML7671-61XGD (*)
Mounted Parts	C2, C4, C6-C16, C18, C21-C23, C27-C29: Capacitors
	FB1, FB2: Ferrite Beads
	L1, L2: Filter Inductors
	Q1 : FET
	R1-R10: Resistance
	TX-coil: Power Transmission Antenna
	LED : LED
	X1: Quartz Crystal
Component Mounting Pad	C10, C13, C22, C24, C25: Capacitors
	CN1: For Debugger Connection: 6 Pins, 1.27mm pitch
	R11: Resistance
Power Pad	CN4 (Pitch=2mm, $\phi$ =1.0mm)
Operating voltage	VDD : 4.7~5.3V
External dimensions, board thickness	64mm x 8.2mm, Substrate thickness: 0.2mm

(\*) The configuration settings have been updated to ML7671\_Config\_REF68022\_REV1.json for the ML7671 and to ML7670\_Config\_REF68022\_REV1.json for the ML7670.



### 1.4 Example configuration

We have a reference design for wireless charging applications for batteries in ultra-compact devices.

Power the ML7671RD3-EVK-001 and connect the battery to the ML7670RD3-EVK-001 in an example configuration as shown in Figure 1.

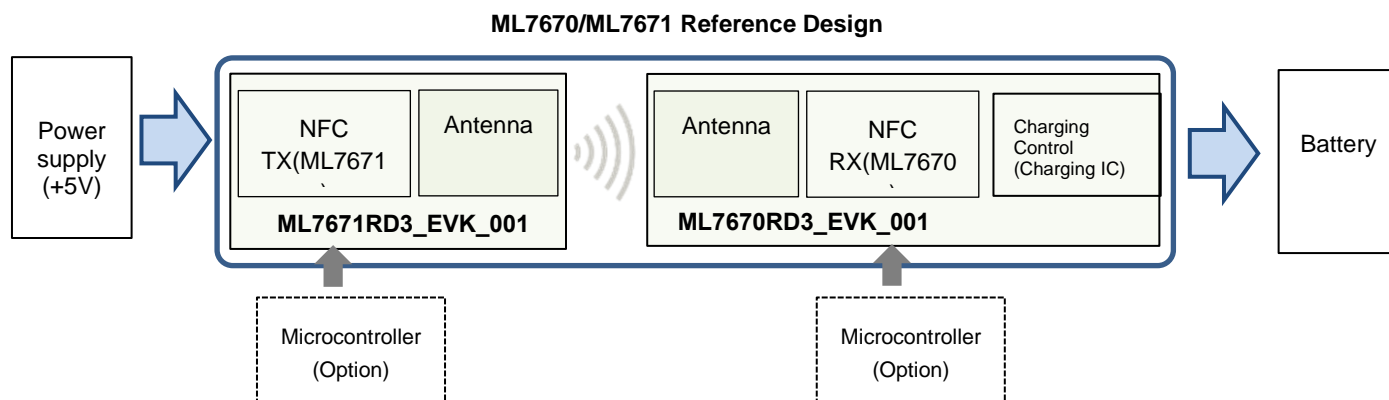


Figure 1 Example block configuration.

### 1.5 Schematic specifications

#### 1.5.1 ML7670RD3-EVK-001 Board Schematic Specifications

The exterior of the ML7670RD3\_EVK-001 is shown in Figure 2.

ML7670RD3\_EVK-001 consists of a powered LSI ML7670-61XHB, a small antenna, a charging IC, and an evaluation connector.

- Powered by the high-frequency magnetic field generated by ML7671RD3\_EVK-001
- Connectors for FTDI and MCU connections
- Equipped with a connector that can be connected to the battery (CN1)

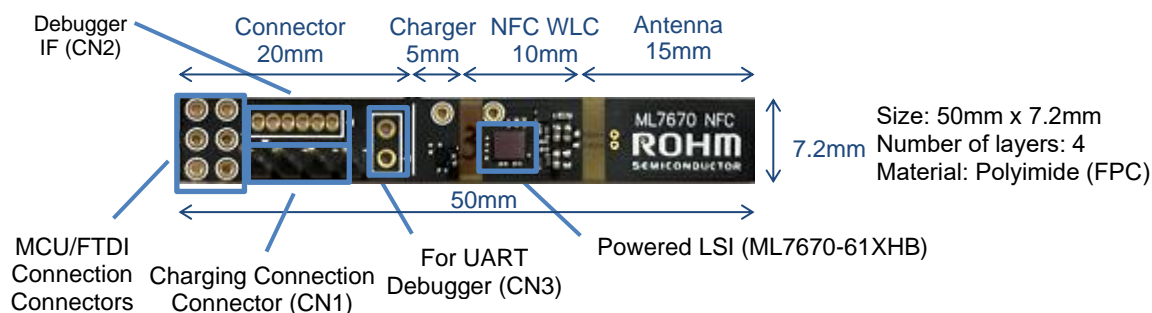


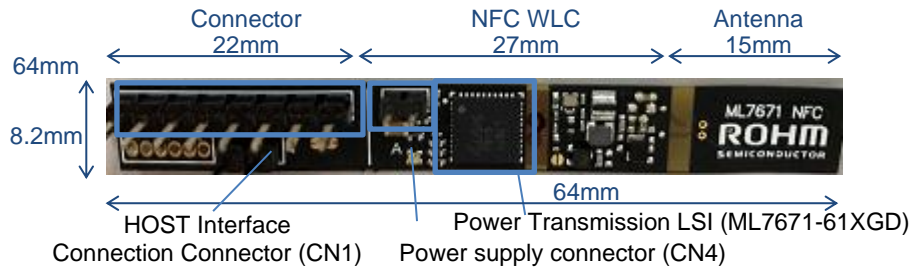
Figure 2. ML7670RD3-EVK-001 Board Exterior Drawing

## 1.5.2 ML7671RD3-EVK-001 Board Schematic Specifications

The appearance of the ML7671RD3-EVK-001 is shown in Figure 3.

The ML7671RD3-EVK-001 consists of a power transmission LSI ML7671-61XGD, a miniature antenna, and an evaluation connector.

- 5V stamped on the power supply connector (CN1) generates a high-frequency magnetic field to power the RX board
- Equipped with a connector (CN1) for connecting to the host microcontroller and FTDI board.



Size: 64mm x 8.2mm  
Number of layers: 4  
Material: Polyimide (FPC)

Figure 3. ML7671RD3-EVK-001 Exterior Drawing

## 2. Features

## 2.1 Power Circuit

Please adjust the power supply voltage so that it is +5.0 V at the power supply connector (CN1) of the ML7671RD3-EVK-001, using a regulated power supply or equivalent. Use a power supply with a voltage ripple of less than 50 mVp-p. To prevent damage to onboard components due to overcurrent, set the current limit to 500 mA.

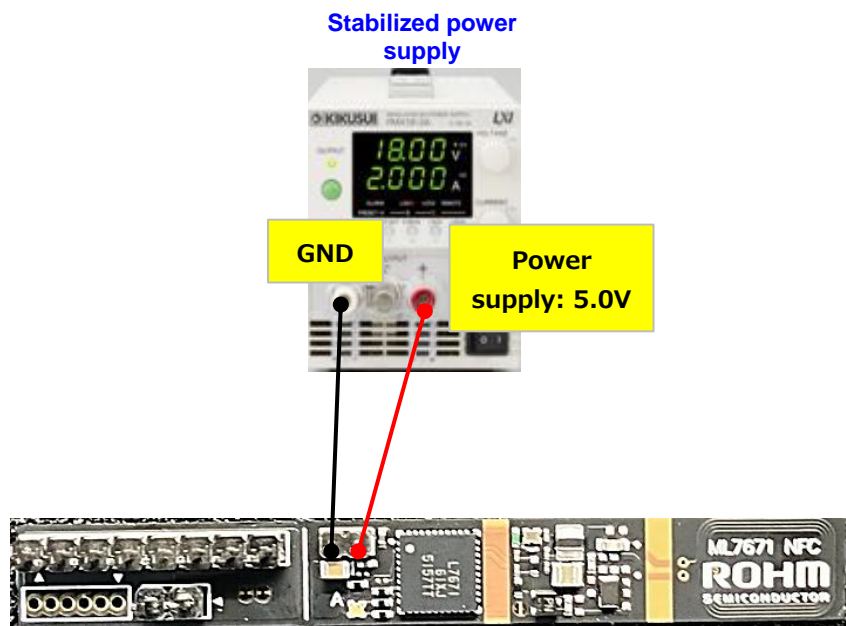


Figure 4. ML7671RD3-EVK-001 Power Terminal Connection

## 2.2 Antenna

As shown in the figure below, place the antennas (ANT-Coil sections) of the ML7671RD3-EVK-001 and ML7670RD3-EVK-001 facing each other. To maintain a constant distance between the antennas, insert a 2 mm-thick spacer between them and secure the assemblies in place using tape or an equivalent method.

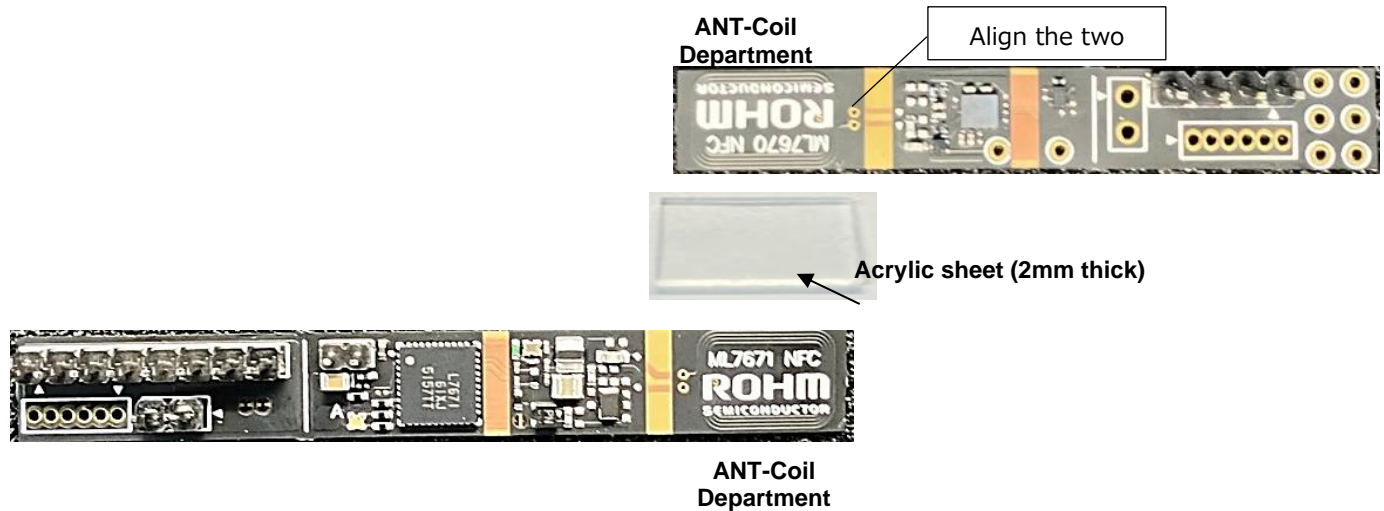


Figure 5. ML7670RD3-EVK-001/ ML7671RD3-EVK-001 Antenna Placement

## 2.3 Connecting to a Host Microcontroller (ML7671 CN1)

Connect the host MCU's I2C terminal to the I2C terminal of the CN1 of the ML7671RD3-EVK-001 (Fig. 6). For information on how to control from the host MCU, refer to the NFC reference software host command manual.

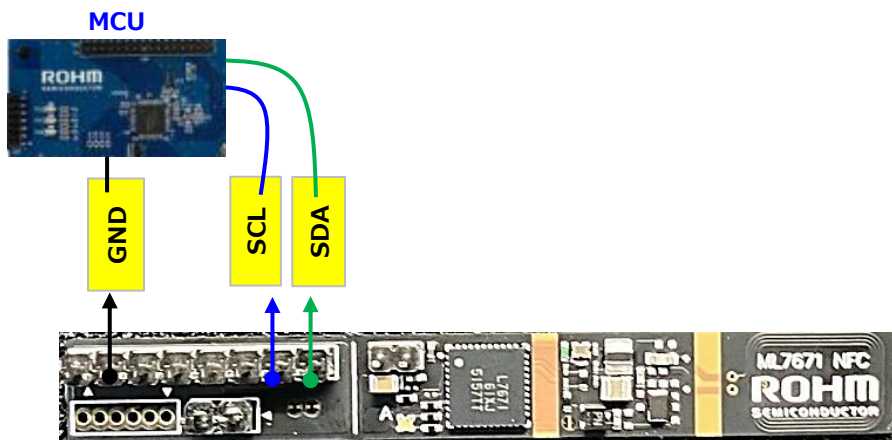


Figure 6. I2C connection to the host microcontroller

## 2.4 Connection with FTDI Board (ML7671 FTDI-IF)

It is possible to rewrite the configuration data of the ML7671 and ML7670 using the FTDI board. The ML7670 uses the NFC communication function of the ML7671 to perform rewrites. In addition, when using the evaluation kit, it is connected to the FTDI board for evaluation. Connect the I2C terminal of the FTDI board to the CN1 of the ML7671RD3-EVK-001 (Figure 7). For information on how to use the Configuration tool and parameters, refer to the Configuration Tool Manual and the ML7670/ML7671 Application Note.

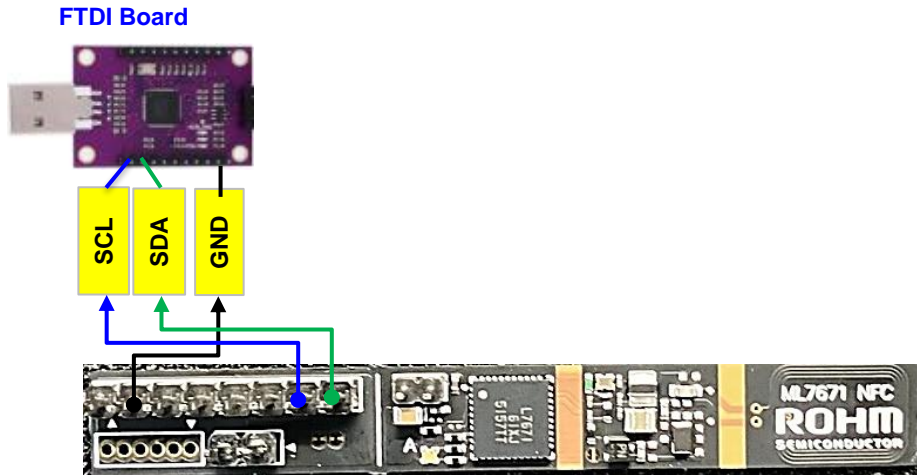


Figure 7. Connection with FTDI Board

## 2.5 Connection with batteries

The power obtained by wireless power supply is supplied to the lithium-ion battery through the Charger\_VOUT terminal after information exchange in communication between the TX and RX. Connect the batteries to be charged to the Charger\_VOUT (+) and GND (-) terminals of the ML7670RD3-EVK-001. Check the Charger\_VOUT terminals to check the power received to the ML7670RD3-EVK-001.

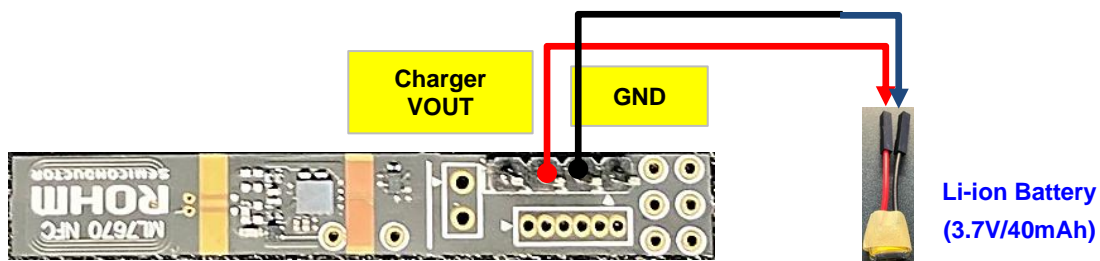


Figure 8. Connection with the battery

## 2.6 Connecting with a Debug Terminal Monitor

When debugging the operation of the ML7671RD3-EVK-001/ ML7670RD3-EVK-001, you can debug it with a PC by connecting the USB-UART FTDI board to the debug terminal monitor connector (TP1). For more information about the log analysis tool, download it from the ROHM website.

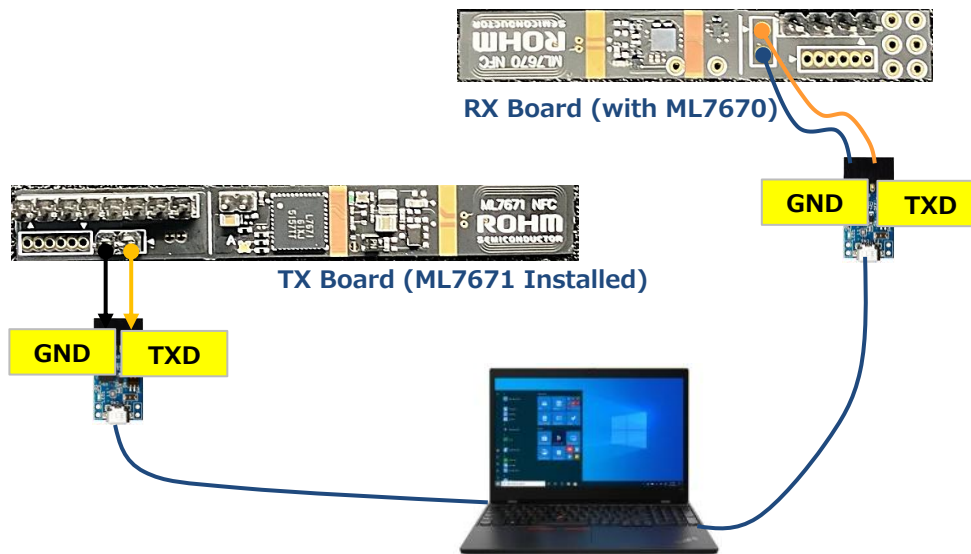


Fig. 9 Connection to the Debug Terminal Monitor

### 3. Hardware Information

### 3.1 ML7670RD3-EVK-001

### 3.1.1 Substrate Information

- Size: 50mm x 7.2mm
- Number of layers: 4
- Material: Polyimide (FPC)

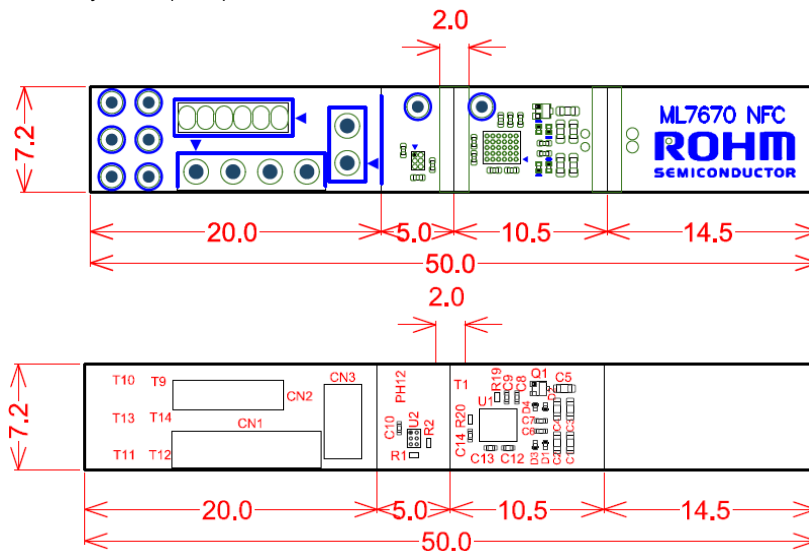


Figure 10 ML7670RD3-EVK-001 PCB Diagram

### 3.1.2 Schematic

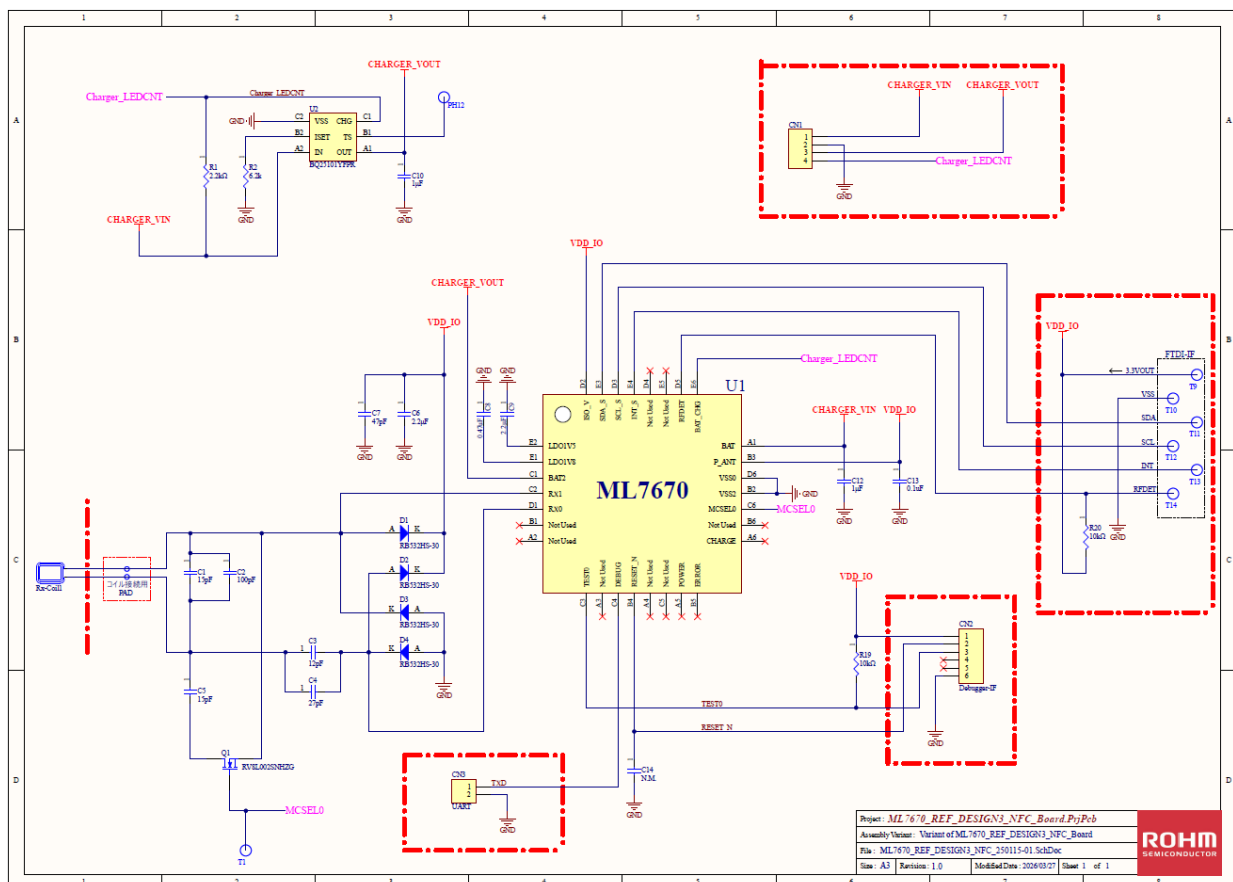


Figure 11. ML7670RD3-EVK-001 Schematic

## 3.1.3 Bill of Materials

Table 2. ML7670RD3-EVK-001 Parts List

Character	Value	Size	Part Number	Maker	Mounted	Note	Quantity
C1	15pF	1005(JIS)	GRM1555C2A150GE01D	Murata	○	100Vdc,2%,matching	1
C2	100pF	1005(JIS)	GRM1555C1H101FB01D	Murata	○	50Vdc,1%,matching	1
C3	12pF	1005(JIS)	GRM1555C2A120GE01D#	Murata	○	100Vdc,2%,matching	1
C4	27pF	1005(JIS)	GRM1555C1H270FB01D	Murata	○	50Vdc,1%,matching	1
C5	15pF	1005(JIS)	GRM1555C2A150GE02#	Murata	○	100Vdc,2%,matching	1
C6	2.2uF	0603(JIS)	GRM033R61C225ME01#	Murata	○	16Vdc,20%,Bypass capacitor	1
C7	47pF	0603(JIS)	GRM0335C1H470FA01#	Murata	○	50Vdc,1%,VDD_IO Bypass capacitor	1
C8	0.47uF	0603(JIS)	GRM033R60J474KE90#	Murata	○	6.3Vdc,Bypass capacitor	1
C9	2.2uF	0603(JIS)	GRM033R61C225ME01#	Murata	○	16Vdc,20%,Bypass capacitor	1
C12	1uF	0603(JIS)	GRM033R61C105ME15#	Murata	○	16Vdc,20%,Bypass capacitor	1
C13	0.1uF	0603(JIS)	GRM033R61C104KE18#	Murata	○	16Vdc,Bypass capacitor	1
C14	N.M.	0603(JIS)	-	-	-	-	1
CN1	4-Pin header	2.54mm pitch	-	-	○	-	1
D1	-	SOD-962	RB532HS-30	Rohm	○	Shotkey_Diode,30V/200mA/0.25~0.43V	1
D2	-	SOD-962	RB532HS-30	Rohm	○	Shotkey_Diode,30V/200mA/0.25~0.43V	1
D3	-	SOD-962	RB532HS-30	Rohm	○	Shotkey_Diode,30V/200mA/0.25~0.43V	1
D4	-	SOD-962	RB532HS-30	Rohm	○	Shotkey_Diode,30V/200mA/0.25~0.43V	1
Q	-	DFN1010-3W	RV8L002SNHZG	Rohm	○	MOSFET for MCSEL0 switching	1
R19	10kΩ	0603(JIS)	MCR03JZH103	Rohm	○	0.1W,±5%, Pull-up	1
R20	10kΩ	0603(JIS)	MCR03JZH103	Rohm	○	0.1W,±5%, Pull-up	1
Rx-Coil1	Pattern Coil	11.5mm×7mm	-	-	-	-	1
T1	Small Pad	-	-	-	-	MCSEL0,Through hole	1
CN3	2-Pin Header	2-Pin(Pitch=2.54mm, φ=1.0mm)	PH-1x2SG	-	○	-	1
CN2	6-Pin Header	6-Pin(Pitch=1.27mm)	XB-1-5-6P	-	-	-	1
T9	Small Pad	-	-	-	-	3.3VOUT,Through hole	1
T10	Small Pad	-	-	-	-	VSS,Through hole	1
T11	Small Pad	-	-	-	-	SDA,Through hole	1
T12	Small Pad	-	-	-	-	SCL,Through hole	1
T13	Small Pad	-	-	-	-	INT,Through hole	1
T14	Small Pad	-	-	-	-	RFDET,Through hole	1
U1	-	WLCSP30(2.28mm×2.56mm)	ML7670-61XHB	Rohm	○	S-UFLGA30-2.28×2.56-0.40-W Configuration data for ref68022 is built in	1
U2	-	1.60mm x 0.90mm	BQ25101	TI	○	DSBGA-6	1
R1	2.2k	1005(JIS)	MCR01M2P2201	Rohm	○	0.063W,±5%, Pull-up	1
R2	6.2K	1005(JIS)	MCR01M2P6201	Rohm	○	0.063W,±5%, Pull-up	1
C10	1uF	0603(JIS)	GRM033R61C105ME15#	Murata	○	16Vdc,20%,Bypass capacitor	1

3.1.4 Layout

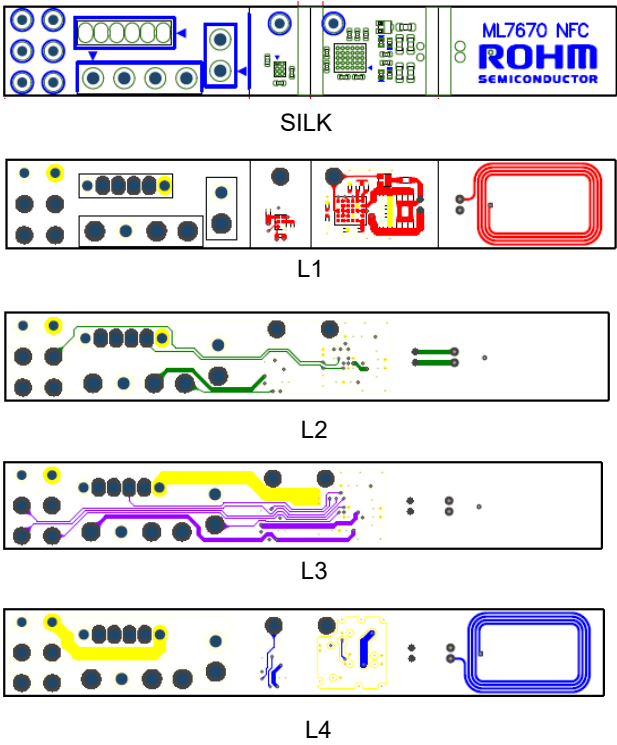


Figure 12 ML7671RD3-EVK-001 board diagram

3.1.5 External Interface Information

Connector for charging IC connection

CN No	PIN No	Terminal Name	I/O	Description
CN1	1	CHARGER_VIN		Charging IC supply supply voltage
	2	GND	-	Grand
	3	CHARGER_VOUT		Battery Voltage Monitor Terminals
	4	Charger_LEDCNT	O	Full state of charge input terminal

Connector for connecting the debugger

CN No	PIN No	Terminal Name	I/O	Description
CN2	1	VDD_IO		Logic IO Power Terminals
	2	RESET_N	I	Reset Input Terminal
	3	TEST0	I/O	Debagge I/O terminals
	4	NC		NC Pin
	5	NC		NC Pin
	6	GND		Grand

Debug terminal monitor connector

CN No	PIN No	Terminal Name	I/O	Description
CN3	1	TXD	O	Debug Terminals
	2	GND		Grand



## FTDI Interface Connection Connector

CN No	PIN No	Terminal Name	I/O	Description
FTDI-IF	T9	VDD_IO		Logic IO Power Terminals (for Host Communication)
	T10	GND		Grand
	T11	SDA_S	I/O	I2C Target Data I/O Terminals
	T12	SCL_S	I/O	I2C Target Clock Input
	T13	INT_S	I/O	Interrupt output terminals
	T14	RFDET	O	Magnetic field detection signal output terminal

### 3.2 ML7671RD3-EVK-001

### 3.2.1 Substrate Information

Size: 64mm x 8.2mm

- Number of layers: 4  
Material: Polyimide (FPC)

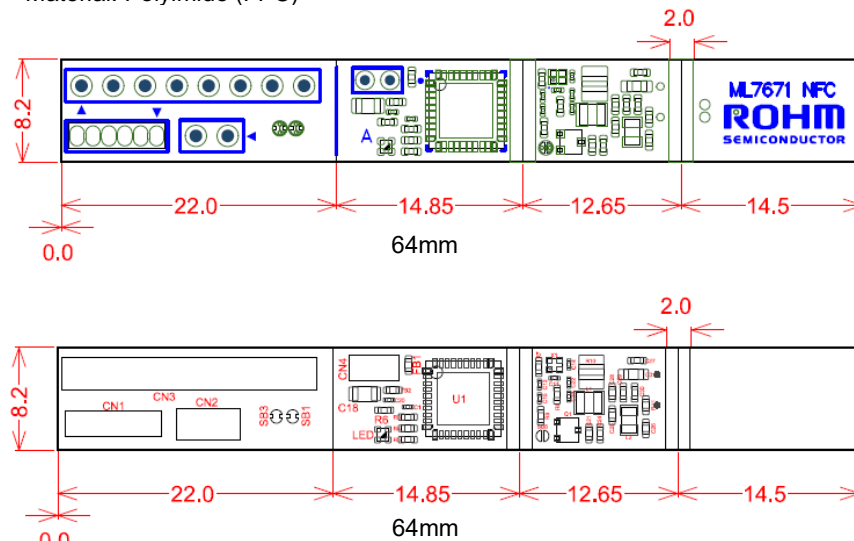


Figure 13 ML7671RD3-EVK-001 PCB Diagram

### 3.2.2 Schematic

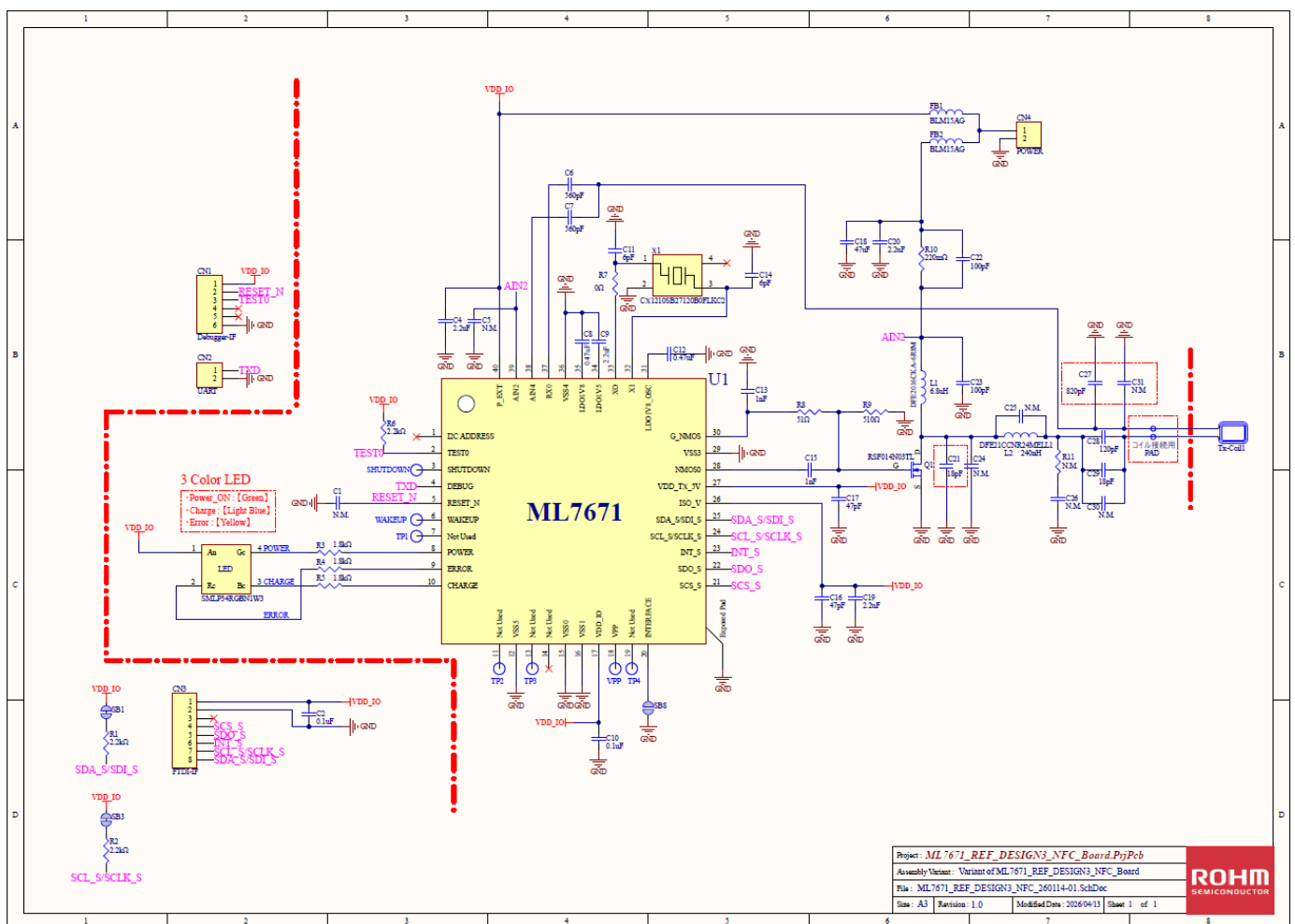


Figure 14. ML7671RD3-EVK-001 Schematic

## 3.2.3 Bill of Materials

Table 3. ML7671RD3-EVK-001 Parts List

Designator	Value	Size	Part Number	Maker	Mounted	Note	Quantity
C1, C5	N.M.	0603(JIS)	-	-	-	-	2
C2, C10	0.1uF	0603(JIS)	GRM033R61C104KE18#	Murata	○	16Vdc,10%	2
C4, C9	2.2uF	0603(JIS)	GRM035R61C225ME01#	Murata	○	16Vdc,20%	2
C19, C20	N.M.	0603(JIS)	-	-	-	-	2
C6, C7	560pF	0603(JIS)	GRM033R71C561KA01#	Murata	○	16Vdc,10%	2
C8, C12	0.47uF	0603(JIS)	GRM033R60J474KE90#	Murata	○	6.3Vdc,10%	2
C11, C14	6pF	0603(JIS)	GRM0335C1H6R0BA01#	Murata	○	50Vdc,1%	2
C13	1nF	0603(JIS)	GRM033B11E102KA01#	Murata	○	25Vdc,10%	1
C15	1nF	0603(JIS)	GRM0335C1E102FA01#	Murata	○	25Vdc,1%	1
C16	47pF	0603(JIS)	GRM0335C1H470FA01#	Murata	○	50Vdc,1%	1
C17	N.M.	0603(JIS)	-	-	-	-	1
C18	47uF	2012(JIS)	GRM21BR61A476ME15#	Murata	○	10Vdc,20%	1
C21	18pF	1005(JIS)	GRM1555C1H180FB01D#	Murata	○	50Vdc,1%,matching	1
C22, C23	100pF	0603(JIS)	GRM0335C1H101FA01#	Murata	○	50Vdc,1%	2
C24	N.M.	1005(JIS)	-	-	-	-	1
C25, C26	N.M.	1005(JIS)	-	-	-	-	2
C27	820pF	1005(JIS)	GRM1555C1H821GB01D	Murata	○	50Vdc,1%	1
C28	120pF	1005(JIS)	GRM1555C2A121GE01#	Murata	○	100Vdc,2%,matching	1
C29	18pF	1005(JIS)	GRM1555C1H180FB01D#	Murata	○	50Vdc,1%,matching	1
C30	N.M.	1005(JIS)	-	-	-	-	1
C31	N.M.	1608(JIS)	-	-	-	-	1
CN4	2-Pin Header	2-Pin(Pitch=2mm, $\phi$ =1.0mm)	PH2-1X25BG	-	○	-	1
CN2	2-Pin Header	2-Pin(Pitch=2.54mm, $\phi$ =1.0mm)	PH-1x25G	-	○	-	1
CN1	6-Pin Header	6-Pin(Pitch=1.27mm)	XB-1-5-6P	-	-	-	1
FB1, FB2	-	1005(JIS)	BLM15AG100SN1D	Murata	○	-	2
CN3	8-Pin Header	8-Pin(Pitch=2.54mm)	PH-1x8SG	-	○	-	1
L1	6.8uH	2mm × 1.6mm	DfE201610E-6R8M=P2#	Murata	○	-	1
L2	240nH	2mm × 1.2mm	DfE21CCNR24MELL1	Murata	○	-	1
LED	-	1mm × 1mm	SMLP34RGB1W3C	Rohm	○	3-color LED	1
Q1	-	SOT-323T	RSF014N03	Rohm	○	-	1
R1, R2, R6	2.2k $\Omega$	1005(JIS)	MCR01MZPJ222	Rohm	○	0.063W, $\pm$ 5%, Pull-up	3
R3, R4, R5	1.8k $\Omega$	1005(JIS)	MCR01MZPJ182	Rohm	○	0.063W, $\pm$ 5%, Pull-up	3
R7	0 $\Omega$	1005(JIS)	RK73Z1ERTTP	KOA	○	-	1
R8	51 $\Omega$	1005(JIS)	MCR01MZPJ510	Rohm	○	0.063W, $\pm$ 5%	1
R9	510 $\Omega$	1005(JIS)	MCR01MZPJ511	Rohm	○	0.063W, $\pm$ 5%	1
R10	220m $\Omega$	1.2mm × 2.0mm	LTR10LEZPFLR220	Rohm	○	1W, $\pm$ 1%	1
R11	N.M.	1005(JIS)	-	-	-	-	1
SB1, SB3	Solderbridge Shorted	-	Solderbridge Shorted	-	-	-	2
SB8	Solderbridge	-	Solderbridge	-	-	-	1
SHUTDOWN1, TP1, TP2, TP3, TP4, VPP1, WAKEUP1	Small Pad	$\phi$ =0.5mm	-	-	-	-	7
Tx-Coil1	Pattern Coil	11.5mm × 8mm	-	-	-	-	1
U1	-	6mm × 6mm, QFN	ML7671-61XGD	Rohm	○	WQFN-40pin Configuration data for ref68022 is built in	1
X1	-	1.2mm × 1.0mm	CX1210SB27120B0FLKC2	Kyocera	○	-	1

3.2.4 Layout

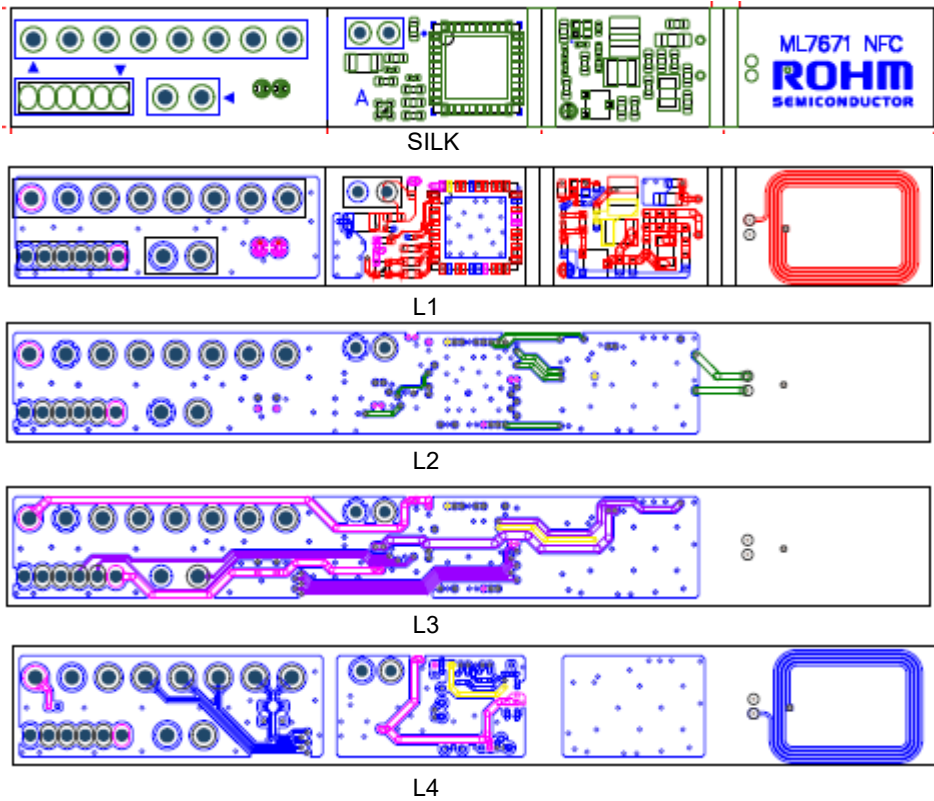


Figure 15 ML7671RD3-EVK-001 Board Diagram

3.2.5 External Interface Information

Connector for connecting the debugger

CN No	PIN No	Terminal Name	I/O	Description
CN1	1	VDD_IO		Logic IO Power Terminals
	2	RESET_N		Unused
	3	TEST0		Unused
	4	NC	I	NC Pin
	5	NC	I	NC Pin
	6	GND		Grand

Debug terminal monitor connector

CN No	PIN No	Terminal Name	I/O	Description
CN2	1	TXD	O	Debug Terminals
	2	GND		Grand

FTDI Interface Connection Connector

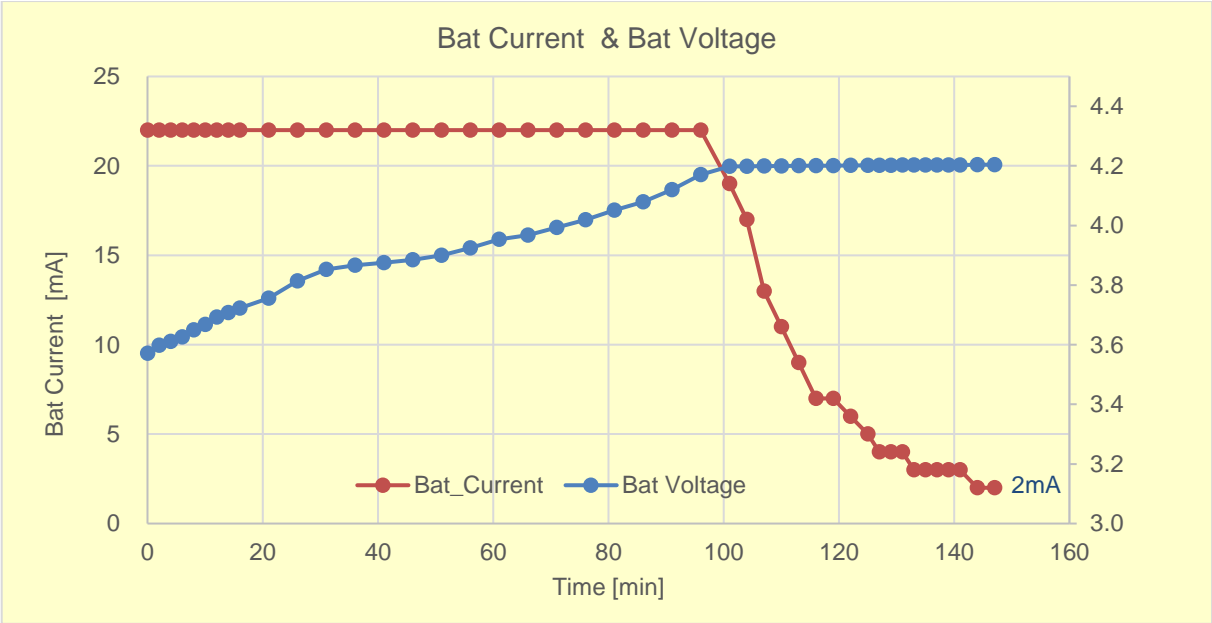
CN No	PIN No	Terminal Name	I/O	Description
CN3	1	VDD_IO		Logic IO Power Terminals (for Host Communication)
	2	GND		Grand
	3	NC		
	4	SCS_S		No Use
	5	SDO_S		No Use
	6	INT_S	O	Interrupt output terminals
	7	SCL_S	I/O	I2C Target Clock Input/
	8	SDA_S	I/O	I2C Target Data Input/Output Terminals

Power supply connector

	PIN No	Terminal Name	I/O	Description
CN4	1	POWER		Power Input (+5V)
	2	GND		Grand

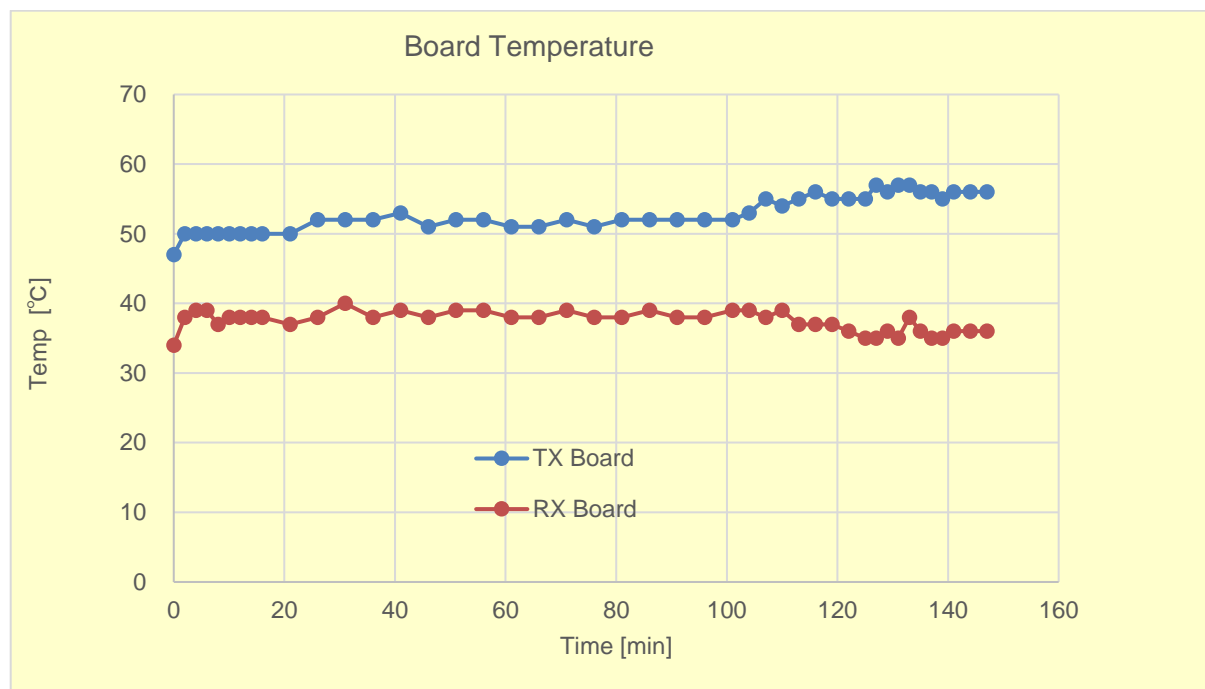
4. Reference evaluation data

4.1 Charging profile



\*Power supply voltage: 5.0V, Battery=3.7V / 40mAh, state LED=ON  
Charger charge current = set to 22mA

## 4.2 Substrate temperature



\*Power supply voltage: 5.0V, Battery=3.7V / 40mAh, state LED=ON  
Charger charge current = set to 22mA

## 4.3 Temperature



Figure 16: Operating Board Temperature

Note: The data provided is for reference only. It is not a guaranteed value.  
The temperature fluctuates depending on the actual operating environment.

Revision history

Document No.	Publication date	Pages		What's changed
		Before the revision	After the revision	
FEXT767xRD3-EVK-001_UG-01	2026.04.17	—	—	First version