MN52M-U32

Bluetooth® Low Energy Module

Datasheet Version A

Ordering Code

MN52M-U32 module for Tray packaging: MN-832Q2-01A-UT

BLE Solution: Nordic NRF52832

RF IC	Crystal	UFL connector
Nordic NRF52832/V2	32MHz/20ppm Embedded	Embedded

Overview and Benefits

Overview

The MN52M-U32 from Aradconn is a highly flexible, ultra-low power, Bluetooth Low Energy module based on the nRF52832 SoC from Nordic Semiconductor. With an Arm® Cortex®-M4 with FPU 32-bit processor, embedded 2.4GHz transceiver, and integrated UFL connector. Providing full use of the nRF52832's capabilities and peripherals, which include I2C, SPI, UART, I2S, ADC, GPIO, PWM and NFC interfaces.

Benefits

- **Bluetooth qualification and Regulatory certification reduce the burden to enter the market.**
- **Complete RF solution with no additional RF design, allowing faster time to launch a new product, and providing long working distance.**

  MN52M-U: up to 490 meters in open space. @1 Mbps

- **Compact size: (L) 15.8 x (W) 9.0 x (H) 2.2mm.**
- **Provides flexibility in the OEM's application development choice with full support for using Nordic SDK and firmware tools.**

Contents

1. Features and Application

1.1 Features

- **2.4 GHz transceiver**
  - -96 dBm sensitivity in Bluetooth® low energy mode
  - Supported data rates: 1 Mbps, 2 Mbps Bluetooth® low energy mode
  - -20 to +4 dBm TX power, configurable in 4 dB steps
  - 5.3 mA peak current in TX (0 dBm)
  - 5.4 mA peak current in RX
  - RSSI (1 dB resolution)
- **Arm® Cortex®-M4 32-bit processor with FPU, 64 MHz**
  - 215 EEMBC CoreMark® score running from flash memory
  - 58 µA/MHz running from flash memory
  - 51.6 µA/MHz running from RAM
  - Serial wire debug (SWD)
- **Flexible power management**
  - 1.7 V–3.6 V supply voltage range
  - Fully automatic LDO and DC/DC regulator system
  - 0.3 µA at 3 V in System OFF mode
  - 0.7 µA at 3 V in System OFF mode with full 64 kB RAM retention
  - 1.9 µA at 3 V in System ON mode, no RAM retention, wake on RTC
- **Memory**
  - 512 kB flash/64 kB RAM
- **Nordic SoftDevice ready**
- **Support for concurrent multi-protocol**
- **Type 2 near field communication (NFC-A) tag with wakeup-on-field and touch-to-pair capabilities**
- **12-bit, 200 ksps ADC - 8 configurable channels with programmable gain**
- **64 level comparator**
- **15 level low power comparator with wakeup from System OFF mode**
- **Temperature sensor**
- **32 general purpose I/O pins**
- **3x 4-channel pulse width modulator (PWM) unit with EasyDMA**
- **Digital microphone interface (PDM)**
- **5x 32-bit timer with counter mode**
- **Up to 3x SPI master/slave with EasyDMA**
- **Up to 2x I2C compatible 2-wire master/slave**

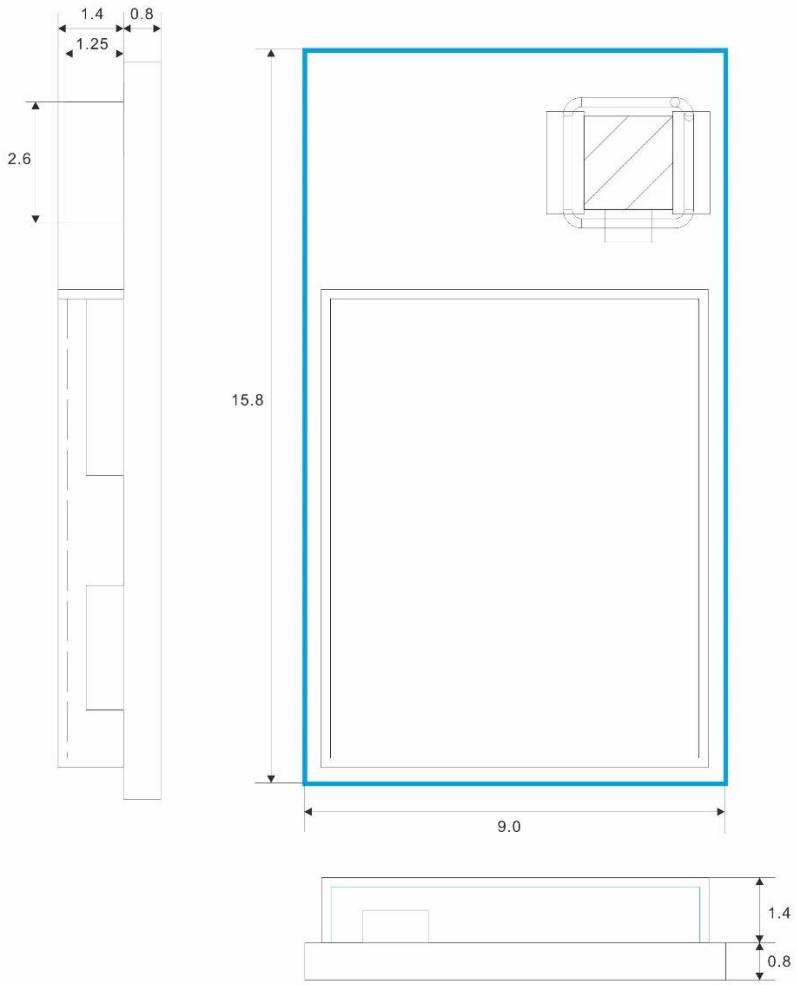
- **I2S with EasyDMA**
- **UART (CTS/RTS) with EasyDMA**
- **Programmable peripheral interconnect (PPI)**
- **Quadrature decoder (QDEC)**
- **AES HW encryption with EasyDMA**
- **Autonomous peripheral operation without CPU intervention using PPI and EasyDMA**
- **3x real-time counter (RTC)**
- **Single crystal operation**

1.2 Application

Iot	• Home automation • Sensor networks • Building automation • Industrial • Retail
Personal Area Networks	• Health / fitness sensor and monitor device • Medical devices • Key-fobs and wrist watches
Interactive entertainment devices	• Remote control • Gaming controller
Beacons	
A4WP wireless chargers and devices	
Remote control toys	
Computer peripherals and I/O devices	• Mouse • Keyboard • Multi-touch trackpad • Gaming

2. Mechanical specifications

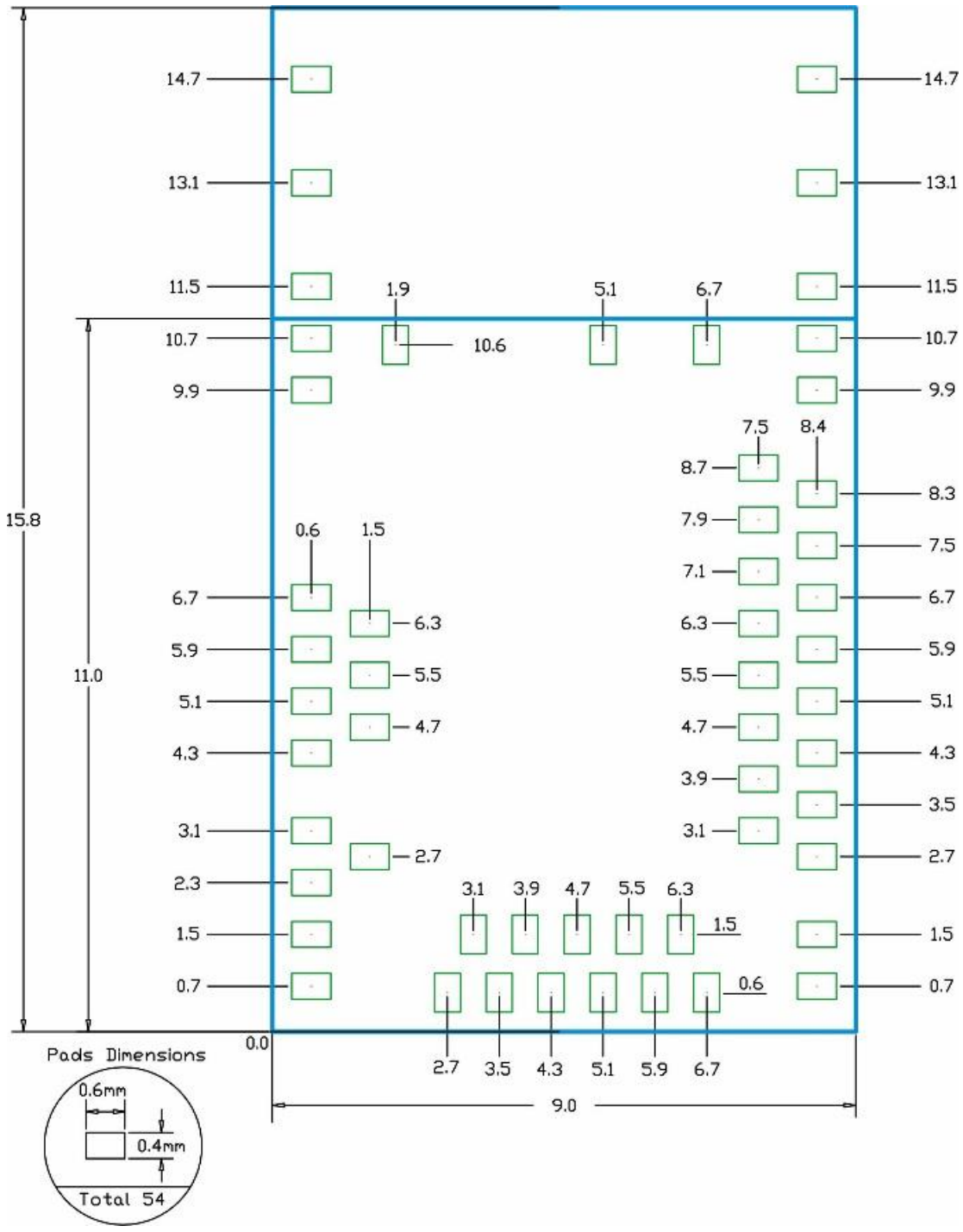
2.1 Dimensions



All dimensions are in millimeters.

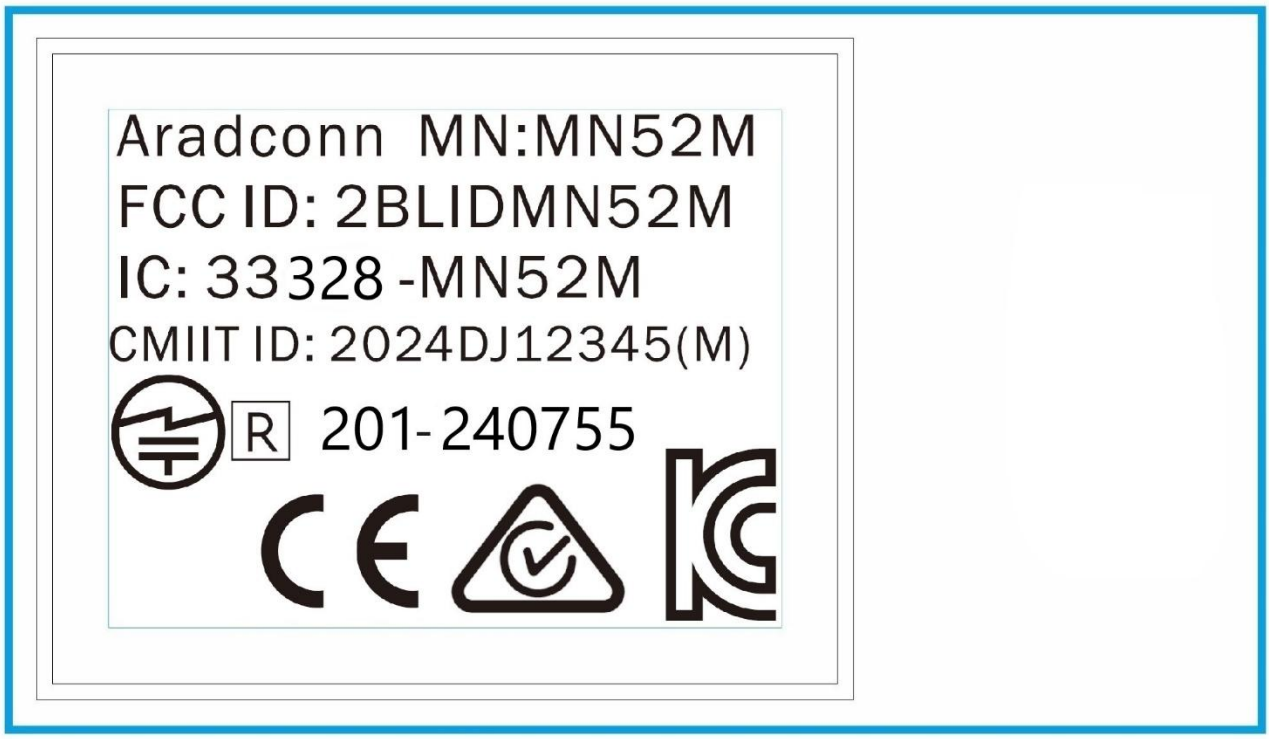
Item	Dimension	Tolerance
Length	15.8mm	±0.30 mm
Width	9.0mm	±0.30mm
Height	2.2mm	±0.30mm

2.2 Footprint

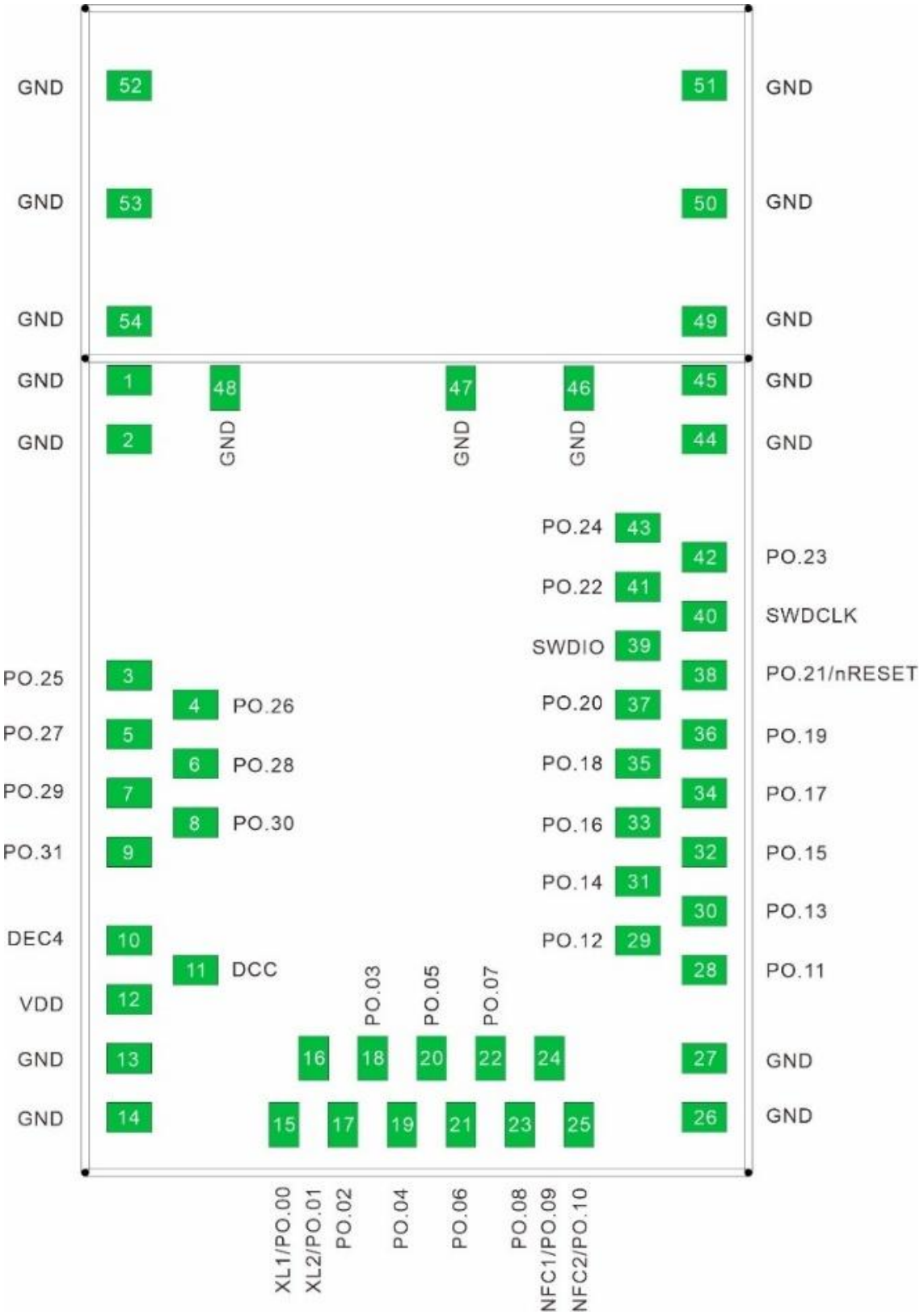


All dimensions are in millimeters.

2.3 Module Marking



3. Pin Assignment



Pin No.	Name	Pin function	Description
(1)	GND	Ground	The pad must be connected to a solid ground plane
(2)	GND	Ground	The pad must be connected to a solid ground plane
(3)	P0.25	Digital I/O	General-purpose digital I/O
(4)	P0.26	Digital I/O	General-purpose digital I/O
(5)	P0.27	Digital I/O	General-purpose digital I/O
(6)	P0.28	Digital I/O	General-purpose digital I/O
	AIN4	Analog input	SAADC/COMP/LPCOMP input
(7)	P0.29	Digital I/O	General-purpose digital I/O
	AIN5	Analog input	SAADC/COMP/LPCOMP input
(8)	P0.30	Digital I/O	General-purpose digital I/O
	AIN6	Analog input	SAADC/COMP/LPCOMP input
(9)	P0.31	Digital I/O	General-purpose digital I/O
	AIN7	Analog input	SAADC/COMP/LPCOMP input
(10)	DEC4	Power	1V3 regulator supply decoupling. Input from DC/DC converter. Output from 1V3 LDO
(11)	DCC	Power	DC/DC converter output pin
(12)	VDD	Power	Power-supply pin
(13)	GND	Ground	The pad must be connected to a solid ground plane
(14)	GND	Ground	The pad must be connected to a solid ground plane
(15)	P0.00	Digital I/O	General-purpose digital I/O
	XL1	Analog input	Connection to 32.768kHz crystal (LFXO)
(16)	P0.01	Digital I/O	General-purpose digital I/O
	XL2	Analog input	Connection to 32.768kHz crystal (LFXO)
(17)	P0.02	Digital I/O	General-purpose digital I/O
	AIN0	Analog input	SAADC/COMP/LPCOMP input
(18)	P0.03	Digital I/O	General-purpose digital I/O
	AIN1	Analog input	SAADC/COMP/LPCOMP input
(19)	P0.04	Digital I/O	General-purpose digital I/O
	AIN2	Analog input	SAADC/COMP/LPCOMP input
(20)	P0.05	Digital I/O	General-purpose digital I/O
	AIN3	Analog input	SAADC/COMP/LPCOMP input
(21)	P0.06	Digital I/O	General-purpose digital I/O
(22)	P0.07	Digital I/O	General-purpose digital I/O
(23)	P0.08	Digital I/O	General-purpose digital I/O
(24)	P0.09	Digital I/O	General-purpose digital I/O
	NFC1	NFC input	NFC antenna connection
(25)	P0.10	Digital I/O	General-purpose digital I/O
	NFC2	NFC input	NFC antenna connection
(26)	GND	Ground	The pad must be connected to a solid ground plane
(27)	GND	Ground	The pad must be connected to a solid ground plane

Pin No.	Name	Pin function	Description
(28)	P0.11	Digital I/O	General-purpose digital I/O
(29)	P0.12	Digital I/O	General-purpose digital I/O
(30)	P0.13	Digital I/O	General-purpose digital I/O
(31)	P0.14	Digital I/O	General-purpose digital I/O
	TraceData(3)		Trace port output
(32)	P0.15	Digital I/O	General-purpose digital I/O
	TraceData(2)		Trace port output
(33)	P0.16	Digital I/O	General-purpose digital I/O
	TraceData(1)		Trace port output
(34)	P0.17	Digital I/O	General-purpose digital I/O
(35)	P0.18	Digital I/O	General-purpose digital I/O
	TraceData(0)		Trace port output
(36)	P0.19	Digital I/O	General-purpose digital I/O
(37)	P0.20	Digital I/O	General-purpose digital I/O
	Trace CLK		Trace port clock output
(38)	P0.21	Digital I/O	General-purpose digital I/O
	RESET		Configurable as system RESET pin
(39)	SWDIO	Digital I/O	Serial Wire debug I/O for debug and programming
(40)	SWDCLK	Digital input	Serial Wire debug clock input for debug and programming
(41)	P0.22	Digital I/O	General-purpose digital I/O
(42)	P0.23	Digital I/O	General-purpose digital I/O
(43)	P0.24	Digital I/O	General-purpose digital I/O
(44)	GND	Ground	The pad must be connected to a solid ground plane
(45)	GND	Ground	The pad must be connected to a solid ground plane
(46)	GND	Ground	The pad must be connected to a solid ground plane
(47)	GND	Ground	The pad must be connected to a solid ground plane
(48)	GND	Ground	The pad must be connected to a solid ground plane
(49)	GND	Ground	The pad must be connected to a solid ground plane
(50)	GND	Ground	The pad must be connected to a solid ground plane
(51)	GND	Ground	The pad must be connected to a solid ground plane
(52)	GND	Ground	The pad must be connected to a solid ground plane
(53)	GND	Ground	The pad must be connected to a solid ground plane
(54)	GND	Ground	The pad must be connected to a solid ground plane

3.1 GPIO Located Near the Radio

Radio performance parameters, such as RX sensitivity, may be affected by high frequency digital I/O with a large sink/source current close to the Radio power supply and antenna pins.

<table>
<tr><th>Module PIN N0.</th><th>NRF52832 GPIO</th><th>Recommended usage</th></tr>
<tr><td>03</td><td>P0.25</td><td rowspan="9">These GPIO are low driver only :
<table><tr><th>Description(Standard driver)</th><th>Min.</th><th>Typ.</th><th>Max.</th><th>Unit</th></tr><tr><td>VDD ≥1.7, output set low</td><td>1</td><td>2</td><td>4</td><td>mA</td></tr><tr><td>VDD≥ 1.7, output set high</td><td>1</td><td>2</td><td>4</td><td>mA</td></tr></table>
These GPIO are low frequency I/O only :
A frequency over 10kHz (UART, SPI, I2C,I2S,PWM,QSPI) are not recommended , it will decrease Radio performance</td></tr>
<tr><td>04</td><td>P0.26</td></tr>
<tr><td>05</td><td>P0.27</td></tr>
<tr><td>06</td><td>P0.28</td></tr>
<tr><td>07</td><td>P0.29</td></tr>
<tr><td>08</td><td>P0.30</td></tr>
<tr><td>41</td><td>P0.22</td></tr>
<tr><td>42</td><td>P0.23</td></tr>
<tr><td>43</td><td>P0.24</td></tr>
</table>

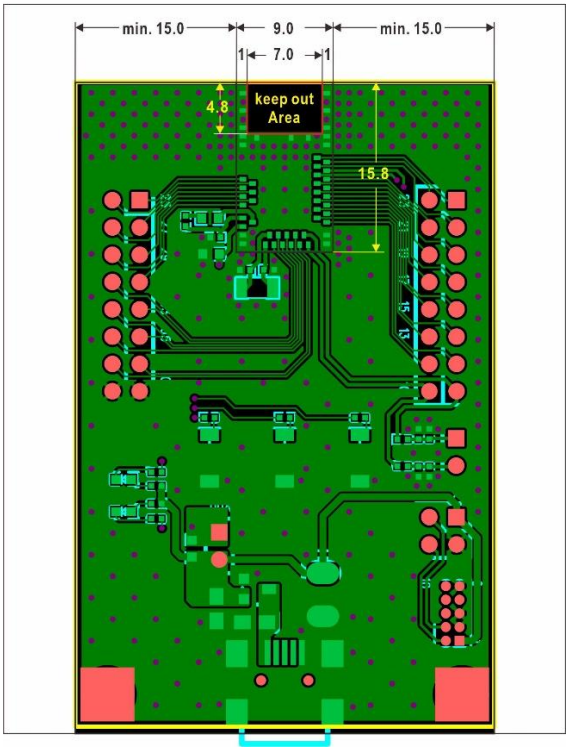
4 Layout design notes

4.1 Recommended RF layout and ground plane

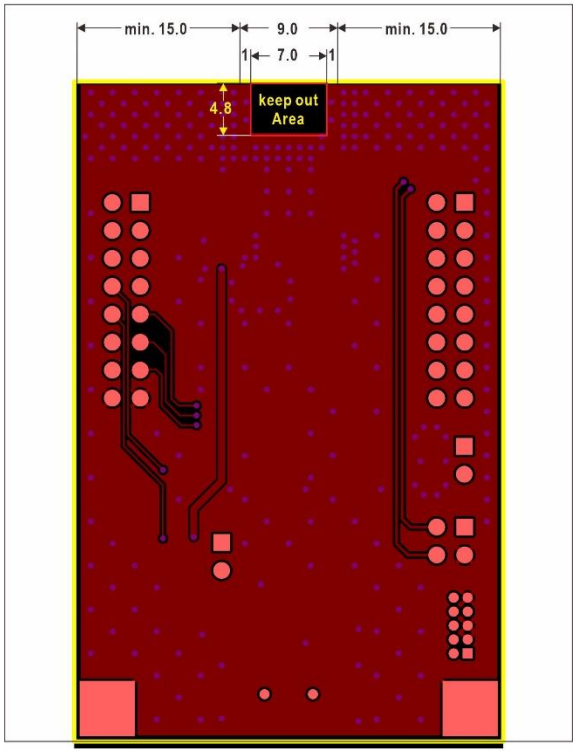
It is recommended to place the module:

- In the center (horizontal) of any mother PCB edge, with GND planes to the left and right
- Keep out Area should be included in the corresponding position of the antenna in each layer.
- Add via hole around GND pads on the mother PCB as many as you can, especially on the four corners and antenna area.

TOP VIEW

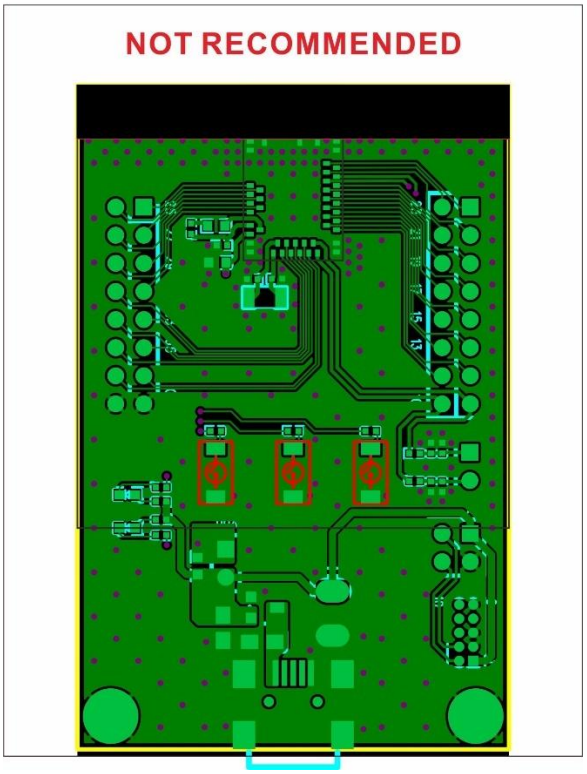


Bottom VIEW

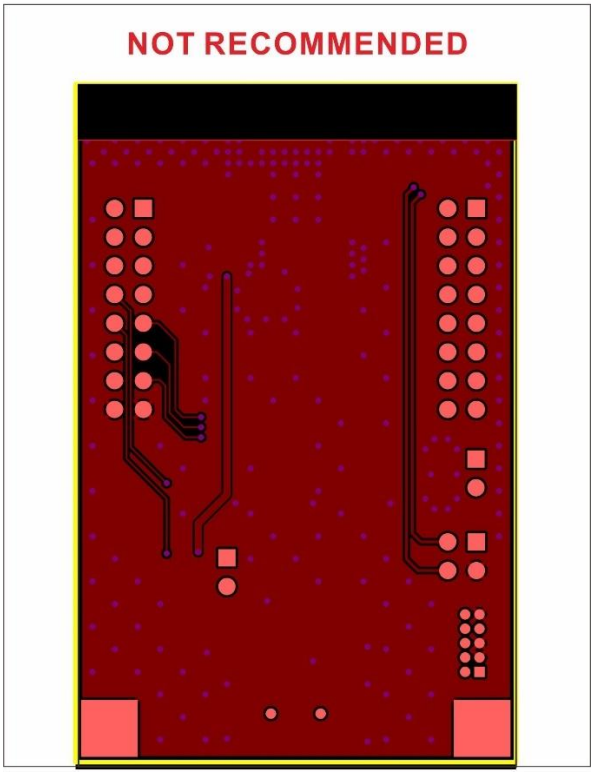


4.2 Not Recommended RF layout and ground plane

TOP VIEW



Bottom VIEW



4.3 Antenna keep out when proximity to Metal

• The minimum safe distance for metals without seriously compromising the antenna tuning is 4cm (bottom, top, left, right).

• Metal close to the antenna (bottom, top, left, right) will degrade RF performance. Any metal closer than 2 cm will significantly degrade RF performance.

5. Electrical Specification

5.1 Absolute Maximum Ratings

Maximum ratings are the extreme limits to which the chip can be exposed for a limited amount of time without causing permanent damage. Prolonged exposure to absolute maximum ratings may affect the device's reliability.

Parameter	Min.	Max.	Unit
Supply voltage			
VDD	-0.3	+3.9	V
VSS		0	V
I/O pin voltage			
$V_{I/O}$, VDD ≤3.6 V	-0.3	VDD+0.3	V
$V_{I/O}$, VDD >3.6 V	-0.3	3.9	V
NFC antenna pin current			
NFC 1/2		80	mA
Radio			
RF input level		10	dBm
Environmental			
Storage temperature	-40	+125	°C
MSL (moisture sensitivity level)		2	
ESD HBM (human body model)		4	KV
ESD CDM (charged device model)		1000	V
Flash memory			
Endurance		10000	Write/erase cycles
Retention		10 years at 85°C	

5.2 Operation Conditions

Parameter	Min.	Nom.	Max.	Units
VDD (independent of DCDC)	1.7	3.0	3.6	V
VDD rise time (0V to 1.7V)			60	ms
Operating temperature	-40	25	85	°C

Important: The on-chip power-on reset circuitry may not function properly if the rise times exceed the specified maximum.

5.3 Radio Specifications

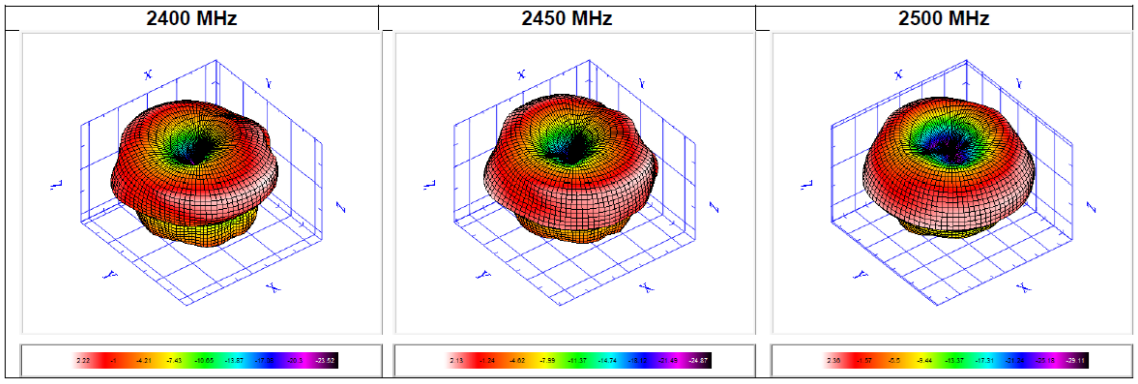
Parameter	Description	Min.	Typ.	Max.	Unit
Operating frequencies	BLE	2402		2480	MHz
Channel spacing	BLE		2		MHz
Frequency deviation	BLE 1Mbps		±250		kHz
	BLE 2Mbps		±500		kHz
On-the-air data rate		1		2	MHz
Transmitter					
TX power	Setting at +4dBm		4	6	dBm
RF power control range	-20 ~+4dBm, in 4db step	-20		+4	dBm
TX current (TX only)	DCDC@3V/+4 dBm		7.5		mA
	Setting at +4 dBm		16.6		mA
Receiver					
Receive Sensitivity	1Msps BLE ideal transmitter Packet <=37bytes BRE=0.1%		-96		dBm
	2Msps BLE ideal transmitter Packet <=37bytes BRE=0.1%		-93		dBm
RX current (RX only)	DCDC@3V/1Msps BLE		5.4		mA
	Setting at 1Msps BLE		11.7		mA
	DCDC@3V/2Msps BLE		5.8		mA
	Setting at 2Msps BLE		12.9		mA
RSSI	RSSI Accuracy Valid range	-90		-20	dBm
	RSSI resolution		1		dB
	Sample period		0.25		us
Antenna gain	ANTX100ETHAB24553			2.0	dBi
	ANTX100P011B24003			2.2	dBi
	ANTX100P111B24003			3.3	dBi

5.4 Antenna information

The MN52M-U32 has been designed and certificated to operate with below antennas listed .

Part number	Connector type	Supplier	Gain(dBi)	Certification
ANTX100ETHAB24553	IPEX	YAGEO	2.0	FCC/IC/NCC/CE/RCM/KC/MIC
ANTX100P011B24003	IPEX	YAGEO	2.2	FCC/IC/NCC/CE/RCM/KC/MIC
ANTX100P111B24003	IPEX	YAGEO	3.3	FCC/IC/NCC/CE/RCM/KC/MIC

YAGEO : ANTX100ETHAB24553

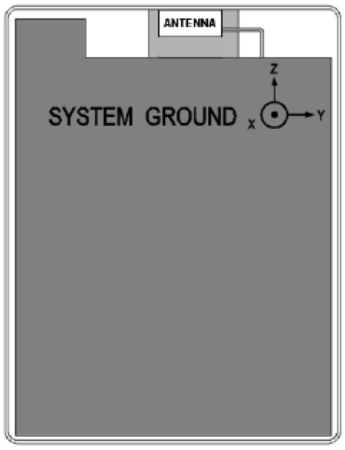


Frequency	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500
TRP (dBm)	-2.29	-2.22	-2.11	-2.11	-2.15	-1.99	-2.14	-2.04	-1.99	-1.91	-1.75
Peak EIRP (dBm)	2.22	2	1.91	1.95	1.98	2.13	1.94	2.14	2.06	2.29	2.36
NHPRP +/- 45 (degree)	-3.15	-3.02	-2.86	-2.8	-2.78	-2.57	-2.68	-2.54	-2.45	-2.33	-2.13
NHPRP +/- 30 (degree)	-4.57	-4.4	-4.14	-4	-3.95	-3.68	-3.74	-3.55	-3.4	-3.21	-2.95
E-Theta Peak Gain (dBi)	-6.03	-6.35	-6.04	-6.35	-6.37	-6.64	-6.62	-7.35	-7.88	-8.23	-8.81
E-Phi Peak Gain (dBi)	2.2	1.95	1.89	1.92	1.98	2.07	1.89	2.13	2.06	2.28	2.36
E-Total Peak Gain (dBi)	2.22	2	1.91	1.95	1.98	2.13	1.94	2.14	2.06	2.29	2.36
Directivity (dBi)	4.52	4.22	4.02	4.06	4.12	4.12	4.08	4.18	4.05	4.2	4.11
Efficiency (%)	58.96	60	61.45	61.5	60.98	63.26	61.14	62.48	63.26	64.39	66.82

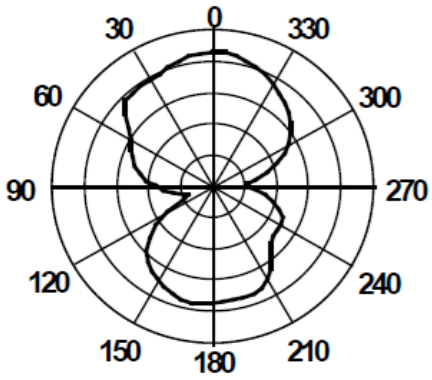
YAGEO : ANTX100P011B24003

ANTENNA RADIATION PATTERNS

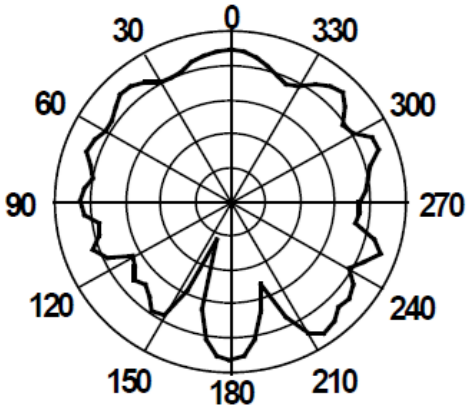
Scale: 5 dBi / div Max : 5 dBi Min : -25 dBi



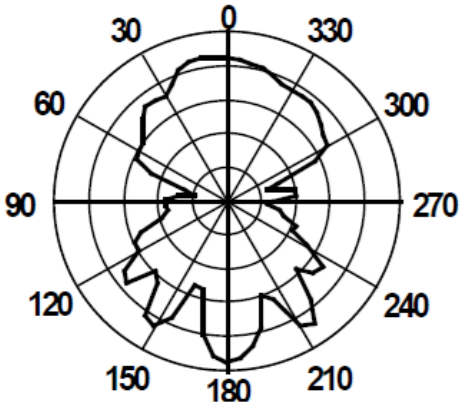
Device Setup & Coordinates



X-Y Plane



X-Z Plane



Y-Z Plane

Fig. 4 Antenna radiation patterns at 2.45 GHz

ANTENNA GAIN & EFFICIENCY

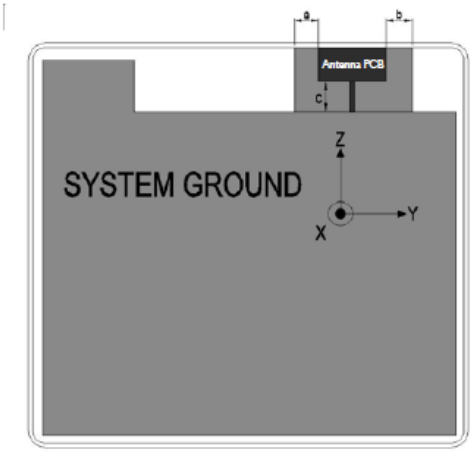
Table 3

FREQUENCY (GHz)	AVERAGE GAIN (dBi)	EFFICIENCY (%)	PEAK GAIN (dBi)
2.40	-1.7	67.8	2.1
2.45	-1.8	68.2	2.2
2.50	-2.0	63.1	2.2

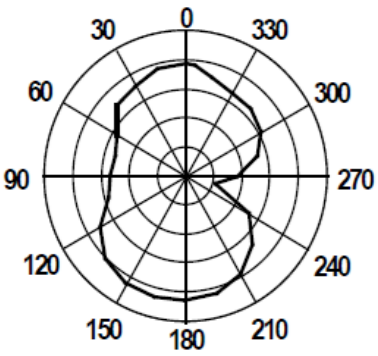
YAGEO : ANTX100P111B24003

ANTENNA RADIATION PATTERNS

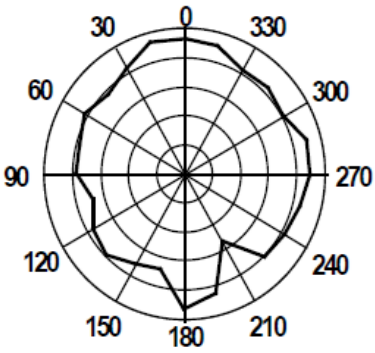
Scale: 5 dBi / div Max : 5 dBi Min : -20 dBi



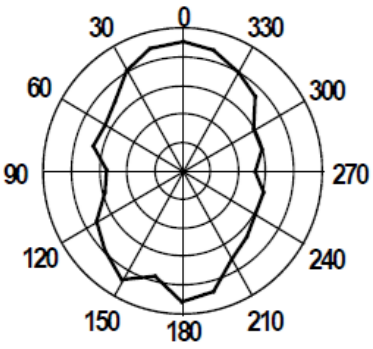
Device Setup & Coordinates



X-Y Plane



X-Z Plane



Y-Z Plane

Fig. 4 Antenna radiation patterns at 2.45 GHz

ANTENNA GAIN & EFFICIENCY

Table 3

FREQUENCY (GHz)	AVERAGE GAIN (dBi)	EFFICIENCY (%)	PEAK GAIN (dBi)
2.40	-1.0	80.4	3.3
2.45	-1.3	73.7	3.2
2.50	-1.8	65.6	3.2

5.5 CPU Specifications

The ARM® Cortex®-M4 processor with floating-point unit (FPU) has a 32-bit instruction set.

Memory	Flash	RAM			
	512KB	64KB			
Parameter	Description	Min.	Typ.	Max.	Unit
CoreMark	running from flash, cache enabled		215		CoreMark
CoreMark /MHz	running from flash, cache enabled		3.36		CoreMark/ MHz
CoreMark/mA	running from flash, cache enabled, DCDC 3V		58		CoreMark/ mA
CPU efficiency	running from flash, cache enabled, LDO		125		µA/MHz
	running from flash, cache enabled, DCDC 3V		58		µA/MHz
CPU current	running from flash, cache enabled, LDO		7.4		mA
	running from flash, cache enabled, DCDC 3V		3.7		mA
	running from RAM, LDO		6.7		mA
	running from RAM, DCDC 3V		3.3		mA

5.6 Power Management

Parameter	Description	Min.	Typ.	Max.	Unit
System OFF	No RAM retention, Wake on reset		0.3		uA
	No RAM retention, Wake on GPIO		0.3		uA
	No RAM retention, Wake on NFC field		0.7		uA
	Full 64 kB RAM retention, Wake on reset		0.7		uA
	No RAM retention, Wake on LPCOMP		1.9		uA
System ON	No RAM retention, Wake on any event		1.2		uA
	Full RAM retention, Wake on any event		1.5		uA
	No RAM retention, Wake on RTC		1.9		uA
MCU + Radio	running CoreMark from Flash, Clock = HFXO, Cache enabled, 0 dBm TX @ 1 Mb/s BLE		9.2		mA
	running CoreMark from Flash, Clock = HFXO, Cache enabled, 0 dBm RX @ 1 Mb/s BLE		9.2		mA

5.7 System Clock

The MN52M-32 requires two clocks, a high frequency clock and a low frequency clock.

- The high frequency clock (HFCLK)

HFCLK is provided on-module by a high-accuracy 32 MHz/±20 ppm crystal for radio and CPU operation.

- The low frequency clock (LFCLK)

LFCLK can be provided internally by an RC oscillator (±250 ppm) with calibration, or externally by a 32.768 kHz crystal.

Internal 32.768 kHz RC oscillator (LFRC)

Description	Min.	Typ.	Max.	Unit
Nominal frequency		32.768		kHz
Frequency tolerance for LFRC after calibration (calibration performed at least every 8 seconds)			±250	ppm
Run current for 32.768 kHz RC oscillator		0.6	1	uA
Startup time for 32.768 kHz RC oscillator		600		us

External 32.768 kHz crystal oscillator (LFXO)

Parameter	Description	Min.	Typ.	Max.	Unit
	Crystal frequency		32.768		kHz
	Frequency tolerance requirement for BLE stack			±250	ppm
	Frequency tolerance requirement for ANT stack			±50	ppm
	Run current for 32.768 kHz crystal oscillator		0.25		uA
CL	Load capacitance			12.5	pF
C0	Shunt capacitance			2	pF
RS	Equivalent series resistance			100	Kohm
PD	Drive level			1	uW
Cpin	Input capacitance on XL1 and XL2 pads			4	pF

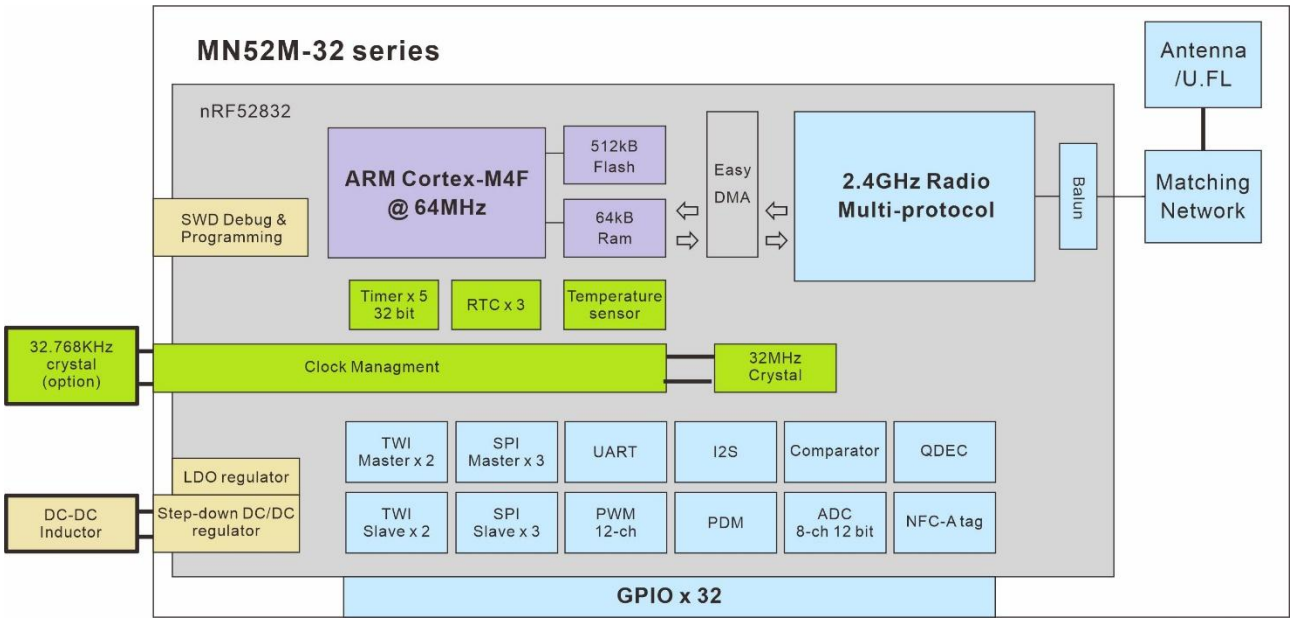
An external crystal provides the lowest power consumption and greatest accuracy.

Using the internal RC oscillator with calibration provides acceptable performance for BLE stack at a reduced cost and slight increase in power consumption.

Important:

- The ANT protocol requires the use of an external crystal for high accuracy.
- Nordic SDK example program P0.00/P0.01 as external LFXO, you need an external crystal to work.
- Nordic SDK example program P0.00/P0.01 as external LFXO, if you would like to reduce material cost, save layout space or requires 2 more GPIO for application. You need program p0.00/p0.01 as internal LFRC.

5.8 Block Diagram



6. BN52M-U32 evaluation board

6.1 BN52M-U32 component placement

BN52M-U32 is a full-featured evaluation board for MN52M-U32 that supports:

M1:MN52M-U32 module

J6: A power over mini-USB

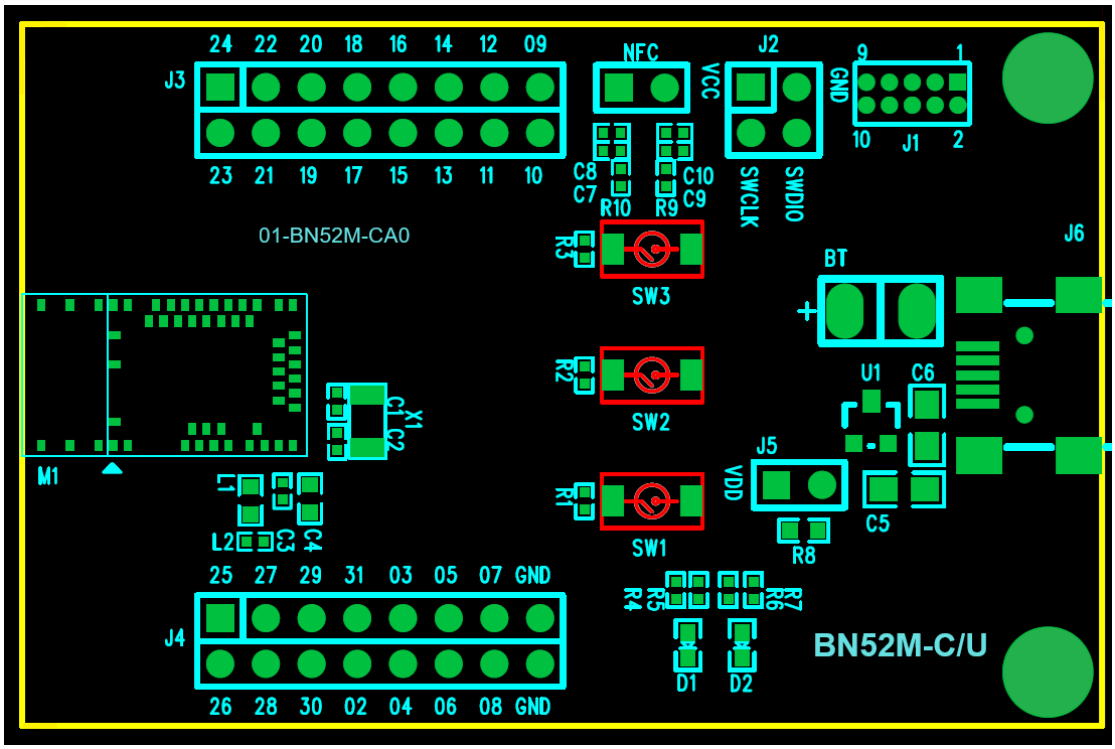
J3/J4: Complete I/O pinout to headers

J1: On-board programming and debugging interface

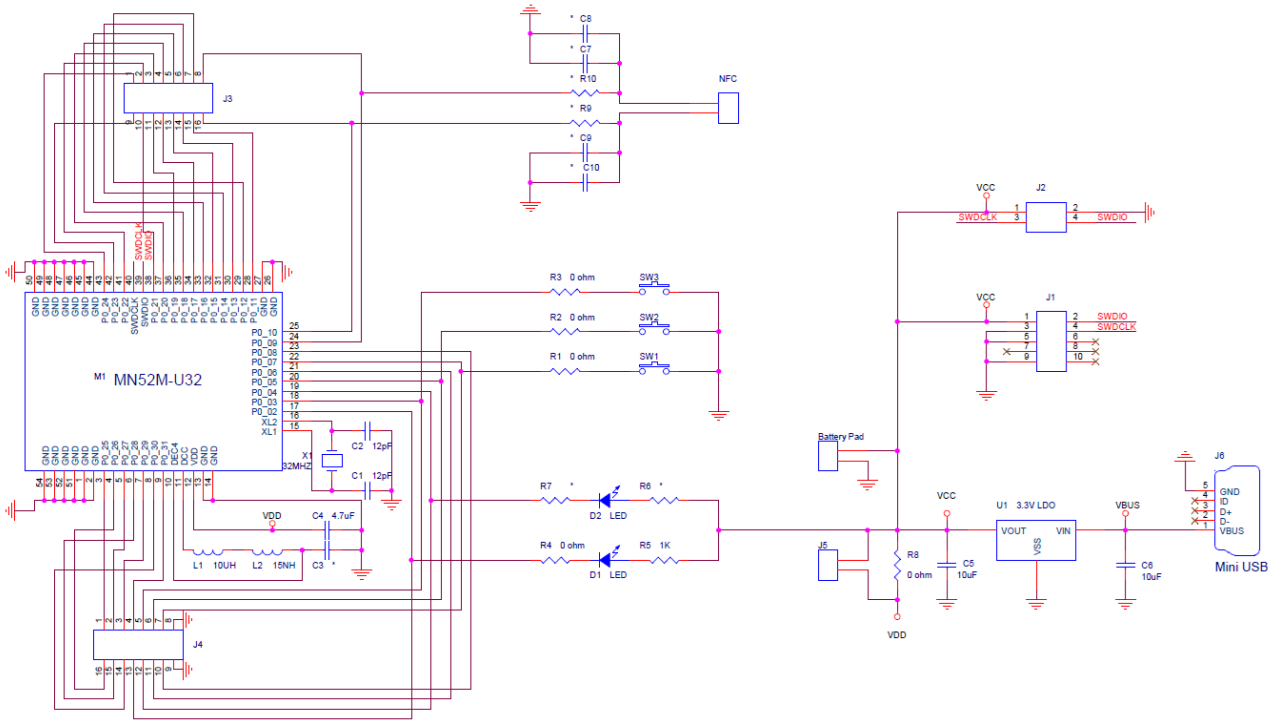
X1:32.768 kHz crystal

D1: One user LED

SW1/SW2/SW3: Three user buttons



6.2 BN52M-U32 schematic



REMARK:

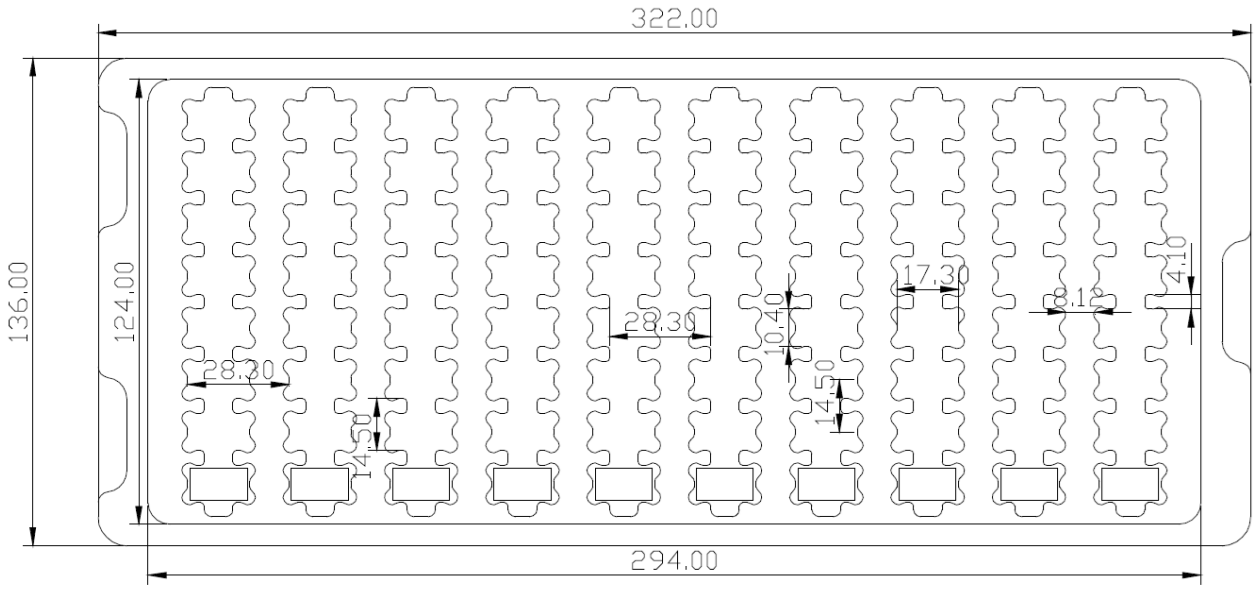
- **When using DC-DC mode, please add L1 / L2 .**
- **When using internal 32.768kHz RC oscillator, please remove X1 / C1 / C2 and calibration performed at least every 8 seconds.**

7. Product Information

7.1 Mass production information

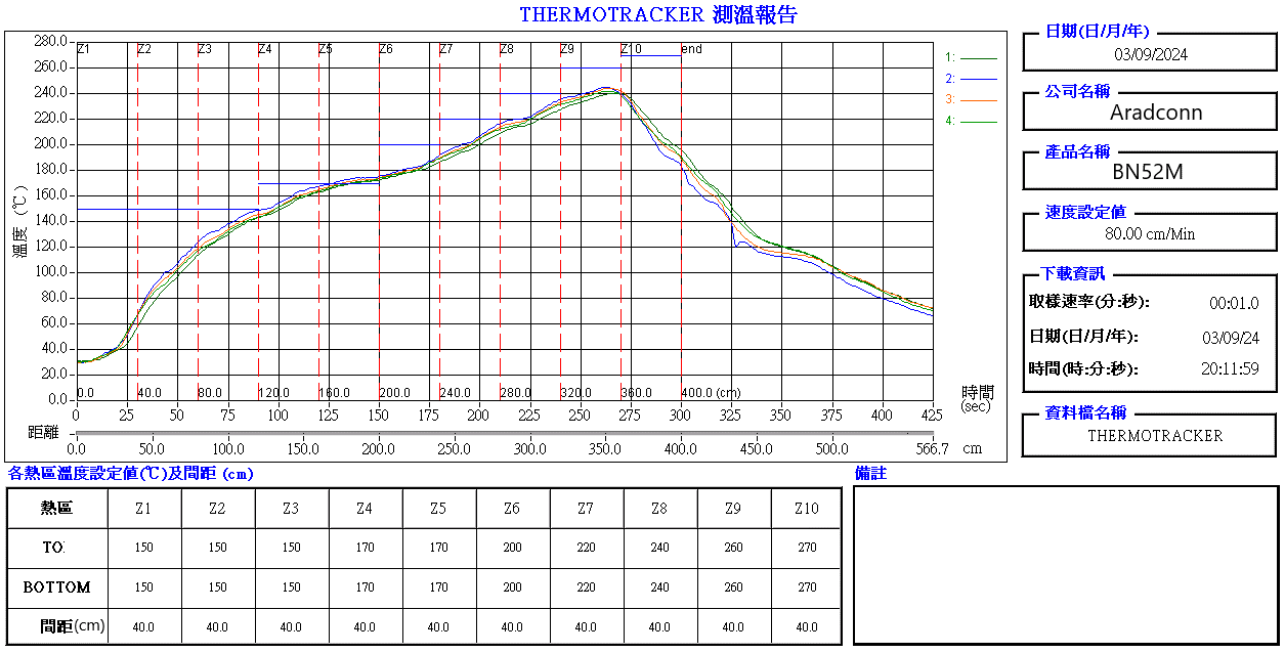
7.1.1 Tray Packaging:

Material: anti-static PET
PET thickness: 0.8mm
Dimension: 322mm x 136mm x 8.5mm



The tray is designed for direct use on a SMT automatic machine.

7.1.2 Reflow Parameters



熱區	Z1	Z2	Z3	Z4	Z5	Z6	Z7	Z8	Z9	Z10
TOP	150	150	150	170	170	200	220	240	260	270
BOTTOM	150	150	150	170	170	200	220	240	260	270
間距(cm)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0

7.2 Packing information

Type	Quantity	Dimension (L)x(W)x(H)	Gross Weight
Unit	1pcs	15.8x9.0x2.2mm	0.61g
Tray	80 pcs per tray	322x136x8.5mm	
Carton	1040 pcs(13 trays)	36x20x12cm	3.0Kg

7.3 Ordering Code

Model	Ordering code	Photo
MN52M-U32	MN-832Q2-01A-UT	

Ordering code: MN-832Q2-01A-CT

MN: Module/Nordic

832Q2: NRF52832/QFN/V2

01A: Aradconn standard module without customer code

T: U.FL connector/Tray packing

MN52M Series

Model	IC/Version	Antenna	Ordering code
MN52M-C32	NRF52832/V2	Chip	MN-832Q2-01A-CT
MN52M-C10	NRF52810/V2		MN-810Q2-01A-CT
MN52M-C11	NRF52811/V1		MN-811Q1-01A-CT
MN52M-P32	NRF52832/V2	PCB	MN-832Q2-01A-PT
MN52M-P10	NRF52810/V2		MN-810Q2-01A-PT
MN52M-P11	NRF52811/V1		MN-811Q1-01A-PT
MN52M-U32	NRF52832/V2	U.FL Connector	MN-832Q2-01A-UT

8. Bluetooth qualification& Regulatory certification

8.1 Bluetooth qualification

The MN52M-C32 Bluetooth Low Energy module is based on Nordic Semiconductor's NRF52 series SOC and listed on the Bluetooth SIG website as a qualified End Product.

Model	Bluetooth Version	DID	QDID	Company
MN52M-U32	5.4			Arad Connectivity

8.2 USA (FCC Certificate)

8.2.1 FCC ID and Labeling requirements

The MN52M series hold full modular certification, are assigned the

FCC ID number: 2BLIDMN52M

If the FCC ID is not visible when the module is installed inside OEM device, then the outside of the finished product must also display a label referring to the enclosed module. The end product must in any case be labelled on the exterior with:

Contains FCC ID: 2BLIDMN52M

8.2.2 FCC Notice:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

8.2.3 CAUTION:

The OEM should have their device which incorporates the MN52M series tested by a qualified test Lab to verify compliance with FCC Part 15 Subpart B limits for unintentional radiators.

8.2.4 RF Exposure Statement:

This module is approved for installation into mobile and/or portable host platforms.

This device is intended only for OEM integrators under the following conditions:
(1) The transmitter module may not be co-located with any other transmitter or antenna.
(If the condition above is met, further transmitter test will not be required.)

(2) The OEM integrator is still responsible for testing their end-product for any additional compliance requirements required for satisfying RF Exposure compliance when this module is installed.

8.3 Canada (IC Certificate)

8.3.1 IC ID and Labeling requirements

The MN52M series hold full modular certification, are assigned the

IC ID number: 33328-MN52M

If the IC ID is not visible when the module is installed inside OEM device, then the outside of the finished product must also display a label referring to the enclosed module. The end product must in any case be labelled on the exterior with:

Contains IC ID: 33328-MN52M

8.3.2 IC Notice:

This device complies with Industry Canada license-exempt RSSs. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage;
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

8.3.3 RF Exposure Statement:

This module is approved for installation into mobile and/or portable host platforms.

This device is intended only for OEM integrators under the following conditions:
(1) The transmitter module may not be co-located with any other transmitter or antenna.
(If the condition above is met, further transmitter test will not be required.)

(2) The OEM integrator is still responsible for testing their end-product for any additional compliance requirements required for satisfying RF Exposure compliance when this module installed.

8.4 European Union (CE)

8.4.1 Labeling requirements

The label on the final products which contain the MN52M series module must follow CE marking requirements, should be labelled as follows:

CE logo: 

The OEM should consult with a qualified test Lab before entering their device into an EU member country to make sure all regulatory requirements have been met for their complete device.

8.6.2 Radio Equipment Directive (RED)

The MN52M series module complies with the essential requirements and other relevant provisions of Radio Equipment Directive (RED 2019/07) .

8.5 Australia / New Zealand (RCM)

The MN52M series has been tested to comply with the AS/NZS 62368.1:2022

RCM logo : 

8.6 NCC Certificate (Taiwan)

8.6.1 NCC ID and Labeling requirements

MN52M 系列依天線不同,可分為 3 種型式 , 認證為 3 個不同的 NCC ID

NCC logo and NCC ID

MN52M-C: **CCAF24Y11292T6**

MN52M-P: **CCAH24Y11291T4**

MN52M-U: **CCAH24Y11290T2**

請依下列標籤式樣自製標籤，標貼或印鑄於器材(產品)本體明顯處，始得販賣或公開陳列。

NCC 平台政策下的完全模組: 須符合平台政策才能適用完全模組「平台」定義如下：若器材無安裝型式認證之模組仍具備其它複合性功能，該器材得視為平台，若無其它複合性功能，則不能視為平台

8.7 South Korea (KC Certificate)

8.7.1 KC ID and Labeling requirements

The MN52M series hold full modular certification. are assigned the

KC ID number: R-R-Pid-MN52M

Since the printable area on the MN52M series is too small to show the KC ID, When a product containing the MN52M series is placed on the South Korean market, the product must be affixed with a label or marking containing the KC logo and KC ID as shown in the following figure.

Contains KC logo and KC ID: R-R-Pid-MN52M

▲ This information must also be included in the product user manuals.

8.8 Japan (MIC Certificate)

8.8.1 MIC ID and Labeling requirements

The MN52M series hold type certification. are assigned the

MIC ID number: R 201-240755

If the MIC ID is not visible when the module is installed inside OEM device, then the outside of the finished product must also display a label referring to the enclosed module. The end product must in any case be labelled on the exterior with:

Contains MIC logo and MIC ID:  R 201-240755

8.9 SRRC Certificate (China)

8.9 .1 SRRC ID and Labeling requirements

The MN52M series hold modular certification. are assigned the

CMIIT ID: 2024DJABCDE

If the CMIIT ID is not visible when the module is installed inside OEM device, then the outside of the finished product must also display a label referring to the enclosed module. The end product must in any case be labelled on the exterior with:

Contains CMIIT ID: 2024DJABCDE(M)

9. RoHS & REACH Report

MN52M series modules comply with EU RoHS Directive 2011/65/EU, 2015/863/EU and do not contain or over the threshold value of SVHC (Substance of Very High Concern), as defined by Directive EC/1907/2006 Article according to REACH Annex XVII.

10. Life support warning

This module is not designed for use in life support appliances, devices, or systems where malfunction can reasonably be expected to result in a significant personal injury to the user, or as a critical component in any life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety.

Revision history

Version	Date	Notes	Name
0.9	2024/12/01	Initial Release	