General Description

BDE-RFM207-IN is an industrial grade multiprotocol 2.4G wireless module targeted at low power sensors and PC/Phone accessories. It supports Thread, Zigbee, Bluetooth 5.0 Low Energy, IEEE 802.15.4g, IPv6-enabled smart objects (6LoWPAN), Wi-SUN, proprietary systems, SimpleLink TI 15.4-Stack (2.4 GHz), and Dynamic Multiprotocol Manager (DMM) driver.

BDE-RFM207-IN highly integrates radio, stack, profile and applications in a SoC, without the need of using an external MCU. The module also offers flexible hardware interfaces for the sensor application.

It is made for extreme operating temperature and no disruption industrial applications.

Key Features

- Multiprotocol, Bluetooth 5.0 low energy compliant, Zigbee, Thread
- Powerful ARM Cortex-M4F processor
  - Clock speed: up to 48MHz
  - 352KB of In-System programmable flash
  - 80KB SRAM
  - 8KB of cache SRAM
  - 2-Pin cJTAG and JTAG debugging
  - Support Over-the-Air upgrade (OTA)
  - Ultra-Low power sensor controller with 4KB of SRAM
  - 31 GPIOs
  - 4 x 32-Bit or 8 x 16-Bit general purpose timer
  - 12-Bit ADC, 200 kSamples/s, 8 channels
  - 2 x comparator with internal reference DAC
  - Programmable current source
  - 2 x UART
  - 2 x SSI (SPI, MICROWIRE, TI)
  - IIC, IIS
  - Real-Time-Clock (RTC)
  - AES 128- and 256-bit crypto accelerator
  - ECC and RSA public key hardware accelerator
  - SHA2 accelerator (Full suite up to SHA-512)
  - True Random Number Generator (TRNG)
  - Capacitive sensing, up to 8 channels
  - Integrated temperature and battery monitor
  - On-Chip buck DC/DC converter
- RF performance
  - TX power: Output power up to +5 dBm with temperature compensation
  - RX sensitivity: up to -105dBm (LE coded PHY)
- Communication range: about 250 meters (LOS) – Long Range Mode
- Antenna: PCB antenna, 1.71 dBi average gain, 2.18 dBi peak gain
- Size: 22.95 mm x 15 mm x 2.15 mm (With Shielding)
- Ultra low power consumption:
  - Shutdown: 150nA (Wake up on external events)
  - Standby: 0.94uA (RTC running and RAM/CPU retention)
  - 11uA at +105°C operating temperature
  - RX current: 6.9mA
  - TX current @ 0dBm: 7.3mA
  - TX current @ 5dBm: 9.6mA
- Industrial grade operating temperature range from -40°C to +105°C
- Long life nonvolatile memory at extreme working temperature
- Low soft error rate for long operation lifetime with always-on SRAM parity checking against corruption due to potential radiation events, suitable for no disruption industrial applications
- FCC ID: 2ABRU-RFM207, IC: 25657-RFM207, CE-RED

Applications

- 2400 to 2480 MHz ISM and SRD systems with down to 4 kHz of receive bandwidth
- Building automation
- Grid infrastructure
- Industrial transport – asset tracking
- Factory automation and control
- Medical
- Electronic point of sale (EPOS) – Electronic Shelf Label (ESL)

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1. References

[1] CC2652R resources: https://www.ti.com/product/CC2652R

2. Block Diagram

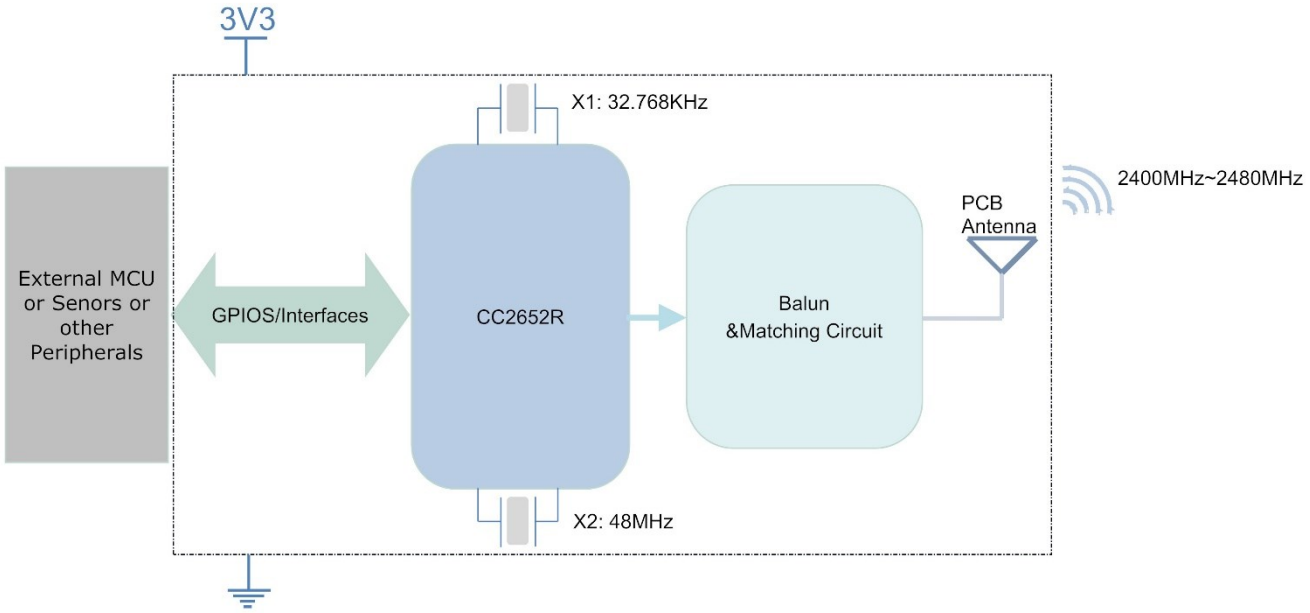

Figure 2-1. BDE-RFM207-IN Module Block Diagram

3. Terminal Configuration and Functions

3.1 Pin Diagram

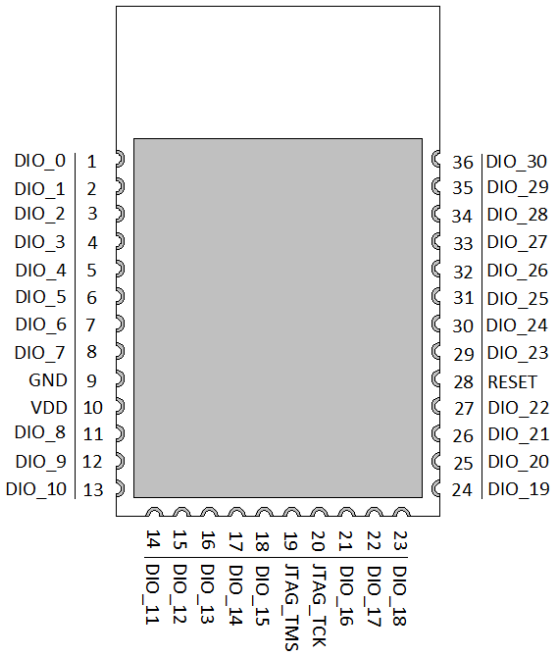

Figure 3-1. Pin Diagram (Top View)

3.2 Pin Attributes and Pin Multiplexing

Table 3-1. Pin Description

Pin #	Pin Name	Description
1	DIO_0	GPIO, Sensor Controller
2	DIO_1	GPIO, Sensor Controller
3	DIO_2	GPIO, Sensor Controller
4	DIO_3	GPIO, Sensor Controller
5	DIO_4	GPIO, Sensor Controller
6	DIO_5	GPIO, Sensor Controller, high-drive capability
7	DIO_6	GPIO, Sensor Controller, high-drive capability
8	DIO_7	GPIO, Sensor Controller, high-drive capability
9	GND	Power Ground
10	VDD	Power Supply
11	DIO_8	GPIO
12	DIO_9	GPIO
13	DIO_10	GPIO
14	DIO_11	GPIO
15	DIO_12	GPIO
16	DIO_13	GPIO
17	DIO_14	GPIO
18	DIO_15	GPIO
19	JTAG_TMS	JTAG TMSC, high-drive capability
20	JTAG_TCK	JTAG TCKC
21	DIO_16	GPIO, JTAG_TDO, high-drive capability
22	DIO_17	GPIO, JTAG_TDI, high-drive capability
23	DIO_18	GPIO

Pin #	Pin Name	Description
24	DIO_19	GPIO
25	DIO_20	GPIO
26	DIO_21	GPIO
27	DIO_22	GPIO
28	RESET	Reset, active-low
29	DIO_23	GPIO, Sensor Controller, Analog
30	DIO_24	GPIO, Sensor Controller, Analog
31	DIO_25	GPIO, Sensor Controller, Analog
32	DIO_26	GPIO, Sensor Controller, Analog
33	DIO_27	GPIO, Sensor Controller, Analog
34	DIO_28	GPIO, Sensor Controller, Analog
35	DIO_29	GPIO, Sensor Controller, Analog
36	DIO_30	GPIO, Sensor Controller, Analog

4. Specifications

4.1 Absolute Maximum Ratings

PARAMETER	MIN	MAX	UNIT	Notes
VDDS	-0.3	4.1	V	
Other Digital Terminals	-0.3	VDDS+0.3≤4.1	V	
Voltage on ADC input	-0.3	VDDS	V	Voltage scaling enabled
	-0.3	1.49	V	Voltage scaling disabled, internal reference
	-0.3	VDDS/2.9	V	Voltage scaling disabled, VDDS as reference
Storage Temperature	-40	150	°C	

4.2 Recommended Operating Conditions

PARAMETER	MIN	TYP	MAX	UNIT
VDDS	1.8	3.3	3.8	V
Operating Temperature	-40	-	105	°C

5. Reference Design

5.1 Design Recommendations

In order to get the best performance when integrate the module to your product, it is advised to use the recommended module location to the respective PCB.

- Location in X-Y plane

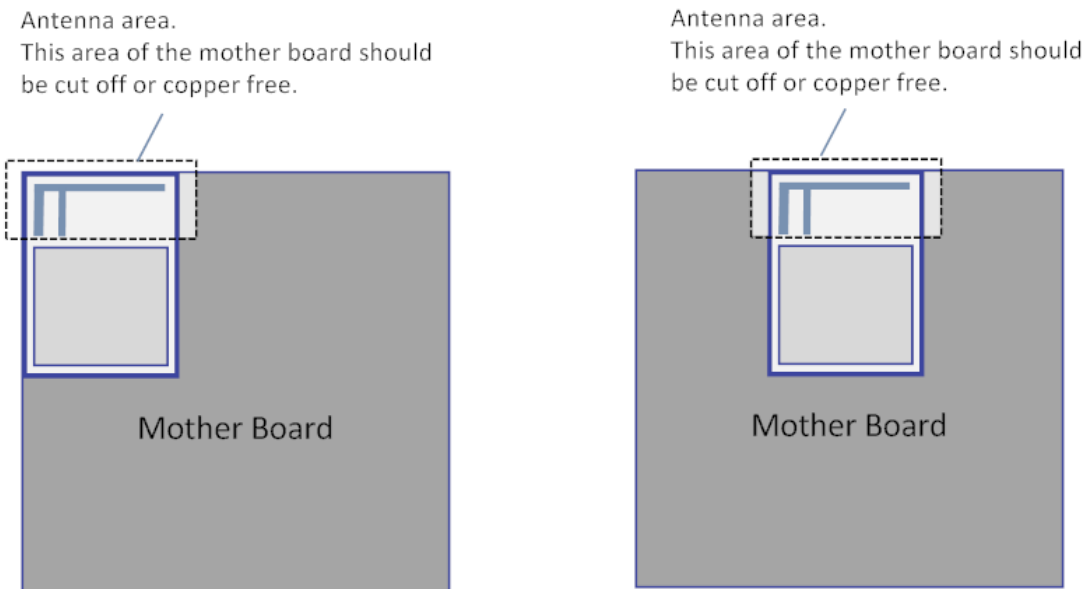

Fig 5-1. Recommended location in X-Y plane

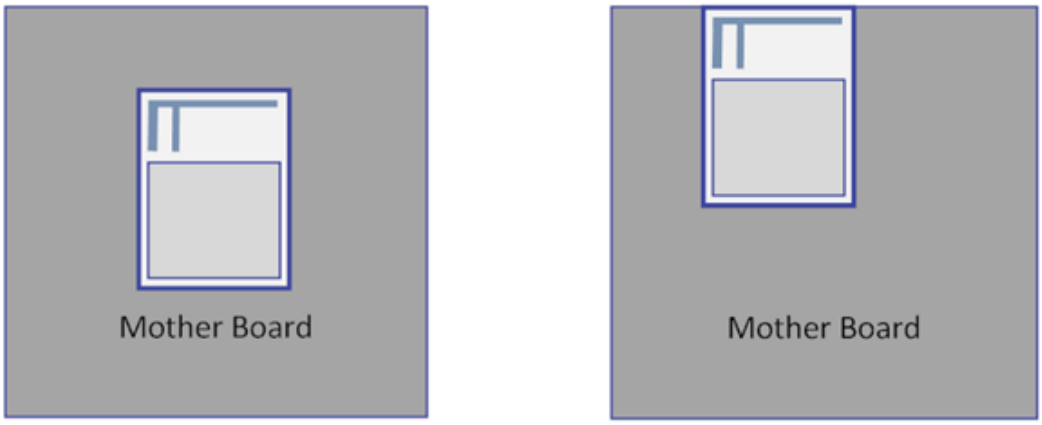

Fig 5-2. Not recommended location in X-Y plane

- Location in Z plane

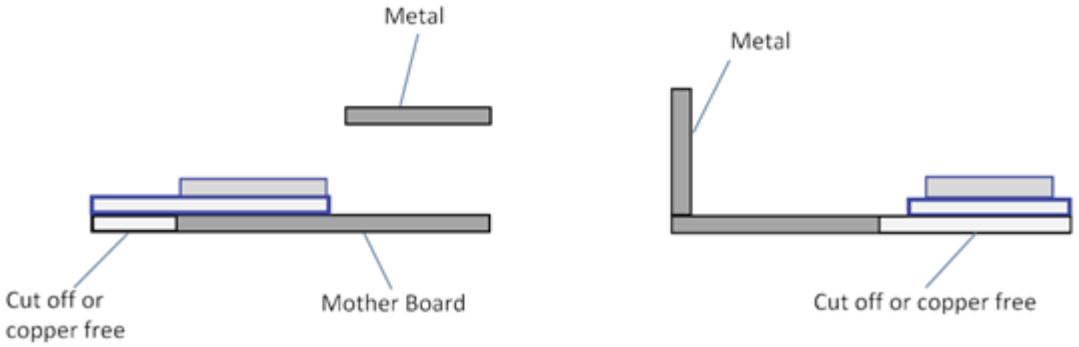

Fig 5-3. Recommended location in Z plane

Fig 5-4. Not recommended location in Z plane

6. Mechanical Specifications

6.1 Dimensions

Fig 6-1 shows the overall dimensions of BDE-RFM207-IN. The module measures 22.95mm long by 15mm wide by 2.15mm high with the shield.

Note: All dimensions are in mm.

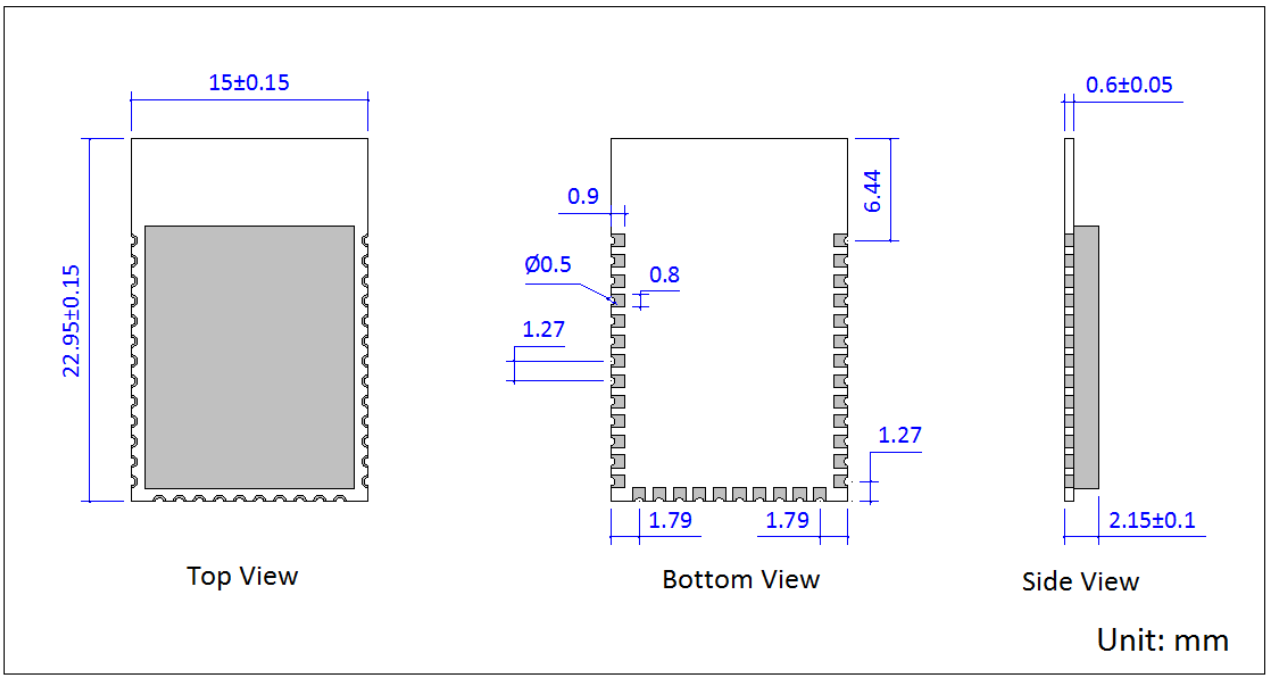

Figure 6-1. Mechanical Drawing

7. Packaging Information

Fig 7-1. Package information

8. Ordering Information

Part Number	Size (mm)	Core Chip	Shipping Form	MOQ
BDE-RFM207-IN	22.95 x 15 x 2.15	CC2652R	Tray	1K

9. Revision History

Revision	Date	Description
V1.0	5-Jun-2019	Initial Release
V1.1	10-Jun-2019	Editorial Correction
V2.0	14-Apr-2021	Replacement of template
V2.1	23-Apr-2022	Correct some mistakes

Contacts

BDE Technology Inc.

China: B2-403, 162 Science Avenue, Huangpu District, Guangzhou 510663, China

Tel: +86-20-28065335

Website: http://www.bdecomm.com Email: shu@bdecomm.comm

USA: 67 E Madison St, # 1603A, Chicago, IL 60603, US

Tel: +1-312-379-9589

Website: http://www.bdecomm.com Email: info@bdecomm.com