

General Description

BDE-RFM207 is a 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 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 enables ultra-low power connectivity and data transfer for the applications that are sensitive to power consumption, size and cost.

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 JTAG 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)
 - RX current: 6.9mA
 - TX current @ 0dBm: 7.3mA
 - TX current @ 5dBm: 9.6mA
- Certifications
 - 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

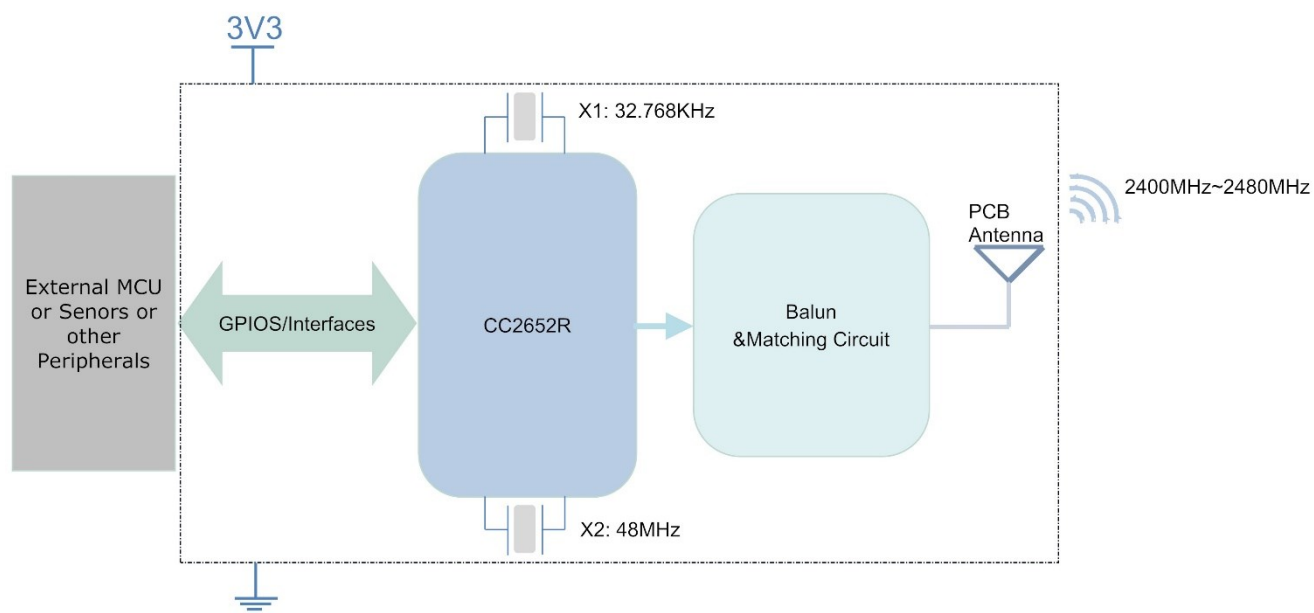


Figure 2-1. BDE-RFM207 Module Block Diagram

3. Terminal Configuration and Functions

3.1 Pin Diagram

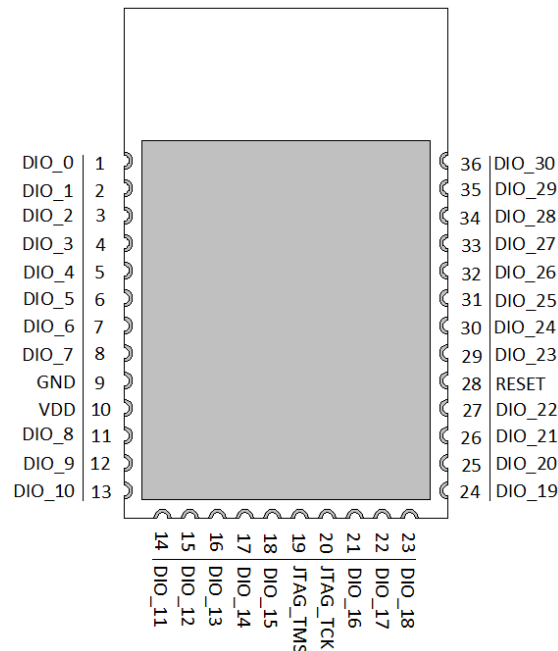


Figure 3-1. Pin Diagram (Top View)

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 TMS, high-drive capability
20	JTAG_TCK	JTAG TCK
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	$V_{DDS}+0.3 \leq 4.1$	V	
Voltage on ADC input	-0.3	VDDS	V	Voltage scaling enabled
	-0.3	1.49	V	Voltage scaling disabled, internal reference
	-0.3	$V_{DDS}/2.9$	V	Voltage scaling disabled, VDDS as reference
Storage Temperature	-40	125	°C	

4.2 Recommended Operating Conditions

PARAMETER	MIN	TYP	MAX	UNIT
VDDS	1.8	3.3	3.8	V
Operating Temperature	-40	-	85	°C

5. Reference Design

5.1 Design Recommendations

In order to get a fine 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

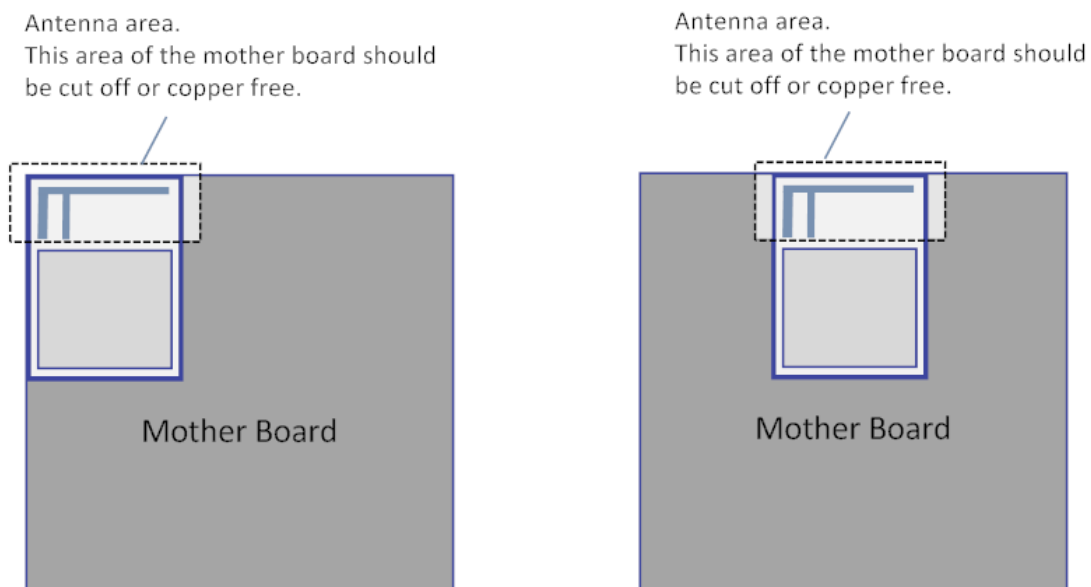


Fig 5-1. Recommended location in X-Y plane

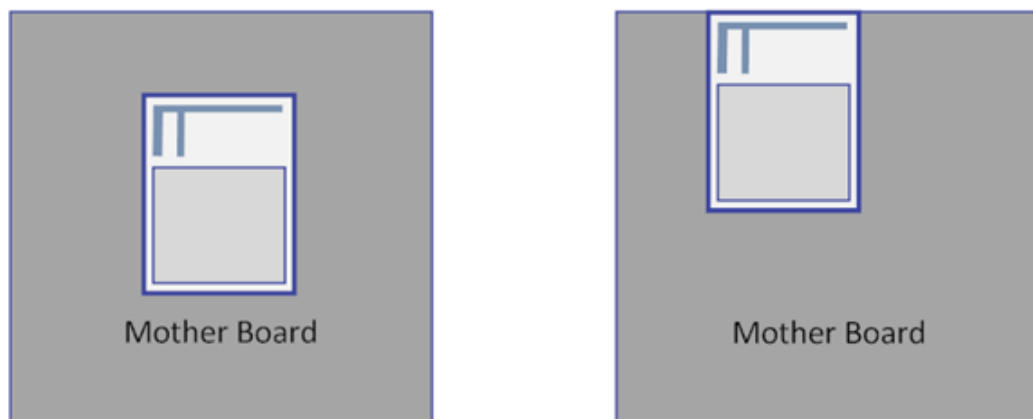


Fig 5-2. Not recommended location in X-Y plane

■ Location in Z plane

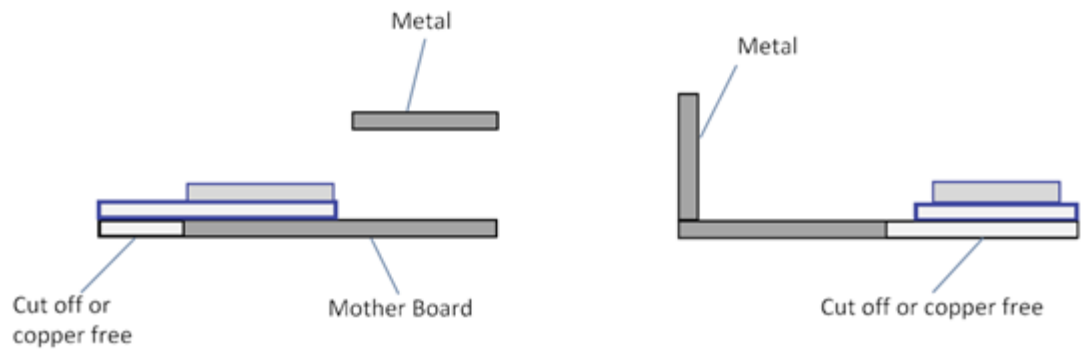


Fig 5-3. Recommended location in Z plane



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. The module measures 22.95mm long by 15mm wide by 2.15mm high with the shield.

Note: All dimensions are in mm.

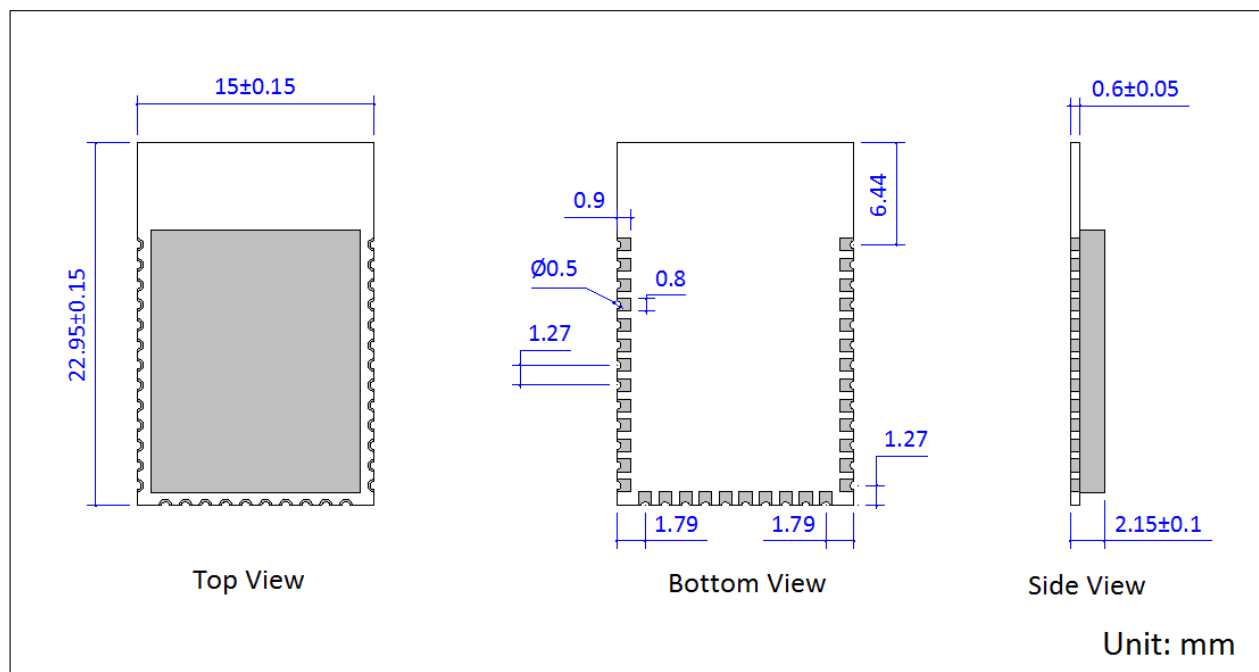


Fig 6-1. Mechanical Drawing

7. Packaging Information



Fig 7-1. Package information

8. Ordering Information

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

9. Revision History

Revision	Date	Description
V1.0	8-May-2019	Initial Release
V1.2	10-Jun-2020	Editorial Correction
V2.0	14-Apr-2021	Replacement of template

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.com

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

Tel: +1-312-379-9589

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