

## General Description

BDE-RFM204A is an ultra-low power, long-range Sub-1 GHz module targeted at low power sensors and long range applications.

BDE-RFM204A integrates a high performance RF core and also a powerful ARM cortex-M3 processor, which makes it suitable for certain products that need high performance MCU to deal with difficult applications.



The module supports 868 MHz and 915 MHz bands, with the maximum output power up to 15 dBm, along with its Long-Range Mode feature, the module is to be the best choice for IoT products which utilize battery supply and require long range communication.

## Key Features

- Ultra low power Sub-1 GHz
- Supports 868 MHz, 915 MHz
- Powerful Cortex-M3 MCU for your IoT products
  - Clock Speed: up to 48MHz
  - Up to 128KB of In-System-Programmable Flash
  - 20KB of Ultra-Low-Leakage SRAM
  - 30 GPIOs
- RF performance
  - TX power: Up to +15 dBm
  - RX sensitivity: up to -124 dBm using Long-Range Mode, -110 dBm at 50 kbps (Sub-1 GHz)
- Communication range
  - 800 meters (LOS) @ +10 dBm, 2.4 kbps
- Ultra-low power
  - Power supply: 1.8 V ~ 3.8 V
  - RX: 5.4 mA
  - TX @ +10 dBm: 13.4 mA
  - Standby: 0.7 uA (RTC running and RAM/CPU retention)
  - Shutdown: 185 nA (Wake up on external events)
- Antenna: PCB antenna
- Size
  - 25 mm x 15 mm x 1.7 mm (Without Shielding)
  - 25 mm x 15 mm x 2.15 mm (With Shielding)

## Applications

- Long-range sensor applications
- Smart grid and automatic meter reading
- Wireless healthcare applications
- Industry monitoring and control
- Home and building automation
- Energy-harvesting applications

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## 1. References

[1] CC1310 resources: <https://www.ti.com/product/CC1310>

## 2. Block Diagram

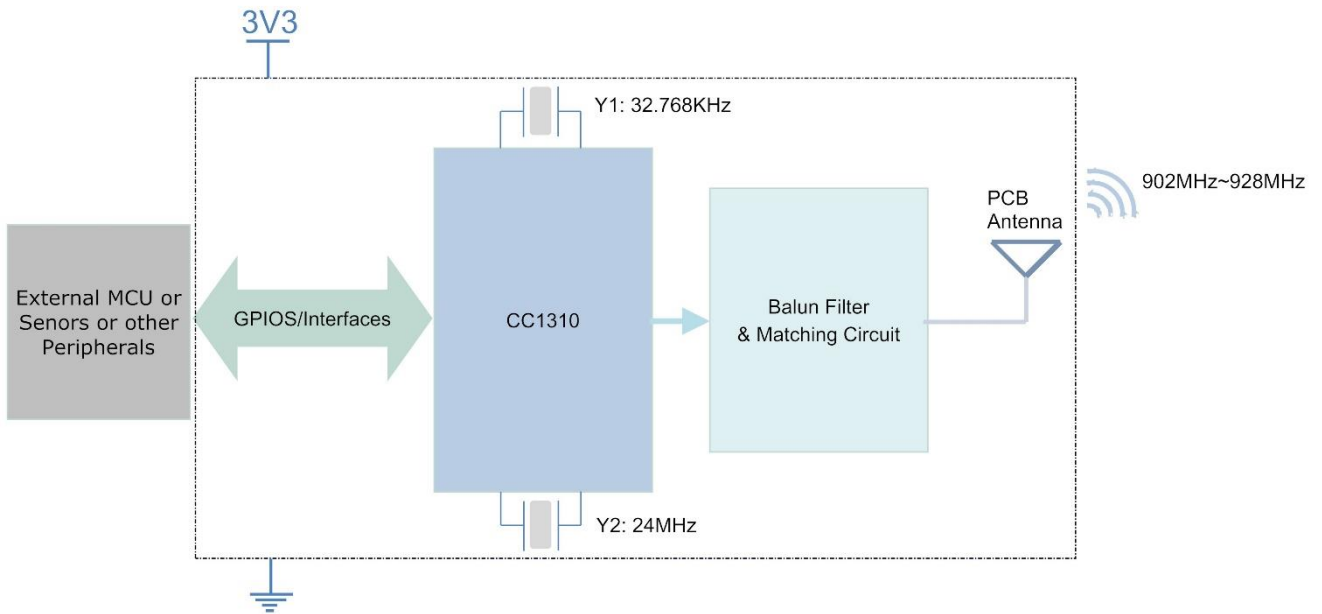


Figure 2-1. BDE-RFM204A Module Block Diagram

### 3. Terminal Configuration and Functions

#### 3.1 Pin Diagram

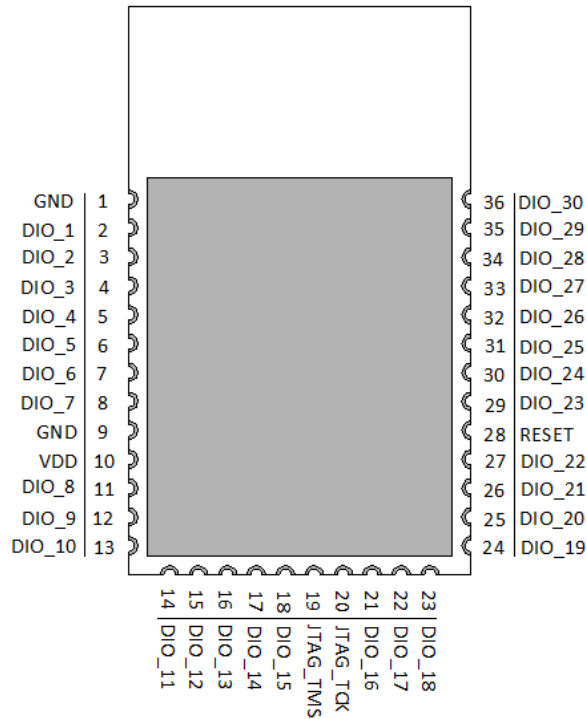


Figure 3-1. Pin Diagram (Top View)

#### 3.2 Pin Attributes and Pin Multiplexing

Table 3-1. Pin Description

Pin #	Pin Name	Description
1	GND	Power Ground
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

Pin #	Pin Name	Description
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
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
VDDS	-0.3	4.1	V
Other Digital Terminals	-0.3	$V_{DD5}+0.3 \leq 4.1$	V
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. Design Recommendations

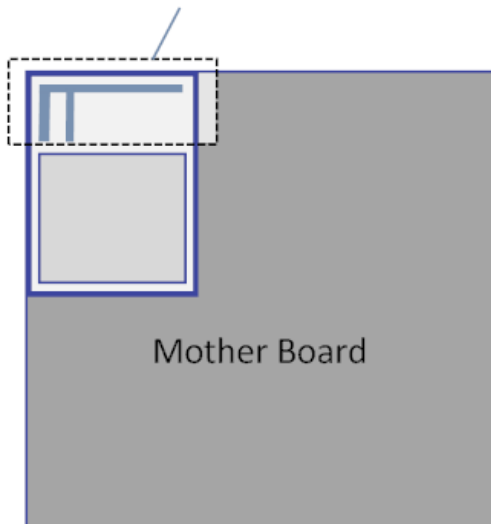
### Module Location

In order to get the best performance when integrating the module to your product, it is advised to use the recommended module location to the mother board.

#### ■ Location in X-Y plane

Antenna area.

This area of the mother board should be cut off or copper free.



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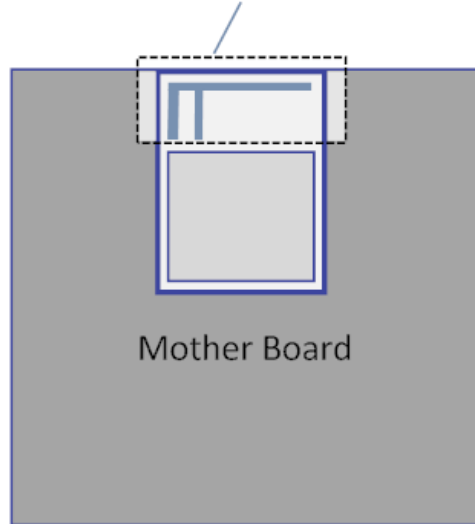


Fig 5-1. Recommended location in X-Y plane

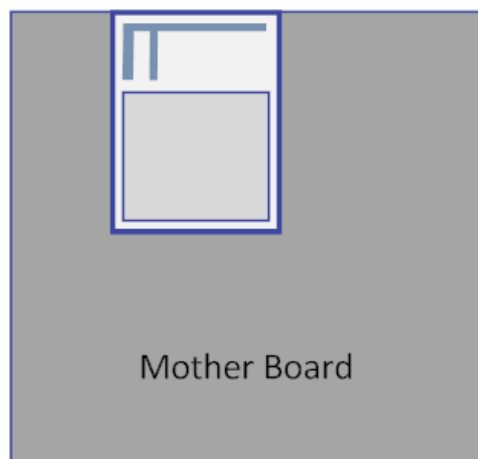
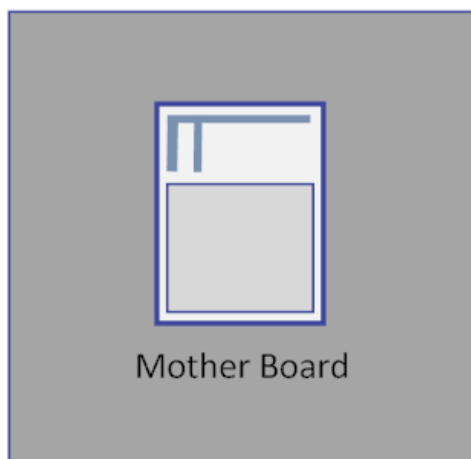


Fig 5-2. Not recommended location in X-Y plane

■ Location in Z plane

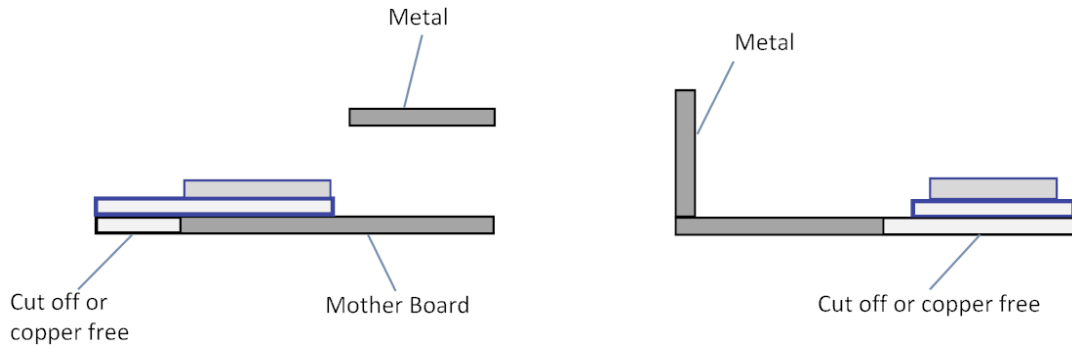


Fig 5-3. Recommended location in Z plane

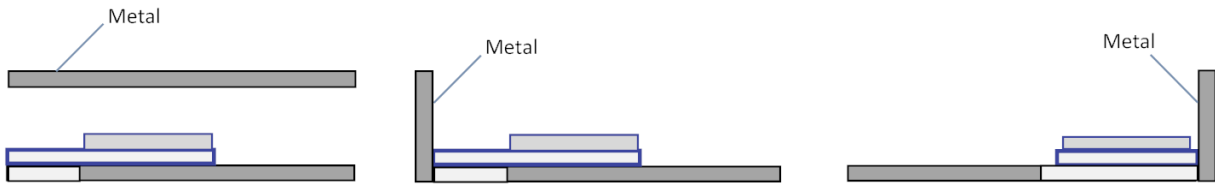


Fig 5-4. Not recommended location in Z plane

## 6. Mechanical Specifications

### 6.1 Dimensions

The module dimensions are presented in the following figure:

Note: All dimensions are in mm.

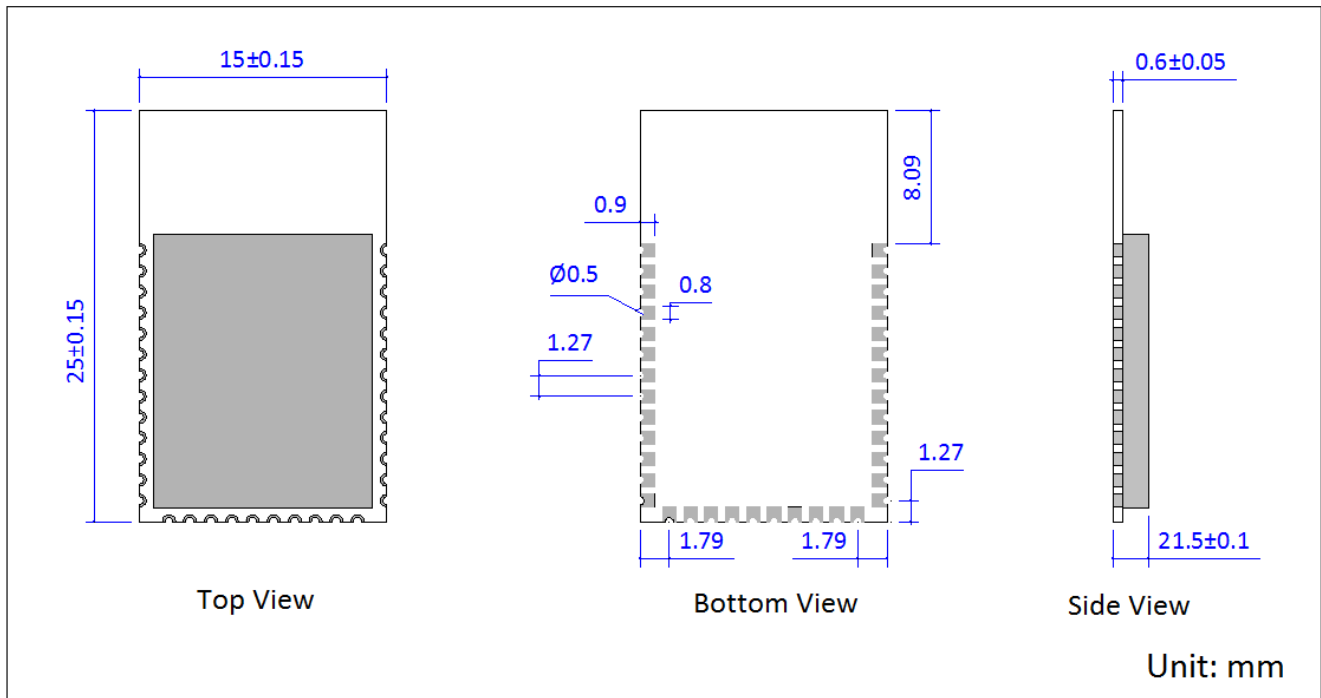


Figure 6-1. Mechanical Drawing

## 7. Packaging Information



**Fig 7-1. Package information**

## 8. Ordering Information

Part Number	Size (mm)	Core Chip	Package	MOQ
BDE-RFM204A	33.5 x 16 x 2.35	CC1310	Tray	1K

## 9. Revision History

Revision	Date	Description
V1.0	19-Aug-2019	Initial Release
V2.0	14-Apr-2021	Replacement of template

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