

Multi-Band Wireless Module



Key Features

- Multi-Band, supports 2.4G and Sub-1G band
- 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
 - 28 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 +14 dBm (Sub-1G) and +5dBm (2.4G) with temperature compensation
 - RX sensitivity: -121 dBm for SimpleLink long-range mode, -110 dBm at 50 kbps, -105 dBm for Bluetooth 125 kbps (LE Coded PHY)
- Communication range: about 250 meters (LOS) – Long Range Mode (2.4G), upto 1000 meters (LOS) – Long Range Mode (Sub-1G) (TBD)
- Antenna: UFL connector for Sub-1G, UFL or PCB antenna for 2.4G

- Size: 29.86 mm x 19.98 mm x 2.15 mm (With Shielding)
- Ultra low power consumption:
 - Shutdown: 150nA (Wake up on external events)
 - Standby: 0.85uA (RTC running and RAM/CPU retention)
 - RX current: 5.8mA (3.6 V, 868 MHz), 6.9 mA (3.0 V, 2.4 GHz)
 - TX current @ 0dBm: 8.0 mA (3.6 V, 868 MHz), 7.1 mA (3.0 V, 2.4 GHz)
 - TX @ 14 dBm: 24.9 mA (868 MHz)
- BQB, FCC, CE, RoHS compliant

Descriptions

BDE-RFM208 is a multi-band wireless module which supports Sub-1G and 2.4G band. It also supports multiprotocol, such as Thread, Zigbee, Bluetooth 5 Low Energy, IEEE 802.15.4g, IPv6-enabled smart objects (6LoWPAN), Wireless M-Bus, Wi-SUN, KNX RF, proprietary systems, SimpleLink TI 15.4-Stack (Sub-1 GHz), and Dynamic Multiprotocol Manager (DMM) driver.

BDE-RFM208 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.

Block Diagram

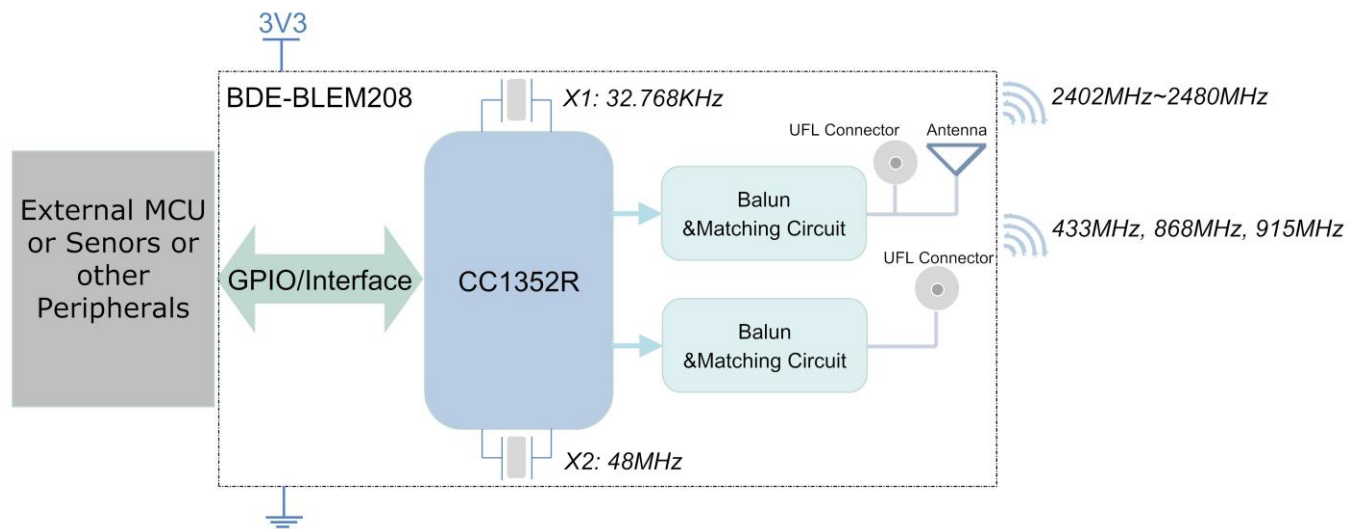


Fig. 1: The Block Diagram of BDE-RFM208

Applications

- 433, 470 to 510, 868, 902 to 928, and 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)

Electrical Characteristics

- Absolute maximum rating

| Rating | Min | Typ | Max | Unit | Notes |
|-------------------------|------|-----|-----------------------|------|---|
| Storage Temperature | -40 | - | 125 | °C | |
| VDD | -0.3 | - | 4.1 | V | |
| Other Digital Terminals | -0.3 | - | $V_{DD}+0.3 \leq 4.1$ | V | |
| Voltage on ADC input | -0.3 | - | V_{DD} | V | Voltage scaling enabled |
| | -0.3 | - | 1.49 | V | Voltage scaling disabled, internal reference |
| | -0.3 | - | $V_{DD}/2.9$ | V | Voltage scaling disabled, V_{DD} as reference |
| RF pin | - | - | 5 | dBm | Input level, 2.4 GHz RF pins |
| | - | - | 10 | dBm | Input level, Sub-1 GHz RF pins |

- Recommended operating conditions

| Rating | Min | Typ | Max | Unit |
|-----------------------|-----|-----|-----|------|
| Operating Temperature | -40 | - | 85 | °C |
| VDD | 2.1 | 3.3 | 3.8 | V |

Pinout

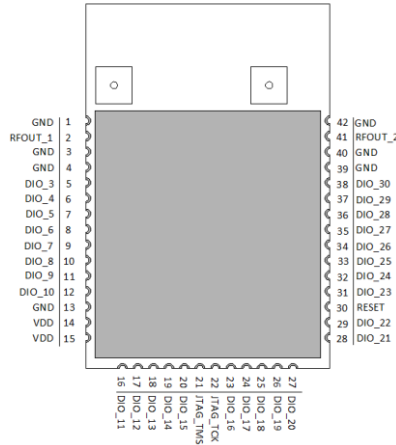


Fig. 2: The pinout of BDE-RFM208 (TOP VIEW)

Table 1: Pin definitions of BDE-RFM208

| Pin Number | Pin Name | Definitions |
|------------|-----------|---------------------------------------|
| 1 | GND | Power Ground |
| 2 | RFOUT_1 | Sub-1G RF Output Port |
| 3 | GND | Power Ground |
| 4 | GND | Power Ground |
| 5 | DIO_3 | GPIO |
| 6 | DIO_4 | GPIO |
| 7 | DIO_5 | GPIO, High-drive Capability |
| 8 | DIO_6 | GPIO, High-drive Capability |
| 9 | DIO_7 | GPIO, High-drive Capability |
| 10 | DIO_8 | GPIO |
| 11 | DIO_9 | GPIO |
| 12 | DIO_10 | GPIO |
| 13 | GND | Power Ground |
| 14 | VDD | Supply Power |
| 15 | VDD | Supply Power |
| 16 | DIO_11 | GPIO |
| 17 | DIO_12 | GPIO |
| 18 | DIO_13 | GPIO |
| 19 | DIO_14 | GPIO |
| 20 | DIO_15 | GPIO |
| 21 | JTAG_TMSC | JTAG TMS, High-drive Capability |
| 22 | JTAG_TCKC | JTAG TCKC |
| 23 | DIO_16 | GPIO, JTAG_TDO, High-drive Capability |
| 24 | DIO_17 | GPIO, JTAG_TDI, High-drive Capability |
| 25 | DIO_18 | GPIO |

| | | |
|----|---------|-------------------------|
| 26 | DIO_19 | GPIO |
| 27 | DIO_20 | GPIO |
| 28 | DIO_21 | GPIO |
| 29 | DIO_22 | GPIO |
| 30 | RESET | Reset, Active Low |
| 31 | DIO_23 | GPIO, Analog Capability |
| 32 | DIO_24 | GPIO, Analog Capability |
| 33 | DIO_25 | GPIO, Analog Capability |
| 34 | DIO_26 | GPIO, Analog Capability |
| 35 | DIO_27 | GPIO, Analog Capability |
| 36 | DIO_28 | GPIO, Analog Capability |
| 37 | DIO_29 | GPIO, Analog Capability |
| 38 | DIO_30 | GPIO, Analog Capability |
| 39 | GND | Power Ground |
| 40 | GND | Power Ground |
| 41 | RFOUT_2 | 2.4G RF Output Port |
| 42 | GND | Power Ground |

Overall Dimensions

Fig. 3 shows the overall dimensions of BDE-RFM208. The module measures 29.86mm long by 19.97mm wide by 2.15mm high with the shield.

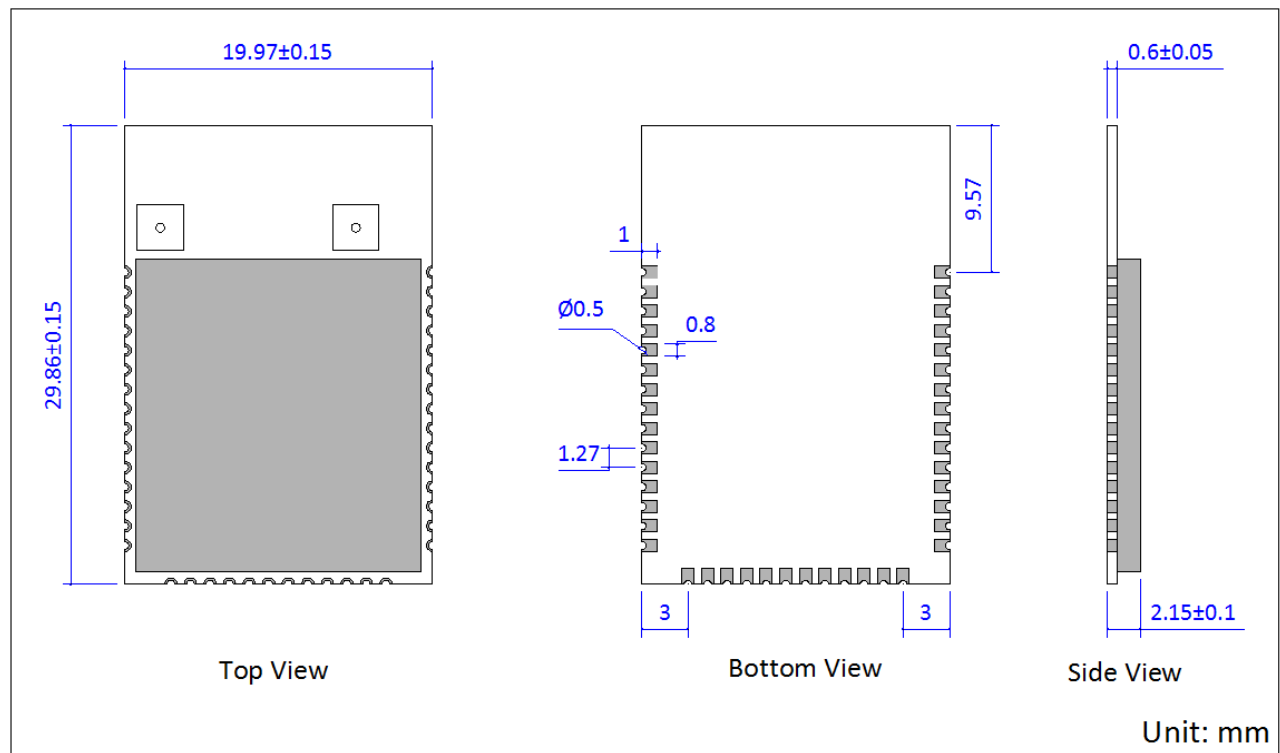


Fig. 3: Overall Dimensions of BDE-RFM208

Module Location

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

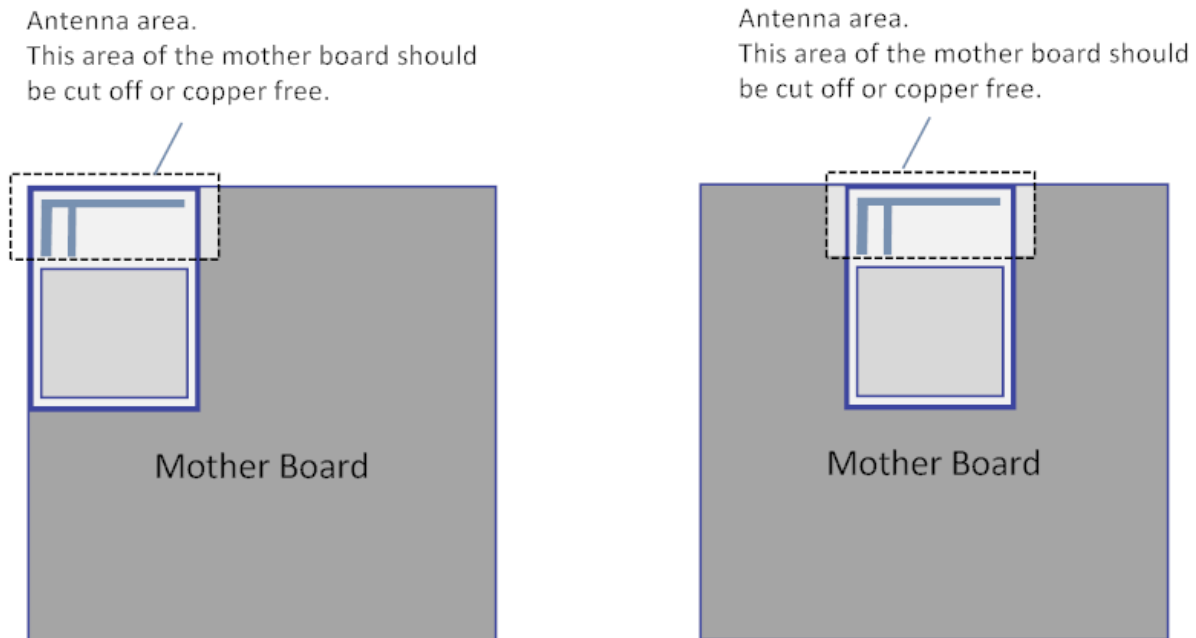


Fig. 4: Recommended location in X-Y plane

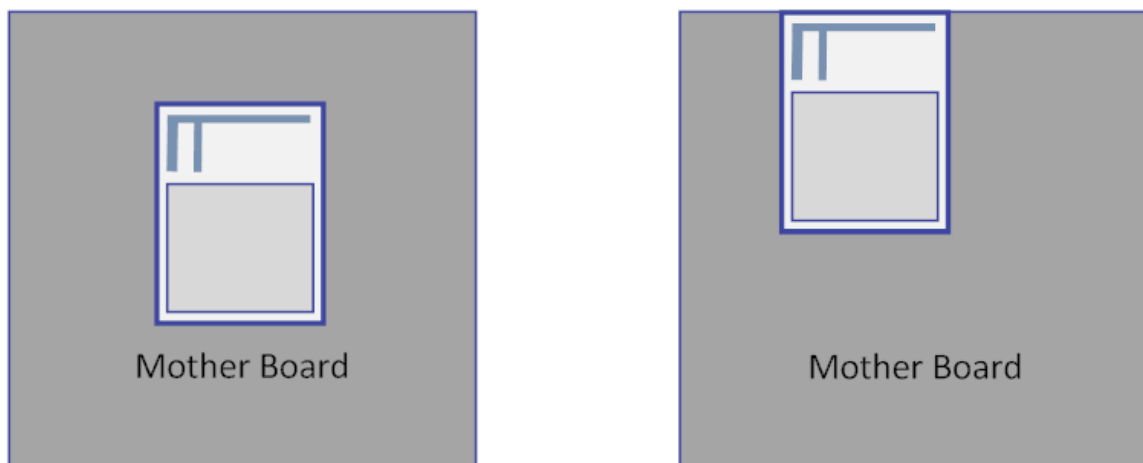


Fig. 5: Not recommended location in X-Y plane

■ Location in Z plane

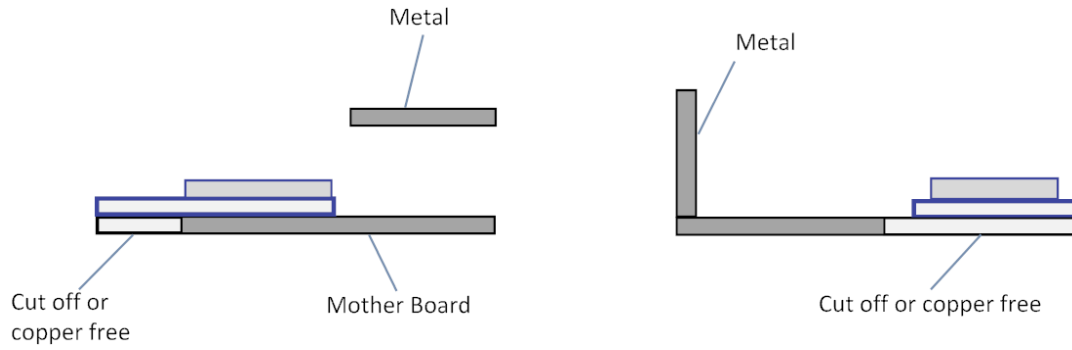


Fig. 6: Recommended location in Z plane

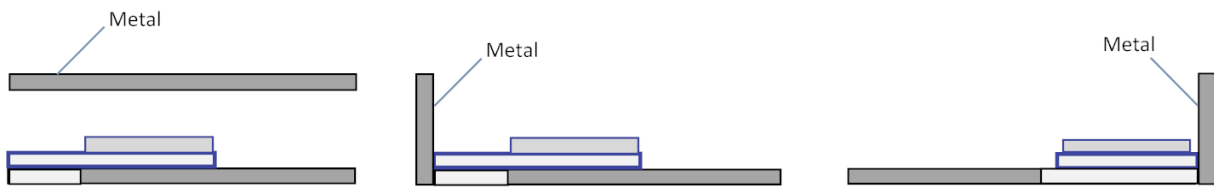


Fig. 7: Not recommended location in Z plane

Typical Solder Reflow Profile

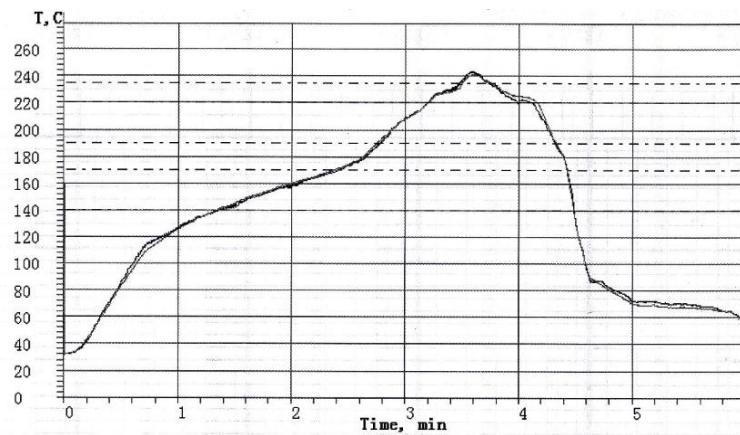


Fig. 8: Typical Solder Reflow Profile

Package Information



Fig. 9: Package

Contacts

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