Multi-Band Wireless Module with PA Datasheet V1.1

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
  - 26 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 +20 dBm 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 2000 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 19.97 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 @ 20 dBm: 63 mA (3.3 V, 915 MHz), 85 mA (3.0 V, 2.4 GHz)

- BQB, FCC, CE, RoHS compliant

Descriptions

BDE-RFM208P 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-RFM208P has an integrated power amplifier which enables 20dBm output power.

BDE-RFM208P 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

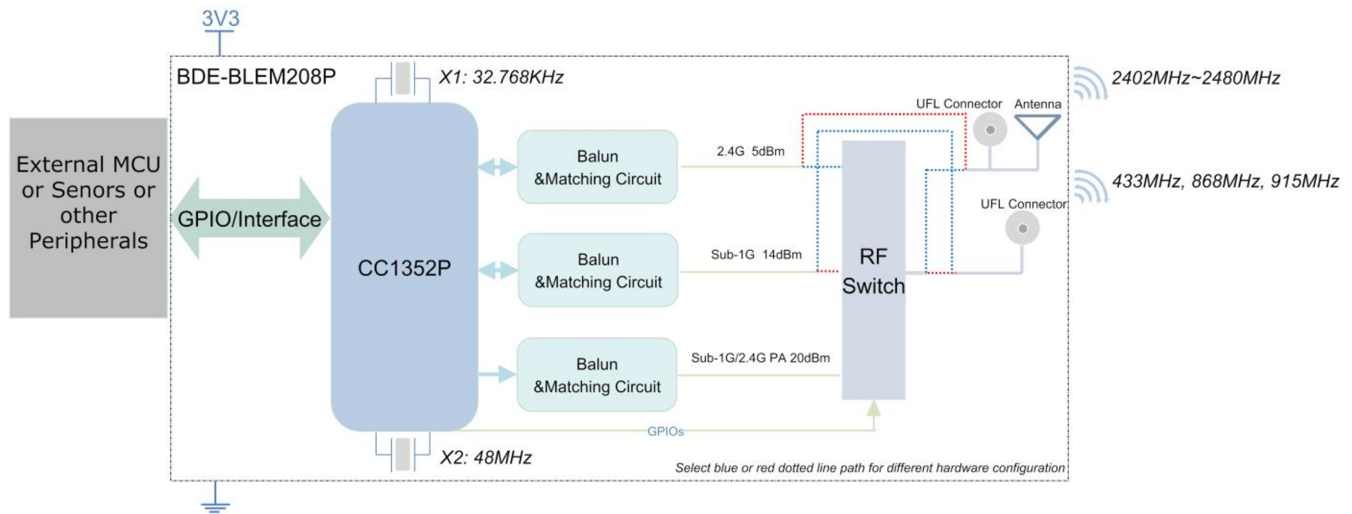

Fig. 1: The Block Diagram of BDE-RFM208P

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	℃	
VDD	-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

- Recommended operating conditions

Rating	Min	Typ	Max	Unit
Operating Temperature	-40	-	85	℃
VDD	2.1	3.3	3.8	V

Pinout

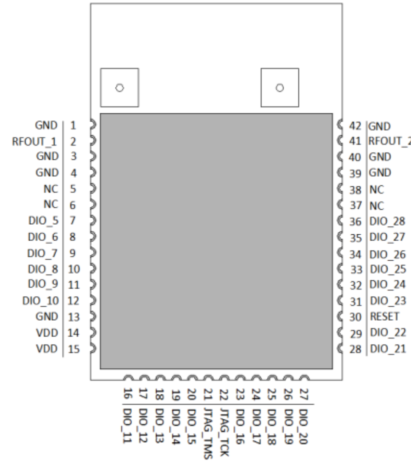

Fig. 2: The pinout of BDE-RFM208P (TOP VIEW)

Table 1: Pin definitions of BDE-RFM208P

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	NC	NC
6	NC	NC
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 TMSC, 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	NC	NC
38	NC	NC
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-RFM208P. The module measures 29.86mm long by 19.97mm wide by 2.15mm high with the shield.

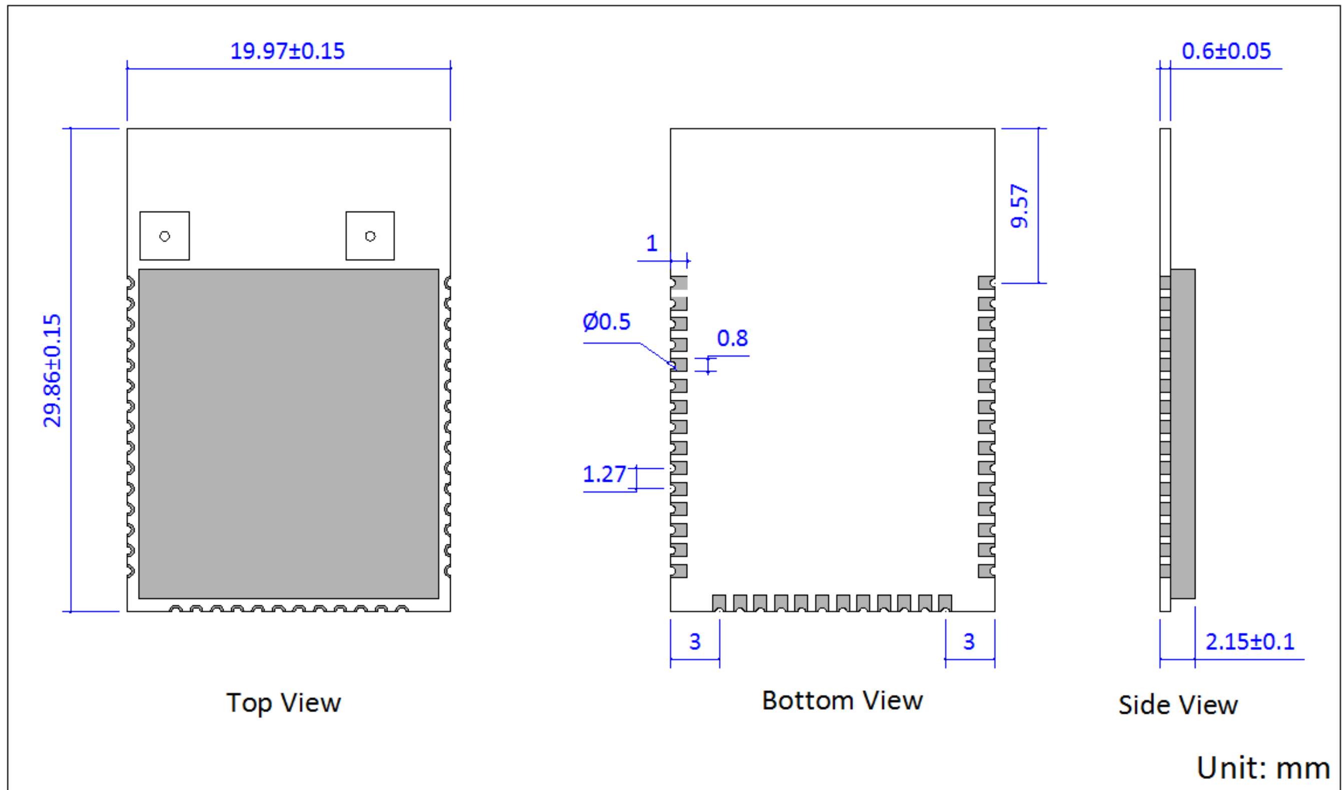

Fig. 3: Overall Dimensions of BDE-RFM208P

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

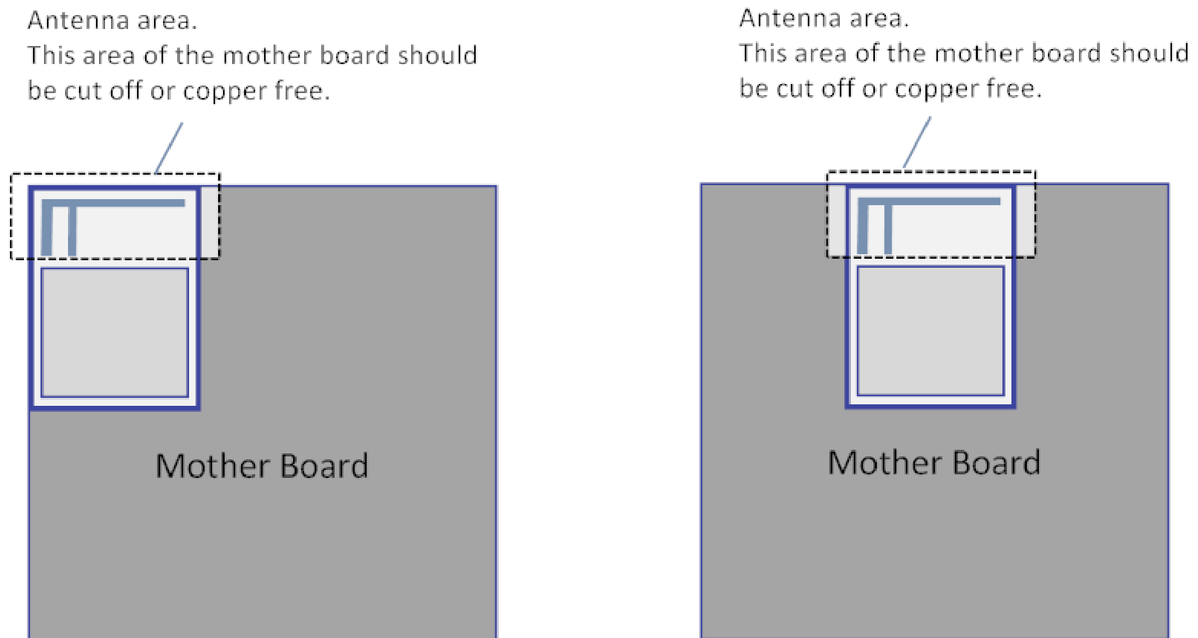

Fig. 4: Recommended location in X-Y plane

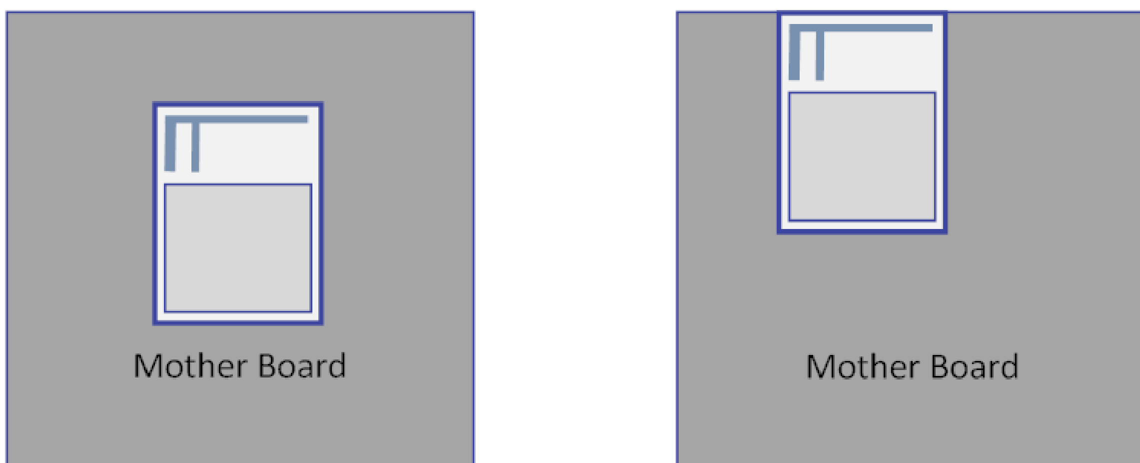

Fig. 5: Not recommended location in X-Y plane

- Location in Z plane

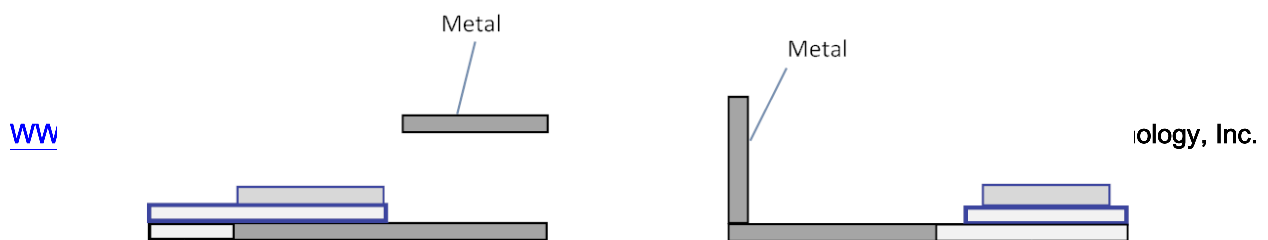

Fig. 6: Recommended location in Z plane

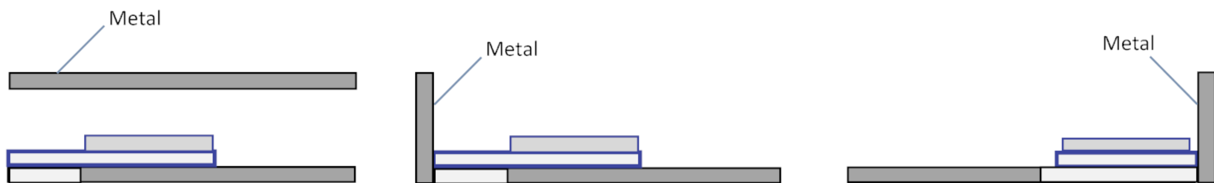

Fig. 7: Not recommended location in Z plane

Typical Solder Reflow Profile

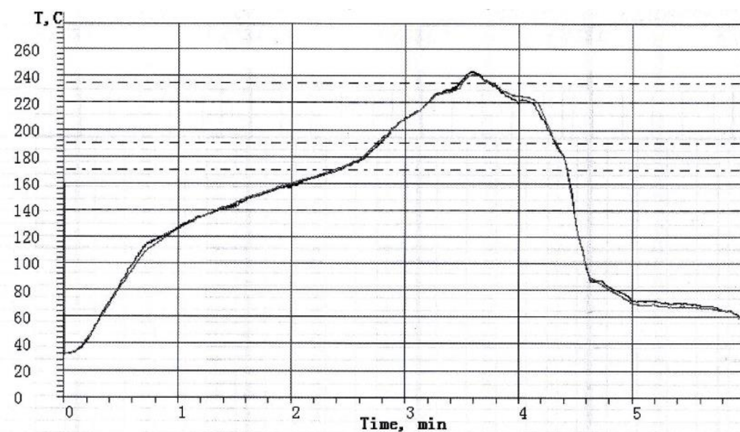

Fig. 8: Typical Solder Reflow Profile

Package Information

Fig. 9: Package

Contacts

BDE Technology Inc.

Address: Originality Building B2-403, 162 Science Ave, Huangpu District, Guangzhou, 510663, China

67 E Madison St, Ste 1603A#436, Chicago, IL 60603,, USA

Tel: +86-020-28065335 Fax: +86-020-28065338

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