



Key Specifications

- Low Power Wi-Fi module with Microcontroller and Antenna
- 80MHz Processor 36kB RAM, 8Mbit Flash
- Ultra Low Power modes (Deep Sleep, Standby)
- IEEE 802.11n/g/b, 1x1 SISO, 2.4 GHz and HT20
- Embedded Stack and TCP/IP, Simple UART interface
- I2C, UART, QSPI, Up to 17 GPIOs
- Small form factor (22mm x 15.5mm x 1.5mm)

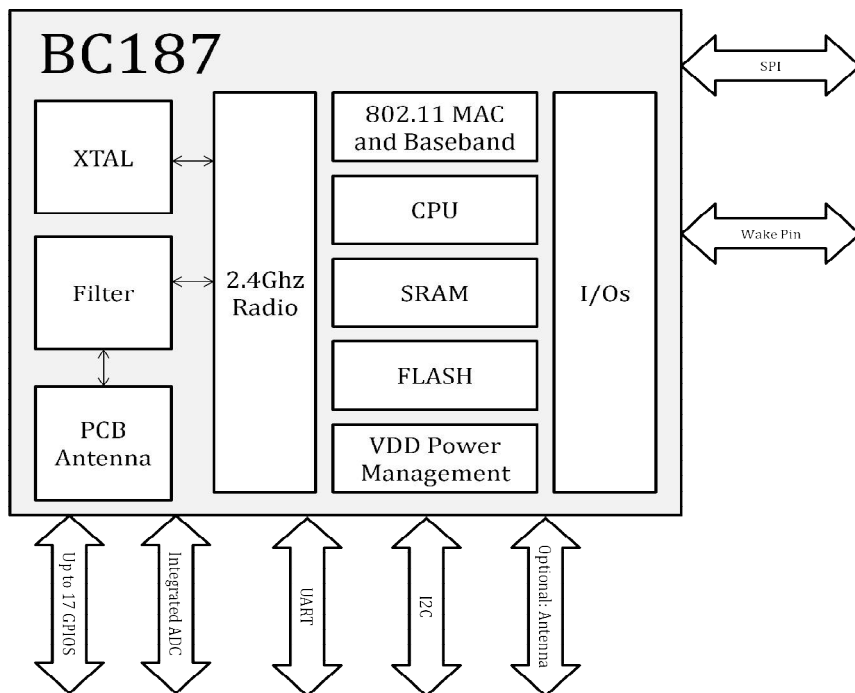


Applications

- White Goods/Appliances
- Consumer Devices and Accessories
- Home Automation
- Personal Health Devices
- IoT and Wearables
- Commercial and Industrial

Description

BC187 is a highly flexible, low power, small form factor self contained Wi-Fi module. It comes preloaded with BlueCreation Melody-Wi-Fi software, and is ideal for developers who want to quickly and cost effectively integrate Wi-Fi functionality into their products.





General Specifications

Specifications	Description
Wi-Fi	802.11 b.g.n
Interfaces	UART, GPIO, SPI, I2S, I2C, ADC
Size	22mm x 15.5mm x 1.5mm
Weight	0.9g

Wi-Fi Specifications

Specifications	Description
Encryption	WEP 64 and 128 bit encryption (WPA), AES-CCMP, WAPI
Frequency Range	2400 to 2500 MHz
Rx Sensitivity	-91dbm at 11 Mbps
Tx output saturation	20dBm
Rx input IP3	-15dBm
Phase Noise	-103dBc/Hz

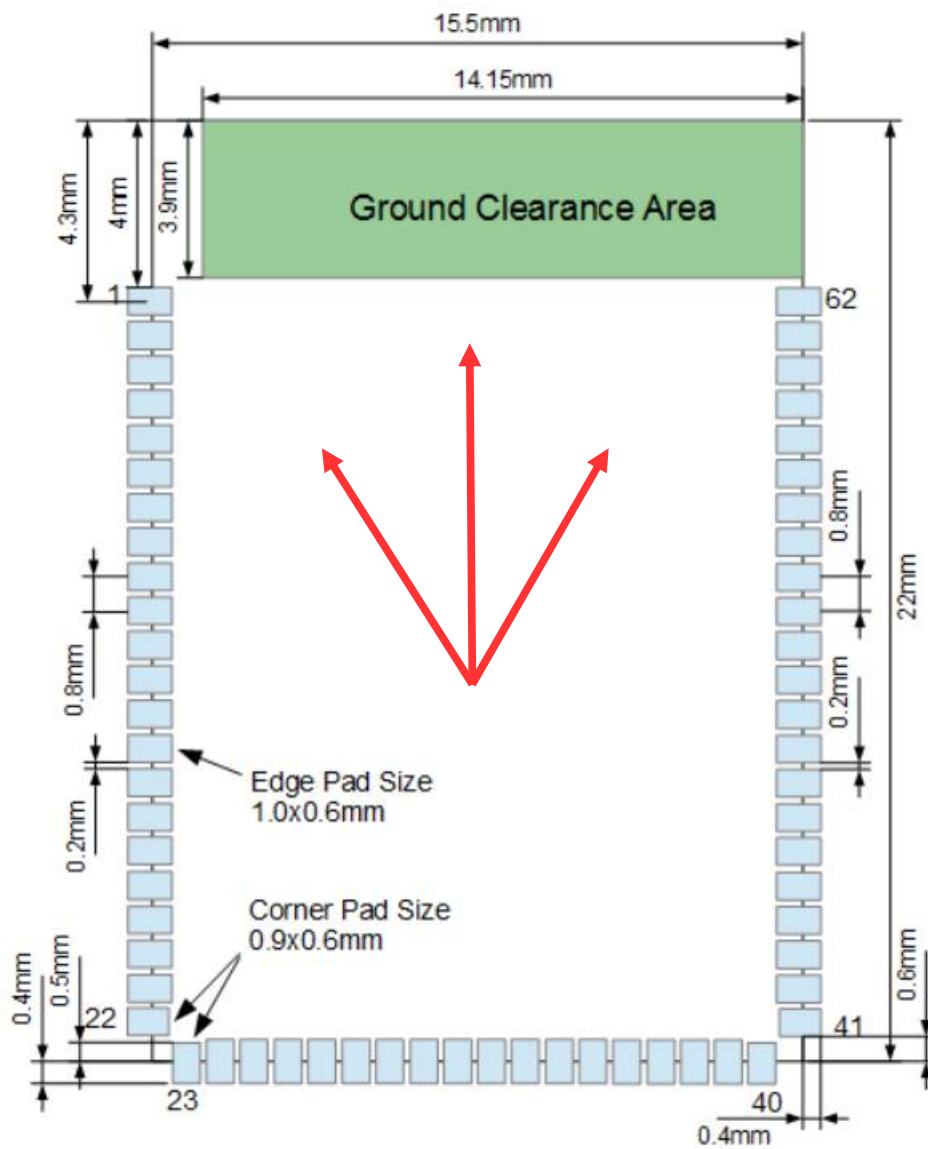


Electric Specifications

Specifications	Description
Supply Voltage	3.0V to 3.6 V DC (Supports Li Ion battery voltage range)
Typical Current (Sleep)	10 μ A
Wake Up	<2ms
Operating Temperature	-40°C to 125°C



Module Footprint





Layout Notes

For the internal antenna to work efficiently the ground clearance area must be adhered to. No tracking or ground should run under this area.

The RF performance (range) of the module depends upon the application PCB to which it is mounted. Large PCBs with good ground planes will give better range than smaller application PCBs with discontinuous ground planes.

Avoid placing the antenna module end close to metallic objects or placing in a metallic or metalised plastic case. On the footprint drawing the red arrows denote the orientation of maximum antenna radiation, orientate the module with the antenna end pointing in the direction you want maximum range.

Pins marked NC should be grounded on the application PCB.



PIN Description

No	Pin Name	Primary Function	Other Functions
1	GND	Ground	NA
2	ANT_CTRL1 ¹	Output ANT_CTRL1	General Purpose IO 44
3	ANT_CTRL0 ²	Output ANT_CTRL0	General Purpose IO 45
4	GND	Ground	NA
5	RF_EXT ³	External RF Connection	NA
6	GND	Ground	NA
7	NC	No Connection	No Connection
8	NC	No Connection	No Connection
9	UART_TX	UART Transmit	NA
10	UART_RX	UART Receive	NA
11	VDD_PADS	Supply input for GPIOs	NA
12	NC	No Connection	No Connection
13	GND	Ground	NA
14	GND	Ground	NA
15	GND	Ground	NA
16	NC	No Connection	No Connection
17	GND	Ground	NA
18	GND	Ground	NA
19	NC	No Connection	No Connection
20	NC	No Connection	No Connection
21	GPIO4	General Purpose IO 4	PWM3
22	GND	Ground	NA
23	GND	Ground	NA
24	GND	Ground	NA
25	NC	No Connection	No Connection
26	RST#	Module Reset (Active Low)	NA
27	TOUT	ADC Output	NA
28	GND	Ground	NA
29	GND	Ground	NA
30	QSPI_D1 ⁴	Flash SPI Data I/O connected internally	NA
31	QSPI_CLK ⁴	Flash SPI Clock connected internally	NA
32	NC	No Connection	No Connection
33	GND	Ground	NA
34	QSPI_HOLD ⁴	Flash SPI Data HOLD connected internally	NA



BC187 Datasheet

No	Pin Name	Pin Type	Pin Description
35	QSPI_WP ⁴	Flash SPI Write Protect connected internally	NA
36	QSPI_D0 ⁴	Flash SPI Data I/O 0 connected internally	NA
37	QSPI_SSN ⁴	Flash SPI Chip Select connected internally	NA
38	NC	No Connection	No Connection
39	GND	Ground	NA
40	GND	Ground	NA
41	GND	Ground	NA
42	GND	Ground	NA
43	CHIP_ENABLE	Wi-Fi IC Enable	NA
44	XPD_DCDC	Deep-Sleep Wake-Up	General Purpose IO 16
45	GPIO5	General Purpose IO 5	IRDA Tx
46	GND	Ground	NA
47	NC	No Connection	No Connection
48	MTDI	HSPI DATA_IN	General Purpose IO 12 : HSPIQ : PWM0
49	MTCLK	HSPI CLK	General Purpose IO 13 : HSPID
50	MTDO	HSPI DATA_OUT	General Purpose IO 15 : HSPICS : PWM1
51	NC	No Connection	No Connection
52	NC	No Connection	No Connection
53	NC	No Connection	No Connection
54	NC	No Connection	No Connection
55	GPIO2	General Purpose IO 2	I2C_SDA
56	MTMS	HSPI CHIP SELECT	General Purpose IO 14 : HSPICLK: I2C_SCL : PWM2 : IRDA Rx
57	GPIO0	General Purpose IO 0	NA
58	NC	No Connection	No Connection
59	NC	No Connection	No Connection
60	NC	No Connection	No Connection
61	VDD	Module Supply Voltage	NA
62	GND	Ground	NA

Notes

¹Pulled High internally (Defaults to on module Antenna).

²Pulled Low internally (Defaults to on module Antenna).

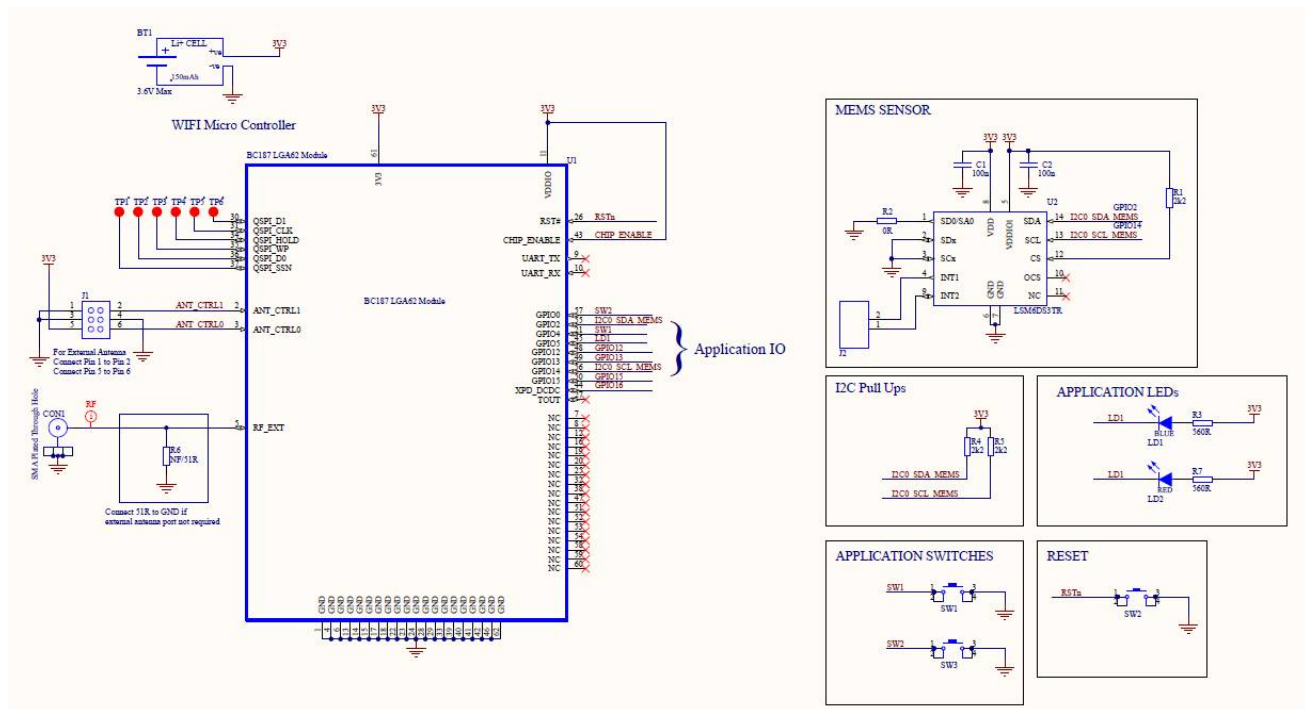
³External RF Port, internally DC blocked, connect to ground via a 500ohm resistor if not using.

⁴Signals provided externally for monitoring of internal Flash Memory read/write activity.



Hardware Design Guideline

Application Schematic



Power Supply Requirements

Net	Minimum	Typical	Maximum	Absolute Maximum**
VDD	3.0V*	3.3V	3.60V	3.63V
VDD_PADS	3.0V	3.3V	3.63V	4.00V

*This is the minimum voltage allowed to enable the module in the boot modes described below.
 **Operation above this level of voltage may damage the device.

Boot Modes

All supplies (VDD_PADS Pin 11 and VDD Pin 61) should be applied simultaneously. No digital pins (GPIO, UART, I2C etc.) should be powered externally without first applying VDD_PADS.

Pulling CHIP_ENABLE (Pin 43) high will start the module once the supplies are present. CHIP_ENABLE, VDD_PADS and VDD can all be driven high at the same time to boot the module.

Pulling CHIP_ENABLE low will power off the module.



BC187 Datasheet

If a power management IC is used to provide the supply voltage and the CHIP_ENABLE control it is advised to place a RC circuit in series with the control from the power management IC and the input to the CHIP_ENABLE pin, a series resistor of 1k Ohm and a shunt or parallel capacitor of 100nF is advised.

RESET Mode

RST# will be internally pulled low during boot and the entire module will be in a reset state. After boot the RST# will be internally pulled high. An external pull up is not required.

Pulling RST# low will reset the module.

Power Down Modes

Several power down modes are supported:

OFF: CHIP_ENABLE is pulled low.

Deep Sleep: Only the RTC is powered on – the rest of the chip is powered off.

Sleep: Only the RTC is operating: External wake events from MAC, host, RTC timer, external interrupts will put the chip into **Wake Up** mode.

Wake Up: Chip transitions into On mode.

GPIOs

Unused PIOs should be left floating.

The maximum GPIO drive current available is 12mA.

UART

The BC187 is controlled by GPIOs. This can be configured. If GPIO control is not used, these GPIOs should be left floating. The UART does not use RTS/CTS (hardware) flow control.

EXT_RF

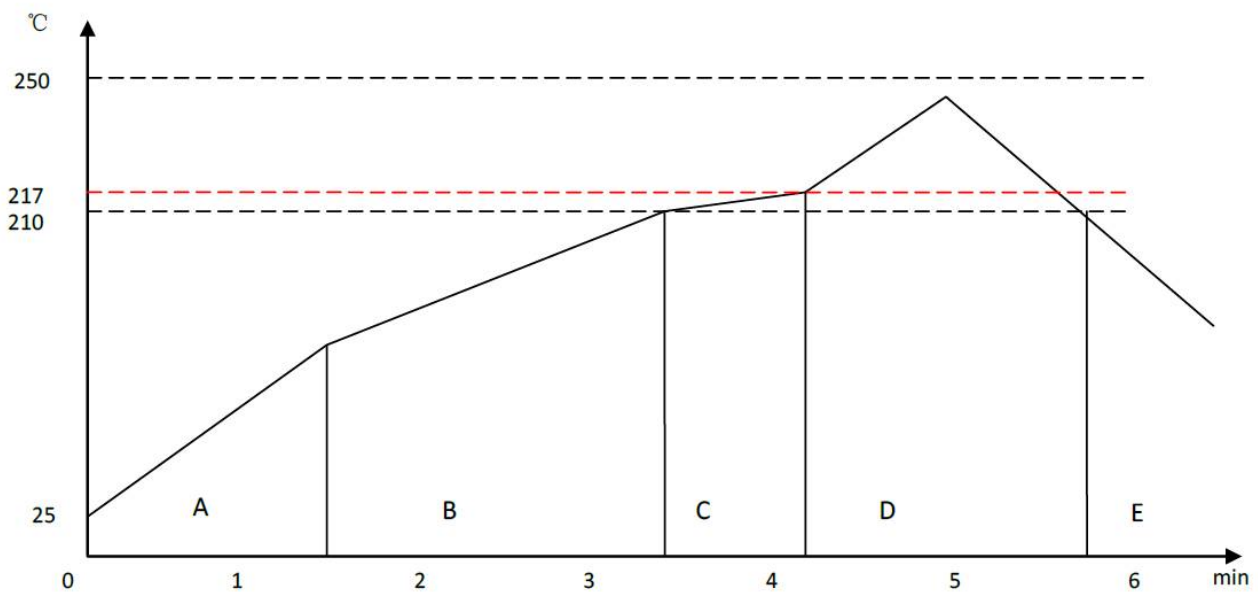
If the External RF Port is not used terminate with a 51Ohm 1% resistor to ground.

The external RF port is internally DC Blocked and can be used as a external RF connection for test purposes or as an additional antenna where higher gain or range is required than that supported by the internal antenna on the module.



Solder Reflow Profile

The solder profile is described below.



Zone A: Preheat: This raises the temperature at a controlled rate, typically 0.5 - 2C/s. This will preheat the component to 120°C to 150°C to distribute the heat uniformly to the PCB.

Zone B: Equilibrium1: In this zone, the flux becomes soft and uniformly spreads solder particles over the PCB board, preventing re-oxidisation. The recommended temperature for this zone is 150°C to 200°C for 60s to 120s.

Zone C: Equilibrium2: This is optional and in order to resolve the upright component issue. Temperature is 210°C to 217°C for 20s to 30s.

Zone D: Reflow zone: The temperature should be high enough to avoid wetting but low enough to avoid component deterioration. The recommended peak temperature is 230°C to 250°C. The soldering time should be 30s to 90s when the temperature is above 217°C.

Zone E: Cooling: The cooling rate should be fast to keep the solder grains small which will give a longer lasting joint. A typical cooling rate is 4°C/s.



Ordering Information

Part number BC187

Order number	Description
BC187	WiFi Module with integrated PCB Antenna
BC187-DISKIT-001	Development kit for the BC187 module

General Notes

- BlueCreation's products are not authorised for use in life-support or safety-critical applications. Use in such applications is done at the sole discretion of the customer. BlueCreation will not warrant the use of its devices in such applications.
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