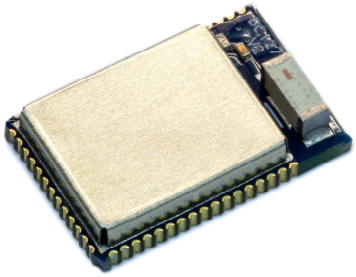
Datasheet

Key Specifications

- Bluetooth Certified 4.0 Audio module
- Dual Mode: Bluetooth and Bluetooth Low Energy (BLE)
- Backwards compatible with 1.1, 2.0, 2.1 + EDR and 3.0
- Embedded Bluetooth Protocol Stack
- Supports HFP, A2DP, AVRCP, PBAP and SPP
- Supports IAP1/IAP2 profiles for connection to iOS devices
- Simple UART and GPIO interface for command and control
- Can connect to external Codecs with I2S, PCM, SPDIF interface
- Small form factor (11.8mm x 18mm x 3.2mm)
- Bluetooth, FCC and CE certified

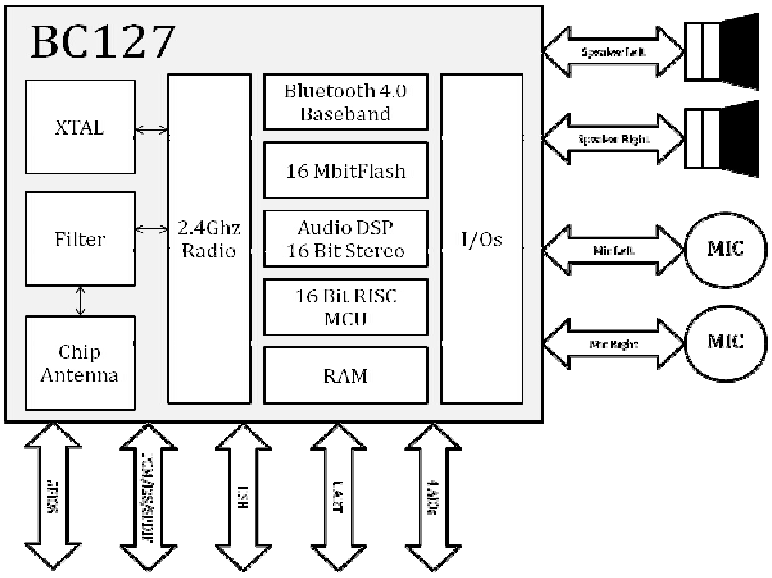


Applications

- Wireless Speakers, Docks and Headsets
- SmartPhone Controlled Audio Systems
- Automotive Infotainment Systems
- Medical Devices
- High Quality Audio Streaming
- Gaming Accessories and MP3 Players
-

Description

BC127 is a highly flexible, low power, small form factor Bluetooth Version 4.0 Certified Audio module. It comes preloaded with BlueCreation Melody software, and is ideal for developers who want to quickly and cost effectively integrate Bluetooth functionality into their products.



General Specifications

Specifications	Description
Bluetooth Standard	Bluetooth 4.0 Class 2
Interfaces	UART, AIO, GPIO, USB, SPI, Audio In, Mic In, PCM, I2S, SPDIF, I2C
Size	11.8mm x 18mm x 3.2mm
Weight	1.1g

RF Specifications

Specifications	Description
Frequency Band	2,402 MHz to 2,480 MHz
Modulation	8 DPSK, PI/4 DQPSK, GFSK
Maximum Data Rate	3Mbps (typical 1.6Mbps)
Operating Range	20m to 30m
RF Sensitivity	0.1% BER at -88dBm
Transmit Power	BER/EDR Class2＜4dBm, BLE＜10dBm

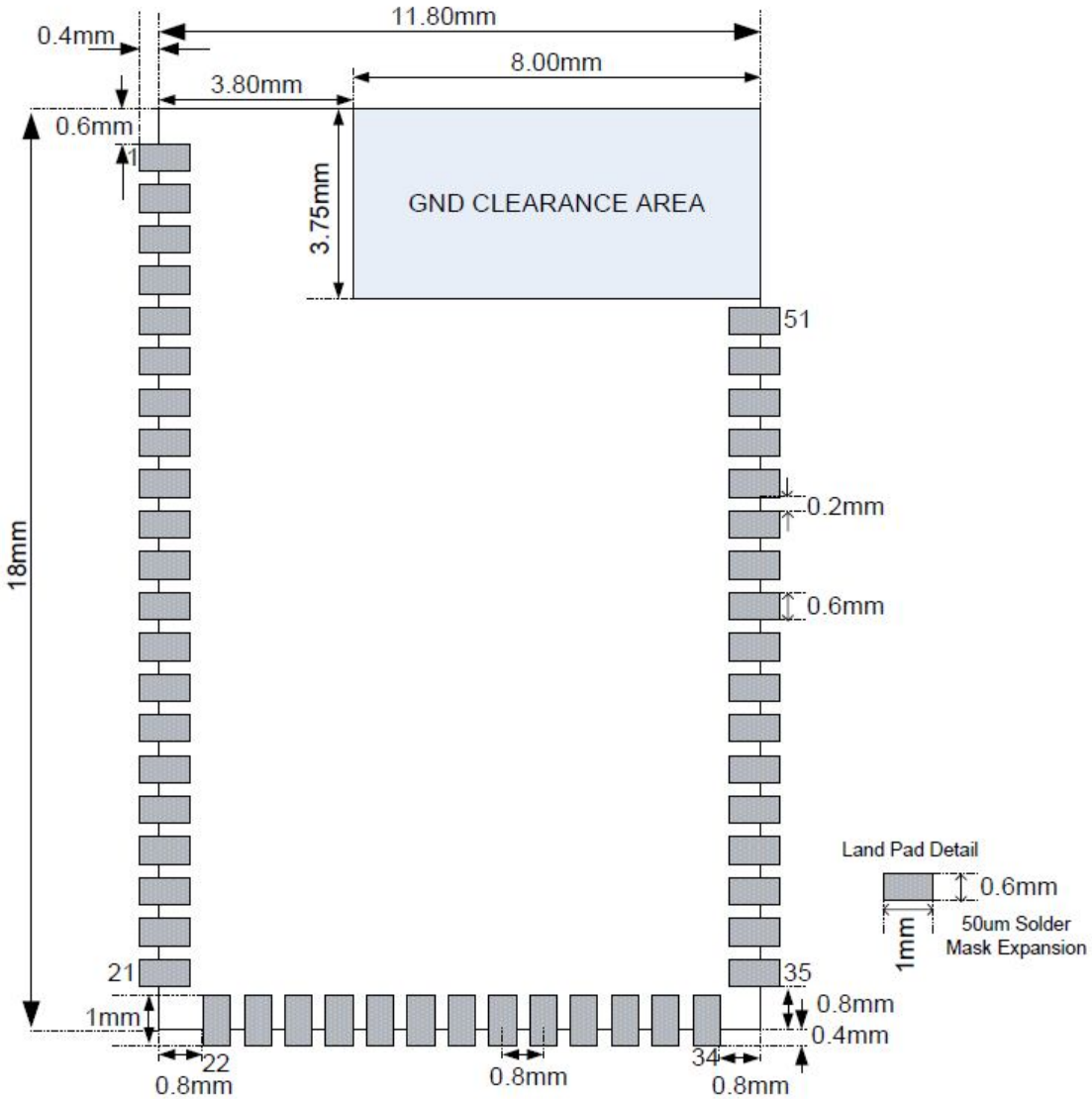
Audio Specifications

Specifications	Description
DAC resolution	16 bits
DAC Output Sample Rate	8 KHz to 90 KHz
DAC SNR	96dB
Stereo Separation	-87.7dB

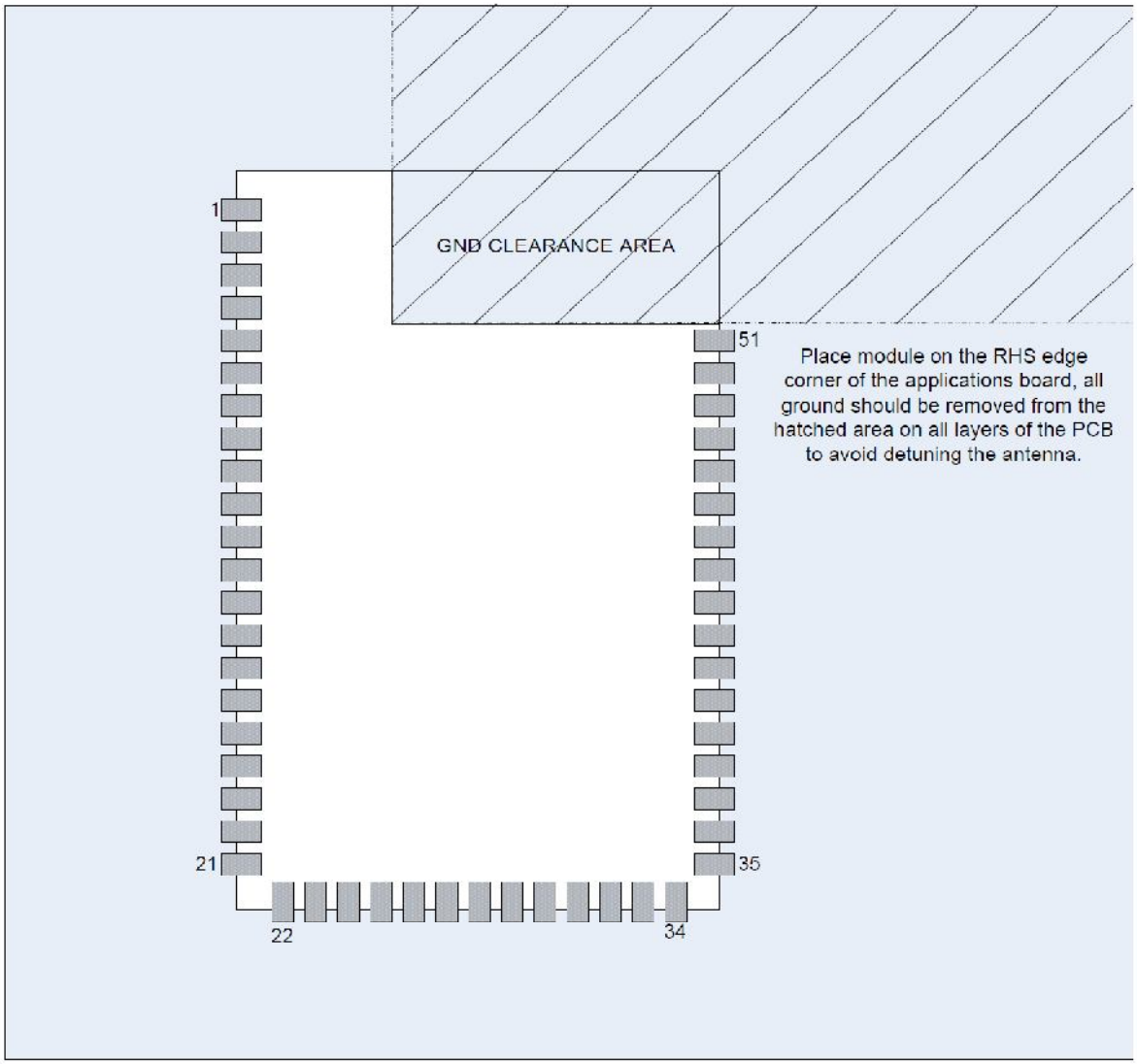
Electric Specifications

Specifications	Description
Supply Voltage	3.3V to 4.7 V DC (Supports Li Ion battery voltage range)
Typical Current	15mA (Music streaming)
Typical Current Idle	<1mA (Connectable)
Operating Temperature	-40°C to 85°C

Module Footprint



Placement Considerations



Audio Circuit

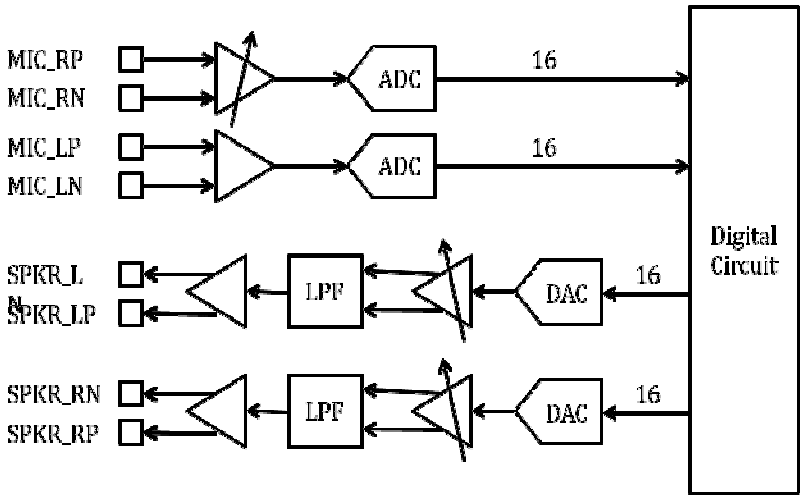
The Audio circuit consists of:

- 2 independent 16-bit high-quality ADC channels:
  - Programmable as either microphone or line input
  - Programmable as either stereo or dual-mono input
  - Multiplexed with 2 of the digital microphone inputs
  - Each channel is independently configurable to be either single-ended or fully differential
  - Each channel has an analog and digital programmable gain stage
- A dual differential class A-B output stage. If a single ended audio output is required, use an external differential to single-ended converter.

The main features of the interface are:

- Stereo and mono analog Input for voice band and audio band
- Stereo and mono analog output for voice band and audio band
- Support for stereo digital audio bus standards such as I2S
- Support for IEC-60958 standard stereo digital audio bus standards, e.g. SPDIF and AES3
- Support for PCM including PCM master codecs that require an external system clock

The analog Audio diagram is below:



PIN Description

No	Pin Name	Pin Type	Pin Description
1	GND	GND	Common Ground
2	GND	GND	Common Ground
3	GND	GND	Common Ground
4	GND	GND	Common Ground
5	PIO_6	Bi-directional	Programmable input/output line
6	PIO_7	Bi-directional	Programmable input/output line
7	CAP_SENSE_1	Analog Input	Capacitive Touch Sense Input
8	CAP_SENSE_4	Analog Input	Capacitive Touch Sense Input
9	CAP_SENSE_3	Analog Input	Capacitive Touch Sense Input
10	CAP_SENSE_2	Analog Input	Capacitive Touch Sense Input
11	GND	GND	Common Ground
12	AIO_1	Bi-directional	Analog programmable input/output line
13	SPKR_LN	Audio output	Speaker output negative, left
14	SPKR_LP	Audio output	Speaker output positive, left
15	SPKR_RN	Audio output	Speaker output negative, right
16	SPKR_RP	Audio output	Speaker output positive, right
17	MIC_BIAS_A	Analog input	Microphone bias
18	MIC_RN	Analog input	Microphone input negative, right
19	MIC_RP	Analog input	Microphone input positive, right
20	MIC_LN	Analog input	Microphone input negative, left
21	MIC_LP	Analog input	Microphone input positive, left
22	GND	GND	Common Ground
23	PIO_0	Bi-directional	Programmable input/output line
24	PIO_1	Bi-directional	Programmable input/output line
25	PIO5	Bi-directional	Programmable input/output line
26	PIO_4	Bi-directional	Programmable input/output line
27	GND	GND	Common Ground
28	VREGEN	Analogue	Take High to Enable Switch-Mode Regulator
29	CHG_EXT	Charger input	External battery charger control
30	VCHG	Charger input	Battery Charger Input
31	VBAT_SENSE	Battery sense	Battery Charger Sense
32	VBAT	Battery terminal +ve	Battery Positive
33	VDD_PADS	Supply	Positive Supply input
34	3V3_USB	Supply	Positive Supply input
35	USB_N	Bi-directional	USB data negative
36	USB_P	Bi-directional	USB data positive
37	LED_0	Open drain output	LED Driver
38	LED_1	Open drain output	LED Driver

39	LED_2	Open drain output	LED Driver

No	Pin Name	Pin Type	Pin Description
40	UART_CTS	Bi-directional	UART Clear to Send
41	UART_TX	Bi-directional	UART TX Data
42	UART_RX	Bi-directional	UART RX Data
43	UART_RTS	Bi-directional	UART request to send ,active low
44	RST#	Reset Input	Reset if low for more than 5ms
45	SPI_PCM#	Input	Select PCM/SPI
46	PCM_SYNC	Bi-directional	Synchronous data sync
47	PCM_CLK	Bi-directional	Synchronous data clock
48	PCM_OUT	CMOS output	Synchronous data output
49	PCM_IN	CMOS input	Synchronous data input
50	PIO_2	Bi-directional	Programmable input/output line
51	PIO_3	Bi-directional	Programmable input/output line

Notes

- PIO_X are bidirectional with weak pull down
- Reset Input is with strong pull-up
- USB data positive with selectable internal 1.5kΩ pull up resistor
- UART are Bidirectional with weak pull up
- PCM_OUT, IN, SYNC and CLK can be used as SPI_MISO, MOSI, CSB and CLK respectively. SPI-PCM# high switches SPI/PCM lines to SPI, low switches to PCM/PIO use

Solder Reflow Profile

- Preheat Temperature: 150°C for 100 seconds
- Temperature: 220°C for 40 seconds.
- Single Pass

Regulatory Certifications

BC127 is delivered with FCC, CE, IC and Bluetooth SIG certifications. This allows to integrate the module in an end product without the need to obtain subsequent and separate approvals from these regulatory agencies. This is valid in the case no other intentional or un-intentional radiator components are incorporated into the product. Without these certification, an end product cannot be marketed in the relevant regions.

United States - FCC

- In case no other intentional or un-intentional radiator is incorporated, the BC127's FCC certification allows users to integrate the module into products without the need to obtain subsequent and separate approval.
- The BC127 was approved as "intentional transmitter radio module" by the United States' Federal Communications Commission (FCC) with accordance to CFR47 Telecommunications Part 15, Subpart C, section 212. This certification is applicable in all the states in the United States.
- The certification allows products to be listed in the NRTL (National Recognized Test Laboratory) as appointed by OSHA (Occupational Safety and Health Administration).

Labelling

- The BC127 has been labelled with its own FCC ID number. In order to the extend the certification granted to the BC127, its FCC ID number must be displayed on the finished product in which the module is integrated. The following wording should be used "Contains Transmitter Module FCC ID: SSS-BC127" or “Contains FCC ID: SSS-BC127”.
- The user-manual for any product in which the BC127 is integrated in must include the following statements:

> This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: Reorient or relocate the receiving antenna; Increase the separation between the equipment and receiver; Connect the equipment into an outlet on a circuit different from that to which the receiver is connected; Consult the dealer or an experienced radio/TV technician for help.

To satisfy FCC RF Exposure requirements for mobile and base station transmission devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operation at closer than this distance is not recommended. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

For further information regarding the FCC certification requirements please review the following websites:

Federal Communications Commission (FCC):
http://www.fcc.gov

FCC Office of Engineering and Technology (OET) Laboratory Division Knowledge Database (KDB):
http://apps.fcc.gov/oetcf/kdb/index.cfm

Europe - CE and RoHS Marking

- In case no other intentional or un-intentional radiator is incorporated, the BC127's CE marking certification allows users to integrate the module into products without the need to obtain subsequent and separate CE approval.
- The BC127 has been tested and granted approval as R&TTE Directive product under the 1999/5/EC Essential Requirements for Health and Safety (Article (3.1(a)), Electromagnetic Compatibility, (EMC) (Article 3.1(b)), and Radio (Article 3.2). A Notified Body Opinion has been issued.
- The BC127 has also been tested and granted approval under the directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2002/95/EC (commonly referred to as the Restriction of Hazardous Substances Directive or RoHS). This certification ensures the module is environmental safe and free from hazardous substances (including Lead).
- Both certifications are applicable in all the 27 countries of the European Economic Area.

Labelling and Documentation

- Products complying with all relevant essential requirements shall bear the CE conformity marking accompanied by the identification number XXX-XXX
- The RoHS certification does not dictate any specific product labelling. However, we recommend marking the product with a "RoHS Compliant" statement.
- R&TTE Directive requires a manufacturer to establish technical documentation. It must be kept by the manufacturer or his authorised representative in the EU for at least 10 years after the last product has been manufactured. The documentation must cover:
  - a general description of the product,
  - conceptual design and manufacturing drawings and schemes of components, sub-assemblies, circuits and other design documentation,
  - descriptions and explanations necessary for the understanding of said drawings and schemes and the operation of the product,
  - a list of the standards referred to in Article 5, applied in full or in part, and descriptions and explanations of the solutions adopted to meet the essential requirements of the Directive where such standards
  - results of design calculations made, examinations carried out, etc.,
  - test reports.

- Test reports must include the following table containing the BC127 tests:

Certification	Standards	Article	Laboratory	Report Number	Date
Safety	EN 60950-1:2006+A11:2009+A1:2010	(3.1(a))			
Health	EN 50371:2002-03				
EMC	EN 301 489-1 V1.8.1 (2008-04); EN 301 489-17 V2.1.1 (2009-05)	(3.1(b))			
Radio	EN 300 328 V1.7.1 (2006-10)	(3.2)			

- For further labelling and CE marking requirements please review the R&TTE Compliance Association Technical Guidance: http://rtteca.com/

For further information regarding the R&TTE certification requirements please review the following websites:

Radio and Telecommunications Terminal Equipment (R&TTE):
http://ec.europa.eu/enterprise/rtte/index_en.htm

European Conference of Postal and Telecommunications Administrations (CEPT):
http://www.cept.org

European Telecommunications Standards Institute (ETSI):
http://www.etsi.org

European Radio Communications Office (ERO):
http://www.ero.dk

Canada - IC

- In case no other intentional or un-intentional radiator is incorporated, the BC127's IC certification allows users to integrate the module into products without the need to obtain subsequent and separate approval.
- The BC127 has been tested and granted approval under Industry Canada (IC) Radio Standards Specification (RSS) RSS-210, RSSGen and ICES-003. This certification is applicable in Canada.

Labelling and Documentation

- The BC127 has been labelled with its own IC ID number. In order to the extend the certification granted to the BC127, its CE ID number must be displayed on the finished product in which the module is integrated. The following wording should be used "Contains Transmitter Module IC: XXX"
- The user-manual for any product in which the BC127 is integrated in must include the following statements:

> This device complies with Industry Canada license exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
>
> Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

> Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.
>
> Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante

- For further labelling and IC marking requirements please review the Industry Canada website: http://www.ic.gc.ca/

Bluetooth Qualification Program (BQP)

- In case no other non-certified Bluetooth components are incorporated, the BC127's BQP marking certification allows users to integrate the module into products without the need to obtain subsequent and separate approval.

- The BC127 has been approved by the Bluetooth Qualification Body (BQB) to use the Bluetooth trademark and to offer official Bluetooth functionality. The approval according to the V4.0B Bluetooth specification confirms that the module complies with the Bluetooth specification and will successfully operate with other products supporting the same profile. BQP certification also ensures that the module has gone through safety assessment. This certification was granted through a combination of product performance testing and interoperability testing. This certification applies globally.

Labelling

- Products complying with all relevant requirements are allowed to bear the official Bluetooth logo

For further information regarding the BQP certification requirements please review the following websites:

Bluetooth Special Interest Group:
https://www.bluetooth.org/apps/content/

Notes:

- Changes or modifications that are made to the module circuitry can hinder the certification
- Installers must comply with all of the instructions provided by the certification agency, which indicate installation and/or operating conditions necessary for compliance
- It is important to note that the finished product is required to comply with all applicable authorizations regulations and requirement that is not associated with the BC127 module, including non-intentional transmitting modules and other intentionally transmitting modules.
- The previous section represents BlueCreation interpretation of the salient issues of the certifications. For full details of the certification please refer to the local agencies' websites. Where there is any difference between this document and the local agencies' website, the subsequent should be followed.
- At the time of writing this document FCC, CE and BQP certification were still processed by the relevant authorities.

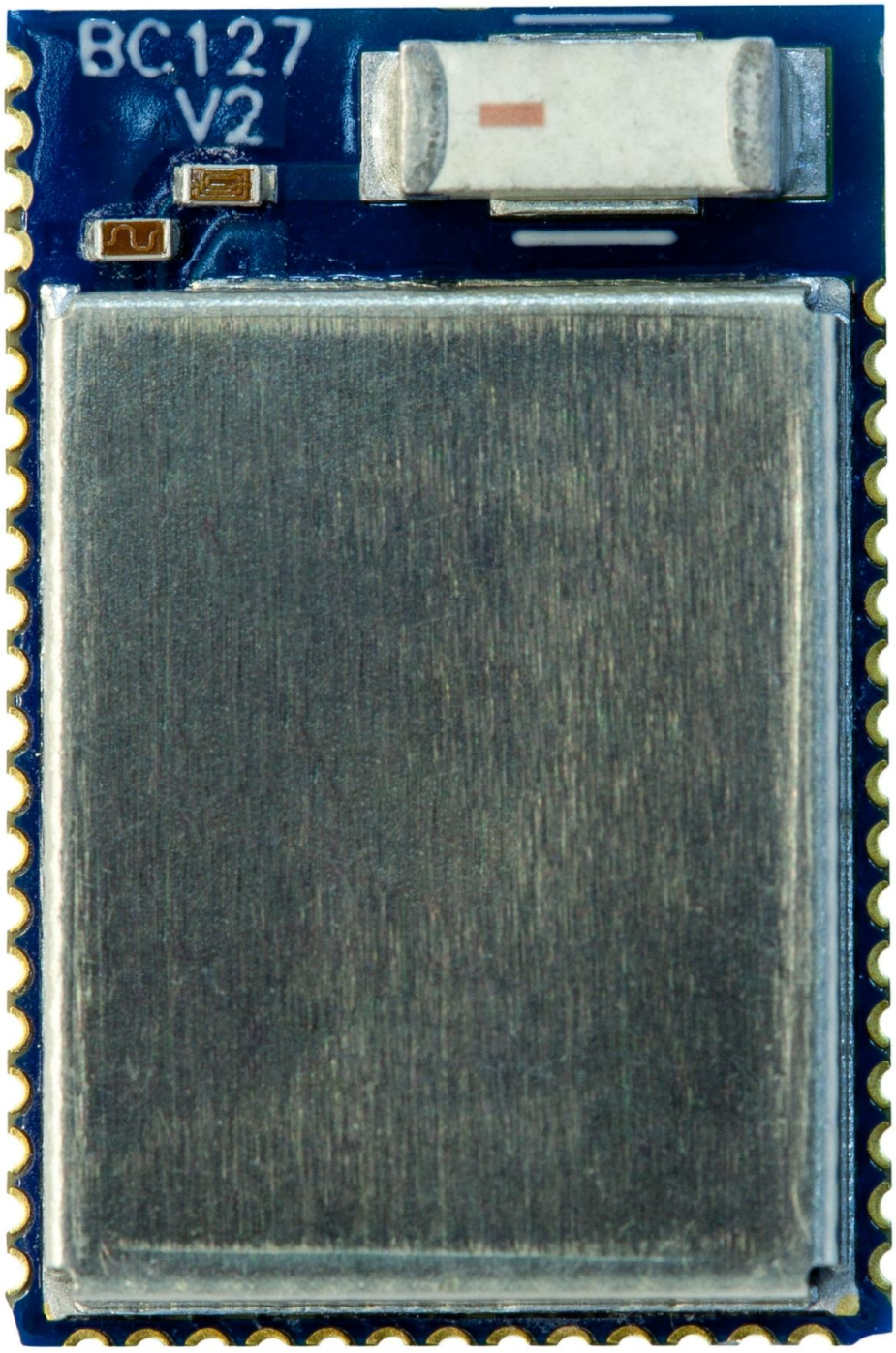
Ordering Information

Part number BC127

Order number	Description
BC127	Class2 Bluetooth 4.0 Module with integrated chip Antenna
BC127-A	Class2 Bluetooth 4.0 Module with integrated Antenna and connection to iOS
BC127-DEVKIT-001	Development kit for the BC127 module
BC127-DEVKIT-A-001	Development kit for the BC127-AI 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.
- While every care has been taken to ensure the accuracy of the contents of this document, BlueCreation cannot accept responsibility for any errors. BlueCreation reserves the right to make modifications, corrections and any other changes to its products at any time. Customers should obtain the latest information before placing orders.
- BlueCreation, other products, services and names used in this document may have been trademarked by their respective owners. The publication of this information does not imply that any license is granted under any patent or other rights owned by BlueCreation.
- Refer to www.blue-creation.com for more information. BlueCreation® is a trading name for Cambridge Executive Limited.


BC127
V2

Datasheet