



開元通訊股份有限公司 **InnoComm Mobile Technology Corp.**

30078 新竹科學工業園區新安路 6 號 3F

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BT4.1 LE Module

User Manual

Model name: BM15_AN



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Introduction

This document describes Key feature, pin definition, mechanical drawing, Recommendation for PCB Layout and operation temperature and voltage range, and reflow data of Bluetooth Low Energy Module and it can helps designer to design in easier and manufacturing smoothly.

BLE module Install Guide line

Key Features

RF

- 2.4-GHz *Bluetooth* low energy Compliant and Proprietary RF Single Mode Module
- Supports 250-kbps, 500-kbps, 1-Mbps, 2-Mbps Data Rates
- Software programmable adjustable transmitter power (-20dBm to 5dBm) for short to long range applications
- Suitable for Systems Targeting Compliance With Worldwide Radio Frequency Regulations: ETSI EN 300 328 and EN 300 440 Class 2 (Europe), FCC CFR47 Part 15 (US), and ARIB STD-T66 (Japan)

Layout

- Few External Components
- 18.0 mm × 10.5 mm × 2.0 mm, 26 pin LCC Package

Low Power

- Wide supply voltage range : 1.9 – 3.8V
- Differential RF mode : 6.4±3 mA
- Differential RF mode TX at 0 dBm: 6.8±3 mA
- Differential RF mode TX at +5 dBm: 8.9±3mA
- Low Power Mode: 1 µA (RTC Running + RAM/CPU retention)
- Low Power Mode: 100 nA (Flash retention)
- Optional on-chip DC/DC converter (not available in 1.8V mode)

Peripherals

- Integrated temperature sensor
- 4 General-purpose Timer Modules (8x 16-bit or 4x 32 bit-timer, PWM each)
- 12-bit ADC, 200 ksamples/s, 8 channel analog MUX



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- Ultra-low-power analog comparator
- UART
- 2x SPI
- Ultra-low power
- I2C, I2S
- Real-time clock
- AES-128 security module
- Support for 8 capacitive sensing channels

Application Profile

- Consumer electronics
- Mobile phone accessories
- Sports & Fitness equipment
- HID applications
- Home and Building Automation
- Lighting Control
- Alarm and Security
- Electronic Shelf Labeling
- Proximity Tags
- Medical
- Remote Controls
- Wireless Sensor Networks



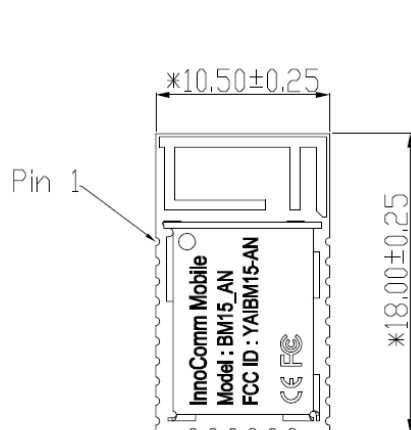
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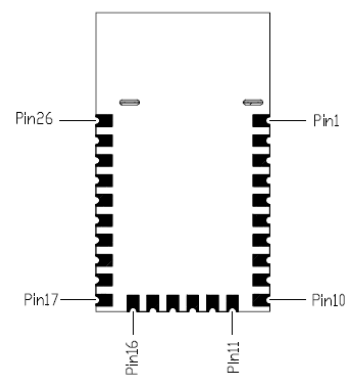
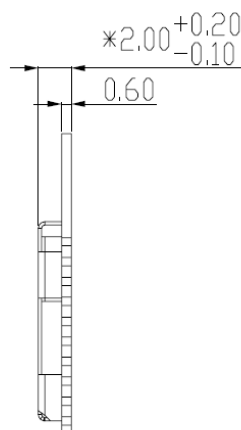
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Mechanical Drawing



TOP VIEW



BOTTOM VIEW



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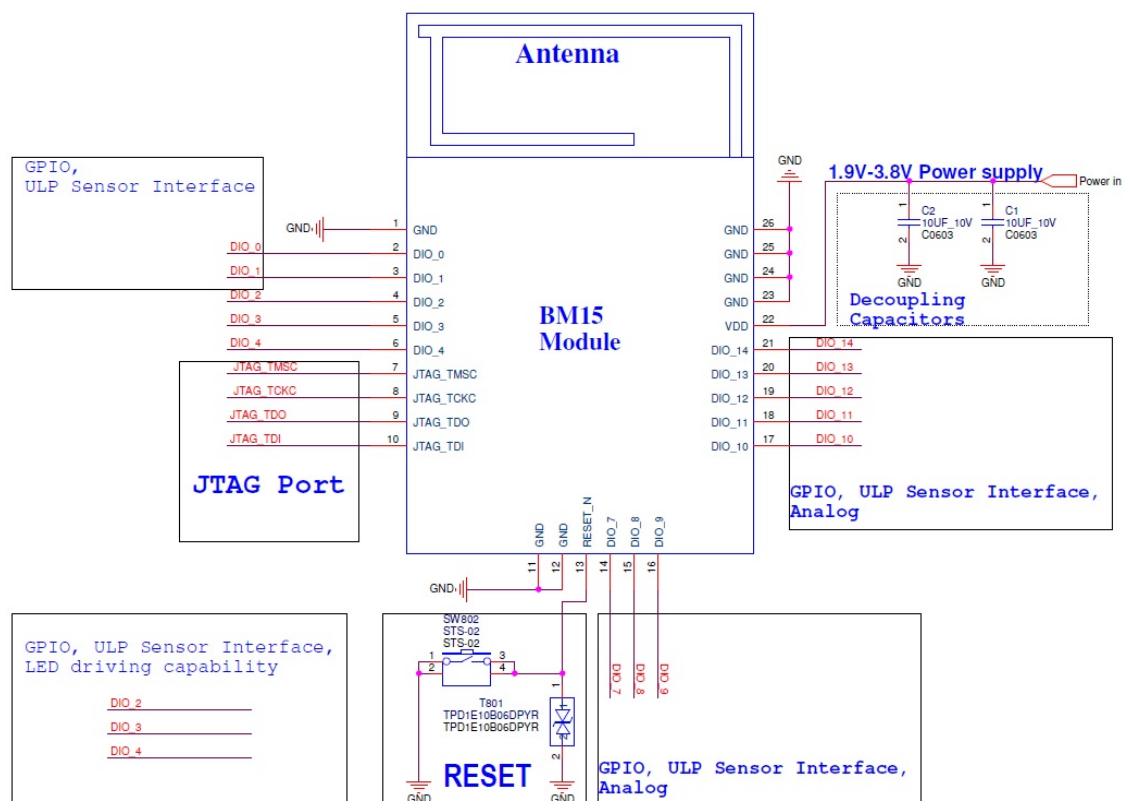
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Module Pin Definition

Pin #	Pin Name	Direction/Type	Description
1	GND	Power	Ground
2	DIO_0	Digital I/O	GPIO, ULP Sensor Interface
3	DIO_1	Digital I/O	GPIO, ULP Sensor Interface
4	DIO_2	Digital I/O	GPIO, ULP Sensor Interface, LED driving capability
5	DIO_3	Digital I/O	GPIO, ULP Sensor Interface, LED driving capability
6	DIO_4	Digital I/O	GPIO, ULP Sensor Interface, LED driving capability
7	JTAG_TMSC	Digital I/O	JTAG TMS, LED driving capability
8	JTAG_TCKC	Digital I/O	JTAG_TCKC
9	JTAG_TDO	Digital I/O	GPIO, LED driving capability, JTAG_TDO
10	JTAG_TDI	Digital I/O	GPIO, LED driving capability, JTAG_TDI
11	GND	Power	Ground
12	GND	Power	Ground
13	nRESET	Digital In	Reset, active-low. No internal pull-up
14	DIO_7	Digital/Analog I/O	GPIO, ULP Sensor Interface, Analog
15	DIO_8	Digital/Analog I/O	GPIO, ULP Sensor Interface, Analog
16	DIO_9	Digital/Analog I/O	GPIO, ULP Sensor Interface, Analog
17	DIO_10	Digital/Analog I/O	GPIO, ULP Sensor Interface, Analog
18	DIO_11	Digital/Analog I/O	GPIO, ULP Sensor Interface, Analog
19	DIO_12	Digital/Analog I/O	GPIO, ULP Sensor Interface, Analog
20	DIO_13	Digital/Analog I/O	GPIO, ULP Sensor Interface, Analog
21	DIO_14	Digital/Analog I/O	GPIO, ULP Sensor Interface, Analog
22	VDD	Power	1.9V to 3.8V main chip supply
23	GND	Power	Ground
24	GND	Power	Ground
25	GND	Power	Ground

26	GND	Power	Ground
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Reference Circuit for User design

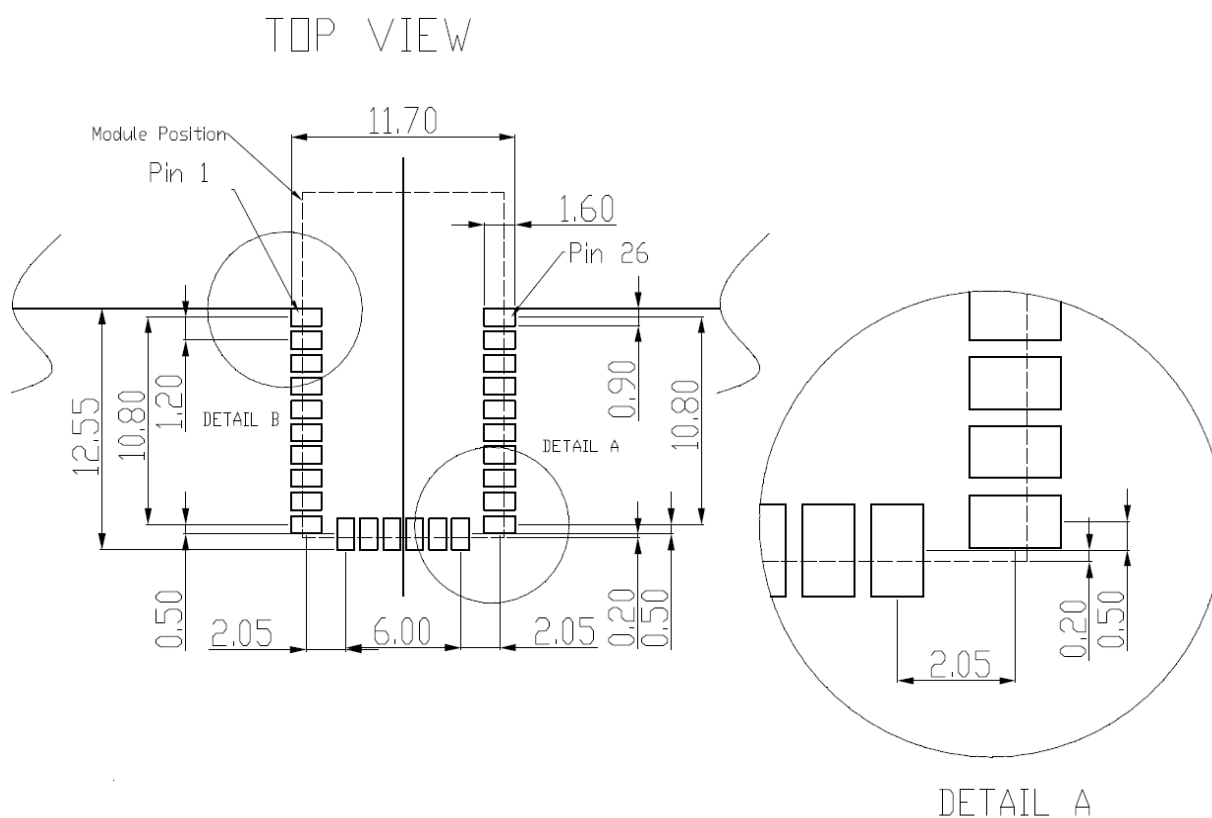


Recommended: Operating Range

over operating free-air temperature range (unless otherwise noted)

	MIN	NOM	MAX	UNIT
Operating ambient temperature range, T _A	-40		85	°C
Operating supply voltage	1.9		3.8	V

Recommendation: PCB Layout for User design





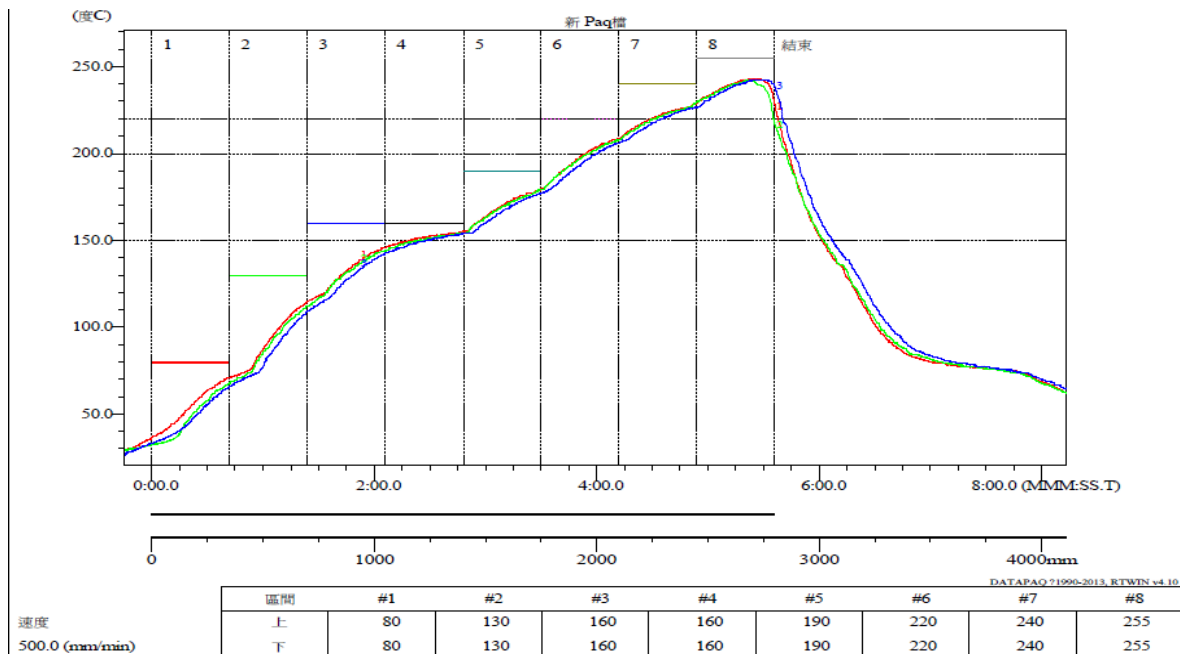
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Reflow data





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Federal Communication Commission Interference Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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 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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.



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Radiation Exposure Statement:

The product comply with the FCC portable RF exposure limit set forth for an uncontrolled environment and are safe for intended operation as described in this manual. The further RF exposure reduction can be achieved if the product can be kept as far as possible from the user body or set the device to lower output power if such function is available.

This device is intended only for OEM integrators under the following conditions:

- 1) The transmitter module may not be co-located with any other transmitter or antenna.

As long as **1** conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed

IMPORTANT NOTE: In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

The product can be kept as far as possible from the user body or set the device to lower output power if such function is available. The final end product must be labeled in a visible area with the following: "Contains FCC ID: YAIBM15-AN". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.