MeshTek-H52

Bluetooth® 4.2 Low Energy Module

GENERAL DESCRIPTION

BLE modules from Ilumi make it easy to add single - mode Bluetooth Low Energy (BLE), high range application devices. The fully approved, programmable modules feature ilumi innovative technology, which significantly simplifies BLE module integration in range constrained. The DUT has a small factor of 17.4mmx20.4mmx3mm, it consists of pcb antenna.

FEATURES

- Long-range, module connectivity up to 120 meters
- Up to +18 dBm TX power / -96dBm RX sensitivity, RSSI monitoring for proximity applications
- Power Configurable in 4dB step
- Castellated SMT pads for easy and reliable PCB mounting with internal pcb antenna
- Simple & fast integration with development kits and sample iOS & Android API
- Built-in reliable Connection based mesh to support large data packets, Mesh Network (Node and Bridge) for Android
- Over the Air firmware update from one device to an entire network
- 32-bit ARM® Cortex™ M4F nRF52832 CPU
- No. of GPIOs available for user - 26
- Configurable I/O mapping for analog and digital
- Supports master and slave configurations
- Lead Free and RoHS Compliance

APPLICATIONS

- Lighting – bulbs and fixtures
- Health & Fitness Equipment
- Automotive
- Home Automation
- Power plugs, routers
- Internet of Things (IoT)
- AV consoles
- Industrial Control

ELECTRICAL SPECIFICATIONS

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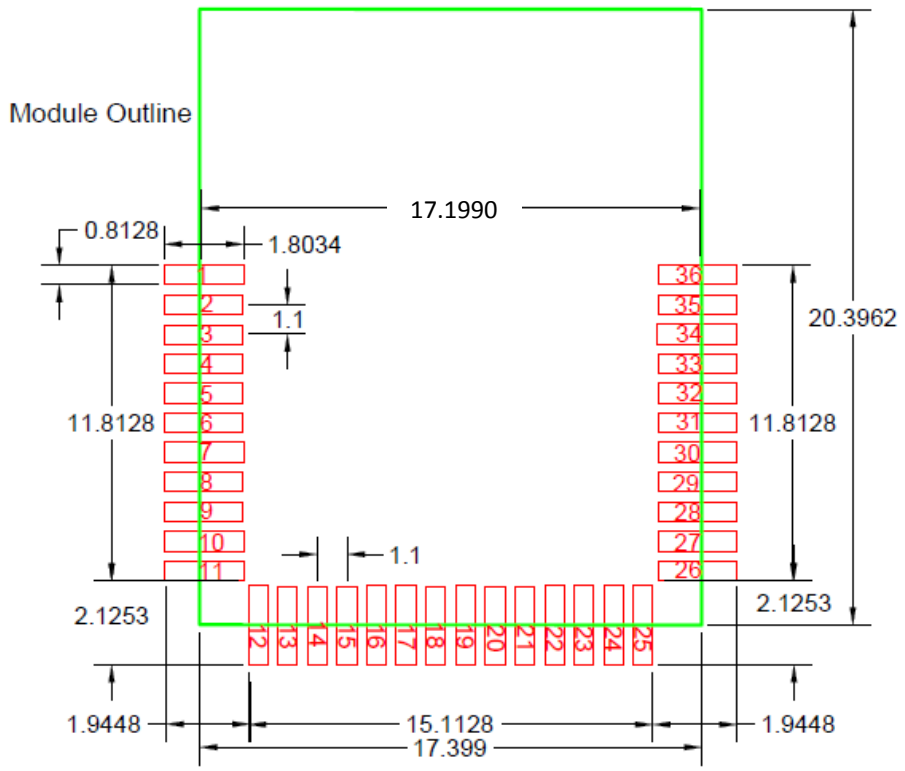
Description	**Min**	**Nom**	**Max**	**Notes**
VDD - Supply Voltage	1.7V	3.3V	3.6V	
Built-in Crystal Frequency		32 MHz		
Radio Operating Frequencies	2402MHz		2480 MHz	1 MHz channel spacing
Radio On-Air data rate		BLE 1Mbps		
Radio Output Power			+18 dBm	RF output power configured to +18dBm using external PA
Receiver Sensitivity @ BLE		-96 dBm		Ideal transmitter
UART Baud Rate			1000 kbps	
SPI Bit Rate	0.125 Mbps		8 Mbps	
TWI Bit Rate	100 kbps		400 kbps	
Analog-to-Digital Converter (ADC) ENIB		12 bit		12-bit/200KSPS ADC
ADC Internal Reference Voltage		1.2V, 1.8V, 2.4V		
Internal Temperature Sensor Range	-40 °C		85 °C	
General Purpose I/O (GPIO) input high voltage	0.7 * VDD		VDD	
General Purpose I/O (GPIO) input low voltage	VSS		0.3 * VDD	
Output standard drive current		20 mA		
Supply Current (TX)			65mA	+18dBm output Power
Supply Current (RX)			22.5mA	Radio RX Active
System ON, No RAM retention, Wake on any event		1.2uA		
System ON, Full RAM retention, Wake on any event		1.5uA		

PIN DESCRIPTION

Pin No	Pin Name	Function
1	GPIO29/AIN5	General purpose input/output/ADC input 5
2	GPIO30/AIN6	General purpose input/output/ADC input 6
3	GPIO0/XL1	General purpose input/output/RTC Input
4	GPIO2/AIN0	General purpose input/output/ADC input 0
5	GPIO4/AIN2	General purpose input/output/ADC input 2
6	GPIO1/XL2	General purpose input/output/RTC Output
7	GPIO3/AIN1	General purpose input/output/ADC input 1

8	GPIO5/AIN3	General purpose input/output/ADC input 3
9	GPIO6	General purpose input/output
10	GPIO7	General purpose input/output
11	GPIO8	General purpose input/output
12	GPIO9/NFC1/UART_TX	General purpose input/output/NFC1/UART TXD
13	GPIO11/UART_RX	General purpose input/output/ UART RXD
14	GPIO10/NFC2	General purpose input/output/NFC2
15	GPIO13	General purpose input/output
16	GPIO14	General purpose input/output
17	GPIO15	General purpose input/output
18	GPIO16	General purpose input/output
19	SWDIO	SWD data input/output
20	SWDCLK	SWD Clock
21	GPIO12	General purpose input/output
22	GPIO17	General purpose input/output
23	VSS1	GND
24	VSS2	GND
25	VSS3	GND
26	VSS4	GND
27	VDD4	3.3V Power supply input
28	VDD3	3.3V Power supply input
29	VDD1	3.3V Power supply input
30	VDD2	3.3V Power supply input
31	GPIO21/RESET	General purpose input/output/Reset
32	GPIO24	General purpose input/output
33	GPIO25	General purpose input/output
34	GPIO26	General purpose input/output
35	GPIO27	General purpose input/output
36	GPIO28/AIN4	General purpose input/output/ADC input 4

RECOMMENDED PCB FOOTPRINT



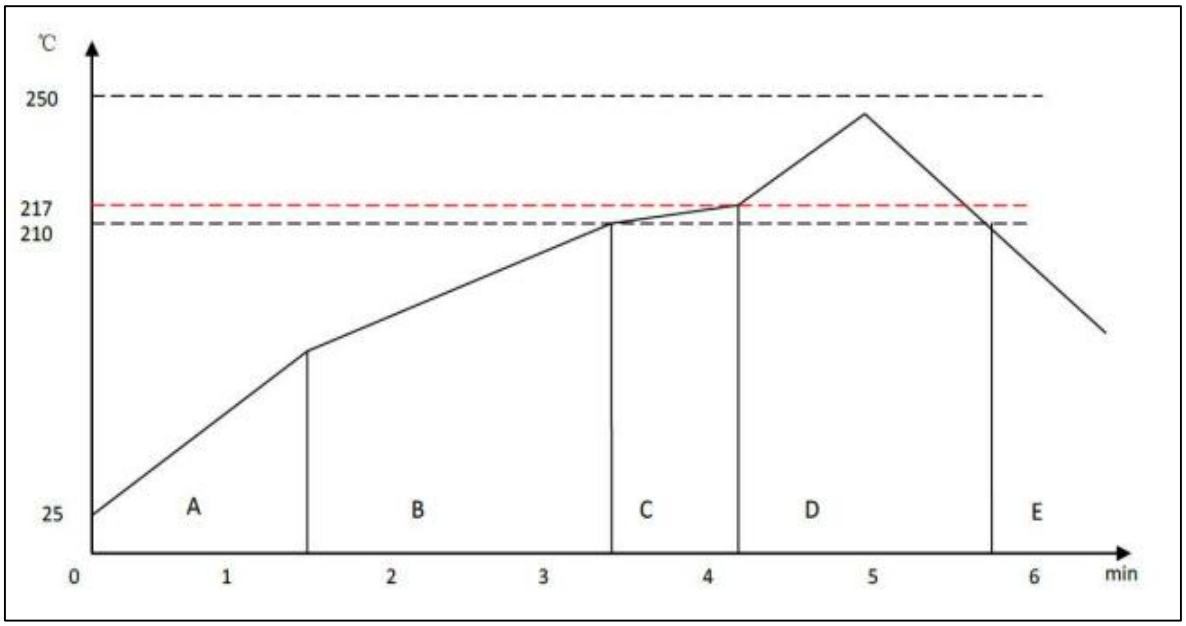
All dimensions are in mm

Module Keep-Out Area: - An area of 1.5mm around the module should be reversed as a keep-out area. No component should be placed in this area.

APPLICATION NOTES

- Ensure there is no copper in the antenna keep out area on any layer of the host PCB. Also keep all mounting hardware or any metal clear of the area to prevent affecting proper radiation pattern.
- For best antenna performance the module should be placed on the edge of the host PCB and preferably in the corner with the antenna facing the corner.
- Antenna keep out area definition comes from the module design document or can be referred to the antenna datasheet.
- Ensure no exposed copper under module on host PCB to avoid shorting to bottom on the underside of the module.

SOLDER REFLOW PROFILE



A. 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.

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

C. 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.

D. 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.

E. 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

REGULATORY APPROVAL

1. European Union regulatory compliance

The MESHTEK_H52 module conforms to the product specifications listed in below Table.

MESHTEK-H52 ETSI Conformity

	Standard
R&TTE directive 1999/5/EC	ETSI EN 300 328 V1.9.1 (2015-02) EN 62479: 2010
EMC	ETSI EN 301 489-1 V1.9.2(2011-09) ETSI EN 301 489-17 V2.2.1(2012-09)

2. FCC and IC Compliance

The MESHTEK_H52 module conforms to the product specifications listed in below Table.

MESHTEK-H52 FCC and IC Conformity

	Standard
FCC	FCC part 15 modular certification MESHTEK-H52 FCC ID: 2AEHU-MESHTEK-H52
IC	Industry Canada RSS-247 modular certification MESHTEK-H52 IC: 20059-MESHTEKH52
Bluetooth	RF-PHY Component (Tested); QDID: 80428

a. FCC Statement

To integrate this module into the host, the host manufacturer is responsible for the applicable FCC rules, including the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. In the user manual of the host device, the following statements are required to be included.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

This device 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 radiated 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

FCC CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment

b. IC compliance

This device complies with Industry Canada license-exempt RSS standard(s).
This device complies with FCC 15.209 radiation limits for Class B digital devices requirement, 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.

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 chosen in such a way that the equivalent isotropically radiated power (e.i.r.p.) is not more than that is necessary for successful communication.

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

c. Conformité aux norms d´IC

Cet appareil est conforme à la(aux) norme(s) RSS sans licence d'Industry Canada. Son utilisation est soumise aux deux conditions suivantes:

1. Cet appareil ne doit pas causer d'interférences et
2. il doit accepter toutes interférences reçues, y compris celles susceptibles d'avoir des effets indésirables sur son fonctionnement.

Conformément aux réglementations d'Industry Canada, cet émetteur radio ne peut fonctionner qu'à l'aide d'une antenne dont le type et le gain maximal (ou minimal) ont été approuvés pour cet émetteur par Industry Canada. Pour réduire le risque d'interférences avec d'autres utilisateurs, il faut choisir le type d'antenne et son gain de telle sorte que la puissance isotrope rayonnée équivalente (p.i.r.e) ne soit pas supérieure à celle requise pour obtenir une communication satisfaisante.

Cet équipement respecte les limites d'exposition aux rayonnements IC RSS-102 définies pour un environnement non contrôlé. Il doit être installé et utilisé en maintenant une distance minimum de 20 cm entre le radiateur et votre corps.

3. OEM RESPONSIBILITIES TO COMPLY WITH FCC AND INDUSTRY CANADA REGULATIONS

The MESHTEK-H52 Module has been certified for integration into products only by OEM integrators under the following conditions:

This device is granted for use in configurations in which the antennas used for this transmitter must be installed to provide a separation distance of at least 20cm from all person and not be co-located with any other transmitters except in accordance with FCC and Industry Canada multi-transmitter product procedures.

As long as the two conditions above are met, further transmitter testing 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 (for example, digital device emissions, PC peripheral requirements, etc.).

IMPORTANT NOTE: In the event that these conditions cannot be met (for certain configurations or co-location with another transmitter), then the FCC and Industry Canada authorizations are no longer considered valid and the FCC ID and IC Certification Number cannot 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 and Industry Canada authorization.

4. OEM Labeling requirements for end product

For an end product using the MESHTEK-H52 module there must be a label containing, at least, the following information:

This device contains
FCC ID: 2AEHU-MESHTEK-H52
IC: 20059-MESHTEKH52

The label must be affixed on an exterior surface of the end product such that it will be visible upon inspection in compliance with the modular approval guidelines developed by the FCC.

In accordance with 47 CFR § 15.19, the end product shall bear the following statement in a conspicuous location on the device: "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."

When the device is so small or for such use that it is not practicable to place the statement above on it, the information shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed.
In case, where the final product will be installed in locations where the end-user is not able to see the FCC ID and/or this statement, the FCC ID and the statement shall also be included in the end-product manual.

ORDERING INFORMATION

Table below provides ordering information for the MESHTEK-H52 module.

ORDERING INFORMATION

Part Number	Description
MESHTEK-H52	Bluetooth High Power Module

Note: For custom applications, contact ilumi Solutions Inc. representative