7581-01

Datasheet

MESH Bluetooth Low Energy (BLE) 4.2 Module

Module No.: 7581-01

Version: V1.0

Date: 2018-7-28

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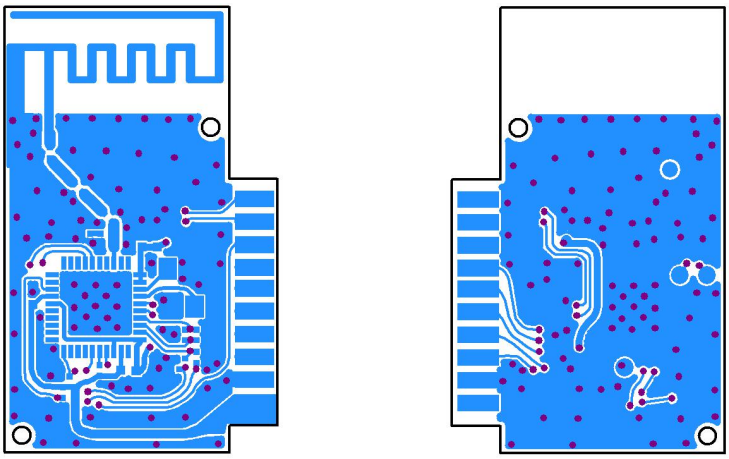
Content



1. Introduction

The 7581-01 with internal PCB printing antenna is MESH Bluetooth Low Energy (BLE) *ultra-low cost and human labor saving* solution which is fully Bluetooth 4.2 standard compliant and allows easy connectivity with Bluetooth Smart Ready devices. 7581-01 supports BLE slave and master mode operation, including broadcast, encryption, connection updates, and channel map updates. It is RoHS-compliant and 100% lead (Pb)-free. With internal 512KBytes Flash are programmable for more applications, 10bits AIO, 5 channels PWMs and GPIOs.

10 golden-finger pins are easy installation with PCB-Through-PCB by automatically wave-soldering machine in the mean time.

2. Features

- Airoha MT7581/AB1601 system on chip
- Built-in Flash 512KBytes
- Compact size 24.8 x 15.3 x 2.8mm
- Up to 5 channels PWM
- Embedded Hardware AES
- Host Controller Interface (HCI) over UART
- Class 1 supported with 4dBm maximum TX power
- Operation Temperature: -40 to 85 ℃
- Bluetooth 4.2 1Mbps, Boost Mode: 2Mbps
- TX RF Power: +3dBm

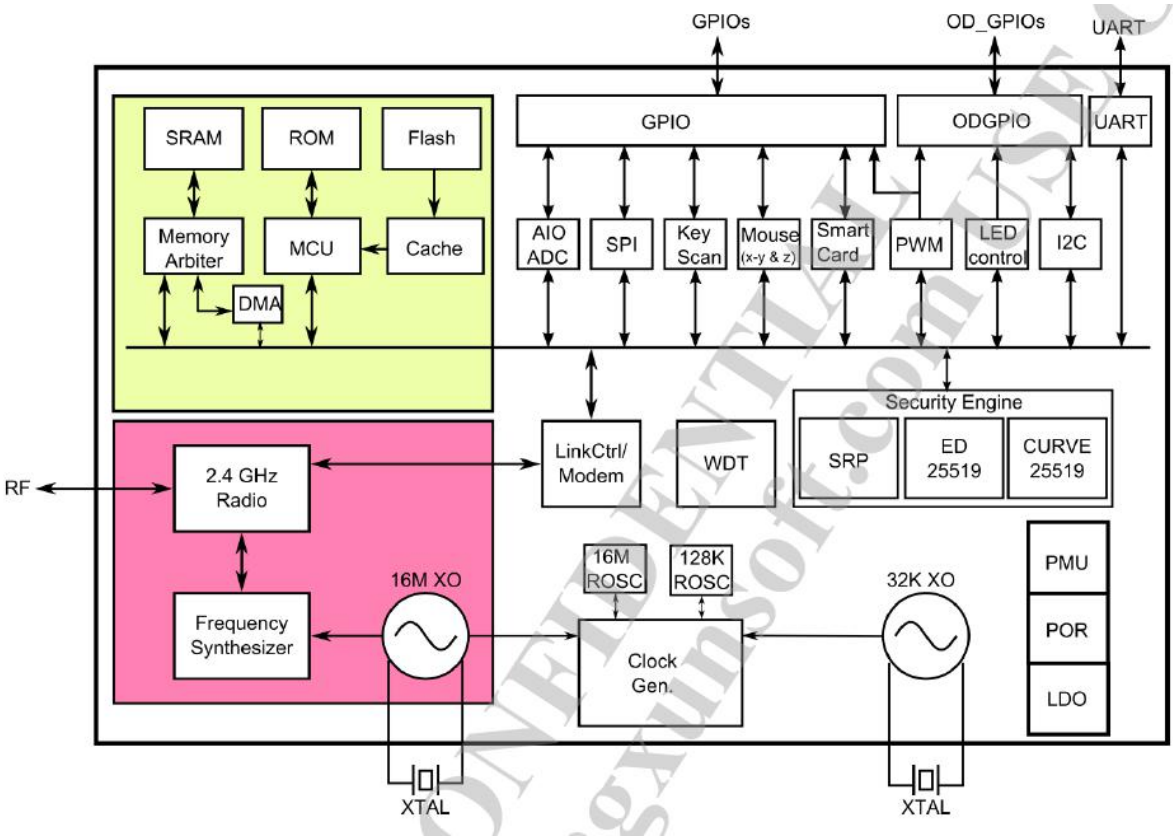
- RX :-93dBm BT4.2 Sensitivity
- RSSI Monitoring
- Embedded LDO
- Battery monitoring
- Low power consumption

3. Applications

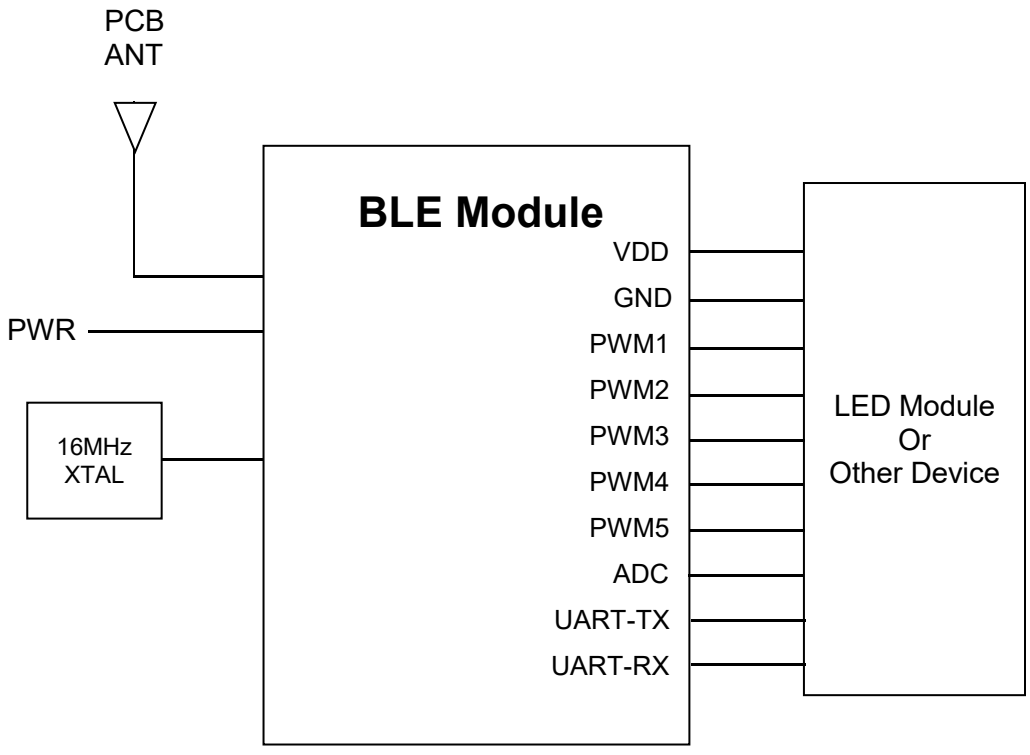
- Smart Devices Switch, Plug
- LED Lighting control
- Smart Home
- HID Device
- Sports and fitness tracking
- Wearable devices
- PC and tablet peripherals, including Mouse / Keyboard
- Bluetooth BLE transparent transmit capability via dedicated UART

4. Module Diagram

MT7581/AB1601 SoC diagram



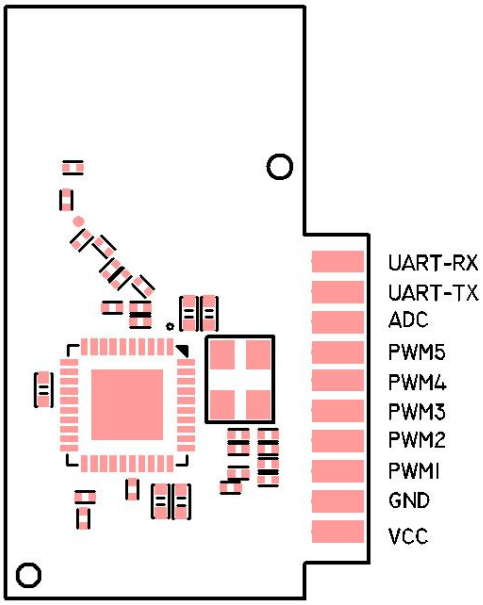
BLE Module diagram



Module Pins Assignments/Dimensions/Recommended Layout

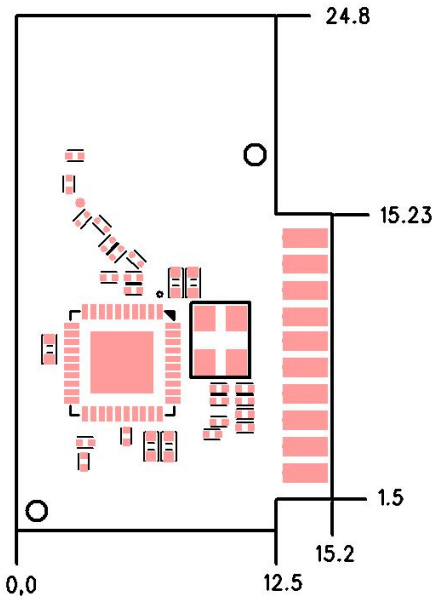
1. Pin Assignment

Top View



2. Dimension Diagram

Dimension unit: mm

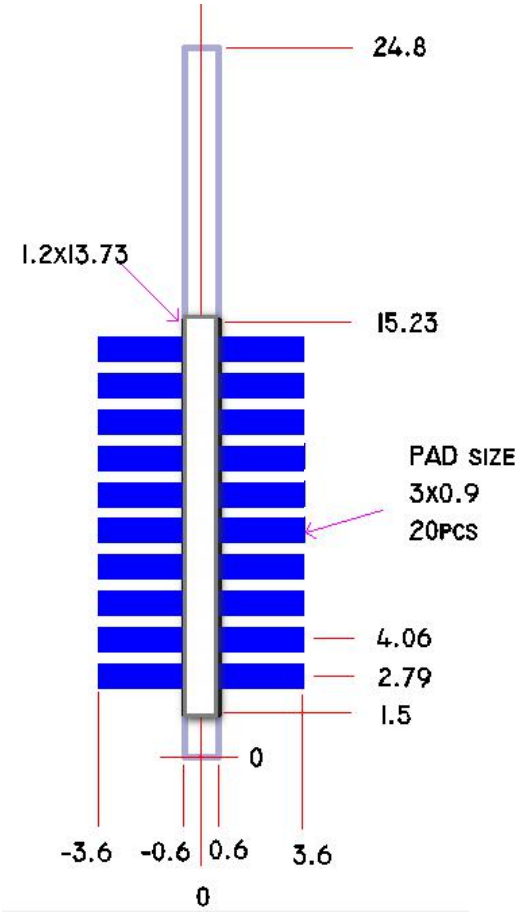


Tolerance: +/-0.15mm

PCB Thickness: 1.2+/-0.15mm

3. Recommended Layout

Unit: mm



Pad(as blue) size 3x0.9mm, pitch 1.27mm. Need cut off the area 1.2x13.73mm as mechanical slot hole so that PCB golden-fingers of BLE module can be through-inserted and mounted with your PCB by an automatically wave-soldering workmanship.

Please contact your sales consultants for original PCB footprint if needed in case your PCB layout design tool is PADS.

5. Module Schematic

Please further contact if needed.

6. Pins Description

Pin	NAME	I/O	Description
1	VDD_3.3V	P	DC 3.3V input, Max 3.6V, Min 3.0V
2	GND	P	Ground
3	PWM1	I/O	SoC MT7581/AB1601 Pin13, PWM output for Red (R) LED lighting control
4	PWM2	I/O	SoC MT7581/AB1601 Pin21, PWM output for Green (G) LED lighting control
5	PWM3	I/O	SoC MT7581/AB1601 Pin32, PWM output for Blue (B) LED lighting control
6	PWM4	I/O	SoC MT7581/AB1601 Pin33, PWM output for Cold White (CW) LED light control if 2-color lighting source. Or it is for brightness control if only single color lighting source is available despite of the color of lighting source.
7	PWM5	I/O	SoC MT7581/AB1601 Pin34, PWM output for Warm White (WW) control for 2-color lighting color source.
8	ADC	I/O	SoC MT7581/AB1601 Pin25 for LED driver Temperature detection
9	UART_TX	I/O	SoC MT7581/AB1601 Pin36, UART Tx
10	UART_RX	I/O	SoC MT7581/AB1601 Pin35, UART Rx

7. Electronic Specification

Item	Specification
RF Transmitting Power Level	4 dBm Max
RF Receiver Sensitivity	-93 dBm at 1Mbps
Flash	512kb
Antenna	Printed PCB Antenna 0 dBi Gain
Linking Distance	30 M Out of Sight
Data Rate	250 kbps, 500 kbps, 1 Mbps, 2 Mbps
Physical Connectors	1 x 10 pins 1.27mm pitch PCB-through-PCB terminals or connector if cost-careless
Operation Voltage	3.0V to 3.6V
Operation Temperature	-40 to 85 ℃
Security	128 Bit AES encryption

Interface	PWM, UART, GPIO, ADC
EMC/BQB approval	TBD

8. Power Consumption

Operation Mode	Consumption
Operation (TX/RX) 0dBm	28mA
Standby (Deep Sleep) depend on firmware	2uA (optional by firmware)

9. Antenna Specification

ITEM	UNIT	MIN	TYP	MAX
Frequency	MHz	2400		2500
V.S.W.R				2.0
Gain(AVG)	dBi	0		
Maximum input power	W			1
Characteristics TYPE	Meander IFA			
Polarization	Vertical			
Radiated Pattern	Omni-directional			
Impendence	50			
SIZE	12.5 X 5.9 mm			

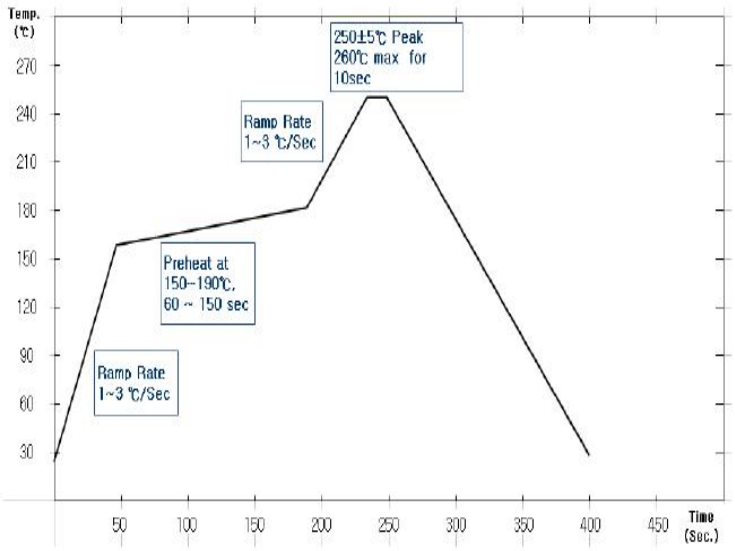
10. Ordering Information

Part Number	Description
7581-01-00	Internal Printing PCB Antenna, PCB-Through-PCB mounted form

11. Package

Tray plate: **To Be Defined**

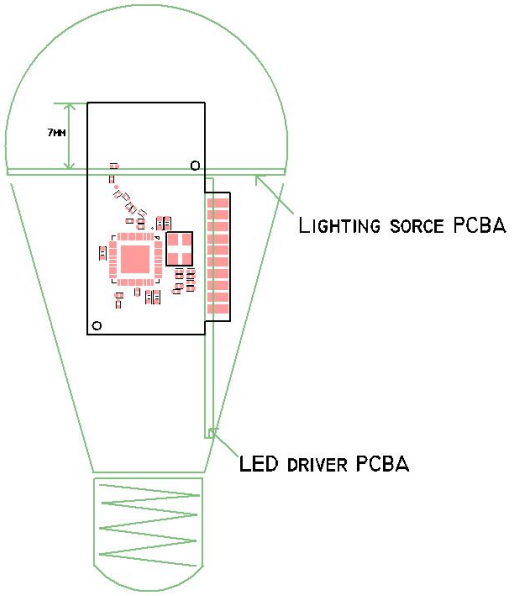
12. Reflow Profile



13. Application Design Note

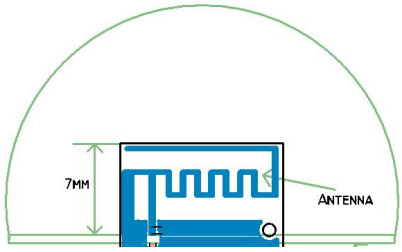
- For a lighting application, strongly recommend you adopt the dimming chip which is high-level to light on the light source, or it will be a flash at the beginning of turning on the light. It is because the PWM2-5 output ports will last one second low-level before the program initialization finish. However, PWM1 is high-level, because it is OD_GPIO(Open Drain) port with a weak pull-high.
- To conform all PWM ports with the same outputting level, in your design a NPN transistor need to be added on PWM1 port to invert its initial level to low.

14. Antenna Design



To obtain an ideal communications range for your smart BLE device, the antenna should be effective radiation capability, the top edge of PCB of BLE module should be not less than 7mm higher than the lighting source PCBA accordingly, as the design example of LED bulb lamp. And keep the antenna of module at least 10mm far away from the metal components, elements and parts etc..

If you have any design problems, please contact our R&D



engineer for help in terms of the installation of module to optimize the antenna radiated efficiency.

15. Critical Materials

Please further contact if needed.