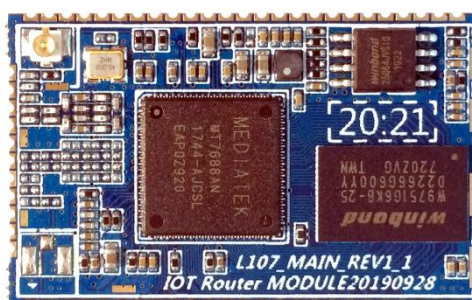


# BOJINGnet L107 IOT Router Module

## Datasheet



Name: 802.11b/g/n L107 IOT Router Module

Model No.: L107

Revision: v1.1

Manufacturers:Shenzhen BOJINGnet Technology Co., Ltd

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### Revision History

| Revision | Date     | Description           | Approved | Remark |
|----------|----------|-----------------------|----------|--------|
| REV1.0   | 20170611 | Initial Release       | PanyuLu  |        |
| REV1.0   | 20180403 | Correction error      | PanyuLu  |        |
| REV1.1   | 20191105 | Update the appearance | PanyuLu  |        |

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## 1. Overview

BOJINGnet L107 IOT Router Module is based on MediaTek MT7688 chipset. The module requires only an external 3.3V power supply. MT7688 chipset integrates a 1T1R 802.11n Wi-Fi radio, a 580MHz MIPS® 24KEc™ CPU, 1-port fast Ethernet PHY, USB2.0 host, SD-XC, I2S/PCM and multiple low-speed IOs in a single SOC. The MT7688 supports two operation modes – IoT gateway and IoT device mode. The high-performance USB 2.0 allows MT7688 to add 3G/4G LTE modem support or a H.264 ISP for wireless IP camera. The IoT gateway mode also supports Zigbee/Z-Wave and Sub-1 GHz RF for smart home control. In IoT device mode, MT7688 supports eMMC, SD-XC and USB 2.0 in addition to Wi-Fi high quality audio via 192Kbps/24bits I2S interface and VoIP application through PCM, as well as peripheral interfaces including PWM, SPI host, 3rd UART and more GPIOs.

## 2. Features

- ◆ Embedded MIPS24KEc (575/580 MHz) with 64 KB I-Cache and 32 KB D-Cache
- ◆ 1T1R 2.4 GHz with 150 Mbps PHY data rate
- ◆ Legacy 802.11b/g and HT 802.11n modes
- ◆ 20/40 MHz channel bandwidth
- ◆ DDR2 RAM 64MByte or 128MByte or 256MByte
- ◆ SPI Flash 8MByte or 16MByte or 32MByte
- ◆ 5-port 10/100 FE PHY
- ◆ x1 USB 2.0 Host
- ◆ SD-XC, eMMC, I2C, PCM, I2S(192K/24bits), PWM, SPI master/slave, UART lite, JTAG, GPIO
- ◆ Internet Of Things
- ◆ Embedded PMU
- ◆ Support AP/Client/Router mode
- ◆ WEP64/128, TKIP, AES, WPA, WPA2, WAPI
- ◆ 40mm(L) x 25mm(W) x 3.0mm(H) dimension LCC61 pin

## 3. Applications

Internet Of Things

USB WiFi Camera

WiFi audio

WiFi disk

3G/4G Wi-Fi Router

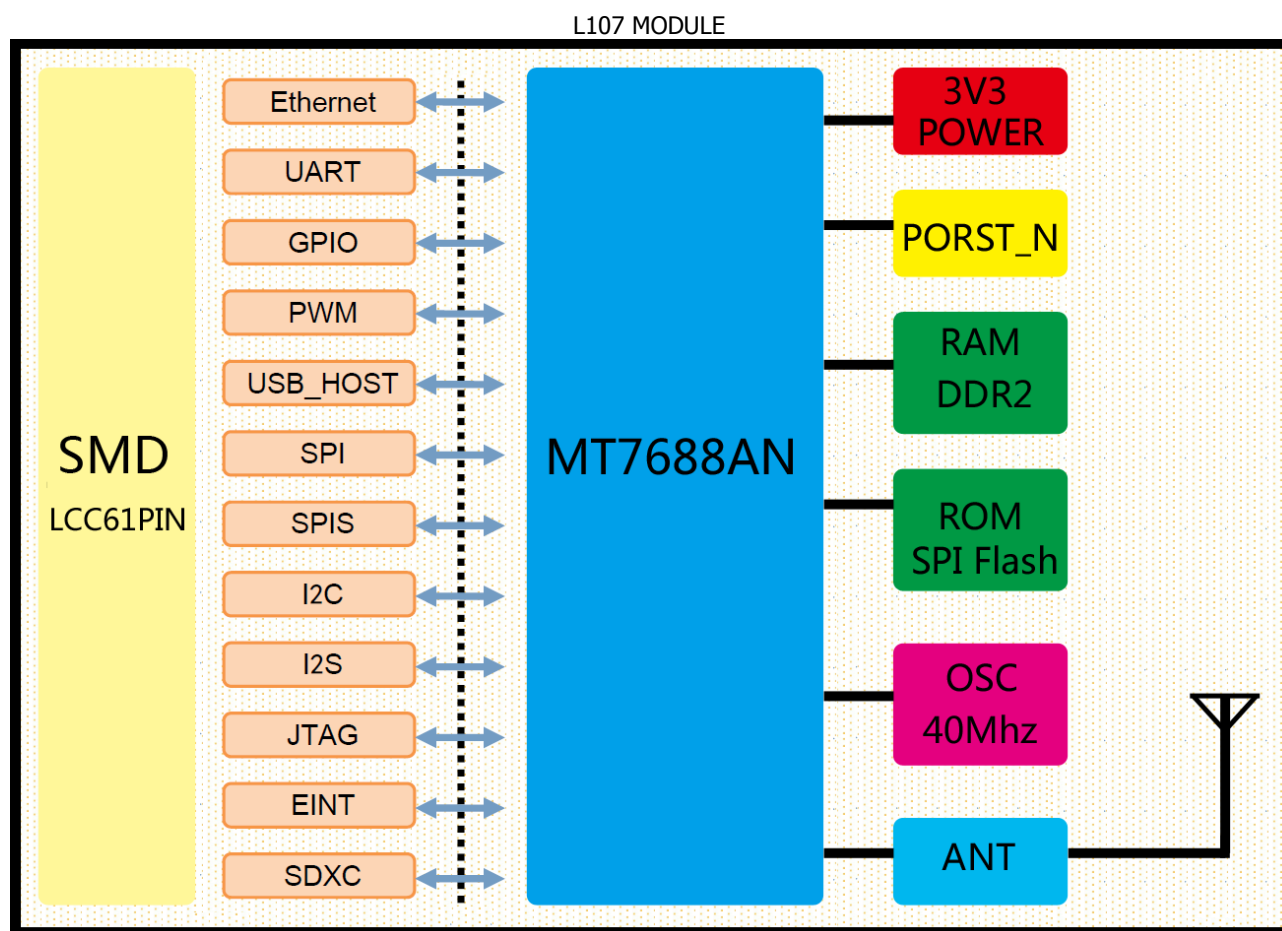
WiFi ap or WiFi RJ45

Smart Home Gateway

Data Transfer unit

Industry Control or Home Automation

## 4. Fuctional Block Diagram

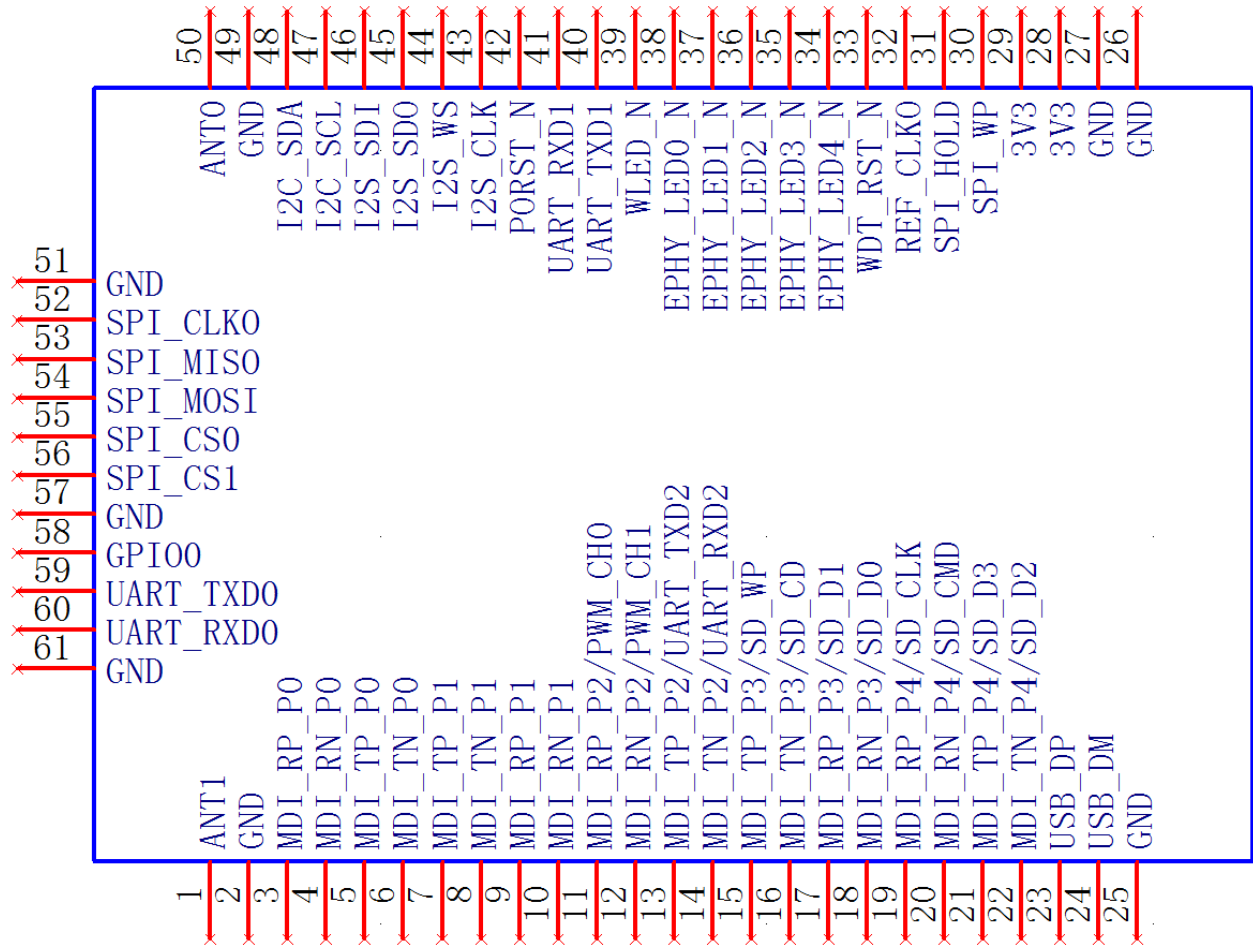


## 5. Module Specifications

| Hardware Features    |                                           |
|----------------------|-------------------------------------------|
| Model                | L107                                      |
| Antenna Type         | IpeX or LCC PIN                           |
| Chipset solution     | MT7688AN                                  |
| Voltage Input        | 3v3 ±5%                                   |
| Dimension(L×W×H)     | 40mm*25.0mm*3.0mm LCC 61PIN               |
| Wireless Features    |                                           |
| Wireless Standards   | IEEE 802.11b/g/n                          |
| Frequency Range      | 2.412GHz-2.484GHz                         |
| Data Rates           | IEEE 802.11b : 1,2,5.5,11Mbps             |
|                      | IEEE 802.11g : 6,9,12,18,24,36,48,54Mbps  |
|                      | IEEE 802.11n : MCS0--MCS7 @ HT20          |
|                      | MCS0--MCS7 @ HT40                         |
| Receiver Sensitivity | HT40 MCS7 : -70dBm@10% PER(MCS7)          |
|                      | HT20 MCS7 : -73dBm@10% PER(MCS7)          |
|                      | 54M: -77dBm@10% PER                       |
|                      | 11M: -89dBm@ 8% PER                       |
| Modulation Technique | DSSS (DBPSK, DQPSK, CCK)                  |
|                      | OFDM (BPSK, QPSK, 16-QAM, 64-QAM)         |
| Wireless Security    | WPA/WPA2, WEP, TKIP and AES, WPS2.0, WAPI |



## 6.2 Module Logic:



## 6.3 Pin Description:

| Pin No. | Function 1 | Function 2 | Function 3 | Function 4 | GPIO#   | Remark |
|---------|------------|------------|------------|------------|---------|--------|
| 1       | ANT1       |            |            |            |         |        |
| 2       | GND        |            |            |            |         |        |
| 3       | MDI_RP_P0  |            |            |            |         |        |
| 4       | MDI_RN_P0  |            |            |            |         |        |
| 5       | MDI_TP_P0  |            |            |            |         |        |
| 6       | MDI_TN_P0  |            |            |            |         |        |
| 7       | MDI_TP_P1  | SPIS_CS    |            | PWM_CH0    | GPIO#14 |        |
| 8       | MDI_TN_P1  | SPIS_CLK   |            | PWM_CH1    | GPIO#15 |        |
| 9       | MDI_TP_P1  | SPIS_MISO  |            | UART_TXD2  | GPIO#16 |        |
| 10      | MDI_RN_P1  | SPI_MOSI   |            | UART_RXD2  | GPIO#17 |        |
| 11      | MDI_TP_P2  |            | eMMC_D7    | PWM_CH0    | GPIO#18 |        |
| 12      | MDI_RN_P2  |            | eMMC_D6    | PWM_CH1    | GPIO#19 |        |
| 13      | MDI_TP_P2  | UART_TXD2  | eMMC_D5    | PWM_CH2    | GPIO#20 |        |
| 14      | MDI_TN_P2  | UART_RXD2  | eMMC_D4    | PWM_CH3    | GPIO#21 |        |
| 15      | MDI_TP_P3  | SD_WP      | eMMC_WP    |            | GPIO#22 |        |
| 16      | MDI_TN_P3  | SD_CD      | eMMC_CD    |            | GPIO#23 |        |
| 17      | MDI_TP_P3  | SD_D1      | eMMC_D1    |            | GPIO#24 |        |
| 18      | MDI_RN_P3  | SD_D0      | eMMC_D0    |            | GPIO#25 |        |
| 19      | MDI_TP_P4  | SD_CLK     | eMMC_CLK   |            | GPIO#26 |        |
| 20      | MDI_RN_P4  | SD_CMD     | eMMC_CMD   |            | GPIO#28 |        |

|    |             |            |         |         |         |                                |
|----|-------------|------------|---------|---------|---------|--------------------------------|
| 21 | MDI_TP_P4   | SD_D3      | eMMC_D3 |         | GPIO#29 |                                |
| 22 | MDI_TN_P4   | SD_D2      | eMMC_D2 |         | GPIO#27 |                                |
| 23 | USB_DP      |            |         |         |         |                                |
| 24 | USB_DM      |            |         |         |         |                                |
| 25 | GND         |            |         |         |         |                                |
| 26 | GND         |            |         |         |         |                                |
| 27 | GND         |            |         |         |         |                                |
| 28 | 3V3         |            |         |         |         |                                |
| 29 | 3V3         |            |         |         |         |                                |
| 30 | SPI_WP      |            |         |         |         |                                |
| 31 | SPI_HOLD    |            |         |         |         |                                |
| 32 | REF_CLKO    |            |         |         | GPIO#38 |                                |
| 33 | WDT_RST_N   |            |         |         | GPIO#37 |                                |
| 34 | EPHY_LED4_N | JTAG_RST_N |         |         | GPIO#39 |                                |
| 35 | EPHY_LED3_N | JTAG_CLK   |         |         | GPIO#40 |                                |
| 36 | EPHY_LED2_N | JTAG_TMS   |         |         | GPIO#41 |                                |
| 37 | EPHY_LED1_N | JTAG_TDI   |         |         | GPIO#42 |                                |
| 38 | EPHY_LED0_N | JTAG_TDO   |         |         | GPIO#43 |                                |
| 39 | WLED_N      |            |         |         | GPIO#44 |                                |
| 40 | UART_TXD1   |            |         | PWM_CH0 | GPIO#45 | Bootstrapping Pins is relevant |
| 41 | UART_RXD1   |            |         | PWM_CH1 | GPIO#46 |                                |
| 42 | PORST_N     |            |         |         |         |                                |
| 43 | I2S_CLK     | PCMFS      |         |         | GPIO#3  |                                |
| 44 | I2S_WS      | PCMCLK     |         |         | GPIO#2  |                                |
| 45 | I2S_SDO     | PCMDTX     |         |         | GPIO#1  | Bootstrapping Pins is relevant |
| 46 | I2S_SDI     | PCMDRX     |         |         | GPIO#0  |                                |
| 47 | I2C_SCL     |            |         |         | GPIO#4  |                                |
| 48 | I2C_SDA     |            |         |         | GPIO#5  |                                |
| 49 | GND         |            |         |         |         |                                |
| 50 | ANT0        |            |         |         |         |                                |
| 51 | GND         |            |         |         |         |                                |
| 52 | SPI_CLKO    |            |         |         | GPIO#7  | Bootstrapping Pins is relevant |
| 53 | SPI_MISO    |            |         |         | GPIO#9  |                                |
| 54 | SPI_MOSI    |            |         |         | GPIO#8  | Bootstrapping Pins is relevant |
| 55 | SPI_CS0     |            |         |         | GPIO#10 |                                |
| 56 | SPI_CS1     |            |         |         | GPIO#6  | Bootstrapping Pins is relevant |
| 57 | GND         |            |         |         |         |                                |
| 58 | GPIO0       |            |         |         | GPIO#11 |                                |
| 59 | UART_TXD0   |            |         |         | GPIO#12 | Bootstrapping Pins is relevant |
| 60 | UART_RXD0   |            |         |         | GPIO#13 |                                |
| 61 | GND         |            |         |         |         |                                |

Note: Serial port 0 debugging is recommended ;The company system default Function 1 ; Change the relevant kernel drivers if reuse is required

## 7. Electrical Characteristics

### 7.1 Recommended Operation Ratings

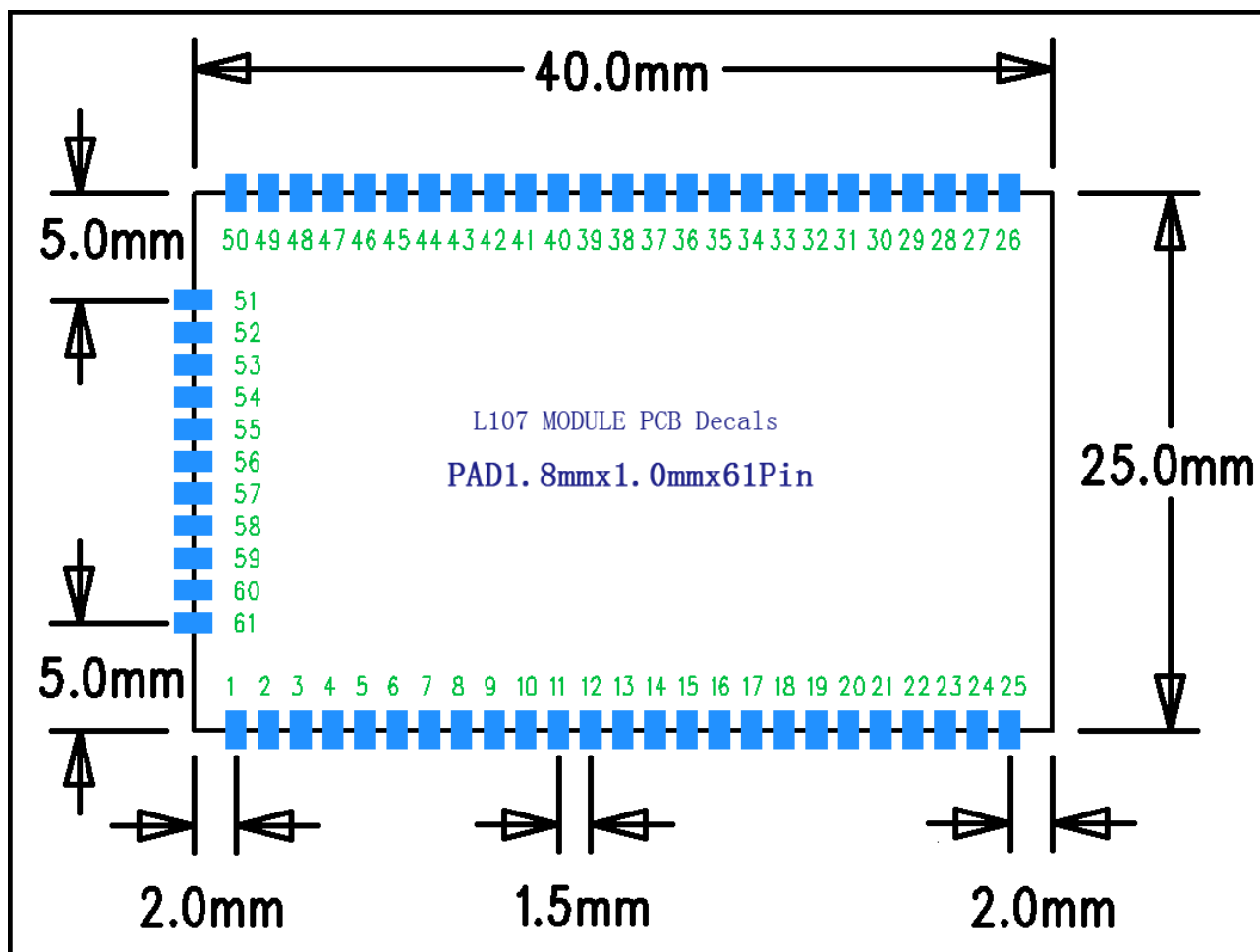
| Parameter          | Symbol | Minimum | Typical | Maximum | Unit |
|--------------------|--------|---------|---------|---------|------|
| Extended temp      | Ta     | -20     | 26      | 55      | °C   |
| Power Supply       | 3V3    | 3.15    | 3.3     | 3.5     | v    |
| Input Low Voltage  | VIL    | -0.3    |         | 0.8     | v    |
| Input High Voltage | VIH    | 2       |         | 3.6     | v    |

### 7.2 Measurement Conditions

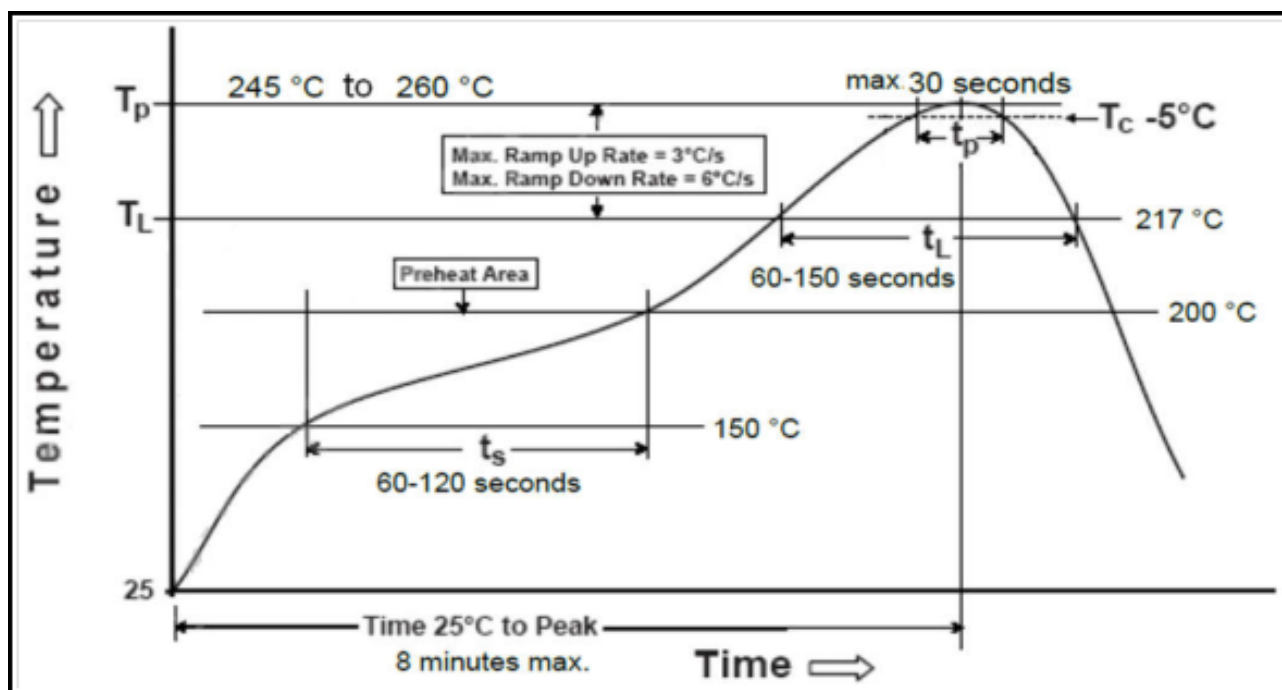
| System state        | Current (Typ) 3.3V | Current (Max) 3.3V |
|---------------------|--------------------|--------------------|
| Standby             | 180 mA             | 200 mA             |
| Full load operation | 650 mA             | 800 mA             |

Note: Dc-dc shall adopt a design larger than 1A

## 8. PCB Footprint and Dimensions



## 9. Manufacturing Process Recommendations



Note : The final soldering temperature chosen at the factory depends on additional external factors like choice of soldering paste , size , thickness and properties of the baseboard , etc. Exceeding the maximum soldering temperature in the recommended soldering profile may permanently damage the module.

## 10. Ordering Information

| Module No. | SPI Flash Size | DDR2 Size |
|------------|----------------|-----------|
| L107_0864  | 8MByte         | 64MByte   |
| L107_16128 | 16MByte        | 128MByte  |
| L107_32256 | 32MByte        | 256MByte  |

**FCC Warning:**

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.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

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 (2) this device must accept any interference received, including interference that may cause undesired operation.

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

## **Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01**

### **2.2 List of applicable FCC rules**

CFR 47 FCC PART 15 SUBPART C has been investigated. It is applicable to the modular transmitter

### **2.3 Specific operational use conditions**

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

### **2.4 Limited module procedures**

This module is Limited single modular without shielding, host manufacturer have to consult with module manufacturer for the module limiting conditions when integrate the module in the host. module manufacturer should reviews detailed test data or host designs prior to giving the host manufacturer approval.

### **2.5 Trace antenna designs**

Not applicable

### **2.6 RF exposure considerations**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

### **2.7 Antennas**

This radio transmitter 2AU8R-L107 has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

| Antenna No. | Operate frequency band | Antenna Type | Maximum antenna gain |
|-------------|------------------------|--------------|----------------------|
| Antenna     | 2400-2500MHz           | Wire Antenna | 3.0dBi               |

### **2.8 Label and compliance information**

The final end product must be labeled in a visible area with the following" Contains FCC ID:2AU8R-L107".

### **2.9 Information on test modes and additional testing requirements**

Host manufacturer is strongly recommended to confirm compliance with FCC requirements for the transmitter when the module is installed in the host.

### **2.10 Additional testing, Part 15 Subpart B disclaimer**

Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B.