


2.4GHz/5GHz WLAN&BT

Module Specification

IEEE 802.11 a/b/g/n 1T1R WLAN

Bluetooth 5.0

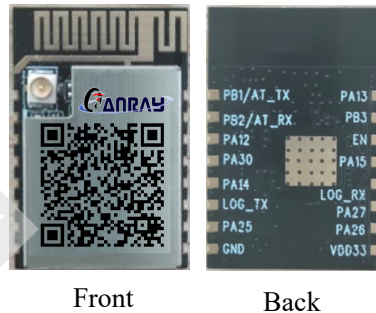
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1. General description

1.1 Introduction



Module name: AM251107
P/N: Anray211810102GA01
(Size: 24*16*3mm)

AM251107 is a dual-frequency Wi-Fi Bluetooth SOC module based on RTL8720DN, supports dual-frequency (2.4GHz & 5GHz) WLAN and low-power Bluetooth 5.0. It integrates ARM V8 (compatible with Cortex-M4F) high-performance MCU, ARM V8M (compatible with Cortex-M0) low-power MCU, WLAN(802.11 a / b / g / n), MAC(Bluetooth baseband and RF baseband) and provides a set of configurable GPIO ports for the control of different peripherals.

AM251107 integrates internal memory, supports some simple application development, and realizes complete Wi-Fi and BT 5.0 protocol functions. This manual is only used as a guide.

1.2 Features

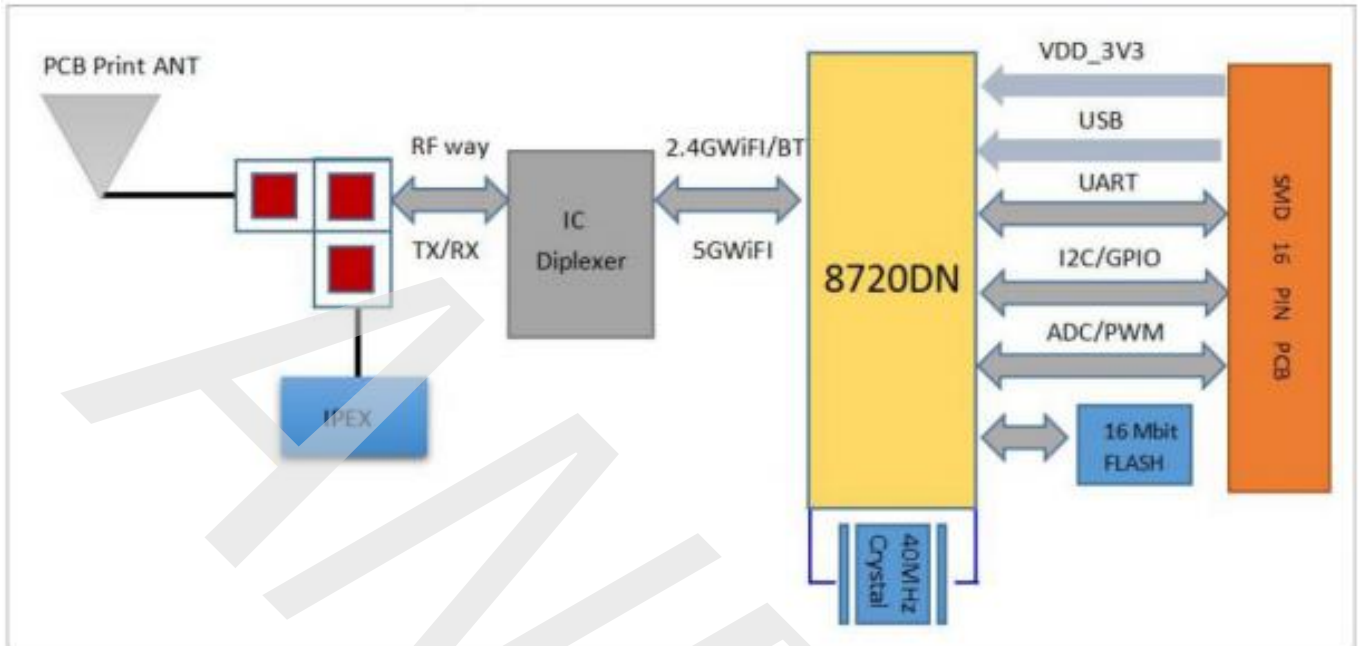
- Support 802.11a/b/g/n 1x1, 2.4GHz & 5GHz.
- Support HT20/HT40 mode.
- Support for low power beacon listening mode, low power reception mode and low power pending mode.
- Embedded AES / DES / SHA hardware engine.
- Support Trust Zone-M and safe start up.
- Support SWD debug port access protection and prohibition mode.
- Support BLE and BT5.0
- Bluetooth supports high power mode (7dBm, share the same PA with WIFI)
- WIFI and BT share the same antenna.
- Support STA/AP/STA+AP operating mode
- Support the smart config (APP) /AirKiss (wechat) of Android、IOS (One-click distribution network)
- Support serial port local upgrade and remote firmware upgrade (FOTA)

1.3 Application

Wireless terminal, industrial remote sensing, security monitoring, medical equipment, electronic station board, intelligent transportation, etc.

2. Electrical Properties

2.1 Schematic diagram



2.2 General Specification

Model Name	AM251107
Product Description	WIFI 2.4GHz&5GHz Module,Support WIFI/Bluetooth function
Frequency range	2400~2483.5MHz & 5180~5825MHz
Antenna	Printed PCB or IPEX antenna
Bluetooth	BLE and BT5.0
Bluetooth frequency range	2402~2480MHz
Interface	UART/GPIO/ADC/PWM/IIC/SPI/SWD
Operating temperature	-20°C to +70°C
Storage temperature	-40°C to +125°C, <90%RH
Power supply	Voltage 3.0V ~ 3.6V, Typ:3.3V, current >450mA
Size:L* W * T(mm)	24*16*3 (typical)
ROHS	All hardware components are fully compliant with EU ROHS directive

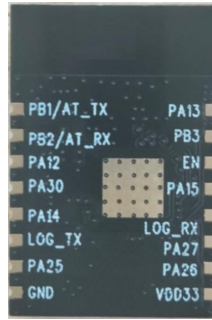
2.3 Recommended Operating

Parameter	Min	Typ	Max	Unit
DC 3.3V (with internal regulator and integration CMOS PA)	3.0	3.3	3.6	V
Figure I/O supply voltage	1.76	1.8-3.3	3.3	mA
DC_IO_33 (3.3V I / O rated current)			50	mA
Electrostatic protection (VESD)			2000	V

Description	Typ	Unit
Operating frequency	2400-2483.5 or 5180-5825	MHz
Output Power		
11a mode, PA output power	14±2	dBm
11n mode, PA output power	14±2	dBm
11g mode, PA output power	15±2	dBm
11b mode, PA output power	16±2	dBm
Bluetooth output power	7±2	dBm

Sensitivity		
CCK, 1 Mbps	≤-90	dBm
CCK, 11 Mbps	≤-85	dBm
6 Mbps (1/2 BPSK)	≤-88	dBm
54 Mbps (3/4 64-QAM)	≤-70	dBm
HT20 (MCS7)	≤-67	dBm
Bluetooth Sensitivity	≤-92	dBm

3. Pin Definition

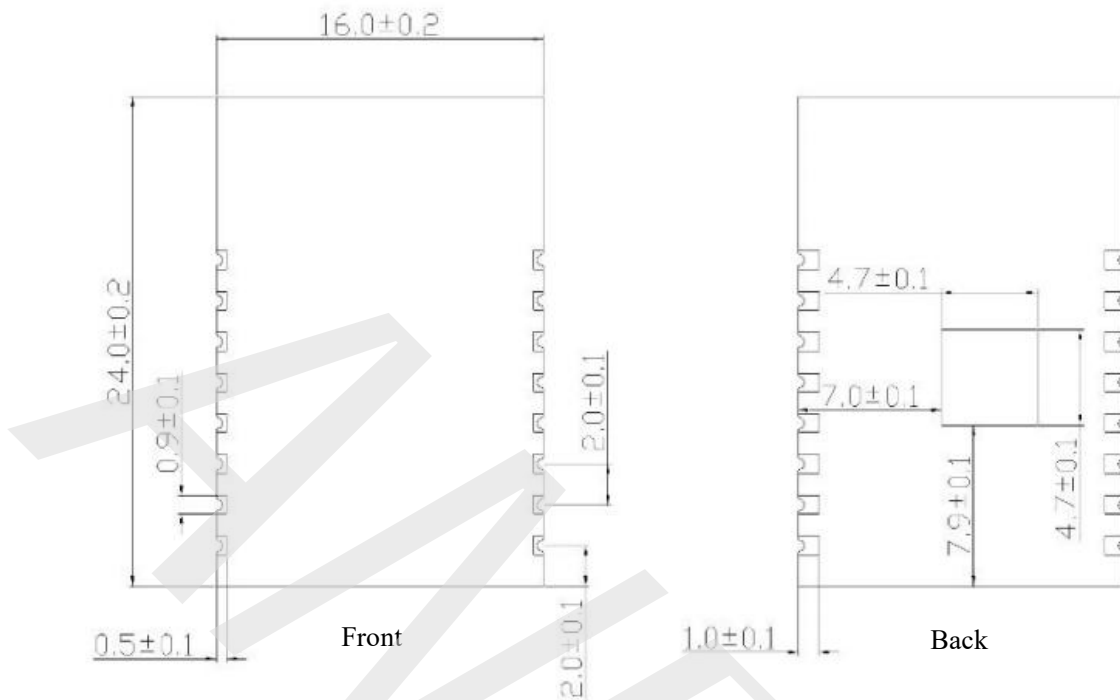


Pin distribution

No.	Name	Function
1	PA13	LP_PWM1/SPI1_MISO
2	PB3	ADC/SWD_CLK
3	CHIP_EN	Chip enable port
4	PA15	SPI1_CS
5	PA8	UART_LOG_RXD
6	PA27	SWD_DATA
7	PA26	LP_I2C_SDA/LP_PWM5
8	VDD_3V3	3.3V (VDD) ; Max: 450mA
9	GND	Ground
10	PA25	LP_I2C_SCL/LP_PWM4
11	PA7	UART_LOG_TXD
12	PA14	SPI1_CLK
13	PA30	LP_PWM1
14	PA12	SPI1_MOSI/LP_PWM0
15	PB2	LP_UART_RXD
16	PB1	LP_UART_TXD

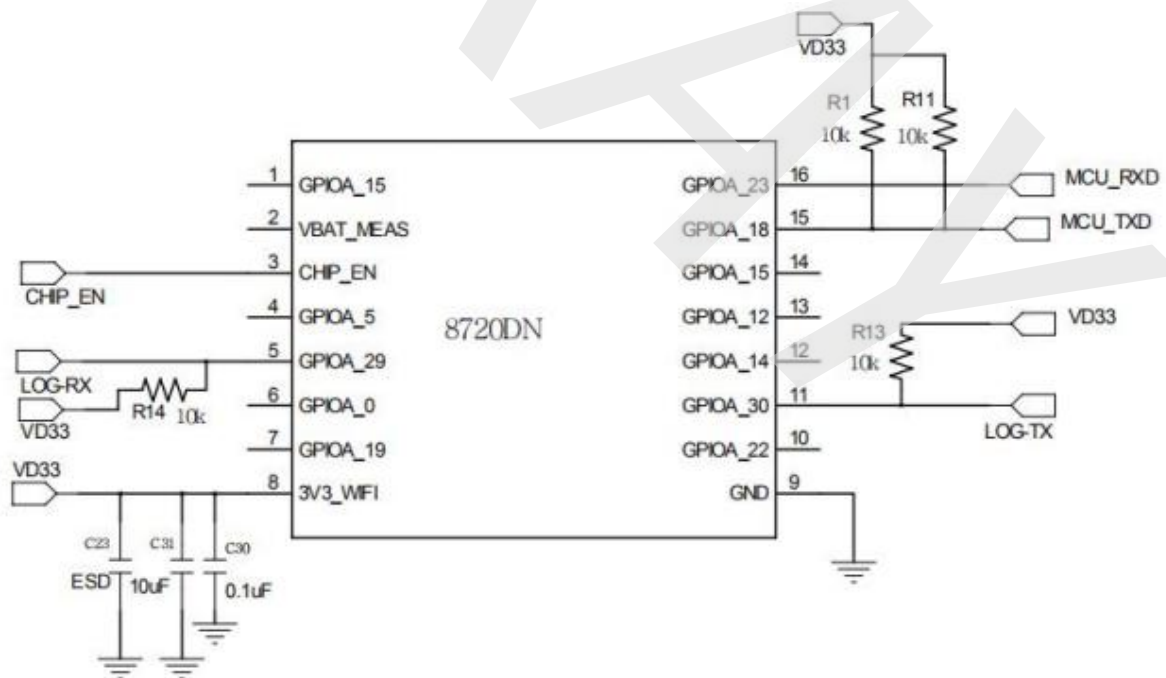
4. Physical Dimension

(Unit: mm)



5. Design Guideline

5.1 Application circuit



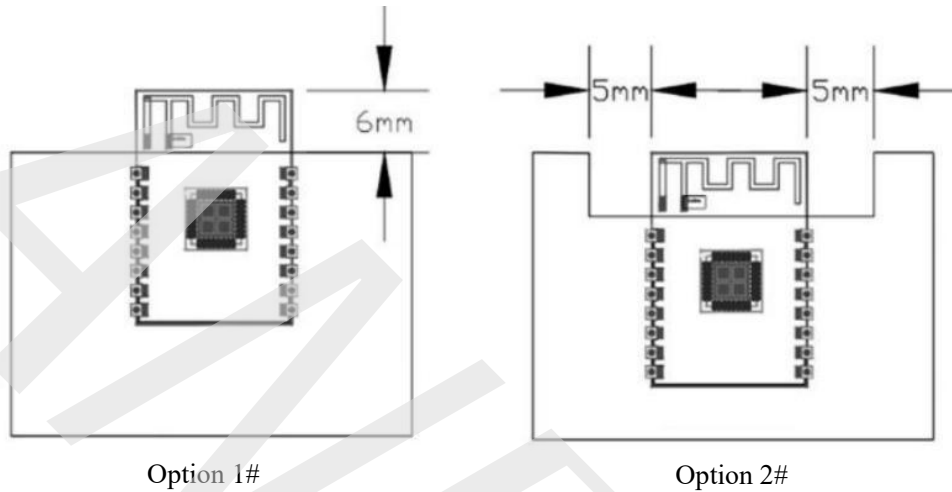
5.2 Antenna layout requirements

1) Installation position on the main board, advise for following two ways:

Option 1#: The module is placed on the edge of the main board, and the antenna area is extended out of the edge of the main board.

Option 2#: Put the module on the edge of the motherboard, and the edge of the motherboard is hollowed out in the antenna position.

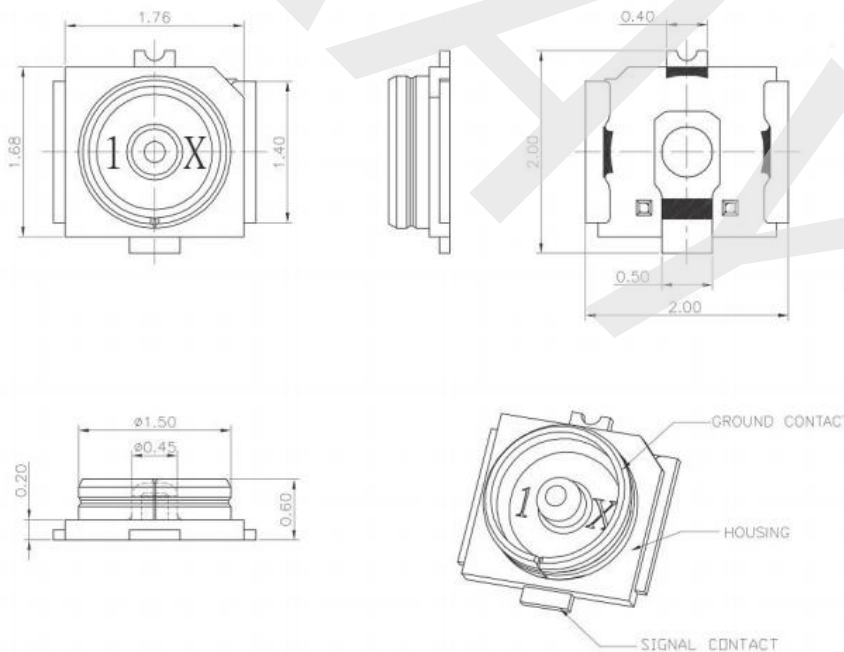
2) In order to meet the performance of the on-board antenna, metal parts are prohibited from being placed around the antenna.



5.3 RF connector of module

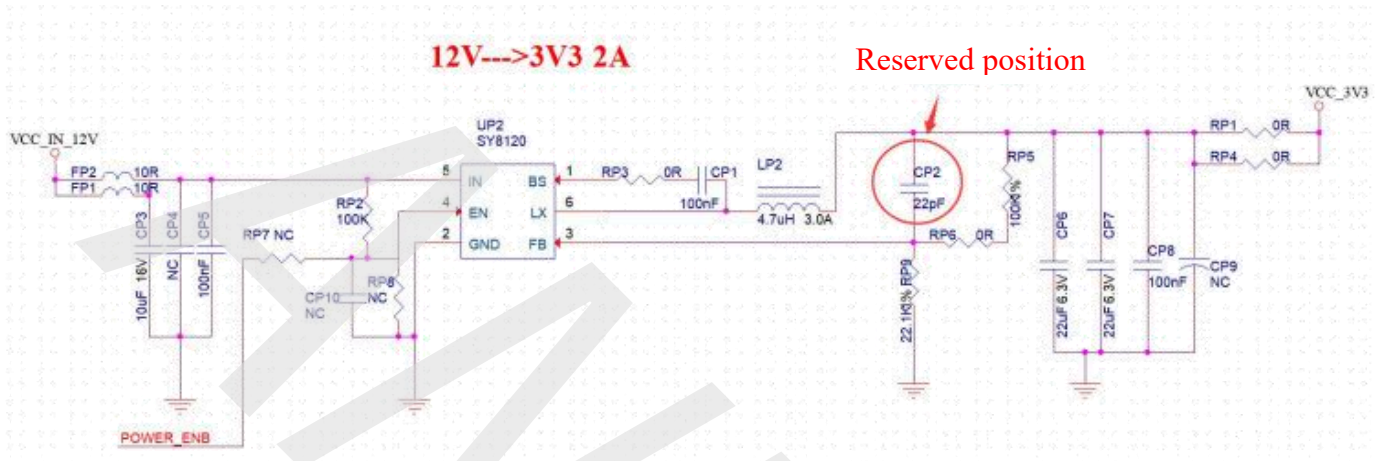
(Unit: mm)

There are RF-I receptacle connectors on the module, for external dual band antenna. The RF receptacle connectors are complied with RF-I standard.



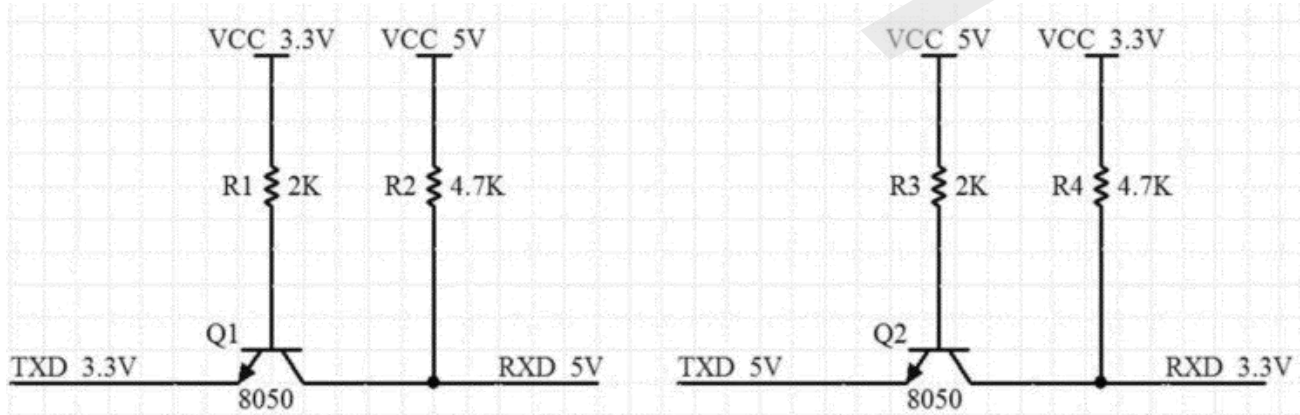
5.4 Power supply

- 1) Recommended voltage 5V, Peak:Current over 500mA .
- 2) It is recommended to use the LDO power supply; If DC-DC is used, the ripple is controlled within 30 mV.
- 3) DC-DC power supply circuit is recommended to reserve the position of the dynamic response capacitor, and the output ripple can be optimized when the load change is large.
- 4) Proposed addition of ESD Devices to 5V Power supply Interface.



5.5 GPIO

- 1) At the periphery of the module, some GPIO ports are led out, and a resistance of 10-100 ohms can be connected in series on the IO port for use. This suppresses overshoot and is more stable on both sides. Help for both EMI and ESD.
- 2) For the up-and-down drawing of the special io-port, reference will be made to the use description of the specification, which will affect the start-up configuration of the module.
- 3) The IO port of the module is 3.3 v. If the main control does not match the io-level of the module, it is necessary to increase the level conversion circuit.
- 4) If the IO interface is directly connected to the peripheral interface, or the pins and other terminals, it is recommended to reserve the ESD device near the terminal at the IO trace.



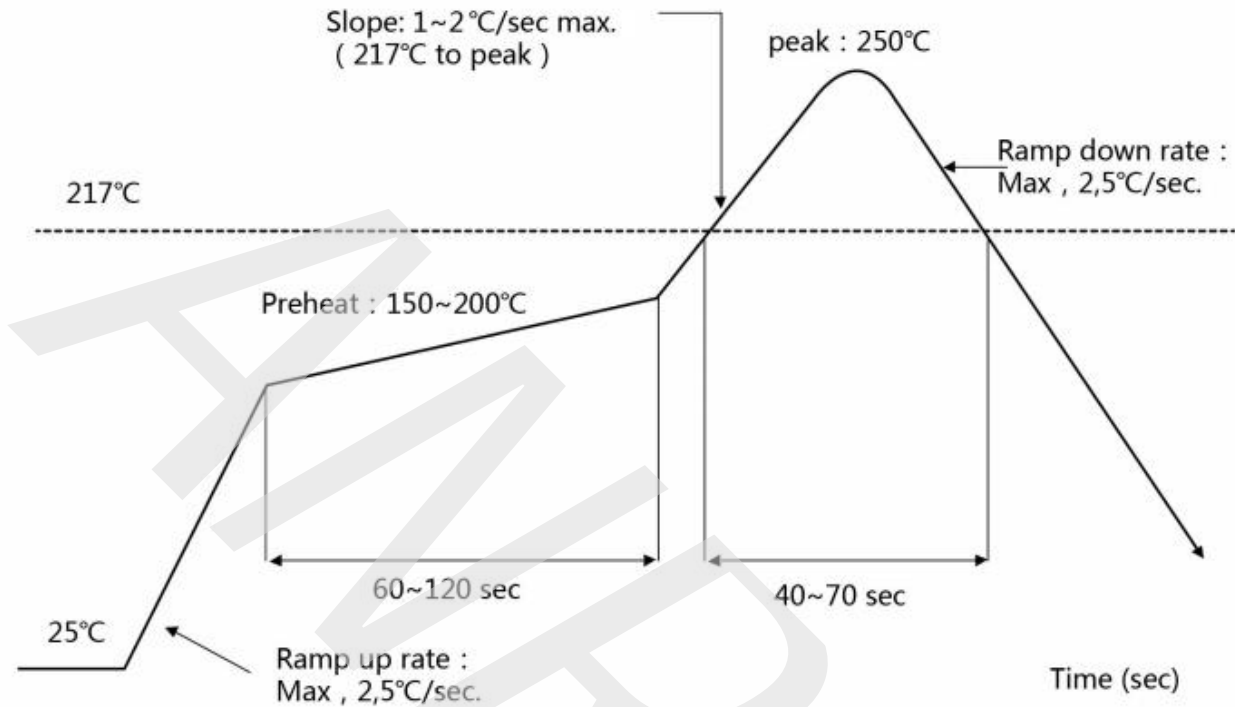
Level switching circuit

6. Recommended SMT temperature

Referred to IPC/JEDEC standard.

Peak Temperature : <math><250^{\circ}\text{C}</math>

Number of Times : ≤ 2 times



7. Notice

AM251107 module is an electrostatic sensitive device, which needs special ESD precautions. When used ESD protective devices should be added. The correct ESD processing and packaging must be adopted in the transportation, operation and use of AM251107 modules. Do not touch the module by hand or weld with a non-antistatic soldering iron to avoid damage to the module.

8. Package

