

WG219 IoT WLAN Module Datasheet

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1 General Description

The WG219 Wi-Fi Module is a small form-factor, single stream, 802.11b/g/n WiFi module with on-board low power application processor. It is a low cost serial WiFi module, support UART-WiFi - Ethernet data transmission. The WG219 has been optimized for client applications in the home, enterprise, smart grid, home automation and control that have lower data rates and transmit or receive data on an infrequent basis. The WG219 Wi-Fi Module also enables rapid application development of ultra low power devices with the complete application SW on-chip . This combination makes the WG219 Wi-Fi Module an ideal solution for low power automation and sensor solutions because of its high efficiency and low power consumption.

The WG219 Wi-Fi Module can be used to design applications using 802.11b/g/n communication protocols. All features are enhanced by a built-in antenna, external antenna connector and an interface port to the carrier board. This interface port includes power supply pins, GPIO ports and UART ports.

2 Applications

- ◆ IoT (internet of things)
- ◆ Network Consumer Device
- ◆ Metering
- ◆ Building Automation
- ◆ Home Automation
- ◆ Smart Home Gateway
- ◆ Smart Lighting
- ◆ Smart Plugs and Lights
- ◆ Baby Monitors
- ◆ Mesh Network
- ◆ Sensor Network
- ◆ Industry Control



Figure 1: WG219 Top View

3 Features

- ◆ 802.11 b/g/n/e/i
- ◆ 802.11 n (2.4 GHz), up to 72.2 Mbps
- ◆ 802.11 e: QoS for wireless multimedia technology
- ◆ AT Set, Cloud Server, App
- ◆ A-MPDU and A-MSDU aggregation
- ◆ Network Protocols: IPv4, TCP/UDP/HTTP/FTP
- ◆ Fragmentation and defragmentation
- ◆ Automatic Beacon monitoring/scanning
- ◆ 802.11 i security features: pre-authentication and TSN
- ◆ Wi-Fi Protected Access (WPA)/WPA2/WPA2-Enterprise/Wi-Fi Protected Setup (WPS)
- ◆ Infrastructure BSS Station mode/Soft AP mode
- ◆ Wi-Fi Direct (P2P), P2P Discovery, P2P Group Owner mode and P2P Power Management
- ◆ UMA compliant and certified
- ◆ Antenna diversity and selection
- ◆ RoHS compliance (Lead-free)
- ◆ FCC,CE compliance

4 Application Block Diagram

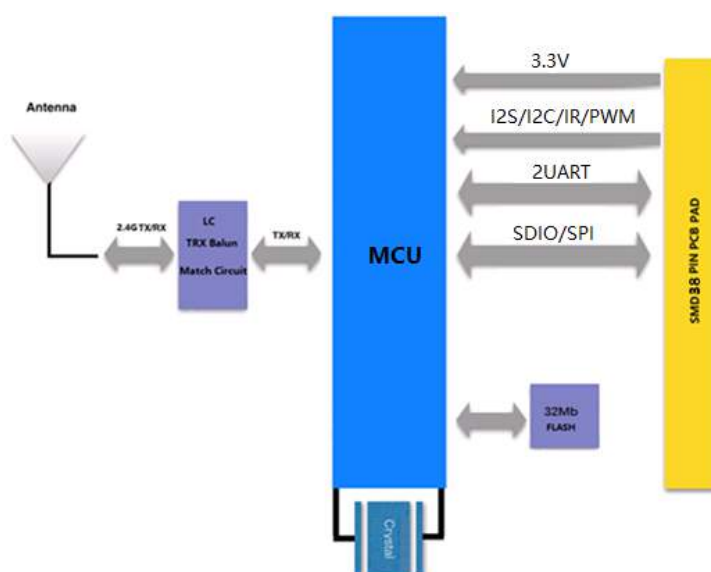


Figure 2: WG219 Block Diagram

5 Module Pinout and Pin Description

5.1 Module Pinout

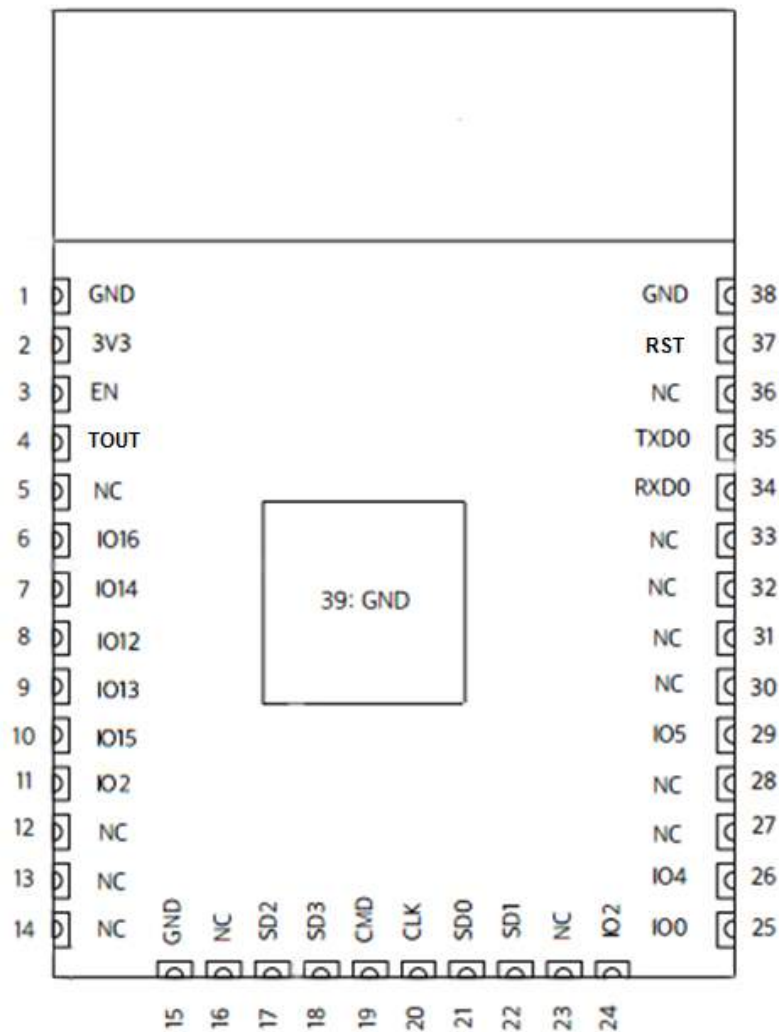


Figure 3: WG219 Pin Package

5.2 Pin Description

NO	Name	Function
1	GND	GND
2	VDD33	3.3 V power supply (VDD)
3	CHIP_PU	Chip enable pin. Active high.

4	TOUT	ADC Pin can be used to check the power voltage of VDD33
5	NC	Not connect
6	IO16	GPI16, Deep-Sleep Wakeup
7	IO14	MTMS, GPI14, HSPI_CLK
8	IO12	MTDI, GPI12, HSPI_MISO
9	IO13	MTCK, GPIO13, HSPI_MOSI, UART0_CTS
10	IO15	MTDO, GPIO15, HSPI_CS, UART0_RTS
11	IO2	GPIO2, UART TX during flash programming
12	NC	Not connect
13	NC	Not connect
14	NC	Not connect
15	GND	GND
16	NC	Not connect
17	SHD/SD2	GPIO9, SD_DATA2, SPIHD, HSPIHD
18	SWP/SD3	GPIO10, SD_DATA3, SPIWP, HSPIWP
19	SCS/CMD	GPIO11, SD_CMD, SPI_CS0
20	SCK/CLK	GPIO6, SD_CLK, SPI_CLK
21	SDO/SD0	GPIO7, SD_DATA0, SPI_MISO
22	SDI/SD1	GPIO8, SD_DATA1, SPI_MOSI
23	NC	Not connect
24	IO2	GPIO2, UART TX during flash programming
25	IO0	GPIO0, SPI_CS2
26	IO4	GPIO4
27	NC	Not connect
28	NC	Not connect
29	IO5	GPIO5
30	NC	Not connect
31	NC	Not connect
32	NC	Not connect
33	NC	Not connect
34	RXD0	GPIO3, U0RXD
35	TXD0	GPIO1, U0TXD

36	NC	Not connect
37	RST	Reset Signal (Active Low)
38	GND	GND

5.3 Strapping Pins

WG219 has three strapping pins:

- GPIO0: internal pull-up
- GPIO2: internal pull-up
- MTDO/GPIO15: internal pull-down

6 Interfaces

6.1 GPIO

The WG219 has 17 GPIO pins which can be assigned to various functions by programming the appropriate registers. These pins can be multiplexed with other functions such as I2C, I2S, UART, PWM, IR Remote Control, etc.

6.2 I2C

WG219 Pin Number	Pin Name	GPIO	Function Name
7	MTMS	GPIO14	I2C_SCL
11	GPIO2	GPIO2	I2C_SDA

Table6-1: I2C pin share scheme

6.3 I2S

WG219 Pin Number	Pin Name	GPIO	Function Name
8	MTDI	GPIO12	I2SI_DATA
9	MTCK	GPIO13	I2SI_BCK
7	MTMS	GPIO14	I2SI_WS
10	MTDO	GPIO15	I2SO_BCK
34	RXD0	GPIO3	I2SO_DATA
11	GPIO2	GPIO2	I2SO_WS

Table6-2: I2S pin share scheme

6.4 UART

WG219 Pin Number	Pin Name	GPIO	Function Name
34	RXD0	GPIO3	U0RXD

35	TXD0	GPIO1	U0TXD
10	MTDO	GPIO15	U0RTS
9	MTCK	GPIO13	U0CTS
11	GPIO2	GPIO2	U1TXD
22	SD_D1	GPIO8	U1RXD

Table6-3: UART pin share scheme

6.5 SDIO

WG219 Pin Number	Pin Name	GPIO	Function Name
17	SD_D2	GPIO9	SD_D2
18	SD_D3	GPIO10	SD_D3
19	SD_CMD	GPIO11	SD_CMD
20	SD_CLK	GPIO6	SD_CLK
21	SD_D0	GPIO7	SD_D0
22	SD_D1	GPIO8	SD_D1

Table6-4: SDIO pin share scheme

6.6 SPI(Master/Slave)

WG219 Pin Number	Pin Name	GPIO	Function Name
17	SD_D2	GPIO9	SPIHD
18	SD_D3	GPIO10	SPIWP
19	SD_CMD	GPIO11	SPICS0
20	SD_CLK	GPIO6	SPI_CLK
21	SD_D0	GPIO7	SPIQ/NISO
22	SD_D1	GPIO8	SPID/MOSI
35	TXD0	GPIO1	SPICS1
25	IO0	GPIO0	SPICS2

Table6-5: SPI pin share scheme

6.7 SPI(Slave)

WG219 Pin Number	Pin Name	GPIO	Function Name
17	SD_D2	GPIO9	NC
18	SD_D3	GPIO10	SPIS_CS

19	SD_CMD	GPIO11	SPIS_MOSI
20	SD_CLK	GPIO6	SPIS_CLK
21	SD_D0	GPIO7	SPIS_MISO
22	SD_D1	GPIO8	SPIS_INT

Table6-6: SPI Slave pin share scheme

6.8 HSPI(Slave)

WG219 Pin Number	Pin Name	GPIO	Function Name
7	MTMS	GPIO14	HSPICK
11	GPIO2	GPIO2	HSPIQ/MISO
9	MTCK	GPIO13	HSPID/MOSI
10	MTDO	GPIO15	HSPICS

Table6-7: HSPI pin share scheme

6.9 PWM

WG219 Pin Number	Pin Name	GPIO	Function Name
8	MTDI	GPIO12	PWM0
10	MTDO	GPIO15	PWM1
7	MTMS	GPIO14	PWM2
26	IO4	GPIO4	PWM3

Table6-8: PWM pin share scheme

6.10 IR Remote

WG219 Pin Number	Pin Name	GPIO	Function Name
7	MTMS	GPIO14	IR TX
29	IO5	GPIO5	IR RX

Table6-9: IR pin share scheme

7 PCB Footprint and Dimensions

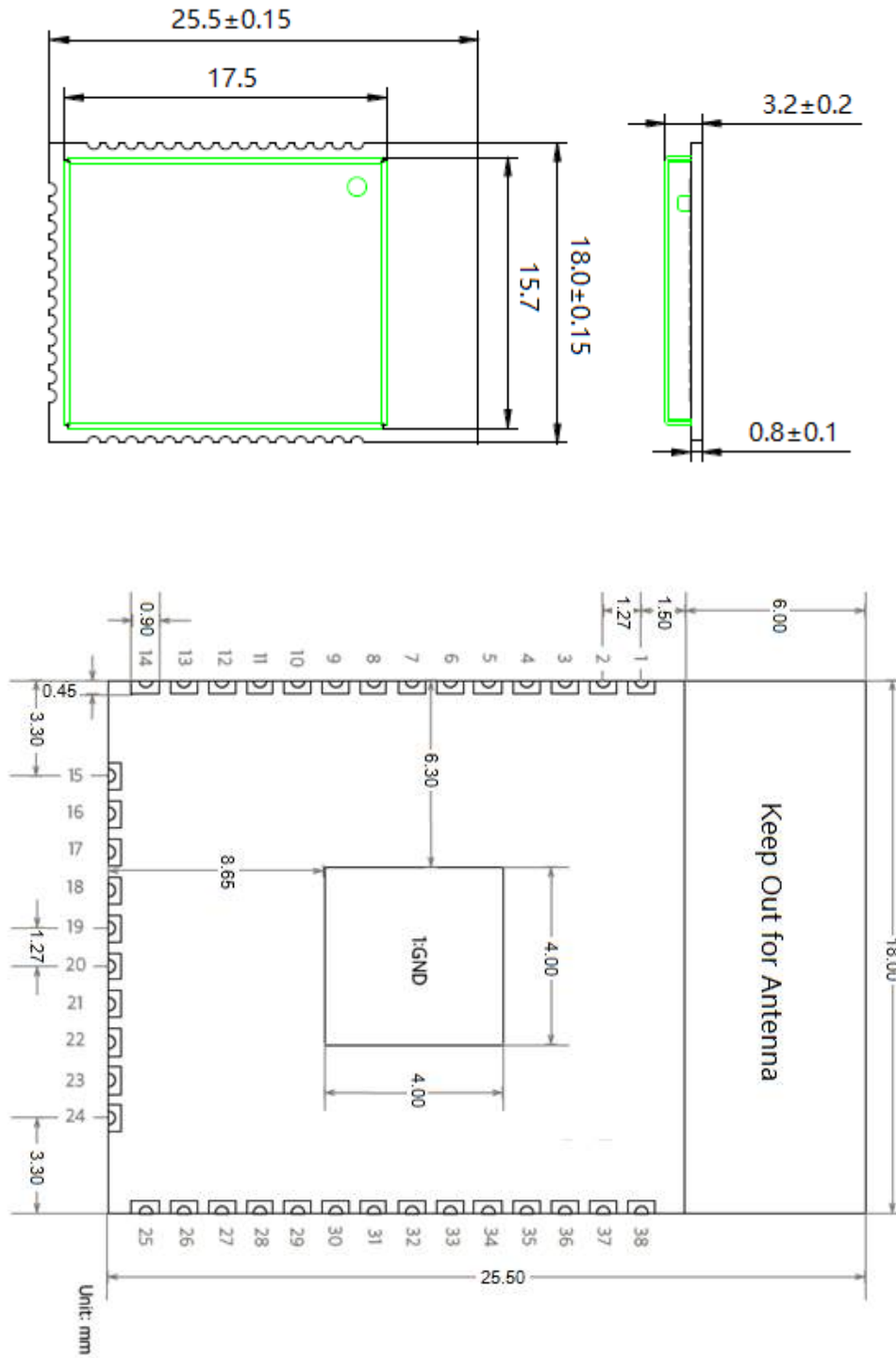


Figure 4:

Recommend PCB Footprint

WG219

8 Electrical Characteristics

8.1 Absolute Maximum Ratings

Parameter	Condition	Min.	Typ.	Max.	Unit
Storage Temperature Range		-40		125	°C
ESD Protection	VESD	/		2000	V
Supply Voltage	VDD33	0		3.6	V
Voltage On Any I/O Pin		-0.3		3.63	V

Table8-1: Absolute Maximum Ratings

Note: Absolute maximum ratings are stress ratings only, and functional operation at the maxims is not guaranteed. Stress beyond the limits specified in this table may affect device reliability or cause permanent damage to the device. For functional operating conditions, refer to the operating conditions tables as follow.

*WG219 series modules are Electrostatic Sensitive Devices and require special precautions while handling.



ESD precautions

The WG219 series modules contain highly sensitive electronic circuitry and are Electrostatic Sensitive Devices (ESD). Handling the WG219 series modules without proper ESD protection may destroy or damage them permanently.

The WG219 series modules are electrostatic sensitive devices (ESD) and require special ESD precautions typically applied to ESD sensitive components. Proper ESD handling and packaging procedures must be applied throughout the processing, handling, transportation and operation of any application that incorporates the WG219 series module. Don't touch the module by hand or solder with non-anti-static soldering iron to avoid damage to the mode.

8.2 Recommended Operation Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit
Extended temp. range	TA	-20		70	°C
Power Supply	VDD33	3.0	3.3	3.6	V
Input Low Voltage	VIL	-0.3		0.8	V
Input High Voltage	VIH	2		3.6	V

Table8-2: Operating Conditions

8.3 Measurement Conditions

System State	Description	Current (Typ.)@3.3V
Deep-sleep	Only RTC Power on	10uA
Light-sleep	Receive Beacon packages	0.9mA
Modem-sleep	The CPU is Power on	15 mA
Active RX(RF Working)	RX and Listening	50-60 mA
Active TX(RF Working)	WIFI TX 13-18dBm	120-180 mA

Table8-3: Power Consumption in Different States

9. Performance Specification

Hardware Features	
Model	WG219
ANTENNA TYPE	PCB Antenna or IPEX Connector
Voltage	3.3V+/-10%
DIMENSIONS(LxWxH)	25.5mm*18.0mm*3.2mm
2.4GHz WiFi Features	
WIRELESS STANDARDS	IEEE 802.11 b/g/n/
FREQUENCY RANGE	2.412-2.484GHz
DATA RATES	IEEE 802.11a Standard Mode: 6,9,12,18,24,36,48,54Mbps IEEE 802.11 b Standard Mode: 1,2,5.5,11Mbps

	IEEE 802.11g Standard Mode: 6,9,12,18,24,36,48,54Mbps
	IEEE 802.11n Standard Mode: 72.2Mbps @ HT20(MCS7)
2.4G RECEIVE SENSITIVITY	HT20 MCS7 : -70dBm@10% PER(MCS7)
	OFDM 54M: -73dBm@10% PER
	CCK, 11M: -88dBm@ 8% PER
WIRELESS SECURITY	Supports WEP64/128, WPA, WPA2, TKIP, WAPI, and AES hardware encryption
WIRELESS TRANSMIT POWER With ±2dBm tolerance	IEEE 802.11n: 12-14dBm@HT20 MCS7
	IEEE 802.11g: 16dBm
	IEEE 802.11b: 18dBm
WORK MODE	Soft AP/ Station/Soft AP+Station
Others	
ENVIRONMENT	Operating Temperature: -20°C~70°C
	Storage Temperature: -40°C~125°C
	Operating Humidity: 10%~90% non-condensing
	Storage Humidity: 5%~90% non-condensing

10 Reference Schematics

10.1 Power Schematic

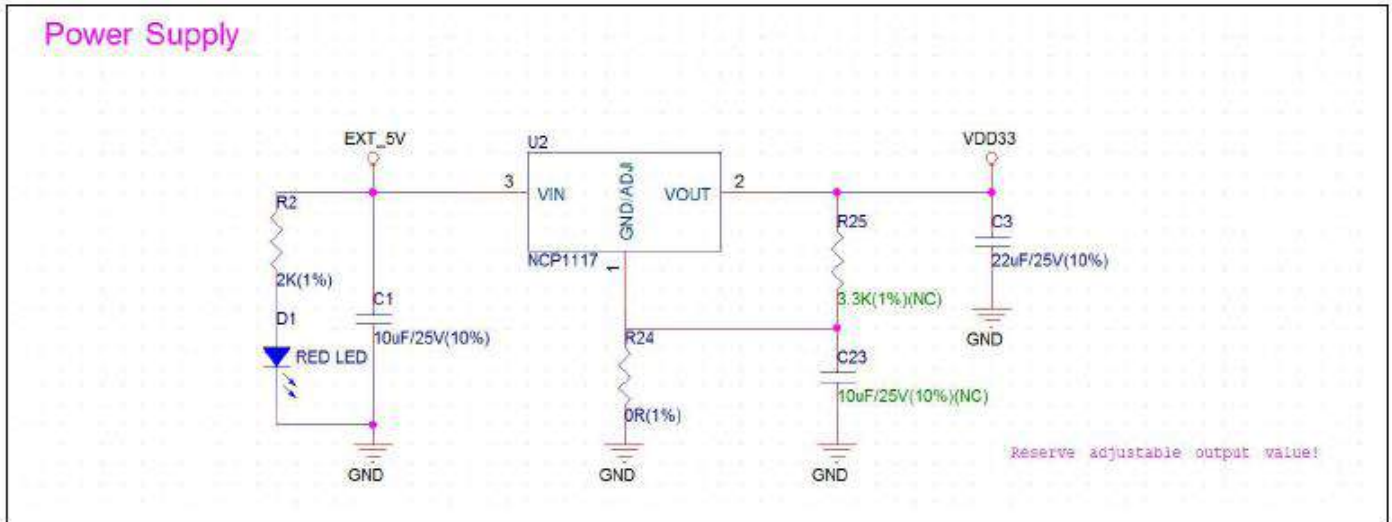


Figure 5: WG219 Typical Power Schematics

10.2 USB-UART Schematic

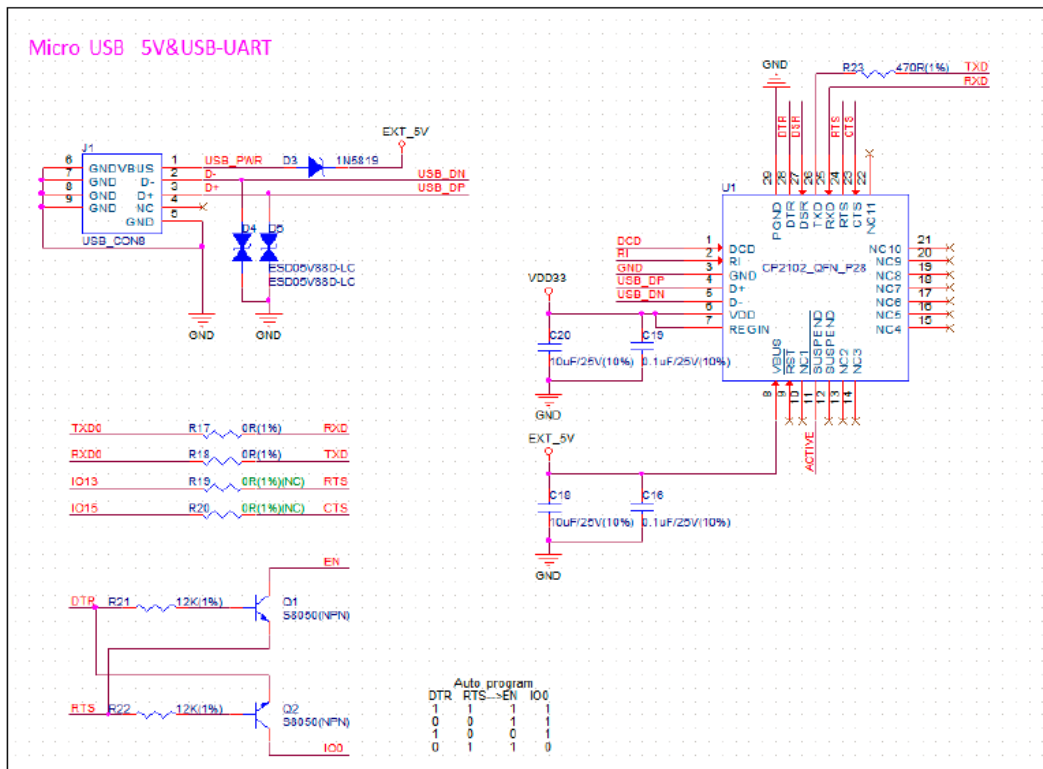


Figure 6: WG219 Typical USB to UART Schematics

10.3 Typical Schematic

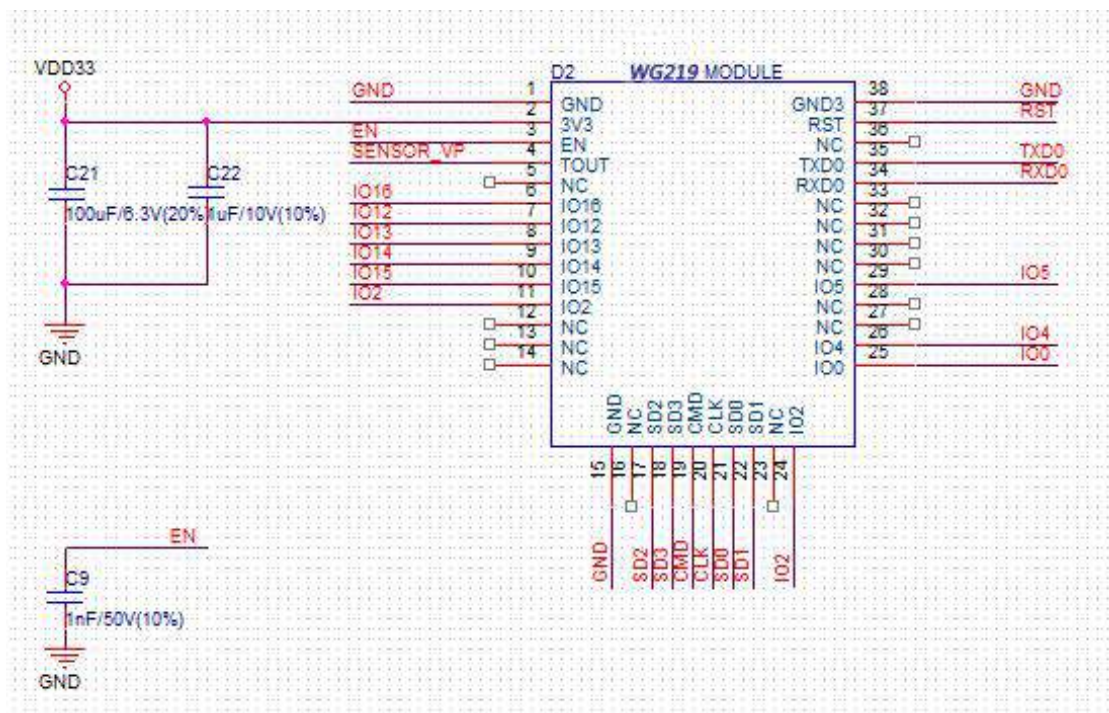


Figure 7: WG219 Typical Schematics

11 Hardware Boot Mode

Boot Mode.	MTDO/IO15	GPIO0	GPIO2
Download Mode	0	0	1
Normal Work Mode	0	1	1

Download Mode

When GPIO15=0, GPIO0=0, GPIO2=1, WG219 is in the Download mode and you can download the firmware to the external flash.

Normal Work Mode

When GPIO15=0, GPIO0=1, GPIO2=1, WG219 is in the Flash mode. WG219 will automatically read and run programs from flash during power-on.

12 Manufacturing Process Recommendations

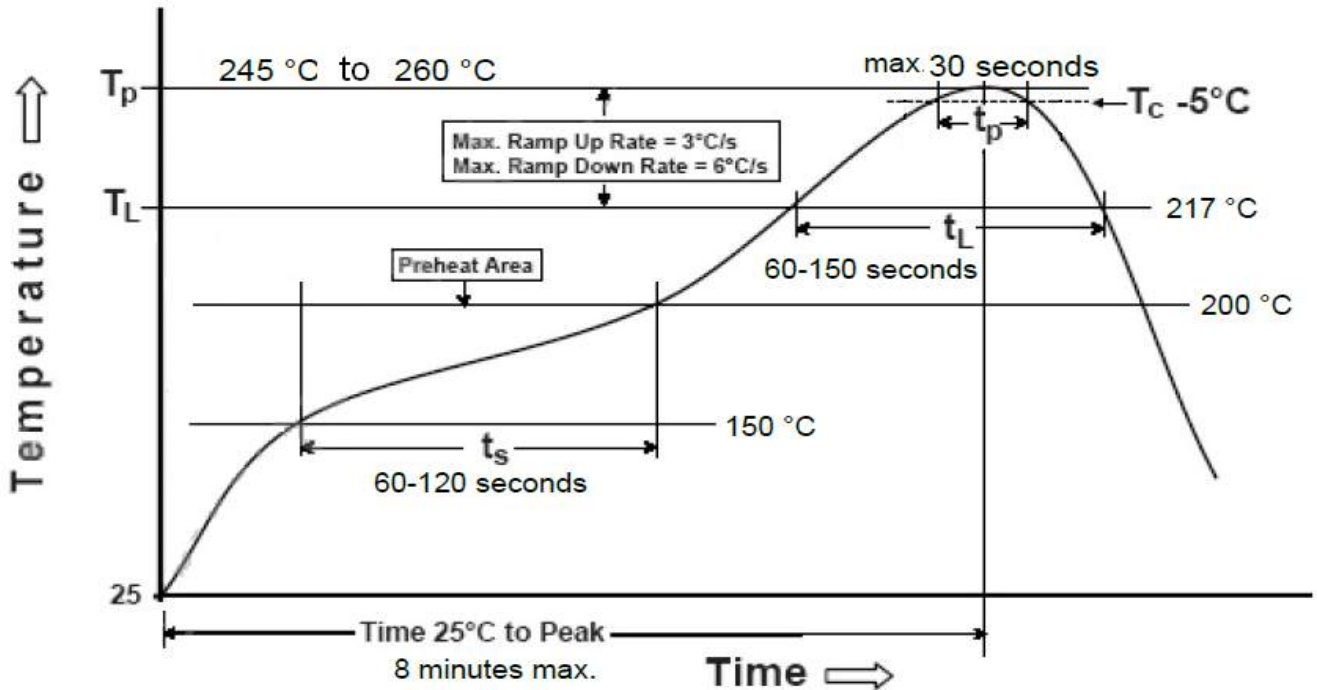


Figure 5: WG219 Typical Lead-free Soldering Profile

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.

13 Ordering Information

Module No.	Antenna Connector Type
WG219-E	IPEX Connector
WG219-P	PCB Antenna

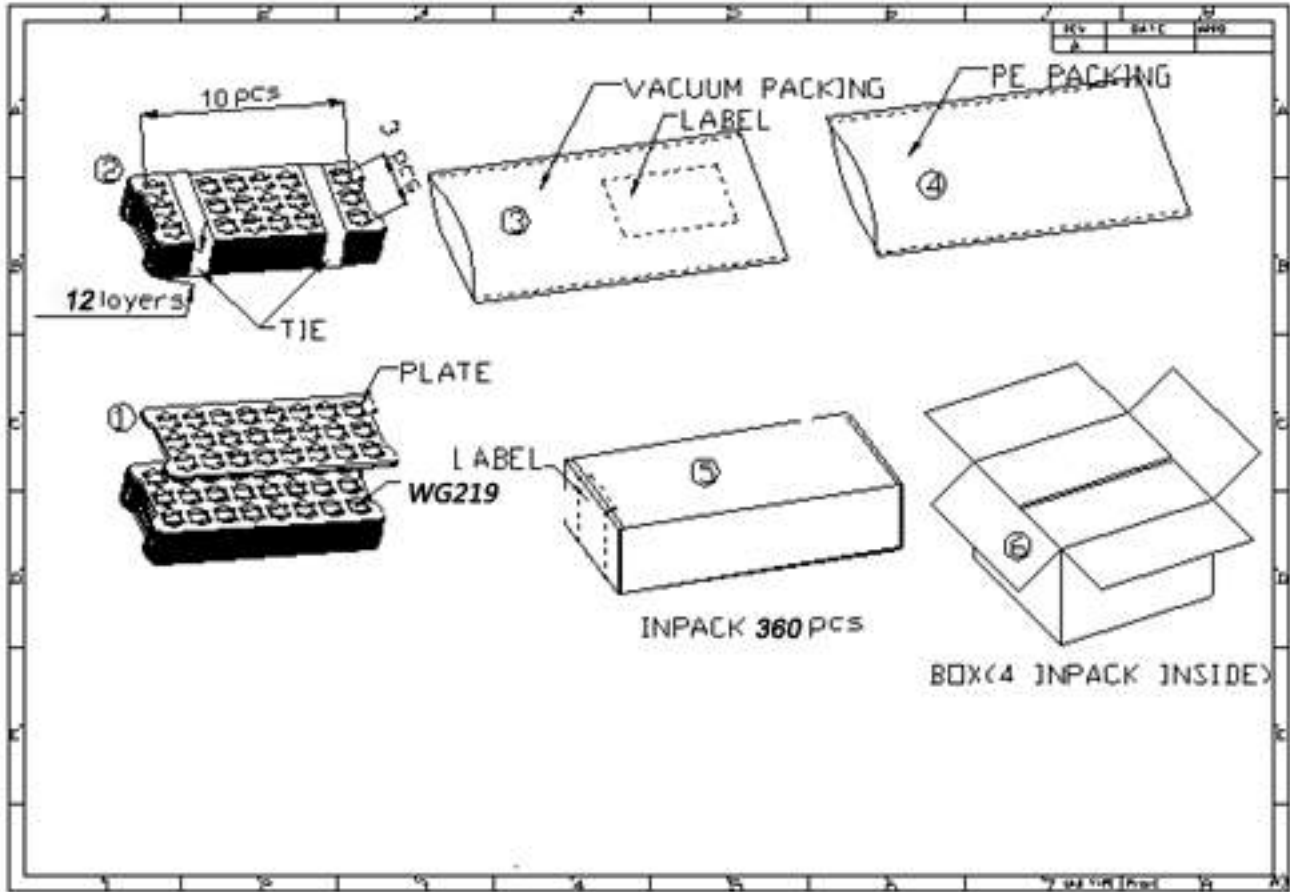


Figure9: WG219-E



Figure9: WG219-P

14 Packaging Specification



15 Revision History

Revision	Description	Approved	Date
V1.01	Initial Release	George He	2017.08.12
V2.01	Update WIFI Features	George He	2017.08.28
V2.02	Update Certification Information	George He	2017.08.31
V2.03	Update Operating Temperature	George He	2017.09.15
V2.04	Update Packaging Information	George He	2018.05.16
V2.05	Ordering Information	George He	2018.06.26

16 Contact Information

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