WG236-A 规格书/datasheet

WIFI 802.11ax + Bluetooth BLE 5.1

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版本/Revision	描述/Description	审核/Approved	日期/Date
V1.01	初始版本/Initial Release	George	2024.01.10
V1.02	更新了引脚分配图和引脚说明	Wilson	2024.1.17

目录/Contents

1.概述/General Description

WG236-A是一款低功耗蓝牙BLE5.1和Wi-Fi 802.11b/ g/ n/ ax的模块。模块主芯片集成了完整的Wi-Fi 和蓝牙应用需要的硬件和软件资源，可以支持AP和STA双角色连接，并同时支持BLE低功耗蓝牙连接。运行速度最高可到240 MHz 的MCU 以及内置的512KB RAM，可以使得芯片支持云连接。

WG236-A integrates Bluetooth Dual Mode 5.1 and Wi-Fi 802.11ax chips. The chip integrates hardware and software resources needed to complete Wi-Fi and Bluetooth applications, supports AP and STA dual role connections, and supports both classic and low-power Bluetooth connections. An MCU running at speeds up to 240 MHz and built-in 512 KB RAM enables the chip to support cloud connectivity.

WG236-A 拥有丰富的外设，如PWM、I2C、UART、SPI。可以直接通过UART 下载和烧录程序。多达六路的32 位高速PWM 输出使用芯片非常适合高品质的LED 控制。每2 个PWM 可配置为相位可控的差分模式，以支持电机和灯带驱动。

WG236-A has a wealth of peripherals, such as PWM, I2C, UART, SPI. You can download and burn the program directly through UART. Up to six channels of 32-bit high-speed PWM output use the chip ideal for high quality LED control. Each 2 PWM can be configured for phase-controlled differential mode to support motor and lamp strip drives.

WG236-A 支持低功耗睡眠模式，MCU 可以进入睡眠状态，达到微安级的睡眠电流。WG236 支持的深度睡眠模式，可以在几个微安的电流下，运行32位时钟，并可以被此时钟唤醒或者被任何GPIO 唤醒。

The WG236-A supports low-power sleep mode, and the MCU can enter the sleep state and reach the microamps level of sleep current. The WG236 supports deep sleep mode, which can run 32 bit clock at several microampals of current and can be awakened by this clock or by any GPIO.

WG236-A 是一款外形小巧，支持协议802.11 b/ g/ n/ ax 的单流板载低功耗应用处理器的WIFI模块。它是一个低成本串行WIFI模块，支持UART-WIFI－以太网数据传输。

WG236-A is a compact WIFI module that supports 802.11b/ g/ n/ ax single-stream, low-power application processor. It is a low cost serial WIFI module that supports UART-WIFI-ethernet data transmission.

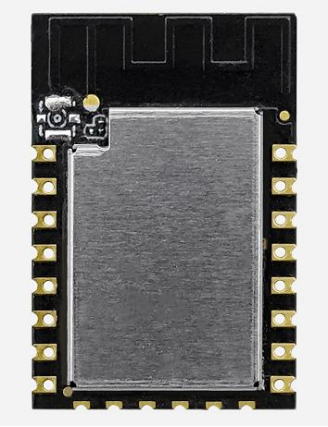


图 1: WG236 正视图/ WG236 Top view

2.应用/Applications

- 物联网/ IOT (internet of things)
- 网络消费设备/ Network Consumer Device
- 计量/ Metering
- 楼宇自动化/ Building Automation
- 家庭自动化/ Home Automation
- 智能家居网关/ Smart Home Gateway
- 智能照明/ Smart Lighting
- 智能插头和灯/ Smart Plugs and Lights
- 婴儿监视器/ Baby Monitors
- 网状网络/ Mesh Network
- 传感器网络/ Sensor Network
- 工业控制/ Industry Control

3.特性/Features

- 符合 IEEE 802.11b/g/n/ax WLAN/ 802.11 b/g/n/ax
- BLE5.1
- 蓝牙和Wi-Fi 共享天线和收发电路/ Bluetooth and Wi-Fi share antennas and transceiver circuits
- 内部基于优先级的调度逻辑保证蓝牙和Wi-Fi 双连接的稳定并能够有效地共享空中资源/ Internal priority-based scheduling logic ensures the stability of Bluetooth and Wi-Fi dual connections and the efficient sharing of air resources
- 支持BLE和BT多设备连接/Support BLE and BT multi-device connection
- 802.11ax (2.4 GHz) 高达86Mbps/ 802.11ax (2.4 GHz)up to 86Mbps
- 支持STA/ AP/ Support STA and AP
- AT Set, 云服务器，应用程序/ AT Set, cloud server, application
- 网络协议：IPv4, TCP/ UDP/ HTTP/ telnet/ Network protocol: IPv4, TCP/ UDP/ HTTP/ FTP
- 支持 WEP、WPA、WPA2、WPA3（个人和企业模式）/Support of WEP, WPA, WPA2, WPA3 (Personal and Enterprise modes)
- 符合ROHS 环保要求/ ROHS
- 符合FCC,CE,TELEC,SRRC/ FCC,CE,TELEC,SRRC

4.框图/Application Block Diagram

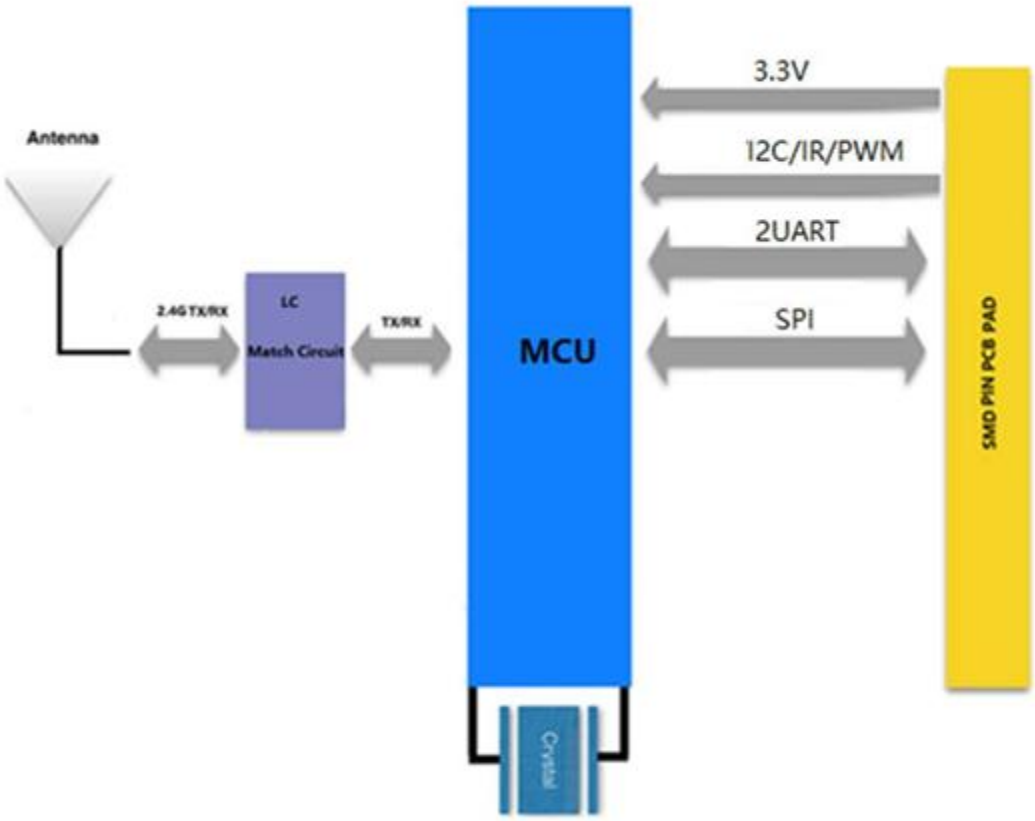


图2: WG236-A 方框图/Block Diagram

5.模块引脚描述/Module Pinout Description

模块引脚分配/Module Pinout

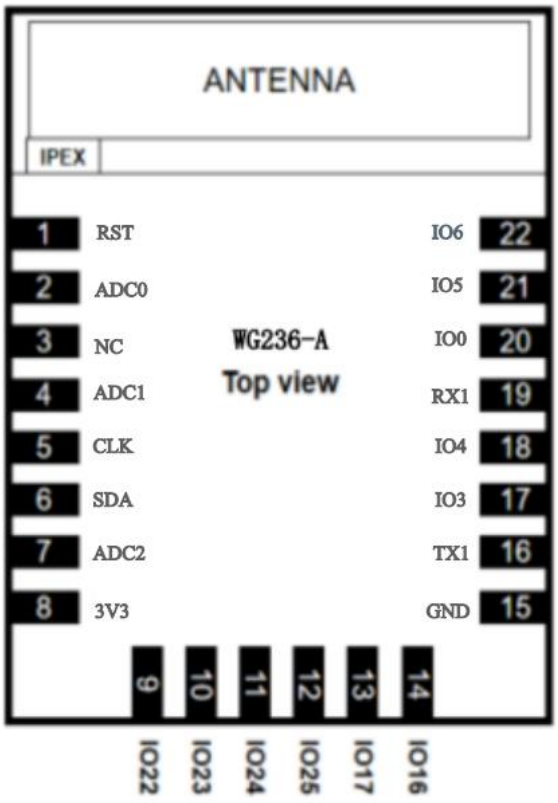


图 3: WG236-A Pin封装/packaging

引脚说明/Pin Description

引脚序号	符号	IO 类型	功能
1	RST		Reset Signal (Active Low)
2	ADC0	I/O	AUX_1,PWM5,GPIO15
3	NC		Not Connect
4	ADC1	I/O	AUX_0,PWM4, GPIO14
5	CLK	I/O	UART2_TXD, I2C_SCL, GPIO13
6	SDA	I/O	UART0_RXD, I2C_SDA, GPIO21
7	ADC2	I/O	AUX_2,PWM3, GPIO20
8	3V3		3.3 V power supply (VDD)

9	IO22	I/O	UART0_TXD, PWM0,GPIO22
10	IO23	I/O	UART1_RTS,PWM1, GPIO23
11	IO24	I/O	UART1_CTS, PWM2, GPIO24
12	IO25	I/O	I2C_SDA, PWM3,GPIO25
13	IO17	I/O	UART2_RXD, PWM5, GPIO17
14	IO16	I/O	UART1_CTS, PWM2, GPIO16
15	GND		GND
16	TX1	I/O	UART1_TXD(AT Command),I2C_SCL, PWM2, GPIO2
17	IO3	I/O	UART0_CTS,I2C_SDA, PWM3, GPIO3
18	IO4	I/O	UART0_RTS, PWM4, GPIO4
19	RX1	I/O	UART1_RXD(AT Command), PWM1, GPIO1
20	IO0	I/O	UART2_TXD, PWM0, GPIO0
21	IO5	I/O	UART0_RXD(debug), GPIO5
22	IO6	I/O	UART0_TXD(debug), GPIO6

6. 接口/Interfaces

6.1 Pin Function Table

PIN	SPI/SDIO	GPIO	SPI/UART	SPI/PWM	PWM/I2S	I2S/I2C
GPIO18	RESET_B	GPIO18	UART1_RTS	SPI1_HOLD	I2C_SCL	I2S_TXD
GPIO15	BOOTMODE1	GPIO15	ATST_B/AUX_1/ VOUT_QN		PWM_CTRL5	I2S_TXWS
GPIO14	BOOTMODE0	GPIO14	ATST_A/AUX_0/ VOUT_QP		PWM_CTRL4	I2S_TXD
GPIO13	SD_H_CLK	GPIO13	UART2_TXD	I2C_SCL	I2S_RXD	DPLL_80M_O
GPIO21	SD_H_CMD	GPIO21	UART0_RXD	I2C_SDA	I2S_TXD	BT_ACTIVE
GPIO20	PWM_CTRL3	GPIO20	AUX_2/VOUT_I P	I2S_MCLK		
GPIO22	SD_H_DATA0	GPIO22	UART0_TXD	PWM_CTRL0	I2S_TXWS	BT_PRIORITY
GPIO23	SD_H_DATA1	GPIO23	UART1_RTS	PWM_CTRL1	I2S_TXSCK	W_ACTIVE
GPIO24	SD_H_DATA2	GPIO24	UART1_CTS	PWM_CTRL2	I2S_MCLK	W_PRIORITY
GPIO25	SD_H_DATA3	GPIO25		PWM_CTRL3		I2C_SDA
GPIO17	WAKEUP	GPIO17	UART2_RXD	SPI1_WP	PWM_CTRL5	I2S_TXWS
GPIO16	TESTMODE	GPIO16	UART1_CTS	IR_OUT	PWM_CTRL2	
TDO	TDO	GPIO2	UART1_TXD	SPI1_MOSI	PWM_CTRL2	I2C_SCL
TDI	TDI	GPIO3	UART0_CTS	SPI1_MISO	PWM_CTRL3	I2C_SDA
TRST	TRST	GPIO4	UART0_RTS	SPI1_CS1	PWM_CTRL4	MSPI_CS1
TMS	TMS	GPIO1	UART1_RXD	SPI1_CS0	PWM_CTRL1	I2S_RXD
TCK	TCK	GPIO0	UART2_TXD	SPI1_CLK	PWM_CTRL0	I2S_TXSCK
UART0_RXD	UART0_RXD	GPIO5	CLK_OUT	IR_OUT	I2S_RXWS	XTAL_I_32k
UART0_TXD	UART0_TXD	GPIO6	COLD_RESET	32K_CLK_OUT	I2S_RXSCK	XTAL_O_32k

7.PCB 规格尺寸/PCB Footprint and Dimensions

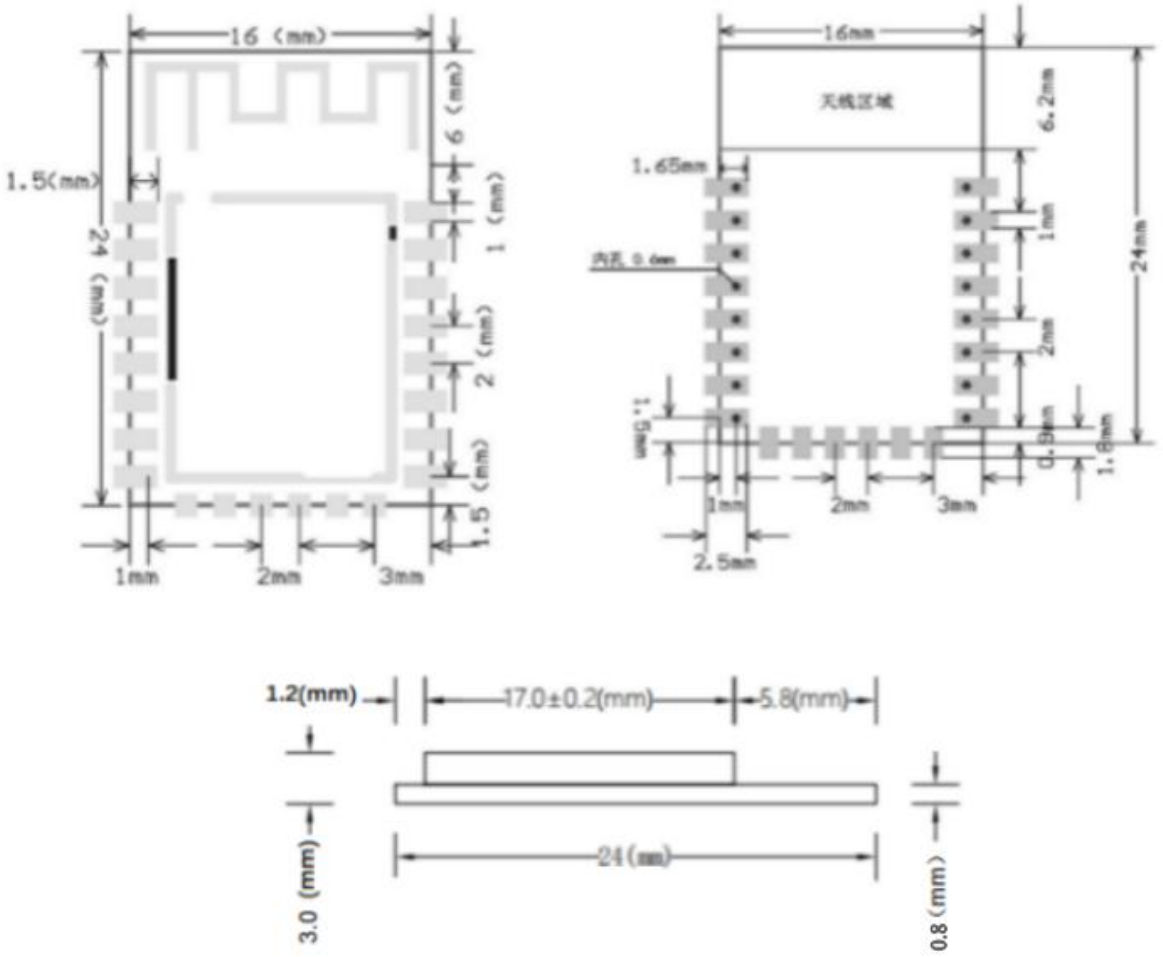


图4: WG236-A 参考 PCB 封装/Recommend PCB Footprint

8.电气特性/Electrical Characteristics

a）绝对最大额定值/Absolute Maximum Ratings

表8-1: 绝对最大额定值/Absolute Maximum Ratings

Parameter	Condition	Min.	Type	Max.	Unit
存储温度范围/ Storage temperature range		-40		105	°C
ESD 保护/ESD protection	VESD	/		2000	V
电源电压/Supply voltage	VDD33	0		3.6	V
I/O脚上电压/ Voltage On Any I/O Pin		-0.3		3.63	V

b)推荐使用范围/Recommended Uses

表8-2: 操作条件/Operating conditions

Parameter	Symbol	Min.	Type	Max.	Unit
扩展温度范围/ Extended temperature range	TA	-40		105	ºC
电源/Power Supply	VDD33	3.0	3.3	3.6	V
输入低电平/ Input Low Voltage	VIL	-0.3		0.8	V
输入高电平/ Input High Voltage	VIH	2		3.6	V

c)测量条件/Measurement Conditions

表8-3: 不同状态下的功耗/Power consumption in different states

系统状态/System State	Description	Current (Typ.)@3.3V
发射电流/Emission current	17dBm, 802.11b 11Mbps	338mA
发射电流/Emission current	14dBm, 802.11g 54Mbps	228mA
接收电流/Receive current	-10dBm输入、802.11b 11Mbps	83mA
接收电流/Receive current	RX BLE	34mA

深度睡眠/Deep sleep	主MCU 系统断电，只有GPIO 状态保持并且AON 部分保持工作。GPIO 边沿改变或者AON 计数器中断可以唤醒系统到工作状态。AON 的保持寄存器保持内容。 The main MCU system is powered down, only GPIO status remains and the AON part remains active. GPIO edge change or AON counter interruption can wake the system to working state. The hold register of AON holds the contents	30uA
关机模式/Shutdown	当CEN=0 系统进入关机模式。当CEN=1 持续几个毫秒后，系统上电启动进入工作模式s When CEN=0 the system enters shutdown mode. When CEN=1 lasts for a few milliseconds, the system is powered up to enter the operating mode s	1uA
正常待机模式/ Normal Standby	MCU 停止运行，外设可以继续工作，并产生中断唤醒MCU 继续运行 When the MCU stops running, the peripheral can continue working and generates an interrupt to wake the MCU to continue running	600uA-1.5mA
低电压待机模式/ Low voltage Standby	MCU 和所有数字外设的时钟都被停止，此时仅有GPIO 中断和AON 计数器中断可以唤醒系统恢复到正常电压继续运行 The clock of the MCU and all digital peripherals is stopped, and only GPIO interruption and AON counter interruption can wake the system to resume operation at normal voltage	96uA

9. 性能参数/Performance Specification

表9-1: 硬件特性参数/Hardware Features

硬件特性/Hardware Features	
模块/Model	WG236-A
天线类型/Antenna type	PCB Antenna or IPEX Connector
电压/Voltage	3.3V+/-10%
尺寸(L×W×H)/ Dimensions(L×W×H)	24.0mm*16.0mm*3.0mm
其他/Others	

环境/environment	Operating Temperature: -40℃~105℃ Storage Temperature: -40℃~105℃ Operating Humidity: 10%~90% non-condensing Storage Humidity: 5%~90% non-condensing

表9-2: WIFI特性参数/WIFI Features

2.4GHz WIFI 特性/2.4GHz WIFI Features	
无线标准/Wireless standards	IEEE 802.11 b/g/n/ax
频率范围/Frequency range	2.400-2.4835GHz
传输速率/Data rates	IEEE 802.11b 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: 150Mbps @ HT40(MCS7)
	IEEE 802.11ax Standard Mode: 86Mbps @ HT20(MCS7)
2.4G 接收灵敏度/ 2.4G Receive sensitivity	IEEE 802.11b: -85dBm@ 8% PER
	IEEE 802.11g: -76dBm@10% PER
	IEEE 802.11n: -73dBm@10% PER(MCS7)
	IEEE 802.11ax: -73dBm@10% PER(MCS7)
无线安全/Wireless security	Support of WEP, WPA, WPA2, WPA3 (Personal and Enterprise modes)
发射功率±2dBm/ Wireless transmit power with ±2dBm tolerance	IEEE 802.11b: 17dBm IEEE 802.11g: 14dBm IEEE 802.11n: 12-14dBm@HT20 MCS7 IEEE 802.11ax: 12-14dBm@HT20 MCS7
工作模式/ Work mode	Soft AP/ Station

表9-3: BLE特性参数/BLE Features

参数/Parameter	条件/Condition	最小/Minimum	典型/Typical	最大/Maximum	单位/Unit
工作频率/ Working frequency		2402		2480	MHz
空中速率/ Data Rate		1		2	Mbps
发射功率/Wireless transmit power			10		dBm
灵敏度/ Sensitivity		-95	-91		dBm

10. 制造工艺/Manufacturing Process Recommendations

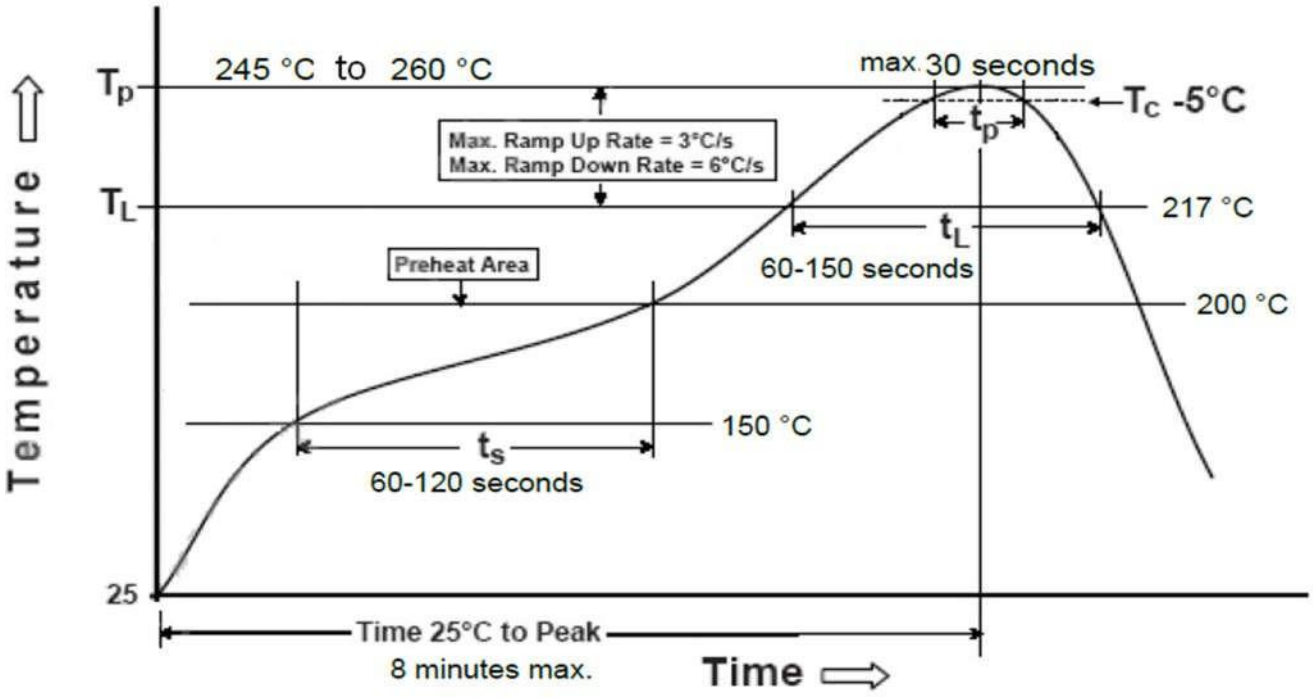
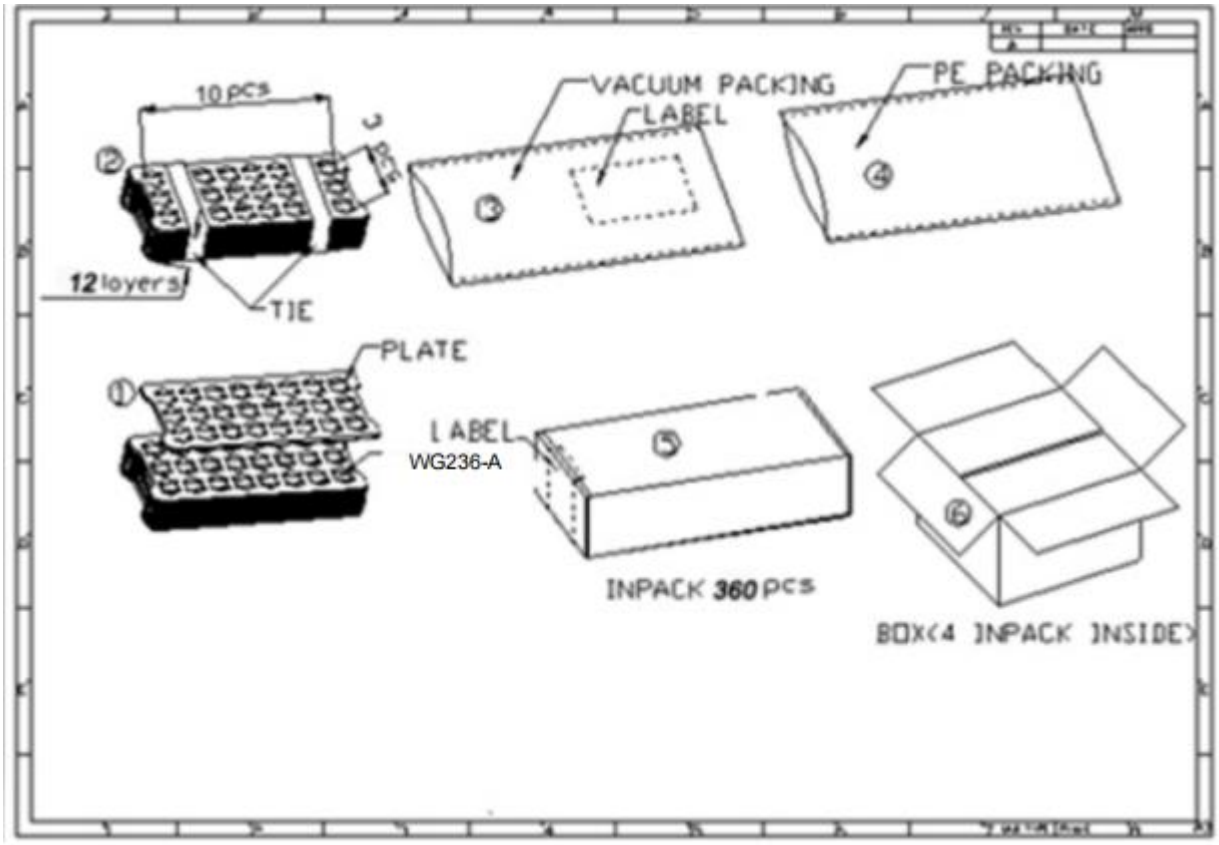


图 5: WG236-A Typical Lead-free Soldering Profile

注意：工厂最终选择的焊接温度取决于其他外部因素，如焊锡膏的选择、基板的尺寸、厚度和性能等。超过推荐的焊接型材中的最高焊接温度可能永久损坏模块。

Note：The final welding temperature selected by the plant depends on other external factors, such as solder paste selection, substrate size, thickness and performance. Exceeding the recommended maximum welding temperature in the welded profile may permanently damage the module.

11. 包装工艺/Packaging Specification



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