

SKW99 规格书

2x2 MIMO WLAN 模块/

SKW99 Datasheet

2x2 MIMO WLAN Module

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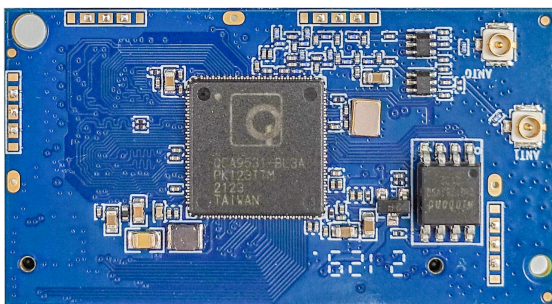
1 简述 General Description

SKW99 模块包括一个 802.11n MAC 和基带，一个 2.4GHz 无线电和 FEM，一个 650MHz MIPS CPU，一个 2 端口 10/100 快速以太网交换机。解决方案适用于低功耗、低成本、高集成度的 AP 路由器和消费类电子设备，该模块只需要外接 3.3V 电源。它支持 802.11n 在 20 MHz 和 40 MHz 信道下分别高达 144Mbps 和 300Mbps，以及 IEEE 802.11b/g 数据速率。

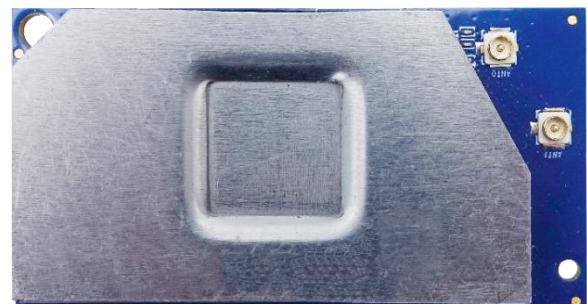
The SKW99 module includes an 802.11n MAC and baseband, a 2.4GHz radio and FEM, a 650MHz MIPS CPU, a 2-port 10/100 fast Ethernet switch. Solution for low power, low-cost, and highly integrated AP router and consumer electronic devices, the module requires only an external 3.3V power supply. It supports 802.11n operating up to 144Mbps for 20 MHz and 300Mbps for 40 MHz channel respectively, and IEEE 802.11b/g data rates.

该模块支持网桥模式、AP Client 模式和 Gateway 模式。高性能模块可以毫不费力地处理高级应用，如路由、安全和 VoIP。它还包括支持各种应用程序的接口选择，例如用于访问外部存储和 3G/TLE 调制解调器的 USB 端口。特别是在物联网方面，应用范围广泛。

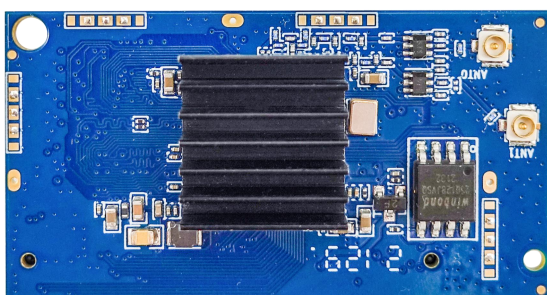
The module supports bridge mode and AP Client mode and Gateway mode. The high performance Module can process advanced applications effortlessly, such as routing, security and VoIP. It also includes a selection of interface to support a variety of applications, such as a USB port for accessing external storage and 3G/TLE modem. Especially in the IOT, a wide range of applications.



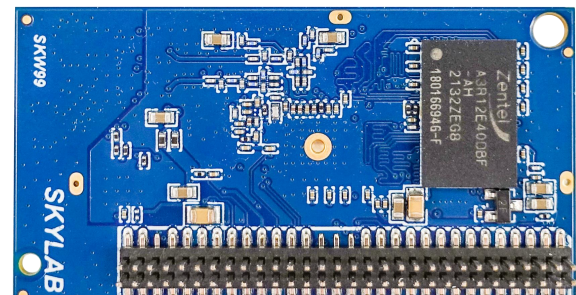
常规款俯视图



带屏蔽件俯视图



带散热器俯视图



仰视图

Figure 1: SKW99 产品图片 SKW99 product picture

2 应用 Applications

- ◆ USB WiFi 摄像头/ USB WiFi Camera
- ◆ IOT（物联网）/ IOT (internet of things)
- ◆ WiFi AP
- ◆ 3G/4G Wi-Fi 路由器 / 3G/4G Wi-Fi Router
- ◆ WiFi 中继器/ WiFi Repeater
- ◆ 建筑自动化/ Building Automation
- ◆ 家庭自动化/ Home Automation
- ◆ 智能家居网关/ Smart Home Gateway
- ◆ 工业控制/ Industry Control

3 特性 Features

- ◆ 符合 IEEE 802.11b/g/n / Compliant to IEEE 802.11b/g/n
- ◆ 2T2R 模式，支持 300Mbps 的 PHY 数据速率/ 2T2R mode with support for a 300Mbps PHY data rate
- ◆ 支持 IPV4/IPV6 协议/Support the IPV4 \ IPV6 protocol
- ◆ DDR2 内存，最高可达 1024Mb / DDR2 memory up to 1024Mb
- ◆ 闪存，最高可达 256Mb / Flash memory up to 256Mb
- ◆ 4 个 LAN 端口和 1 个 WAN 端口 / 4 LAN ports and 1 WAN port
- ◆ 支持 USB 2.0 从设备的 u 盘和 USB 3G/4G 适配器和 USB 摄像头 / Support USB 2.0 slave device for USB disk and USB 3G/4G dongle and USB camera
- ◆ 安全等级 / Security: WEP64/128, TKIP, AES, WPA, WPA2, WAPI
- ◆ 支持 AP/客户端/路由器模式 / Support AP/Client/Router mode
- ◆ 符合 ROHS 环保要求/ ROHS compliance meets environment-friendly requirement
- ◆ 符合 FCC/CE/IC/ROHS 认证标准/ Conform to FCC/CE/IC/ROHS certification standards
- ◆ 小尺寸 48.4(L) x 25.7(W) x 9.0(H) mm/ 48.4(L) x 25.7(W) x 9.0(H) mm small dimension

4 应用框图 Application Block Diagram

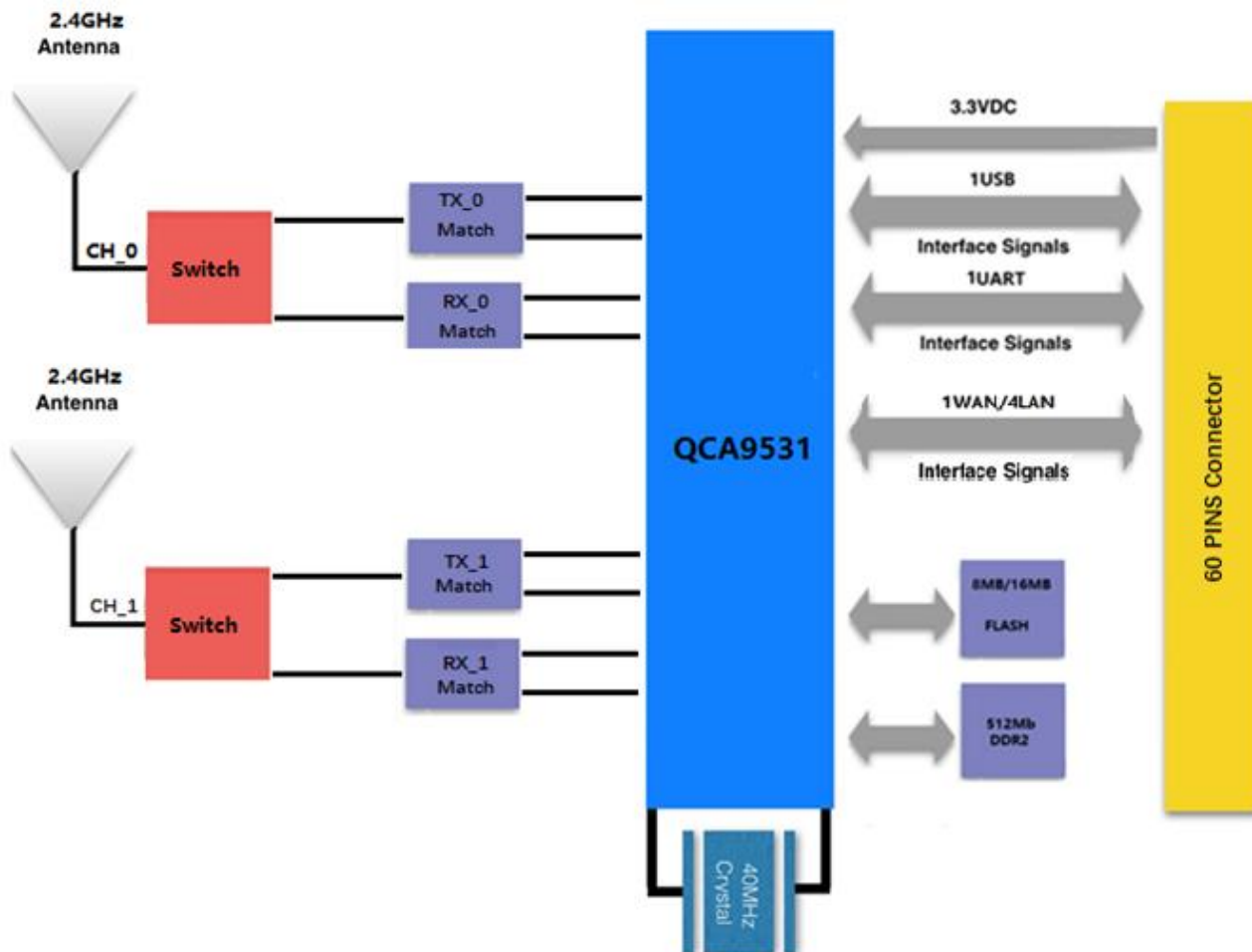


Figure 2: SKW99 框图/ SKW99 Block Diagram

5 接口 Interfaces

USB

USB 接口支持 USB 从设备的 U 盘和 USB 3G/4G 适配器和 USB 摄像头。

The USB interface support USB slave devices for USB disk and USB 3G/4G dongle and USB camera.

UART

UART 的默认波特率为 115200 bps。

The UART default baud rate is 115200bps.

GPIO

引脚序号/Pin NO.	GPIO	描述/Description	共享功能 Share function
--------------	------	----------------	---------------------

24	GPIO0	GPIO0	
26	GPIO1	GPIO1	
28	GPIO2	GPIO2	
44		RESET_CONFIG	
46	GPIO17	JUMPSTART	
54	GPIO4	LED7/WAN LED, do not pull up.	LED
53	GPIO16	LED6/LAN1 LED	
8	GPIO15	LED5/LAN2 LED	
6	GPIO14	LED4/LAN3 LED	
40	GPIO13	LED1/SYSTEM LED	
4	GPIO11	LED3/LAN4_LED	
55	GPIO12	LED0/Wireless LED	

WAN/LAN

SKW99 模块集成了 5 端口 10/100Mbps 的快速以太网交换机。

The SKW99 module integrates 5-port 10/100Mbps fast Ethernet switch.

6 模块性能 Module Specifications

硬件特性 Hardware Features	
型号 Model	SKW99
天线类型 Antenna Type	IPEX
电源 Voltage	3.3V±5%
尺寸 Dimension(L×W×H)	48.4mm*25.8mm*9.0mm
无线特性 Wireless Features	
无线标准 Wireless	IEEE 802.11b/g/n
频率范围 Frequency	2412GHz---2484MHz
数据速率 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
接收灵敏度	HT40 MCS7 : -69dBm@10% PER(MCS7)

	HT20 MCS7 : -71dBm@10% PER(MCS7)
	54M: -75dBm@10% PER
	11M: -88dBm@ 8% PER
调制技术	DSSS (DBPSK, DQPSK, CCK)
Modulation Technique	OFDM (BPSK, QPSK, 16-QAM, 64-QAM)
无线安全 Wireless Security	WPA/WPA2, WEP, TKIP and AES, WPS2.0, WAPI
传输功率 Transmit Power	IEEE 802.11n: 13-16dBm @HT20/40 MCS7
	IEEE 802.11g: 14-17dBm @54MHz
	IEEE 802.11b: 16-20dBm @11MHz
工作模式 Work Mode	Bridge/Gateway/AP Client
其他 Others	
认证 Certification	ROHS
环境 Environment	工作温度 Operating Temperature: -20℃~55℃
	存储温度 Storage Temperature: -40℃~85℃
	工作湿度 Operating Humidity: 10%~90% non-condensing
	存储湿度 Storage Humidity: 5%~90% non-condensing

7 模块引脚定义 Module pin definition

模块引脚 Module Pinout

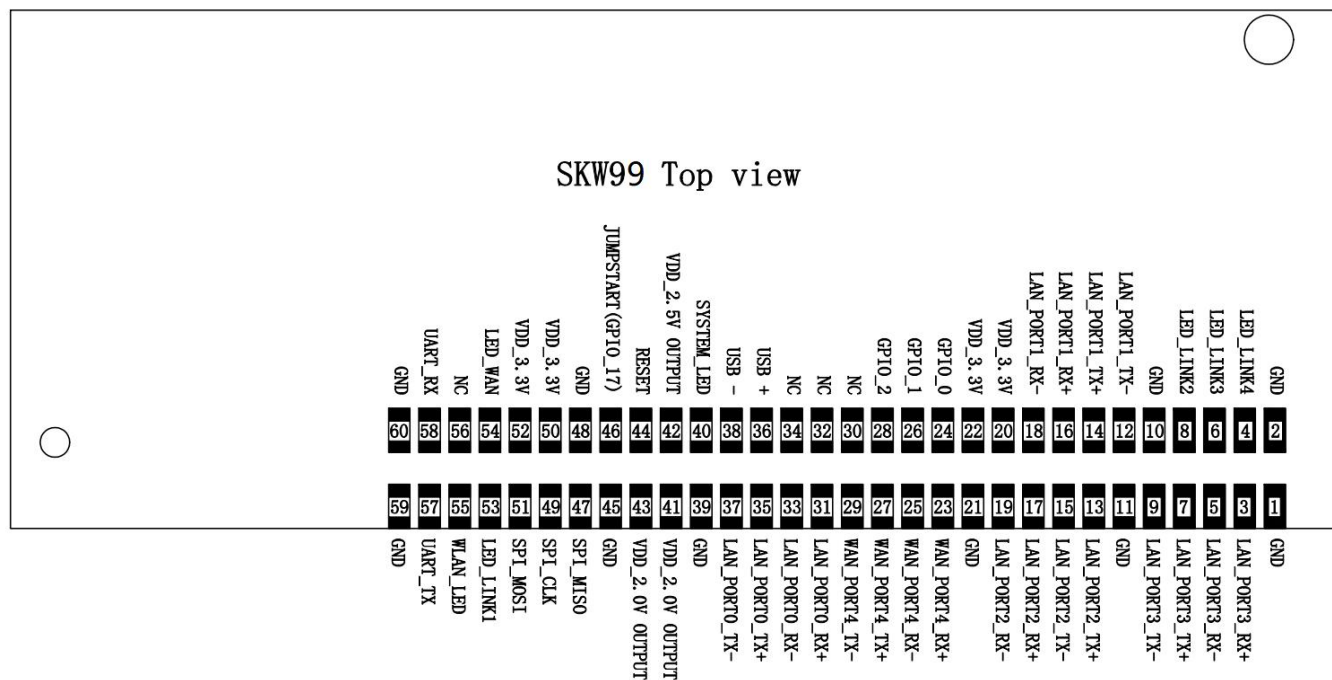


Figure 3: SKW99 引脚封装/ SKW99 Pin Package

引脚描述 Pin Description

序号/No.	引脚名/Pin name	描述/ Description
1	GND	Groud
2	GND	Groud
3	LAN_PORT3_RX+	Ethernet port
4	LED_LINK4	Port #3 activity LED, GPIO#11
5	LAN_PORT3_RX-	Ethernet port
6	LED_LINK3	Port #2 activity LED, GPIO#14
7	LAN_PORT3_TX+	Ethernet port
8	LED_LINK2	Port #1 activity LED, GPIO#15
9	LAN_PORT3_TX-	Ethernet port
10	GND	Groud
11	GND	Groud

12	LAN_PORT1_TX-	Ethernet port
13	LAN_PORT2_TX+	Ethernet port
14	LAN_PORT1_TX+	Ethernet port
15	LAN_PORT2_TX-	Ethernet port
16	LAN_PORT1_RX+	Ethernet port
17	LAN_PORT2_RX+	Ethernet port
18	LAN_PORT1_RX-	Ethernet port
19	LAN_PORT2_RX-	Ethernet port
20	VDD_3.3V	3.3V input 1000mA, recommended voltage 3.3V, Min2.97V, MAX 3.63V
21	GND	Ground
22	VDD_3.3V	3.3V input 1000mA, recommended voltage 3.3V, Min2.97V, MAX 3.63V
23	WAN_PORT4_RX+	Ethernet Wan port
24	GPIO_0	GPIO#0
25	WAN_PORT4_RX-	Ethernet Wan port
26	GPIO_1	GPIO#1
27	WAN_PORT4_TX+	Ethernet Wan port
28	GPIO_2	GPIO#2
29	WAN_PORT4_TX-	Ethernet Wan port
30	NC	No Connect
31	LAN_PORT0_RX+	Ethernet port
32	NC	NC
33	LAN_PORT0_RX-	Ethernet port
34	NC	NC
35	LAN_PORT0_TX+	Ethernet port
36	USB +	USB signal, carries USB data to and from the USB 2.0 PHY
37	LAN_PORT0_TX-	Ethernet port
38	USB -	USB signal, carries USB data to and from the USB 2.0 PHY
39	GND	Ground

40	SYSTEM_LED	System LED, GPIO#13
41	VDD_2.0V OUTPUT	Power supply output for peripheral network transformer
42	VDD_2.5V OUTPUT	GPIO voltage output for LED
43	VDD_2.0V OUTPUT	Power supply output for peripheral network transformer
44	RESET	It has a internal 10k pull-up resistance, and trigger while Pulling down
45	GND	Ground
46	JUMPSTART (GPIO_17)	Resets the firmware to its default configuration, KEY_INPUT to start WPS function, it has a internal 10k pull-up resistance, and trigger while Pulling down
47	SPI_MISO	SPI serial interface
48	GND	Ground
49	SPI_CLK	SPI serial interface
50	VDD_3.3V	3.3V input 1000mA, recommended voltage 3.3V, Min2.97V, MAX 3.63V
51	SPI_MOSI	SPI serial interface
52	VDD_3.3V	3.3V input 1000mA, recommended voltage 3.3V, Min2.97V, MAX 3.63V
53	LED_LINK1	Port #0 activity LED, GPIO#16
54	LED_WAN	WAN LED, GPIO#4, do not pull up to VDD_3V3
55	WLAN_LED	Wireless LED, GPIO#12
56	NC	No Connect
57	UART_TX	Serial data out, GPIO#10
58	UART_RX	Serial data in, GPIO#9
59	GND	Ground
60	GND	Ground

警告： GPIO4 不能被拉到 VDD_3V3。

WARNING: GPIO4 do not pull up to VDD_3V3.

8 PCB 封装和尺寸/ PCB Footprint and Dimensions

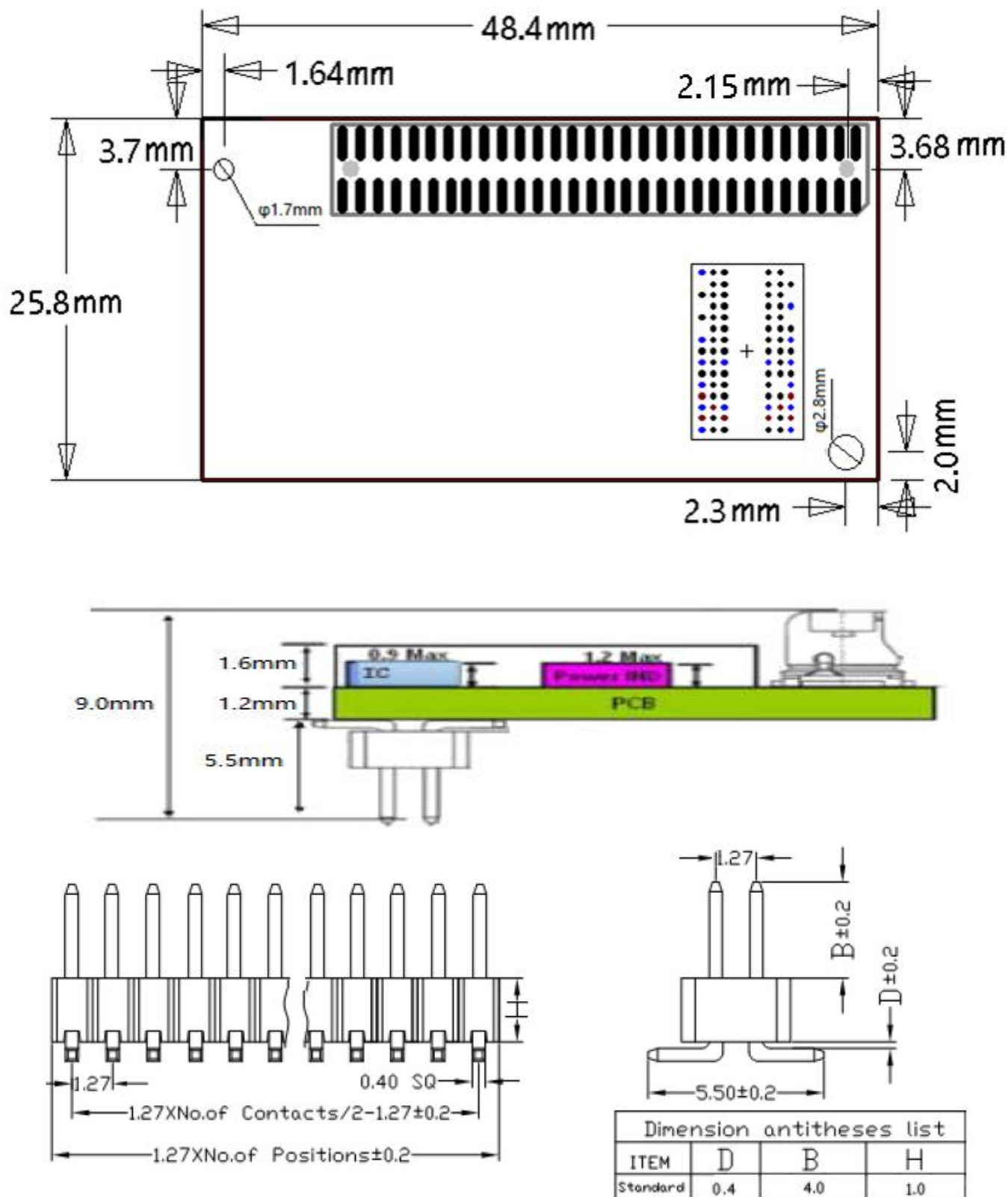


Figure 4: SKW99 推荐 PCB 封装/ SKW99 Recommend PCB Footprint

9 电气特性 Electrical Characteristics

a) 绝对最大额定参数 Absolute Maximum Ratings

Table9-1: 绝对最大额定参数/ Absolute Maximum Ratings

参数/Parameter	条件 /Condition	最小值 /Min	典型值 Typ.	最大值 /Max.	单位/ Unit
存储温度范围/Storage temperature		-40		125	°C
ESD 保护/ ESD Protection	VESD	/		2000	V
电源电压/ Supply voltage	VDD_3.3V	0		3.6	V
I/O 脚电压/ Voltage on any I/O pin		-0.3		3.63	V



SKW99 系列模块是静电敏感设备，在处理时需要特殊的注意事项。

SKW99 series modules are Electrostatic Sensitive Devices and require special precautions while handling.

ESD 预防措施 ESD precautions

SKW99 模块包含高度敏感的电子电路，是静电敏感器件。处理 SKW99 模块时没有做好防静电保护，可能会导致 SKW99 模块永久损坏或毁坏它们。

The SKW99 module contain highly sensitive electronic circuitry and are Electrostatic Sensitive Devices (ESD).

Handling the SKW99 module without proper ESD protection may destroy or damage them permanently.

SKW99 模块属于静电敏感器件，需要针对静电敏感器件采取特殊的防静电措施。在包含 SKW99 模块的任何应用程序的整个加工、处理、运输和操作过程中，必须应用适当的防静电处理和包装程序。请勿用手触摸模块或使用非防静电烙铁焊接，以免损坏模块。

The SKW99 module 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 SKW99 module. Don't touch the module by hand or solder with non-anti-static soldering iron to avoid damage to the module.

b) 推荐的工作条件 Recommended Operation Ratings

Table9-2: 工作条件/ Operating Conditions

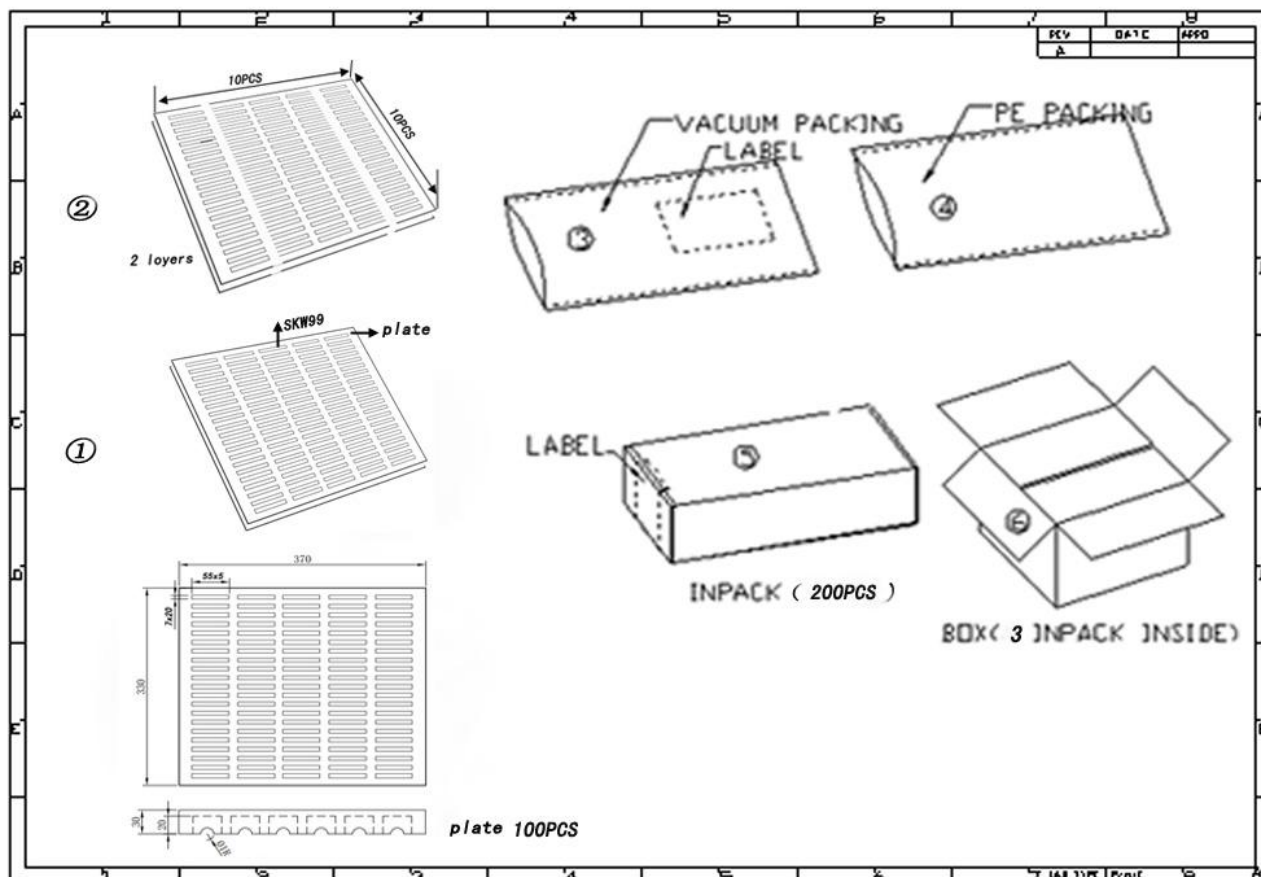
参数/Parameter	符号/Symbol	最小值/Min	典型值/ Typ.	最大值/Max	单位/Unit
Extended temp. range	TA	-20		70	°C
Power Supply	VDD_3.3V	3.14	3.3	3.46	V
Input Low Voltage	VIL	-0.3		0.8	V
Input High Voltage	VIH	2		3.63	V

c) 测量条件/ Measurement Conditions

Table9-3: 不同状态功耗/ Power Consumption in Different States

系统状态/ System state	电流/Current (Typ.)@3.3V	电流/Current (Max.)@3.3V
待机/ Standby	180mA	210mA
Transmit (2.4g; +15dBm @ TX HT20 MCS7.)	400mA	
Transmit (2.4g; +18dBm @ 11b 11Mbps.)	580mA	685mA

10 包装规范 Packaging Specification



11 订购信息 Ordering Information

型号/Module No.	SPI Flash Size	DDR2 Size
SKW99_E85	8M Bytes	512M bites
SKW99_E81	8M Bytes	1024M bites
SKW99_E165	16M Bytes	512M bites
SKW99_E161	16M Bytes	1024M bites
SKW99_E325	32M Bytes	512M bites
SKW99_E321	32M Bytes	1024M bites

12 联系信息 Contact Information

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