

SKW3000 规格书 Datasheet

AX3000 WLAN

| 文档信息/Document information | |
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| 标题/Title | SKW3000 AX3000 WLAN 模块规格书/SKW3000 AX3000 WLAN Module specification document |
| 文档类型/Document type | 规格书/Datasheet |
| 文档编号/Document number | SL-23050327 |
| 版本和日期/Version and date | V1.02 8-Oct-2023 |
| 秘密等级/Disclosure restriction | 外部公开/External public |

版本历史 Revision History

| 版本 Revision | 描述 Description | 审查 Approved | 日期 Date |
|-------------|------------------------------|-------------|----------|
| V1.01 | 初始发布 Initial Release | George He | 20230623 |
| V1.02 | 更新引脚图/Update the pin diagram | Wendy | 20231008 |

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1 产品简介/Brief Introduction

SKW3000 模块使用 MT7981A+MT7976C+MT7531AE 符合 802.11 a/b/g/n/ax Wi-Fi6 解决方案，它集成了一个双核 MIPS1004Kc（880MHz），3 端口 GBE 交换机，USB2.0/3.0，SD-XC。该模块适用于 802.11ac、LTE cat4/5、边缘、热点、VPN、AC（访问控制）。对于消费型电子设备，该模块只需要一个外部的 5V 电源。

The SKW3000 module uses a MT7981A + MT7976C + MT7531AE. It compliant 802.11a/b/g/n/ax Wi-Fi6 solution, which integrates a dual-core MIPS1004Kc (880 MHz), 3-port GBE switch, USB2.0/3.0, SD-XC. This module is suitable for 802.11ac, LTE cat4 / 5, edge, hot spot, VPN, AC (access control). For consumer electronics, the module only requires an external 5V power supply.

该模块集成了一个 2.4 GHz 2x2 MIMO WLAN 芯片和内部 PA 和 LNA，并集成了一个 5 GHz 3x3 MIMO WLAN 芯片和内部 PA 和 LNA。它在 20 MHz 信道支持 144Mbps，40 MHz 信道支持 300Mbps，80 MHz 信道支持 866Mbps 的 5 GHz 操作。

The module integrates a 2.4 GHz 2x2 MIMO WLAN chip with in-house PA and LNA, and integrates a 5 GHz 3x3 MIMO WLAN chip with in-house PA and LNA. It supports 144Mbps for 20 MHz channels, 300Mbps for 40 MHz channels, and 866Mbps 5 GHz operations for 160 MHz channels.

该模块支持桥接模式、AP/客户端模式和网关模式。

This module supports the bridging mode, the AP / client mode, and the gateway mode.

2 应用/Application

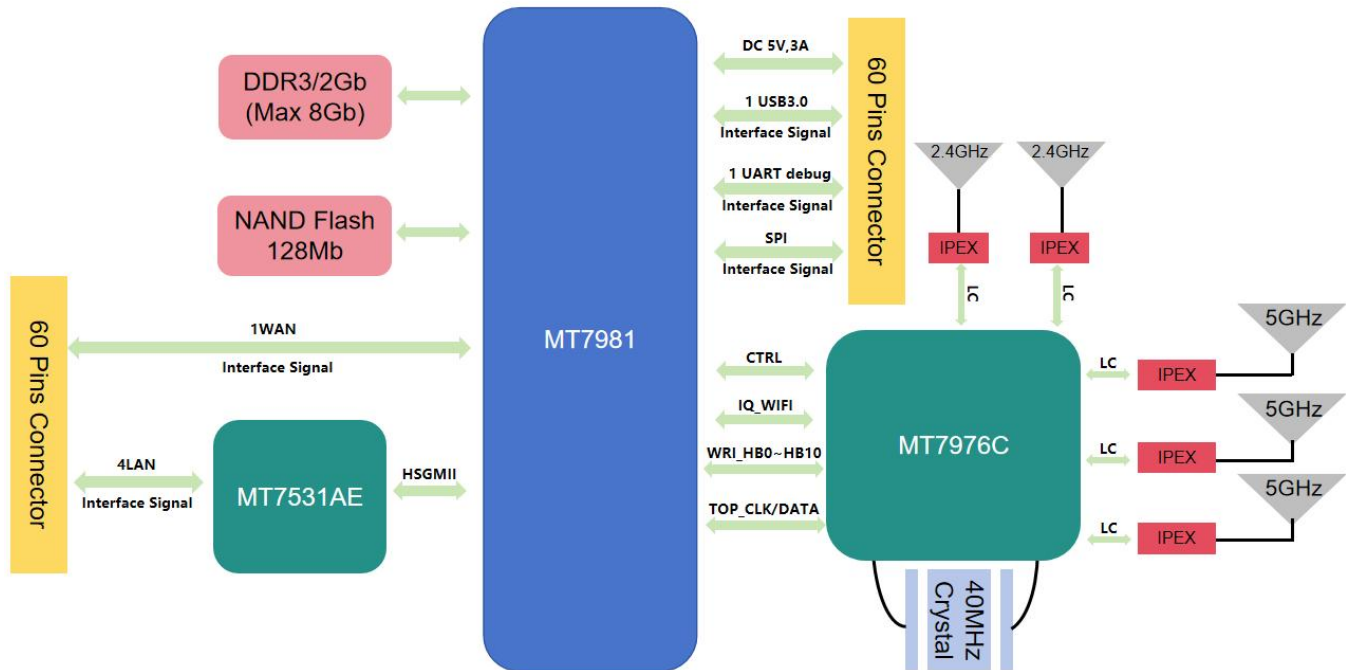
- ◆ 无线路由器/ Wireless router
- ◆ 无线中继器/Wireless repeater
- ◆ 家庭自动化/Home automation
- ◆ NAS 设备/ NAS equipment
- ◆ 家庭安全网关/ Home Security Gateway
- ◆ 互联网服务路由器/ An Internet service router

3 特性/Features

- ◆ 嵌入式双核 ARM@Cortex-A53 MPCore，操作速率在 1.3 GHz/ Embedded dual-core ARM @Cortex-A53 MPCore with an operating rate of 1.3 GHz
 - 32KB L1 I-Cache and 32KB L1 D-Cache
 - 256KB unified L2 Cache

- NEON/FPU
- ◆ 外部存储器接口/External memory interface
 - 支持 DDR3 2GB
- ◆ NOR (SPI), NAND Flash (SPI),
- ◆ USB3.0 Host x 1 ; USB2.0 Host x 1
- ◆ PCIe Gen2 1-Lane x 1
- ◆ SPI , UART Lite, JTAG, MDC, MDIO, GPIO, PWM
- ◆ Giga Bit Ethernet
 - 5-port 10/100/1000Mbps MDI transceivers
- ◆ HW NAT
 - Etherent/WiFi
 - Wired speed
 - IPv4 routing, NAT, NAPT
 - IPv6 routing, DS-Lite, 6RD, 464XLAT, MAP-E/T
- ◆ **WLAN**
 - 双频段（2.4 GHz 和 5 GHz）MIMO 802.11 a/b/g/n/ac/ax RF，20/40/80/160MHz 带宽
2x2 (2ss) 11ax 2.4GHz + 3x3 (2ss) 11ax 5GHz
 - Support up to 1024QAM MIMO 配置。
 - 集成 2.4 GHz/5GHzPA，LNA 和 TRSW。
 - 集成功率检测器，支持每包 Tx 功率控制/ Set success rate detector, support Tx power control
 - 内置校准 PVT 变化/ Built-in calibration of the PVT changes
 - 可配置 Wi-Fi2.4/5 GHz PA, 以在低功率应用中获得更高的效率./ Configurable Wi-Fi2.4/5 GHz PA to achieve higher efficiency in low-power applications.
 - 支持外部 PA 和 LNA 的 WiFi-2.4GHz 和 WiFi-5GHz/ Support for WiFi-2.4GHz and WiFi-5GHz for external PA and LNA

4 应用程序框图/ Application block diagram



5 系统和硬件信息/ System and hardware information

| 系统信息/ System info | |
|---------------------------|---|
| 产品描述/ Product description | IEEE 2x2/2G,3x3/5G 11n/ac/ax dual band dual concurrent access point |
| CPU | MTK7981 (1200MHz) |
| RF | 2.4G: MT7531AE 5G: MT7531AE |
| 千兆 PHY | MT7976C |
| 闪存/ Flash Memory | (16MBx1 SPI NOR flash) 默认 128MBx1 NAND flash |
| 内存/ Internal storage | DDR3 默认 2Gb, 最大可支持 2GB。 |
| Radio | |
| 2x2/2G | IEEE 802.11b/g/n/ac/ax MIMO 2x2 |

| | |
|---------------|---|
| | <p>2.4~2.4835 GHz</p> <p>Modulation</p> <p>IEEE 802.11b/g: DSSS (DBPSK, DQPSK, CCK) OFDM (BPSK, QPSK, 16-QAM, 64-QAM)</p> <p>IEEE 802.11n: OFDM (BPSK, QPSK, 16-QAM, 64-QAM)</p> <p>IEEE 802.11ac: OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM)</p> <p>IEEE 802.11ax: OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM)</p> <p>Channels</p> <p>IEEE802.11b/g: operation in channels 1-14</p> <p>IEEE 802.11n: HT20 and HT40.</p> <p>Data rate:</p> <p>IEEE 11b: 11/5.5/2/1Mbps</p> <p>IEEE 11g: 54/48/36/24/18/12/9/6Mbps</p> <p>IEEE 11n: 20MHz: 6.5Mbps~144.44Mbps 40MHz: 13.5Mbps~300Mbps</p> <p>IEEE 11ac: 20MHz: 6.5Mbps~173.3Mbps 40MHz: 13.5Mbps~400Mbps</p> <p>IEEE 11ax: 20MHz: 8.6Mbps~286.8Mbps 40MHz: 17.2Mbps~573.5Mbps</p> |
| <p>3x3/5G</p> | <p>IEEE 802.11a/n/ac/ax MIMO 2x2</p> <p>5.15~5.850GHz</p> <p>Modulation</p> <p>IEEE802.11a/n: OFDM (BPSK, QPSK, 16-QAM, 64-QAM)</p> <p>IEEE802.11ac</p> |

| | |
|---|---|
| | <p>OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM) IEEE 802.11ax: OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM,1024 -QAM)</p> <p>Channels IEEE 802.11a: Operation in channels 36-165 IEEE 802.11n: HT20 and HT40 IEEE 802.11ac: HT20, HT40, and HT80 IEEE 802.11ax: HT20, HT40, and HT80</p> <p>Data Rate: IEEE 11a: 54/48/36/24/18/12/9/6Mbps IEEE 11n: 20MHz: 6.5Mbps~144.44Mbps 40MHz: 13.5Mbps~300Mbps 11ac: 20MHz: 6.5Mbps~173.3Mbps 40MHz: 13.5Mbps~400Mbps 80MHz: 29.3Mbps~867Mbps IEEE 11ax: 20MHz: 8.6Mbps~286.8Mbps 40MHz: 17.2Mbps~573.5Mbps 80MHz: 36Mbps~1201Mbps 160MHz: 1700Mbps</p> |
| 千兆以太网端口/ The Gigabit Ethernet port | |
| 千兆以太网口/Gigabit Ethernet | <p>LANx4: 10/100/1000 auto-sensing (MDI/MDX) WAN: 10/100/1000 auto-sensing (MDI/MDX)</p> |
| 其他连接器和设计/ Other connectors and designs | |
| USB | USB2.0; USB 3.0 BUS |
| UART 串口 | UARTx2 |
| 电源/ Power | |
| 电源适配器/ Power adapter | 输入 DC 4.5—12.0V, 3A |

| 环境温湿度/ Environmental temperature and humidity | |
|---|---|
| 工作温度/Operation temperature | -20~ 55℃ (风扇散热可增加上限/ Fan heat dissipation can increase the upper limit) |
| 储存温度/ Storage temperature | -40~105℃ |
| 工作湿度/ Working humidity | 5% to 95% (不凝结/ noncondensing) |
| 储存湿度/ Storage humidity | 5% to 95% (不凝结/ noncondensing) |

6 接口/ Interface

6.1 UART 接口

MT7981A 采用通用异步接收机发射机 (UART) 接口作为其主机控制接口。UART 接口的电气定时特性如下图所示。

MT7981A The universal asynchronous receiver transmitter (UART) interface is used as its host control interface. The electrical timing characteristics of the UART interface are shown in the figure below.

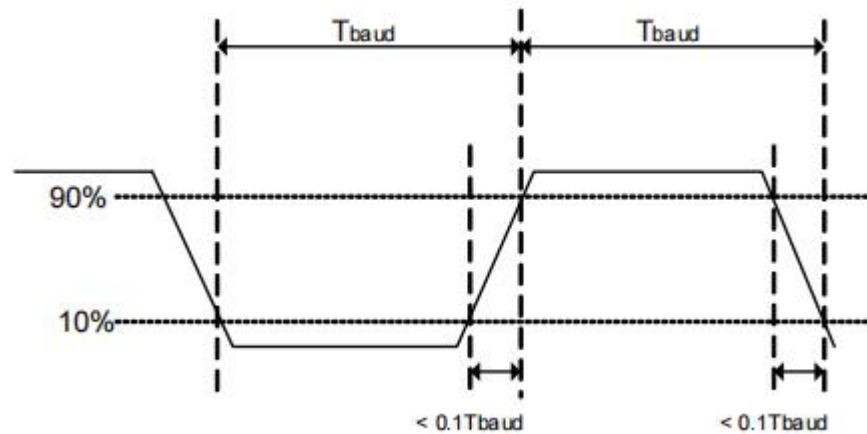


图 6-1 UART 时序/ Figure 6-1 UART timing

6.2 SPI 接口

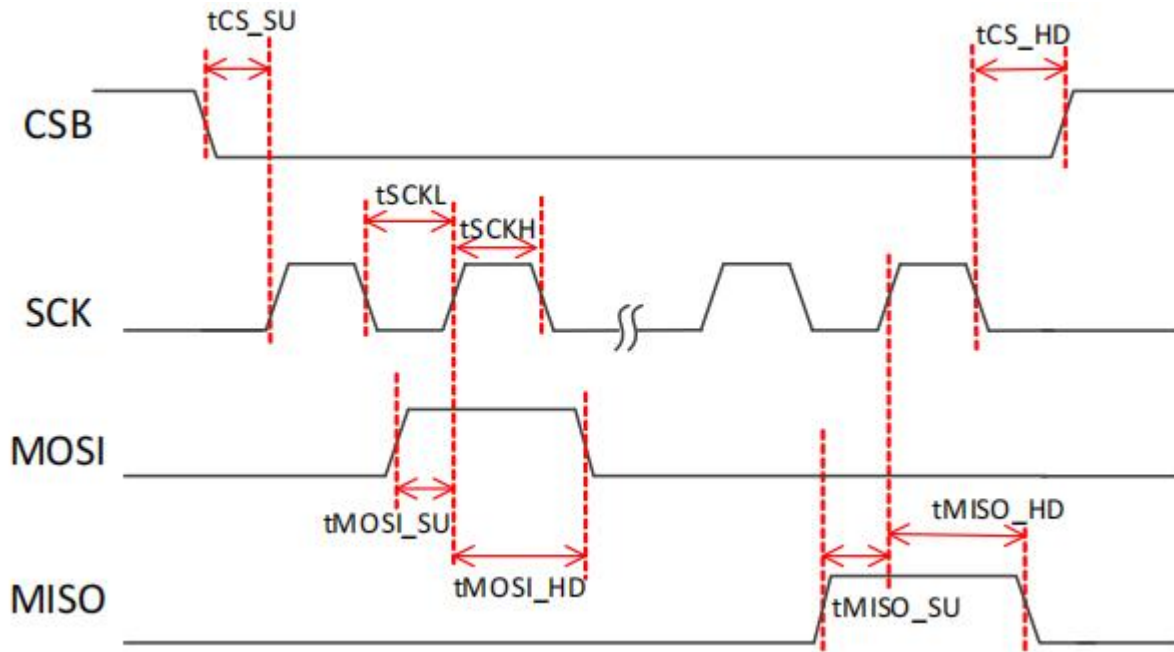


图 6-2 SPI 主时序/ Figure 6-2 The SPI main time sequence

表 6-1 SPI 主电气技术规范/ Table 6-1 Technical Specification for SPI Main Electrical Engineering

| Symbol | Description | Performance | | | Unit | Note |
|-----------|---|-------------|------|------|------|----------------------|
| | | Min. | Typ. | Max. | | |
| fSCK | SPI Master SCK Clock frequency | - | - | 52 | MHz | |
| tMOSI_SU | MOSI to SCK Rising setup Time | 6.6 | - | - | ns | Tsck/2-Tskew-Tmargin |
| tMOSI_HD | SCK Rising to MOSI hold Time | 6.6 | - | - | ns | Tsck/2-Tskew-Tmargin |
| tSCKL | SCK Low Pulse | 7.2 | - | - | ns | Tsck/2*0.75 |
| tSCKH | SCK High Pulse | 7.2 | - | - | ns | Tsck/2*0.75 |
| tCSB_SU1 | CSB Falling to SCK Rising Setup Time | 1.8 | - | - | ns | Tbclk-Tskew-Tmargin |
| tCSB_HD1 | SCK Falling to CSB Rising Hold Time | 1.8 | - | - | ns | Tbclk-Tskew-Tmargin |
| tMISO_SU2 | MISO to SCK Rising Setup Time requirement | 0 | - | - | ns | |
| tMISO_HD3 | SCK Rising to MISO Hold Time requirement | 0 | - | - | ns | |

说明/Explain:

1. 在 CS GPIO 模式下，由 SW 处理 SPI_CS。SW 应该在 SPI 开始传输之前拉下 SPI_CS 引脚，并在 SPI 完成事务时上拉 SPI_CS 引脚。根据上述顺序，可以满足 tCSB_SU 和 tCSB_HD 时间的最小规范。

In the CS GPIO mode, the SPI_CS is processed by the SW. The SW should pull down the SPI_CS pin before the SPI starts transmission, and pull up the SPI_CS pin when the SPI completes the transaction. According to the above order, the minimum specification for tCSB_SU and tCSB_HD time can be satisfied.

2. 为了实现 tMISO_SU 的最小值，需要调整 SPI 主服务器的内部采样时钟延迟。

To achieve the minimum of tMISO_SU, adjust the internal sampling clock delay of the SPI master server.

3. MISO 数据的有效时间应为 fSCK 的一个周期。

The effective time of the MISO data should be one cycle of the fSCK.

4. 对于双模式或四元模式，所有输出数据引脚均可参考 MOSI 定时参数，所有输入数据引脚均可参考 MISO 定时参数。

For dual or quad mode, all output data pins can refer to MOSI timing parameters, and all input data pins can refer to MISO timing parameters.

7 射频性能/ Radio-frequency performance

7.1 发射功率和接收灵敏度/ Emission power and reception sensitivity

下表中的“接收灵敏度”指的是组合流性能。

The received sensitivity in the table refers to the combined flow performance.

| 11b | TX Power(dBm) | Receive Sensitivity |
|-------|---------------|---------------------|
| 1M | 18 | -95 |
| 2M | 18 | -93 |
| 5.5M | 18 | -91 |
| 11M | 18 | -89 |
| 11a/g | TX Power | Receive Sensitivity |
| 6M | 18 | -92 |
| 9M | 18 | -91 |
| 12M | 18 | -90 |
| 18M | 17 | -87 |
| 24M | 17 | -84 |
| 36M | 16 | -81 |

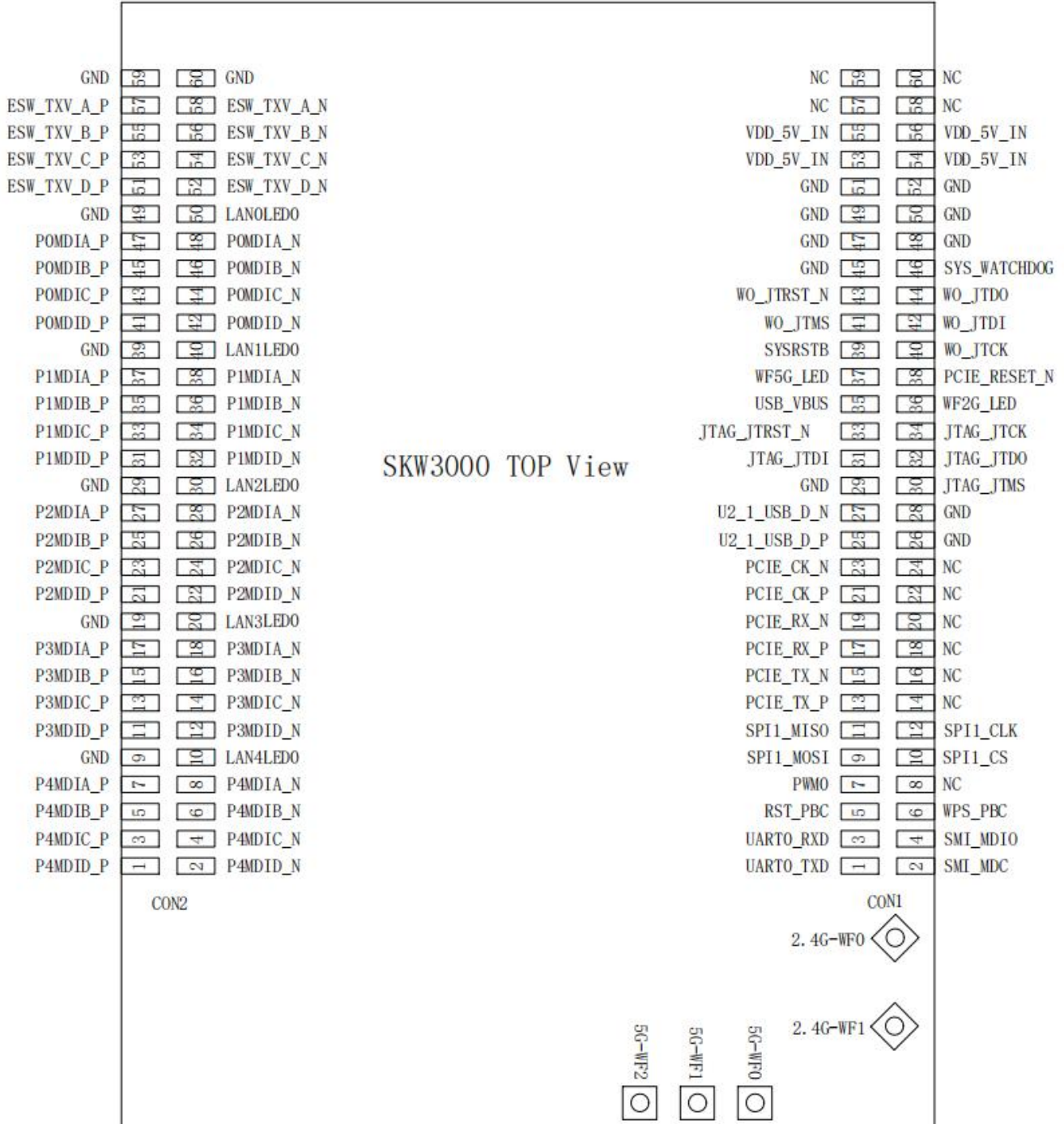
| | | |
|-------------|----------|---------------------|
| 48M | 16 | -76 |
| 54M | 15 | -74 |
| 11n(HT20) | TX Power | Receive Sensitivity |
| MCS0/8 | 18 | -92 |
| MCS1/9 | 18 | -89 |
| MCS2/10 | 17 | -87 |
| MCS3/11 | 17 | -84 |
| MCS4/12 | 16 | -80 |
| MCS5/13 | 16 | -75 |
| MCS6/14 | 15 | -74 |
| MCS7/15 | 15 | -72 |
| 11n (HT40) | TX Power | Receive Sensitivity |
| MCS0/8 | 18 | -88 |
| MCS1/9 | 18 | -86 |
| MCS2/10 | 17 | -84 |
| MCS3/11 | 17 | -81 |
| MCS4/12 | 16 | -77 |
| MCS5/13 | 16 | -73 |
| MCS6/14 | 15 | -71 |
| MCS7/15 | 14 | -69 |
| 11ac (HT20) | TX Power | Receive Sensitivity |
| MCS0/10 | 18 | -91 |
| MCS1/11 | 18 | -88 |
| MCS2/12 | 17 | -85 |
| MCS3/13 | 17 | -82 |
| MCS4/14 | 16 | -79 |
| MCS5/15 | 16 | -74 |

| | | |
|------------|----------|---------------------|
| MCS6/16 | 15 | -73 |
| MCS7/17 | 14 | -72 |
| MCS8/18 | 13 | -68 |
| MCS9/19 | 12 | -66 |
| 11ac(HT40) | TX Power | Receive Sensitivity |
| MCS0/10 | 18 | -88 |
| MCS1/11 | 18 | -85 |
| MCS2/12 | 17 | -83 |
| MCS3/13 | 17 | -80 |
| MCS4/14 | 16 | -77 |
| MCS5/15 | 16 | -71 |
| MCS6/16 | 15 | -70 |
| MCS7/17 | 14 | -69 |
| MCS8/18 | 13 | -67 |
| MCS9/19 | 12 | -64 |
| 11ac(HT80) | TX Power | Receive Sensitivity |
| MCS0/10 | 18 | -85 |
| MCS1/11 | 18 | -81 |
| MCS2/12 | 17 | -79 |
| MCS3/13 | 17 | -76 |
| MCS4/14 | 16 | -73 |
| MCS5/15 | 16 | -71 |
| MCS6/16 | 15 | -66 |
| MCS7/17 | 14 | -66 |
| MCS8/18 | 13 | -62 |
| MCS9/19 | 12 | -60 |
| 11ax(HT80) | TX Power | Receive Sensitivity |

| | | |
|----------|----|-----|
| MCS0/12 | 18 | -85 |
| MCS1/13 | 18 | -81 |
| MCS2/14 | 17 | -79 |
| MCS3/15 | 17 | -76 |
| MCS4/16 | 16 | -73 |
| MCS5/17 | 16 | -71 |
| MCS6/18 | 15 | -66 |
| MCS7/19 | 14 | -66 |
| MCS8/20 | 13 | -62 |
| MCS9/21 | 12 | -60 |
| MCS10/22 | 11 | -57 |
| MCS11/23 | 10 | -54 |

The TX Power Offset: ± 2 dbm

8 引脚说明/ Feet instructions



| CON2 NO. | 引脚名称 PIN name | MT7531AE PIN name | CON1 NO. | 引脚名称 PIN name | MT7531AE PIN name |
|-------------|------------------|-------------------|-------------|------------------|-------------------|
| 1 | 3 | P4MDIC_P | 1 | 3 | UART0_RXD |
| 2 | 4 | P4MDIC_N | 2 | 4 | UART0_TXD |
| 3 | 5 | P4MDIB_P | 5 | 5 | RST_PBC |
| 4 | 6 | P4MDIB_N | 6 | 6 | WPS_PBC |
| 5 | 7 | P4MDIA_P | 7 | 7 | PWM0 |
| 6 | 8 | P4MDIA_N | 8 | 8 | NC |
| 7 | 9 | GND | 9 | 9 | SPI1_MOSI |
| 8 | 10 | LAN4LEDO | 10 | 10 | SPI1_CS |
| 9 | 11 | P3MDID_P | 11 | 11 | SPI1_MISO |
| 10 | 12 | P3MDID_N | 12 | 12 | NC |
| 11 | 13 | P3MDIC_P | 13 | 13 | PCIE_TX_P |
| 12 | 14 | P3MDIC_N | 14 | 14 | PCIE_TX_N |
| 13 | 15 | P3MDIB_P | 15 | 15 | NC |
| 14 | 16 | P3MDIB_N | 16 | 16 | NC |
| 15 | 17 | P3MDIA_P | 17 | 17 | NC |
| 16 | 18 | P3MDIA_N | 18 | 18 | NC |
| 17 | 19 | GND | 19 | 19 | PCIE_RX_N |
| 18 | 20 | LAN3LEDO | 20 | 20 | NC |
| 19 | 21 | P2MDID_P | 21 | 21 | PCIE_CK_P |
| 20 | 22 | P2MDID_N | 22 | 22 | NC |
| 21 | 23 | P2MDIC_P | 23 | 23 | PCIE_CK_N |
| 22 | 24 | P2MDIC_N | 24 | 24 | NC |
| 23 | 25 | P2MDIB_P | 25 | 25 | U2_1_USB_D_P |
| 24 | 26 | P2MDIB_N | 26 | 26 | GND |
| 25 | 27 | P2MDIA_P | 27 | 27 | U2_1_USB_D_N |
| 26 | 28 | P2MDIA_N | 28 | 28 | GND |
| 27 | 29 | GND | 29 | 29 | GND |
| 28 | 30 | LAN2LEDO | 30 | 30 | JTAG_JTMS |
| 29 | 31 | P1MDID_P | 31 | 31 | JTAG_JTDI |
| 30 | 32 | P1MDID_N | 32 | 32 | JTAG_JTDO |
| 31 | 33 | P1MDIC_P | 33 | 33 | JTAG_JTCK |
| 32 | 34 | P1MDIC_N | 34 | 34 | WF2G_LED |
| 33 | 35 | P1MDIB_P | 35 | 35 | USB_VBUS |
| 34 | 36 | P1MDIB_N | 36 | 36 | PCIE_RESET_N |
| 35 | 37 | P1MDIA_P | 37 | 37 | WF5G_LED |
| 36 | 38 | P1MDIA_N | 38 | 38 | WO_JTCK |
| 37 | 39 | GND | 39 | 39 | WO_JTDI |
| 38 | 40 | LAN1LEDO | 40 | 40 | WO_JTDO |
| 39 | 41 | POMDID_P | 41 | 41 | WO_JTRST_N |
| 40 | 42 | POMDID_N | 42 | 42 | NC |
| 41 | 43 | POMDIC_P | 43 | 43 | NC |
| 42 | 44 | POMDIC_N | 44 | 44 | NC |
| 43 | 45 | POMDIB_P | 45 | 45 | NC |
| 44 | 46 | POMDIB_N | 46 | 46 | NC |
| 45 | 47 | POMDIA_P | 47 | 47 | NC |
| 46 | 48 | POMDIA_N | 48 | 48 | NC |
| 47 | 49 | GND | 49 | 49 | NC |
| 48 | 50 | LANOLEDO | 50 | 50 | NC |
| 49 | 51 | ESW_TXV_D_P | 51 | 51 | GND |
| 50 | 52 | ESW_TXV_D_N | 52 | 52 | GND |
| 51 | 53 | ESW_TXV_C_P | 53 | 53 | VDD_5V_IN |
| 52 | 54 | ESW_TXV_C_N | 54 | 54 | VDD_5V_IN |
| 53 | 55 | ESW_TXV_B_P | 55 | 55 | VDD_5V_IN |
| 54 | 56 | ESW_TXV_B_N | 56 | 56 | NC |
| 55 | 57 | ESW_TXV_A_P | 57 | 57 | NC |
| 56 | 58 | ESW_TXV_A_N | 58 | 58 | NC |
| 57 | 59 | GND | 59 | 59 | NC |
| 58 | 60 | GND | 60 | 60 | NC |

| | | | | | |
|----|----------|-------------------|----|-----------|----------------------|
| 1 | P4MDID_P | 30_PAD_TXVP_D_P4 | 1 | UART0_TXD | G17_UART0_TXD |
| 2 | P4MDID_N | 31_PAD_TXVN_D_P4 | 2 | SMI_MDC | L17_GPIO36/SMI_MDC |
| 3 | P4MDIC_P | 28_PAD_TXVP_C_P4 | 3 | UART0_RXD | G16_UART0_RXD |
| 4 | P4MDIC_N | 29_PAD_TXVN_C_P4 | 4 | SMI_MDIO | K17_GPIO37/SMI_MDIO |
| 5 | P4MDIB_P | 25_PAD_TXVP_B_P4 | 5 | RST_PBC | E18_GPIO1_RESET |
| 6 | P4MDIB_N | 26_PAD_TXVN_B_P4 | 6 | WPS_PBC | F17_GPIO0/GPIO_PBC |
| 7 | P4MDIA_P | 22_PAD_TXVP_A_P4 | 7 | PWM0 | D20_PWM0 |
| 8 | P4MDIA_N | 23_PAD_TXVN_A_P4 | 8 | NC | F1_PCIE_LN0_TXN |
| 9 | GND | - | 9 | SPI1_MOSI | B18_GPIO23_UART2_TXD |
| 10 | LAN4LED0 | 70 | 10 | SPI1_CS | C17_GPIO25_UART2_RTS |
| 11 | P3MDID_P | 9_PAD_TXVP_D_P3 | 11 | SPI1_MISO | A18_GPIO24_UART2_CTS |
| 12 | P3MDID_N | 10_PAD_TXVN_D_P3 | 12 | SPI1_CLK | A19_GPIO22_UART2_RXD |
| 13 | P3MDIC_P | 7_PAD_TXVP_C_P3 | 13 | PCIE_TX_P | F2_PCIE_LN0_TXP |
| 14 | P3MDIC_N | 8_PAD_TXVN_C_P3 | 14 | NC | K3_USB_DM |
| 15 | P3MDIB_P | 3_PAD_TXVP_B_P3 | 15 | PCIE_TX_N | F1_PCIE_LN0_TXN |
| 16 | P3MDIB_N | 4_PAD_TXVN_B_P3 | 16 | NC | L3_USB_VBUS |
| 17 | P3MDIA_P | 1_PAD_TXVP_A_P3 | 17 | PCIE_RX_P | G1_PCIE_LN0_RXP |
| 18 | P3MDIA_N | 2_PAD_TXVN_A_P3 | 18 | NC | - |
| 19 | GND | - | 19 | PCIE_RX_N | G2_PCIE_LN0_RXN |
| 20 | LAN3LED0 | 74 | 20 | NC | - |
| 21 | P2MDID_P | 126_PAD_TXVP_D_P2 | 21 | PCIE_CK_P | H2_PCIE_CK_P |
| 22 | P2MDID_N | 127_PAD_TXVN_D_P2 | 22 | NC | - |
| 23 | P2MDIC_P | 123_PAD_TXVP_C_P2 | 23 | PCIE_CK_N | H3_PCIE_CK_N |
| 24 | P2MDIC_N | 124_PAD_TXVN_C_P2 | 24 | NC | - |

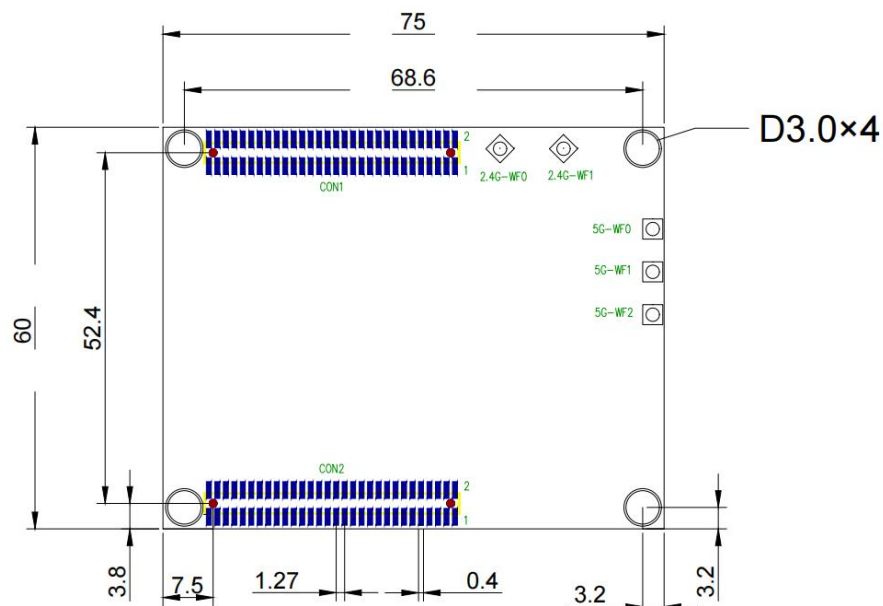
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|----|----------|-------------------|----|--------------|-------------------------------------|
| 25 | P2MDIB_P | 120_PAD_TXVP_B_P2 | 25 | U2_1_USB_D_P | K2_USB_DP |
| 26 | P2MDIB_N | 121_PAD_TXVN_B_P2 | 26 | GND | - |
| 27 | P2MDIA_P | 117_PAD_TXVP_A_P2 | 27 | U2_1_USB_D_N | K3_USB_DM |
| 28 | P2MDIA_N | 118_PAD_TXVN_A_P2 | 28 | GND | - |
| 29 | GND | - | 29 | GND | - |
| 30 | LAN2LED0 | 75 | 30 | JTAG_JTMS | L5_JTAG_JTMS |
| 31 | P1MDID_P | 112_PAD_TXVP_D_P1 | 31 | JTAG_JTDI | L4_JTAG_JTDI |
| 32 | P1MDID_N | 113_PAD_TXVN_D_P1 | 32 | JTAG_JTDO | M3_JTAG_JTDO |
| 33 | P1MDIC_P | 109_PAD_TXVP_C_P1 | 33 | JTAG_JTRST_N | M4_JTAG_JTRST_N |
| 34 | P1MDIC_N | 110_PAD_TXVN_C_P1 | 34 | JTAG_JTCK | N4_JTAG_JTCK |
| 35 | P1MDIB_P | 106_PAD_TXVP_B_P1 | 35 | USB_VBUS | L3_GPIO14/USB_VBUS/ PWM1 |
| 36 | P1MDIB_N | 107_PAD_TXVN_B_P1 | 36 | WF2G_LED | M1_GPIO34/WF2G_LE D/PCIE_CLK_REQ |
| 37 | P1MDIA_P | 103_PAD_TXVP_A_P1 | 37 | WF5G_LED | M2_GPIO35/WF5G_LE D/PCIE_WAKE_N |
| 38 | P1MDIA_N | 104_PAD_TXVN_A_P1 | 38 | PCIE_RESET_N | N3_GPIO3/ PCIE_RESET_N |
| 39 | GND | - | 39 | SYSRSTB | N2_SYSRSTB |
| 40 | LAN1LED0 | 79 | 40 | WO_JTCK | P3_WO_JTAG_JTCLK |
| 41 | P0MDID_P | 100_PAD_TXVP_D_P0 | 41 | WO_JTMS | P2_WO_JTAG_JTMS |
| 42 | P0MDID_N | 101_PAD_TXVN_D_P0 | 42 | WO_JTDI | R4_WO_JTAG_JTDI |
| 43 | P0MDIC_P | 97_PAD_TXVP_C_P0 | 43 | WO_JTRST_N | R2_WO_JTAG_JTRST_ N |
| 44 | P0MDIC_N | 98_PAD_TXVN_C_P0 | 44 | WO_JTDO | R3_WO_JTAG_JTDO |
| 45 | P0MDIB_P | 93_PAD_TXVP_B_P0 | 45 | GND | - |
| 46 | P0MDIB_N | 94_PAD_TXVN_B_P0 | 46 | SYS_WATCHDOG | R1_SYS_WATCHDOG |
| 47 | P0MDIA_P | 91_PAD_TXVP_A_P0 | 47 | GND | - |
| 48 | P0MDIA_N | 92_PAD_TXVN_A_P0 | 48 | GND | - |

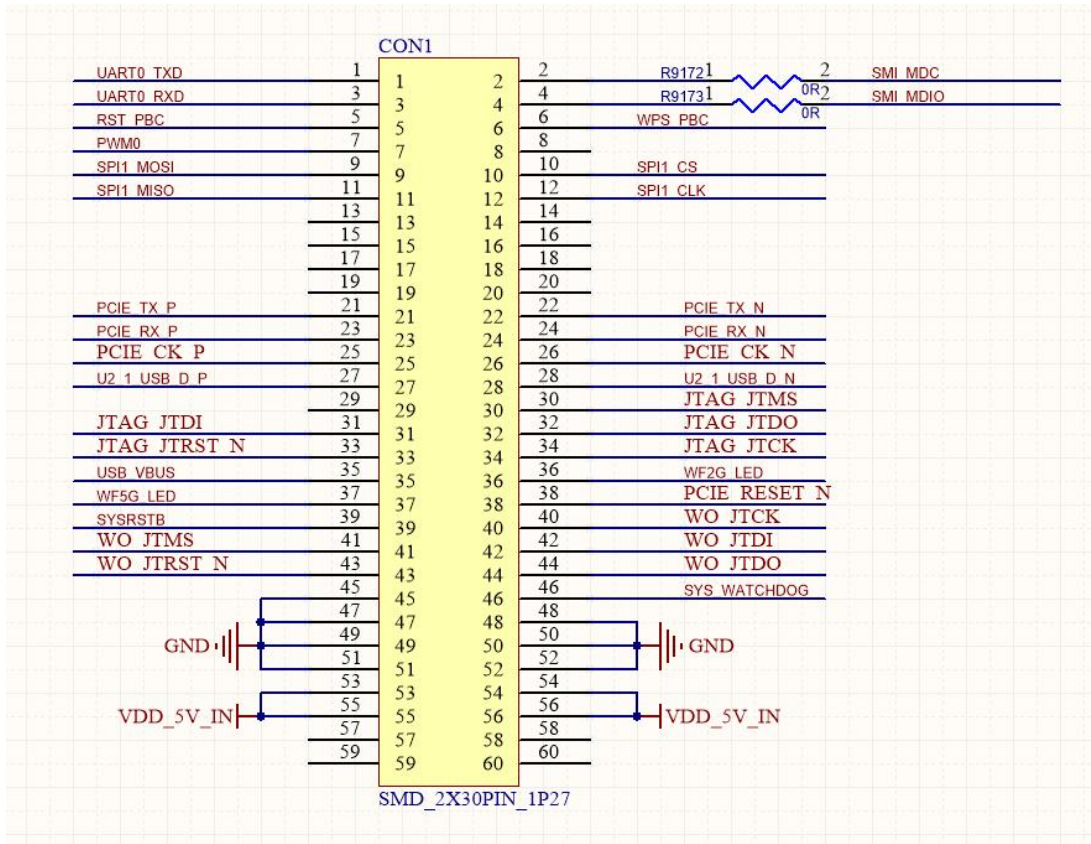
| | | | | | |
|----|-------------|----|----|-----------|---|
| 49 | GND | - | 49 | GND | - |
| 50 | LAN0LED0 | 81 | 50 | GND | - |
| 51 | ESW_TXV_D_P | - | 51 | GND | - |
| 52 | ESW_TXV_D_N | - | 52 | GND | - |
| 53 | ESW_TXV_C_P | - | 53 | VDD_5V_IN | - |
| 54 | ESW_TXV_C_N | - | 54 | VDD_5V_IN | - |
| 55 | ESW_TXV_B_P | - | 55 | VDD_5V_IN | - |
| 56 | ESW_TXV_B_N | - | 56 | VDD_5V_IN | - |
| 57 | ESW_TXV_A_P | - | 57 | NC | - |
| 58 | ESW_TXV_A_N | - | 58 | NC | - |
| 59 | GND | - | 59 | NC | - |
| 60 | GND | - | 60 | NC | - |

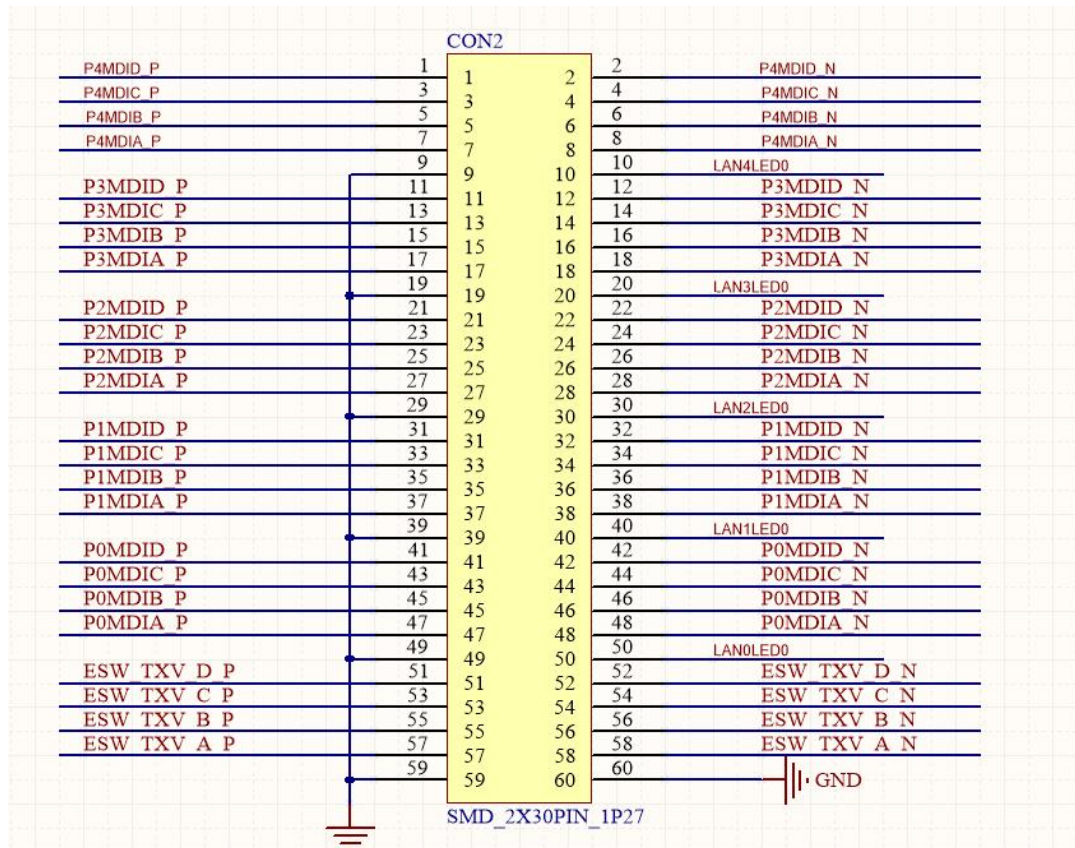
9 产品外观/ Product appearance

尺寸：75mmX60mmX20mm(含散热片高度 10mm,视情况而定)

Size: 75mmX60mmX20mm (including 10mm radiator height, as appropriate)







10. 联系信息/ Contact information

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