PRODUCT SPECIFICATION

产品规范

适用于　　　　　For

K922 GNSS 模块
K922 GNSS Module

INTRODUCTION

REVISION HISTORY / 修订历史

Revision/版本	Modification/更改	Date/日期
1.0	New Release. / 新发	2024/9/18
1.1	Add an Identification of PIN 1/ 增加一脚标识	2024/12/5
1.2	Add Usage Requirements of Pin SYS_RSTN / 增加 SYS_RSTN 引脚使用要求	2024/12/18
1.3	Add Transformer Connection Mode / 增加变压器连接方式	2025/2/19
1.4	Modify the Protect Image / 修改产品图片	2025/3/3

DIRETORY / 目录

1. Introduction / 简介

K922 is a small-size high-precision positioning module and heading independently developed by SinoGNSS at full-system and full-frequency. It tracks constellations including BDS-2, BDS-3, GPS, GLONASS, Galileo and QZSS, also with onboard inertial navigation device, supporting integrated navigation algorithm. The K922 GNSS module is mainly used for precision agriculture, intelligent driving and so on.

K922模块是司南导航自主研发的全系统全频点的小尺寸高精度定位定向模块。支持BDS-2、BDS-3、GPS、GLONASS、Galileo和QZSS等卫星导航系统的信号跟踪，板载惯导器件，支持组合导航算法，适用于精准农业、智能驾驶等。

1.1. Product Characteristics / 产品特性

Table 1. Product Characteristics / 产品特性

Characteristics		K922
Signals 信号	Positioning 定位	GPS: L1C/A, L2P*, L2C, L5, L1C*
		BDS-2: B1I, B2I, B3I
		BDS-3: B1I, B1C*, B2a, B2b*, B3I
		GLONASS: G1, G2, G3*
		Galileo: E1, E5b, E5a, E5 AltBoC*, E6c*
		QZSS: L1C/A, L2C, L5, L1C*
		SBAS*: L1C/A, L5
		IRNSS*: L5
	Items with * will be adjusted with the version. 带*项会随同版本进行调整。	
Time to First Fix 首次定位时间	Cold Start 冷启动	20s（需支持B2b信号）
	Hot Start (with RTC) 热启动（使用RTC）	10s
Signal Capture 信号捕获	Reacquisition 失锁重捕	1s

	Signals Tracking Sensitivity 信号跟踪灵敏度	-155dBm
	Signal Capture Sensitivity 信号捕获灵敏度	-140dBm
Measurement Precision 测量准确度	**Pseudo-range Accuracy** 伪距精度	10cm
	Carrier Phase Accuracy 载波相位精度	1mm
Accuracy 精度	**PPS（RMS）** 授时精度	20ns
	SPP Accuracy 标准单点定位精度	平面（Horizontality）：1.5m 高程（Verticality）：3m
	Velocity Accuracy 测速精度	0.02m/s
	Orientation Accuracy 定向精度	0.2°/1m基线
	Assisted Dead Reckoning（error） 辅助航位推算（误差）	3%d（d为行驶距离）
PPP	**PPP Convergence Time** PPP收敛时间	20min
	PPP Accuracy PPP精度	平面（Horizontality）：0.1m 高程（Verticality）：0.2m

RTK	RTK Initialization Time RTK初始化时间	5s（D<10km）	
	Initialization Reliability 初始化置信度	99.9%	
	RTK Accuracy RTK精度	平面（Horizontality）：(8+10^{-6}×D)mm 高程（Verticality）：(15+10^{-6} ×D)mm D为基线长度(单位：mm) D-Baseline length (Unit: mm)	
Anti-interference 抗干扰	It can suppress the potential narrowband and single tone radio interference signals in the GNSS signal frequency band, and the interference to signal ratio can reach 60dB. 具备抑制GNSS信号频带内潜在的窄带和单音无线电干扰信号，干信比可达 60dB。		
IMU	Gyroscope 陀螺仪	Measurement ranges 量程：±125°/s	
		Zero-biased repeatability 零偏重复性：0.5°/s	
		Zero-biased stability 零偏稳定性：5°/h	
		Angular random walk 角度随机游走：0.12°/sqrt(h)	
	Accelerometer 加速度计	Measurement ranges 量程：±2g	
		Zero-biased repeatability 零偏重复性：20mg	
		Bias instability	

		零偏稳定性：50ug
		Velocity random walk 速度随机游走：0.07m/s/sqrt(h)
Data Rates 数据速率	Position 单点定位	Max 50Hz （The default is 5Hz, and the maximum option is 50Hz/默认 5Hz，最高可选配至 50Hz）
	RTK 实时载波相位差分	Max 50Hz （The default is 5Hz, and the maximum option is 50Hz/默认 5Hz，最高可选配至 50Hz）
	IMU	Max 100Hz （The default is 5Hz, and the maximum option is 100Hz/默认 5Hz，最高可选配至 100Hz）
Data Formats 输出数据格式	NMEA-0183	GPGGA, GPGSV, GPGLL, GPGSA, GPGST, GPHDT, GPRMC, GPVTG, GPZDA etc.
	ComNav Binary（CNB） 司南二进制格式	ComNav Self-Defined Binary 司南自定义二进制
	CMR(GPS)	CMROBS, CMRREF
	RTCM2.X	RTCM1, RTCM3, RTCM9, RTCM1819, RTCM31, RTCM41, RTCM42
	RTCM3.X	1004 ~ 1008, 1012, 1019, 1020, 1033, 1042, 1045/1046, 1230, 4078 MSM3~MSM7: 1073~1077, 1083~1087, 1123~1127, 1093~1097
Electrical 电气特性	Voltage 供电电压	3.3 V ± 5 %
	Power Consumption 功耗	0.5 W (Anti-interference off，未开启抗干扰) 抗干扰功能开启，功耗约增加 0.1W Set anti-interference on consumes more

		about 0.1W
Environmental 环境要求	**Operating Temperature** 工作温度	-40℃~+85℃ 注意：模组散热焊盘务必有效接地，有且散热面积不小于模组面积。 Attention: The module's heat dissipation pad must be effectively grounded, and the heat dissipation area must be no less than the area of the module.
	Storage Temperature 储存温度	-55℃~+125℃
Antenna Interface 天线接口	**Impedance Matching** 阻抗匹配	50Ω
	Antenna Gain 天线增益	20~35dB
Hardware Interface 硬件接口		UART×2，UART3×1/CAN×1（二选一） I2C×1，SPI×1，PPS×1，EVENT×1 ETH×1（ETH对应的针脚为 12、13、25、26)
Physical 物理参数	**Size** 尺寸	16mm×21mm×2.5mm
	Weight 重量	1.8g
	Package 封装	LGA（48PIN）

2. Size / 尺寸

In this section, product photo, mechanical drawing and the dimension of K922 is provided for customers' further hardware design and installation.

本节提供了K922的实物图，机械图和对应的物理尺寸，便于用户进一步系统硬件设计和安装。

Figure 1. K922 Product Photo / K922 实物图

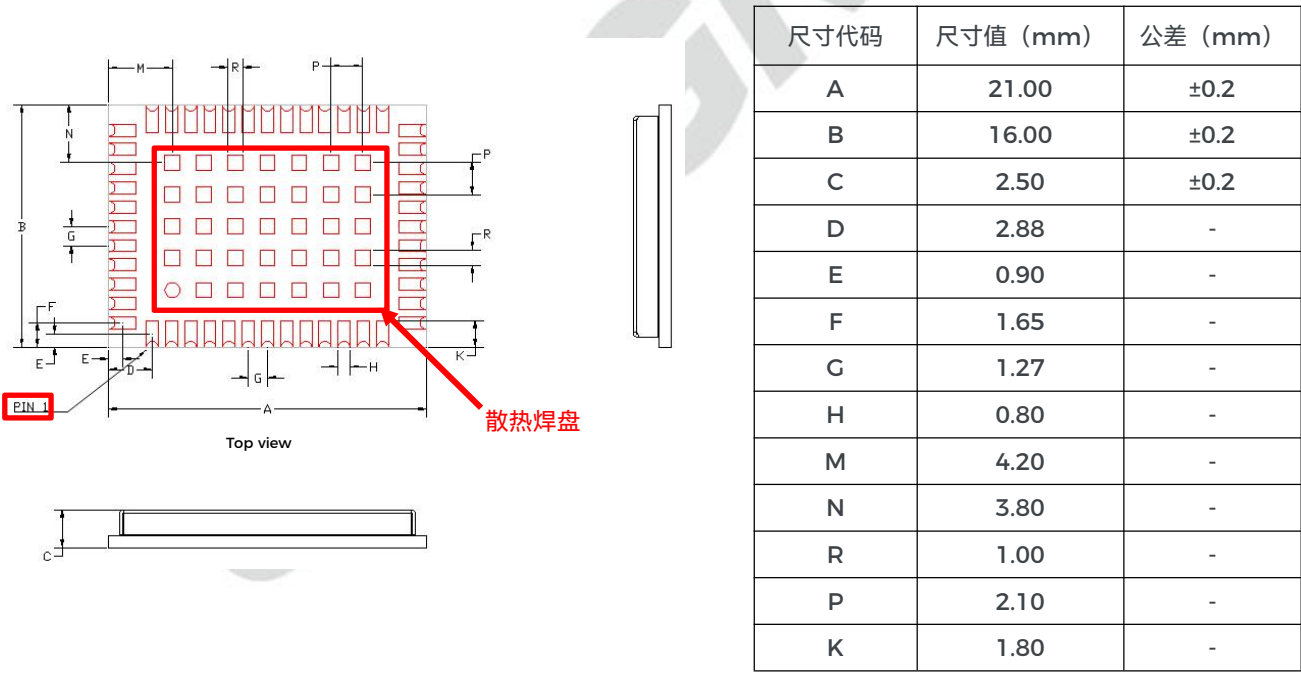| 尺寸代码	尺寸值（mm）	公差（mm）
A	21.00	±0.2
B	16.00	±0.2
C	2.50	±0.2
D	2.88	-
E	0.90	-
F	1.65	-
G	1.27	-
H	0.80	-
M	4.20	-
N	3.80	-
R	1.00	-
P	2.10	-
K	1.80	-

Figure 2. K922 Mechanical Drawing / K922 机械图

3. Pin Arrangement and Definition / 针脚标识与定义

K922 is surface-mount OEM Module which integrates 48 Pin.
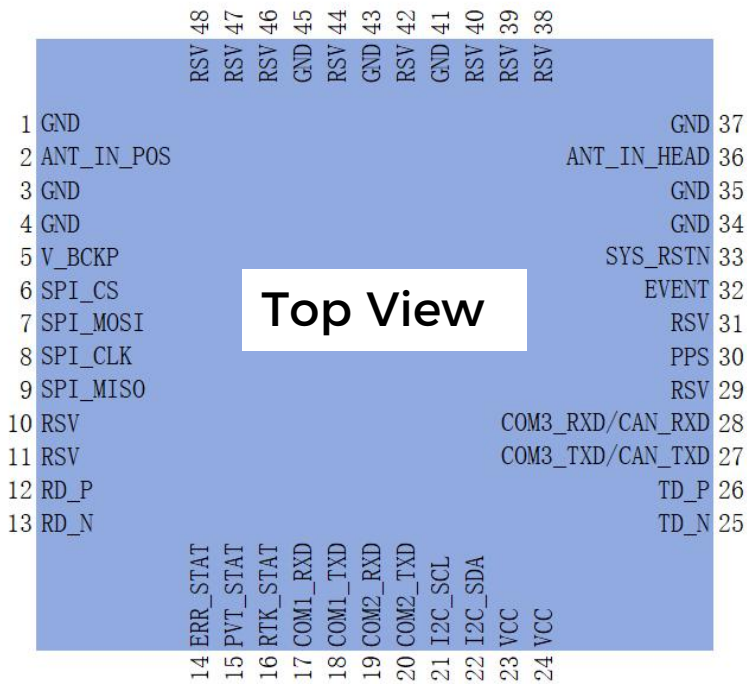
K922包括48Pin，表贴式模块。

Figure 3. K922 Includes 48-Pin Pad/ K922 包括48连接焊盘

Table 2. Pin Definition of K922 48-Pin Pad / K922 48针脚焊盘的针脚定义

Pin	Signal	Type	Description	
1	GND	GND	Ground Reference	参考地
2	ANT_IN_POS	I	Ant input Position	主天线输入
3~4	GND	GND	Ground Reference	参考地
5	V_BCKP	PWR	Backup supply voltage	RTC电源输入
6	SPI_CS	I/O	SPI_CS	SPI片选信号
7	SPI_MOSI	I/O	SPI_MOSI	SPI主设备数据输出
8	SPI_CLK	I/O	SPI_CLK	SPI时钟信号
9	SPI_MISO	I/O -	SPI_MISO	SPI主设备数据输入
10~11	RSV	-	Reserved	保留管脚
12	RD_P	I	Receive Data+	接收数据正
13	RD_N	I	Receive Data-	接收数据负
14	ERR_STAT	O	Failure Indication	故障指示

Pin	Signal	Type	Description	
15	PVT_STAT	O	Number of search satellites	搜星数量指示
16	RTK_STAT	O	RTK Data Indicator	在接收或发送差分信号时会输出高电平脉冲，其他状态输出低电平
17	COM1_RXD	I	UART1 receive	串口1接收
18	COM1_TXD	O	UART1 transmit	串口1发送
19	COM2_RXD	I	UART2 receive	串口2接收
20	COM2_TXD	O	UART2 transmit	串口2发送
21	I2C_SCL	I/O	Clock Line	I2C时钟
22	I2C_SDA	I/O	Data Line	I2C数据
23~24	VCC	PWR	Voltage supply	电源输入
25	TD_N	O	Transmit Data -	发送数据负
26	TD_P	O	Transmit Data +	发送数据正
27	COM3_TXD/CAN_TXD	O	UART3/CAN transmit	串口3或CAN发送（默认为串口3）
28	COM3_RXD/CAN_RXD	I	UART3/CAN receive	串口3或CAN接收（默认为串口3）
29	RSV	-	Reserved	保留管脚
30	PPS	O	Pulse Per Second	秒脉冲
31	RSV	-	Reserved	保留管脚
32	EVENT	I	External Interrupt Pin	外部中断输入
33	SYS_RSTN	I	System Reset Negative	系统复位，低电平有效
34~35	GND	GND	Ground Reference	参考地
36	ANT_IN_HEAD	I	Ant input Heading	从天线输入
37	GND	GND	Ground Reference	参考地
38~40	RSV	-	Reserved	保留管脚
41	GND	GND	Ground Reference	参考地
42	RSV	-	Reserved	保留管脚
43	GND	GND	Ground Reference	参考地
44	RSV	-	Reserved	保留管脚
45	GND	GND	Ground Reference	参考地
46~48	RSV	-	Reserved	保留管脚

3.1. **Remarks / 说明**

1. Electrical Characteristics / 电气特性

COM1/2/3(TX&RX), SPI, I2C, SYS_RSTN, PPS, EVENT, ERR_STAT, PVT_STAT and RTK_STAT are LVCMOS 3.3V. All these signals are compatible with LVCMOS / LVTTL 3.3V.

COM1/2/3（TX&RX），SPI，I2C，SYS_RSTN，PPS，EVENT，ERR_STAT，PVT_STAT和RTK_STAT为LVCMOS

3.3V电平，所有这些信号均兼容LVCMOS / LVTTL 3.3V。

Table 3. LVCMOS 3.3V Electrical Standard / LVCMOS 3.3V电气标准

Symbols 符号	Description 描述	Min 最小	Max 最大
V_{IH}	Input high voltage 输入高电压	2.0V	3.6V
V_{IL}	Input low voltage 输入低电压	-0.3V	0.8V
V_{OH}	High-level output voltage 高电平输出电压	2.9V	--
V_{OL}	Low-level output voltage 低电平输出电压	--	0.4V
I_{OH}	Sourcing current 拉电流		8mA
I_{OL}	Sinking current 灌电流		8mA

Table 4. LVTTL 3.3V Electrical Standard / LVTTL 3.3V电气标准

Symbols 符号	Description 描述	Min 最小	Max 最大
V_{IH}	Input high voltage 输入高电压	2.0V	VCC+0.3V
V_{IL}	Input low voltage 输入低电压	-0.3V	0.8V
V_{OH}	High-level output voltage 高电平输出电压	VCC-0.4V	--
V_{OL}	Low-level output voltage 低电平输出电压	--	0.41V
I_{OH}	Sourcing current 拉电流		8mA
I_{OL}	Sinking current 灌电流		8mA

2.   Can withstand Voltage Range / 能承受的电压范围

The signal with the maximum voltage range from -0.3V to 3.6V is as follows: COM1 / 2 / 3 (TX&RX), SPI, I2C, ERR_STAT, PVT_STAT, RTK_STAT, SYS_RSTN, PPS, EVENT

所能承受电压的最大值范围是 -0.3V~3.6V 的信号如下： COM1 / 2 / 3 (TX&RX)，SPI， I2C，ERR_STAT， PVT_STAT，RTK_STAT，SYS_RSTN，PPS， EVENT

3.   Supply Voltage / 供电电压

VCC is main power supply, and voltage range is 3.3V. The requirement for voltage ripple and spike is less than 50mV. The voltage range of V_BCKP is 1.8V to 3.6V, and the requirements for voltage ripple and spike are less than 30mV.

VCC主供电电源，电压范围：3.3V （直流）。电压纹波和尖峰脉冲要求小于50mV。 V_BCKP，电压1.8V~3.6V,电压纹波和尖峰脉冲要求小于30mV。

4.   Power On and Off the module/ 模块上电与下电

VCC/V_BCKP

- VCC/V_BCKP power-on, the initial level is lower than 0.4V, and has a good monotonicity, and the upstroke and ringing are guaranteed within the range of 5% VCC/V_BCKP;
- VCC/V_BCKP power-on waveform, rise time from 10% to 90% should be in the range from 100us to 1ms.
- Power-on interval，after the VCC/V_BCKP is powered off less than 0.4V, before the next power-on, the interval must be greater than 500ms.

VCC/V_BCKP

- VCC/V_BCKP 上电，起始电平低于 0.4V，具有良好的单调性，下冲与振铃保障在 5% VCC/V_BCKP 范围内。
- VCC/V_BCKP 上电波形，从 10%到 90%的上升时间需在 100us~1ms 范围内。
- 上电时间间隔，模块 VCC/V_BCKP 下电低于 0.4V 后，到下一次开始上电，时间间隔需大于 500ms。

5. Usage Requirements of Pin SYS_RSTN / SYS_RSTN 引脚使用要求

- The module is equipped with an internal power-on reset circuit, eliminating the need for an external hardware reset circuit;
- If choose to control the reset of SYS_RSTN through GPIO, ensure that VCC has been properly powered up; then use GPIO to reset SYS_RSTN by pulling it down to ground (longer than 1ms) and then pulling it up to 3.3V.
- 模块内置上电复位电路，不需要外接硬件复位电路；
- 若通过 GPIO 控制复位 SYS_RSTN，务必保证 VCC 已正常供电；然后通过 GPIO 把 SYS_RSTN 下拉到地复位 (时长大于 1ms)，再上拉至 3.3V。

6. RTK_STAT

RTK_STAT signal pin, receiving or transmitting differential signals will output high level pulse, other states output low level, needing to connect to the external indicator light.

RTK_STAT信号脚，在接收或发送差分信号时会输出高电平脉冲，其他状态输出低电平，需要外接指示灯。

7. Add Surge Protection / 增加浪涌保护

When the user integrates the module, an external high-gain choke antenna is connected. If a surge protector is not added, it is easy to damage antenna feed circuit. It is recommended that users install a surge protector on the antenna when connecting a high-gain choke antenna.

当用户集成模块时，外接高增益的扼流圈天线，如果不加浪涌保护器，容易造成天线馈电电路损坏。建议用户在外接高增益扼流圈天线时，天线上安装一个浪涌保护器。

8. Thermal Design / 热设计

The K922 module contains temperature-sensitive components inside, requiring a stable temperature environment; hence, during PCB layout, the module needs to be positioned away from heat-generating or low-temperature areas. The TCXO (Temperature Compensated X Tal Oscillator) inside the module is highly sensitive to temperature changes, and sudden temperature fluctuations can affect the module's ability to track satellite signals. Consequently, the layout of the module should maintain a certain distance from heat-generating components, cooling fans, or heat dissipation vents.

K922模组内部含温度敏感元件，需确保温度稳定；故PCB布局时，模组需远离发热区或低温区。模组内部的TCXO（温度补偿晶体振荡器）对温度变化反应敏感，温度突变会影响模组对卫星信号的追踪能力。因此，模组布局应与发热元件、散热风扇或散热孔保持一定距离。

9. Hardware Integration Considerations / 硬件集成注意事项

1) Use the VCC pin to provide a reliable power supply and all GND pins of the module are grounded;
2) Connect the ANT_IN_POS and ANT_IN_HEAD signal to the antenna, pay attention to the 50Ω impedance matching of the line;
3) The module reset pin SYS_RSTN is for reset. Please connect it correctly to ensure that the module can be reset reliably;
4) Special attention should be paid to:
   ①. Place the power supply as close to the module as possible
   ②. Widen the power supply lines or use split copper surface to transmit current;
   ③. Power routing should avoid high-power and high-inductive devices, such as magnetic coils.
   ④. To ensure good heat dissipation of the module, it is recommended that the grounding pad of the module be fully in contact with the PCB and that more ground holes be added to facilitate heat dissipation
5) The PHY of the network uses a voltage type PHY, and when the external network port is connected, the middle tap of the transformer cannot supply power;
6) Antenna interface: The antenna line is as short and smooth as possible, avoiding acute angles;
7) Avoid wiring directly under K922;
8) The module is as far away from the high temperature airflow as possible.

1) 用VCC引脚提供可靠的电源且模块所有GND引脚接地；
2) 连接ANT_IN_POS and ANT_IN_HEAD信号至天线,注意线路50Ω阻抗匹配；
3) 模块复位引脚SYS_RSTN为复位，请正确连接以保证模块可以可靠复位；
4) 在设计中应特别注意：
   ①布局上供电尽量靠近模块放置；
   ②加宽电源走线或采用分割铺铜面来传输电流；
   ③电源走线避免经过大功率与高感抗器件，如磁性线圈；
   ④为保障模块良好散热，建议模块接地焊盘与PCB充分接触，多加地孔便于散热。
5) 网络的PHY使用的是电压型的PHY，在外接网口时，变压器的中间抽头不能供电；
6) 天线接口：天线线路尽量短且顺畅，避免走锐角；
7) 避免在K922正下方走线；
8) 模块尽量远离高温气流。

10. Static Electricity Protection / 静电保护

Some components on K922 module are easily damaged by static electricity, which in turn affects the IC circuit and other components. Therefore, you should pay attention to electrostatic protection measures when using it.

1) When handling the module, try to wear gloves or finger cots and an anti-static wrist strap that meets the electrostatic protection standards;
2) During the process of taking the module, only the edge of the board should be taken, and the solder joints, circuit parts or components should not be directly touched to avoid sweat fingerprints from contaminating the solder joints;
3) The module should be protected by a soft protective pad between the module and the module interval during transportation;
4) When the module is idle, it should be placed on a soft protective pad (such as anti-static sponge pad, etc.), and do not stack at will;
5) The modules should be placed neatly and orderly, with a certain interval between modules to avoid collision with each other;
6) The module should be handled with care during use to prevent the module from being damaged by rough operation;
7) When powering on, pay attention to the positive and negative poles of the power supply and the voltage to avoid reverse connection and excessive voltage from burning the module;

8) When soldering the module to the motherboard, please ensure that the GND is soldered first, and then the ANT_IN pin;

9) When handling ANT_IN pin, do not touch any live capacitance or material (e.g., surface mount antenna, coaxial cable, wire iron, etc.) to avoid damage to the ANT_IN pin by the charge generated or stored by said capacitor or material;

10) Please make sure to solder the ANT_IN pin with an electrical protection iron.

K922模块上的部分元器件易受静电影响而损坏，进而影响IC电路及其他元件。因此在使用时应注意做好静电保护措施。

1) 拿取模块时应尽量戴好手套或者指套以及符合静电防护标准的防静电腕带；

2) 模块拿取过程中应只拿取板卡的边缘部位，不能直接接触焊点，线路部分或者元器件，避免汗液指印污染焊点；

3) 模块在运输过程中模块与模块间隔之间应该采用软性防护垫进行保护；

4) 模块闲置时应放置在软性防护垫上（如防静电海绵垫等），不要随意堆叠；

5) 模块摆放应摆放整齐有序，模块之间保持一定间隔，避免相互碰撞；

6) 模块在使用过程中应该轻拿轻放，防止粗暴作业损坏模块；

7) 上电时，注意电源正负极以及电压，避免反接和电压过高烧毁模块；

8) 将模块焊接到主板时，请确保GND先焊接，然后再焊接ANT_IN引脚；

9) 处理ANT_IN引脚时，请不要接触任何带电电容或材料（例如表贴天线、同轴电缆、电络铁等），以免所述电容或材料所产生或存储的电荷损坏ANT_IN引脚；

10) 请确保使用带电保护的电络铁焊接ANT_IN引脚。

4. Assembling & Repairing Note / 装配及维修说明

4.1. Module Assembling Note / 模块装配说明

K922 is surface mounted, SMT welding is used for assembly.
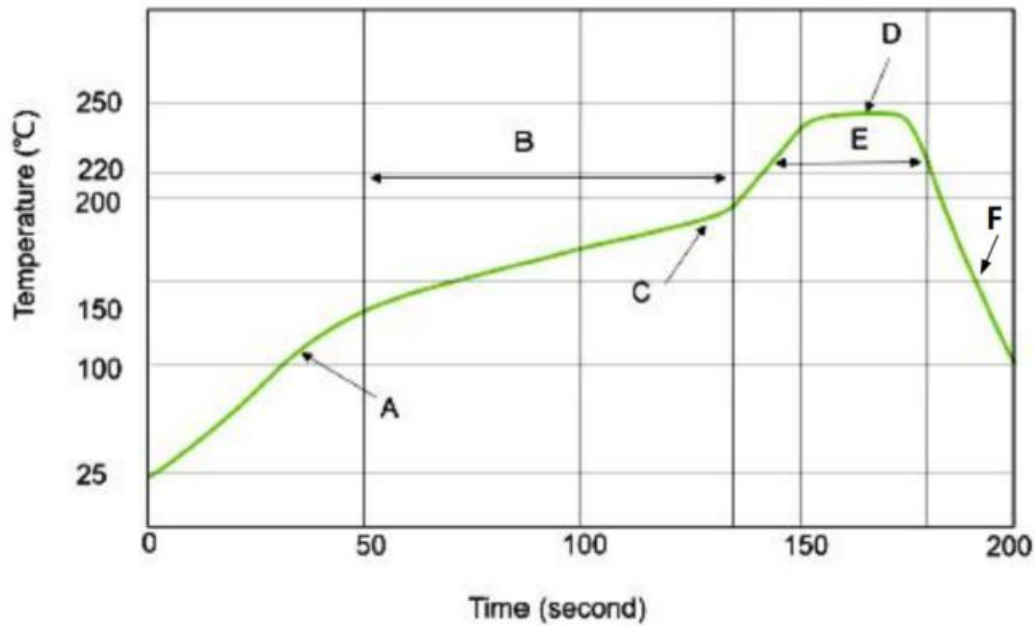
K922为表贴式模块，使用SMT的焊接方式进行装配。

Figure 4. Furnace Temperature Curve / 炉温曲线

The process temperature limits are as follows:

A: Heating Zone: Rising Slope: 1 ~ 3℃ / sec

B: Constant Temperature Zone: Range: 150 ~ 190 ℃   Time: 80 ~ 110 S

C: Constant Temperature→Reflow Zone: Rising Slope: 1 ~ 3℃ / sec

D: Peak Temperature: 235 ~ 245℃

E: Reflow Zone: Range: Over 220℃   Time: 50 ~ 80 S

F: Descent Slope: -5℃ ~ -1℃ / sec

制程温度界限如下：

A：升温区：斜率：1 ~ 3℃ / sec

B：恒温区：150 ~ 190℃   时间：80 ~ 110S

C：恒温→回流区：斜率：1 ~ 3℃ / sec

D：峰值温度：235 ~ 245℃

E：回流区：大于 220℃   时间：50 ~ 80S

F：下降斜率：-5 ~ -1℃ / sec

In order to prevent the module from being damaged by repeated heating, it is recommended to place the module after finishing the first side of PCB board.

为避免模块因反复受热而损坏，建议在完成PCB板第一面的回流焊之后再贴模块。

4.2. **Repairing Note / 维修说明**

When disassembling the module, it is suggested using a BGA welding bench. Please use correct air tuyere and choose certain temperature curve. Keep peak temperature under 245℃, rising slope under 3℃/s.

拆卸模块时，请使用BGA返修台，选择适合尺寸的风嘴并使用合适的温度曲线，最高温度不超过245℃，升温斜率不超过3℃/s。

5. Application Connection Example / 应用连接示例

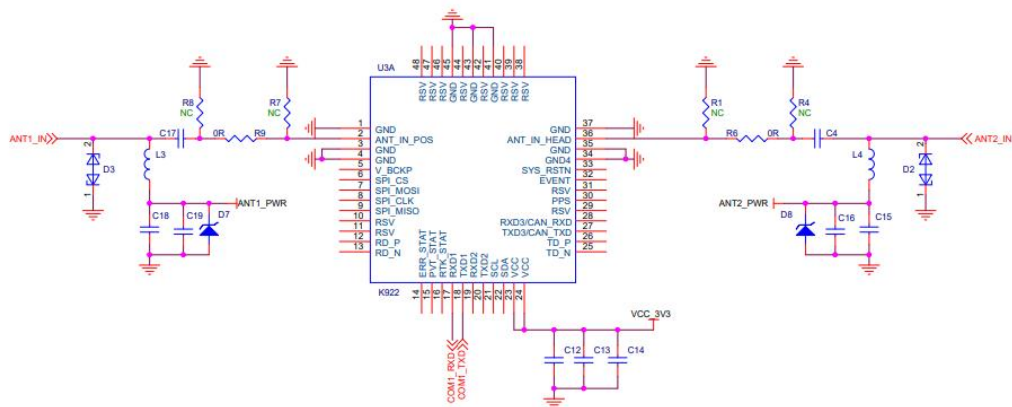## 5.1. Minimum Circuit Description of K922 / K922最小电路说明

Figure 5. Minimum Hardware Design of K922 / K922 最小硬件设计

Table 5. Minimum Circuit Description of K922/ K922 最小电路说明

| 位号	类型	数值	作用
C12,C13	去耦电容	22uF	抑制低频波纹，稳压
C14	去耦电容	1uF	抑制高频波纹，稳压
C16,C19	去耦电容	0.1uF	抑制高频波纹，稳压
C15,C18	去耦电容	1uF	抑制低频波纹，稳压
L3,L4	馈电电感	68nH	射频阻断，推荐使用68nH射频电感
D2,D3	ESD二极管	-	防静电，支持高频信号（2000MHz以上）的ESD防护器件
D7,D8	TVS二极管	-	避免出现过压导致元件损坏，需根据馈电电压、天线耐压等指标选择钳位特性达标的 TVS 管
C4,C7	隔直电容	100pF	隔直，防止电压倒灌模块
R1,R4,R7,R8	电阻	-	预留π型电路，确保50Ω阻抗匹配
R6,R9	电阻	0Ω	预留器件位置，保证匹配

5.2. Transformer Connection Mode / 变压器连接方式
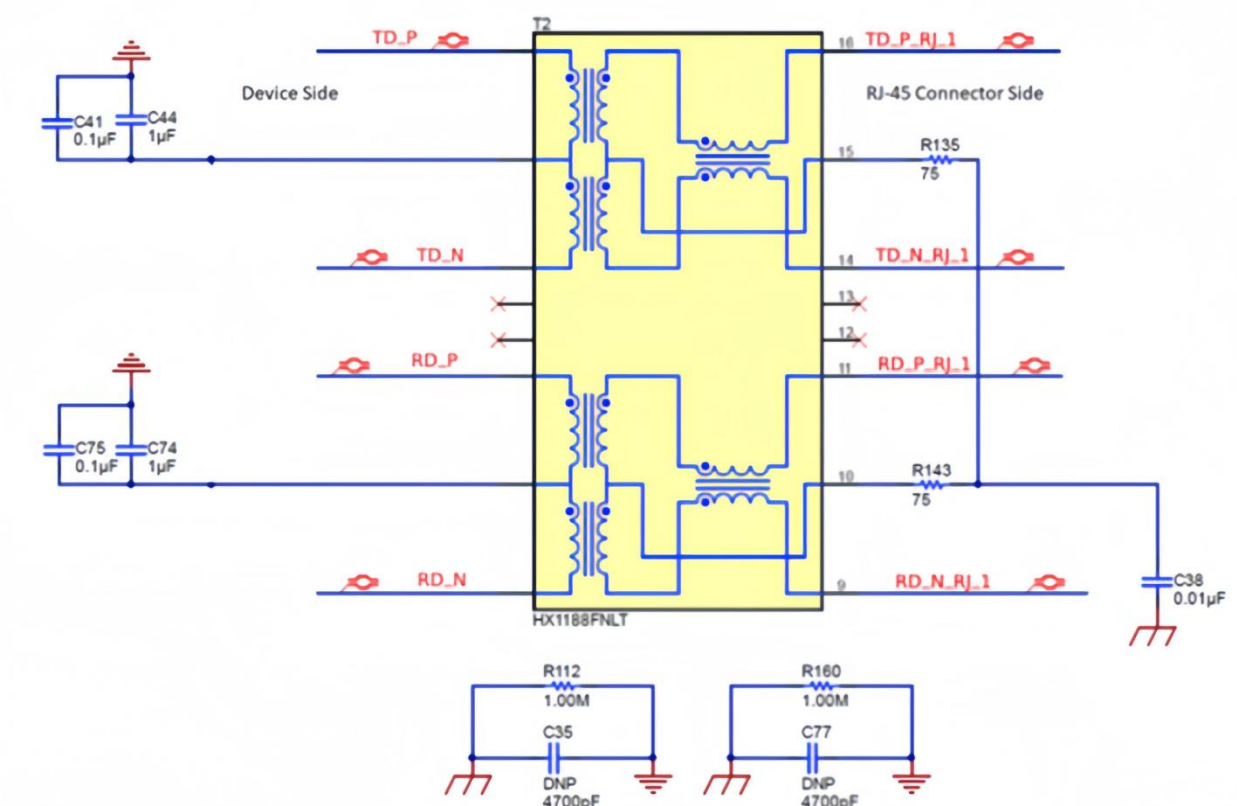
Figure 6. Transformer Connection Mode of K922 / K922 接变压器方式

Notice：
1) K922 Ethernet applications need a transformer;
2) The PHY of the network uses a voltage type PHY, and when the external network port is connected the middle tap of the transformer cannot supply power.

注意：
1) K922 以太网应用需接变压器：
2) 网络的 PHY 使用的是电压型的 PHY，在外接网口时，变压器的中间抽头不能供电

6. Package / 包装

K922 module is packaged by means of carrier tape and coil (applicable to mainstream surface mount equipment), packaged in a vacuum-sealed aluminum foil electrostatic bag (The storage life of the K922 module in this anti-static bag is one year), containing desiccant for moisture proof. When the module is transported or not used after unpacking, it is still necessary to do moisture-proof work to avoid module failure. When welding modules by reflow soldering process, please strictly comply with IPC standards for humidity control of modules. Because the packing materials such as the carrier belt can only withstand 55℃, the modules need to be removed from the packaging during baking operation.

K922 模块使用载带、卷盘方式（适用于主流表面贴装设备），包装在真空密封的铝箔防静电袋中（K922 模块在此防静电袋中的保存期限为一年），内含干燥剂防潮。在模块运输过程或拆开包装后未使用的情况下，仍需要做好防潮工作，以免模块失效。采用回流焊工艺焊接模块时，请严格遵守 IPC 标准对模块进行湿度管控。由于载带等包装材料只能承受55℃，在进行烘烤作业时需要将模块从包装中取出。
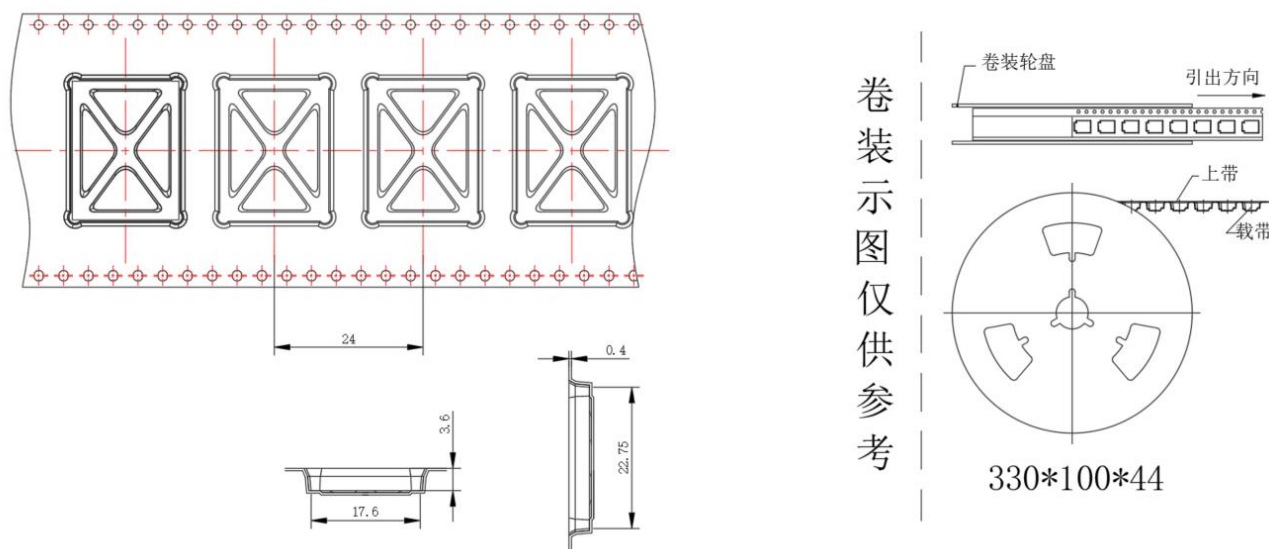
Figure 7. K922 Roll Tape Packing / K922 卷带包装

Table 6. K922 Package Description / K922 包装说明

Project	Description	
Module packaging 模块包装	**Quantity of Modules** 模块数量	500 Slice/Roll 500 片/卷
	Reel Size 卷盘尺寸	Material tray:13 inches 料盘：13 寸
		Outer diameter: 330mm, inner diameter: 100mm, width: 44mm, wall thickness: 3.6mm 外径 330mm，内径 100mm，宽 44mm，壁厚 3.6mm
		Package of each module: length 22.75mm, width 17.6mm 每个模块包装：长 22.75mm，宽 17.6mm
	Carrier Belt 载带	Module Spacing (Center Distance): 24mm 模块间距（中心距）：24mm
	Quantity of Desiccant 干燥剂数量	1 pcs/box 1 袋/盒
	Quantity of Humidity card 湿度卡数量	1 pcs/box 1 张/盒 Attention: Check the humidity card label in the package before the patch, and the 30% identifier ring of the humidity card should be displayed as blue if normal; If the color of the 20% label circle of the humidity card is pink and that of the 30% label circle is lilac, bake the card as required before mounting it 注意：贴片前需查看包装内湿度卡标识，湿度卡的 30%标识圈颜色正常应显示为蓝色；若湿度卡的 20%

		标识圈颜色显示为粉色、30%标识圈显示为淡紫色，需按要求进行烘焙后再贴片
Module storage 模块存储	Storage Temperature 存储温度	23℃±5℃
	Storage humidity 存储湿度	≤30%