



司南导航

QinNav  
钦天导航

# PRODUCT SPECIFICATION

# 产品规范

适用于 For

U70 数传 模块  
U70 Datalink Module

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## REVISION HISTORY / 修订历史

Revision/版本	Modification/更改	Date/日期
1.0	New Release / 新发	2023/09/22
1.1	Add receiving sensitivity / 添加接收灵敏度	2023/09/25
1.2	Change weight / 更改重量	2023/10/18

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# 1. Introduction / 简介

U70 is a high performance wireless datalink module that specially designed for GNSS differential data transmission by QinNav Technology Ltd. The advanced technology of using advanced CSS digital modulation and demodulation technology, integrating receiving and transmitting functions make it suitable for RTK real time data transmission. It has the advantage of stable output power, high receiving sensitivity, low error rate and strong anti-interference ability. Besides, its characteristics of small size, low power consumption, better electromagnetic compatibility, pin type interface, and modular design are in favor of system integration.

U70 数传模块是软天导航专为 GNSS 差分数据传输设计的高性能数传模块，采用先进的 CSS 数字调制解调技术，集接收和发射功能于一体，适用于 RTK 实时数据传输；并具有输出功率稳定、接收灵敏度高、低误码率、抗干扰能力强等优点，确保恶劣环境下能正常工作。它体积小、功耗低、电磁兼容性好、贴片式接口设计、模块化设计，便于各种系统集成。

## 1.1. Product Characteristics / 产品特性

Table 1. Product Characteristics / 产品特性

Characteristics	U70
Channel Spacing 信道间隔	125KHz/250KHz/500KHz
Work Pattern 工作模式	Half duplex 半双工
Working Frequency 工作频率	410MHz -470MHz
Frequency Stability 频率稳定度	1.5ppm
Modulation System 调制方式	CSS
Air Baud Rate 空中波特率	500bps/11000bps/12500bps/15500bps/18000bps
Protocol Type	LoRa

协议类型		
Serial Port Baud Rate 串口波特率	4800 bps /9600 bps /19200 bps /38400 bps /115200 bps	
Max send and receive data length per second 每秒最大收发数据大小	1000Byte	
Electrical Characteristics 电气特性	Power supply range 供电范围	+3.3 V~+3.6 V DC
	Receive Power 接收功耗	0.15 W~0.16 W
	Receiving Sensitivity 接收灵敏度	-129dBm, transmission distance 5km (clear and open, no obstacle interference; with maximum power, altitude 2m, air speed 2.4kbps) -129dBm, 传输距离 5km (晴朗空旷, 无障碍物干扰; 最大功率、高度 2m、空中速率 2.4kbps)
	Transmit Power 发射功耗	2.7 W~5.4 W
	Transmit Signal Power 发射信号功率	(27±1) dBm / (30 ±1) dBm / (33 ±1) dBm
Physical Characteristics 物理特性	Communication Interface 通讯接口	2x22 Pin Pitch of pin 1.27 mm (引脚间距 1.27 mm)
	Antenna Interface 天线接口	IPEX-J

	Size (With Connectors) 尺寸(含接头)	30mmx30mmx3mm
	Weight 重量	7.6 g ± 0.1 g
Environmental Characteristics 环境特性	Working Temperature 工作温度	-40 °C~+75 °C
	Storage Temperature 存储温度	-45 °C~+85 °C

## 2. U70 Product Size / U70 尺寸

In this section, product photo, three-side views and the dimension of U70 is provided for customers' further hardware design and installation.

本节提供了U70的实物图，三视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. U70 Product Photo / U70 实物图

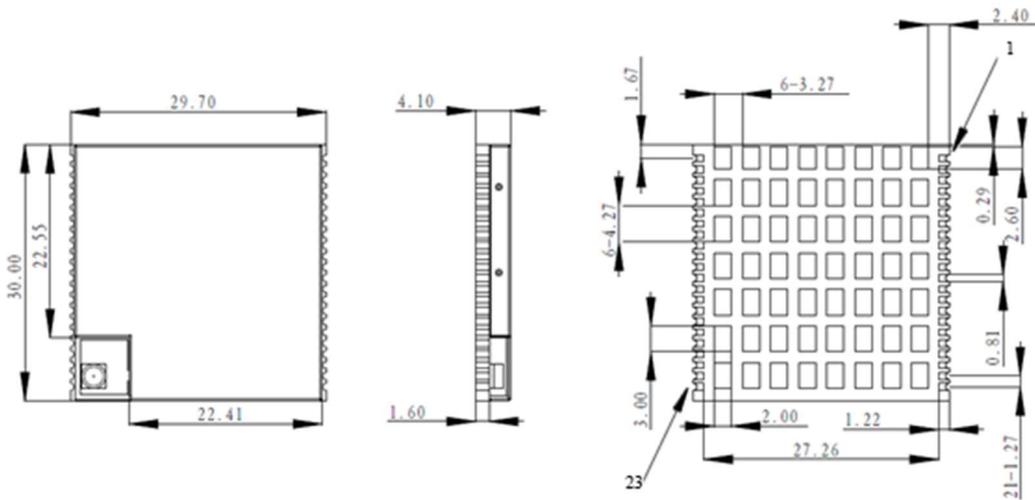


Figure 2. U70 Dimension View / U70 三视图

### 3. Pin Arrangement and Definition / 针脚标识和定义

U70 is surface-mount OEM Module which integrates 44 Pin (pitch 1.27mm).

U70包括44Pin, 表贴式模块 (pitch 1.27mm) 。

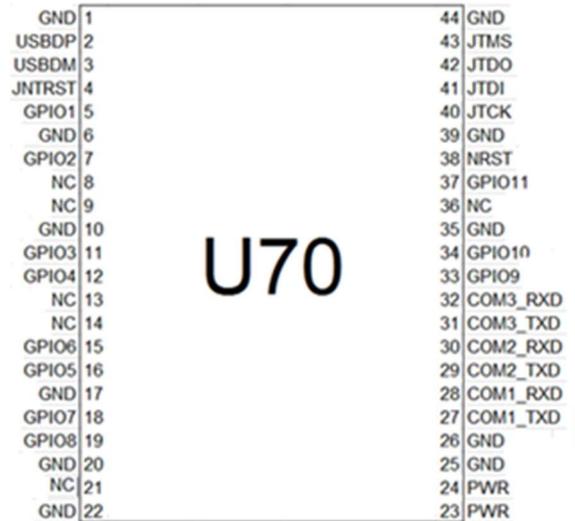


Figure 3. U70 Includes 44-Pin Pad / U70 包括44连接焊盘

Table 2. Pin Definition of U70 44-Pin Pad / U70 44针脚焊盘的针脚定义

PIN	SIGNAL	TYPE	DESCRIPTION	
1	GND	GND	Ground Reference	系统接地
2	USBDP	IO	USB interface data (+)	USB数据信号 (+)
3	USBDM	IO	USB interface data (-)	USB数据信号 (-)
4	JNTRST	I	JTAG RESET	JTAG复位
5	GPIO1	IO	General-purpose input/output	通用输入输出
6	GND	GND	Ground Reference	系统接地
7	GPIO2	IO	General-purpose input/output	通用输入输出
8	NC	/	Not Connected	悬空
9	NC	/	Not Connected	悬空
10	GND	GND	Ground Reference	系统接地
11	GPIO3	IO	General-purpose input/output	通用输入输出
12	GPIO4	IO	General-purpose input/output	通用输入输出
13	NC	/	Not Connected	悬空
14	NC	/	Not Connected	悬空
15	GPIO5	IO	General-purpose input/output	通用输入输出
16	GPIO6	IO	General-purpose input/output	通用输入输出
17	GND	GND	Ground Reference	系统接地

PIN	SIGNAL	TYPE	DESCRIPTION	
18	GPIO7	IO	General-purpose input/output	通用输入输出
19	GPIO8	IO	General-purpose input/output	通用输入输出
20	GND	GND	Ground Reference	系统接地
21	NC	/	Not Connected	悬空
22	GND	GND	Ground Reference	系统接地
23	VCC	PWR	POWER	系统电源
24	VCC	PWR	POWER	系统电源
25	GND	GND	Ground Reference	系统接地
26	GND	GND	Ground Reference	系统接地
27	COM1_TX	O	COM1_TX	COM1串口输出 (暂时不支持数据传输,仅COM1支持升级)
28	COM1_RX	I	COM1_RX	COM1串口输入
29	COM2_TX	O	COM2_TX	COM2串口输出
30	COM2_RX	I	COM2_RX	COM2串口输入
31	COM3_TX	O	COM3_TX	COM3串口输出
32	COM3_RX	I	COM3_RX	COM3串口输入
33	GPIO9	IO	General-purpose input/output	通用输入输出
34	GPIO10	IO	General-purpose input/output	通用输入输出
35	GND	GND	Ground Reference	系统接地
36	NC	/	Not Connected	悬空
37	GPIO11	IO	General-purpose input/output	通用输入输出
38	NRST	IO	Reserve for use	预留
39	GND	GND	Ground Reference	系统接地
40	JTCK	I	JTAG TCK	JTAG时钟输入
41	JTDI	I	JTAG TDI	JTAG数据输入
42	JTDO	O	JTAG TDO	JTAG数据输出
43	JTMS	I	JTAG TMS	JTAG模式选择
44	GND	PWR	Ground Reference	系统接地

### 3.1. Remarks / 说明

#### 1. Electrical Characteristics / 电气特性

COM1\_Tx, COM1\_Rx, COM2\_Tx, COM2\_Rx, COM3\_Tx, COM3\_Rx are LVCMOS 3.3V.

COM1\_Tx, COM1\_Rx, COM2\_Tx, COM2\_Rx, COM3\_Tx, COM3\_Rx为LVCMOS 3.3V电气标准。

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	

## 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\_Tx, COM1\_Rx, COM2\_Tx, COM2\_Rx, COM3\_Tx, COM3\_Rx.

所能承受电压的最大值范围是-0.3V~3.6V的信号如下：COM1\_Tx, COM1\_Rx, COM2\_Tx, COM2\_Rx, COM3\_Tx, COM3\_Rx.

## 3. Supply Voltage / 供电电压

Main power supply (input), voltage range: 3.3V to 3.6V (DC). Voltage ripple and spike demand: <100mV.

主供电电源（输入），电压范围：3.3V~3.6V（直流）。电压纹波和尖峰脉冲需求：<100mV。

## 4. Thermal / 散热

It is recommended that the heat dissipation pad at the bottom of the module be grounded to provide the best heat dissipation of the module.

建议模块底部散热焊盘接地，提高模块散热效果。

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

### 4.1. Module Assembling Note / 模块装配说明

U70 is surface mounted, SMT welding is recommended for assembly.

U70为表贴式模块，推荐使用SMT的焊接方式进行装配。

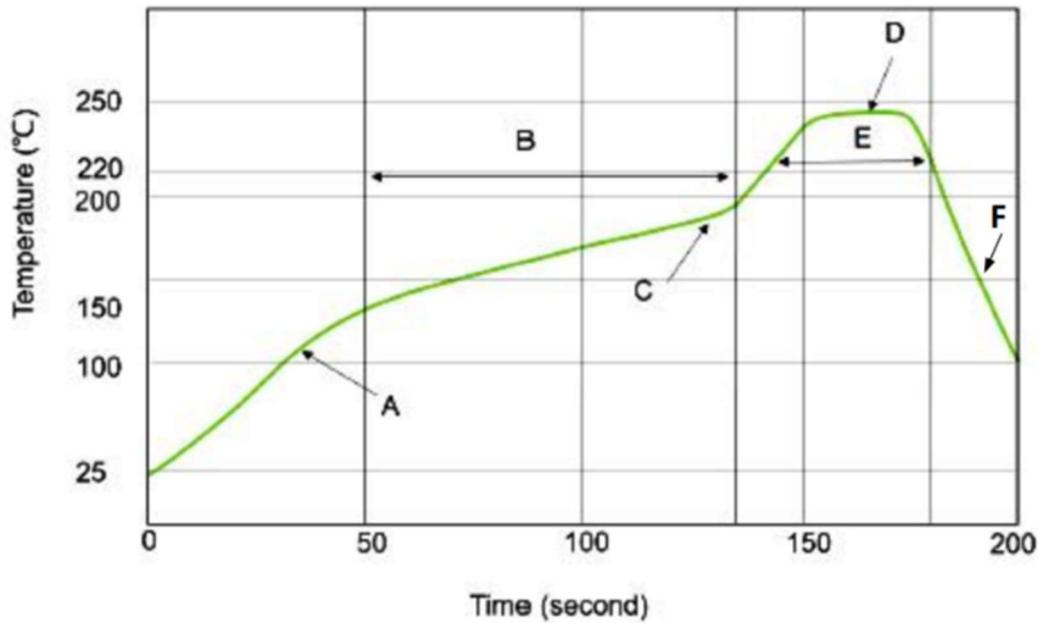


Figure 4. Furnace Temperature Curve / 炉温曲线

The process temperature limits are as follows:

- A: Heating Zone: Rising Slope:  $1 \sim 3^{\circ}\text{C} / \text{sec}$
- B: Constant Temperature Zone: Range:  $150 \sim 190^{\circ}\text{C}$  Time:  $80 \sim 110\text{ S}$
- C: Constant Temperature  $\rightarrow$  Reflow Zone: Rising Slope:  $1 \sim 3^{\circ}\text{C} / \text{sec}$
- D: Peak Temperature:  $235 \sim 245^{\circ}\text{C}$
- E: Reflow Zone: Range: Over  $220^{\circ}\text{C}$  Time:  $50 \sim 80\text{ S}$
- F: Descent Slope:  $-5^{\circ}\text{C} \sim -1^{\circ}\text{C} / \text{sec}$

制程温度界限如下：

- A: 升温区：斜率： $1 \sim 3^{\circ}\text{C} / \text{sec}$
- B: 恒温区： $150 \sim 190^{\circ}\text{C}$  时间： $80 \sim 110\text{S}$
- C: 恒温 $\rightarrow$ 回流区：斜率： $1 \sim 3^{\circ}\text{C} / \text{sec}$
- D: 峰值温度： $235 \sim 245^{\circ}\text{C}$
- E: 回流区：大于 $220^{\circ}\text{C}$  时间： $50 \sim 80\text{S}$
- F: 下降斜率： $-5 \sim -1^{\circ}\text{C} / \text{sec}$

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°C, rising slope under 3°C /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°C，升温斜率不超过3°C/s。

## 5. Application Connection Example / 应用连接示例

In this section, an application connection example of U70 OEM Module is presented via specific schematic diagrams. Per the instruction of these diagrams, you could easily build the communication circuits between U70 OEM Module and other terminals such as PC, GPRS or Bluetooth module, and some other devices with an UART.

本部分以具体电路的形式提供一个U70模块应用连接示例。参照下面的图示，您可以很方便建立U70模块和其他终端（如PC，GPRS模块，蓝牙模块或其他带有UART的设备）之间的通讯电路。

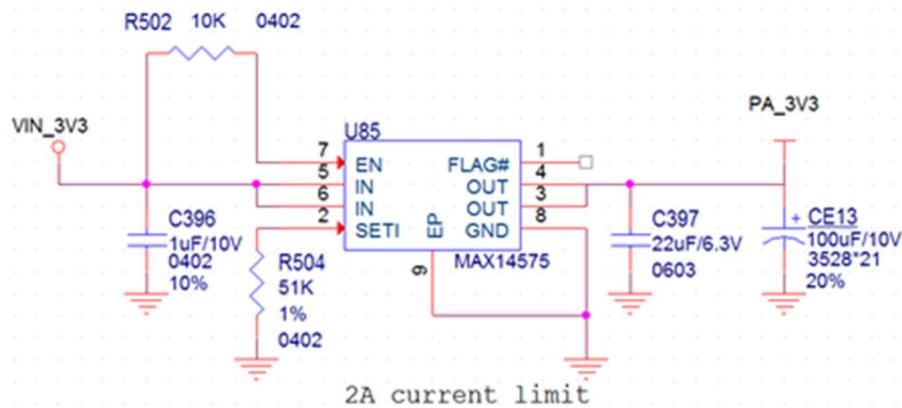


Figure 5. U70 Limiting Current / U70限流设计示意

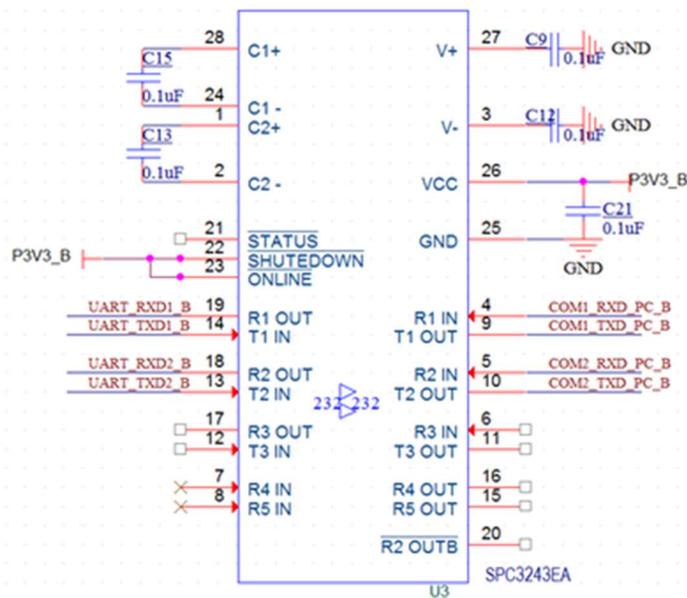


Figure 6. Connections between COM of U70 and some other Devices with an UART /

U70 COM与其他使用UART接口的设备之间的连接原理图

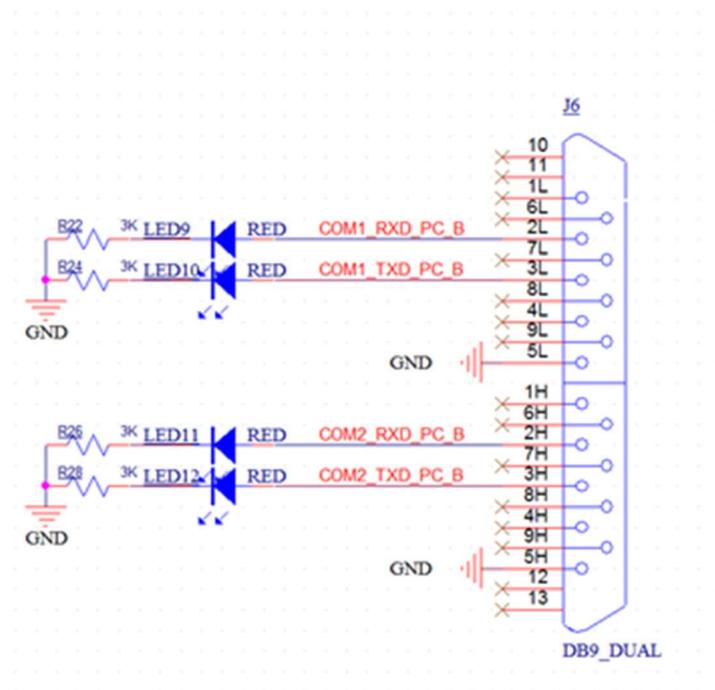


Figure 7. Connection of U70 COM Connector to PC /  
U70 COM与电脑连接原理图

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## 6. Packaging Information / 包装信息

The U70 modules are packed in pallets, and each box provides 100 pieces of U70 modules.

U70 模块使用托盘方式包装，每盒提供 100 片 U70 模块。

Table 4. U70 Package Description / U70包装说明

Project	Description
Number of ESD vacuum bags 防静电真空袋数量	1 Pcs/Box 1个/盒
Humidity card number 湿度卡数量	1 Pcs/Box 1个/盒
Quantity of desiccant 干燥剂数量	1 Pcs/Box 1个/盒
Number of trays: 6 Pcs/Box 托盘数量	6 Pcs/Box 6个/盒 (Note: Modules are not stored on the top tray) (注：最上面的托盘上不存放模块)
Number of modules in each tray 每个托盘中模块数量	20 Slice/Plate 20片/盘
Module quantity 模块数量	100 Slice/Box 100片/盒

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