



司南导航

QinNav  
钦天导航

# PRODUCT SPECIFICATION

# 产品规范

适用于

For

U703 数传 模块

U703 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

U703 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.

U703数传模块是钦天导航专为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	U703
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
Modulation System 调制方式	CSS
Air Baud Rate 空中波特率	500/11000/12500/15500/18000 bps/自定义(customize)
Protocol Type 协议类型	LoRa

Serial Port Baud Rate 串口波特率	4800 bps /9600 bps /19200 bps /38400 bps /115200 bps	
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	0.2 W~0.3W
	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	2.8 W~5.8 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	80 Pin Pin Pitch 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)	33mmx26.5mmx3.6mm
	Weight 重量	5.8g ± 0.1 g

Environmental Characteristics 环境特性	Working Temperature 工作温度	-40 °C~+70 °C
	Storage Temperature 存储温度	-45 °C~+85 °C

## 2. U703 Product Size / U703 尺寸

In this section, product photo, three-side views and the dimension of U703 is provided for customers' further hardware design and installation.

本节提供了U703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. U703 Product Photo / U703 实物图

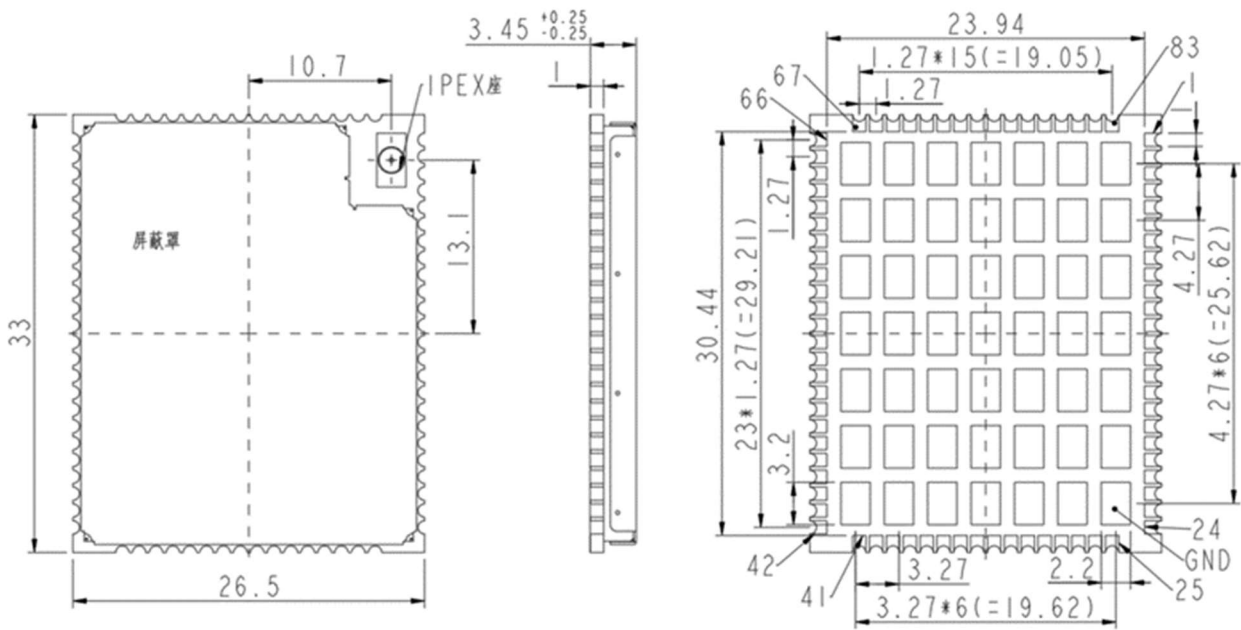


Figure 2. U703 Dimension View / U703 三视图

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

U703 is surface-mount OEM Module which integrates 80 Pin (pitch 1.27mm).

U703包括80Pin, 表贴式模块 (pitch 1.27mm)。

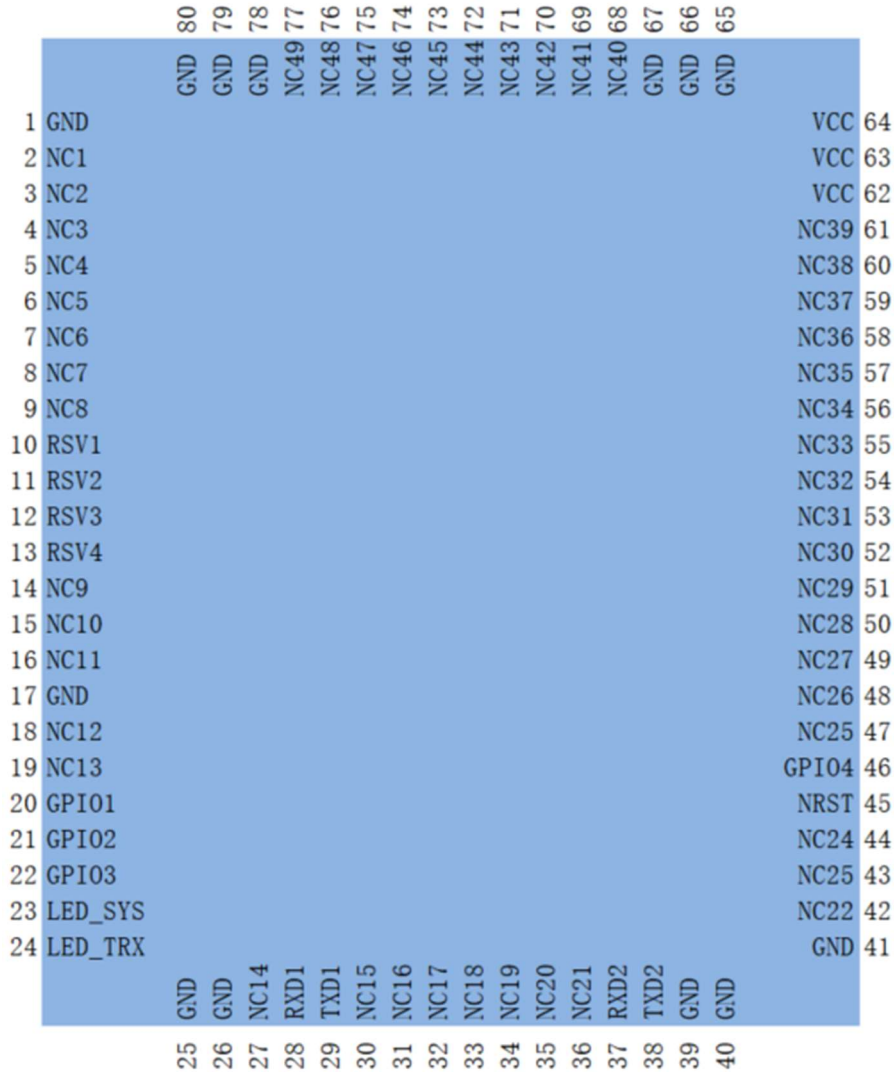


Figure 3. U703 Includes 80-Pin Pad / U703 包括80连接焊盘

Table 2. Pin Definition of U703 80-Pin Pad / U703 80针脚焊盘的针脚定义

PIN	SIGNAL	TYPE	DESCRIPTION	
1	GND	GND	Ground Reference	系统接地
2~9	NC	/	Not Connected	悬空
10~13	RSV	/	Reserve	保留管脚
14~16	NC	/	Not Connected	悬空

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PIN	SIGNAL	TYPE	DESCRIPTION	
17	GND	GND	Ground Reference	系统接地
18~19	NC	/	Not Connected	悬空
20~22	GPIO	I/O	General-purpose input/output	通用IO
23	LED_SYS	I	Receive and transmit signal indicator	系统信号指示灯
24	LED_TRX	O	Receive and transmit signal indicator	接收发射信号指示灯
25~26	GND	GND	Ground Reference	系统接地
27	NC	/	Not Connected	悬空
28	RXD1	I	UART1 input	串口1输入
29	TXD1	O	UART1 output	串口1输出
30~36	NC	/	Not Connected	悬空
37	RXD2	I	UART2 input	串口2输入
38	TXD2	O	UART2 output	串口2输出
39~41	GND	GND	Ground Reference	系统接地
42~44	NC	/	Not Connected	悬空
45	NRST	I	RESET	复位
46	GPIO	I/O	General-purpose input/output	通用IO
47~61	NC	/	Not Connected	悬空
62~64	VCC	PWR	POWER	系统电源
65~67	GND	GND	Ground Reference	系统接地
68~77	NC	/	Not Connected	悬空
78~80	GND	GND	Ground Reference	系统接地

Among the two serial ports of U703, only COM1 supports firmware upgrade.

注：U703 只有 COM1 和 COM2 的两个串口，但是仅 COM1 支持固件升级。

### 3.1. Remarks / 说明

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

RXD1/TXD1 RXD2/TXD2 are LVCMOS 3.3V electrical standard.

RXD1/TXD1 RXD2/TXD2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	$V_{CC}+0.3V$
$V_{IL}$	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	$V_{CC}-0.4V$	--

$V_{OL}$	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: RXD1/TXD1, RXD2/TXD2.

所能承受电压的最大值范围是-0.3V~3.6V的信号如下: RXD1/TXD1, RXD2/TXD2。

## 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

U703 is surface mounted, SMT welding is recommended for assembly.

U703为表贴式模块，推荐使用SMT的焊接方式进行装配。

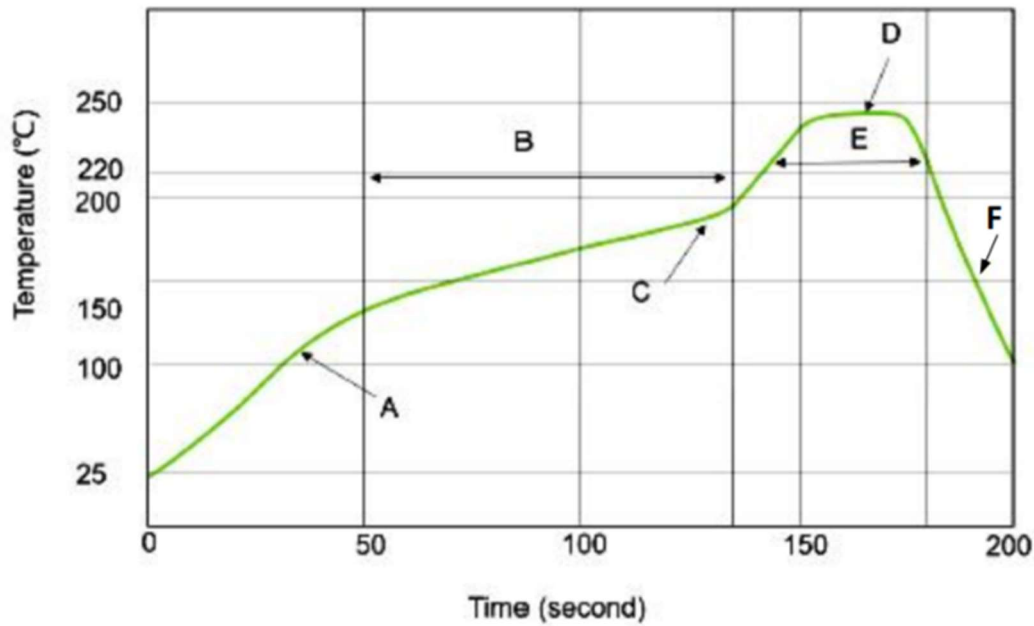


Figure 4. Furnace Temperature Curve / 炉温曲线

The process temperature limits are as follows:

- A: Heating Zone: Rising Slope: 1 ~ 3°C / sec
- B: Constant Temperature Zone: Range: 150 ~ 190 °C Time: 80 ~ 110 S
- C: Constant Temperature→Reflow Zone: Rising Slope: 1 ~ 3°C / sec
- D: Peak Temperature: 235 ~ 245°C
- E: Reflow Zone: Range: Over 220°C Time: 50 ~ 80 S
- F: Descent Slope: -5°C ~ -1°C / sec

制程温度界限如下:

- A: 升温区: 斜率: 1 ~ 3°C / sec
- B: 恒温区: 150 ~ 190°C 时间: 80 ~ 110S
- C: 恒温→回流区: 斜率: 1 ~ 3°C / sec
- D: 峰值温度: 235 ~ 245°C
- E: 回流区: 大于220°C 时间: 50 ~ 80S
- F: 下降斜率: -5 ~ -1°C / 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 U703 OEM Module is presented via specific schematic diagrams. Per the instruction of these diagrams, you could easily build the communication circuits between U703 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U703模块应用连接示例。参照下面的图示，您可以很方便建立U703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。

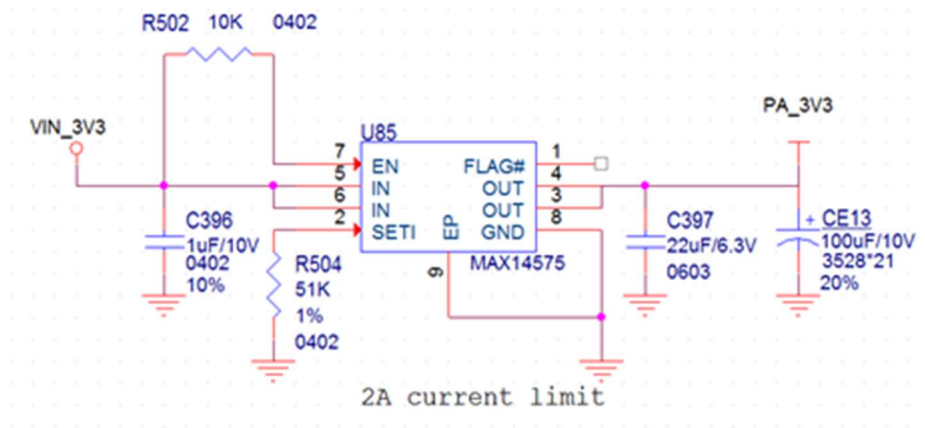


Figure 5. U703 Limiting Current / U703限流设计示意

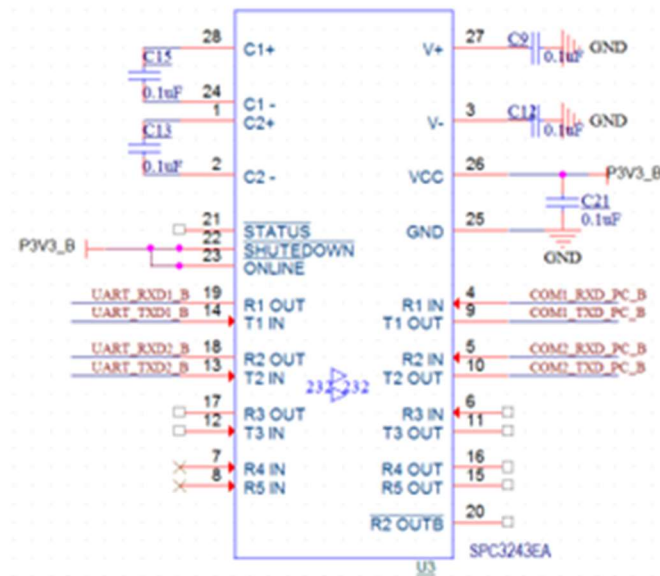


Figure 6. Connections between COM of U703 and some other Devices with an UART /

U703 COM与其他使用UART接口的设备之间的连接原理图

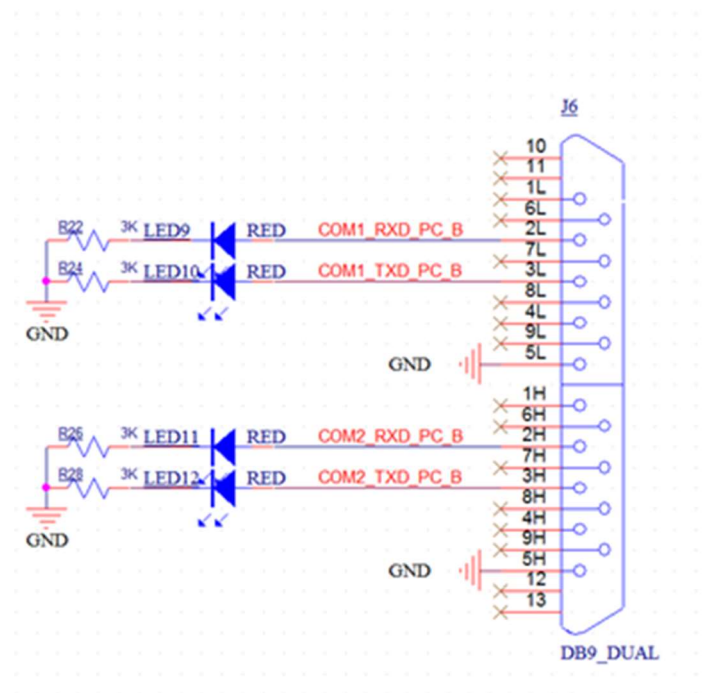


Figure 7. Connection of U703 COM Connector to PC /

U703 COM 与电脑连接原理图

## 6. Packaging Information / 包装信息

U703 module is packaged in a vacuum-sealed aluminum foil electrostatic bag containing desiccant and moisture proof by means of carrier tape and coil (applicable to mainstream surface mount equipment). 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°C, the modules need to be removed from the packaging during baking operation.

U703 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，内含干燥剂防潮。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°C，在进行烘烤作业时需要将模块从包装中取出。

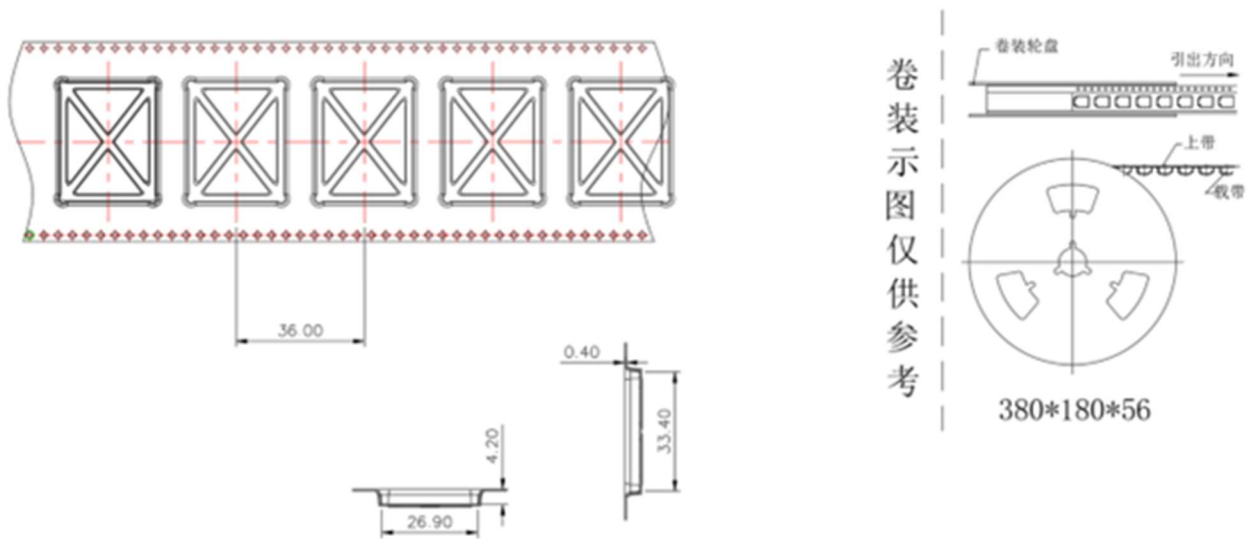


Figure 8. U703 Roll Tape Packing / U703卷带包装

Table 4. U703 Package Description / U703包装说明

Project	Description
Number of Modules 模块数量	300 Slice/Roll 300片/卷
Reel Size 卷盘尺寸	Material tray:15 inches 料盘: 15寸
	Outer diameter: 380mm, inner diameter: 180mm, width: 56mm, wall thickness: 4.2mm 外径380mm, 内径180mm, 宽56mm, 壁厚4.2mm
	Package of each module: length 33.40mm, width 26.90mm

	每个模块包装: 长33.40mm, 宽26.90mm
Carrier Belt 载带	Module Spacing (Center Distance): 36mm 模块间距 (中心距) : 36mm

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