



产品规格书 Specification

产品名称 Product name : 蓝牙模块 Bluetooth module

产品型号 Product model: F-6988 V2.3

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一、产品概述 Product overview:

F-6988 蓝牙模块为本公司自主开发的智能型无线音频数据传输产品，是低成本的高性价比的立体声无线传输方案，模块采用了 BEKEN 的 BK3266 芯片 QFN40 封装设计。F-6988 蓝牙模块采用免驱动方式，客户只需要把模块接入应用产品，就可以快捷地实现音乐的无线传输，享受无线音乐的乐趣，而且支持简单的数据传输功能。支持智能语音提示及报号功能；集成 TF 卡播放功能；集成移动 U 盘播放功能；支持内部 LINE-IN；支持内部 MIC 通话。

F-6988 is the Bluetooth module for intelligent wireless audio transmission products designed by our company . F-6988 also is the low cost stereo audio Bluetooth solution with high performance. The main chip uses BEKEN BK3266 chip QFN40 packaging design. Without any driver, you can connect the module with your device to enjoy the high quality music easily and simple data transmission functions.It supports intelligent voice prompting and reporting number function, integrated TF card playback function and integrated mobile USB-disk playback function. It also supports internal LINE-IN

二、应用领域 Application area:

该模块主要用于短距离的音乐传输，可以方便地和笔记本电脑，手机，PDA 等数码产品的蓝牙设备相连，实现音乐的无线传输。

F-6988 is used for Bluetooth audio transmission and it is convenience to connect with mobile phone, personal computer, PDA and other digital products with Bluetooth hardware to enjoy the music wirelessly.The major application are included

- ※ 高档蓝牙音响 Bluetooth speaker
- ※ 蓝牙立体声耳机 Bluetooth stereo headset
- ※ 免提电话 Hands-free Phone
- ※ 蓝牙无线传输音频 Bluetooth speaker with data transmission
- ※ 蓝牙数传应用 Bluetooth data transmission application
- ※ 支持移动互联周边设备 Support for mobile internet peripheral devices



※ 蓝牙智能音响 Bluetooth Smart Speaker

三、基本特性 Features:

Bluetooth Profiles

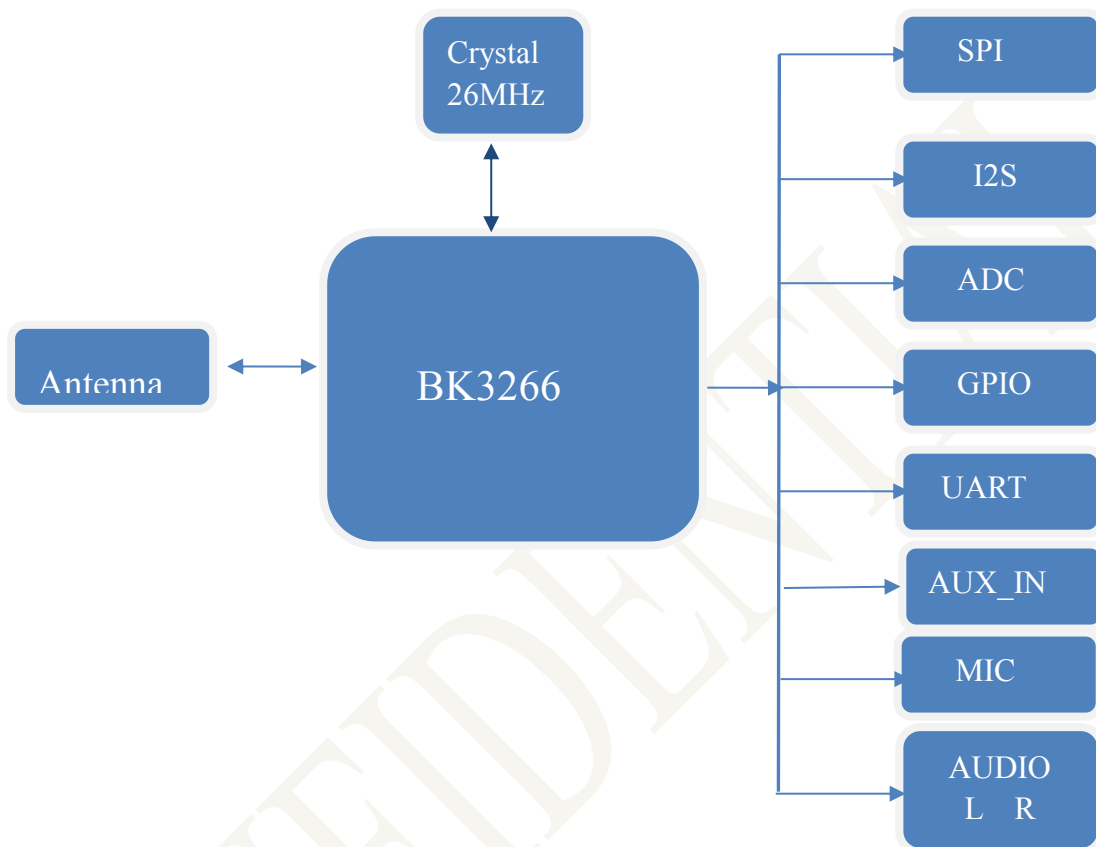
- ※ Bluetooth V4.2 specification support
- ※ 9 mA average current for A2DP
- ※ 0.8 uA deep sleep current
- ※ Bluetooth 4.2 classic and low energy
- ※ A2DP v1.3, AVRCP v1.6, HFP v1.7, HID v1.1, AVCTP v1.4, AVDTP v1.3, and SPP v1.2
- ※ True wireless stereo and two active link
- ※ Two wires UART download interface
- ※ 16 bits stereo ADC and DAC
- ※ Stereo line in and dual microphone
- ※ Five bands digital hardware equalizer
- ※ SPI, UART, I2C, SDIO and USB
- ※ I2S master and slave interface with MCLK output
- ※ Interface for external PA and LNA
- ※ Up to 220 mA battery charge controller

四、性能参数 performance parameter:

型号 Model	F-6988
蓝牙规格 Bluetooth specification	Bluetooth V4.2
供电电压 Service voltage	DC3.3-4.2V
支持蓝牙协议 Bluetooth Profile	A2DP v1.2, AVRCP v1.5, HFP v1.7, AVCTP v1.4, AVDTP v1.2,
工作电流 Supply voltage	≤20mA
待机电流 Standby current	<500uA
温度范围 Temperature range	-40°C to +80°C
无线传输范围 The wireless transmission range	>10 米(meter)
传输功率 Transmission power	CLASS2, 4dbm
灵敏度 Sensitivity	-81dBm<0.1%BER
频率范围 Frequency range	2.402GHz-2.480GHz
对外接口 The external interface	SPI, UART, I2C, GPIO,SDIO and USB
音频性能 Audio performance	SBC 解码(decode)
音频信噪比 The audio signal to noise ratio	≥75dB
模块尺寸 Module size	25 X 13.5 X 2mm

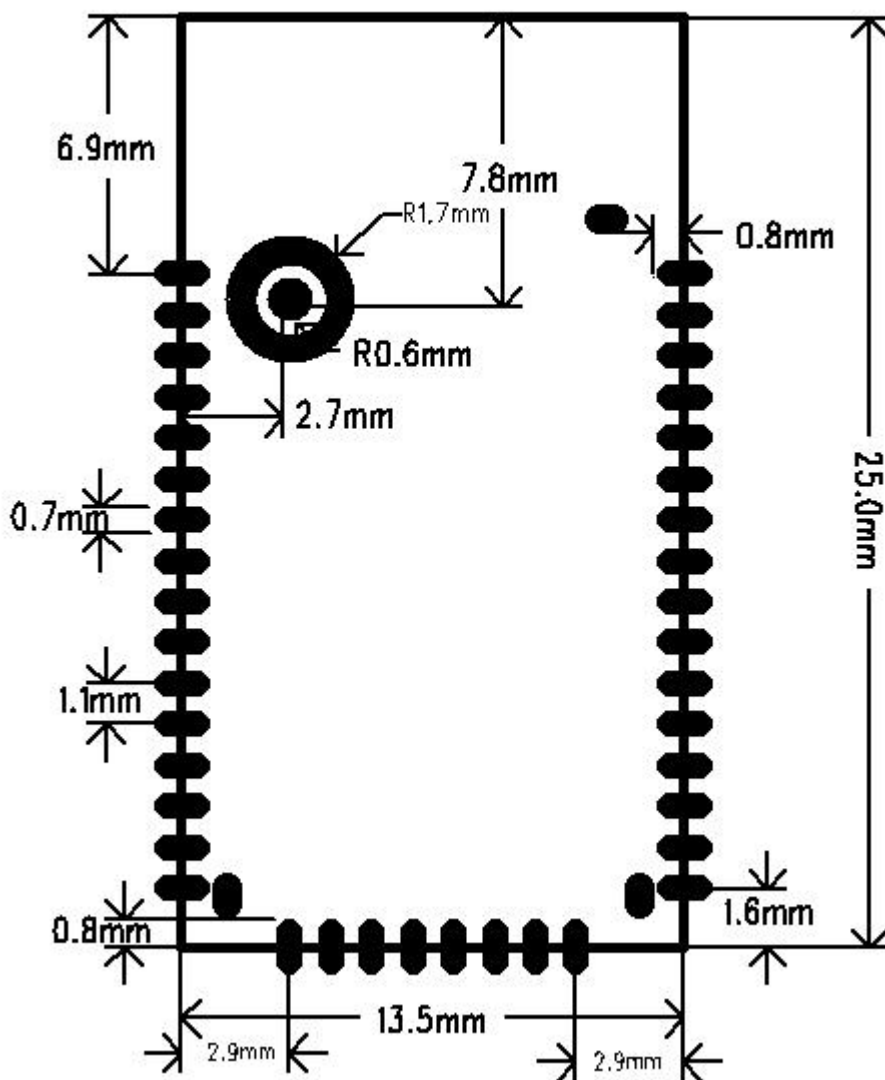


五、方框图 Module block diagram:



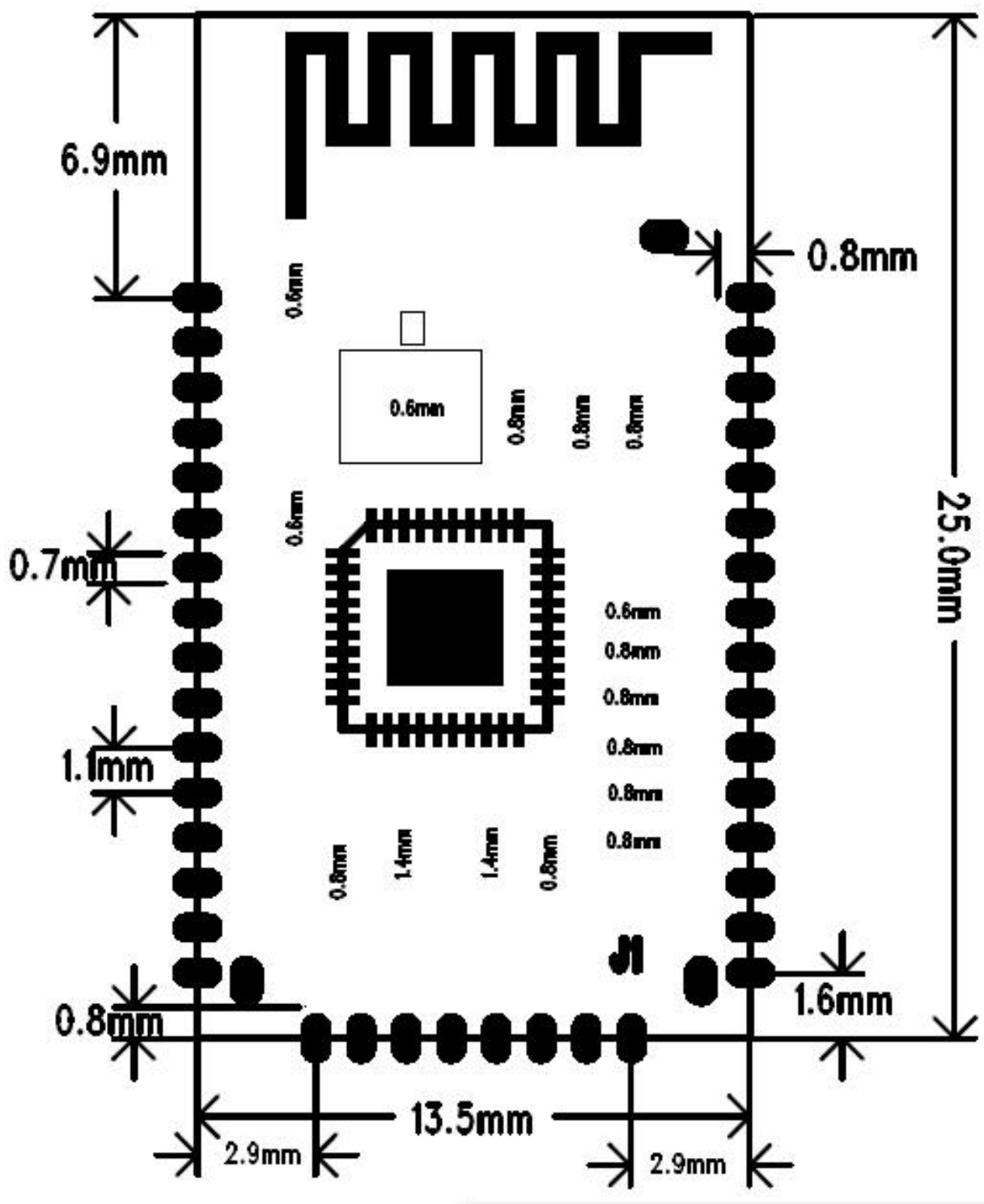


六、模块尺寸图 The size of the module graph:



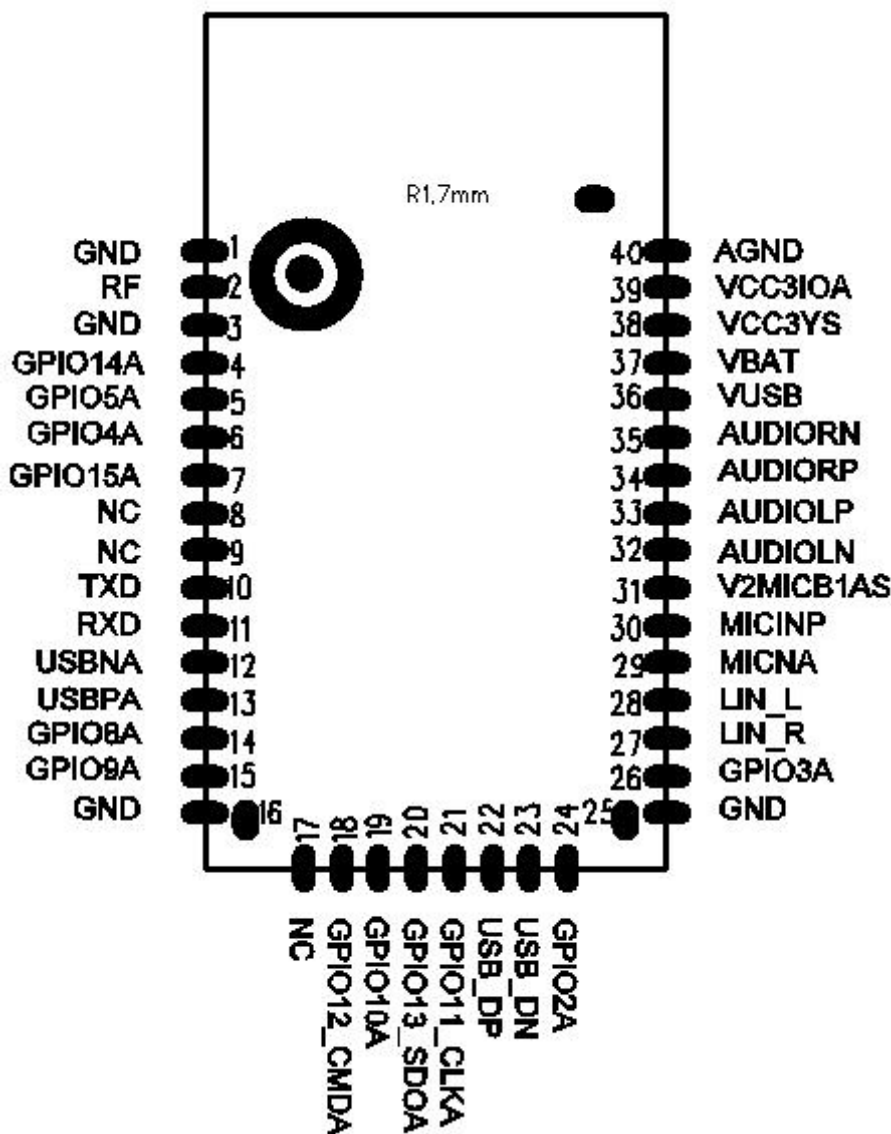


七、模块的封装物料高度尺寸 Module packaging material height dimensions:





八、模块脚位定义图 Device pin out diagram:



九、引脚功能说明 Pin definition:

Pin	Symb	I/O	Description
1	GND	GND	RF_GND
2	RF	RF	RF_OUT / NC
3	GND	GND	RF_GND
4	GPIO14	Digital I/O	GPIO14, JTAG_TDO/PWM5/ADC7/PCM_DOUT
5	GPIO5	Digital I/O	GPIO5,SPI_MISO//I2C_SDA
6	GPIO4	Digital I/O	GPIO4,SPI_MOSI//I2C_SCL



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7	GPIO15	Digital I/O	GPIO15, Soft shut down and wake up (active high)
8	NC	NC	NC
9	NC	NC	NC
10	TXD	Digital I/O	GPIO0, UART_TXD/I2C_SCL, Download port
11	RXD	Digital I/O	GPIO1, UART_RXD/I2C_SDA, Download port
12	USB_DN/NC	Digital I/O	GPIO7, PWM1 / USBN./NC
13	USB_DP/NC	Digital I/O	GPIO6, PWM0 / USBP./NC
14	GPIO8	Digital I/O	GPIO8, SD_CLK//SPI2_SCK
15	GPIO9	Digital I/O	GPIO9, SD_CMD/TX_EN/SPI2_MOSI
16	GND	GND	Ground connect battery negative
17	NC	NC	NC
18	GPIO12_CMD	Digital I/O	GPIO12,JTAG_TMS/PWM3/PCM_CLK/SD_CMD/ SPI2_MOSI
19	GPIO10	Digital I/O	GPIO10, SD_DATA0/RX_EN/SPI2_MISO
20	GPIO13_SDO	Digital I/O	<div style="border: 1px solid black; width: 100px; height: 15px; margin-bottom: 5px;"></div> GPIO13,JTAG_TDI/PWM4/ADC6/PCM_DIN/S D_DATA0/SPI2_MISO
21	GPIO11_CLK	Digital I/O	GPIO11,JTAG_TCK/PWM2/ADC4/PCM_SYNC/S D_CLK//SPI2_SCK
22	USB_DP	Digital I/O	GPIO6, PWM0 / USBP
23	USB_DN	Digital I/O	GPIO7, PWM1 / USBN
24	GPIO2	Digital I/O	GPIO2, SPI_CSN/ADC1/IrDA/Capture Time
25	GND	GND	GND
26	GPIO3	Digital I/O	GPIO3, SPI_SCK/ADC2/CLKOUT
27	LIN_R	AUX_INPUT	LINR
28	LIN_L	AUX_INPUT	LINL
29	MICINN	MIC-NC	Microphone input negative./NC
30	MICINP	MIC+	Microphone input positive
31	V2MICB1AS	VMIC	Microphone reference voltage
32	AUDIOLN	Audio output	Audio left channel negative
33	AUDIOLP	Audio output	Audio left channel positive
34	AUDIORP	Audio output	Audio right channel positive
35	AUDIORN	Audio output	Audio right channel negative
36	VUSB	Power	VUSB (4.7-5.2V)
37	VBAT	Power supply	Power supply(3.3V-4.2V)
38	VCC3YS	Power	3.3V OUTPUT
39	VCC3IO	VCCSD	SD POWER
40	AGND	AGND	AGND



十、电路连接注意 Design notes:

F-6988 模块应用过程中，请注意避免功放、升压线路，DC/DC 电路等干扰源对模块的影响，避免模块供电回路同大功率电路单元形成串联回路，以此来提高整机 SNR；AGND 必须连接后级功放大地。

In order to better SNR, please pay attention to the hardware design of PA, DC booster, DC/DC circuit and the module power circuit to avoid influencing module; AGND must be connected to the earth of the power amplifier of the following stage.

十一、注意事项 Note:

A. 关于无线蓝牙的使用环境，无线信号包括蓝牙应用都受周围环境的影响很大，如树木、金属等障碍物会对无线信号有一定的吸收，从而在实际应用中，数据传输的距离受一定的影响。

The signal strength is depending on the environment of Bluetooth application, such as wood and metal will block the transmission signal to get the shorter transmission distance.

B. 由于蓝牙模块都要配套现有的系统，放置在外壳中。由于金属外壳对无线射频信号是有屏蔽作用的。所以建议不要安装在金属外壳中。

Because of metal will block the signal transmission, it is recommend not to using the metal housing.

C. PCB 布板：蓝牙模块的天线部分的是 PCB 天线，由于金属会削弱天线的功能，在给模块布板的时候，模块天线下面严禁铺地和走线，若能挖空更好。

PCB layout guideline: no any copper existed in the antenna area of the module is the PCB antenna, the metal will weaken the function of the antenna when the antenna module to the module board, following prohibited paving and walk the line.

D. 如果模组天线旁边有电池，金属物，液晶屏，喇叭等，要求离天线距离至少 15mm

If the module antenna next to the battery、metal, liquid crystal screen, loudspeaker, at least keep them away from antenna distance 15mm

E. layout 时供电线路建议使用星形走线，并确保蓝牙模组供电线性度要好，还有 BT 的地须与



运放，功放，MCU 等的地分开，而且 BT 下侧不可有其他干扰地

When layout the power supply line recommended star line, and to ensure that the Bluetooth module Power supply lines is better , and BT should be with the amplifier, power amplifier, MCU, separately, and the underside of the BT has no other interference.

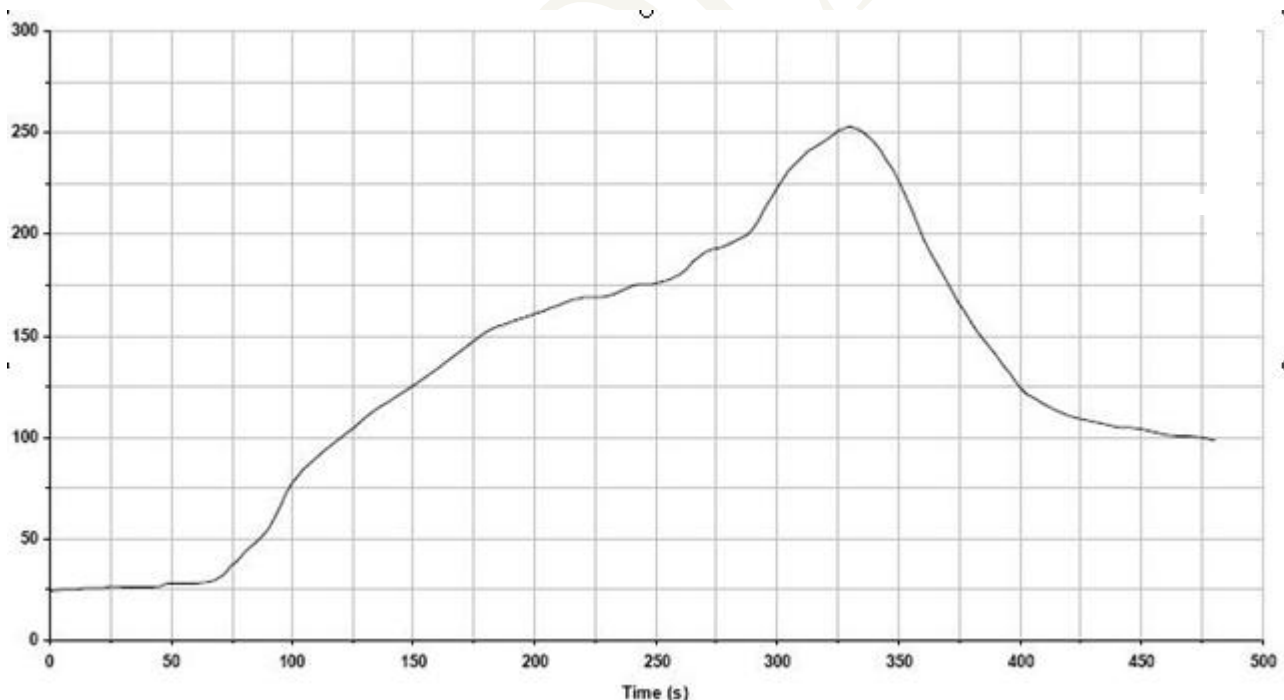
F. 天线周围不可走控制线，电源线，音频线，MIC 等干扰线.

suggests the module antenna part floating on the floor, do not go around the antenna control line, power line, audio line, MIC interference lines;

G. 如果模组天线附近有排座，外壳有金属铁网等对信号有影响的，建议选用专业的高增益天线。

If the module antenna near the row seats, Because of metal will block the signal transmission, it is recommended to use professional high-gain antenna.

十二、推荐回流温度 Recommended reflow temperature:



Key features of the profile:

- Initial Ramp=1-2.5°C/sec to 175°C equilibrium
- Equilibrium time=60 to 80 seconds
- Ramp to Maximum temperature (250°C)=3°C/sec Max
- Time above liquidus temperature(217°C): 45 - 90 seconds
- Device absolute maximum reflow temperature: 250°C



十三、应用原理图 Application schematic diagram:

参考原理图仅供参考应用!

Reference schematic diagram for reference purposes only!

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