



产品规格书 Product Details Specification

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FR-SSAM	A 1	2023.09.10	1/7

■ 产品概述 Product Overview

FR-SSAM空气质量气体+温湿度传感器模组是一款采用MEMS工艺的微型气体传感器；可以精准检测出当前环境下的空气质量情况，对烟雾和空气中的异味很明感，可以用来作为净化器智能家居车载产品的场景；同时FR-SSAM模组可以检测周围环境的温湿度，提供精准的数据参考。

The FR-SSAM air quality gas + temperature and humidity sensor module is a miniature gas sensor using MEMS process, which can accurately detect the air quality in the current environment, and is very sensitive to smoke and odor in the air, which can be used as a purifier smart home vehicle product scene, and the FR-SSAM module can detect the temperature and humidity of the surrounding environment and provide accurate data reference.

■ 主要特性 Features

- ✦ 精度高、寿命长、耐低温

High precision, long life, low temperature resistance

- ✦ 响应速度快，开机立即响应，回零快

Fast response speed, fast back to zero

- ✦ 抗中毒性良好

Good anti-toxicity

- ✦ 采用 UART 数字信号输出

UART digital signal output

- ✦ 耐久可靠，3 年以上

Durable and reliable, more than 3 years

- ✦ 优良的精度、可重复性、线性、一致性

Excellent accuracy, repeatability, linearity, consistency

- ✦ 抗电磁干扰能力强

Strong anti-electromagnetic interference ability

- ✦ 带固定安装孔，方便安装

With fixed mounting holes for easy installation

■ 主要应用 Application

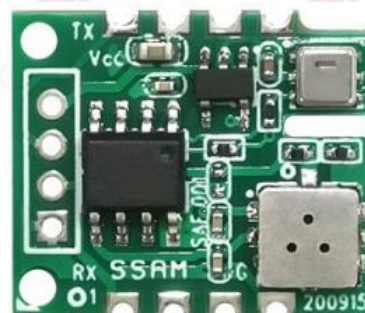
- ✦ 空气净化器Air purifiers

- ✦ 智能烟灰缸Smart ashtray

- ✦ 智能新风系统智能家居Smart Fresh Air System Smart Home

- ✦ 空气检测报警器Air detection alarm

- ✦ 空气检测仪等Air detectors, etc





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■ 技术指标 Technical Indicators

产品型号 Model	FR-SSAM
产品类型 Type	MEMS半导体传感器 MEMS semiconductor sensors
标准封装 Package	陶瓷封装贴装在PCB上 The ceramic package is mounted on the PCB
检测气体 Detection of gases	烟雾, VOC, 酒精 Smoke, VOCs, Alcohol
检测浓度 Detection of concentration	0~500ppm(乙醇) 0~500ppm(ethanol)
分辨率 Resolution	1ppm
工作温度 Operating temperature	-10~55℃
工作湿度 Operating humidity	10~90RH
预热时间 Warm-up time	无, 开机立即启动 None, boot up immediately
响应时间 (T90) Response time (T90)	<5s
恢复时间 (T10) Recovery Time (T10)	<5s
功耗 Power consumption	<40mW
寿命 Life	≥3年 ≥3years
温度 Temperature	-40~80度, 精度±0.3 -40~80℃, Accuracy±0.3
湿度 Humidity	0~100%RH, 精度±3%RH 0~100%RH, Accuracy±3%RH

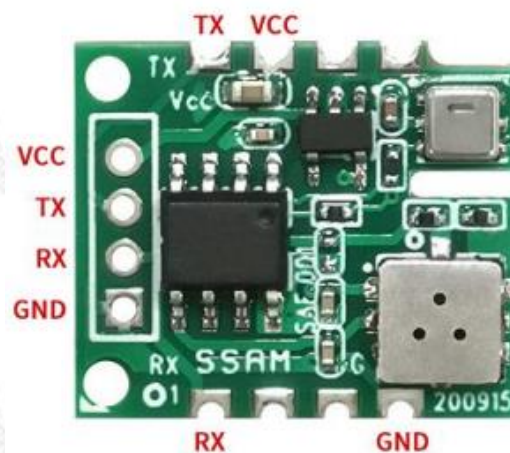


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■ 接口定义 Interface Definition

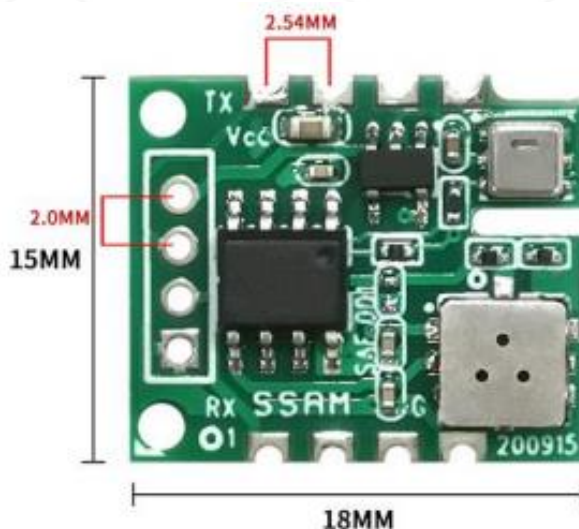
1	RXD(UART input)
2	NC
3	NC
4	GND
5	NC
6	NC
7	VCC(3.3V)
8	TXD(UART output)



■ 外观尺寸 Size

单位unit:mm

18*15*3mm



■ 包装 Package

拼版或者托盘

Imposition or tray



东莞富锐仕电子科技有限公司

Dongguan Forest Electronic Technology CO.,LTD.



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■ 串口协议 Serial Communication Protocol

一、通信协议：串行通讯方式配置参数：

Communication protocol: serial communication mode configuration parameters:

波特率Baud rate	数据位Data bits	停止位Stop bits	校验位Check bits
9600	8 bits	1 bits	无 None

二、模组主动上传数据The module actively uploads data:

1、模组主动发送 8 个字节的数据包，数据解析如下：

The module actively sends an 8-byte packet, and the data is parsed as follows:

数据包序 Packet order	名称(单位)Name (Unit)	描述 Description
0	码头 UDS	0x2C
1-2	空气质量 TVOC(10ug/m ³)	Data[1]*28+Data[2]
3-4	温度 Temperature(0.1 °)	Data[3]*28+Data[4]
5-6	湿度 Humidity(0.1%RH)	Data[5]*28+Data[6]
7	校验和 Checksum	前 7 个字节累加的和 The sum of the first 7 bytes

温湿度重要说明 Important instructions for temperature and humidity:

1、温度采用的 16 位无符号数表示，当最高位出现为 '1' 的时候，表示该温度数据实际是零下，需要用 0x10000(或者 0xFFFF),减去当前数据，即得到当前的温度，注意是零下；比如：

-10=1111111111110110B=0xffff6,用 0x10000-0xffff6=0x000a=10，加上零下标记就是-10

When the highest digit appears as '1', it means that the temperature data is actually below zero, and you need to use 0x10000 (or 0xFFFF) to subtract the current data to get the current temperature, note that it is below zero, for example: -10 = 1111111111110110B = 0xffff6, use 0x10000-0xffff6=0x000a=10, plus the sub-zero mark is -10

2、实际环境温度的补偿，温湿度传感器在模块上会受到 PCB 当前的环境影响，当焊接到系统板上后可能还会受到影响，补偿情况需要根据系统整机板上的为准，如有相关疑问，可以联系我司技术人员；

Compensation of actual ambient temperature, temperature and humidity sensor on the module will be affected by the current environment of the PCB, when soldered to the system version may also be affected, the compensation needs to be based on the whole board of the system, if you have any relevant questions, you can contact our technical staff;

3、单位：温度的单位是 0.1 °，即所读取的数据需要*0.1=实际的温度值，0x013d=317*0.1 °=31.7 °；湿度的单位是 0.1%。

Unit: The unit of temperature is 0.1 °, that is, the data to be read needs *0.1=actual temperature value, 0x013d=317*0.1 °=31.7 °, and the unit of humidity is 0.1%.

4、温度的数据，可能会出现负数，按照负数处理即可，最高位为 1，表示零下，按照负数处理。The highest digit is 1, which means below zero, and is treated as a negative number.

地址：东莞市东城街道莞长路东城段53号1栋202号

Add: Room 202, Building 1, No. 53, Dongcheng Section, Guanchang Road, Dongcheng Street, Dongguan

Mobile: 18929273459 / 18922972749

Http: www.forest-electron.com

E-mail: forest_vip@163.com



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■ 注意事项 Notes

1.必须避免的情况 Situations that must be avoided:

❖ 暴露于可挥发性硅化合物蒸气中：传感器要避免暴露于硅粘接剂、发胶、硅橡胶、腻子或其它存在可挥发性硅化合物的场所。如果传感器表面吸附了硅化合物蒸气，传感器的敏感材料会被硅化合物分解形成的二氧化硅包裹，抑制传感器的敏感性，且不可恢复。

Exposure to volatile silicone vapors: Avoid exposure to silicone adhesives, hairsprays, silicone rubber, putty, or other locations where volatile silicone compounds are present. If silicon compound vapor is adsorbed on the surface of the sensor, the sensitive material of the sensor will be encapsulated by the silicon dioxide formed by the decomposition of the silicon compound, which will inhibit the sensitivity of the sensor and cannot be recovered.

❖ 高腐蚀性的环境：传感器暴露在高浓度的腐蚀性气体（如 H_2S ， SO_x ， Cl_2 ， HCl 等）中，不仅会引起加热材料及传感器引线的腐蚀或破坏，并会引起敏感材料性能发生不可逆的劣变。

Highly corrosive environment: Sensor exposure to high concentrations of corrosive gases (such as H_2S , SO_x , Cl_2 , HCl , etc.) will not only cause corrosion or damage to heating materials and sensor leads, but also cause irreversible deterioration of sensitive material properties.

❖ 碱、碱金属盐、卤素的污染：传感器被碱金属尤其是盐水喷雾污染后，或暴露在卤素如氟利昂中，也会引起性能劣变。

Alkali, alkali metal salts, halogens: Sensors can also cause performance degradation when they are contaminated with alkali metals, especially salt water sprays, or when exposed to halogens such as freons.

❖ 接触到水：溅上水或浸到水中会造成传感器敏感特性下降。在室内使用条件下，轻微凝结水对传感器性能会产生轻微影响。但是，如果水凝结在敏感层表面并保持一段时间，传感器特性则会下降。

Exposure to water: Splashing or immersing in water can reduce the sensitivity of the sensor. Under indoor conditions, slight condensation can have a slight impact on sensor performance. However, if water condenses on the surface of the sensitive layer and remains there for a period of time, the sensor characteristics will deteriorate.

❖ 结冰：水在传感器敏感材料表面结冰会导致敏感层碎裂而丧失敏感特性。

Icing: Water freezing on the surface of the sensor's sensitive material can cause the sensitive layer to fragment and lose its sensitive properties.

❖ 施加电压过高：如果给传感器或加热器施加的电压高于规定值，即使传感器没有受到物理损坏或破坏，也会造成引线 and/或加热器损坏，并引起传感器敏感特性下降。

Applied Voltage Too High: If a voltage is applied to a sensor or heater higher than the specified value, even if the sensor is not physically damaged or destroyed, it can cause damage to the leads and/or heater and cause a decrease in the sensor's sensitive characteristics.

❖ 电压加错管脚：如果给传感器或加热和信号管脚电压加错，也会造成引线 and/或加热器损坏，并引起传感器敏感特性下降。

Voltage Misplacement Pins: Misapplying voltage to the sensor or heating and signal pins can also cause damage to the leads and/or heaters and degrade the sensor's sensitivity characteristics.

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2. 尽可能避免的情况，违反以下使用条件将使传感器特性下降If you try to avoid the following conditions of use, the characteristics of the sensor will be degraded:

❖ 处于高浓度气体中：无论传感器是否通电，在高浓度气体中长期放置，均会影响传感器特性。如用打火机气直接喷向传感器，会对传感器造成极大损害。

Presence in a high concentration of gas: Long-term exposure to a high concentration of gas, regardless of whether the sensor is energized or not, will affect the sensor characteristics. If lighter gas is sprayed directly into the sensor, it can cause great damage to the sensor

❖ 长期贮存：传感器在不通电情况下长时间贮存，其电阻会产生可逆性漂移，这种漂移与贮存环境有关。传感器应贮存在不含可挥发性硅化合物的密封袋中。经长期贮存的传感器，在使用前需要更长时间通电以使其达到稳定。

Long-term storage: If the sensor is stored for a long time without power, its resistance will produce a reversible drift, which is related to the storage environment. The sensor should be stored in a sealed bag that does not contain volatile silicone compounds. Sensors that have been stored for a long time need to be powered on for a longer period of time before use to stabilize them.

贮存时间及对应的老化时间建议（放置时间低于3天的芯片不用预先老化）：

Recommended storage time and corresponding aging time (chips that have been placed for less than 3 days do not need to be pre-aged):

贮存时间Storage time	建议老化时间Aging time is recommended
1个月以下Less than 1 month	不低于24小时Not less than 24 hours
1-6个月1-6 months	不低于48小时Not less than 48 hours
6个月以上More than 6 months	不低于72小时Not less than 72 hours

❖ 长期暴露在极端环境中无论传感器是否通电，长时间暴露在极端条件下，如高湿、高温或高污染等极端条件，传感器性能将受到严重影响。

Long-term exposure to extreme environments, regardless of whether the sensor is powered on or not, and prolonged exposure to extreme conditions, such as high humidity, high temperature, or high pollution, will seriously affect sensor performance.

❖ 振动：频繁、过度振动会导致传感器内部引线产生共振而断裂。在运输途中及组装线上使用气动改锥/超声波焊接机会产生此类振动。

Vibration: Frequent and excessive vibration can cause the internal leads of the sensor to resonate and break. These vibrations are generated by the use of pneumatic cone/ultrasonic welding machines during transport and on the assembly line.

❖ 冲击：如果传感器受到强烈冲击或跌落会导致其引线断裂。

Shock: If the sensor is subjected to a strong shock or drop, its leads will break.

❖ 防静电：在移动和移动过程中，需要使用防静电托盘或者佩戴放进点手环操作。

Anti-static: In the process of moving and moving, it is necessary to use an anti-static tray or wear a put in point bracelet to operate.



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3、气体传感器主要作用是检测气体成分与含量，请不要让传感器任何部位接触液体。

The main function of the gas sensor is to detect the composition and content of gas, please do not let any part of the sensor come into contact with liquid.

4、禁止插拔模组上的传感器。

It is forbidden to plug or unplug the sensors on the module.

5、禁止改动、移动电子元件安装状态。

It is forbidden to change or move the installation status of electronic components.

6、传感器的通气面不要阻塞、污染，孔阻塞是导致灵敏度降低、响应时间变慢的原因。

Do not block or contaminate the vent surface of the sensor, and the blocked hole is the cause of reduced sensitivity and slower response time.

7、禁止超限使用模组。

It is forbidden to use mods beyond the limit.

8、不可过度撞击或振动，外壳有损伤等情况，请确保结构无损下使用，否则输出将不再可靠。

Do not excessive impact or vibration, the shell is damaged, etc., please ensure that the structure is not damaged, otherwise the output will no longer be reliable.

9、高浓度气体环境中长期使用后恢复到初期状态较缓慢，回复速度与超量程倍数成正比。

After long-term use in a high-concentration gas environment, the recovery rate is slow to return to the initial state, and the recovery speed is proportional to the overrange multiple.

10、请不要拆开传感器，拆开会损坏传感器。

Please do not disassemble the sensor, it will damage the sensor.

11、传感器的交叉干扰，一般而言，每种传感器都对应一个特定的检测气体，在使用气体传感器时，应尽量避免其他气体对该传感器的检测干扰，以保证他对特定气体的准确检测。

In general, each sensor corresponds to a specific detection gas, and when using a gas sensor, the detection interference of other gases should be avoided as much as possible to ensure the accurate detection of a specific gas.

12、测量范围与精度，请根据应用环境和浓度需求来选择量程和精度匹配的传感器，否则可能会无法分辨浓度和判断准确数据，并损坏传感器。

Measurement range and accuracy, please choose a sensor with matching range and accuracy according to the application environment and concentration requirements, otherwise it may not be possible to distinguish the concentration and judge the accurate data, and the sensor will be damaged.

13.东莞富锐仕公司只承担本产品自身不良问题，对不良品进行退换处理，不承担其它费用责任。

Dongguan Forest company only bear the problems of the product itself, and return or exchange the defective products, do not accept other expenses.

14.东莞富锐仕公司的产品验收期为15天。验收期过后视为产品验收合格，东莞富锐仕公司不再接受退货。

The product acceptance period of Dongguan Forest company is 15 days. After the acceptance period, the product shall be deemed to have passed acceptance, and Dongguan Forest Company will not accept the returns..