

模块参数		
参数名称	参数值	备注
模块型号	AD9220	
模块类型	模数转换模块	
模块供电	DC5V	
模块电流	20mA (MAX)	
模块通讯协议	数据并行	
模块提供例程	STM32F103RBT6	
例程平台	STM32F103X-M3	KEIL5版本源码
模块控制信号电平	3.3V	
模块输入电压范围	0-5V	
输入阻抗	1M欧	
ADC分辨率位数	12位	
采样率	10MSPS	
输入通道数	1通道独立	
模块输入接口	SMA	
基准电压	2.5V	可焊接SOP8封装外部输入基准
采样模式	可配置采集电压范围	最大0-5V
输出模式	12位数据并行	
模块特点	多种	真差分输入端口，具有采样保持电路，内置数字输出纠错逻辑，高速情况不损失动态范围。
模块应用	多种	电力线监控和保护、多相电机控制、仪表和控制、多轴定位、数据采集等系统
模块重量	15g	
模块规格	47*47*12	长*宽*高-PCB尺寸
模块接口类型		3.81-10PIN插座、XH2.54双排针数据接口

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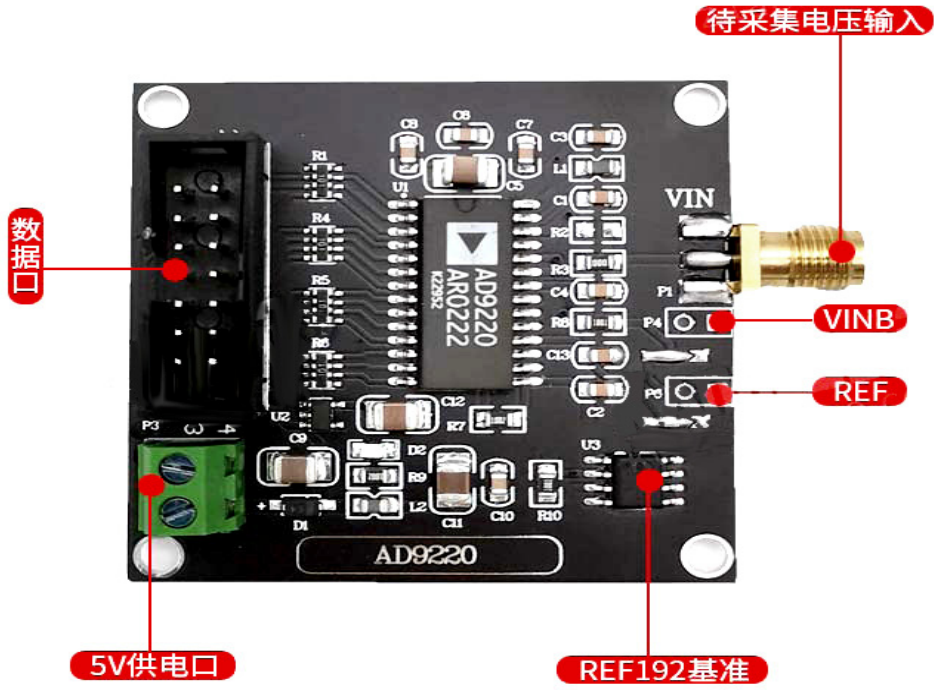
模块描述

AD9220为新一代高性能、12位模数转换器，采用单电源供电。具有真12位线性度和温度漂移性能,以及11.5位或更佳交流性能。

AD9220采用高速、低成本单CMOS工艺及新颖的架构，分辨率和速度均达到现有混合单芯片方案的水平，而功耗与成本却低得多。内置片内高性能、低噪声采样保持放大器，选用外部基准电压，以满足应用的直流精度与温度漂移要求。器件采用多级差分流水线架构，内置数字输出纠错逻辑，在额定数据速率时可提供12位精度，并保证在整个工作温度范围内无失码。适用于IF下变频的通讯系统。

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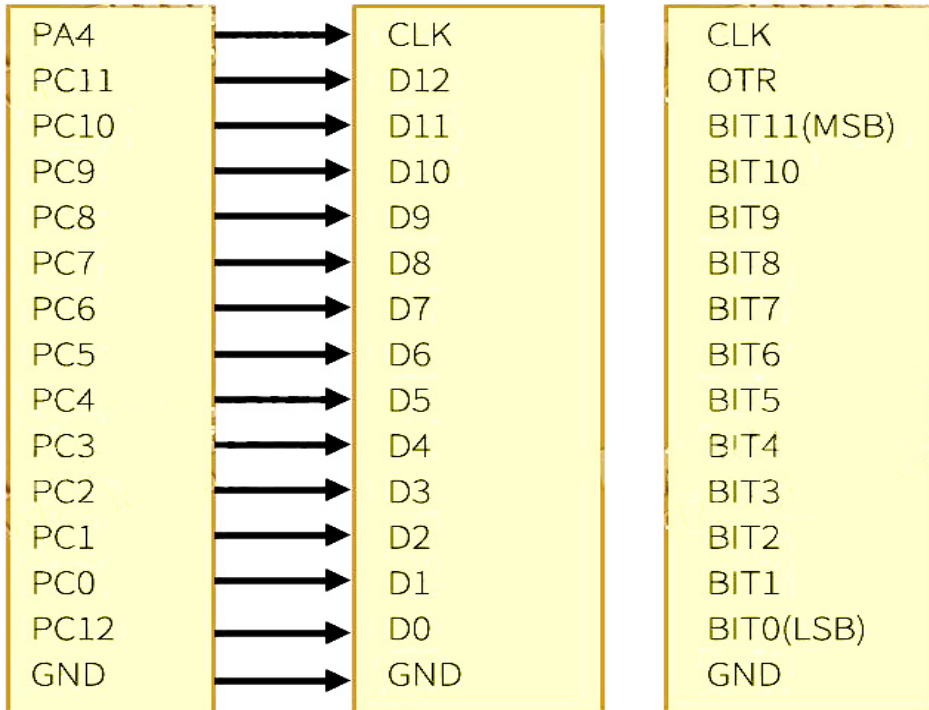
模块接口图



STM32单片机管脚

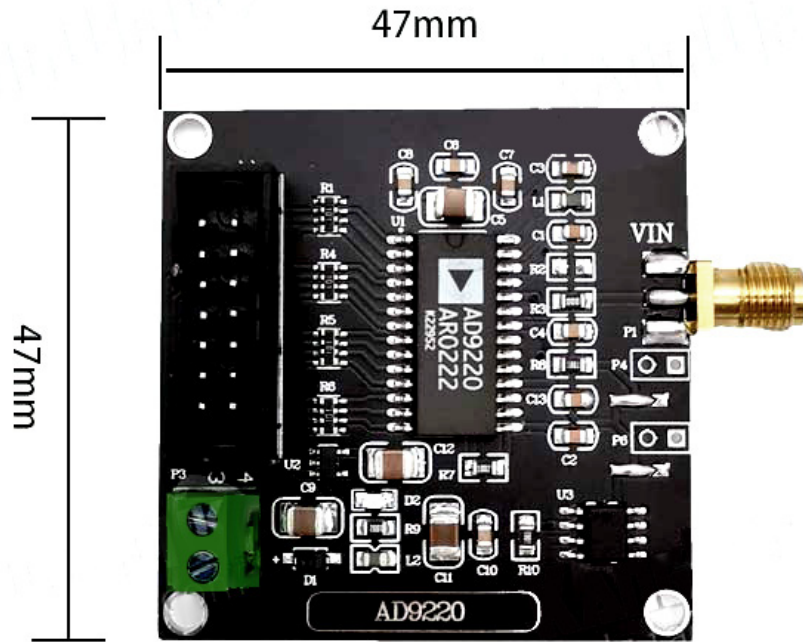
本店AD9220管脚

功能



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模块尺寸图



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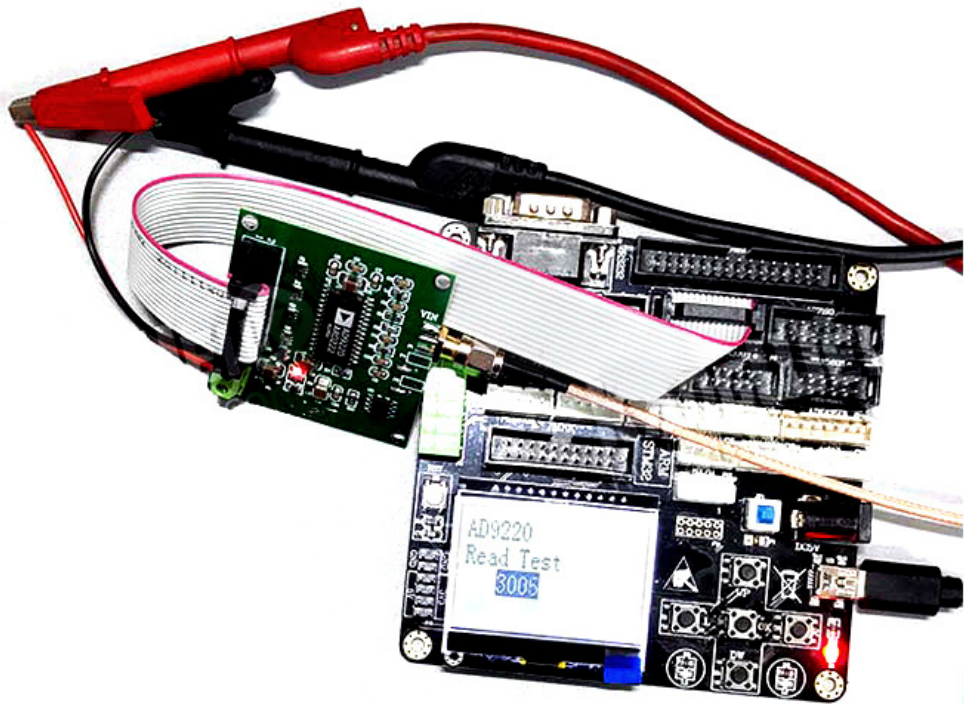
模块使用注意事项

- (1) 模块为低功耗模块，供电电源不超过6V，信号输入电压不可超过5.5V。
- (2) 由于模块是高精度器件，为了避免不必要的干扰，建议使用线性电源供电。
- (3) 输出信号线建议尽量短，模块接口为SMA，建议使用同轴线SMA接口的线材。接触不良或劣质的线材可能导致信号衰减或者噪声过大。
- (4) 配送的代码仅为配套主控板使用，不提供单片机教程，宝贝详情展示以外的功能需要自行开发。
- (5) 如需简单测试模块功能，建议搭配本店控制板使用，正确接线后给控制板供电即可实现信号采集显示。

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模块测试图

输入检测电压3V



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常见问题解答

Q:AD9220配合本店主控板能到多少采样率?

A: 由于单片机的主频和IO速度不够, 我们没有做主控板的最高速度测试, 如需达到10MSPS采样率, 一般需要用到FPGA等高速逻辑器件。

Q:我想将AD9220的12位分辨力用到1-3V的采集, 需要怎么做?

A: 根据原理图, AD9220采集的电压范围是 $V_{in}=V_b \pm V_{ref}$, 即是说需要将 $V_b=2V$, $V_{ref}=1V$ 即可。

Q:我用STC51单片机采集的数据怎么不对, 有较大跳动, 是什么原因?

A: 一般来说有两种可能, 一是信号本身抖动就比较大, 二是通讯电平不兼容, AD9220是3.3V通信电平, 用5V-TTL的话会对模块有干扰。

Q:使用AD9220和配套的主控板, AD9220使用5V供电, 无法采集到5V的电压?

A:首先AD9220和主控板之间的电源是需要共地, 否则AD9220无法接收和返回正常的信号。这样就无法采集, 其次是AD9220做了电源的反接保护, 需要采集到5V电压建议供电5.3V左右。但是不可超过5.8V, 这样就可以采集到5V的电压



Complete 12-Bit 1.5/3.0/10.0 MSPS Monolithic A/D Converters

AD9221/AD9223/AD9220

FEATURES

Monolithic 12-Bit A/D Converter Product Family
Family Members Are: AD9221, AD9223, and AD9220
Flexible Sampling Rates: 1.5 MSPS, 3.0 MSPS, and 10.0 MSPS
Low Power Dissipation: 59 mW, 100 mW, and 250 mW
Single 5 V Supply
Integral Nonlinearity Error: 0.5 LSB
Differential Nonlinearity Error: 0.3 LSB
Input Referred Noise: 0.09 LSB
Complete On-Chip Sample-and-Hold Amplifier and Voltage Reference
Signal-to-Noise and Distortion Ratio: 70 dB
Spurious-Free Dynamic Range: 86 dB
Out-of-Range Indicator
Straight Binary Output Data
28-Lead SOIC and 28-Lead SSOP

GENERAL DESCRIPTION

The AD9221, AD9223, and AD9220 are a generation of high performance, single supply 12-bit analog-to-digital converters. Each device exhibits true 12-bit linearity and temperature drift performance¹ as well as 11.5-bit or better ac performance.² The AD9221/AD9223/AD9220 share the same interface options, package, and pinout. Thus, the product family provides an upward or downward component selection path based on performance, sample rate and power. The devices differ with respect to their specified sampling rate, and power consumption, which is reflected in their dynamic performance over frequency.

The AD9221/AD9223/AD9220 combine a low cost, high speed CMOS process and a novel architecture to achieve the resolution and speed of existing hybrid and monolithic implementations at a fraction of the power consumption and cost. Each device is a complete, monolithic ADC with an on-chip, high performance, low noise sample-and-hold amplifier and programmable voltage reference. An external reference can also be chosen to suit the dc accuracy and temperature drift requirements of the application. The devices use a multistage differential pipelined architecture with digital output error correction logic to provide 12-bit accuracy at the specified data rates and to guarantee no missing codes over the full operating temperature range.

The input of the AD9221/AD9223/AD9220 is highly flexible, allowing for easy interfacing to imaging, communications, medical, and data-acquisition systems. A truly differential input structure allows for both single-ended and differential input interfaces of varying input spans. The sample-and-hold

NOTES

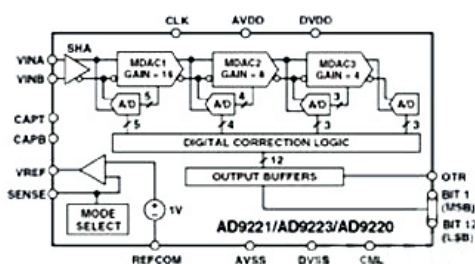
¹Excluding internal voltage reference.

²Depends on the analog input configuration.

REV. E

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FUNCTIONAL BLOCK DIAGRAM



amplifier (SHA) is equally suited for both multiplexed systems that switch full-scale voltage levels in successive channels as well as sampling single-channel inputs at frequencies up to and beyond the Nyquist rate. Also, the AD9221/AD9223/AD9220 is well suited for communication systems employing Direct-IF down conversion since the SHA in the differential input mode can achieve excellent dynamic performance far beyond its specified Nyquist frequency.²

A single clock input is used to control all internal conversion cycles. The digital output data is presented in straight binary output format. An out-of-range (OTR) signal indicates an overflow condition that can be used with the most significant bit to determine low or high overflow.

PRODUCT HIGHLIGHTS

The AD9221/AD9223/AD9220 family offers a complete single-chip sampling 12-bit, analog-to-digital conversion function in pin compatible 28-lead SOIC and SSOP packages.

Flexible Sampling Rates—The AD9221, AD9223, and AD9220 offer sampling rates of 1.5 MSPS, 3.0 MSPS, and 10.0 MSPS, respectively.

Low Power and Single Supply—The AD9221, AD9223, and AD9220 consume only 59 mW, 100 mW, and 250 mW, respectively, on a single 5 V power supply.

Excellent DC Performance Over Temperature—The AD9221/AD9223/AD9220 provide 12-bit linearity and temperature drift performance.¹

Excellent AC Performance and Low Noise—The AD9221/AD9223/AD9220 provide better than 11.3 ENOB performance and have an input referred noise of 0.09 LSB rms.²

Flexible Analog Input Range—The versatile on-board sample-and-hold (SHA) can be configured for either single-ended or differential inputs of varying input spans.

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