

利用 ADI 公司产品进行电路设计
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连接/参考器件

AD5381	40 通道、12 位、3 V/5 V 单电源 DAC
ADR421	低噪声、2.500 V XFET®基准电压源
ADR431	超低噪声 XFET 基准电压源

利用 AD5381 DAC 实现 40 通道可编程电压以及出色的温度漂移性能

电路功能与优势

本电路为多通道 DAC 配置, 具有出色的温度漂移性能。它提供 40 个独立输出电压通道, 分辨率为 12 位, 温度稳定性典型值低于 3 ppm/°C。

电路描述

图 1 显示采用外部基准电压源的 AD5381 典型配置。在所示电路中, 所有 AGND、SIGNAL_GND 和 DAC_GND 引脚均连在一起, 并与一个公共 AGND 引脚相连。在 AD5381 器件上, AGND 与 DGND 连在一起。上电时, AD5381 默认采用外部基准电压源工作。

此设计使用两个独立的 5.0 V 电源, 一个电源为基准电压源和 AD5381 的模拟部分(AVDD)供电, 另一个电源为 AD5381 的数字部分(DVDD)供电。为获得最佳性能, 务必使用线性稳压器驱动电路的模拟部分。如果用开关稳压器驱动数字部分, 应注意将 DVDD 电源引脚上的开关噪声降至最低。可能还需要利用串联的铁氧体磁珠进行额外去耦。AD5381 数字(DVDD)电源可以采用 3 V 或 5 V 电源, 与数字元件接口时, 这种电源可以带来极大的灵活性。如果电源从线性稳压器获得, 则两个电源引脚可连在一起, 并连至共同的 5 V 电源。有关电源设计的指导信息, 请参考 [ADIsimPower™](#) 设计工具。

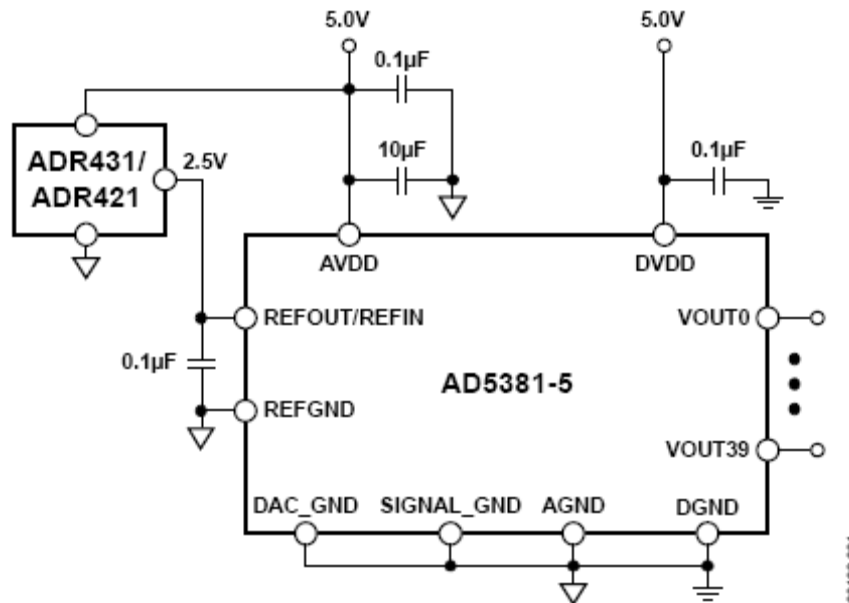


图 1. 采用外部基准电压源的 AD5381 典型配置 (原理示意图)

Rev.A

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建议使用 0.1 μF 陶瓷电容和 10 μF 钽电容，对靠近器件的各电源引脚去耦。本电路中，AD5381 的基准电压从 2.5 V 外部基准电压源 ADR421 或 ADR431 获得。ADR431 具有较低的输出电压噪声，适合特别注重这一特性的应用。应使用 0.1 μF 电容在器件的 REFOUT/REFIN 引脚对基准电压源去耦。

常见变化

本电路的一种变化形式是使用 AD5381-3 (3 V 器件) 和 1.2 V 基准电压源 ADR280，所有其它连接和元件均与以上所述相同。

进一步阅读

[ADIsimPower Design Tool.](#)

[Kester, Walt. 2005. *The Data Conversion Handbook*. Analog Devices. Chapters 3 and 7.](#)

[MT-015 Tutorial, *Basic DAC Architectures II: Binary DACs*. Analog Devices.](#)

[MT-031 Tutorial, *Grounding Data Converters and Solving the Mystery of AGND and DGND*. Analog Devices.](#)

[MT-101 Tutorial, *Decoupling Techniques*. Analog Devices.](#)

[Voltage Reference Wizard Design Tool.](#)

数据手册和评估板

[AD5380/AD5381 Evaluation Board.](#)

[AD5381 Data Sheet.](#)

[ADR421 Data Sheet.](#)

[ADR431 Data Sheet.](#)

修订历史

5/09—Rev. 0 to Rev. A

Updated Format Universal

10/08—Revision 0: Initial Version

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