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连接/参考器件

AD5410 | 12 位、4 mA 至 20 mA 电流源 DAC

## 利用电流源 DAC AD5410 提供 12 位、4 mA 至 20 mA 输出简化解决方案

### 电路功能与优势

本电路利用单通道、12 位、串行输入、4 mA 至 20 mA 电流源 DAC AD5410, 提供 4 mA 至 20 mA 输出。它只需用产品 AD5410, 所需外部元件只有电源引脚和基准输入上的去耦电容, 以及用于开漏故障输出的上拉电阻。当输出端丧失兼容电压或 AD5410 温度过高时, 开漏故障输出会予以警示。这种实施方案具有很高的集成度, 可节省成本和电路板空间。本电路非常适合工业控制应用中的可编程逻辑控制器 (PLC) 和分布式控制系统 (DCS)。

### 电路描述

AD5410 是一款低成本、高度集成的 12 位数模转换器, 提供可编程电流源输出, 针对工业过程控制应用的要求而设计。电流输出可通过编程设置为 4 mA 至 20 mA、0 mA 至 20 mA 或 0 mA 至 24 mA。AD5410 内置一个 5 V、10 ppm/°C (最大值) 基准电压源, 从而可以进一步节省成本和电路板空间。该电路采用最高 24 V 的  $AV_{DD}$  额定电源电压工作; 不过, AD5410 能够以最高 40 V 的  $AV_{DD}$  电源电压工作。该器件含有 4.5 V 片内稳压输出 ( $DV_{CC}$  引脚), 能够提供最大 5 mA 源电流, 可以用作上拉电阻的端电极, 或者为数字电路供电, 从而无需产生逻辑电源电压。图 2 显示, 该电路在 25°C 环境温度时的精度典型值为 0.011%。

本电路必须构建在具有较大面积接地层的多层电路板上。为实现最佳性能, 必须采用适当的布局、接地和去耦技术 (请参考教程 MT-015 和教程 MT-101)。

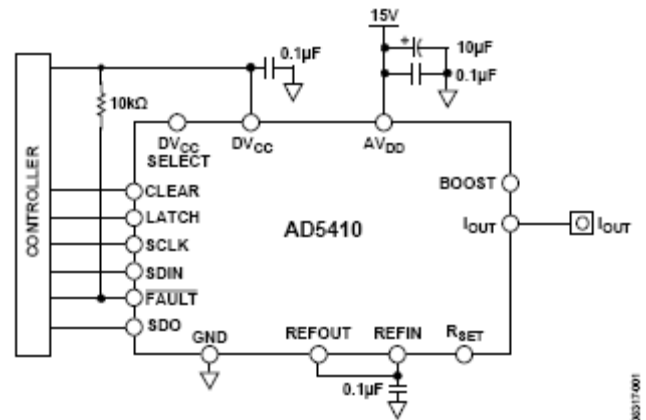


图 1. AD5410 的连接图

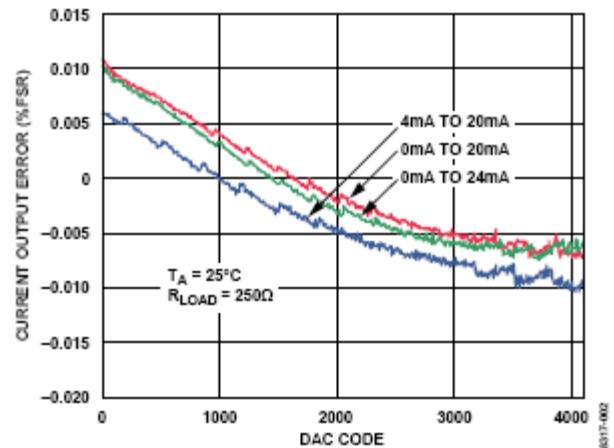


图 2. 电流输出精度

Rev.0

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### 进一步阅读

Kester, Walt. 2005. *The Data Conversion Handbook*. Chapters 3 and 7. Analog Devices.

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

AD5410 Data Sheet.

AD5420 Evaluation Board (Compatible with AD5410).

### 修订历史

**07/09—Revision 0: Initial Version**

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