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连接/参考器件

AD5426/AD5432/ AD5443	8/10/12 位乘法 DAC
AD8038	低功耗、高性能放大器

利用电流输出 DAC AD5426/AD5432/AD5443 进行交流信号处理

电路功能与优势

此电路利用电流输出 DAC AD5426/AD5432/AD5443 和运算放大器来实现二象限信号乘法功能。它的乘法带宽最高可达 10 MHz，因而用户能够精确调理带宽最高为该频率的交流信号。该电路非常适合通信、工业和医疗应用中的交流信号调理应用。

电路描述

AD5426、AD5432 和 AD5443 分别是 CMOS、8/10/12 位电流输出数模转换器。这些器件均采用 2.5 V 至 5.5 V 电源供电，因此适合电池供电应用、信号衰减、通道均衡和波形生成。信号范围最大可达到 ±12，不过输出摆幅受限于放大器的电源电压。图 1 显示的是利用电流输出 DAC 进行交流信号处理的典型应用电路。只需一个运算放大器，即可轻松配置这些器件来提供二象限乘法操作或单极性输出电压摆幅，如图 1 所示。当输出放大器以单极性模式连接时，输出电压可由下式得出：

$$V_{OUT} = -V_{REF} \times (D/2^N)$$

其中 D 为载入 DAC 的数字字，而 N 为位数：D = 0 至 255（8 位 AD5426）；D = 0 至 1023（10 位 AD5432）；D = 0 至 4095（12 位 AD5443）。 V_{REF} 可以是交流输入信号。图 2 显示的是交流乘法带宽，实际上就是在 V_{REF} 输入引脚上施加交流基准电压时 DAC 的频率响应。该图显示该电路可处理最高约 10 MHz 的 ±3.5 V 交流波形。

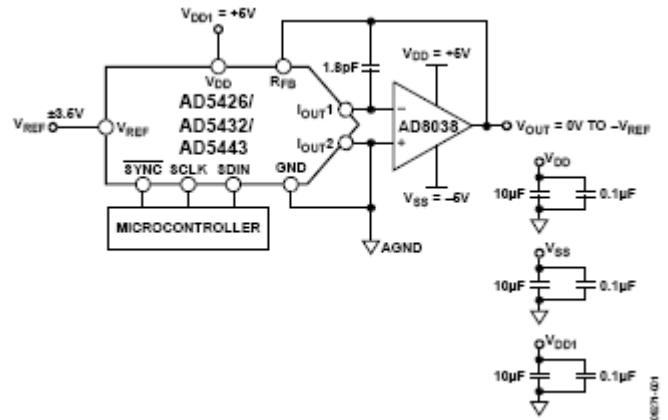


图 1. 利用乘法电流输出 DAC 的交流信号处理配置（原理示意图）

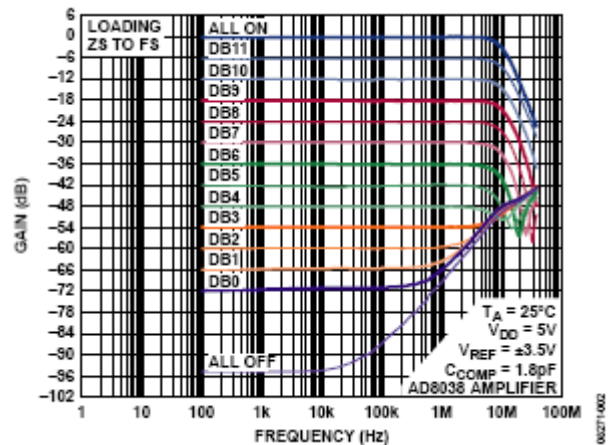


图 2. 交流乘法带宽性能

Rev.A

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进一步阅读

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 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-033 Tutorial, *Voltage Feedback Op Amp Gain and Bandwidth*. Analog Devices.
 MT-035 Tutorial, *Op Amp Inputs, Outputs, Single-Supply, and Rail-to-Rail Issues*. Analog Devices.
 MT-101 Tutorial, *Decoupling Techniques*. Analog Devices.
 Voltage Reference Wizard Design Tool. Analog Devices.

数据手册和评估板

AD5426 Data Sheet.
 AD5432 Data Sheet.
 AD5443 Data Sheet.
 AD8038 Data Sheet.

修订历史

7/09—Rev. 0 to Rev. A

Updated Format Universal

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