

利用 AD5754R DAC 提供软件可配置的 16 位、四通道、单极性/双极性电压输出

电路功能与优势

本电路采用四通道、16 位、串行输入、单极性/双极性电压输出 DAC AD5754R，可提供单极性和双极性数模转换。该 16 位 DAC 所需的外部器件只有电源引脚和基准输入上的去耦电容，从而可以节省成本和电路板空间。本电路非常适合闭环伺服控制应用。

电路描述

AD5754R 是一款数模转换器，可保证 16 位单调性，积分非线性(INL)误差为 ± 16 LSB，总非调整误差(TUE)为 0.1%，建立时间为 10 μ s。该器件还集成了一个 2.5 V、5 ppm/ $^{\circ}$ C 基准电压源、基准电压缓冲和输出放大器，从而可以进一步节省成本和电路板空间。在以下电源电压范围内能够保证性能： AV_{DD} 电源电压范围为 +4.5 V 至 +16.5 V， AV_{SS} 电源电压范围为 -4.5 V 至 -16.5 V。如果只需要单极性输出，则可以将 AV_{SS} 电源与 0 V 相连。各通道的输出范围均可独立编程，提供以下选项：0 V 至 +5 V、0 V 至 +10 V、0 V 至 +10.8 V、-5 V 至 +5 V、-10 V 至 +10 V、-10.8 V 至 +10.8 V。对于双极性输出，输入编码方式为用户可选的二进制补码或偏移二进制（取决于 $BIN/\overline{2sCOMP}$ 引脚的状态）。对于单极性输出，编码方式为标准二进制。图 2 显示，该电路在 25 $^{\circ}$ C 环境温度时的典型输出误差小于 0.07%FSR。

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-031 — “实现数据转换器的接地并解开 AGND 和 DGND 的迷团”，以及教程 MT-101 — “去耦技术”）。

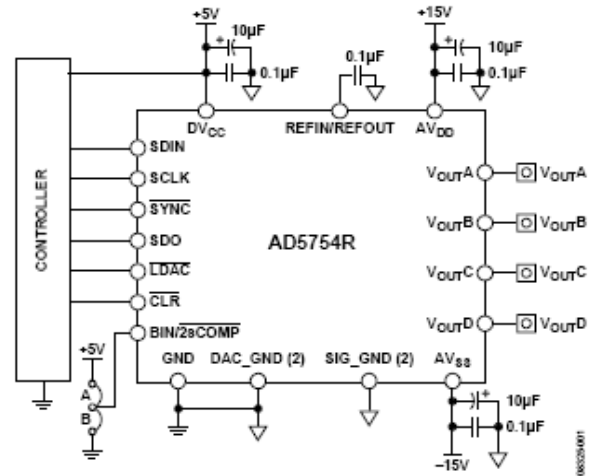


图 1. AD5754R DAC 的单极性/双极性配置（原理示意图）

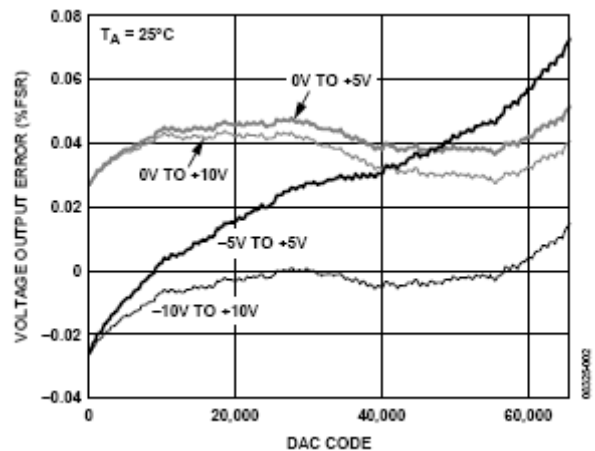


图 2. 电压输出误差

Rev.0

“Circuits from the Lab” from Analog Devices have been designed and built by Analog Devices engineers. Standard engineering practices have been employed in the design and construction of each circuit, and their function and performance have been tested and verified in a lab environment at room temperature. However, you are solely responsible for testing the circuit and determining its suitability and applicability for your use and application. Accordingly, in no event shall Analog Devices be liable for direct, indirect, special, incidental, consequential or punitive damages due to any cause whatsoever connected to the use of any “Circuit from the Lab”. (Continued on last page)

进一步阅读

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

[AD5754R Data Sheet](#).

[AD5754R Evaluation Board](#).

修订历史

7/09—Revision 0: Initial Version

(Continued from first page) "Circuits from the Lab" are intended only for use with Analog Devices products and are the intellectual property of Analog Devices or its licensors. While you may use the "Circuits from the Lab" in the design of your product, no other license is granted by implication or otherwise under any patents or other intellectual property by application or use of the "Circuits from the Lab". Information furnished by Analog Devices is believed to be accurate and reliable. However, "Circuits from the Lab" are supplied "as is" and without warranties of any kind, express, implied, or statutory including, but not limited to, any implied warranty of merchantability, noninfringement or fitness for a particular purpose and no responsibility is assumed by Analog Devices for their use, nor for any infringements of patents or other rights of third parties that may result from their use. Analog Devices reserves the right to change any "Circuits from the Lab" at any time without notice, but is under no obligation to do so. Trademarks and registered trademarks are the property of their respective owners.