8-/16-Channel, 3 V/5 V, Serial Input, Single-Supply, 12-/14-Bit Voltage Output

Data Sheet

AD5390/AD5391/AD5392

FEATURES

- AD5390: 16-channel, 14-bit voltage output DAC
- AD5391: 16-channel, 12-bit voltage output DAC
- AD5392: 8-channel, 14-bit voltage output DAC
- Guaranteed monotonic
- INL
  - ±1 LSB max (AD5391)
  - ±3 LSB max (AD5390-5/AD5392-5)
  - ±4 LSB max (AD5390-3/AD5392-3)
- On-chip 1.25 V/2.5 V, 10 ppm/°C reference
- Temperature range: −40°C to +85°C
- Rail-to-rail output amplifier
- Power-down mode
- Package types
  - 64-lead LFCSP (9 mm × 9 mm)
  - 52-lead LQFP (10 mm × 10 mm)
- User interfaces
- Serial SPI-, QSPI-, MICROWIRE-, and DSP-compatible (featuring data readback)
- I²C-compatible interface
- Integrated functions
  - channel monitor
  - simultaneous output update via $\overline{\text{LDAC}}$
  - clear function to user-programmable code
  - amplifier boost mode to optimize slew rate
  - user-programmable offset and gain adjust
  - toggle mode enables square wave generation
  - thermal monitor
- Robust 6.5 kV HBM and 2 kV FICDM ESD rating

APPLICATIONS

- Instrumentation and industrial control
- Power amplifier control
- Level setting (ATE)
- Control systems
- Microelectromechanical systems (MEMs)
- Variable optical attenuators (VOAs)
- Optical transceivers (MSA 300, XFP)

FUNCTIONAL BLOCK DIAGRAM

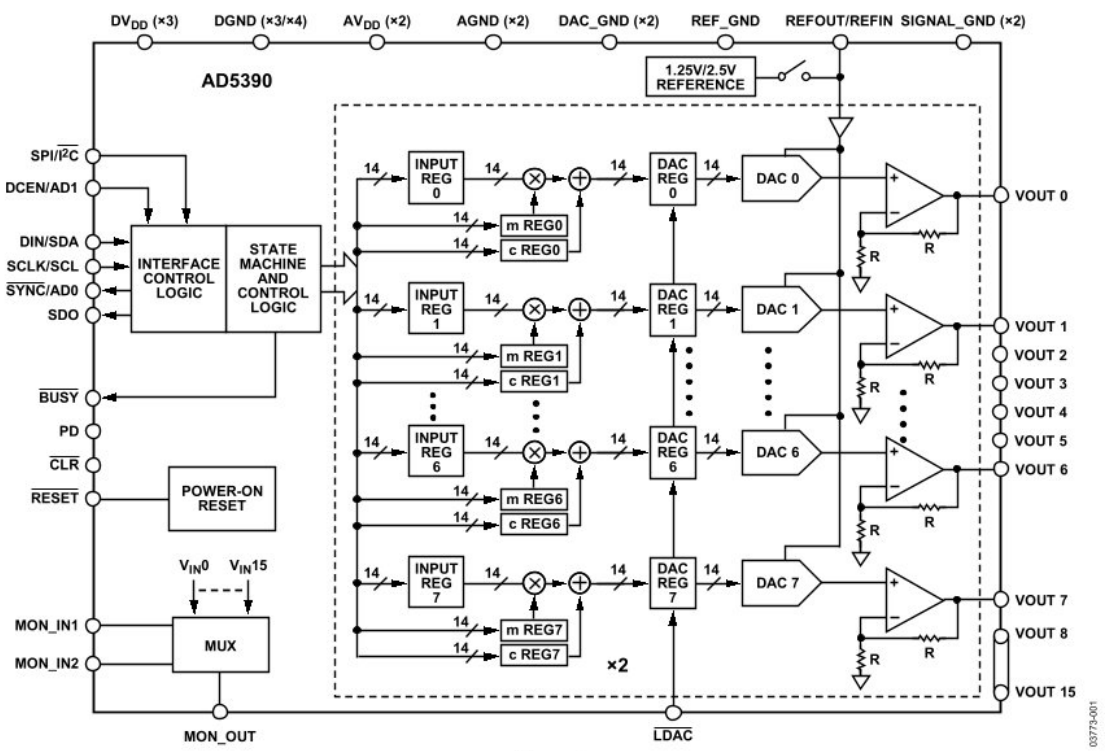

Figure 1.

Rev. F Document Feedback

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REVISION HISTORY

6/14—Rev. E to Rev. F

Deleted Table 1; Renumbered Sequentially 4
Changed AD5390-3/AD5391-3/AD5392-3 Input Current from ±10 µA (max) to ±1 µA (max); Table 3 8
Changes to Table 5 11
Changes to Soft Reset Section 31
Changes to Reset Function Section 35
Replaced ADSP2101 with ADSP-BF527 36
Added Power Supply Sequencing Section 38
Changes to Ordering Guide 43

6/12—Rev. D to Rev. E

Changes to Table 1 4
Change to Accuracy Parameter, Gain Error, Table 2 5
Change to Accuracy Parameter, Gain Error, Table 4 8
Added Exposed Pad Notation to Figure 7 and Figure 8 15

5/12—Rev. C to Rev. D

Changes to Product Title and Features Section 1
Changes to Table 2 4
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1/09—Rev. B to Rev. C

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3/06—Rev. A to Rev. B

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10/04—Rev. 0 to Rev. A

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4/04—Revision 0: Initial Version

GENERAL DESCRIPTION

The AD5390/AD5391 are complete single-supply, 16-channel, 14-bit and 12-bit DACs, respectively. The AD5392 is a complete single-supply, 8-channel, 14-bit DAC. The devices are available in either a 64-lead LFCSP or a 52-lead LQFP. All channels have an on-chip output amplifier with rail-to-rail operation. All devices include an internal 1.25/2.5 V, 10 ppm/°C reference, an on-chip channel monitor function that multiplexes the analog outputs to a common MON_OUT pin for external monitoring, and an output amplifier boost mode that optimizes the output amplifier slew rate.

The AD5390/AD5391/AD5392 contain a 3-wire serial interface with interface speeds in excess of 30 MHz that are compatible with SPI®, QSPI™, MICROWIRE™, and DSP interface standards and an I²C-compatible interface supporting a 400 kHz data transfer rate.

An input register followed by a DAC register provides double-buffering, allowing DAC outputs to be updated independently or simultaneously using the $\overline{\text{LDAC}}$ input. Each channel has a programmable gain and offset adjust register, letting the user fully calibrate any DAC channel.

Power consumption is typically 0.25 mA per channel.