SYNOPSYS®
Predictable Success

Synopsys and Analog Devices

Analog Devices Achieves Silicon Success for Multiple ICs Using DesignWare Non-Volatile Memory IP

"Synopsys high-quality DesignWare AEON NVM IP enabled us to incorporate the required functionality and tapeout multiple chips on schedule."

Dr. Craig Wilson
Technology Director, Analog Devices

Business

Analog Devices, Inc. (ADI) is acknowledged industry-wide as the world leader in data-conversion and signal-conditioning technologies. ADI serves over 60,000 customers, representing virtually all types of electronic equipment.

Challenges

- Acquire a Non-volatile Memory (NVM) IP solution that met the required functionality of the analog ICs
- Reduce integration risk and achieve silicon success by selecting a provider with a stringent qualification process for NVM IP
- Meet aggressive time-to-market schedule

DesignWare IP Solution

- AEON® Multi-time Programmable (MTP) NVM IP

Benefits

- Delivered higher precision calibration in its industrial ICs for improved system performance
- Achieved silicon success for three digipot analog ICs and met project schedules
- Reduced overall development costs with NVM IP implemented in standard CMOS process, allowing all programming and reprogramming to be accomplished without additional masks or process steps

Overview

As a leading manufacturer of analog integrated circuits (ICs), ADI offers products that are characterized by outstanding performance and high reliability, enabling competitive advantages in terms of performance, precision, speed, power, size and integration. ADI's products and manufacturing processes undergo extensive reliability tests that validate market readiness, serving demanding market segments including industrial, automotive, consumer and communications.

ADI's comprehensive portfolio of products includes a wide range of digital potentiometer (digipot) options, including different memory technologies, single and dual supply options, a variety of digital interfaces, high resolution devices and the industry's, broadest end-to-end resistance options. A digipot is a digitally controlled device that can be used to adjust voltage or current and offers the same analog functions as a mechanical potentiometer or rheostat. This allows an automatic calibration process that is more accurate, robust, and faster, with smaller voltage glitches. Digipots are often used for digital trimming and calibration of analog signals and are typically controlled by digital protocols, such as I2C and SPI, as well as more basic up/down and push-button protocols.

We knew that Synopsys would help us reduce our integration risk and achieve silicon success because of its stringent qualification process for NVM IP and excellent technical support."

Donal Geraghty
Product Line Director, Analog Devices

Leading DesignWare IP Solution

When ADI set out to develop digipot analog ICs the company wanted to focus on developing the differentiated portions of its design and acquire the NVM IP from a trusted, third-party provider. ADI's products offer superior performance and reliability and it needed a third-party IP to meet the same standards.

ADI selected Synopsys because it offered a silicon-proven NVM IP solution that delivered low power dissipation, small area and high performance. Furthermore, the DesignWare® AEON MTP NVM IP is implemented in standard CMOS processes, which allowed all programming and re-programming to be accomplished without the need for additional masks or process steps.

Synopsys' DesignWare AEON MTP NVM IP enabled ADI to deliver higher precision calibration in its industrial analog ICs, featuring up to 100,000-times-programmable memory and 1024 tap adjustments to precisely calibrate and trim electronic circuits for improved system performance.

High-Quality IP and Excellent Support

Synopsys provided ADI with a high-quality DesignWare AEON MTP NVM IP solution that offers endurance of up to one million programming cycles, supports extended temperature ranges up to 150°C and is designed to withstand harsh process, voltage and temperature (PVT) variations. In addition, the DesignWare AEON MTP NVM IP is fully characterized and qualified for commercial and industrial grade standards (e.g., JEDEC) as well as for automotive grade standards (e.g., AEC-Q100).

In the few times that ADI needed it, Synopsys' technical support team was always there to provide ADI with timely and knowledgeable support, enabling the company to meet its project schedule. With DesignWare AEON MTP NVM IP, ADI successfully taped-out three digipot chips, delivering products with increased reliability and higher accuracy to its customers.

"The successful tapeouts of our digipot analog designs demonstrate Synopsys' ability to provide a reliable NVM IP solution that met the performance, power and area requirements of our innovative chips.

Brendan O'Dowd
Marketing and Applications Manager, Analog Devices

SYNOPSYS®
Predictable Success

Synopsys, Inc. • 700 East Middlefield Road • Mountain View, CA 94043 • www.synopsys.com