

R&D of Mixed-signal LSI IP and Its Cutting-edge Design Technologies

< Program for Fostering Regional Innovation (Global Type) >

Project Team

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Enterprises

Toshiba Corporation Semiconductor Company

Renesas Technology Corp.

NEC Micro Systems, LTD.

Jedat Innovation Inc.

Purpose of the Research

We will study and develop various types of pioneering analog circuits (IP) and the fundamental technology to design these IPs.

We aim to form a cultural climate in Kitakyushu area in which innovations related to analog LSI designing occurs continuously by inviting businesses to participate right from the research program planning stage to improve the certainty of technology transfer and commercialization, and by widely spreading the design environment.

Summary of the Research

Power supply circuit (Inoue, Huang): Charge pump circuit technology, micro power supply control circuit technology, and others.

High-frequency circuits (Yoshimasu): Circuits for wireless communications in the frequency range from 1 GHz - 76 GHz, and so on

Low-voltage circuit design technology (Yoshihara): Design of self-compensation power supply circuit, DC/DC voltage converter, and others

Analog DFM technology (Nakatake): Development of an analog floorplanner, migration tool, and others

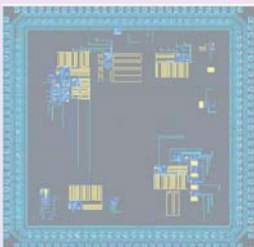
Ultrahigh-reliability and environmental-fluctuation-resistant, flexible analog LSI design technology (Nakamura, Onishi, Koike):

A circuit simulator introducing long-term device-deterioration, design method of a high-reliability on-chip SRAM, A new analog-digital integrated design method with correction after manufacturing, IPs with the above design technologies

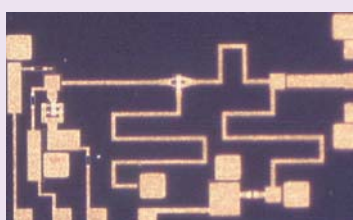
Circuit simulation technology (Inoue): Advanced Pseudo transient analysis method circuit simulator, statistical analysis circuit simulator, and others

Results of the Research

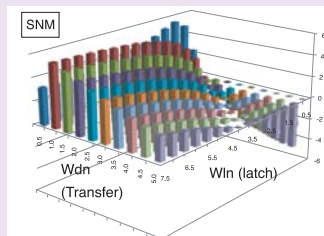
Reference voltage circuit prototype chip, construction of a high-frequency transmission line analysis environment, made a transmission line on an experimental basis, advanced circuit simulator prototype, extended version of the constraint driven device arrangement tool (Name: acell), prototype of a variation tolerant analog floorplanner (Name: aplan), I/F of Virtuoso-XL and aplan, highly-reliable SRAM design tool, and others



Reference voltage circuit prototype chip



30 GHz band oscillator IC



Highly-reliable SRAM design tool based on a new Static Noise Margin calculation method

Prospective Fields of Application

Circuit IP

Ultralow-power circuit, self-generating ultralow-power circuit, high-efficiency charge pump circuit, low-cost booster circuit, digital-analog integrated circuit, high-frequency circuit for communication, noise resistant communication circuit, drive-line power IC, circuits for various type of sensors, PLL, and others

Design environment

- Circuit simulation technology
- Mixed signal LSI EDA environment
- High-frequency circuit analysis
- Liquid crystal/communication/onboard LSI
- Analog floorplanner
- Migration tool



Information

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