Integrated Power Management Circuits for Energy-Efficient IoT Systems

Prof. Dr. Makoto Takamiya
Institute of Industrial Science
Tokyo University

mtaka@iis.u-tokyo.ac.jp

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About Prof. Dr. Makoto Takamiya

1. 1997, 2000, M.S., and Ph.D. degrees in electronic engineering from the University of Tokyo,

2. 2000, NEC Corporation, Japan, where he was engaged in the circuit design of high-speed digital LSI's.

3. 2005, joined University of Tokyo, Japan in 2005, where he is now a Professor of Institute of Industrial Science.

4. He received 2009 and 2010 IEEE Paul Rappaport Awards of the IEEE Electron Devices Society.

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SPEAKERS

Prof. Takamiya of University of Tokyo

Topic: Integrated Power Management Circuits for Energy-Efficient IoT Systems

Integrated voltage regulation is critical to the energy efficiency in every systems ranging from high-end processors to ultra-low power IoT devices. Challenges of the integrated power management circuits include the large number of voltage domains, DVFS per domain, large current transients, and wide dynamic range of current loads. In addition, IoT systems present new challenges to the voltage regulators, keeping the high power conversion efficiency at the ultra-low input voltage (< 0.1V) and/or the ultra-small output current (< 1uA). In this talk, I will present several circuit designs of voltage regulators for IoT systems, including a sub-0.5V digital LDO / digital-analog hybrid LDO, a sub-0.5V-input buck converter, and a sub-0.1V-input boost converter for the thermoelectric energy harvesting.

Biography:

Makoto Takamiya (S'98-M'00-SM'14) received the B.S., M.S., and Ph.D. degrees in electronic engineering from the University of Tokyo, Japan, in 1995, 1997, and 2000, respectively. In 2000, he joined NEC Corporation, Japan, where he was engaged in the circuit design of high speed digital LSI's. He joined University of Tokyo, Japan in 2005, where he is now a Professor of Institute of Industrial Science. From 2013 to 2014, he stayed at University of California, Berkeley as a visiting scholar. His research interests include the integrated power management circuits for wireless powering and energy harvesting for wearable and IoT applications, and the digital gate driver IC for power electronics. He is a member of the technical program committee of IEEE International Solid-State Circuits Conference (ISSCC) and is a Far East Regional Chair in ISSCC 2020. He is a Distinguished Lecturer of IEEE Solid-State Circuits Society. He formerly served on the technical program committees of IEEE Symposium on VLSI Circuits from 2009 to 2017 and IEEE Custom Integrated Circuits Conference from 2006 to 2011. He received 2009 and 2010 IEEE Paul Rappaport Awards and the best paper award in 2013 IEEE Wireless Power Transfer Conference.

Email: mtaka@iis.u-tokyo.ac.jp

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