
FOREWORD

Special Section on Solid-State Circuit Design — Architecture, Circuit, Device and Design Methodology

Semiconductor solid-state integrated circuits promote the evolvement of dedicated hardware for Internet of Things (IoT), Artificial Intelligence (AI), and the fifth generation (5G) mobile communication applications. The continuous efforts have been devoted by circuits and systems designers to develop advanced electronics that meet the fundamental requirements of efficiency, reliability, security as well as safety toward sustainable and healthy societies. Those goals will not be achieved without the enthusiasms by our talented specialists and young engineers in the field of integrated circuits and devices.

It is my great honor to announce the publication of this special section on solid-state circuit design. This section contains 1 invited, 4 regular and 1 brief papers, all devoted to the distinctive exploration of novel techniques on integrated circuits, systems and architectures. Design methodologies for analog, digital, memory, radio frequency (RF), and mixed-signal circuits are widely discussed and explored.

The first paper (invited) is entitled “Essential Roles, Challenges and Development of Embedded MCU Micro-Systems to Innovate Edge Computing for the IoT/AI Age” and presents an extensive review on embedded system approaches to edge computing in IoT implementations. This is followed by a paper discussing high reliability with in-depth evaluation of single event upsets of digital circuits when heavy ions are interacted. Then, the next paper proposes a 28-GHz band power amplifier exploring stacked transistor topology and achieving very high linearity and power efficiency. Two subsequent papers focus on solid-state drives that are featured with various non-volatile memory devices of multi-level cells. The energy minimization is challenged in digital processing in the last paper.

On behalf of the editorial committee, I would like to express my sincere appreciation to all the authors for their contributions and to all the reviewers for their critical inputs. In addition, I would like to thank the editorial committee for their works on this special section.

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Makoto Nagata (*Member*) received the B.S. and M.S. degrees in physics from Gakushuin University, Tokyo, in 1991 and 1993, respectively, and a Ph.D. in electronics engineering from Hiroshima University, Hiroshima, in 2001. He is currently a professor of the graduate school of science, technology and innovation, Kobe University, Kobe, Japan. Dr. Nagata is currently chairing the technology committee of integrated circuits and devices (ICD) of IEICE and also the technology directions subcommittee for international solid-state circuits conference (ISSCC) of IEEE. He also served as an associate editor of the IEICE Transactions on Electronics (2002–2005).

