



TECHNOLOGY

On-chip Ultra-wideband Chaotic Oscillator Circuit Using Boolean Chaos Algorithm

OVERVIEW

Background

In the fields of chaos encryption communication and chaotic sensor networks, the generation of a wideband chaotic signal is essential. Because of the sensitive nature of chaos to parasitic effects, it is hard to generate a high speed and wideband chaotic oscillator. Inductive and capacitive coupling by the periphery circuit, the rectification of electrostatic discharge (ESD) circuits, and the need for a buffer capable of high current driving create difficulty in controlling chaotic oscillation.

Researchers at the University of Maryland have developed a chaotic oscillator architecture based off of the Boolean Chaos algorithm, which generates chaos by time differencing and feedback of inputs. Researchers monolithically integrated a source follower buffer and a chaotic oscillator, in order to create an autonomous ultra-wideband chaotic source circuit having only one power terminal, and one output which can be measured without any external amplifier. The integrated chaotic oscillator is compatible with other CMOS technology and serves as an important step towards developing chaos encrypted communication and chaotic sensor networks.

Advantages

- Monolithic Architecture
- Ultra-wide Frequency Band
- CMOS Compatibility
- Autonomous Oscillation

Applications

- Encrypted Communications
- Chaotic Sensor Networks
- Random Number Generator (RNG) Cores

CONTACT INFO

UM Ventures
0134 Lee Building
7809 Regents Drive
College Park, MD 20742
Email: umdtechtransfer@umd.edu
Phone: (301) 405-3947 | Fax: (301) 314-9502

Additional Information

INSTITUTION

University of Maryland, College Park

PATENT STATUS

Patent(s) pending

LICENSE STATUS

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CATEGORIES

- Software + Algorithm

EXTERNAL RESOURCES

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