

Name ISHIZUKA Yoichi	Job Title Professor	Area of Expertise Electronic Circuits and Integrated Circuit Engineering
1. Main Research Topics ① Research on high-speed response and flexible control of power conversion circuits with diversifying requirements We are developing power electronics design support technologies driven by power requirement data for direct current-driven loads such as data centers and lighting equipment. ② Research on integrated power conversion circuits The performance improvement of processors such as CPUs and GPUs requires a stable supply of operating voltage under any operating condition. Globally, research is advancing to achieve stable power supply near the processor by integrating power conversion circuits with CPUs, referred to as Power SOC. In this laboratory, we are conducting research utilizing unique ideas such as MHz-driven digital control circuits and high-density implementation technology within this research field. ③ Research on Bidirectional Power Conversion Systems with Batteries We are conducting research on high-power-efficiency bidirectional power conversion circuits for the effective utilization of renewable energy generated under limited conditions, focusing on further reduction of conversion losses and generalization. ④ Research on solving social issues through the utilization of IoT/AI and sensor network technologies This research primarily focuses on the development of outdoor remote monitoring systems utilizing IoT/AI technology. In collaboration with Associate Professor Tomofumi Sugimoto, we have been developing systems for slope disaster prevention and preservation. Currently, we are expanding our research to include stability assessment of damaged stone walls at Kumamoto Castle and advanced cultivation techniques for open-field farming through joint research with the Nagasaki Prefectural Agricultural Experiment Station. ⑤ Research on in-vivo low-invasive stimulation/sensing for medical research In the field of medical research, efforts are underway to measure and analyze various information from living organisms using small animals. However, there are many obstacles in this process that hinder the efficient implementation of research. We are collaborating with the Inoue Tsuyoshi Laboratory at the Faculty of Medicine to address these issues from an engineering perspective. Through the development of low-invasive stimulation/sensing technologies and the proposal of new methods, we aim to support the smoother and more effective advancement of medical research.		
2. Keywords Electronic circuits, integrated circuits, IoT/AI		
3. Remarks and Websites researchmap: https://researchmap.jp/read0055707 Laboratory: https://pemsic.eee.nagasaki-u.ac.jp *We also conduct education, research, and hub formation through the Center for Advanced Micro-Device Research (CAMRIS) at Nagasaki University's Integrated Production Science Division. For more details, please visit: https://camris.ist.nagasaki-u.ac.jp		