IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 1, November 2024

Comprehensive Review on Advancements in VLSI Circuits for IoT Applications: A Survey of Current Trends and Technologies

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Abstract: *The Internet of Things (IoT) represents a paradigm shift in connectivity and automation, significantly impacting various domains through interconnected devices and smart systems. Central to the realization of efficient and effective IoT applications is the advancement in Very-Large-Scale Integration (VLSI) circuits, which play a crucial role in enabling the functionality and performance of IoT devices. This comprehensive review surveys the latest developments in VLSI circuit design tailored for IoT applications. It provides a detailed examination of current trends, including low-power design techniques, high-speed processing, and integration of sensors and communication modules. The review also explores emerging technologies such as ultra-low-power VLSI circuits, advanced fabrication processes, and innovative circuit architectures that address the unique challenges posed by IoT environments. By analyzing recent advancements and their implications for IoT systems, this survey aims to offer a holistic perspective on the state-of-the-art VLSI circuits, identify key research directions, and highlight future trends in the field. This synthesis of current technologies serves as a valuable resource for researchers, engineers, and practitioners striving to enhance the performance and efficiency of IoT applications through advanced VLSI circuit design*

Keywords: Internet of Things (IoT), VLSI circuits, efficiency, communication modules.