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Radiation-induced degradation of silicon carbide MOSFETs – A review
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Abstract
Silicon Carbide (SiC) Metal-Oxide-Semiconductor Field-Effect Transistors (MOSFETs) have gained significant attention due to their ability to achieve lower on-resistance, reduced switching losses, and higher switching speeds. However, when exposed to radiation-rich environments, SiC MOSFETs can experience radiation-induced charge build-up, leading to degradation and potential failure. This article provides a critical review focusing on the consequences of different types of radiation, including gamma rays, heavy ions, electrons, protons, and neutrons, on SiC MOSFETs. The impact of radiation on crucial parameters of MOSFETs such as threshold voltage, mobility, leakage current, and state resistance are discussed. The review aims to analyze in detail how radiation affects these parameters and the resulting consequences for SiC MOSFET performance. By exploring the effects of various radiation types on SiC MOSFETs, the article contributes to a comprehensive understanding of the challenges associated with radiation-induced degradation in these devices. This understanding is essential for developing strategies to mitigate the detrimental effects of radiation and enhance the reliability and performance of SiC MOSFETs in radiation-prone environments. © 2023

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Index Keywords
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