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Leakage Current Mechanisms in Silicon Carbide MOSFETs - A Review

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By [Baba, T](#) (Baba, Tamana) ^[1] ; [Hasbullah, NF](#) (Hasbullah, Nurul Fadzlina) ^[1] ; [Saidin, N](#) (Saidin, Norazlina) ^[1] ; [Siddiqui, NA](#) (Siddiqui, Naseeb Ahmad) ^[2] ; [Üzüm, A](#) (Uzum, Abdullah) ^[3] ; [Turhal, M](#) (Turhal, Mehmet) ^[3]

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Abstract

MOSFETs are integral components in modern electronics, renowned for their efficiency and performance. However, leakage currents, including drain-source (IDSS) and gate-source (IGSS) currents, pose significant challenges to device reliability and overall system efficiency, leading to issues such as increased power loss, thermal stress, and reduced lifespan of devices. This review delves into the mechanisms underlying leakage currents in SiC MOSFETs, a promising technology for high-power applications. The key factors contributing to leakage, such as gate oxide degradation, material properties, and device architecture, have been identified by examining the research conducted over the past few years. Understanding the leakage current mechanisms is crucial for developing effective mitigation strategies and optimizing SiC MOSFET performance. This review concludes by summarizing key findings and highlighting the importance of ongoing research.

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Author Information

Corresponding Address: Hasbullah, Nurul Fadzlin (corresponding author)
Int Islamic Univ Malaysia, Dept Elect & Comp Engn, Kulliyyah Engn, Kaula Lumpur, Malaysia
E-mail Addresses : nfadzlinh@iium.edu.my
Addresses :
¹ Int Islamic Univ Malaysia, Dept Elect & Comp Engn, Kulliyyah Engn, Kaula Lumpur, Malaysia

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