



Design and Analysis of MOSFET's as Solid-State Relays for Precise AC Load Control

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Abstract:

In the field of engineering, the complexities of accurate fan load control are closely related to the potential of Solid-State Relay (SSR) Technology. This paper delves into the complex landscape of utilization of SSR technology, including design considerations, the methodical implementation process, performance measurement metrics, difficulties encountered, and potential applications. As fans are widely used in a variety of applications, such as cooling systems and industrial processes, it is essential to ensure efficient energy consumption, proper temperature regulation, and optimal operating conditions. This paper examines the complex relationship between fan requirements and the characteristics of Solid-State Relays (SSR). The architecture of SSR technology is elucidated, including PWM techniques, strong gate driver circuitry, and sophisticated reverse voltage protection (RVPP) mechanisms. Schematic design, component selection, PCB layout, and assembly all play important roles in the painstaking process of translating theoretical design into practical implementation. Future horizons include the incorporation of MOSFET-driven SSRs with IoT platforms, improved thermal management strategies, and cutting-edge reliability testing procedures. By presenting a thorough picture of its benefits and possibilities in a variety of applications, this study sheds light on the crucial role MOSFETs play in contemporary fan load control

Keywords:

Solid State Relay, Microcontroller, MOSFET, IoT.