WHITEPAPER

Considerations and guidelines for using high-voltage CoolGaN™ switches in power systems

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Abstract

The design of an electronic switched-mode power system has always been a complex task, requiring both knowledge and experience. With the appearance of gallium nitride (GaN), this task has even become more complex, because the electrical properties of GaN expand the room for possible system solutions. Particularly the lack of a physical body diode and the lateral device operation enable completely new power topologies, e.g., hard-switched half-bridges or bidirectional switches. And it will still be the key task of the system designer to choose the concept best suited for his needs. It is also evident that cookbooks or simple algorithms do not exist for this task. But there are some general considerations that might be helpful for a successful system design.

This whitepaper summarizes the most important aspects and guidelines, rules, and trade-offs that should be taken into account when designing a power system utilizing high-voltage GaN switches. While some of these considerations are valid for any power system, some are specific for GaN. The paper mainly has to be seen as a summary, referencing numerous additional technical documents to provide further details.

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