

Veille fiabilité 26 avril

Junction temperature estimation of SiC MOSFETs based on Extended Kalman Filtering

19/04/2018 - ieeexplore.ieee.org

State of health monitoring, reliability improvement, and lifetime extension of power electronic systems necessitate accurate and real-time junction temperature estimation of semi-conductor devices. This paper presents a non-invasive real-time junction temperature estimation method for SiC MOSFETs. A state-space thermal model of the MOSFET is developed. Based on the developed model, a real-time junction temperature estimation method based on an Extended Kalman Filter (EKF) is proposed to measure

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Evaluation of LPCVD SiN Measurement in Si-Substrate-Based AlGaIn/GaN MIS-HEMT

15/04/2018 - ieeexplore.ieee.org

Si-substrate-based AlGaIn/GaN high-electron mobility power transistors with low pressure chemical vapor deposition (LPCVD) SiN compatible process. The dielectric failure by forward-biased constant-voltage stress time-dependent dielectric breakdown (TDDB) measurements at various temperatures (from room temperature to 250 °C) and their statistical Weibull analysis are compared. Impact of gate dielectric area and multifinger on the SiN

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A nonlinear model to assess DC/AC performance reliability of submicron SiC MESFETs

12/04/2018 - link.springer.com

il y a 4 jours - Abstract A modified nonlinear model to predict direct-current (DC) and alternating-current (AC) characteristics of submicron SiC metal-semiconductor field-effect transistors (MESFETs) is presented. Such devices are normally operated under high-bias ...

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HALF BRIDGE POWER CONVERSION CIRCUITS USING GAN DEVICES

12/04/2018 - worldwide.espacenet.com

GaN-based half bridge power conversion circuits employ control, support and logic functions that are monolithically integrated on the same devices as the power transistors. In some embodiments a low side GaN device communicates through one or more level shift circuits with a high side GaN device. Both the high side and the low side devices may have one or more integrated control, support and logic functions. Some devices employ electro-static discharge circuits and features formed within the GaN-based devices to improve the reliability and performance of the half bridge power conversion circuits.

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A New Design Paradigm for GaN Based LLC Converter

10/04/2018 - ieeexplore.ieee.org

In today's power electronics products, quality and reliability are given. Great emphases are placed

on efficiency, power density and cost. With recent advances made in gallium nitride power devices (GaN), it is expected that GaNs will make significant impacts to all three areas mentioned above. Thanks to the significantly reduced output capacitance of GaN devices, it enables GaN to operate at a switching frequency more than ten times higher than its silicon counterparts. To illustrate the impact of GaN on efficiency, density and even design practices, three decades of development of LLC resonant converter for computer server are highlighted. By virtue of higher switching frequency beyond 1MHz, the bulky magnetic components for LLC converters are replaced with distributed magnetics and then integrated in a form of matrix transformer with simple PCB winding. The new generation of DC/DC converters are characterized with an order of magnitude higher power density, and with higher efficiency and additionally with dramatic reduction of labor contents in the manufacturing process. Even though this paper only demonstrated the impact of GaN for computer server application, similar can be said for wide range of application for for IT, communication equipment, consumer electronics, lightings and other electronics equipment

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SiC MOSFETs robustness for diode-less applications

03/04/2018 - tandfonline.com

Silicon-Carbide (SiC) technology presents several advantages over silicon for power electronics applications, such as lower losses. However, SiC technology is not totally mature, and some reliability problems remain. This paper studies the robustness of SiC MOSFETs in the case of diode-less applications and the associated phenomena, such as gate oxide degradation. Several devices were stressed under conditions of inductive switching and inverse current conduction. These devices were periodically characterized. As a result, a threshold voltage shift was observed in the MOSFET, with a dependence on the duty cycle of the transistor. On the contrary, no significant degradation of the internal P-N junction of the transistor was observed

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