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Reliability of GaN Electronics: Novel Electrical Results

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GaN electronics is presently been explored for power electronic applications, with large investments being made in this field. Excellent device performances have been demonstrated by various companies and academic researchers, however, device reliability is still not as high as desired and the physics of device failure of GaN power electronics is still not well understood. While advances in the understanding of the reliability of GaN microwave devices have been achieved, for GaN power electronics much less is known. I will present our latest results using dynamic transconductance and noise measurements coupled to device simulation, on GaN power electronics device reliability, in particular in the context of the more commonly used C-doped GaN buffer layer in these devices. Key trap parameters are identified, as well as the evolution of trap generation during device operation such as using gate bias dependent noise measurements. The role of dislocations in the devices on device reliability will also be discussed.