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SMART Mobility Forum

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Biography
Simon Price is CEO of Exawatt, a provider of strategic consulting, technology analysis and cost forecasting to manufacturers in the solar PV, EV, power electronics and lithium-ion battery industries. Exawatt's work is united by a common theme: decarbonisation via electrification.

Prior to founding Exawatt in 2015, Simon 2010 was a member of the founding team of PV Tech Group, which provided factory design and integration services to solar PV companies. He has been active in PV since 2008, when he was part of the founding team of a startup technology company dedicated to improving the efficiency of crystalline solar cells.

Previously, as a management consultant in the interactive entertainment industry, Simon provided services to a number of industry-leading manufacturers, including Microsoft, Sony, Intel and Nokia. Other clients included software publishers and financial institutions. Simon began his career as a business journalist, overseeing two of the interactive entertainment industry's leading publications.

Simon has an MSc in Science Communication from Imperial College of Science, Technology and Medicine, University of London, and a BEng in Electrical and Electronic Engineering from the University of Newcastle upon Tyne, UK.

SiC in the Automotive Supply Chain

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Abstract
Silicon carbide (SiC) has the potential to dominate EV power electronics manufacturing in the coming years, due to the numerous benefits it offers EV makers, including improved performance, reduced size and weight, and increased vehicle range. However, there is a widespread misconception that SiC is not yet ready for the mass market, due to concerns over the technology's maturity, its high cost relative to silicon and its suitability for mainstream vehicles. This presentation will examine the status and prospects of SiC in EVs and will

discuss the developments that must - and will - happen to drive SiC market share.

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Gallium Nitride Technology to Meet Automotive High Reliability Requirements

K. Smith
VisIC Technologies, Nes Ziona, Israel

Abstract
The unique structure of wideband GaN devices creates a device with very high transport characteristics with high charge density in the channel that operate at high voltages. These characteristics allow the devices to operate at much higher frequencies and with fewer parasitics. Inherent in these unique characteristics is a flexibility in device design to allow robust operation and high performance. As shown in by the measured operational locus for VisICs D^3GaN power devices, GaN devices operate at current levels well below the maximum current and at voltages well below the blocking (similar to breakdown) voltages. This paper will show the reason, necessity, and testing of these design conditions in creating a highly reliable device needed for automotive applications.
Yet, all Gallium Nitride transistors are not the same. Even outside of the device design parameters necessary to establish a proper overhead, the intrinsic device should be chosen to best satisfy the needs of the application. There are 2 implementations of lateral GaN power devices: a normally on or depletion mode (D-mode) device and a normally-off or enhancement (E-mode) device. While each device has it's advantages and disadvantages, understanding these tradeoffs are necessary to make a proper choice for the chosen application. The gate region is very different for these two implementations and plays a critical role in the potential reliability. D^3GaN D-mode technology has a very robust gate structure as illustrated here. Additional characterization and testing will be shown to illustrate both the reliability and understanding of why VisIC's D^3GaN D-mode technology is the best choice to meet the high-reliability needs of the automotive sector.

Biography
Kurt has 18 years of experience in Gallium Nitride Reliability. He has worked in RF GaN with Raytheon supporting reliability analysis of high power RF amplifiers for radar and other high-frequency applications. More recently, Kurt was the Reliability Manager at Transphorm, working on high voltage power devices. He was responsible for reliability testing, analysis and degradation models to support both physical understanding of factors contributing to the reliability of devices and customer requests for specialized testing and understanding. Kurt is currently a member of the leadership team for the JEDEC J70 efforts to develop standards for GaN and SiC testing, datasheets and reliability
Kurt is a veteran of the USNavy, where he was a Nuclear Machinist Mate. He received his BS, MS, and Ph.D. at the University of California, San Diego