Power Management and Gate Driver ICs for Future Power Semiconductor Devices
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Power Management ICs (PMICs) have become a mainstream smart power IC products for over a decade. Majority of the PMICs are either fully integrated switched mode power supplies (e.g. DC-DC converters) or controller ICs designed with low cost, high efficiency and reliability. Another important product category is the gate driver ICs for power semiconductor devices such as power MOSFETs, IGBTs and the emerging GaN HEMTs. In this talk, we will examine the unique features of dedicated gate driver ICs for modern power semiconductor devices. In particular, the segmented gate drive output stage with built-in digital timing controls in the gate drivers will be discussed. The driving requirements for silicon-based and GaN-based power devices will be explored. The important dependence of the gate driving capabilities and dead-times have on the switching loss and EMI will be illustrated via actual circuit applications. Finally, we will introduce enhanced features for next generation gate drive ICs.