Bridging Realities: Compound Semiconductor Solutions for Next-Generation Augmented Reality Displays

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Abstract

Virtual, Mixed, and Augmented Reality (VR, MR, AR) platforms are ushering in the next era of computer platform evolution, requiring a paradigm shift toward wearable, all-day persistent computing. This transformation hinges on a deep understanding of the five human senses—sight, sound, smell, taste, and touch—to seamlessly integrate virtual content into the real world. The central challenge and opportunity in wearable electronics lie in emulating and harnessing these senses to create a realistic virtual experience.

Among the myriad technologies involved, near-eye transparent displays emerge as a critical component, representing the highest bandwidth channel for delivering context-aware augmented reality (AR) content. The compact glasses form factor places stringent demands on these displays, necessitating exceptional power efficiency, thermal performance, weight, and volume considerations. This presentation, led by Jason Hartlove, delves into the pivotal role of compound semiconductors in addressing the challenges posed by AR displays. By exploring the opportunities presented by compound semiconductors as light sources, waveguides, and sensors, the talk will shed light on how these advanced materials can elevate the performance and capabilities of AR displays. From pushing the boundaries of power efficiency to optimizing thermal performance, this session will provide valuable insights into the cutting-edge solutions that propel AR displays towards a future where virtual content seamlessly blends with the real world.