

SESSION 8

THERMAL MANAGEMENT FOR HIGH POWER DEVICES

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This session contains five exciting papers relevant to thermal management of both GaN and GaAs high power FET technologies. The first paper is concerned with extracting the thermal conductivity of the carbon or iron doped high resistivity GaN buffer beneath the conducting channel of GaN HEMTs. The second paper describes how the technique of transient thermoreflectance can be used to extract the thermal boundary resistance at the GaN/diamond interface; knowing this extra thermal boundary resistance impeding the heat flow is obviously essential to anticipate the overall thermal resistance of such GaN HEMTs on CVD diamond. The third paper shifts the focus and compares the thermal resistances of AlGaIn/GaN power FETs on Si and n-SiC substrates extracted by pulsed IV measurements. The fourth paper shifts the focus again to band engineering of a GaN MIS-HEMT by using a partially recessed fluorine-implanted barrier. The partially recessed barrier improves thermal stability, and the fluorine implant provides normally-off operation and maintains a high mobility heterojunction channel. The final paper describes another important design choice affecting FET thermal resistances, namely the proximity and geometry of backside vias adjacent to the device, in the case of GaAs, GaN on Si, and GaN on SiC FETs. We hope you will join us for this important and interesting session on thermal design and thermal management.

