

Thermal Considerations for High Power GaN RF Amplifiers

Manuel Romero
Cree/Wolfspeed
mromero@cree.com

The reliability of high-power GaN HEMTs, employed in high power amplifiers, is driven by peak temperatures within the base semiconductor technology. As such, the design engineer must carefully consider the thermal environment presented to a high-power amplifier. This talk will discuss how peak temperatures in the GaN HEMT's semiconductor translate to its reliability. Thermal properties of leading semiconductor substrates, silicon carbide and silicon, will be compared and the concept of thermal resistance will be introduced. The effect of transistor packaging as well as the importance of proper transistor assembly will also be discussed. Finally, a practical RF high power example will be presented.