1. Title: RF GaN Device electrical behavior correlation to MTTF / Lifetime with investigation of failure and modeling of expected vs measured.

2. Individual Sponsor:
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3. Academic Area/Field and Education Level: GaN HEMTs, test and characterization, device modeling, thermal characterization, material analysis, failure analysis, reliability (MS or PhD)

4. Objective: Form correlation between the GaN HEMT device stresses to failure and the device characteristics from a device physics prospective and correlate with physical findings to inform design and manufacturing and feed model development.

5. Description: Qualification of electronic devices is crucial to system operational lifetime, maintenance schedules and successful missions. One lengthy step of qualification is determining Mean Time to Failure (MTTF) for the devices. To improve reliability assessments identifying stressors and device characteristics to use as early identification of future failure is critical to limit time and nature of change in device construct that is often lost in full failures. Building process and material-based models from the mechanism analysis allow for emulation of process change prior to costly manufacturing, characterization and reliability assessments. Under this topic students will perform standard device characterization and reliability assessments of COTS devices and correlate changes in performance parameters to the observed failure mechanism. They will characterize the failure mechanism and correlate it to the device physics to create mathematic models of mechanisms to be used for predictive simulations.

6. Research Classification/Restriction: Not Classified/Not Restricted

7. Eligible Research Institutions: All

Keyword: GaN HEMT, Reliability, Thermal Resistance