Physical analysis of power AlGaN/GaN HEMT reliability

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AlGaN/GaN HEMTs are on the way to lead the radiofrequency power amplification field according to their



outstanding performances. However, due to the relative youth of this technology, reliability studies in several types of operating conditions are still necessary to understand failure mechanisms peculiar to these devices and responsible for their wearing out. This study deals with the failure analysis of power AlGaN/GaN HEMTs in RADAR operating mode (pulsed and saturated). This is based on the design of test amplifiers, their characterization and their stress on ageing benches. The setting up of a methodology aiming at discriminating predominant degradation modes, jointly with a micro-structural analysis of aged devices,

permits to link the evolution of electrical performances with the physical roots of these defects.