

Physical analysis of power AlGaIn/GaN HEMT reliability

Farid Temcamani

*Ecole Nationale Supérieure de l'Electronique et de ses Applications, Université de Cergy Pontoise,
6 avenue du Ponceau - CS 20 707 Cergy - 95014 Cergy-Pontoise Cedex, France*

AlGaIn/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 AlGaIn/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.

