

Design method of balanced AlGaN/GaN HEMT cascode cells for wideband distributed power amplifiers

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Abstract – A specific design of a GaN HEMT cascode cell dedicated to flip-chip distributed power amplifiers is presented in this paper. The active device used in the design is a $8 \times 50 \mu\text{m}$ AlGaN/GaN HEMT grown on SiC substrate. The GaN-based die which integrates the active cascode cell and its passive matching elements is flip-chipped onto an AlN substrate via electrical and mechanical bumps. The matching elements of the cascode cell are composed of series capacitors on the gate of both transistors with additional resistors to insure stability and bias path. The series capacitor on the gate of the 1st transistor is added to enable the power optimization of wideband distributed amplifiers up to their maximum frequency while the series capacitor on the gate of the 2nd transistor is dedicated to the intrinsic power balance of the cascode cell.