

GaAs Technology Status and Perspectives for Multi-band and Multi-standard Challenges in Upcoming RF-Frontends

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GaAs HBT technologies currently dominate the wireless handset PA marketplace due to their proven RF performance, time-to-market, and size advantages compared to other technologies. As with any technology, new customer specifications and requirements drive the development of next-generation devices and processes.

Changing requirements regarding the bias circuit reference voltage (along with more sophisticated bias circuit functions) is a big challenge. Skyworks addresses this task by using GaAs BiFET technologies that allow low and no-reference circuits to be designed for just such applications.

In so-called “linear” PAs, the important figure of merit is the lowest overall current consumption. This means that the efficiency at mid-power is as important as the higher power efficiency. This requirement is being addressed through design topologies (quasi-Doherty), integrated HBT-FET, and advanced assembly techniques. The pros and cons of these approaches, as well as the technology considerations, will be discussed.

Finally, multi-mode, multi-band operation of PA modules is becoming a reality. The approaches will vary depending on the particular in-house strengths of a given company. No matter what the approach, switching or tunable output matching networks can play a pivotal role in this area. There exist several different technologies for tuning networks (MEMs, BST, and high-Q varactors). The relative merits of these approaches will be compared and contrasted relative to implementation in commercial products.