

GaN power devices for a new wave of electric vehicles and microwave applications

Yong Tae Kim

Korea Institute of Science and Technology, Dongdaemoon, Seoul, Korea

Wide bandgap technologies like GaN high electron mobility transistors (HEMTs) can achieve high speed, high power, improved reliability, a large heat capacity, and reduced circuit complexity, making it ideal for fast-growing applications in electric vehicles and communications. In particular, the high operating voltages and high power densities that are possible in wide bandgap devices offer a number of advantages for smart power control and microwave systems [1].

However, the challenges for GaN technologies have been in reliability, as well as in volume manufacturing. To meet these challenges, SnGeSi is now suggested for high-quality epitaxial growth of GaN, instead of conventional step-graded AlGaIn buffer layers. Also, larger heat capacity and efficient heat dissipation may be ensured by a novel diamond coating process.

1. R. J. Trew, "Wide bandgap transistor amplifiers for improved performance microwave power and radar applications", *Proc. 15th Intern. Conf. Microwaves, Radar Wireless Commun. (MIKON-2004)*, Vol. 1, pp. 18– 23 (2004).