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Title:An overview of solid-state integrated circuit amplifiers in the submillimeter-wave and THz regime

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Abstract:We present an overview of solid-state integrated circuit amplifiers approaching terahertz frequencies based on the latest device technologies which have emerged in the past several years. Highlights include the best reported data from heterojunction bipolar transistor (HBT) circuits, high electron mobility transistor (HEMT) circuits, and metamorphic HEMT (mHEMT) amplifier circuits. We discuss packaging techniques for the various technologies in waveguide modules and describe the best reported noise figures measured in these technologies. A consequence of THz transistors, namely ultra-low-noise at cryogenic temperatures, will be explored and results presented. We also present a short review of power amplifier technologies for the THz regime. Finally, we discuss emerging materials for THz amplifiers into the next decade.

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