Abstracts

Efficient power combining with D-band (110-170 GHz) InP Gunn devices in fundamental-mode operation

H. Eisele and G.I. Haddad. "Efficient power combining with D-band (110-170 GHz) InP Gunn devices in fundamental-mode operation." 1998 Microwave and Guided Wave Letters 8.1 (Jan. 1998 [MGWL]): 24-26.

D-band InP Gunn devices on diamond heat sinks with an n/sup +/n/sup -/n/sup +/ structure and a graded doping profile in the active region were tested as free-running oscillators in individual resonant-cap full-height waveguide cavities. Subsequently, matched oscillators were power-combined in an in-line dual-cavity configuration. Combined radio frequency (RF) power levels of more than 300 mW at 106 GHz, 130 mW at 136 GHz, and more than 100 mW at 152 GHz were achieved. These RF power levels are the highest reported to date from either single or power-combined Gunn devices at W-band and D-band frequencies. They correspond to combining efficiencies of more than 80%, 86%, and more than 100% as well as overall DC-to-RF conversion efficiencies of 1.95%, 1.25%, and 0.90%, respectively. Similar to oscillators with single devices, these power-combined Gunn device oscillators exhibit good tunability and a phase noise of well below -100 dBc/Hz, measured at a frequency off the carrier of 500 kHz.

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