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Title:Nonresonant Detection of Terahertz Radiation in High-Electron-Mobility Transistor Structure Using InAlAs/InGaAs/InP Material Systems at Room Temperature
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Abstract:In this paper, we report on nonresonant detection of terahertz radiation using the rectification mechanism of two-dimensional plasmons in high-electron-mobility transistors using InAlAs/InGaAs/InP material systems. The experiments were performed at room temperature using a Gunn diode operating at 0.30 THz as the THz source. The measured response was dependent on the polarization of the incident THz wave; The device exhibited higher response when the electric-field vector of the incident radiation was directed in the source-drain direction. The 2D spatial distribution image of the transistor responsivity extracted from the measured response shows a clear beam focus centered on the transistor position, which ensures the appropriate coupling of the terahertz radiation to the device. The device also demonstrated excellent sensitivity/noise performances of similar to 125 V/W and similar to 10(-11) W/Hz(0.5) under 0.30 THz radiation.
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