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Abstract:This Letter describes the fabrication of a microelectromechanical systems (MEMS) bimaterial terahertz (THz) sensor operating at 3.8 THz. The incident THz radiation is absorbed by a metamaterial structure integrated with the bimaterial. The absorber was designed with a resonant frequency matching the quantum cascade laser illumination source while simultaneously providing structural support, desired thermomechanical properties and optical readout access. Measurement showed that the fabricated absorber has nearly 90% absorption at 3.8 THz. A responsivity of 0.1°/μW and a time constant of 14 ms were observed. The use of metamaterial absorbers allows for tuning the sensor response to the desired frequency to achieve high sensitivity for potential THz imaging applications. © 2012 Optical Society of America.
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