587. 标题: SRRs Embedded with MEMS Cantilevers to Enable Electrostatic Tuning of the Resonant Frequency
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摘要: A microelectromechanical systems (MEMS) cantilever array was monolithically fabricated in the gap region of a split ring resonator (SRR) to enable electrostatic tuning of the resonant frequency. The design consisted of two concentric SRRs each with a set of cantilevers extending across the split region. The cantilever array consisted of five beams that varied in length from 300 to 400 mu m, with each beam adding about 2 pF to the capacitance as it actuated. The entire structure was fabricated monolithically to reduce its size and minimize losses from externally wire bonded components. The beams actuate one at a time, longest to shortest with an applied voltage ranging from 30-60 V. The MEMS embedded SRRs displayed dual resonant frequencies at 7.3 and 14.2 GHz or 8.4 and 13.5 GHz depending on the design details. As the beams on the inner SRR actuated the 14.2 GHz resonance displayed tuning, while the cantilevers on the outer SRR tuned the 8.4 GHz resonance. The 14.2 GHz resonant frequency shifts 1.6 GHz to 12.6 GHz as all the cantilevers pulled-in. Only the first two beams on the outer cantilever array pulled-in, tuning the resonant frequency 0.4 GHz from 8.4 to 8.0 GHz.
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