Abstracts

Differential multi-finger MEMS tunable capacitors for RF integrated circuits

G.V. Ionis, A. Dec and K. Suyama. "Differential multi-finger MEMS tunable capacitors for RF integrated circuits." 2002 MTT-S International Microwave Symposium Digest 02.1 (2002 Vol. I [MWSYM]): 345-348 vol.1.

Several micro-electro-mechanical tunable capacitors fabricated in polysilicon surface micro-machining process are presented. These devices are based on parallel-plate and zipper actuation principles. Differential and multi-finger techniques are used to achieve higher quality factors. These devices are evaluated by direct measurements and by measuring phase noise of voltage-controlled oscillators that use these devices. A voltage-controlled oscillator with a two-finger parallel-plate variable capacitor shows the phase noise of -129 dBc/Hz at 600 kHz offset from the carrier while outputting 1.3 dBm and tuning between 1.81 GHz and 1.85 GHz. An experimental fractal capacitor with quality factor better than 17 at 1.5 GHz and capacitance varying from 1.9 pF to 6.7 pF is also presented.

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