Abstracts

30 GHz tuned MEMS switches

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This paper demonstrates the use of resonant tuning in high-isolation reflective MEMS electrostatic switches. Tuned switches can achieve higher isolation and a lower pulldown voltage than a comparable single element switch. An equivalent circuit model was developed for individual shunt capacitive membrane switches and then implemented in tuned circuits. The novel cross switch was developed on a high resistivity silicon. The cross switch attained an insertion loss of less than 0.6 dB and a return loss below -20 dB from 22-38 GHz in the up-state, and a down-state isolation of 50 dB with only 1.1 pF of down-state capacitance (Cd) per element. The pulldown voltage is 15-20 V, which is much better than typical industry numbers of 28-50 V. Application areas are low-loss high-isolation communication switches at 28 GHz and automotive switches at 77 GHz.

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