Abstracts

Nonlinear electro-mechanical modeling of MEMS switches

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We present an accurate model of the switching mechanism of MEMS switches. The model is based on a electro-mechanical analysis which takes into account the varying force and damping versus position (time). The model also calculates the switching current taking into account both the capacitance change and the voltage change versus time. The model accurately predicts the switching time, the switching current, the velocity versus position (and time) of the MEMS bridge, and the energy consumed in the switching process. It is found that the current can be very large and the total switching energy is larger than predicted by simple models due to the damping underneath the MEMS bridge.

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