

# **Fabrication of Electro-Thermally Driven Bimorph Element**

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## ***Abstract***

The aim of this project is to generate a suspended bimorph element for tunable cavity filters and resonators. MEMS tunable element integrated with bulk micro-machined cavity offers small size, large tuning frequency range and low insertion loss which results in improved quality factor. Large vertical displacement, negligible tilting angle and zero lateral shift are the main requirements of the bimorph element. The fabrication of electro-thermally actuated square membrane/plate with gold and silicon dioxide bimorph beams has been done. The bimorph beam is essentially a composite layer of two materials with difference in coefficient of thermal expansion (CTE). A surface micromachining process has been employed in which bimorph structure is suspended by removing underneath sacrificial layer through dry and wet etching.

**Keywords:** Bimorph, Tunable cavity filters, Vertical displacement, Coefficient of thermal expansion (CTE), Surface micromachining.