

# Two-axis Analysis of Micromirror Using Electrothermal Actuators for Optical Switching Applications

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## Abstract

Micro Mirrors is a versatile device which has been gaining popularity and also the importance of MEMS techniques to develop such devices. These mirrors find applications in fields such as optical switching, display and in medical fields for non-invasive imaging. A thermally actuated mirror moves in either positive or negative directions of x and y, and combination of both x and y directions. The ends of thermal actuators are attached to the edges of the mirror. Thus when voltage is applied at the anchor end of the thermal actuator, an electric current passes through the cold and hot arms, the heat generated in the hot arm is more than that of the cold arm. In this project, we discuss about the design, analysis and actuation of mirror using four electro thermal actuators. A mirror design capable of the above mentioned movement is simulated with COMSOL Multiphysics®. The COMSOL Multiphysics' CAD tool is used to analyze the mirror structure and the thermal actuators using Joule heating physics to obtain the results. Analysis of the device will be carried by applying voltages in electro thermal actuators to obtain displacement and current density for each applied voltage.

## Reference

Ankur Jain, Shane Todd and Huikai Xie “An Electrothermally-Actuated, Dual-Mode Micromirror for Large Bi-Directional Scanning” National Science Foundation IEEE 2004.