ABSTRACT

HIGH ASPECT RATIO TRENCH ISOLATION PROCESS FOR SURFACE MICROMACHINED SENSORS AND ACTUATORS

A process for fabricating an integrated circuit sensor/actuator is described. High aspect ratio deep silicon beams are formed by a process of deep trench etch and silicon undercut release etch by using oxide spacers to protect the silicon beam sidewalls during release etch. An oxide layer is then formed, followed by deposition of a controlled thickness of polysilicon which is then thermally oxidized. The polysilicon layer inside the trenches gets fully oxidized resulting in void-free trench isolation. This process creates a silicon island or beam on three sides leaving the third side for interfacing with the sensor/actuator beams. The sensor/actuator is formed by a similar process of deep trench etch and release etch process on the same substrate. These suspended beams of the sensors and actuators are bridged with the silicon islands from the fourth side. The above process finally results in suspended silicon beams connected to electrically isolated silicon islands.

(FIGURE 2 IS SUGGESTED FOR PUBLICATION)