A Low Cost CMOS Compatible MEMS Based Fingerprint Sensor Design

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Abstract

In this paper, a novel design of a fingerprint sensor composed of a 2D array of piezo resistive micro beams has been presented. When the user presses the sensor array with a finger, the ridges and valleys that compose the fingerprint induce corresponding deflections in the micro beams. These deflections can be detected by means of a resistivity change, which when used with appropriate signal processing circuits, convert the deflections into an equivalent voltage signal. The design also includes post processing circuits comprising of A/D converter, needed to digitalize the amplified signal. The digitalized outputs from individual micro beams represent the pixels of the final fingerprint image. A sample data resulting from a sensor array of (224 x 256) micro beams, each of dimensions 50µm x 50µm, has been successfully used to reconstruct an image of the fingerprint using MATLAB. The sensor along with the associated processing circuit can be realized as a CMOS circuit and the micro beams developed using front side bulk micromachining.
Reference