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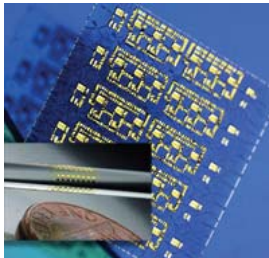
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News and New Products

Process makes silicon circuits that can fold, bend, and stretch

By Matthew Miller, Editor in Chief, EDN.com -- EDN, 5/1/2008



Optimized mechanical layouts and fabrication strategies create "wavy" silicon circuits that conform to curves and even tolerate folding and bending while they operate.

A new process creates ICs that not only can bend to conform to various surfaces, but also can operate while stretching, compressing, and folding. Scientists at the **University of Illinois—Urbana-Champaign**, working with colleagues at **Northwestern University** and **Singapore's Institute for High Performance Computing**, have developed fabrication strategies for circuits that can, for example, play a role in wearable medical devices or wrap around airplane wings for structural monitoring.

The researchers use conventional planar IC-fabrication techniques, along with printing methods that lay down aligned nanoribbons of single-crystal silicon, to build circuit elements on top of a thin plastic sheet. They then bond the resulting IC to a piece of prestrained silicone rubber. Releasing the strain allows the rubber to return to its original shape, thus applying compressive stresses to the circuit.

This step leads to a complex pattern of buckling and creates a geometry that in turn allows the circuit to fold, bend, and even tolerate deformation during operation.

The team has constructed circuits containing transistors, oscillators, logic gates, and amplifiers and claims that these ICs exhibit electronic performance similar to their more rigid, conventional-silicon counterparts.

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