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A Silicon and Carbon Foam Low Mass Interposer

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We present prototype results for a new wafer integration component called a low mass interposer (LMI). The LMI prototype is an assembly of silicon and carbon foam resulting in a composite 4 inch wafer of 4 mm thickness and average density 10% that of silicon. Rows of vertical copper contacts traverse the bulk on 4mm pitch. Each row consists of identical contacts on 10 micron pitch. This results in an average contact density of 25 /mm² for this particular prototype. The contact and row pitches as well as the final thickness are arbitrary choices made for demonstration purposes. These parameters can be varied by factors of 2 or more within the construction process under development. The LMI is intended for copper-copper bonding to IC wafers in a 3D integration process. This prototype does not match any specific wafer design and was produced to develop a fabrication procedure and quantify the results. 3D integration tests using these LMI prototypes would have to be done elsewhere.

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