

## 3D Printing of Flexible and Stretchable Interconnects

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### Abstract

Flexible hybrid circuits typically require interconnecting rigid bare silicon or packaged die to a flexible circuit board. Flexing these assemblies can cause extreme stress on the electrical connections, especially near the edge of the chip where it mates with the substrate. Much of the stress can be relieved by first printing an elastic fillet at the base of the chip to form a flexible ramp leading to the surface. Metal ink traces can then be printed along the ramp to connect between the board and chip I/O. Aerosol Jet® is an ideal printing tool for precision deposition of polymeric and metal inks in this 3D application. It is a non-contact, high resolution printing technology that is compatible with a wide range of conductive, insulating, and resistive materials. We will present the printing of robust, flexible and stretchable 3D interconnects with line and space below 50 micrometers and good stability under thermal cycling. We also present the printing of passive electronic components and sensors.

Key words: Aerosol Jet, 3D Interconnects, Flexible Hybrid Circuits, 3D Printing