

# Aerosol and Inkjet Printing of interconnects for Die Level Custom Electronic Packaging

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When it comes to manufacturing involving custom die-level packaging, traditional wire bonding can be significantly challenging. In this study we propose an alternative low cost, packaging method utilizing inkjet and aerosol printing to successfully produce functional interconnects on custom packages: silicon die assembled on PCB. Our approach involves manufacturing of the multilayer structure with insulating and conducting layer, printed using inkjet and aerosol jet techniques respectively. Firstly, we have conducted characterization of the UV adhesive deposition, with the help Nordson EFD Pico Pulse inkjet printer, in order to obtain the optimal parameters necessary for the fabrication of insulating layer with thicknesses around 100 micron. Silver conducting layer is printed using OPTOMECH Decathlon aerosol jet printer, which enables to form structures with features as small as 20 microns with the high precision, on surfaces with more complex geometries. After the fabrication, our structures were tested for conductivity and repeatability. Based on our results we plan to optimize the manufacturing process to ensure successful realization of the proposed packaging method. In the future, our approach could be efficiently used to connect various electronic components on different substrates including traditional and flexible PCBs. Furthermore, applied printing techniques enable the use of other insulating or conducting inks and formation of the structures of custom geometries at wide range of scale – 20 micron to 1 mm.

Michael Sassa is entering his third year studying mechanical engineering as an undergraduate for Clemson University. He has some Design, research, and manufacturing experience.

