ABSTRACT

Title of Thesis: INFLUENCE OF GAS FLOW RATES ON TRACE QUALITY AND RELIABILITY IN A SELECTED CONDUCTOR INK PRINTED WITH AN AEROSOL JET PRINTER

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Preliminary comparisons conducted between two aerosol jet printed samples, an interconnect-over-fillet specimen and baseline test coupons, revealed strong differences in surface agglomeration characteristics. These differences were subsequently found to be strongly correlated with differences in thermal cycling durability. One potential cause could be the differences in the carrier and sheath gas flow rates at which the nanoparticle ink was deposited onto the substrate during the AJP process. A parametric study was conducted to explore any relationship between gas flow rates and print quality. Serpentine test structures were aerosol jet printed at parametrically varied carrier and sheath gas flow rates. For each serpentine, its macroscale and micromorphological features were assessed as quality metrics and investigated for a potential relationship with gas flow rates. Future studies will subject these printed serpentine test structures of

varying quality to thermal cycling to establish possible correlations between gas flow rate and thermal cycling durability.