Abstract

A segmented and unsegmented 3D insulated copper through silicon vias (TSVs) of diameter 10µm, height 100µm and silicon of sizes 100µm by 100µm by 100µm are modelled using analysis system (ANSYS) and equivalent circuit using advanced design system (ADS) at frequency ranges between 100MHz and 20GHz at 10MHz step sizes. The segmented via is divided into three parts; part 1, part 2 and part 3. Each part is modelled separately. The scattering parameters especially the S21 which defines power loss in TSVs in both cases are found. The outputs are optimized to give accurate results. The results show that the outputs reflect the transmission characteristics of an ideal TSV. It's concluded that segmented TSV experiences a much lower insertion loss compared to the unsegmented one. Since insertion loss is a key reliability problem in TSVs, we propose this kind of modelling to eradicate it. However other reliability issues need to be eradicated too.