Electrical Impedance Tomography System for Silicon Wafer Characterization

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Abstract

In this paper we developed a new system for determining the distribution of resistivity of silicon wafers and thin conducting films using Electrical Impedance Tomography (EIT) technique. Electrical Impedance Tomographic Image of silicon wafer or thin conducting film can be obtained by injecting a small medium frequency current into the silicon wafer or thin conducting film via an array of electrodes attached around the silicon wafer or thin conducting film. The system uses the 32X4 multiplexer to define the patterns of current injection and voltage measurement around the silicon wafer or thin conducting film. Data from voltage measurement are sent to a microcomputer for reconstruction of the image by improved algorithm based on Finite Element and Newton-Raphson Method. Then the distribution of resistivity of silicon wafer or thin conducting film image in gray scale and color picture are displayed on monitor. In some experiments the system using current 1-10 mA at 100 KHz with 50 mm diameter silicon wafer ,the resulting images from measured and calculated show the distribution of resistivity of silicon wafer with distinction.

Keywords : EIT, FEM, Silicon Wafer Characterization, Process Monitoring

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