Abstract

SEMICONDUCTOR DEVICE AND METHOD OF FORMING CONDUCTIVE TSV WITH INSULATING ANNULAR RING

A semiconductor wafer has an insulating layer formed over an active surface of the wafer. A conductive layer is formed over the insulating layer. A first via is formed from a back surface of the semiconductor wafer through the semiconductor wafer and insulating layer to the conductive layer. A conductive material is deposited in the first via to form a conductive TSV. An insulating material can be deposited in the first via to form an insulating core within the conductive via. After forming the conductive TSV, a second via is formed around the conductive TSV from the back surface of the semiconductor wafer through the semiconductor wafer and insulating layer to the conductive layer. An insulating material is deposited in the second via to form an insulating annular ring. The conductive via can be recessed within or extend above a surface of the semiconductor die.

(Fig 7e)