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Abstract**A Solder Interconnection Having a Layered Barrier Structure and Method for Forming Same**

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The present invention is a solder interconnection having a layered barrier structure which inhibits reaction between a solder material and a substrate, and a method for forming the solder interconnection. The method involves a number of steps. First, depositing a nickel layer on a substrate.

10 Second, depositing a copper layer on the nickel layer. Third, depositing a solder material having a defined melting point on the copper layer. Fourth, heating the layers and solder material at a temperature above the melting point of the solder material, thereby causing the copper layer to react with tin in the solder material to form a non-continuous Cu_6Sn_5 intermetallic layer on the

15 nickel layer. Fifth, heating the layers and solder material at a temperature below the melting point of the solder material, thereby flattening out the non-continuous intermetallic layer into a substantially continuous intermetallic layer. The nickel layer and the substantially continuous intermetallic layer make up the layered barrier structure of the interconnection. The substantially

20 continuous intermetallic layer is capable of substantially inhibiting an adverse reaction between the solder material and the nickel layer and between the solder material and the substrate.

[Figure 1]



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