

LEAD-FREE AND ANTIMONY-FREE SOLDER ALLOY, SOLDER BALL, AND SOLDER JOINT

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Abstract

Provided are a lead-free and antimony-free solder alloy, a solder ball, and a solder joint capable of suppressing fusion failure as a result of having improved shear strength, which is attributed to the refinement of crystal grains at junction interfaces. This lead-free and antimony-free solder alloy has an alloy composition comprising, in terms of mass percentage, 0.1 – 4.5% of Ag, 0.20 – 0.85% of Cu, 0.005 – 0.090% of Ni, and 0.0005 – 0.0090% of Ge with the balance being Sn . The alloy composition satisfies formulas (1) and (2). (1): $0.006 \leq (\text{Ag} + \text{Cu} + \text{Ni}) \times \text{Ge} < 0.023$, (2): $(\text{Sn}/\text{Cu}) \times (\text{Ni} \times \text{Ge})/(\text{Ni} + \text{Ge}) < 0.89$. In the formulas (1) and (2), Ag, Cu, Ni, Ge, and Sn represent respective contents in the alloy composition (mass%).

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[No Figure]