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Verbinden von Leistungshalbleiterbauelementen durch Sintern von nanoskaligen Silberpartikeln

By Matthias Knörr

Shaker Verlag Sep 2011, 2011. Taschenbuch. Condition: Neu. Neuware - This thesis deals with the application of nano-scaled silver particles for die attachment in power electronics. The goal is to lower the levels of the parameters time (60-180 s), pressure (30-50 MPa) and temperature (230-250 °C) that are needed for the state-of-the-art sintering process using micron-scaled silver flakes. The main focus is on reducing the pressure needed as high scrap rates have to be expected for high levels of pressure. First, the sintering of different silver powders is compared. The results indicate that the capping material passivating the nano-scaled silver particles defines the sintering behaviour: the process cannot start until the coating is removed. The polymer polyvinylpyrrolidone proves to be too stable to be decomposed at the desired temperatures of less than 300 °C. Particles capped with oleic acid sinter very well in air. Only poor sintering can be detected in absence of oxygen, though. It follows that the adsorbed oleic acid decomposes by means of oxidation. Density measurements are used to track the sintering of stencil printed layers of a silver nanopaste. The silver particles in the paste are sized 30-50 nm and passivated with oleic acid. Rising densities...



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