

Semiconductor

3DIC thermal management based on phonon engineering

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Summary :

The three-dimensional structure of 3DICs and the rise in junction temperature due to the increase in power density are issues that must be overcome, and the development of highly efficient heat dissipation technology is essential.

In this project, the low thermal conductivity SiO_2 insulator used in the TSV and BEOL sections will be partially replaced by high thermal conductivity AlN. This structure enables the achievement of efficient heat dissipation and contributes to the realization of 3DICs that enable both the advancement of the semiconductor industry and the reduction of CO_2 emissions. To achieve high heat dissipation, we will develop a realistic and effective low-temperature deposition technology for AlN, taking process integration into consideration, and introduce a new structure based on a phonon engineering perspective. This technology supports 3DICs, which contribute to the reduction of more than 50 million t- CO_2 e in data centers and achieve carbon neutrality by 2050.

