# Impact of Vias on the Thermal Characteristics of Deep Sub-Micron Cu/low-k Interconnects

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## Abstract

This paper investigates in detail the impact of vias on the thermal characteristics of high performance Cu/low-k interconnects. It shows that the effectiveness of vias in reducing the temperature rise in interconnects is highly dependent on the dielectric material used. An efficient 3-D electro-thermal simulation methodology is presented to evaluate the temperature profile along wires and the thermal coupling between them. Furthermore, the possibility that thermal effects may degrade the expected speed improvement from the use of low-k dielectrics is discussed.