UK researchers find way to reduce power consumption of transistors in computer chips

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University of Kentucky researchers have discovered a means of reducing gate leakage current of transistors in computer chips that will permit chip producers to continue developing more efficient and powerful chips with reduced power consumption.

Zhi Chen, associate professor of electrical and computer engineering, found that applying rapid thermal processing directly on gate insulators – used to control current flow of transistors in computer chips – can dramatically reduce the chips' leakage current and correspondingly the power consumption. In fact, the technique can improve the insulating qualities of gate insulators so that their direct tunneling current is reduced by 10,000 to 100,000 times. No effect was found if rapid thermal processing was not directly applied on the gate insulators.

In order to improve computer chips' performance, transistors' size and gate insulators have to be continuously shrunken so that more components can be packed into a single chip. Computer chip producers were hitting a wall in downscaling the transistors and gate insulators because of their inability to reduce the leakage current of the existing gate insulators. This new technique will help the chip producers to develop more powerful chips with low-power consumption.

Chen and his team will present their findings in a paper to be presented Dec. 7-9 at the 2005 International Semiconductor Device Research Symposium in Bethesda, Md.

Source: University of Kentucky

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