

Increasing Memory Capacity on Limited Space

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Infineon Technologies AG, demonstrating its leadership as memory supplier, today announced new high-density memory products for notebook computer and graphics applications, designed to help system manufacturers meet growing demand for mobility, miniaturization and lifelike graphics.

Building on its industry leadership in providing memory products based on new concepts such as Dual-Die-technology or innovative connector techniques for mobile computing, Infineon introduced:

- 2GB dual-die based DDR2 SO-DIMMs (Double Data Rate2, Small Outline Dual Inline Memory Module) with improved thermal condition and power consumption
- Maximum memory density at smallest available DIMM size with

the 1GB DDR2 Micro-DIMM

Infineon also expanded its graphics memory portfolio, supporting applications in both high performance to mainstream systems, with two new products:

- 512Mbit GDDR3 (Graphics Double Data Rate 3) memory with the increased density and bandwidth needed for advanced 3D-Graphics
- New 256Mbit DDR2 Graphics RAM (Random Access Memory) reaching speeds of up to 450MHz at reduced footprint and with additional functionalities

New 2GB DDR2 dual-die based SO-DIMMs for High-End Notebooks

Infineon released first engineering samples of the 2GB DDR2 dual-die based SO-DIMMs for next generation high-end notebooks and laptop PCs which require a reduced module thickness and height due to their smaller dimensions. The Infineon 2GB DDR2 SO-DIMMs are manufactured with 18 dual-die 2Gbit DDR2 components that achieve the currently maximum density of 2GB with a thickness of 3.8mm at the standard 30mm height. The module is organized in 2 ranks and operates at 1.8 Volt.

Infineon's DDR2 dual-die components have industry's lowest measured power consumption, which improves thermal conditions by one third compared to alternative solutions and decreases working power consumption by 30 percent. Infineon also leads the industry in Dual-Die technology, which is realized by stacking two identical dies in one BGA (Ball Grid Array) package. Dual-Die technology is pre-requisite to manufacture next generation, high-density modules without significantly increasing their dimensions.

According to market research firm iSuppli the demand for notebooks will increase from around 36.1 million units in 2003 to approx 52.2 units in 2006 with a yearly average growth rate of 13 percent.

Samples of the 2GB DDR2 SO-DIMM are available now at US-Dollar 1,700.

1GB DDR2 Micro-DIMM offers maximum memory density at smallest size

Infineon extends its DDR2 Micro-DIMM offering with 1GB modules, which will further accelerate the manufacturing of lighter and smaller sub-notebooks with enhanced functionalities and battery lifetime.

Samples were shipped to selected customers. The JEDEC (Joint Electron Device Council) compliant Micro-DIMMs are only 65 per cent of the size of equal capacity SO-DIMMs (Small Outline DIMMs) used for conventional notebooks. Micro-DIMMs use a new 214-pin “mezzanine connector” technique that reduces the size of the module and the area covered by the connector by about 35 per cent. Additionally, the use of low-power DDR2 components will decrease power consumption of the module by approximately 50 percent which allows either extended battery lifetime or smaller battery size in sub-notebook computers.

According to market research firm Gartner, sub-notebooks are expected to represent 17 per cent of the notebook market, with 9.4 million units sold per year by 2007. Infineon is the only DRAM manufacturer producing Micro-DIMMs in volume quantities.

The 1GB DDR2 Micro-DIMMs are based on 8 single-die 1Gbit DDR2 components and extend Infineon’s DDR2 Micro-DIMM portfolio of 256MB and 512MB Micro-DIMMs. Samples are available for speeds of PC2-3200 and PC2-4300 now.

New 512Mbit GDDR3 components for high performance graphics cards and notebook graphics

Infineon extended its graphics memory portfolio with 512Mbit GDDR3 (Graphic Double Data Rate 3) graphics DRAM. The new GDDR3 16Mbit x 32 components have a clock frequency of 800MHz, enabling data bandwidths of up to 51.2Gbit/s per memory. With this memory Infineon targets new high end graphics systems for desktops and notebooks.

Large frame buffers and high bandwidth are the key requirements for desktop graphic cards designed to drive PC games towards virtual reality. The 512Mbit GDDR3 allows manufacturers to build leading edge graphics cards with frame buffer sizes of 512MB or even 1GB and very high data bandwidth of 51.2GB/s. The 512Mbit GDDR3 provides clock frequencies of up to 800MHz at an operating voltage of 1.9V. The package is a JEDEC compliant 136 ball FBGA package with 11mm x 14mm x 1.2mm dimensions.

With its density of 512Mbit it is ideally suited for frame buffer sizes of 128MB and 256MB for notebooks. Operating the device at V_{dd}/V_{ddq} at 1.8V especially for notebook applications is also possible. In addition, small package sizes combined with high densities are also key factors for notebook graphic applications. The Infineon 512Mbit GDDR3 is available in a 11mmx14mm package and provides the highest Mbits per square mm of all available graphics DRAMs.

Infineon began shipping samples in February to industry leading customers. Volume production is scheduled for the second half of 2005.

DDR2 256 Mbit Graphics RAM with speeds up to 450MHz available

With volume production of 256Mbit DDR2 started in March, Infineon now offers a full graphics memory portfolio for high performance and mainstream systems. The Infineon 256Mbit DDR2 Graphics RAM for standalone graphic cards improves performance of mainstream graphics and gaming applications at a competitive price. The 256Mbit DDR2 is available in a small form factor FBGA-84 package with operating voltages starting at 1.8V, which makes it suitable for the latest desktop and notebook applications.

By increasing the clock frequency by 50 percent compared to previous generations of graphics memory to up to 450MHz, a data bandwidth 1.8 Gigabytes per second can be achieved. The FBGA-84 chip size package is half as big as current DDR Graphic RAMs. The new DDR2 includes also the “On Die Termination” feature which is necessary for clear read and write signals at operating speeds above 250MHz.

The DDR2 256 Mbit 16Mx16 DDR2 300MHz-400MHz Graphics RAM is available in volume quantities now. Qualification samples of the 16Mx16 DDR2 450MHz are available also now.

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