

HITACHI RELEASES INDUSTRY'S FASTEST 1-GBIT MULTI LEVEL CELL FLASH MEMORY

Tokyo, July 10, 2002—Hitachi, Ltd. (TSE: 6501) today announced the HN29V1G91 1-Gbit multi level cell*¹ flash memory, achieving 10 Mbytes/sec write speed, for large-volume data storage with high speed such as digital moving-image. Sample shipment will begin in October 2002 in Japan.

The HN29V1G91 achieves a write speed of 10 Mbytes/sec--5 times faster than Hitachi's previous multi level cell flash memory—by using 0.13 μm process and the development of Hitachi's AG-AND (Assist Gate-AND)*² next-generation AND type flash memory cell which is offering both small chip size and fast write speed. HN29V1G91 is suitable for the storage media of the picture data of high quality digital still cameras and silicon movies. Also this product will be an effective storage media of large-volume digital contents combined with broadband such as moving picture because of its ability to write 128 Mbytes (1Gbit) data in approximately 13 seconds.

As future plans for compact removable cards incorporating the HN29V1G91, Hitachi is planning to develop the 1-Gbyte CompactFlashTM*³ and 256 Mbyte MultiMediaCardTM*⁴. Hitachi is providing useful storage solutions for high-speed communication infrastructures such as broadband and wireless LAN by offering these high speed storage media.

[Background]

Data storage flash memory such as AND type flash memory is widely used for the large density storage devices/ cards in a variety of portable products and information products, including not only digital still cameras and portable music players but also digital video cameras, mobile phones, and PDAs. In addition, demand is growing for the use of such flash memory as a replacement of small-capacity HDDs in industrial and telecommunications applications. The most important key point of achieving larger density, smaller size, and competitive cost is realized by finer process and the reduction of chip size by using multi level cells.

However, a problem with multi level cells had been their slow write speed compared with binary cells. While the current write speed of approximately 2 Mbytes/sec has been adequate for digital cameras with around 2 to 3 million pixels, a write speed on the order of 10 Mbytes/sec is necessary for higher pixel counts and various kinds of digital contents distribution using broadband transmission.

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To meet this demand for smaller size and faster speed, Hitachi has developed an AG-AND type flash memory cell that enables fast write speed with a multi level cell, and is releasing HN29V1G91 as the industry's fastest 1-Gbit multi level cell flash memory.

[About this Product]

Major features of the HN29V1G91 are summarized below.

(1) Industry's fastest write speed for multi level cell flash memory of 10 Mbytes/sec

Use of the hot electron injection method*⁵ and simultaneous 4-bank programming operation within the chip has made it possible to achieve the industry's first 10 Mbytes/sec write speed by using multi level cells. This five times faster speed over Hitachi's previous multi level cell flash memory is useful for recording large volume data such as video moving image.

(2) Small chip size

Use of a 0.13 μm process and multi level cell technology, together with Hitachi's newly developed AG-AND type flash memory cells, enables fast write speed to be achieved with a small chip size. The area of the HN29V1G91 is approximately 80% that of Hitachi's 512-Mbit AND type flash memory chips, enabling application products to be made smaller and lighter.

(3) Power-on read function (2Kbyte size)

When the system is powered on, up to 2 Kbytes of data can be read by controlling two control lines (CE pin and RE pin) without command or address input.

(4) Cache program function while programming operation, and programming data input function while erasing operation.

While the device is under programming operation, it is available to input the next 2 Kbyte data maximum 2 times (4Kbyte). The HN29V1G91 also supports the function of the 2 Kbyte data input while erasing operation.

(5) NAND interface

The HN29V1G91 is compatible with NAND type flash memory at pin arrangement and command levels, enabling its use in systems currently employing NAND type flash memory with a minimum of software modification.

Package is 48-pin TSOP type-I which is the same size as Hitachi's 512-Mbit AND type flash memory.

Future plans include the development of a controller for the HN29V1G91 and development toward use in high-speed flash cards and silicon disks, as well as extension of the lineup of products using AG-AND type flash memory.

[Development Support Tools]

A function description model and C language reference library will be available from October 2002 as support tools for the design of systems using this flash memory.

- Notes:
1. Multi level cell technology: A technology suitable for large density flash memory, effective in reducing chip size, whereby four or more values, such as 00, 01, 10, and 11, can be held as opposed to the usual two values, 0 and 1, of ordinary memory. When four values are used, one cell does the work of two ordinary cells.
 2. AG-AND (Assist Gate-AND): A new flash memory cell developed by Hitachi. Use of Hitachi's original field isolation method in the cell structure, in which assist gates and floating gates are combined in an alternating arrangement in order to prevent inter-cell interference, enables cell area to be reduced compared with conventional shallow groove isolation (SGI) technology, in which cells are isolated by creating grooves.
 3. CompactFlash: CompactFlash is a trademark of SanDisk Corporation in United States and is licensed to CFA (CompactFlash Association). Hitachi, Ltd. is a board member of CFA.
<http://www.compactflash.org>
 4. MultiMediaCard: MultiMediaCard is a trademark of Infineon Technologies AG, Germany, and is licensed to MMCA(MultiMediaCard Association). Hitachi, Ltd. is a board member of MMCA.
<http://www.mmca.org>
 5. Hot electron injection method: A programming method whereby high-energy "hot" electrons accelerated by a channel field are injected into a floating gate. The cell programming time is 10 μ s or less.

< Typical Applications >

- Storage media for high image quality digital still cameras and silicon movies
- Storage media for mobile equipment used for high-speed communication such as wireless LAN(IEEE802.11a), USB2.0, etc.
- Storage media for large volume data such as digital video image.

< Prices in Japan >(For Reference)

Product Number	Sample Price (Yen)
HN29V1G91	8,000

< Specifications >

Item	Specification	
Memory configuration	128 M words × 8 bits	
Process	0.13 μm (AG-AND type flash memory cells)	
Power supply voltage	2.7 V to 3.6 V	
Programming	Unit	2048 + 64 bytes (1 page)
	Time	600 μs (typ.) <4-bank operation>
Erasing	Unit	4096 + 128 bytes
	Time	650 μs (typ.) <4-bank operation>
Reading	First access	100 μs (max.)
	Read cycle	35 ns (max.)
Power dissipation (at 3.3 V)	Standby	10 μA (typ.)
	Reading/programming/erasing	10 mA (typ.)
Operating temperature	-25°C to +85°C	
Other features	Power-on read function (2-Kbyte size)	
	Cache program function while programming operation	
	Programming data input function while erasing operation	
	NAND interface	
Package	48-pin TSOP type-I	

Information contained in this news release is current as of the date of the press announcement, but may be subject to change without prior notice.
