

Single Chip Solid State Drives (SSD) TDK Launches eSSD Series

- Integrates NAND Type Flash Memory and Flash Memory Controller
- Realizes 1 to 4 GB SATA 3Gbps SSD in 17 mm x 17 mm Form Factor

March 21, 2012

TDK Corporation has developed the eSSD series, a single chip 3Gbps SSD with serial ATA interface that uses multi-chip technology to integrate the TDK SSD controller GBDriver RS3 with NAND type flash memory in a single package. Sales are scheduled to begin in April.

The new product provides a storage capacity of 1 to 4 GB in a 17 mm x 17mm 208-ball BGA package. Compared to a existing configuration with separate flash memory and SSD controller, both mounting footprint and cost are significantly reduced, making it ideal for SSD device integration in industrial equipment.

The internal flash memory is of the high-endurance SLC type. Combined with the powerful error correction capability of the GBDriver RS3, the power interruption tolerance algorithm, data randomizer, and auto refresh function result in an SSD with excellent reliability and long life span.

Data security has also been enhanced, with an automated encryption function using AES*128-bit encryption. Data in the NAND Flash memory is encrypted, providing robust security against data tampering and leaks.

An evaluation kit of the SSD device comprising an mSATA module and a mSATA-SATA converter board is also available.

Glossary

- AES: Advanced Encryption Standard. A block encryption method registered as United States Department of Commerce Federal Information Processing Standards FIPS PUB197.

Main applications

- Office equipment such as multifunction printers (MFP), label printers, barcode printers, and commercial projectors
- Amusement devices such as karaoke on demand, arcade games, and game consoles
- Factory automation equipment such as NC machine tools, sequencers, PLCs, panel computers, touch panel systems, and embedded CPU boards
- Railway and transport equipment such as automated ticket gates, automated ticket vending machines, commuter pass vending machines, automated air ticket vending machines, and automated check-in systems
- Banking terminals such as POS devices, convenience store and kiosk terminals, and ATMs

- Medical and measuring instruments such as diagnostic imaging systems, cardiology equipment, blood analysis equipment, medical PCs, and electronic records systems
- Communications and broadcasting equipment and information system devices for base stations such as third-generation mobile phone data communications systems
- Security terminals and security devices such as digital signage, entry control systems, and monitoring cameras
- Disaster prevention related equipment such as earthquake early warning systems and household fire detectors
- Audio-visual devices such as digital cameras, video cameras, smart TVs, Blu-ray TVs, Blu-ray disc players, Blu-ray disc recorders, set-top boxes (STB), and communication satellite broadcast tuners
- Thin client PCs and mobile Internet devices (MID), netbooks and other ultra-mobile PCs (UMPC)
- Automotive devices such as car navigation systems, portable navigation devices (PND), digital tachographs, data loggers, drive recorders, and rear view monitors

Main features and applications

1. Integrates NAND Type Flash Memory and SSD Controller Using MCP Technology

Storage capacity of 1 to 4 GB realized in a 17 mm x 17mm 208-ball BGA package.

2. Host Interface

Compliant with Serial ATA Standard Revision 2.6. Compatible with Gen1:1.5 Gbps, and Gen2:3.0 Gbps. Supports read access speeds up to 55 MB/sec and write access speeds up to 30 MB/sec. (4 GB type, measured with Crystal Disk Mark 2.2. Actual speeds depend on the system environment.)

3. Single Level Cell (SLC) NAND Type Flash Memory

Combination of SLC memory with the TDK flash memory controller GBDriver RS3 implementing the TDK "SMART SWAP" algorithm for global static wear leveling results in an SSD device with long life span.

4. TDK SSD Controller GBDriver RS3

The product uses the NAND type flash memory controller GBDriver RS3 developed by TDK, offering the following technology features for enhanced reliability.

4.1 Global static wear leveling

TDK's global static wear leveling algorithm counts the number of times each memory block is rewritten (erased) and replaces blocks uniformly. Static blocks such as OS/FAT are also periodically leveled, which drastically improves the lifespan of the installed flash memory. The 4 GB type for example supports 786 million rewrite cycles. Even at a rate of 2.5 rewrites per second, this equates to an expected service life of 10 years.

4.2 Power interruption tolerance algorithm

A proprietary algorithm reduces the risk of collateral data errors such as corruption of data other than the data being written if power is interrupted when writing data.

4.3 Error correction and recovery

15-bit error correction capability together with an auto recovery function correct bit errors automatically when reading data repeatedly (read disturbance errors).

4.4 Data randomizer function

Data patterns are automatically randomized during the write process, to minimize the risk of bit errors due to writing the same data repeatedly.

4.5 Auto-refresh function

While there is no access by the system, internal data are automatically refreshed. This function is paused during access, so there is no delay in response.

4.6 Automated encryption using 128-bit AES

The integrated 128-bit AES encryption function automatically encrypts data and writes it to the NAND flash memory, preventing leaks of and tampering with personal data and confidential information.

4.7 Other functions

(a) Total sector number setting function (clipping function)

The number of logical blocks allocated to a data area can be adjusted up or down in individual block units. For example, the number of times data can be written to the flash memory can be increased by reducing the number of logical blocks in the data area. Conversely, in the case of applications that do not require an extended life span, the memory capacity can be maximized by increasing the number of logical blocks in the data area.

(b) Protection function

Incorporation of an ATA standard protection function allows customers to set and remove a password to implement independent authentication and protect important data.

(c) SMART command support

The number of times all memory blocks are rewritten (erased) can be obtained using SMART Command, which allows for easy determination of the flash memory status and facilitates appropriate life span management.

5. Solution Support

TDK has independently developed and marketed the GBDriver series of NAND Flash memory controllers since 2000 and provides technical support to customers in Japan and overseas backed up by its advanced proprietary technologies, including dispatch of field application engineers and support for implementation of reliability monitoring functions.

About TDK Corporation

TDK Corporation is a leading electronics company based in Tokyo, Japan. It was established in 1935 to commercialize ferrite, a key material in electronic and magnetic products. TDK's current product line includes passive components, magnetic application products as well as energy devices, flash memory application devices, and others. TDK today focuses on demanding markets in the areas of information and communication technology and consumer, automotive and industrial electronics. The company has a network of design and manufacturing locations and sales offices in Asia, Europe, and in North and South America. In fiscal 2011, TDK posted total sales of USD 10.6 billion and employed about 88,000 people worldwide.

You can download this text and associated images from
www.global.tdk.com/news_center/press/aah38800.htm.

Contact for media

Contact	Phone	Mail
Mr. Yoichi Osuga TDK Corporation	+81 3 5201-7102	pr@jp.tdk.com

Contact for customers

Contact	Phone	Mail
Mr. Shunichi. Hanafusa TDK Corporation	+81 47 378-9130	shanafus@jp.tdk.com