mSATA

SATA 3Gbps mSATA **SMG4A** Series

A high-reliability mSATA SSD equipped with a power backup circuit that can always record data even during sudden power failures.

When data is being written in the SSD and the power is interrupted, collateral data errors where not only the data that is being written but also the previous and following data also get caught up in the trouble and lost. This particularly occurs frequently in MLC flash and DRAM cache SSDs, and in the worst cases, troubles such as the OS not being able to be started up may occur. The TDK SMG4A series consists of mSATA SSDs equipped with the TDK SSD controller GBDriver® RS4. The GBDriver® RS4 has an algorithm that returns the data back to the state where it was before the power interruption, thus being sure to preserve your data. Furthermore, the TDK SMG4A series is equipped with a power backup circuit in the mSATA SSD and is at the highest level of data reliability in the industry.

□ BASIC CHARACTERISTICS / RATINGS

Data capacity	8GB~64GB
Power supply voltage	3.3V±5%
Ambient operating temperature	0 to +70°C (–40 to +85°C)
Ambient storage temperature	–25 to +85°C (–40 to +85°C)
Consumption current	160mA max. (3.3V in Single mode Read/Write)
	275mA max. (3.3V in 2ch mode Read/Write)
	470mA max. (3.3V in 4ch mode Read/Write)
	less than 50mA (3.3V in Slumber)

TDK

Serial ATA 3Gbps compatible Industrial-use High-reliability Embedment mSATA type Solid State Drive (SSD) Module

Complies with RoHS directives

SMG4A Series

8GB/16GB/32GB/64GB/128GB

TDK SSD controller IC GBDriver® RS4 Employed
Life monitor software included, as well as internal power backup circuit and enhanced ECC function + read retry function equipped
High-reliability SATA II mSATA type SSD module

The TDK SMG4A series consists of mSATA SSDs equipped with a power backup circuit. mSATA SSD is highly resistant to power failures and power interruptions with a data reverse algorithm of a TDK GBDriver® RS4.
The flash memory can be selected from among the SLC (Single Level Cell) type or MLC (Multi-Level Cell) type in a lineup of products offering up to 64GB (SLC types) and 128GB (MLC types).
While having a powerful ECC that can be modified to maximum 71bit/512Byte ECC, it is at the highest level of data reliability in the industry with functions such as read retry function and a data randomizer function.
Furthermore, it is reliable in terms of security with a password lock function, an AES 128bit encryption function, complete data erasing by ATA Trim command-compatibility, and more. Maintenance such as module swaps is also made easy with the SSD life monitor software.

□ FEATURES

1. TDK SSD controller GBDriver® RS4 employed.
2. Serial ATA Standard Rev.2.6 (Gen1: 1.5Gbps/Gen2: 3.0Gbps)-compliant. Read 215MB/s, Write 95MB/s achieved. (*1)
3. Equipped with an advanced global static wear leveling function “TDK Smart Swap” algorithm. This algorithm counts the number of times each memory block is erased (programmed) and replaces blocks uniformly, which drastically improves the endurance of the installed flash memory. (*2)
4. Equipped with a data randomizer function. Data reliability in the MLC flash is increased as write data is randomized and biases in data are eliminated when data is written.
5. Equipped with an auto-refresh function. All data is periodically read out and ECC corrections are made as measures against read disturb errors of the flash memory. Processing is done in the background so there is a minimum amount of delays in responses to commands even during corrections.
6. Equipped with an enhanced ECC function. An error correction ability of 71bits/1KByte is equipped as a standard, and it can be extended to up as high as 71bits/512Bytes (optional).
7. Equipped with a read retry function.
   When an error is detected in a read operation, the GBDriver® RS4 attempts to read the data again by changing thresholds.
8. TDK GBDriver® RS4 algorithm and an internal power back up circuit in SSD 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.
9. SSD life monitor software “TDK SMART” is included.
   Drive life span can be checked quantitatively in real time, allowing easy maintenance.
10. Supports security functions based on ATA standards. Customers can set and remove passwords to prevent falsification of leaking of personal and confidential information.
11. Equipped with the AES128bit (Advanced Encryption Standard) encryption function.
12. Compatible with ATA Trim commands (complete data erasing function).
13. Complies with RoHS Directives as a solid state drive. The components, lead terminals, etc. are all free from hazardous substances prohibited by the RoHS Directives of the EU (European Union).

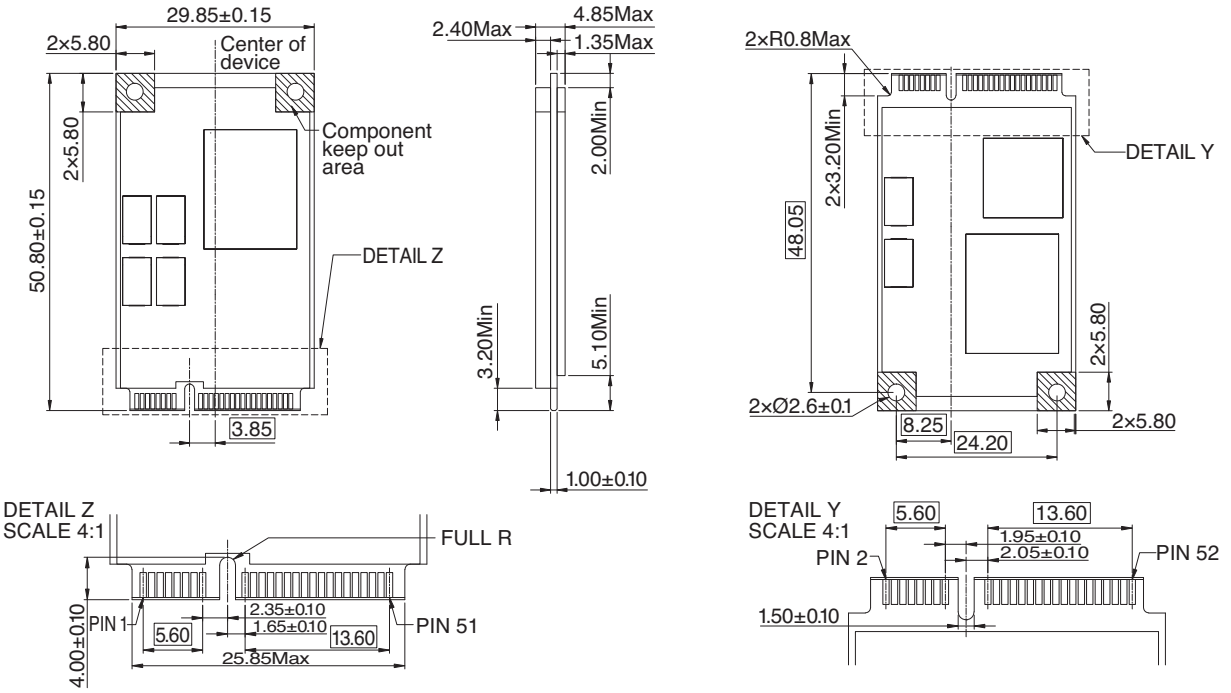
(*1) Dependent on the flash memory connection configuration and system environment.
(*2) The scope of static wear leveling execution can be customized. (Dynamic wear leveling is executed in areas outside the scope of static wear leveling execution.)

□ EXAMPLES OF APPLICATIONS

- Thin-client computers, SATA RAID SSD installations, and other IT equipment and cloud computing systems
- General vehicle-installed equipment such as drive recorders and tachographs
- General OA equipment such as multifunction printers (MFPs), label printers, barcode printers, industrial-use projectors, and telephone conference systems
- General amusement and game equipment such as online karaoke machines and arcade games
- General FA equipment such as semiconductor production equipment, NC machine tools, sequencers, PLCs, panel computers, touch panel systems and embedded CPU boards
- General transportation facility equipment such as Suica terminals and automatic ticket gates, ticket machines, commuter pass vending machines, auto air-ticketing machines, and auto check-in machines
- Banking terminals such as POS systems, convenience store/kiosk terminals, and ATMs
- Medical equipment and measurement equipment such as diagnostic imaging apparatuses, electrocardiographs, blood analysis devices, medical PCs, and electronic health record systems
- General communication broadcasting and information systems for LTE base stations such as 4th generation (4G) mobile data communication systems
- Security equipment such as digital signage, entry/exit control systems, security terminals for surveillance cameras, and other security equipment
- General disaster prevention equipment such as earthquake emergency information systems, and household fire detectors

● Complies with RoHS directives
This means that, in conformity with EU Directive 2011/65/EU, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

□ SHAPES AND DIMENSIONS



Dimensions in mm

□ CHARACTERISTICS

Series		SMG4A Series
Data capacity		8GB/16GB/32GB/64GB [SLC] 16GB/32GB/64GB/128GB [MLC]
Form factor		mSATA Type SSD
Memory type		SLC (Single Level Cell) NAND type Flash Memory (8KB/Page) MLC (Multi Level Cell) NAND type Flash Memory (16KB/Page)
Controller		TDK GBDriver® RS4
Interface		Serial ATA Revision 2.6
Transfer mode		SATA Gen1: 1.5Gbps, Gen2: 3.0Gbps
Transfer speed*	Read (max.)	215MByte/sec
	Write (max.)	95MByte/sec
Error check and correction (ECC)		71bit/1KByte (SLC 8GB～64GB) 44bit/1KByte (MLC 16GB～128GB)
Power supply voltage		3.3V±5%
Ambient operating temperature		0 to+70˚C [–40 to +85˚C Industrial Option]
Ambient storage temperature		–25 to+85˚C [–40 to +85˚C Industrial Option]
Storage / operating humidity		0 to 90(%) RH [No condensation]
Conformed standards		CE/FCC/VCCI
Environmental specifications		RoHS-compliant

* In 4ch mode, measured by CrystalDiskMark 3.0. The speed may vary depending on the actual use environment/conditions.

□ ENDURANCE (Expected P/E cycles)

	Data Capacity	Part No.	Expected endurance (Unit: million times)	Allowable accesses per second according to age of equipment (When operating 24 hrs/d, 365 ds/yr)		
				1 year	5 years	10 years
SLC	8GB	SMG4A08GXBB**C**S-SSA	788	24.99	5.00	2.50
	16GB	SMG4A16GXDB**C**S-SSA	1,576	49.97	9.99	5.00
	32GB	SMG4A32GXDB**C**S-SSA	3,152	99.95	19.99	9.99
	64GB	SMG4A64GXDB**C**S-SSA	6,304	199.90	39.98	19.99

	Data Capacity	Part No.	Expected endurance (Unit: million times)	Allowable accesses per second according to age of equipment (When operating 24 hrs/d, 365 ds/yr)		
				1 year	3 years	5 years
MLC	16GB	SMG4A16GGBBCS-SSA	46	1.46	0.49	0.29
	32GB	SMG4A32GGDBCS-SSA	92	2.92	0.98	0.59
	64GB	SMG4A64GGDBCS-SSA	184	5.85	1.95	1.17
	128GB	SMG4A12GGDBCS-SSA	368	11.69	3.90	2.34

- The above products have an operating temperature of 0 to +70°C. For products with an operating temperature of –40 to +85°C, convert the blue letter "**C**" in the product name to "**W**".
  (Example: SMG4A08GXBB**C**S-SSA [0 to +70°C product]
  ⇒ SMG4A08GXBB**W**S-SSA [–40 to +85°C product])
  The MLC lineup consists of products ranging from 0 to +70°C.