

For Industrial Use

SD Cards MMGBA Series, microSD Cards MUGBB Series

Conformity to RoHS Directive

With Enhanced Power Interruption Tolerance

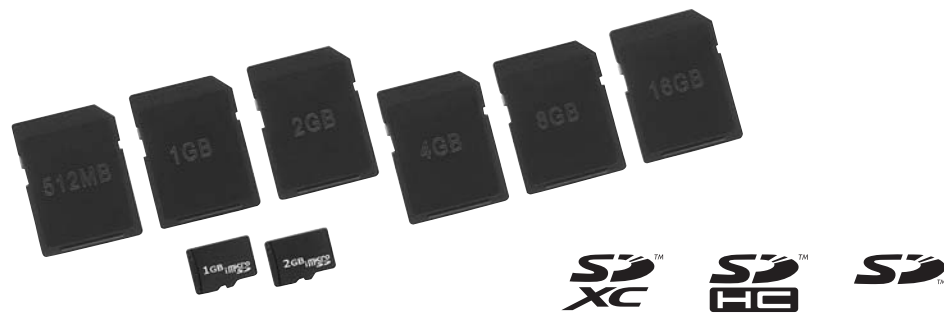
MMGBA series (512MB, 1GB, 2GB, 4GB, 8GB, 16GB), MUGBB series (1GB, 2GB)

TDK's MMGBA series of SD cards and MUGBB series of microSD cards realize high speeds, data reliability, long storage life and high level data security. The MMGBA series not only realizes high speed access, supporting CLASS 10 specifications, but is equipped with a powerful error correction function that can be expanded to 16-bit ECC, achieving a high level of data reliability.

In addition, TDK has provided these products with enhanced power interruption tolerance that is required for industrial equipment, taking advantage of its expertise in developing NAND type flash memory controllers, compact flash (CF) cards, solid-state drives (SSD) and other products, which has been accumulated over a long period of time spent in the industrial equipment field. This feature makes these SD/micro SD cards optimal for industrial applications.

The lifespan of the SD cards has also been significantly improved. The MMGBA series and MUGBB series use high-reliability Single-Level Cell (SLC) NAND type flash memory, instead of Multi-Level Cell NAND flash memories such as Triple-Level Cell (TLC) NAND flash memory, which is commonly used in consumer equipment with shorter rewrite lives. Furthermore, equipped with the high-performance distributed writing function using a global static wear leveling algorithm, the products achieve industry-leading storage life, which meets the requirements of industrial equipment characterized by high usage frequency and long service periods.

Both series are equipped with "TDK SMART" SD card life monitor software, which has a rewrite life monitoring function, to respond to the requests of many customers who have been using TDK CF cards or SSD. The software provides information on the rewrite (erase) status of all memory blocks as SMART information, thereby facilitating maintenance and scheduling of replacement of the modules.



FEATURES

- Features high-speed and high durability, equipped with SLC NAND type flash memory.
- Supports SDA Specification ver. 2.0.*1
- Supports SDHC Class10 (4GB and higher, 2GB and lower: SD Class6).
Realizes high-speed access of 19MByte/sec read access, 15MByte/sec write access.*2
- Supports SD commands Classes 0, 2, 4, 5, 7, 8, 10.
- Significantly enhanced error correction ability, owing to its 16bit/1KByte ECC capacity, which far surpasses the regular error correction requirements for SLC NAND type flash memory of 4 bit or 8 bit/1KB ECC.
- Adopts a global static wear leveling technique. Rewrites are distributed evenly across all areas of the flash memory, significantly improving the service life of the SD/micro SD cards. (As a reference, a product with an 8GB capacity supports 1.5 billion rewrite (erase) cycles. This equates to an expected service life of 10 years at a rate of 5 rewrites (erases) per second.*3
- Equipped with "TDK SMART" life diagnosis software. It facilitates management of the remaining life of the SD/micro SD card, which allows accurate life information to be obtained or replacement timing to be easily set.
- Implementation of a reliability test based on TDK's own reliability standard. In addition to the reliability and durability tests required by the SDA specification, TDK implements a reliability test based on its own reliability test, established using the technologies TDK has accumulated through long-term experience in the distribution of CF cards and SSDs for industrial applications. Through these reliability tests, these series have been confirmed to achieve a high level of reliability.
- Dedicated FAE (Field Application Engineer) system provides speedy and accurate solutions, e.g. system compatibility verification and customizing.
- Complies with RoHS Directives as SD cards/micro SD cards. The components, lead terminals, etc., are all free of hazardous substances prohibited by the RoHS Directives of the EU (European Union).

*1 Standard established by the SD Card Association.

*2 Dependent on flash memory connection configuration and system environment.

*3 Applies to a product equipped with an SLC flash memory with a structure of 4Kbyte/page.

• Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

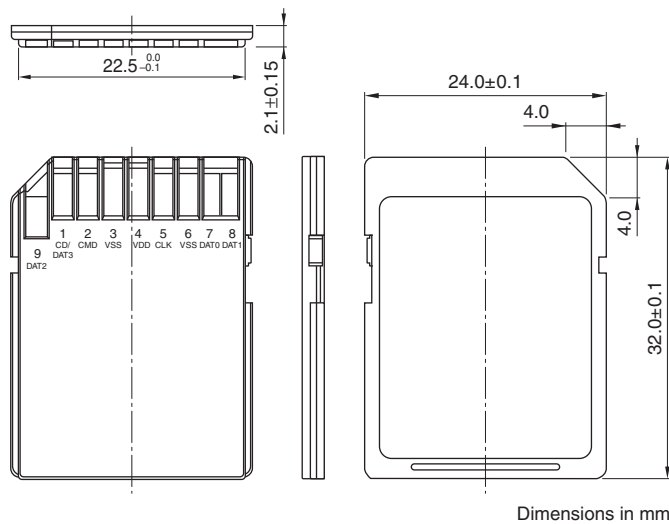
• All specifications are subject to change without notice.

MAIN APPLICATIONS

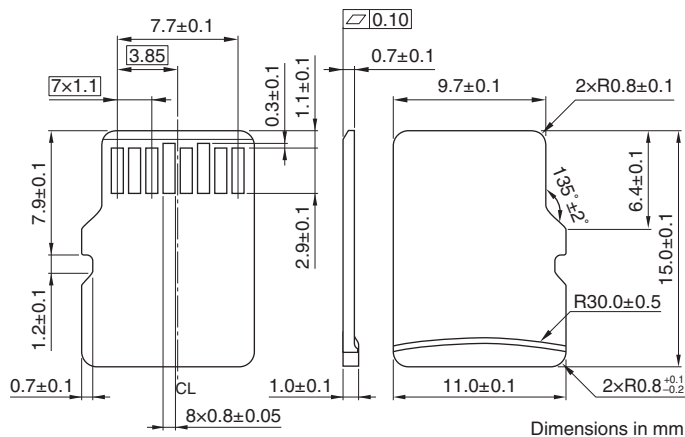
- Usages storage devices requiring a high frequency of data rewriting such as POS systems.
- Usages requiring high reliability and durability for long-term use such as Smart Grid Systems and base stations, and also requiring lifespan monitoring functions such as replacement time detection.
- For WIN or Android OS, system or user data storage for home information appliances: e.g. netbooks, BD devices, digital TV, STB
- Usages requiring vibration resistance, energy conservation, and compact size such as Green IT equipment, medical equipment, logistics systems, and machine tools.
- Usages requiring strict data security such as terminals for financial institutions and digital signage.

SHAPES AND DIMENSIONS

SD CARD



microSD CARD



APPLICATION EXAMPLES

- Thin client PC, tablet PC and other IT devices, as well as cloud computing systems.
- General marine navigation equipment: fish finders, GPS plotters, satellite compasses, Navtex, Navi Net 3D navigation radar, VTS (Vessel Transportation System) devices and overland AIS(Automatic Identification System), Inmarsat, weather FAX machines, National Oceanic and Atmospheric Administration, and Electronic Chart Display and Information Systems (ECDIS).
- General OA equipment: multifunction printers (MFPs), business use projectors, TV conference systems, and electronic blackboards.
- Entertainment equipment such as online karaoke and amusement arcades.
- Advertising display equipment such as digital signage and digital posters.
- General FA equipment such as semiconductor manufacturing equipment, NC machine tools, sequencers, PLCs, panel computers, and embedded CPU boards.
- General transportation facility equipment such as automatic ticket vending and checking, and commuter pass-vending machines, train traffic control systems, automatic airline ticketing machines, and automatic check-in machines.
- Financial institution terminals such as cash registers and other POS (point-of-sales) equipment, convenience stores and kiosk terminals, electric money terminals including Suica, and ATMs (Automatic Teller Machines).
- General medical equipment and data analysis equipment: imaging CTs, blood analyzers, medical computers, electronic medical records, DNA micro array synthesizers, automated biochemical analyzers, remote medical systems, and automatic nursing-care systems.
- General communication/broadcast and information system equipment for communication base station: fourth-generation (4G) mobile phone data communication systems(LTE-Advanced/WiMax2), data broadcasting system supporting digital broadcasting, VCR-editing devices, digital mixing consoles, digital multi-track recorders, master sound displays, multi-format routing switchers, broadcasting equipment including FPU devices, and information system equipment.
- General smart grid system equipment: smart meters, power grid communication infrastructure, next-generation power grid systems, power equipment control systems, energy management systems and building A/C systems.
- General security terminals and equipment such as digital signage, biometric authentication systems, room entering/leaving management systems, and surveillance cameras.
- Disaster prevention equipment such as earthquake notification systems, residential fire alarms, and other devices including simulators for danger avoidance, training and disaster prevention.
- Onboard equipment such as car navigation systems, portable navigation devices (PND), digital tachograph, data logger, drive recorder, and rear view monitor.

SPECIFICATIONS

Series	SD cards for industrial use	microSD cards for industrial use
Product name	MMGBA series	MUGBB series
Data capacity	512MB/1GB/2GB/4GB/8GB/16GB	1GB/2GB
Size	Secure Digital (SD) card	microSD card
Memory type	SLC(Single Level Cell) NAND Flash Memory	
Controller	RD2	
Interface	SDA Specification Ver. 2.0	
Transfer mode	SDHC Class10 (4GB and higher, 2GB and lower: SD Class 6)	
Transfer speed*	Read(max.)	19MByte/sec
	Write(max.)	15MByte/sec
Error-Correcting function(ECC)	16bit ECC / 1KByte	
Endurance(reference)	With/Without fixed area	With/Without fixed area
	Effective blocks×50,000 times (Ex: 1.5billion for 8GB)	Effective blocks×50,000 times (Ex: 390million for 2GB)
Operating temperature range	0 to +70°C (Industrial option : -25 to +85°C)	
Ambient storage temperature range	-40 to +85°C	
Storage/Operation humidity range	0 to 90(%) RH [No condensation]	
Power supply voltage	3.3V	
Environmental specifications	RoHS compliant	
Country of origin	Taiwan	

* Measured by CrystalDiskMark 2.0 in interleave mode. Dependent on system environment.

* SD, SDHC, microSD logo are trademarks of the SD-3C, LLC.

* The above performance may not be achieved depending on the actual usage environment and conditions of the user.

[LIFE MONITOR SOFTWARE “TDK SMART”]

