TOSHIBA
Leading Innovation

HDD

MG05ACA800x SERIES
ENTERPRISE CAPACITY HDD

Product image may represent a design model.

The MG05ACA Enterprise Capacity HDD provides 8TB[1] of capacity and 7,200 rpm performance, in a robust design engineered for nearline business-critical workloads. The MG05ACA utilizes industry-standard 3.5-inch[2] 26.1 mm height form factor and Advanced Format sector technologies for optimum capacity and data reliability. This models support Toshiba Persistent Write Cache technology[3] which helps enhance performance with handling data in the event of a sudden loss of power. Equipped with SATA 6.0 Gbit/s[4] interface, the Enterprise Capacity MG05ACA models help save rack space and reduce the footprint and operational burden of business critical servers and storage systems.

The MG05ACA improves sustained transfer rate performance by 12% when compared to the prior MG04ACA series. 512e or 4Kn Advanced Format sector technology models are available. 4Kn sector models (MG05ACAxxxA) offer optimum performance and compatibility with the 4Kn-capable applications and operating environments. 512e sector models (MG05ACAxxxE) provide support for legacy applications and operating environments that require 512 byte sector lengths.

KEY FEATURES

- Industry Standard 3.5-inch 26.1 mm Height Form Factor
- Large 8TB Capacity
- 7,200 rpm Performance
- SATA 6.0 Gbit/s Interface
- MTTF of 2,000,000 hours[5]
- 550 Total TB Transferred per Year Workload Rating[6]
- 4Kn or 512e Advanced Format Sector Technology
- Toshiba Persistent Write Cache Technology for Data-Loss Protection in Sudden Power-Loss Events
- Improved sustained transfer rate (12%) versus MG04ACA Series

APPLICATIONS

- Engineered for Mid-line / Nearline Business Critical Workloads
- Tier 2 Business-Critical Servers and Storage Systems
- Servers Supporting Application Workloads that Benefit from High Capacity per Spindle
- Capacity-Optimized Data Center Storage Systems
- Cloud-scale Storage and Server Infrastructure

SPECIFICATIONS

Model Number		MG05ACA800A	MG05ACA800E
Interface		SATA (1.5 Gbit/s, 3.0 Gbit/s, 6.0 Gbit/s)	
Formatted Capacity		8 TB	
Performance	Interface Speed	6.0 Gbit/s Max	
	Rotation Speed	7,200 rpm	
	Average Latency Time	4.17 ms	
	Buffer Size	128 MiB[7]	
	Data Transfer Speed (Sustained)	230 MiB/s Typ.	
Logical Data Block Length		4,096 B	Host 512B Disk 4,096B[8]
Supply Voltage	Allowable Voltage	12 V[9] ± 10% / 5 V[9] +6/-5% [10]	
Power Consumption	Random read (4KB 16Q)	11.4 W Typ.	
	Active Idle (Idle-A)	6.20 W Typ.	
Acoustics (Sound Power)	Low Power Idle (Idle-B)	34 dB Typ.	

ENVIRONMENTAL LIMITS

Item		Specification
Ambient temperature	Operating	5 °C to 55 °C
	Non-Operating	- 40 °C to 70 °C
Humidity	Operating	5 % to 90 % R.H.
	Non-Operating	5 % to 95 % R.H.
Shock	Operating	686 m/s^2 { 70 G } (2 ms duration)
	Non-Operating	2,450 m/s^2 { 250 G } (2 ms duration)
Vibration[11]	Operating[12]	7.35 m/s^2 { 0.75 G } (5- 300Hz) 2.45 m/s^2 { 0.25 G } (300- 500Hz) or less
	Non-Operating[13]	49 m/s^2 { 5 G } (5- 500Hz) or less
Altitude	Operating	- 305 m to +3,048 m
	Non-Operating	- 305 m to +12,192 m

ENVIRONMENTAL FEATURE

Item	Specification
RoHS[14]	Compatible
Halogen free[15]	Yes
Antimony free[15]	Yes

[1] Definition of capacity: Toshiba defines a megabyte (MB) as 1,000,000 bytes, a gigabyte (GB) as 1,000,000,000 bytes and a terabyte (TB) as 1,000,000,000,000 bytes. A computer operating system, however, reports storage capacity using powers of 2 for the definition of 1GB = 2^{30} = 1,073,741,824 bytes and therefore shows less storage capacity. Available storage capacity (including examples of various media files) will vary based on file size, formatting, settings, software and operating system, such as Microsoft Operating System and/or pre-installed software applications, or media content. Actual formatted capacity may vary.
[2] "2.5-inch" and "3.5-inch" mean the form factor of HDDs or SSDs. They do not indicate drive's physical size.
[3] PWC with PLP is a function to handle the write data that the drive reports "Normal completion" to the host but not being stored to hard disk media yet. The write data may be written to the commanded LBA on the hard disk media. The un-written data to hard disk media is stored to Flash memory using back up power by PLP when the power supply to the drive suddenly is shut down. And, after PLP operation, it may be required more time to start up the drive than in case of normal shutdown. 1) PLP does not secure data in the mode of all the power shutdowns. When power supplies other than recommended procedure are intercepted, data might be lost. 2) In the power shutdown before it reports on the Write completion, data not anticipated might be lost.
[4] Read and write speed may vary depending on the host device, read and write conditions, and file size.
[5] MTTF (Mean Time to Failure) is not a guarantee or estimate of product life; it is a statistical value related to mean failure rates for a large number of products which may not accurately reflect actual operation. Actual operating life of the product may be different from the MTTF.
[6] Workload is defined as the amount of data written, read or verified by commands from host system.
[7] A kibibyte (KiB) means 2^{10}, or 1,024 bytes, a mebibyte (MiB) means 2^{20}, or 1,048,576 bytes, and a gibibyte (GiB) means 2^{30}, or 1,073,471,824 bytes.
[8] Read–modify-write is supported.
[9] Input voltages are specified at the HDD connector side, during HDD ready state.
[10] Make sure the value is not less than -0.3V DC (less than -0.6V, 0.1ms) when turning on or off the power.
[11] Vibration applied to the HDD is measured at near the mounting screw hole on the frame as much as possible.
[12] At random seek write/read and default on retry setting with log sweep vibration.
[13] At power-off state after installation
[14] Toshiba Storage & Electronic Devices Solutions Company defines "RoHS-Compatible" products as products that either (i) contain no more than a maximum concentration value of 0.1% by weight in Homogeneous Materials for lead, mercury, hexavalent chromium, polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs) and of 0.01% by weight in Homogeneous Materials for cadmium; or (ii) fall within any of the application exemptions set forth in the Annex to the RoHS Directive (Directive 2011/65/EC of the European Parliament and of the Council of 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment). "Homogeneous Material" means a material of uniform composition that cannot be mechanically disjointed (meaning separated, in principle, by mechanical actions such as unscrewing, cutting, crushing, grinding and/or abrasive processes) into different materials. Examples of "Homogeneous Materials" would be individual types of plastics, ceramics, glass, metals, alloys, paper, board, resins and coatings.
[15] Toshiba Storage & Electronic Devices Solutions Company defines halogen-free and antimony-free SSD and HDD products as those meeting all of the following requirements: (a) containing bromine (Br) and chlorine (Cl) at no more than 900 parts per million (ppm) by weight for each element, and containing bromine and chlorine in an aggregate amount not exceeding 1500 ppm by weight; and (b) containing no more than 1000 ppm antimony (Sb) by weight. For the avoidance of doubt, Halogen-Free/Antimony-Free SSD or HDD products may not be entirely free of bromine, chlorine, or antimony, and may contain other element of the halogen family.

RELIABILITY

Item	Specification
MTTF	2,000,000 hours
Non-recoverable Error Rate	10 error per 10^{16} bits read
Load / Unload	600,000 times (Max)
Availability	24 hours/day, 7 days/week
Rated Annual Workload (Total TB Transferred per Year, R/W)	550 TB/year

MODEL NUMBERS

Model Number	Interface	Formatted Capacity	Sector Format
MG05ACA800A	SATA-3.3	8 TB	4Kn
MG05ACA800E	SATA-3.3	8 TB	512e

MARKING

1) WEEE

Following information is only for EU-member states:

The use of the symbol indicates that this product may not be treated as household waste. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. For more detailed information about recycling of this product, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

2) Names and Contents of Hazardous Substances or Elements in Products

产品中有害物质的名称及含量

部件名称	有害物质					
	铅（Pb）	汞（Hg）	镉（Cd）	六价铬（Cr(VI)）	多溴联苯（PBB）	多溴二苯醚（PBDE）
HDD(硬盘驱动器)	×	○	○	○	○	○

本表格依据 SJ/T 11364 的规定编制。
○：表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。
×：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。

中华人民共和国环保使用期限

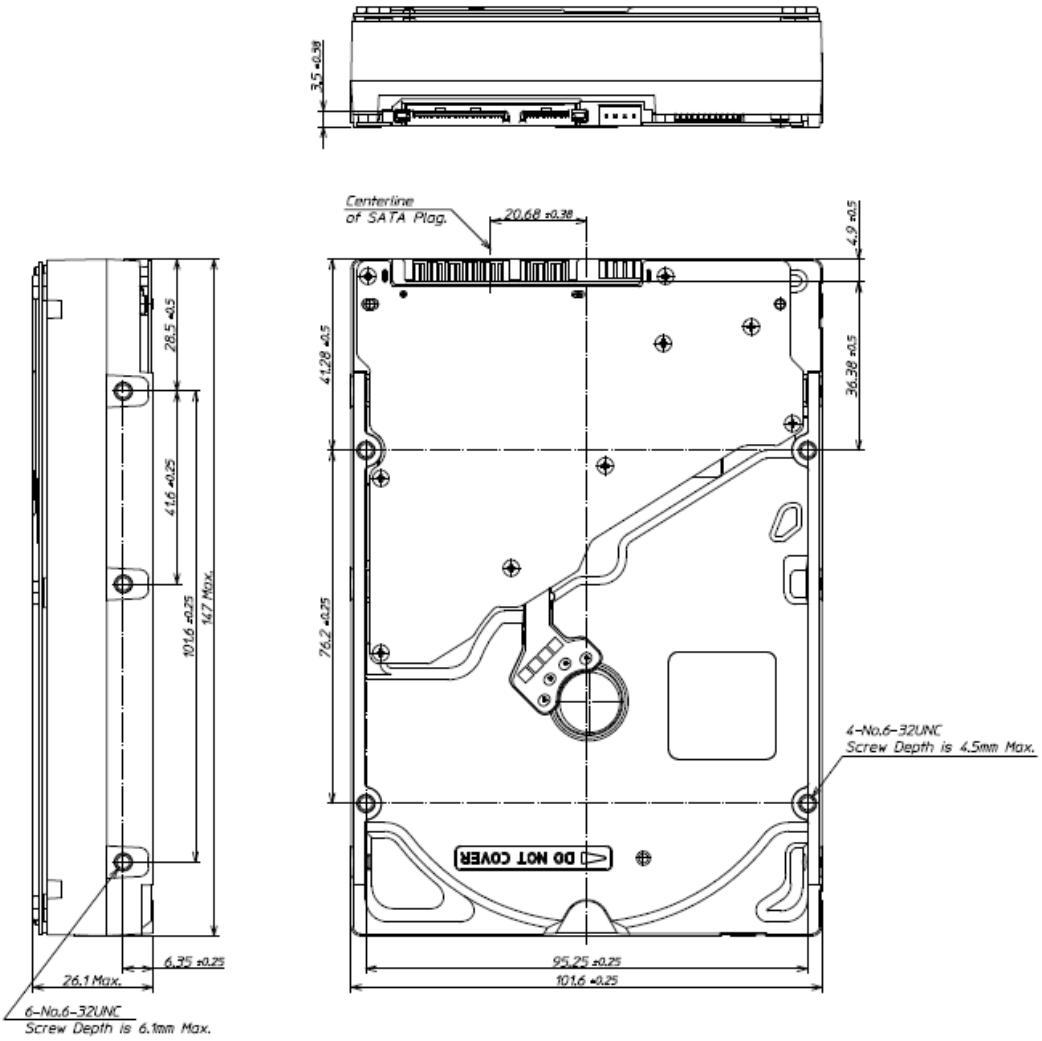
SAFETY / EMI STANDARDS

Title	Description	Region
UL (Underwriters Laboratories)	UL 60950-1	USA
CSA (Canadian Standard Association)	CAN/CSA-C22.2 No.60950-1	Canada
TÜV (Technischer Überwachungs Verein)	EN 60950-1	Germany
BSMI (Bureau of Standards, Metrology and Inspection)	CNS 13438 (CISPR Pub. 22 Class B):D33003	Taiwan
MSIP (Ministry of Science, ICT & Future Planning)	KN32, KN35 (CISPR Pub. 22 Class B) (Note)	Korea
ACMA (Australian Communications and Media Authority)	AS/NZS CISPR22	Australia

(Note) Marks of KC	
Made in Japan	
Made in Philippines	

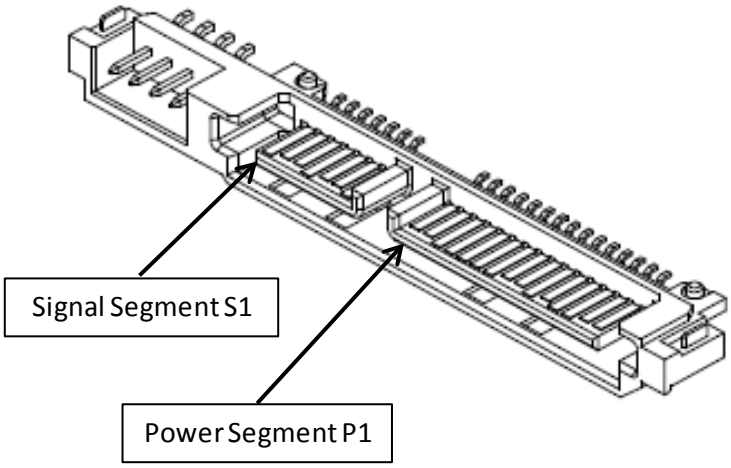
MECHANICAL SPECIFICATIONS

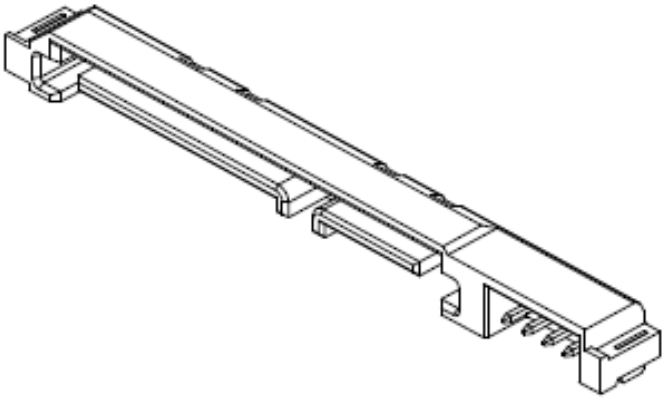
Item	Specification
Width	101.85 mm Max
Height	26.1 mm Max
Length	147 mm Max
Weight	770 g Max



[Unit: mm]
(Reference)

INTERFACE CONNECTOR





INTERFACE CONNECTOR (SATA plug) SIGNAL ALLOCATION

Segment	Pin No.	Pin Definition	
Signal Segment	S1	GND	2nd Mate
	S2	A+	Differential Pair A from PHY
	S3	A-	
	S4	GND	2nd Mate
	S5	B-	Differential Pair B from PHY
	S6	B+	
	S7	GND	2nd Mate
Power Segment	P1	V33	3.3 V Power (Unused)
	P2	V33	3.3 V Power (Unused)
	P3	V33	3.3 V Power Pre-Charge 2nd Mate (Unused)
	P4	GND	1st Mate
	P5	GND	2nd Mate
	P6	GND	2nd Mate
	P7	V5	5 V Power Pre-Charge 2nd Mate
	P8	V5	5 V Power
	P9	V5	5 V Power
	P10	GND	2nd Mate
	P11	Spin/ACT	- Staggered Spin-up Mode Detect (Input) - Activity LED Drive (Output)
	P12	GND	1st Mate
	P13	V12	12 V Power Pre-Charge 2nd Mate
	P14	V12	12 V Power
	P15	V12	12 V Power

Notice: This drive uses 5V and 12V power. 3.3V power is not used.
HDA (Head Disk Assembly) and DC ground (ground pins on interface) are connected electrically each other.

COMMAND TABLE (Part 1)

Op-Code	Command Name
E5h/98h	CHECK POWER MODE
B1h	DEVICE CONFIGURATION
92h	DOWNLOAD MICROCODE
93h	DOWNLOAD MICROCODE DMA
90h	EXECUTE DIAGNOSTICS
E7h	FLUSH CACHE
EAh	FLUSH CACHE EXT
ECh	IDENTIFY DEVICE
E3h/97h	IDLE
E1h/95h	IDLE IMMEDIATE
91h	INITIALIZE DEVICE PARAMETERS
00h	NOP
E4h	READ BUFFER
C8h	READ DMA
25h	READ DMA EXT
60h	READ FPDMA QUEUED
2Fh	READ LOG EXT
47h	READ LOG DMA EXT
C4h	READ MULTIPLE
29h	READ MULTIPLE EXT
F8h	READ NATIVE MAX ADDRESS
27h	READ NATIVE MAX ADDRESS EXT
20h	READ SECTOR(S)
24h	READ SECTOR(S) EXT
40h	READ VERIFY SECTOR(S)
42h	READ VERIFY SECTOR(S) EXT

COMMAND TABLE (Part 2)

Op-Code	Command Name
1xh	RECALIBRATE
0Bh	REQUEST SENSE DATA EXT
B4h	SANITIZE DEVICE
F1h	SECURITY SET PASSWORD
F2h	SECURITY UNLOCK
F3h	SECURITY ERASE PREPARE
F4h	SECURITY ERASE UNIT
F5h	SECURITY FREEZE LOCK
F6h	SECURITY DISABLE PASSWORD
70h – 76h, 79h – 7F	SEEK
77h	SET DATE & TIME EXT
EFh	SET FEATURES
F9h	SET MAX
37h	SET MAX ADDRESS EXT
C6h	SET MULTIPLE MODE
E6h/99h	SLEEP
B0h	SMART Function Set
E2h/96h	STANDBY
E0h/94h	STANDBY IMMEDIATE
E8h	WRITE BUFFER
CAh	WRITE DMA
35h	WRITE DMA EXT
3Dh	WRITE DMA FUA EXT
61h	WRITE FPDMA QUEUED
3Fh	WRITE LOG EXT
57h	WRITE LOG DMA EXT
C5h	WRITE MULTIPLE
39h	WRITE MULTIPLE EXT
CEh	WRITE MULTIPLE FUA EXT
30h	WRITE SECTOR(S)
34h	WRITE SECTOR(S) EXT
45h	WRITE UNCORRECTABLE EXT
3Ch	WRITE VERIFY

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