

## MG07ACA SERIES ENTERPRISE CAPACITY HDD

Using the world's first<sup>[1]</sup> 9-disk Helium-sealed design, the MG07ACA Enterprise Capacity SATA HDD provides up to 14 TB<sup>[2]</sup> of conventional magnetic recording (CMR) capacity and 7,200 rpm performance. The industry-standard 3.5-inch<sup>[3]</sup> form-factor integrates easily into cloud-scale storage infrastructure, business-critical servers and storage, and File and Object storage solutions.

The MG07ACA Series utilizes Toshiba precision laser welding technology to seal helium inside the 9-disk mechanics for the life of the drive. The helium-sealed design reduces aerodynamic drag to deliver a lower operational power profile, helping to achieve TCO objectives for cloud-scale and software-defined data center infrastructure.



Product image may represent a design model.

### KEY FEATURES

- 14TB and 12TB capacity models
- Innovative 9-disk helium-sealed design for superior storage density
- Industry Standard 3.5-inch 26.1 mm Form Factor
- 7,200 rpm Performance
- SATA 6.0 Gbit/s Interface<sup>[4]</sup>
- Low operational power profile, providing excellent power efficiency (W/TB) for better TCO
- 550 Total TB Transferred per Year Workload Rating<sup>[5]</sup>
- Sanitize Instant Erase (SIE<sup>[6]</sup>) and Self-Encrypting Drive (SED) option model available

### APPLICATIONS

- Cloud-scale Storage Infrastructure
- Software-defined data center infrastructure
- File- and Object-based storage infrastructure
- Mid-line / Nearline Business Critical Workloads
- Tier 2 Business-Critical Servers and Storage Systems

### SPECIFICATIONS

Item		MG07ACA14TA MG07ACA14TE MG07ACA14TAY MG07ACA14TEY MG07ACP14TE	MG07ACA12TA MG07ACA12TE MG07ACA12TAY MG07ACA12TEY MG07ACP12TE
Interface		SATA-3.3	
Formatted Capacity		14 TB	12 TB
Performance	Interface Speed <sup>[8]</sup>	6.0 Gbit/s, 3.0 Gbit/s, 1.5 Gbit/s	
	Rotation Speed	7,200 rpm	
	Buffer Size	256 MiB <sup>[7]</sup>	
	Maximum Data Transfer Speed <sup>[8]</sup> (Sustained)	248 MiB/s Typ.	242 MiB/s Typ.
Logical Data Block Length	MG07ACAxxx A/AY (fixed length)	4,096 B	
	MG07ACAxxx E/EY / MG07APAxxE (emulation) <sup>[9]</sup>	HOST: 512 B, DISK: 4,096 B	
Supply Voltage	Allowable Voltage	12 V <sup>[10]</sup> ± 10 % / 5 V <sup>[10]</sup> + 10% / -7% <sup>[11]</sup>	
Power Consumption	Random Read / Write 4KB Q1	8.09 W Typ.	7.83 W Typ.
	Active Idle (Idle-A)	4.53 W Typ.	4.25 W Typ.

Acoustics (Sound Power) <sup>[12]</sup>	Idle	20 dB Typ.
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## ENVIRONMENTAL LIMITS

Item		Specification
Ambient temperature	Operating	5 °C to 55 °C (No condensation)
	Non-Operating <sup>[13]</sup> <sup>[14]</sup>	- 40 °C to 70 °C (No condensation)
Relative Humidity	Operating	5 % to 90 % R.H. (No condensation)
	Non-Operating	5 % to 95 % R.H. (No condensation)
Altitude	Operating	- 305 m to 3,048 m
	Non-Operating <sup>[13]</sup>	- 305 m to 12,192 m
Shock <sup>[15]</sup>	Operating	686 m/s <sup>2</sup> { 70 G } ( 2 ms duration )
	Non-Operating	2,450 m/s <sup>2</sup> { 250 G } ( 2 ms duration )
Vibration <sup>[15]</sup>	Operating <sup>[16]</sup>	7.35 m/s <sup>2</sup> { 0.75 G } ( 5 to 300 Hz ) 2.45 m/s <sup>2</sup> { 0.25 G } ( 300 to 500 Hz )
	Non-Operating <sup>[17]</sup>	29.4 m/s <sup>2</sup> { 3.0 G } ( 5 to 500 Hz )

[1] Source: Toshiba Electronic Devices & Storage Corporation, as of December, 2017.

[2] 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<sup>30</sup> = 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.

[3] "2.5-inch" and "3.5-inch" mean the form factor of HDDs. They do not indicate drive's physical size.

[4] Read and write speed may vary depending on the host device, read and write conditions, and file size.

[5] Workload is defined as the amount of data written, read or verified by commands from host system.

[6] SIE: Sanitize Instant Erase. SIE is a function to invalidate the data recorded on the magnetic disks at a blink.

[7] A kibibyte (KiB) means 2<sup>10</sup>, or 1,024 bytes, a mebibyte (MiB) means 2<sup>20</sup>, or 1,048,576 bytes, and a gibibyte (GiB) means 2<sup>30</sup>, or 1,073,741,824 bytes.

[8] The maximum sustained data rate and interface speed may be restricted to the response speed of host system and by transmission characteristics.  
1 Gbit/s = 1,000,000,000 bit/s. 1 MiB/s = 1,048,576 B/s

[9] Read-modify-write is supported.

[10] Input voltages are specified at the HDD connector side, during HDD ready state.

[11] Make sure the value is not less than -0.3V DC (less than -0.6V, 0.1ms) when turning on or off the power.

[12] The measuring method is based on ISO 7779.

[13] Non-operating condition(except storage condition) assumes short term transportation.

[14] The range of altitude is 3,048 m or less. Up to 55°C at 7,620m. Up to 40°C at 12,192m.

[15] Vibration applied to the HDD is measured at near the mounting screw hole on the frame as much as possible.

[16] At random seek write/read and default on retry setting with log sweep vibration.

[17] At power-off state after installation

## RELIABILITY

Item	Specification
MTTF / AFR <sup>[18]</sup>	2,500,000 hours / 0.35%
Non-recoverable Error Rate	10 error per 10 <sup>16</sup> bits read
Load / Unload	600,000 times
Availability	24 hours/day, 7 days/week
Rated Annual Workload (Total TB Transferred per Year, R/W)	550 TB/year

[18] MTTF (Mean Time to Failure) of the HDDs during its life time is 2,500,000 hours and AFR (Annualized Failure Rate) is 0.35%. (POH: 8,760 hours per one year (24 hours per one day, 7 days per one hours). Average HDA surface temperature: 40°C or less, workloads: 550 TB per one year, which is defined as the amount of data written, read or verified by commands from host system). Continual or sustained operation at case HDA surface temperature above 40°C may degrade product reliability.

## MODEL NUMBERS

Model Number	Interface	Formatted Capacity	Sector Format	Optional Security Function
MG07ACA14TA	SATA-3.3	14 TB	4Kn	
MG07ACA12TA	SATA-3.3	12 TB	4Kn	
MG07ACA14TE	SATA-3.3	14 TB	512e	
MG07ACA12TE	SATA-3.3	12 TB	512e	
MG07ACA14TAY	SATA-3.3	14 TB	4Kn	SIE
MG07ACA12TAY	SATA-3.3	12 TB	4Kn	SIE
MG07ACA14TEY	SATA-3.3	14 TB	512e	SIE
MG07ACA12TEY	SATA-3.3	12 TB	512e	SIE
MG07ACP14TE	SATA-3.3	14 TB	512e	SED
MG07ACP12TE	SATA-3.3	12 TB	512e	SED

## 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	Region
UL (Underwriters Laboratories)	USA
CSA (Canadian Standard Association)	Canada
TÜV (Technischer Überwachungs Verein)	Germany
BSMI (Bureau of Standards, Metrology and Inspection)	Taiwan
MSIP (Ministry of Science, ICT & Future Planning)	Korea
ACMA (Australian Communications and Media Authority)	Australia

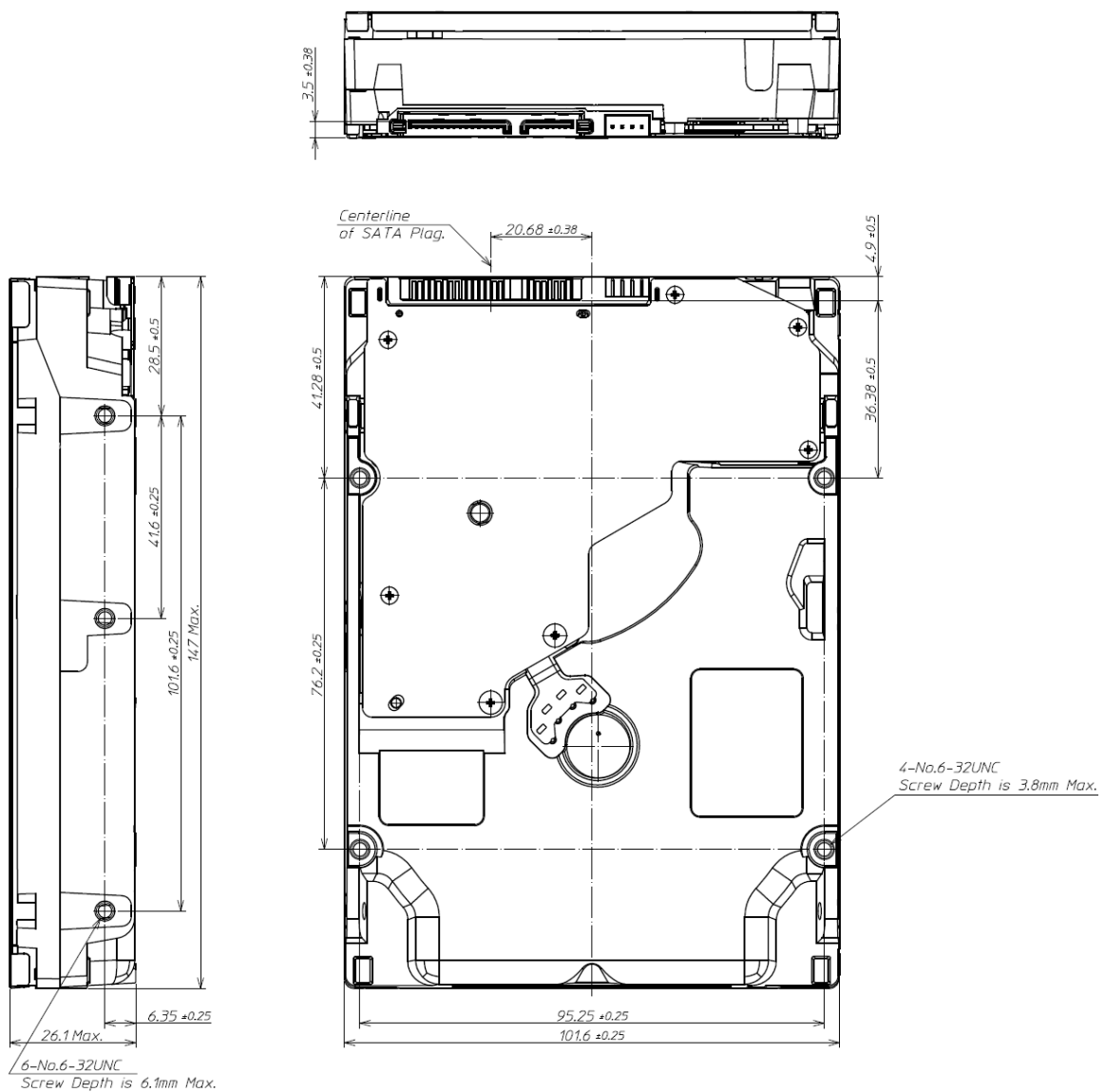
### (Note) Marks of KC

Made in Japan	 <p>1. 기기의 명칭(모델명) : MG07ACA14T/12T A/E/AY/EY / MG07ACP14T/12T E                  2. 인증번호 : MSIP-REM-T48-MG07ACA14TE                  3. 인증받은 자의 상호 : TOSHIBA ELECTRONIC DEVICES &amp; STORAGE CORPORATION                  4. 제조년월일 : 2017-09                  5. 제조자 / 제조국가 : TOSHIBA ELECTRONIC DEVICES &amp; STORAGE CORPORATION / 일본</p>
Made in Philippines	 <p>1. 기기의 명칭(모델명) : MG07ACA14T/12T A/E/AY/EY / MG07ACP14T/12T E                  2. 인증번호 : MSIP-REM-T48-MG07ACA14TE                  3. 인증받은 자의 상호 : TOSHIBA ELECTRONIC DEVICES &amp; STORAGE CORPORATION                  4. 제조년월일 : 2017-09                  5. 제조자 / 제조국가 : TOSHIBA ELECTRONIC DEVICES &amp; STORAGE CORPORATION / 필리핀</p>

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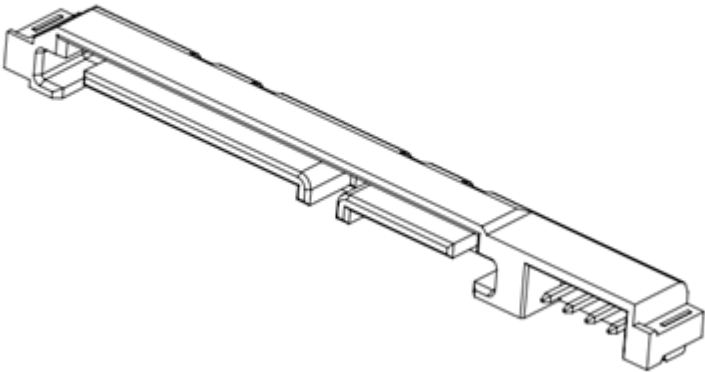
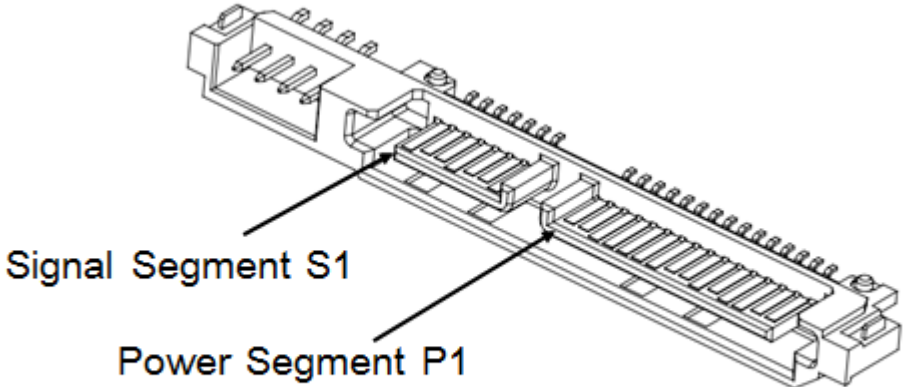
## MECHANICAL SPECIFICATIONS

Item	Specification
Width	101.85 mm Max
Height	26.1 mm Max
Length	147.0 mm Max
Weight	720 g Max



[Unit: mm]

INTERFACE CONNECTOR



## INTERFACE CONNECTOR (SATA plug) SIGNAL ALLOCATION

Segment	Pin No.	Pin Definition	
Signal Segment	S1	GND	2 <sup>nd</sup> Mate
	S2	A+	Differential Pair A from PHY (Device Rx+)
	S3	A-	Differential Pair A from PHY (Device Rx-)
	S4	GND	2 <sup>nd</sup> Mate
	S5	B-	Differential Pair B from PHY (Device Tx-)
	S6	B+	Differential Pair B from PHY (Device Tx+)
	S7	GND	2 <sup>nd</sup> Mate
Power Segment	P1		(Unused)
	P2		(Unused)
	P3	PWDIS	Enter/Exit Power Disable (Option)
	P4	GND	1 <sup>st</sup> Mate
	P5	GND	2 <sup>nd</sup> Mate
	P6	GND	2 <sup>nd</sup> Mate
	P7	V5	5 V Power Pre-Charge 2 <sup>nd</sup> Mate
	P8	V5	5 V Power
	P9	V5	5 V Power
	P10	GND	2 <sup>nd</sup> Mate
	P11	Spin	- Staggered Spin-up Mode Detect (Input)
		ACT	- Activity LED Drive (Output)
	P12	GND	1 <sup>st</sup> Mate
	P13	V12	12 V Power Pre-Charge 2 <sup>nd</sup> 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
78h	ACCESSIBLE MAX ADDRESS CONFIGURATION
E5h / 98h	CHECK POWER MODE
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
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 – 7Fh	SEEK
77h	SET DATE & TIME EXT
EFh	SET FEATURES
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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