

MQ04-V SERIES VIDEO HDD

Toshiba's MQ04ABD-V series of 5400 rpm 2.5-inch^[1] HDDs deliver up to 2 TB^[2] of storage capacity, using drive-managed SMR technology. The MQ04ABD-V series is suitable for set-top-box (STB), digital video recorders (DVR) and network video recorders (NVR) applications where large capacity, low power and low acoustics are critical.



Product image may represent a design model.

KEY FEATURES

- Up to 2 TB of Storage Capacity
- 2.5-inch, Small Form Factor
- 5400 rpm Performance
- SATA up to 6.0 Gbit/s
- Advanced Format (AF) 512e Sector Length
- Drive-Managed SMR Technology
- Low Power Consumption Compared to 3.5-inch Form Factor (DT01ABAxV series)
- Low acoustics 23 dB (Idle)

APPLICATIONS

- Set-Top-Box (STB)
- Digital Video Recorders (DVR)
- Network Video Recorders (NVR)

SPECIFICATIONS

Item		MQ04ABD200V	MQ04ABF100V
Interface		SATA-3.3	
Formatted Capacity		2 TB	1 TB
Performance	Interface Speed ^[3]	6.0 Gbit/s, 3.0 Gbit/s, 1.5 Gbit/s	
	Rotation Speed	5400 rpm	
	Average Latency Time	5.56 ms	
	Buffer Size	128 MiB ^[4]	
Logical Data Block Length		HOST: 512 B, DISK: 4096 B ^[5]	
Supply Voltage	Allowable Voltage	5 V ^[6] ± 5 %	
Power Consumption	Read / Write ^[7]	1.65 W Typ.	
	Low Power Idle ^[8]	0.60 W Typ.	
Acoustics (Sound Power)	For idle mode (Spindle is rotating)	23 dB Ave.	19 dB Ave.
	Seek	24 dB Ave.	21 dB Ave.

ENVIRONMENTAL LIMITS

Item	Specification	
Ambient temperature	Operating	0 °C to 60 °C (No condensation)
	Non-Operating	- 40 °C to 70 °C (No condensation)
Relative Humidity	Operating	8 % to 90 % R.H. (No condensation)
	Non-Operating	8 % to 90 % R.H. (No condensation)
Altitude	Operating	- 300 m to 3000 m
	Non-Operating	- 300 m to 12 000 m
Shock ^[9]	Operating	3920 m/s ² { 400 G } / 2 ms duration
	Non-Operating	9800 m/s ² { 1000 G } / 2 ms duration
Vibration ^[9]	Operating ^[10]	9.8 m/s ² { 1 G } (5 to 500 Hz)
	Non-Operating ^[11]	49 m/s ² { 5 G } (15 to 500 Hz)

RELIABILITY

Item	Specification
MTTF ^[12]	600 000 hours
Non-recoverable Error Rate	1 error per 10 ¹⁴ bits read
Load / Unload	600 000 times
Rated Annual Workload	55 TB per year

[1] "2.5-inch" mean the form factor of HDDs. They do not indicate drive's physical size.

[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 = 2³⁰ = 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] 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 bits/s. 1 MiB/s = 1 048 576 bytes/s

[4] A kibibyte (KiB) means 2¹⁰, or 1,024 bytes, a mebibyte (MiB) means 2²⁰, or 1 048 576 bytes, and a gibibyte (GiB) means 2³⁰, or 1 073 741 824 bytes.

[5] Read-modify-write is supported.

[6] When DC power is turned off, +5 V voltage must not be lower than 0 V.

[7] The read/write current is specified based on three operations of 63 sector read/write per 100 ms.

[8] The values are based on using S-ATA power management features. The Partial mode is used for the idle modes power consumption measurements and the Slumber mode is used for Standby and Sleep modes power consumption measurements. Motor is rotating at normal speed but heads are unloaded on the ramp.

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

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

[11] At power-off state after installation

[12] MTTF (Mean Time to Failure) of the HDDs during its life time is 600 000 hours. Average HDA surface temperature:25°C or less, workloads: 55 TB/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 25°C may degrade product reliability.

MODEL NUMBER

Model Number	Interface	Formatted Capacity	Sector Format
MQ04ABD200V	SATA-3.3	2 TB	HOST: 512 B, DISK: 4096 B ^[5]
MQ04ABF100V	SATA-3.3	1 TB	HOST: 512 B, DISK: 4096 B ^[5]

MARKING

1) WEEE

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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)	x	o	o	o	o	o

本表格依据 SJ/T 11364 的规定编制。
o: 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。
x: 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。



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TÜV (Technischer Überwachungs Verein)	Germany
BSMI (Bureau of Standards, Metrology and Inspection)	Taiwan
KC (Note 1) (Korea Certification)	Korea
RCM (Regulatory Compliance Mark)	Australia and New Zealand

(Note 1) Marks of KC

(Note 1) Marks of KC	
Made in Philippines	 <ul style="list-style-type: none"> 1. 기기의 명칭(모델명): MQ04ABD200V 2. 인증번호: MSIP-REM-TSD-MQ04ABD200 3. 인증받은 자의 상호: TOSHIBA ELECTRONIC DEVICES & STORAGE CORPORATION 4. 제조년월일: 2017-02 5. 제조자 / 제조국가: TOSHIBA ELECTRONIC DEVICES & STORAGE CORPORATION / 필리핀
	 <ul style="list-style-type: none"> 1. 기기의 명칭(모델명): MQ04ABF100V 2. 인증번호: MSIP-REM-TSD-MQ04ABF100 3. 인증받은 자의 상호: TOSHIBA ELECTRONIC DEVICES & STORAGE CORPORATION 4. 제조년월일: 2016-05 5. 제조자 / 제조국가: TOSHIBA ELECTRONIC DEVICES & STORAGE CORPORATION / 필리핀
Made in China	 <ul style="list-style-type: none"> 1. 기기의 명칭(모델명): MQ04ABD200V 2. 인증번호: MSIP-REM-TSD-MQ04ABD200 3. 인증받은 자의 상호: TOSHIBA ELECTRONIC DEVICES & STORAGE CORPORATION 4. 제조년월일: 2017-02 5. 제조자 / 제조국가: TOSHIBA ELECTRONIC DEVICES & STORAGE CORPORATION / 중국
	 <ul style="list-style-type: none"> 1. 기기의 명칭(모델명): MQ04ABF100V 2. 인증번호: MSIP-REM-TSD-MQ04ABF100 3. 인증받은 자의 상호: TOSHIBA ELECTRONIC DEVICES & STORAGE CORPORATION 4. 제조년월일: 2016-05 5. 제조자 / 제조국가: TOSHIBA ELECTRONIC DEVICES & STORAGE CORPORATION / 중국

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MECHANICAL SPECIFICATIONS

Item	MQ04ABD200V	MQ04ABF100V
Width	69.85 mm	
Height	9.5 mm	7.0 mm
Length	100.0 mm	
Weight (Max)	117 g	92 g

Figure.1 MQ04ABD200V

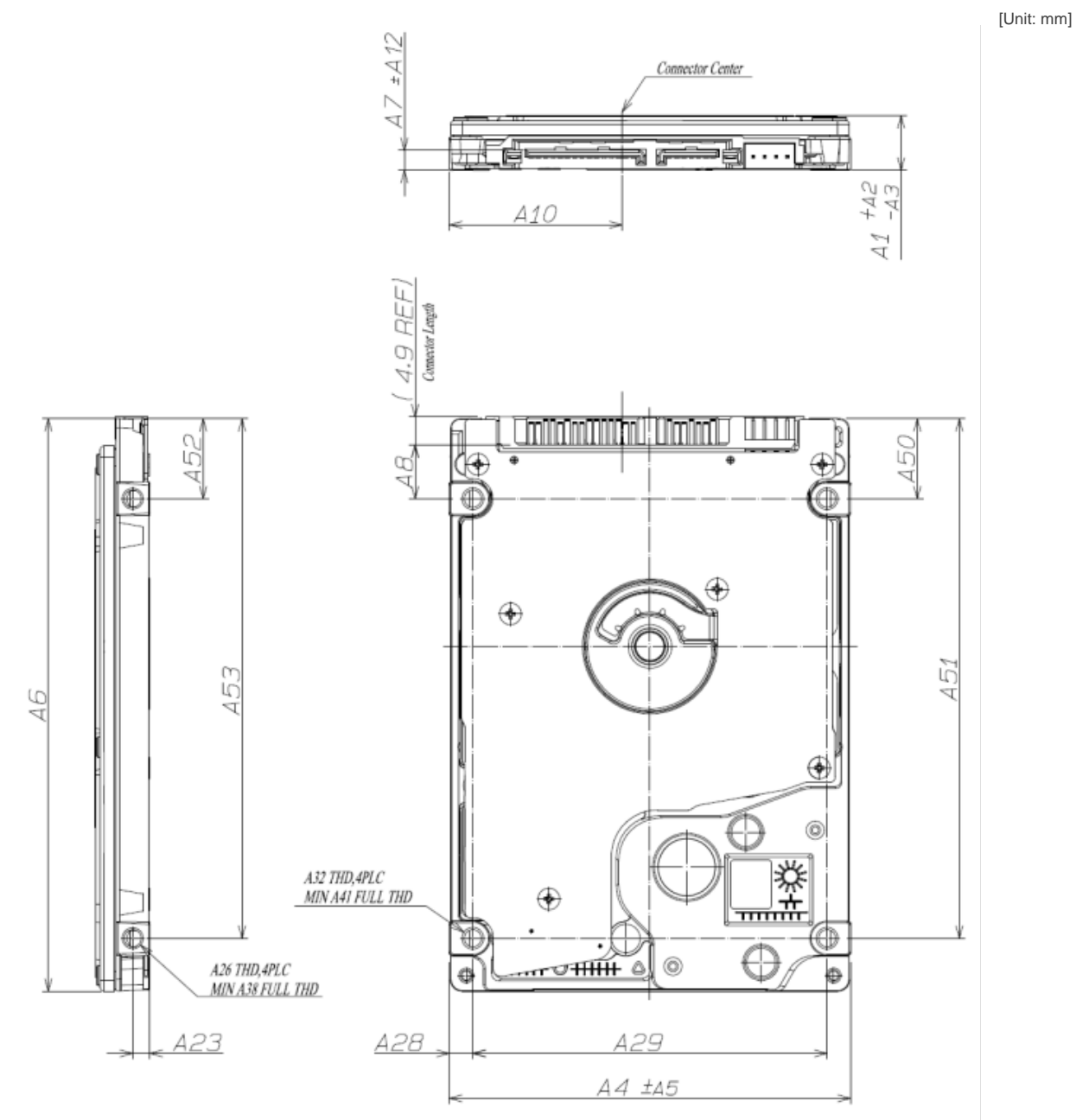


Table.1 MQ04ABD200V

Dimension	SFF-8200 Rev3.3 ^[13] SFF-8201 Rev3.3 SFF-8223 Rev2.7		Toshiba S-ATA Model (Differences only)	
	mm	{ Inch }	mm	{ Inch }
A1	9.5	0.374		
A2	0.20	0.008		
A3	0.20	0.008		
A4	69.85	2.750		
A5	0.25	0.010		
A6 ^[14]	100.45 Max	3.955 Max	100.00 ±0.41	3.937 ±0.016
A7	3.50	0.137		
A8	9.40	0.370	9.40 ±0.51	0.370 ±0.020
A10 ^[15]	—	—	30.125 ±0.28	1.186 ±0.011
A12	0.38	0.015		
A23	3.00	0.118	3.00 ±0.20	0.118±0.007
A28	4.07	0.160	4.07 +0.295 -0.305	0.160 +0.011 -0.012
A29	61.72	2.430	61.72 ±0.25	2.430 ±0.010
A32	M3	N/A		
A38	2# ^[16]	2# ^[16]	3.50	0.137
A41	2.5# ^[16]	2.5# ^[16]	3.50	0.137
A50 ^[14]	14.00	0.551	14.00 ±0.25	0.551 ±0.010
A51 ^[14]	90.60	3.567	90.60 ±0.30	3.567 ±0.012
A52 ^[14]	14.00	0.551	14.00 ±0.25	0.551 ±0.010
A53 ^[14]	90.60	3.567	90.60 ±0.30	3.567 ±0.012

[13] SFF-8200: Small Form Factor Standard.

[14] PCA, Connector not include4

[15] Connector Center defined the same as SFF-8223 A11

[16] # = minimum number of threads

Figure.2 MQ04ABF100V

[Unit: mm]

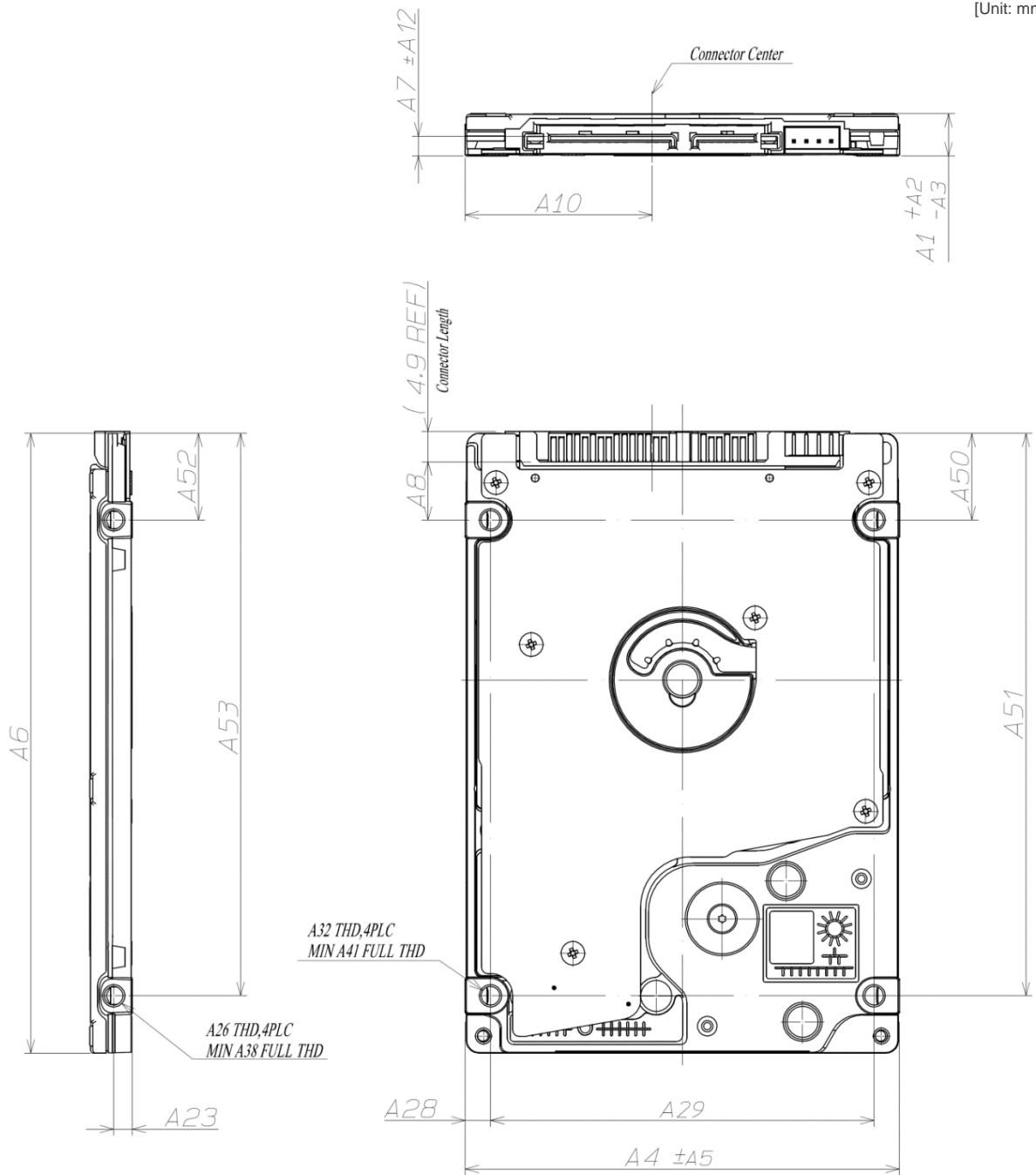


Table.2 MQ04ABF100V

Dimension	SFF-8200 Rev3.3 ^[13] SFF-8201 Rev3.3 SFF-8223 Rev2.7		Toshiba S-ATA Model (Differences only)	
	mm	{ Inch }	mm	{ Inch }
A1	7.00	0.276		
A2	0.20	0.008		
A3	0.50	0.020		
A4	69.85	2.750		
A5	0.25	0.010		
A6 ^[14]	100.45 Max	3.955 Max	100.00 ±0.41	3.937 ±0.016
A7	3.50	0.137		
A8	9.40	0.370	9.40 ±0.51	0.370 ±0.020
A10 ^[15]	—	—	30.125 ±0.28	1.186 ±0.011
A12	0.38	0.015		
A23	3.00	0.118	3.00 ±0.20	0.118±0.007
A28	4.07	0.160	4.07 +0.295 -0.305	0.160 +0.012 -0.012
A29	61.72	2.430	61.72 ±0.25	2.430 ±0.010
A32	M3	N/A		
A38	2# ^[16]	2# ^[16]	3.50	0.137
A41	2.5# ^[16]	2.5# ^[16]	3.50	0.137
A50 ^[14]	14.00	0.551	14.00 ±0.25	0.551 ±0.010
A51 ^[14]	90.60	3.576	90.60 ±0.30	3.567 ±0.012
A52 ^[14]	14.00	0.551	14.00 ±0.25	0.551 ±0.010
A53 ^[14]	90.60	3.567	90.60 ±0.30	3.567 ±0.012

[13] SFF-8200: Small Form Factor Standard.

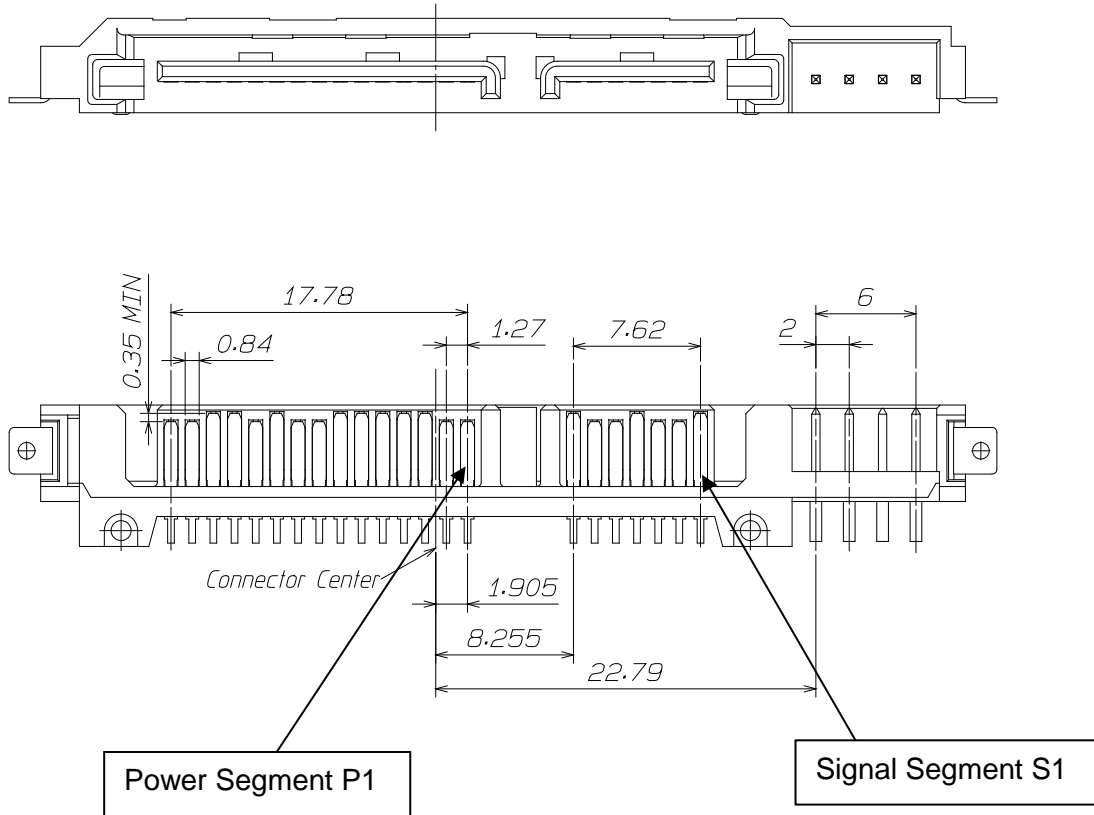
[14] PCA, Connector not include4

[15] Connector Center defined the same as SFF-8223 A11

[16] # = minimum number of threads

INTERFACE CONNECTOR

[Unit: mm]



INTERFACE CONNECTOR (SATA plug) SIGNAL ALLOCATION

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

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

SATA COMMAND TABLE (Part 1)

Op-Code	Command Name
E5h / 98h	CHECK POWER MODE
B1h	DEVICE CONFIGURATION
92h / 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

SATA 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
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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