

DT02 7200 rpm SERIES DESKTOP HDD

Toshiba DT02 series of 3.5-inch ^[1] 7200 rpm hard disk drive (HDD) deliver 2 TB ^[2] of storage capacity. Optimized for use in consumer and commercial desktop computers, All-in-One systems, external storage and applications where capacity, low power consumption and reliability are critical.



Product image may represent a design model.

KEY FEATURES

- 2TB capacity
- 7200 rpm Performance
- MTTF ^[3] of 600 000 hours
- Industry-standard 3.5-inch form-factor and SATA interface
- Advanced Format 512e Sector Technology
- Drive-Managed SMR (Shingled magnetic recording) Technology

APPLICATIONS

- Desktop computers
- All-in-One systems
- External storage

SPECIFICATION

Item		DT02ACA200
Interface		SATA-3.3
Formatted Capacity		2 TB
Performance	Interface Speed ^[4]	6.0 Gbit/s, 3.0 Gbit/s, 1.5 Gbit/s
	Rotation Speed	7200 rpm
	Buffer Size ^[5]	256 MiB
	Maximum Data Transfer Speed ^[6] (Sustained) (Typ.)	210 MiB/s
Logical Data Block Length ^[7]		HOST 512 B, DISK 4096 B
Supply Voltage	Allowable Voltage	12 V ^[8] ± 10 % / 5 V ^[8] ± 5 % ^[9]
Power Consumption	Operating (Typ.) ^[10]	5.21 W
	Active idle (Typ.)	2.92 W
	Standby (Typ.)	0.32 W
Acoustics (Sound Power) ^[11]	Low Power Idle (Typ.)	25 dB

ENVIRONMENTAL LIMITS

Item	Specification	
Ambient temperature	Operating	0 °C to 55 °C (No condensation)
	Non-Operating	- 40 °C to 70 °C (No condensation)
Enclosure surface temperature ^[12]	Operating	0 °C to 60 °C (No condensation) ^[14]
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	- 305 m to 12 192 m
Shock ^[13]	Operating	784 m/s ² { 80 G } (2 ms duration)
	Non-Operating	3430 m/s ² { 350 G } (2 ms duration)
Vibration ^[13]	Operating ^[14]	4.90 m/s ² { 0.50 G } (5 to 350 Hz) 2.45 m/s ² { 0.25 G } (350 to 500 Hz)
	Non-Operating ^[15]	29.4 m/s ² { 3.0 G } (5 to 500 Hz)

RELIABILITY

Item	Specification
MTTF / MTBF (AFR) ^[3]	600 000 hours (0.67 %)
Non-recoverable Error Rate	1 per 10 ¹⁴ bits read
Load / Unload	600 000 times
Rated Annual Workload (Total TB Transferred per Year, R/W)	55 TB / year

[1] "3.5-inch" means the form factor of HDDs. They do not indicate drive's physical size.

[2] Definition of capacity: One terabyte (TB) = one trillion bytes, but storage capacity actually available may vary depending on operating environment and formatting. Available storage capacity (including examples of various media files) will vary based on file size, formatting, settings, software and operating system and/or pre-installed software applications, or media content. Actual formatted capacity may vary.

[3] MTTF / MTBF (Mean Time to Failure / Mean Time Between Failure) of the HDDs during its life time is 600 000 hours and AFR is 0.67 %. (POH: duty of 4000 h/year, average HDA surface temperature: 40 °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 40 °C may degrade product reliability.

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

[5] A kibibyte (KiB) means 2¹⁰, or 1024 bytes, a mebibyte (MiB) means 2²⁰, or 1 048 576 bytes, and a gibibyte (GiB) means 2³⁰, or 1 073 741 824 bytes.

[6] 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

[7] Read-modify-write is supported.

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

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

[10] Operating watt is measured using 80% random read/write and 20 % performance idle.

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

[12] Operation of high surface temperature will be shortened of the drives useful life. The recommendation operating condition of surface temperature is less than 60°C

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

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

[15] At power-off state after installation.

MODEL NUMBER

Model Number	Interface	Capacity	Sector Format	Optional Security
DT02ACA200	SATA-3.3	2 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

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Title	Region
UL (Underwriters Laboratories)	USA
CSA (Canadian Standard Association)	Canada
TÜV (Technischer Überwachungs Verein)	Germany
BSMI (Bureau of Standards, Metrology and Inspection)	Taiwan
KC (Korea Certification)	Korea
RCM (Regulatory Compliance Mark)	Australia
Matches the basic requirements of resolutions: No. 2574.14 of 16 July 2015 on electromagnetic compatibility of equipment. No. 2573.14 of 16 July 2015 on electrical appliances intended for use in certain tensions. This compliance has been established according to the following Moroccan standards. NM EN 55032 NM EN 55035 NM EN IEC63000	Morocco

(Note) Marks of KC											
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CE Marking

Category	Applied standard	Issued year	Comment
EMC 2014/30/EU	Emission: EN55032	2015	Class B (including domestic environment)
	Immunity: EN55035	2017	Product immunity standard for IT-equipment
RoHS 2011/65/EU	EN IEN63000	2018	Category 3

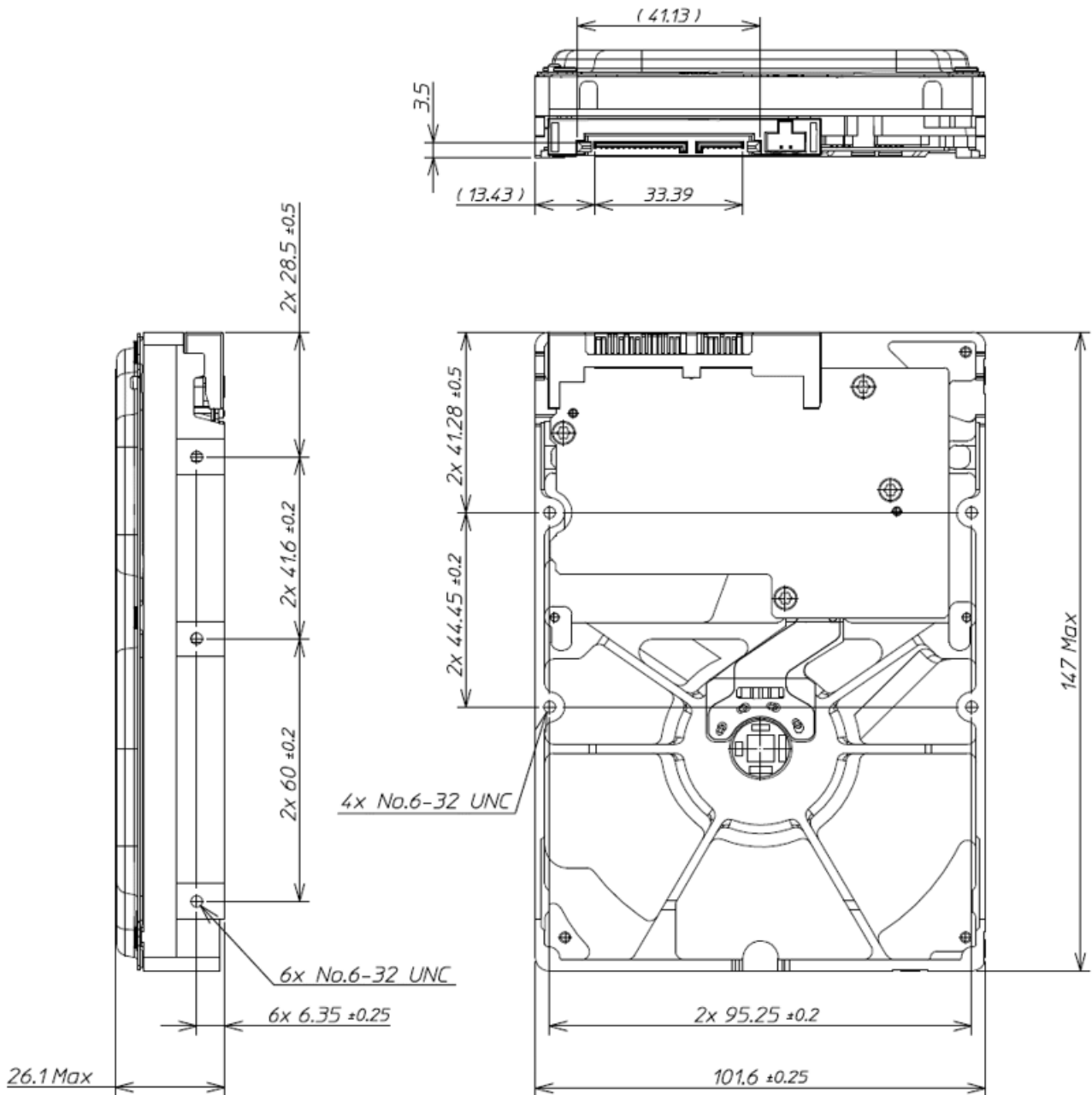
UKCA Marking

Category	Applied standard	Issued year	Comment
EMC	Emission: BS EN55032	2015	Class B (including domestic environment)
	Immunity: BS EN55035	2017	Product immunity standard for IT-equipment
RoHS	BS EN IEC63000	2018	Category 3

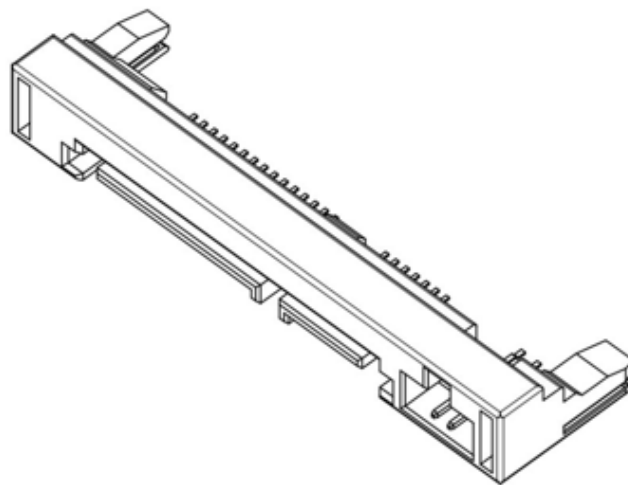
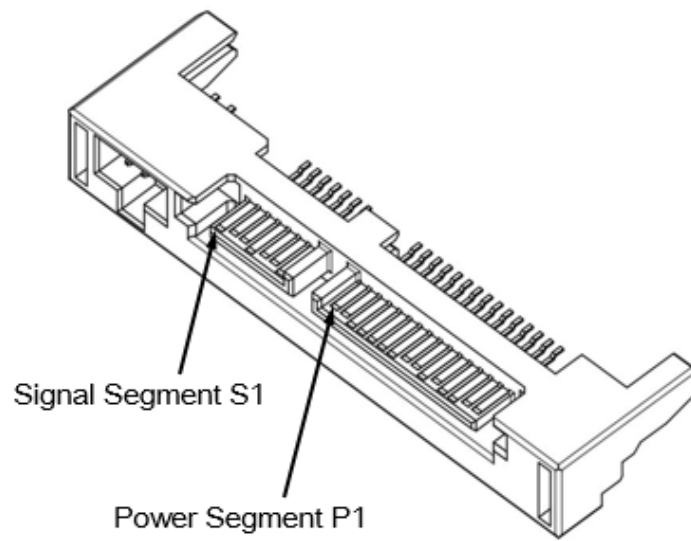
MECHANICAL SPECIFICATIONS

Item	DT02ACA200
Width (Max)	101.85 mm
Height (Max)	26.1 mm
Length (Max)	147.0 mm
Weight (Max)	450 g

[Unit: mm]



INTERFACE CONNECTOR



SATA plug connector overview

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	-	(Unused)
	P2	-	(Unused)
	P3	-	(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	- Staggered Spin-up Mode Detect (Input)
		ACT	- Activity LED Drive (Output)
	P12	GND	1 st Mate
	P13	V12	12 V Power Pre-Charge 2 nd Mate
	P14	V12	12 V Power
P15	V12	12 V Power	

Notice: This drive uses 5 V and 12 V power. 3.3 V power is 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 /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
47h	READ LOG DMA EXT
2Fh	READ LOG 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
F6h	SECURITY DISABLE PASSWORD
F3h	SECURITY ERASE PREPARE
F4h	SECURITY ERASE UNIT
F5h	SECURITY FREEZE LOCK
F1h	SECURITY SET PASSWORD
F2h	SECURITY UNLOCK
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
57h	WRITE LOG DMA EXT
3Fh	WRITE LOG 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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