Terabit™

Industrial M.2 NGFF SATAIII 6.0Gbps Solid State Drive

42mm/60mm/80mm/100mm

Data Sheet

Revision History

Version	Date	Changes	Note
V001	2015-06-28	Released	
	2015-10-09	100mm version added	

Contents

1. Product Features

Interface	NGFF 75PIN
Form Factor	M.2 NGFF SATAIII 6.0Gbps
Dimension	42mm Version: 42.0 x 22.0 x 3.4 ±0.1(mm) 60mm Version: 60.0 x 22.0 x 3.4 ±0.1(mm) 80mm Version: 80.0 x 22.0 x 3.4 ±0.1(mm) 100mm Version: 100.0 x 22.0 x 3.4 ±0.1(mm)
Capacity	NAND MLC: 128GB~1024GB
Performance	Read up to 540MB/s Write up to 300MB/s
Power Supply	D/C 3.3V± 5%
Operating Temperature	Standard: 0~+70°C Industrial: -20~+70°C
Weight	<20g
Storage Temperature	-45~+85°C
Shock	Non-operating 1500G peak, 0.5ms Operating 50G peak, 11ms
Vibration	Jet (Random) Vibration, 10-2000Hz, 16.4G(X, Y, Z)
Falling Test	0.8 meter free falling
Max. Power Consumption	Sequential Reading 0.95W Sequential Writing 1.73W Idle 0.2W
MTBF	2,000,000 Hours
Features	- Enhanced endurance by dynamic/static wear-leveling - Support dynamic power management - Support S.M.A.R.T function - Automatic Bad-block Management - Support TRIM and NCQ (Native Command Queuing) Command - Support BCH ECC 66bits/1024bytes - Support Over Provision - Support DEVSLP mode (optional)
Data Retention	@25°C: 10 years
Certification	CE/FCC/RoHS

2. Overview

Terabit M.2 NGFF SATAIII fully consists of semiconductor devices using original NAND Flash and Industrial controller, which provide high reliability and high performance for data storage. Terabit M.2 NGFF SATAIII SSD has standard interface and 42mm/60mm/80mm types for different applications, and fully conforms to the same mechanical and mounting requirements as standard rotating disk drives. This series of products are designed for premium applications that require both strong reliability and high capacity while installing room is limited such as Embedded Computer, Panel Computer, Tablet PC, Media Player, Ultra-book and Workstations. With up to 1024GB capacity on NAND MLC Flash, Terabit M.2 NGFF SATAIII SSD totally goes through a variety of proofing tests such as Shock Test, Vibration Test, Burn-in Test, and Twisting Test. Well proved under -20~+70°C industrial temperature and equipped with Power Failure Protect and Over Load Protect, this series of products can work smoothly under severe environments.

3. Interface

Terabit M.2 NGFF SATAIII Solid State Drive complies SATA3.0 Standard.
Compatible for SATA2.0 standard.

4. Physical Dimension

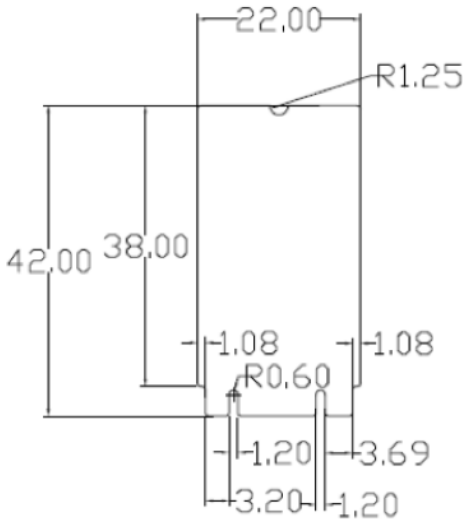


Figure 1: 42mm Version

Parameter	Value	Unit
Length	42.0	mm
Width	22.0	mm
Thickness	3.40	mm

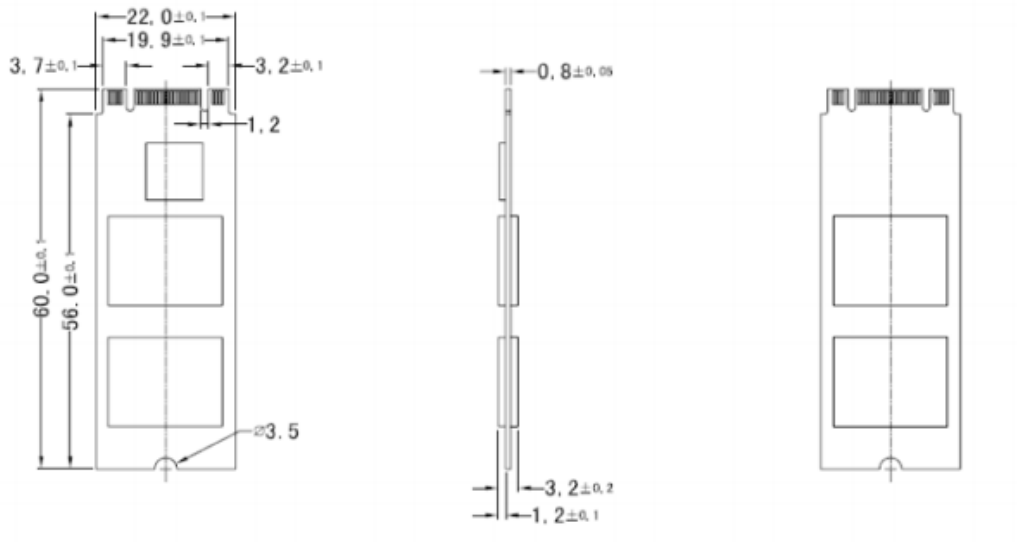


Figure 2: 60mm Version

Parameter	Value	Unit
Length	60.0	mm
Width	22.0	mm
Thickness	3.40	mm

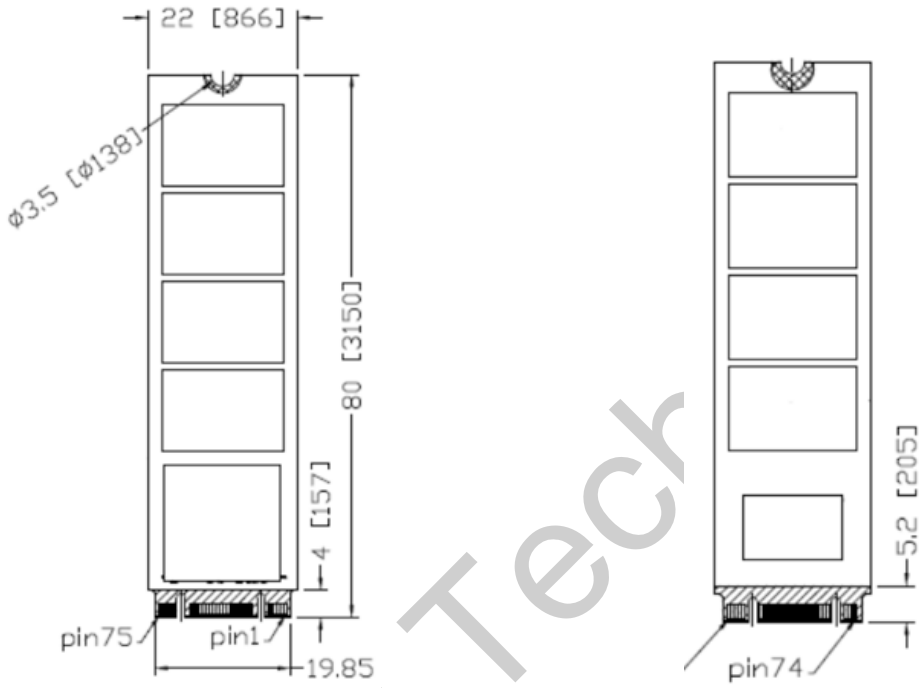


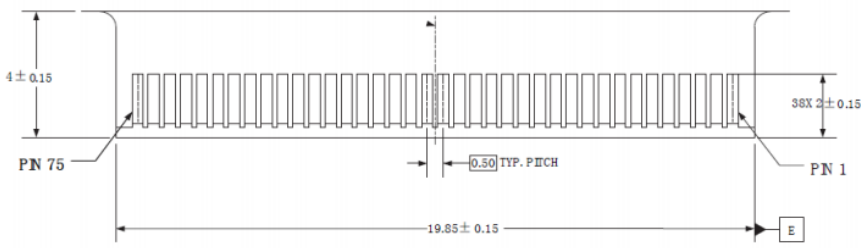
Figure 3: 80mm Version

Parameter	Value	Unit
Length	80.0	mm
Width	22.0	mm
Thickness	3.40	mm

- All of the values are ±0.2mm

5. PIN Description

5.1 PIN Location



5.2 Signal Description

Pin #	Type	Description	Pin#	Type	Description
1	GND	Ground	2	3.3V	Supply pin, 3.3V +/- 0.5% @0.5 Amps
3	GND	Ground	4	3.3V	Supply pin, 3.3V +/- 0.5% @0.5 Amps
5	GND	Ground	6	No connect	
7	No connect		8	No connect	
9	No connect		10	DAS/DSS# (O) (OD)	Status indicators via LED devices that will be provided by the system Active Low. A pulled-up LED with series current limiting resistor should allow for 9mA when On.
11	No connect		12	Module Key	
13	Module Key		14	Module Key	
15	Module Key		16	Module Key	
17	Module Key		18	Module Key	
19	Module Key		20	No connect	
21	CONFIG_0=GND	Ground	22	No connect	

23	No connect		24	No connect	
25	No connect		26	No connect	
27	GND	Ground	28	No connect	
29	No connect		30	No connect	
31	No connect		32	No connect	
33	GND	Ground	34	No connect	
35	No connect		36	No connect	
37	No connect		38	No connect	
39	GND	Ground	40	No connect	
41	SATA-B+	Host receiver differential signal pair	42	No connect	
43	SATA-B-	Host receiver differential signal pair	44	No connect	
45	GND	Ground	46	No connect	
47	SATA-A-	Host transmitter differential signal pair	48	No connect	
49	SATA-A+	Host transmitter differential signal pair	50	No connect	
51	GND	Ground	52	No connect	
53	No connect		54	No connect	
55	No connect		56	No connect	
57	GND	Ground	58	No connect	
59	Module Key		60	Module Key	
61	Module Key		62	Module Key	
63	Module Key		64	Module Key	
65	Module Key		66	Module Key	
67	No connect		68	No connect	
69	GND	Ground	70	3.3V	Supply pin, 3.3V +/- 0.5% @0.5 Amps

71	GND	Ground	72	3.3V	Supply pin, 3.3V +/- 0.5% @0.5 Amps
73	GND	Ground	74	3.3V	Supply pin, 3.3V +/- 0.5% @0.5 Amps
75	GND	Ground			

6. Power Consumption

Capacity	Idle	Read	Write	Unit
128GB	0.18	0.80	1.47	W
256GB	0.20	0.82	1.54	W
512GB	0.20	0.88	1.62	W
1024GB	0.20	0.95	1.73	W

7. Product Reliability

NAND MLC Flash：

Capacity	Endurance Total Bytes Written	Data Retention	MTBF	Warranty
128GB	Up to 260TB	@25°C >10 Years	1 Million Hours	3 Years Limited
256GB	Up to 520TB			
512GB	Up to 1040TB			
1024GB	Up to 2080TB			

*Total Bytes Written= 【（Flash P/E cycle）x (number of bits in drive)】/WAI
WAI=1.428704724

7.1 Wear-Leveling

Terabit M.2 NGFF SATAIII SSD support both static and dynamic wear-leveling technology. These two algorithms guarantee each block of flash memory at same level of erase cycles to improve lifetime limitation of NAND based storage.

7.2 ECC

ECC (Error Correction Code): Enhanced configurable BCH ECC engine. Terabit M.2 NGFF SATAIII SSD implements the BCH ECC Algorithm, which is one of the most powerful ECC algorithms in the industry. This algorithm can correct up to 12 random bit errors in each 512 bytes.

7.3 MTBF

Mean time between failures (MTBFs) for the SSD can be predicted based on the component reliability data using the methods referenced in the SR-332 reliability prediction procedures for electronic equipment, the prediction result for this SSD is more than 1,000,000 hours.

7.4 Bad-block Management

Terabit implements an efficient bad block management algorithm into the SSD to detect factory produced bad blocks as well as those that develop over the lifetime of the device. This process is completely transparent to the user through the use of S.M.A.R.T. command tools, i.e., the user will not be aware of the existence of the bad blocks during operation.

7.5 S.M.A.R.T Function

S.M.A.R.T stands for Self-Monitoring, Analysis and Reporting Technology. This technology enables the PC to predict the future failure of hard disk drives. Through the S.M.A.R.T. system, Terabit M.2 NGFF SSD incorporates a suite of advanced diagnostics that monitor the internal operation of the drive and provide an early warning for many types of potential problems. When a potential problem is detected, the SSD can be repaired or replaced before any data is lost or damaged.

7.6 TRIM Function

Terabit Solid State Drive equips built-in TRIM function, it helps collect and clean data garbage when the system in an idle situation, which keeps the system in a high performance status even after long-term using.

8. Performance

Capacity	Sequential Read	Sequential Write	IOPS Read (max)	IOPS Write (max)
128GB	485MB/s	162MB/s	52000	46000
256GB	500MB/s	280MB/s	55000	51000
512GB	525MB/s	296MB/s	57000	54000
1024GB	540MB/s	300MB/s	58000	55000

9. Cache

Cache	DDR2	DDR3	Capacity
Support	/	✓	/

10. Thermal Sensor

Temperature Sensor	Yes	No
	Support	/

11. Certifications

EN 55022:2010

EN: 55024:2010

EN 61000-3-2:2013

EN 61000-3-3:2014

47 CFR, Part2, Part15, CISPR PUB.22

With reference to RoHS Directive 2011/65/EU recasting 2002/95/EC

12. Ordering information

Series	**Model Name	Capacity	Flash	Length
M.2 NGFF SATAIII	TM2NNXTMLC-128G	128GB	NAND MLC	Optional
	TM2NNXTMLC-256G	256GB	NAND MLC	Optional
	TM2NNXTMLC-512G	512GB	NAND MLC	Optional
	TM2100XTMLC-1024G	1024GB	NAND MLC	100mm

*NN refers to length type, 42/60/80/100(mm).

*XT refers to temperature range，ST refers to standard temperature，CT refers to industrial temperature，KT refers to extended temperature.

13. Contact Information

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