TG128GS3M-KSPHTS1S

M.2 2280 NGFF Drive Datasheet

Version: 1.2

Revision History

Version	Date	Description
V1.0	4/12/2025	First release.
V1.1	21/1/2025	Add PCB color and TBW.
V1.2	26/2/2026	Add PCBA max height.

Note:

Company will not give any notice for change of products specifications. This product manual is only for reference. Please contact with tinyGo for more detail technical parameters and information.

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1. Introduction

1.1. Overview

tinyGO SATA SSD (Solid State Drive) is a high performance and high reliability storage device based on NAND Flash technology that designed to solve the bottleneck of computing system by traditional hard disk drives. Our SATA SSD doesn't have a moving parts and it has a same host interface and same physical dimension with Hard Disk Drive, so it can be drop-in replaced with the hard disk drives without anything. With a high performance and low power consumption,Our SATA SSD can be a good storage device for NB and Tabletop PC.

tinyGO SATA SSD purely consists of semiconductor devices and NAND flash memories, which give rugged features against shock and vibration, used in extreme environment such as industrial PC to increase MTBF. Furthermore, Our SATA SSD has highly advanced flash memory management algorithm to guarantee.

1.2. Part Type Introduction

This chapter is about the specifications of the NGFF SATA SSD with SATA III interface.

Type	Capacity	Flash	Interface	Firmware	PCB Color
TG128GS3M-KSPHTS1S	128GB	TOSHIBA 7DFL	SATA III	SBFC01.2	Black

Table 1 Capacity Specifications

Capacity	Available Capacity	R / W(MB/s)	Random R/W IOPS	TBW
128GB	119.24GB	550/440MB/S	71914/80944	256TB

1.3. Outline

Based spec	Interface	SATA III
	Dimension	80*22*0.8 mm
	Weight ①	5.6g
	Capacity	128GB
	Controller	Tai wan phison S11
	Flash type	3D MLC NAND Flash
Read/Write Performance ②	CDM Sequential Read	Up to 550MB/s
	CDM Sequential Write	Up to 440MB/s
	ATTO Sequential Read	Up to 500MB/s
	ATTO Sequential Write	Up to 450MB/s
Power Consumption	Power Supply	5V±5%
	Standby	0.3W
	Maximum Ripple	70 mV(peak to peak)
	4KB Random Write	2.5W
Reliability	Write endurance:3years @ 100G write/day	
	Read endurance: unlimited	
	MTBF: >2,000,000 hours	
	Data retention: >20years @ 25℃	
	Data destroy do not support	
	Sudden power-off recovery support	
	S.M.A.R.T,NCQ,Trim and dynamic power management support	
	Static and dynamic wear-leveling	
	Bad block management algorithm	
	ECC: LDPC ECC	
Environment	Storage temperature: -20~85 ℃	
	Operation temperature: 0~75℃	
	Humidity: 5%~95%	
	Vibration	15G (10 to 2000Hz)
	Shock	350G at 0.5ms
Warranty	3 years	

Table 3 outline of the driver

①, ②: The Read/Write performance and weight vary with different capacity of products.
The testing environment is below:
OS: Windows 7 Ultimate
CPU: Intel (R) Core(TM) i3-2100T CPU @2.50GHz
Memory: 4GB
Motherboard: Controller: PS3111,SATA III,128GB SSD

Test program: ATTO Disk BenchMark ; CrystalDiskMark
Test Drive: TG128GS3M-KSPHTS1S (3D MLC)

2. Block Diagram

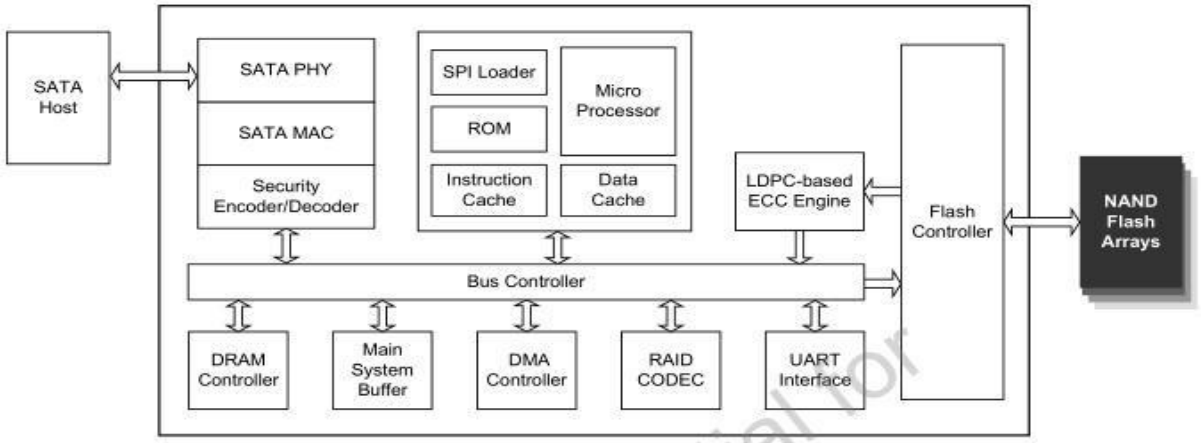


Figure 1 PS3111 Block Diagram

3. Product Specifications

3.1. Physical Dimensions

Parameter	Value
Length	80±0.1 mm
width	22±0.1 mm
PCB height	0.8±0.1 mm
Max PCBA height	2.2±0.1 mm

Table 3 Physical dimensions of the driver

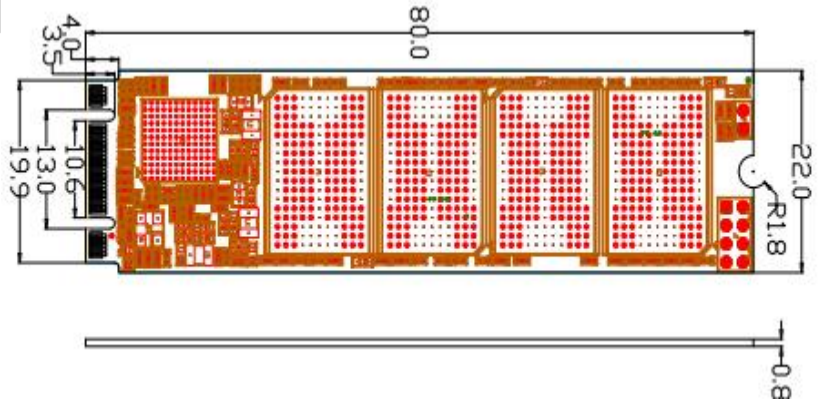


Figure 2 Physical dimensions

3.2. Interface Specification

3.2.1.Pin Assignment

Figure 3 Pin connector

Pin number	Signal name	Description
S1	GND	2nd mate
S2	A+	Differential signal pair A From physical layer electronics
S3	A-	
S4	GND	2nd mate
S5	B-	Differential signal pair B From physical layer electronics
S6	B+	
S7	GND	2nd mate
P1	V33	3.3V power (unused)
P2	V33	3.3V power (unused)
P3	V33	3.3V power,pre-charge,2nd mate(unused)
P4	GND	1st mate
P5	GND	2nd mate
P6	GND	2nd mate
P7	V5	5V power,pre-charge,2nd mate
P8	V5	5V power
P9	V5	5V power
P10	GND	2nd mate
P11	DAS/DSS	Device activity signal/Disable staggered spinal(unused)
P12	GND	1st mate
P13	V12	12V power,pre-charge,2nd mate(unused)
P14	V12	12V power(unused)
P15	V12	12V power(unused)

Table 4 SATAIII interface pin assignment

3.2.2. Interface Mode

The interface of the M.2 NGFF SATA SSD complies with the standard Serial ATA version 3.1:

①Host Transfer Rate is 600MB/s(6.0Gb/s)
②PIO mode 0,1,2,3,4
③DMA mode 0,1,2
④UDMA mode 0,1,2,3,4,5,6

4. Reliability

4.1. ECC Descriptions

The LDPC ECC engine executes parity generation and error detection/correction features, and enhances decoding throughput and data reliability. With LDPC of correction capacity 1e-2 RBER, the hard and soft decoding mechanism provides powerful error correction. Hence the PS3111 can enhance the endurance and retention of 3D MLC Nand Flash and extends the SSD lifespan.

4.2. Advance Wear-Leveling Algorithm

The NAND flash devices are limited by a certain number of write cycles. When using a file system, frequent file table updates is mandatory. If some area on the flash wears out faster than others, it would significantly reduce the lifetime of the whole device, even if the erase counts of others are far from the write cycle limit. Thus, if the write cycles can be distributed evenly across the media, the lifetime of the media can be prolonged significantly. The scheme is achieved both via buffer management and specific advanced wear leveling to ensure that the lifetime of the flash media can be increased, and the disk access performance is optimized as well.

4.3. S.M.A.R.T Function

S.M.A.R.T. is an acronym for Self-Monitoring, Analysis and Reporting Technology, an open standard allowing disk drives to automatically monitor their own health and report potential problems. It protects the user from unscheduled downtime by monitoring and storing critical drive performance and calibration parameters. Ideally, this should allow taking proactive actions to prevent impending drive failure. SMART feature adopts the standard SMART command B0h to read data from the drive. When the SMART Utility running on the host, it analyzes and reports the disk status to the host before the device is in critical condition.

5. Ordering Information

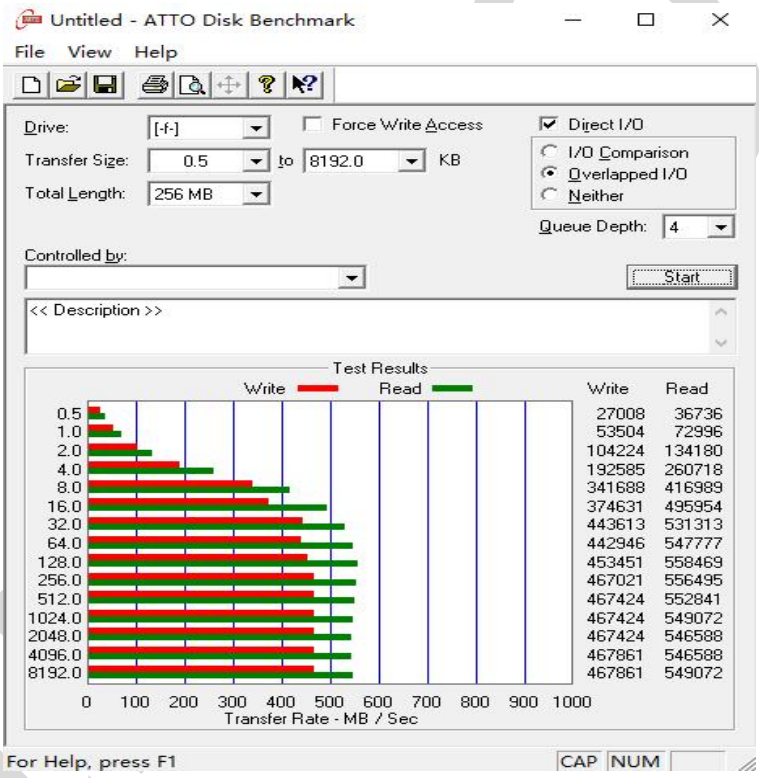
Model	Capacity	PN
TG128GS3M-KSPHTS1S	128GB	TG128GS3M-KSPHTS1S

6. Attachment

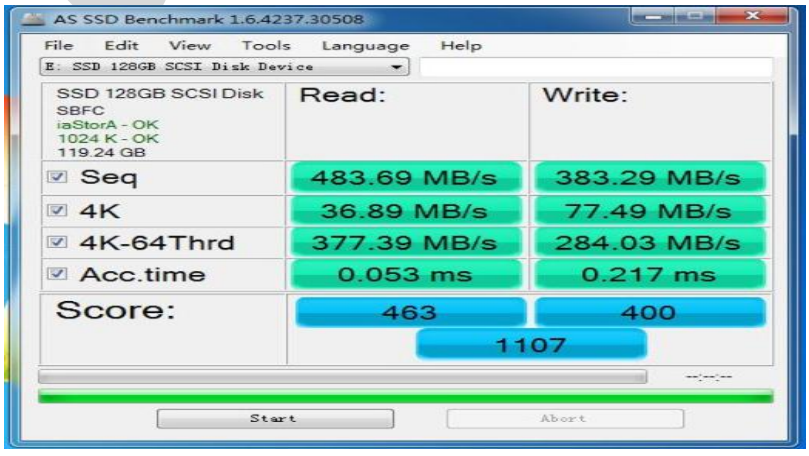
6.1. Performance

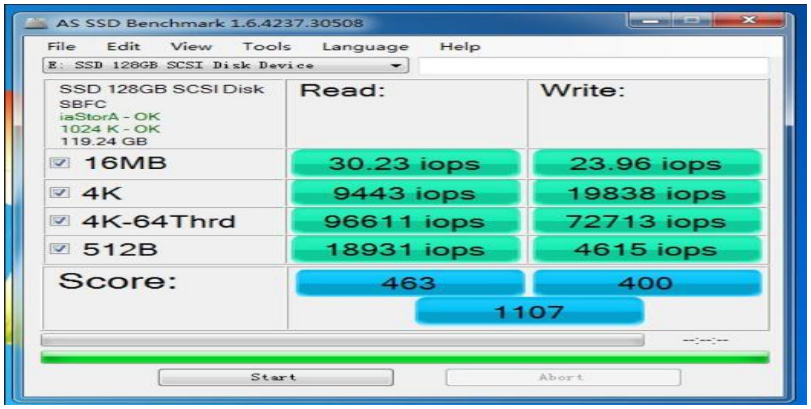
Test platform：
System : Windows 10
CPU: Intel (R) Core(TM) CPU G3930@2.90GHz
Memory : 4GB
Mother Board: Controller:PS3111,SATA III,128GB
Test SSD:Controller:PS3111,SATA III,TG128GS3M-KSPHTS1S
Test performance picture:

① ATTO Disk Benchmark

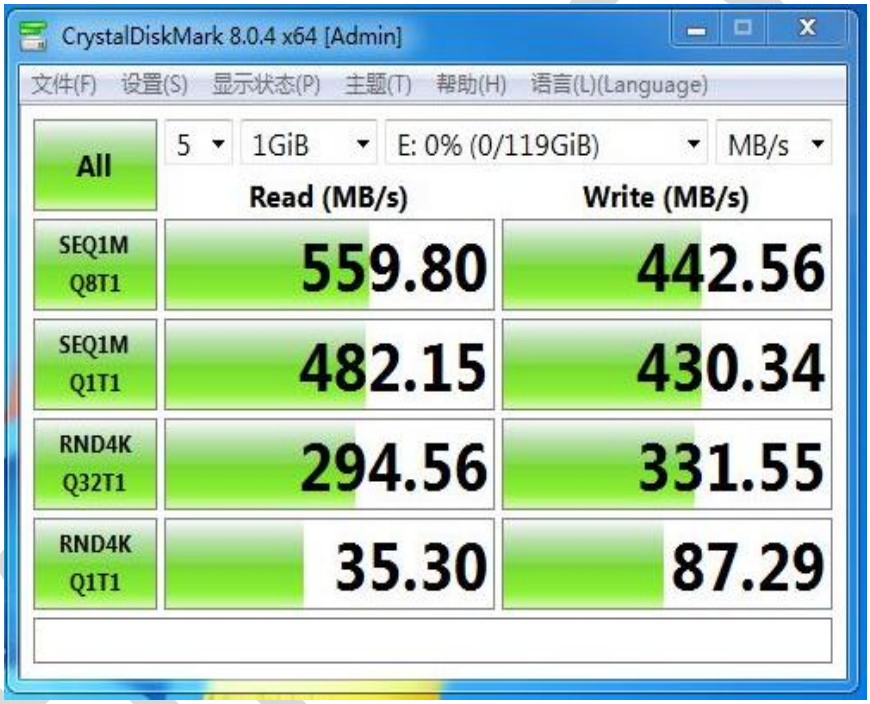


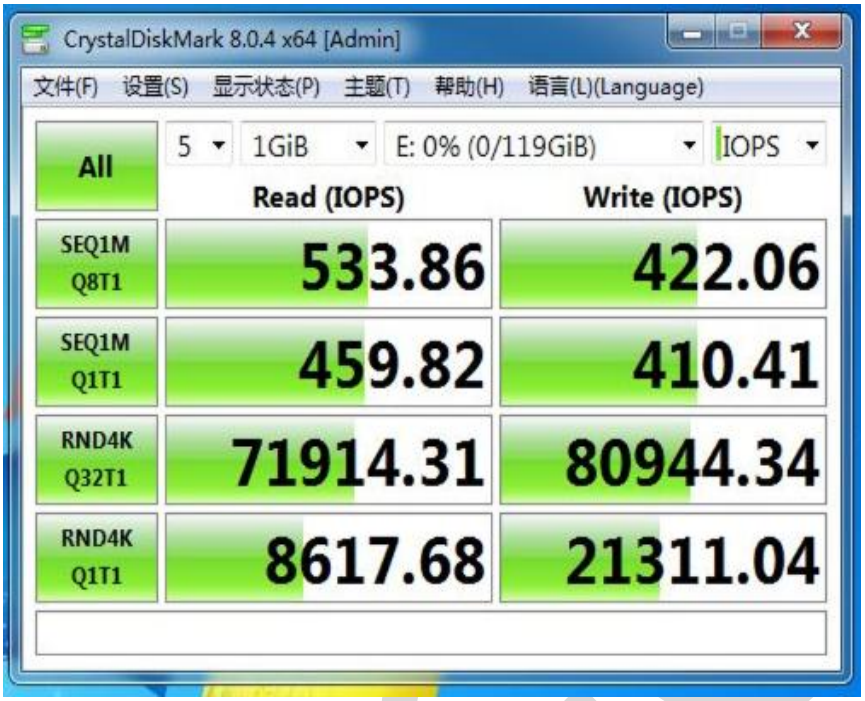
② AS SSD Benchmark





③ Crystal Disk Mark





6.2. Label Information