

2.5 Inch SATA3 SSD

Industrial Wide temperature

-40℃~85℃

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Revision History

Revision	History	Draft Date	Remark	Created By	Review By
A/00	1. initial version	August 3 rd , 2021	Wanghh	Wanghh	Fox xiao

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2.5 INCH SATAIII

Features	
☞SATA3 6.0Gbps	
☞LDPC Technology	
☞Support ATA8 Security Feature Set	
☞Low Power Consumption	
☞Support Trim Command	
☞3D TLC NAND	
☞SRAM ECC	
Drive Configuration	
Capacity	128GB ~ 2048GB
Interface	2.5 Inch SATA
Bytes per Sector	512 Bytes
Performance Specifications ¹⁾	
Sequential Read	Up to 560MB/s
Sequential Write	Up to 515MB/s
Random Read	Up to 94K IOPS
Random Write	Up to 72K IOPS
Reliability Specifications	
UBER ²⁾	< 1 x 10 ⁻¹⁵
MTBF ³⁾	1.5 million hours

Environmental Specifications	
Operation Temperature	-40~85℃
Non-operation Temperature	-55~95℃
Non-operation Humidity	5%~95%RH
Linear Shock(0.5ms duration with 1/2 sine wave)	1500Gpeak
Power Specifications	
Supply Voltage	5V ± 5%
Read Power Consumption	0.85W
Write Power Consumption	1.07W
Idle Power Consumption	0.2W
Physical Dimension	
Length	99.0 ±0.15mm
Width	69.0 ±0.15mm
Height	7.0 ±0.15mm
Weight	<= 45g

Attention: The content of the specification may be modified without notice.

1) All performance test data are obtained at Shenzhen Pancun Technology Co., Ltd. Testing Laboratory;

2) Uncorrectable Bit Error Rate

3) Mean Time between Failures

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1. Introduction

1.1 General Description

The PCGSAXXGT48WT0 is a high-performance SATA3 industry standard solution with a standard SATA 2.5 inch appearance, providing the capacity from 128GB to 2048GB. It adopts end-to-end data protection technology and LDPC ECC algorithm to provide strong data protection, while improving the service life of SSDs through advanced wear balancing algorithms.

Part Number	Capacity	LBA Count	Interface
PCGSA128GT48WT0	128GB	250069680	2.5 Inch SATA
PCGSA256GT48WT0	256GB	500118192	
PCGSA512GT48WT0	512GB	1000215216	
PCGSA001TT48WT0	1024GB	2000409264	
PCGSA002TT48WT0	2048GB	4000797360	

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2.Product Specification

2.1Product Function

-  End-to-end Data Protection
-  Industrial Grade
-  3D TLC NAND
-  Support ATA8 Security Feature Set
-  Support Deep Sleep Mode
-  Support Trim Command

2.2Flash Management

-  Dynamic/Static Wear Leveling
-  Bad Block Management
-  Garbage Collection
-  LDPC ECC
-  S.M.A.R.T

2.3TeraBytes Written

The value of TeraBytes Written reflects the durability of SSD, which is calculated based on several factors related to usage, such as the total amount of data written to the SSD, block management conditions, and daily workload of the drive, to comprehensively predict the durability of the device. In addition, key factors such as

Capacity	TBW
128GB	75
256GB	150
512GB	300
1024GB	600
2048GB	1200

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2.4Power Consumption

Table 1 Supply Voltage

Capacity	Voltage	Unit
128GB	5.0 (+/- 5%)	V
256GB	5.0 (+/- 5%)	V
512GB	5.0 (+/- 5%)	V
1024GB	5.0(+/- 5%)	V
2048GB	5.0 (+/- 5%)	V

Table 2 Power Consumption

Capacity	Description	Power Consumption	Unit
128GB	Sequential Read	802	mW
	Sequential Write	908	mW
	Idle	200	mW
256GB	Sequential Read	816	mW
	Sequential Write	923	mW
	Idle	200	mW
512GB	Sequential Read	838	mW
	Sequential Write	944	mW
	Idle	200	mW
1024GB	Sequential Read	855	mW
	Sequential Write	1077	mW
	Idle	200	mW
2048GB	Sequential Read	879	mW
	Sequential Write	1126	mW
	Idle	200	mW

Attention:
The workload is 128KB, queue depth is 256, sequential writes, measured root mean square power (RMS) over a 500ms sampling period. The performance and power consumption values are typical and may vary depending on platform settings.

2.5Performance

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Table 3 Performance

Parameter	128GB	256GB	512GB	1024GB	2048GB	Unit
Sequential Read	560	560	560	560	560	MB/s
Sequential Write	515	515	515	515	515	MB/s
Random Read	94	94	94	94	94	K IOPS
Random Write	72	72	72	72	72	K IOPS

Attention:

- 1) The performance test results were all obtained using CrystalDiskMark (v8.0.4) software on Windows 10 Professional Edition 64 bit operating system. The interface was SATA3 6.0Gbps during the test, and the total data block size read and write was 1GB. The queue depth for 128K sequential reads and writes is 32, and the thread is 1; The queue depth for 4K random reads and writes is 8, and the thread is 8.
- 2) 1 MB/s = 1,048,576 bytes/s.
- 3) The test results are all obtained from internal testing at Shenzhen Pancun Technology Co., Ltd. Testing Laboratory, and there may be differences in the test results obtained from different platforms or testing software.

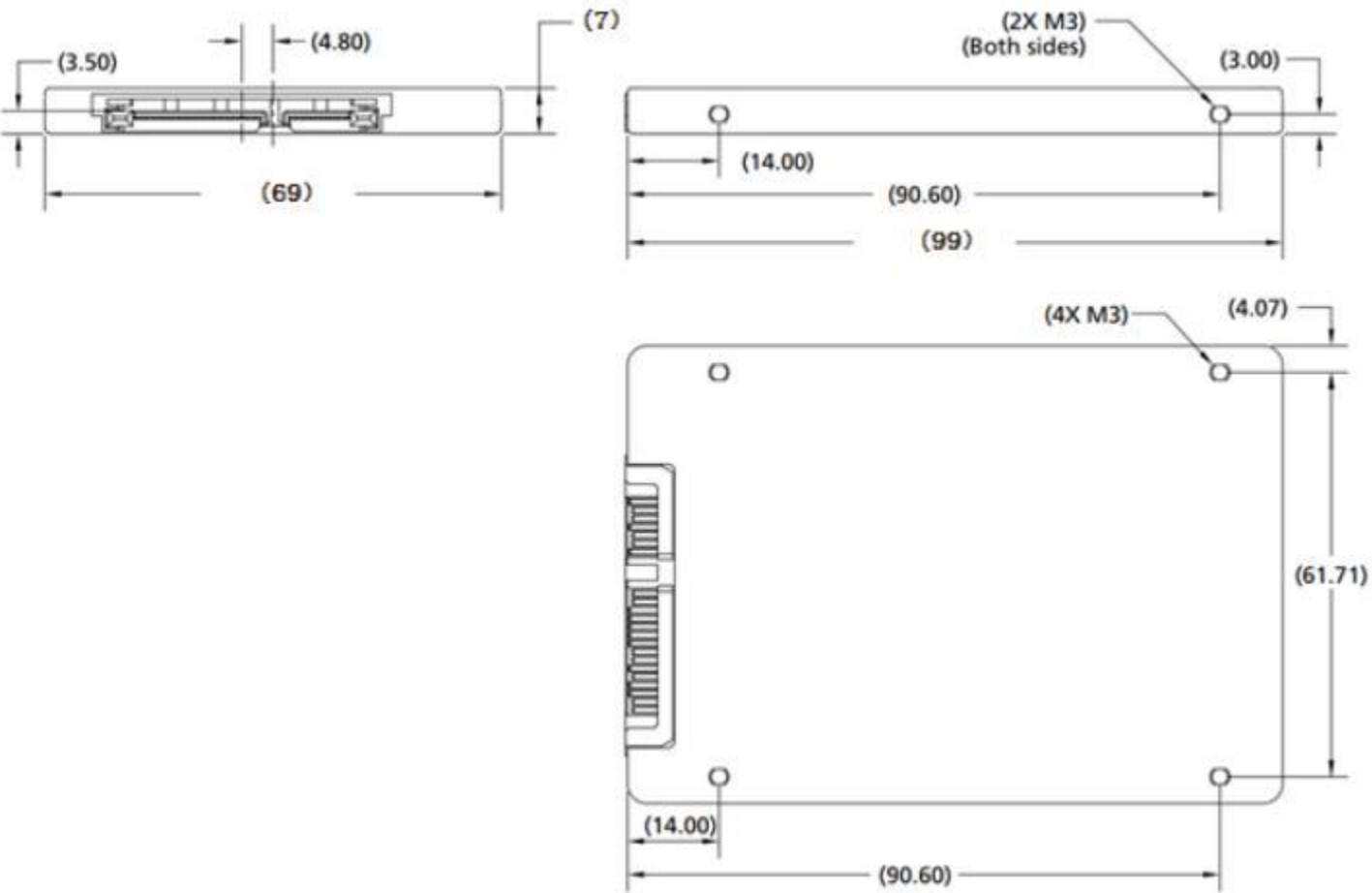
2.6Environmental Specification

Parameter	Specification
Operation Temperature	-40℃ ~ 85℃
Non-operation Temperature	-55℃ ~ 95℃
Non-operation Humidity	5%~95%RH
Vibration	7~800Hz, 3.08Grms, 30min/axis(X,Y,Z)
Shock	1500G, during 0.5ms, 1/2 sine wave

2.7Physical Dimensions

Figure 1 Physical Dimensions

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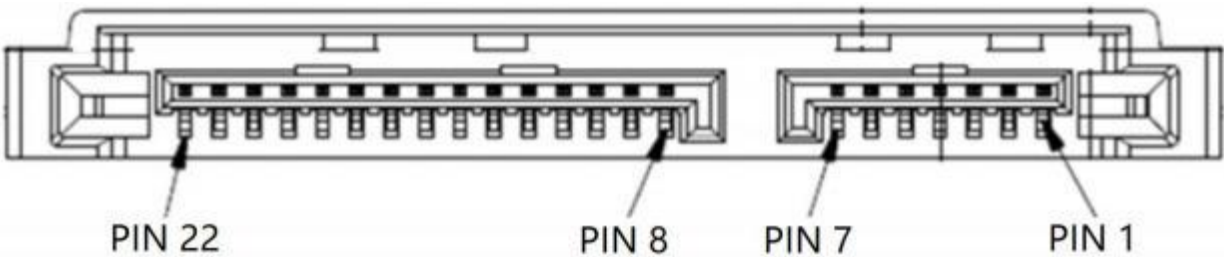


3.Interface Specification

3.1 Pin Assignments and Definitions

The definition of the Pancun’s SSD 2.5 inch SATA interface and power pin is shown in the following figure and table.

Figure 2 Pin Assignments Figure



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Table 4 Pin Assignments and Description

Pin	Description	Pin	Description
1	GND	12	GND
2	A+	13	GND
3	A-	14	5V
4	GND	15	5V
5	B-	16	5V
6	B+	17	GND
7	GND	18	DAS / DSS
8	Retired	19	GND
9	Retired	20	12V
10	DEVSLP/PWDIS	21	12V
11	GND	22	12V

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4. Supported Command Set

Table 5 Supported Admin Command

Opcode	Command Name	Opcode	Command Name
06h	Data Set Management	C5h	Write Multiple
20h	Read Sectors	C6h	Set Multiple Mode
24h	Read Sectors Ext	C8h	Read DMA
25h	Read DMA Ext	CAh	Write DMA
29h	Read Multiple Ext	E0h or 94h	Standby Immediate
2Fh	Read Log Ext	E1h or 95h	Idle Immediate
30h	Write Sectors	E2h or 96h	Standby
34h	Write Sectors Ext	E3h or 97h	Idle
35h	Write DMA Ext	E4h	Read Buffer
37h	Set Max Address Ext	E5h or 98h	Check Power Mode
39h	Write Multiple Ext	E6h or 99h	Sleep
40h or 41h	Read Verify Sectors	E7h	Flush Cache
45h	Write Uncorrectable Ext	E8h	Write Buffer
60h	Read FPDMA Queued	EAh	Flush Cache Ext
61h	Write FPDMA Queued	ECh	Identify Device
77h	Set Date & Time	EFh	Set Features
90h	Execute Device Diagnostic	F1h	Security Set Password
92h	Download Microcode	F2h	Security Unlock
93h	Download Microcode DMA	F3h	Security Erase Prepare
B0h	S.M.A.R.T.	F4h	Security Erase Unit
B4h	Sanitize Device	F5h	Security Freeze Lock
C4h	Read Multiple	F6h	Security Disable Password

5. S.M.A.R.T Information

Table 6 S.M.A.R.T Information

ID(Word)	Default Value	Description
1	100	Raw Read Error Rate
9	0	Power-on Hours
12	0	Power-on Count
167	0	Write Protect Mode
168	0	SATA Phy Error Count
169	0	Bad Block Rate
181	0	Program Fail Count
182	0	Erase Fail Count
187	0	Uncorrectable Error Count
192	0	Unsafe Shutdown Count
194	Current Temperature	Temperature
196	0	Reallocated Event Count
199	0	SATA CRC Error Count
231	100	SSD Life Left
233	0	Flash Write GiB
241	0	Lifetime Write GiB
242	0	Lifetime Read GiB
244	0	Average Erase Count
245	0	Max Erase Count
246	0	Total Erase Count

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