ShenZhen Renice Technology Co., Ltd

X5H M.2 PCIe Gen 4x4 pSLC Industrial SSD

Datasheet

V1.0

2025-8-5

CATALOGUE

1. Introduction

1.1 Product Overview

Renice X5H series pSLC SSD are constructed entirely from semiconductor materials and NAND Flash memory, delivering exceptional resistance to vibration and shock. These drives demonstrate outstanding durability in harsh operating environments, making them ideally suited for demanding applications.

With their robust design and superior component quality, X5H series pSLC SSD reliably meet the stringent requirements of mission-critical operations under extreme conditions.

1.2 Feature

- **Industry Standard PCIe Interface:**
  - PCIe 4.0x4, NVMe 1.4
- **Form factor:**
  - M.2 2280: 22mmx 80mmx 2.4mm
- **NAND Configuration:**
  - pSLC mode
- **Performance:**
  - Sequential Data Read(Max): 7,000MB/s
  - Sequential Data Write(Max): 6,100MB/s
- **Capacities:**
  - M.2 2280 : 64GB, 128GB, 256GB, 512GB, 1TB
- **Lifetime Endurance:**
  - P/E Cycle: 50,000 P/E cycles
- **Data Retention:**
  - JESD218A Compliant
- **Power Management:**
  - Input voltage: 3.3V (±5%)
  - Power Consumption: Active: <3.5W
    Idle: <1W
- **Temperature ranges:**
  - Operation: -40°C~ +85°C
  - Storage: -50°C~ +95°C
- **Reliability:**
  - Global static and dynamic wear leveling
  - UBER: 1 sector per 10^{17} bits read
  - MTBF: 2,000,000 Hours
  - Advanced LDPC error correction
- **Warranty:** 3 years

2. Product Specifications

2.1 Performance

Table 1: Drive performance (Specification subject to change without notice)

Parameter	Capacity(pSLC)			Unit
	128GB	256GB	1TB	
Sequential Read	TBD	5,300	7,000	MB/s
Sequential write	TBD	4,900	6,100	MB/s
4K Random read	TBD	87	91	MB/s
4K Random write	TBD	332	348	MB/s
Full disk steady Write (Avg)	TBD	3.1	3.8	GB/S

2.2 Environment Specification

Table 2: Environmental Specification Table

Parameter	Value
Operating Temperature	-40°C ~+85°C
Storage Temperature	-50°C ~+95°C
Humidity (Non-Condensing)	5%~95% (Operating)
Vibration(Non-Operating)	10G (Peak, 10~2,000Hz)
Shock (Non-Operating)	1,500G (0.5ms duration, half sine wave)

2.3 Power Management

Table 3: Power Management Table

Parameter	Unit	X5H Series
Input voltage	V	3.3 (±5%)
Active Power Consumption(Average)	W	<3.5
Idle Mode Power Consumption(Average)	W	<1.0

2.4 Reliability

X5H series products meet to SSD endurance and data requirements as specified in the JESD218 standard. Reliability specifications are listed in the following table.

Table 4: Reliability table

Parameter	Value
Mean Time Between Failures (MTBF)	2,000,000 hours
Uncorrectable Bit Error Rate (UBER)	<1 sector per 10^{17}

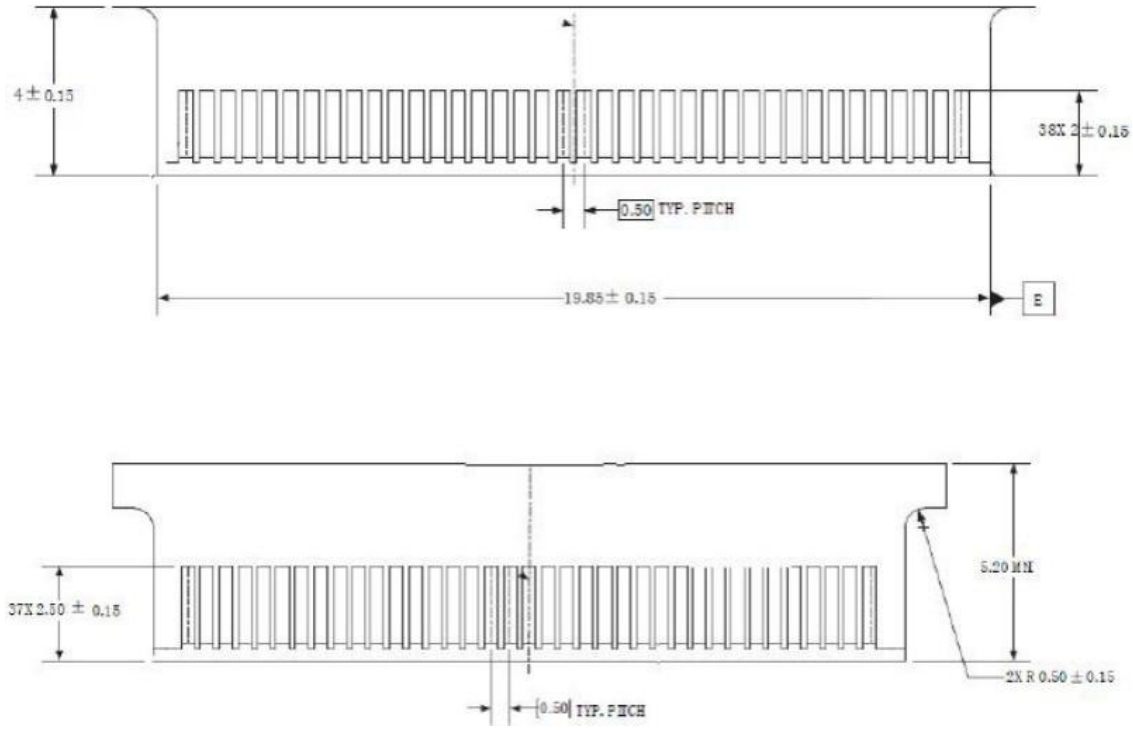
2.5 Functional Description

Table 5: Functional Description

Key Feature	Specification
APST	Support
ASPM/PCI-PM	Support
Multiple Submission and Completion Queues	Support (Up to queue depth=64K)
S.M.A.R.T	Support
Trim Command	Support
Modern Standby	Support
TCG Pyrite 2.01 Specification	Support
NVMe Revision 2.0	Support
Dynamic & Static Wear-Leveling	Support
Background Garbage Collection	Support
Compatible with PCIe I/II/III/IV x 4 interface	Support
Power Management: (1) PS00 (2) PS01 (3) PS02 (4) PS03 (5) PS04	Support

3. Physical Dimension Diagram

3.1 Interface Specification (M Key)



3.2 M.2 2280 physical dimension diagram

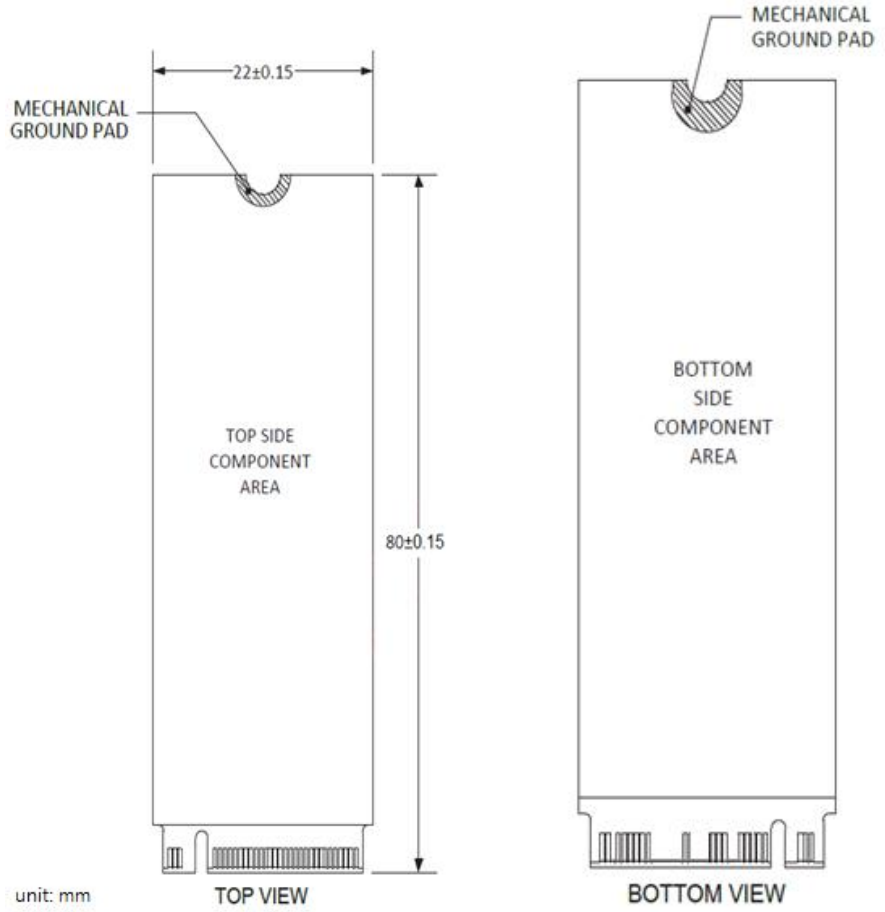


Table 6: Physical Dimension of M.2 2280 Board

Physical Dimensions	Value	Unit
Length	22±0.15	mm
Width	80±0.15	mm
Tickness	2.4	mm

4. Pin Assignment

4.1 M.2 Connector

Table 7: Pin assignment and description for signal and power pins for M.2 2280 board

Pin Name	Signal Name	Description
1	GND	Ground
2	3.3V	3.3V Source
3	GND	Ground
4	3.3V	3.3V Source
5	PCIe 3 TXn	PCIe Lane 3 TX-
6	N/C	No Connect
7	PCIe 3 TXp	PCIe Lane 3 TX+
8	PLN	Power Loss Notification
9	GND	Ground
10	DAS	Device Activity Signal
11	PCIe 3 RXn	PCIe Lane 3 RX-
12	3.3V	3.3V Source
13	PCIe 3 RXp	PCIe Lane 3 RX+
14	3.3V	3.3V Source
15	GND	Ground
16	3.3V	3.3V Source
17	PCIe 2 TXn	PCIe Lane 2 TX-
18	3.3V	3.3V Source
19	PCIe 2 TXp	PCIe Lane 2 TX+
20	N/C	No Connect
21	GND	Ground
22	+1.8V	1.8V Source
23	PCIe 2 RXn	PCIe Lane 2 RX-
24	N/C	No Connect
25	PCIe 2 RXp	PCIe Lane 2 RX+

Pin Name	Signal Name	Description
26	N/C	No Connect
27	GND	Ground
28	N/C	No Connect
29	PCIe 1 TXn	PCIe Lane 1 TX-
30	N/C	No Connect
31	PCIe 1 TXp	PCIe Lane 1 TX+
32	GND	Ground
33	GND	Ground
34	N/C	No Connect
35	PCIe 1 RXn	PCIe Lane 1 RX-
36	N/C	No Connect
37	PCIe 1 RXp	PCIe Lane 1 RX+
38	GND	Ground
39	GND	Ground
40	SMB_CLK	SMB_CLK
41	PCIe 0 TXn	PCIe Lane 0 TX-
42	SMB_DATA	SMB_DATA
43	PCIe 0 TXp	PCIe Lane 0 TX+
44	ALERT#	ALERT#
45	GND	Ground
46	N/C	No Connect
47	PCIe 0 RXn	PCIe Lane 0 RX-
48	N/C	No Connect
49	PCIe 0 RXp	PCIe Lane 0 RX+
50	PERST#	PE-Reset defined by PCIe Mini CEM Spec
51	GND	Ground
52	CLKREQ#	Clock Request defined by PCIe Mini CEM Spec. Used by L1 PM Substates as well
53	REFCLKN	PCIe reference clock signals
54	N/C	No Connect

Pin Name	Signal Name	Description
55	REFCLKP	PCIe reference clock signals
56	N/C	No Connect
57	GND	Ground
58	N/C	No Connect
59	Module Key	No Connect
60	Module Key	No Connect
61	Module Key	No Connect
62	Module Key	No Connect
63	Module Key	No Connect
64	Module Key	No Connect
65	Module Key	No Connect
66	Module Key	No Connect
67	N/C	No Connect
68	N/C	No Connect
69	N/C	No Connect
70	3.3V	3.3V Source
71	GND	Ground
72	3.3V	3.3V Source
73	GND	Ground
74	3.3V	3.3V Source
75	GND	Ground

5. Supported NVMe Commands

The Admin Command Set defines the commands that may be submitted to the Admin Submission Queue. Admin commands should not be impacted by the state of I/O queues (e.g., a full I/O completion queue should not delay or stall the Delete I/O Submission Queue command).

Table 8: Supported Admin Command

Op Code	Command
00h	Delete I/O Submission Queue
01h	Create I/O Submission Queue
02h	Get Log Page
04h	Delete I/O Completion Queue
05h	Create I/O Completion Queue
06h	Identify
08h	Abort
09h	Set Features
0Ah	Get Features
0Ch	Asynchronous Event Request
10h	Firmware Commit
11h	Firmware Image Download

Table 9: Supported Admin Command – NVM Command Set Specific

Op Code	Command
80h	Format NVM
81h	Security Send
82h	Security Receive

Table 10: Supported NVM Command

Op Code	Command
00h	Flush
01h	Write
02h	Read

Op Code	Command
04h	Write Uncorrectable
05h	Compare
08h	Write Zeroes
09h	Dataset Management

6. S.M.A.R.T Support

SMART Attributes provide the SSD's detail working information, like power-on hours or write from host…etc. to help SSD vendor to monitor the health situation and diagnosis while SSD have been damaged or panic under abnormal user behavior.

Table 11: S.M.A.R.T Attributes

Attribute Description	Unit
Critical Warning	-
Composite Temperature	K
Available Spare	%
Available Spare Threshold	%
Percentage Used	%
Data Units Read	1000 sector
Data Units Written	1000 sector
Host Read Commands	Count
Host Write Commands	Count
Controller Busy Time	Count
Power Cycles	Count
Power On Hours	Count
Unsafe Shutdowns	Count
Media and Data Integrity Errors	Count
Number of Error Information Log Entries	Count

7. Ordering Information

Table 12: Valid Combinations

Part Number	Description	Form Factor
RIS064G- M48X5HA	64GB, pSLC,PCIe 4.0x4, -40/+85°C	M.2 2280
RIS128G- M48X5HA	128GB, pSLC, PCIe 4.0x4, -40/+85°C	M.2 2280
RIS256G- M48X5HA	256GB, pSLC, PCIe 4.0x4, -40/+85°C	M.2 2280
RIS512G- M48X5HA	512GB, pSLC, PCIe 4.0x4, -40/+85°C	M.2 2280
RIS001T- M48X5HA	1TB, pSLC, PCIe 4.0x4, -40/+85°C	M.2 2280