Plusetech Technology (SHENZHEN) CO., LIMITED

M.2 2280 NVMe SSD Specification

PCIe Gen3x4, 128GB / 256GB

Lead-Free&Halogen-Free

(RoHS Compliant)

PSP3I3Y10M8-128GB

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Product Overview

- **Capacity**
  - 128GB/256GB
- **Form Factor**
  - M.2 2280
- **Flash Type**
  - 3D TLC NAND Flash
- **Features**
  - PCIe Gen3(8Gbps) interface,up to 4 Lanes
  - Compliant with NVMe 1.4
  - Support HMB
- **Power consumption**
  - Active write:2726mW
  - Active read: 2823mW
- **RoHS compliant**
- **Temperature Range**
  - Operation: 0°C ~ 70°C
  - Storage: -40°C ~ 85°C
- **MTBF**
  - More than 1,500,000 hours
- **Performance**

128GB
  - Sequential Read: Up to 1550MB/s
  - Sequential Write: Up to 700MB/s

256GB
  - Sequential Read: Up to 2300MB/s
  - Sequential Write: Up to 1200MB/s

Part Number Naming Rule

PS	P3	I3	Y10	M8	-128GB
Brand	Version	Flash IC	Controller	Form Factor	Capacity
Plusetech	**PCIe 3.0**	**Intel Flash**	**YS9205**	**M.2 2280**	**128GB**

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1. PRODUCT SPECIFICATIONS

1.1. General Description

Taking the advantages of NAND flash memory, Solid State Drive (SSD) provides better solutions on durability, performance, and power efficiency over traditional hard disk drives. Employing global wear-leveling technology to maximize device mean time between failures (MTBF), The SSD doesn't have any moving parts such as platter (disk) and head media, which provides a better solution in a notebook PC, Tablet PC and industrial PC for a storage device providing higher performance, reduced latency, and a low power consumption in a small form factor. SSD has the same host interface with Hard Disk Drives and has a same physical dimension.

1.2. Function Block Diagram

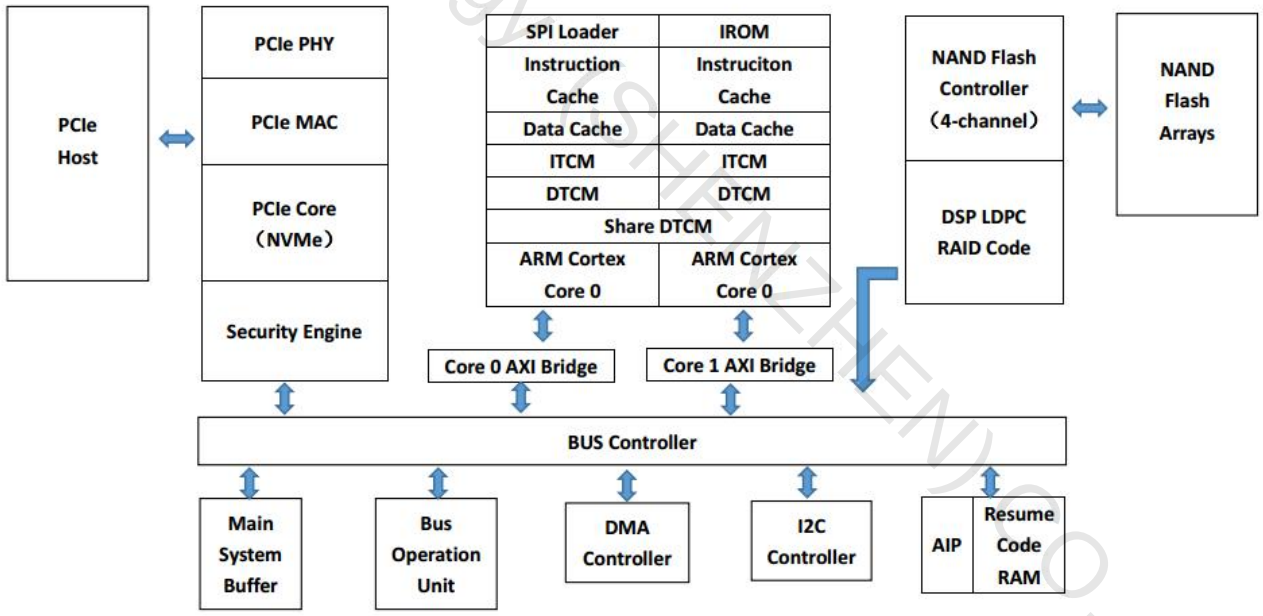


Figure-1 SSD Function Block Diagram

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2. MECHANICAL SPECIFICATION

Form Factor	Type Length(mm)	Type Width(mm)	Type Height(mm)
M.2 2280	80	22	2.25(MAX)

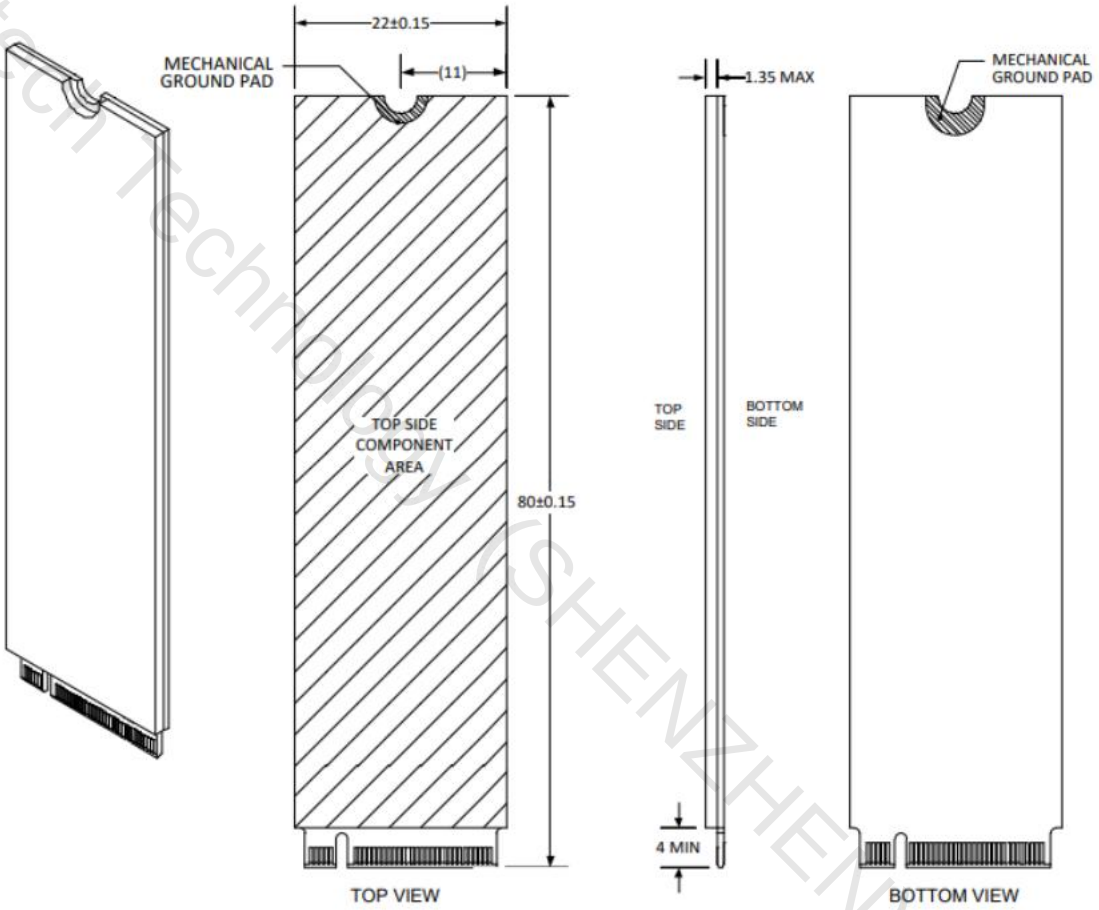


Figure-2 SSD Physical Dimension

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3. PRODUCT SPECIFICATION

3.1. Interface and Configuration

NVMe 1.4 Revision PCIe Gen3 (8Gb/s) x4 Lanes

3.2. System Performance

PCIe Gen3x4 M.2 host interface					
Flash Model	Capacity	Sequential Read (Max)	Sequential Write (Max)	RND4K(Q32) Read(Max)	RND4K(Q32) Write(Max)
		MB/sec	MB/sec	IOPS	IOPS
Micron B27B	128GB	1564	717	43K	65K
	256GB	2318	1221	95K	241K

-CPU：Intel I9-9900X
-DRAM：32GB DDR4
-Chipset：Intel X299
-OS：Windows 10 x64
-Test Tool：CrystalDiskMark 8.0.x
-The system conditions and test environment may affect test result;

3.3. Product Capacity

Nominal Capacity	128GB	256GB
Available capacity	119.24GB	238.47GB

NOTE：

*1,Megabyte (MB) = 1 Million bytes; 1 Gigabyte (GB) =1 Billion bytes .

*2,Available capacity may be less (due to formatting, partitioning, operating system, applications or otherwise).

3.4. Supply Voltage

Parameter	Rating
Operating Voltage	3.3V +/-5%

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3.5. Power Consumption

Flash Model	Capacity	Parameter（Unit：mW）				
		Seq. Read	Seq. Write	Random Read	Random Write	Idle
Micron B27B	128GB	2100	2512	1907	2105	425
	256GB	2823	2726	2130	2538	461

NOTES:

1. The average value of power consumption is achieved based on 100% conversion efficiency.
2. The measured power voltage is 3.3V.
3. It's measured under ambient temperature.
4. Sequential R/W and Random R/W(QD=32) are measured by IOMeter; Idle is measured while entering non-operating mode for 5 minutes.
5. Power Consumption may differ according to flash configuration and platform.

3.6. Reliability

MTBF	1,500,000 Hours

MTBF is Mean Time Between Failure. As same word, annual failure ratio is 0.4%.

3.7. Endurance

TBW	
128GB	**256GB**
65TB	125TB

Notes:

1-TBW (Terabytes Written) is a measurement of SSDs' expected lifespan, which represents the amount of data written to the device. To calculate the TBW of a SSD, the following equation is applied:

TBW = [(NAND Endurance) x (SSD Capacity)] / WAF

NAND Endurance: NAND endurance refers to the P/E (Program/Erase) cycle of a NAND flash.

SSD Capacity: The SSD capacity is the specific capacity in total of a SSD.

4-The endurance of SSD could be estimated based on user behavior, NAND endurance cycles, and write amplification factor. It is not guaranteed by flash vendor.

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4. ENVIRONMENTAL SPECIFICATIONS

- **Temperature:**
  - Storage: -40°C to 85°C
  - Operational: 0°C to 70°C
- **Humidity: RH 90% under 40°C (operational)**
- **Shock: 1500G duration 0.5ms, Half Sine Wave**

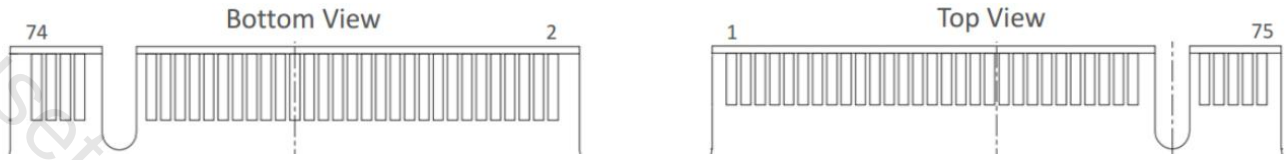
Notes:

1. Temperature specification is following JEDEC standard; Expressed temperature must be measured right on the case
2. Humidity is measured in non-condensing
3. Test condition for shock: 0.5ms duration with half sine wave

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5. ELECTRICAL SPECIFICATIONS

5.1. Connector Dimension and Pin Location



5.2. Pin Assignments and Definition

PIN #	Type	Description	PIN #	Type	Description
1	GND	Ground	2	3.3V	3.3V power
3	GND	Ground	4	3.3V	3.3V power
5	PETn3	PCIe TX,Lane3	6	NC	No Connect
7	PETp3	PCIe TX,Lane3	8	PLN#	Power loss notification
9	GND	Ground	10	LED_1#	Device Active Signal
11	PERn3	PCIe RX,Lane3	12	3.3V	3.3V power
13	PERp3	PCIe RX,Lane3	14	3.3V	3.3V power
15	GND	Ground	16	3.3V	3.3V power
17	PETn2	PCIe TX,Lane2	18	3.3V	3.3V power
19	PETp2	PCIe TX,Lane2	20	NC	No Connect
21	GND	Ground	22	VIO_1.8V	I/O source
23	PERn2	PCIe RX,Lane2	24	NC	No Connect
25	PERp2	PCIe RX,Lane2	26	NC	No Connect
27	GND	Ground	28	NC	No Connect
29	PETn1	PCIe TX,Lane1	30	PLA_S3#	Power Loss Acknowledge
31	PETp1	PCIe TX,Lane1	32	NC	No Connect
33	GND	Ground	34	NC	No Connect
35	PERn1	PCIe RX,Lane1	36	NC	No Connect
37	PERp1	PCIe RX,Lane1	38	NC	No Connect
39	GND	Ground	40	SMB_CLK	SMBus clock
41	PETn0	PCIe TX,Lane0	42	SMB_DATA	SNBus data
43	PETp0	PCIe TX,Lane0	44	ALERT#	Alert(Not used)
45	GND	Ground	46	NC	No Connect
47	PERn0	PCIe RX,Lane0	48	NC	No Connect
49	PERp0	PCIe RX,Lane0	50	PERST#	Fundamental reset

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51	GND	Ground	52	CLKREQ#	Clock Request
53	REFCLKn	Reference Clock port n	54	NC	No Connect
55	REFCLKp	Reference Clock port p	56	NC	No Connect
57	GND	Ground	58	NC	No Connect
59	NC	Mechanical Notch	60	NC	Mechanical Notch
61	NC	Mechanical Notch	62	NC	Mechanical Notch
63	NC	Mechanical Notch	64	NC	Mechanical Notch
65	NC	Mechanical Notch	66	NC	Mechanical Notch
67	NC	No Connect	68	NC	No Connect
69	PEDET	No Connect	70	3.3V	3.3V power
71	GND	Ground	72	3.3V	3.3V power
73	VIO_CFG	I/0 Voltage configuration	74	3.3V	3.3V power
75	GND	Ground			

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6. COMMAND DESCRIPTIONS AND FEATURES SET

The Admin command sets and NVM I/O command sets of PSP3I3Y10M8-128GB series are defined in compliant with NVM Express specification revision 1.4

6.1.Admin Command set

Table 6-1 Admin command

Opcode	Command Name
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
80h	Format NVM

6.2.NVM Express I/O Command set

Table 6-2 NVM I/O command

Op code	Command Name
00h	flush
01h	write
02h	read
09h	Dataset management

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6.3. Log page identifiers support

Table 6-3 Log identifier

Log identifier	Description
01h	Error information
02h	SMART/Health information
03h	Firmware Slot information

6.4. Feature Identifies Support

Table 6-4 Feature Identifier

Feature Identifier	Description
04h	Temperature threshold
07h	Number of queue
08h	Interrupt coalescing
09h	Interrupt vector configuration
0Dh	Host memory buffer

6.5. SMART/Health Information

Table 6-5 SMART Information

Bytes	Description
0	Critical warming
1:2	Composite temperature
3	Available space
4	Available space threshold
5	Percentage used
6:31	reserved
32:47	Data unit read
48:63	Data unit written
64:79	Host read commands
80:95	Host write commands
96:111	Controller busy time
112:127	Power cycles
128:143	Power on hours
144:159	Unsafe shutdowns
160:175	Media and data integrity errors
176:191	Number of error information log entries
192:195	Warning composite temperature time
196:199	Critical composite temperature time

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200:201	Temperature sensor 1
202:203	Temperature sensor 2
204:205	Temperature sensor 3
206:207	Temperature sensor 4
208:209	Temperature sensor 5
210:211	Temperature sensor 6
212:213	Temperature sensor 7
214:215	Temperature sensor 8
216:219	Thermal management temperature 1 transition count
220:223	Thermal management temperature 2 transition count
224:227	Total time for thermal management temperature 1
228:231	Total time for thermal management temperature 2
232:511	Reserved

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7. IDENTIFY COMMAND

The identity command returns the data description below.

Table 7-1 Identify Data Structure

Bytes	Default value	description
00:01	XXX	PCI Vendor ID(VID)
03:03	XXX	PCI Subsystem Vendor ID
04:23	XXX	Serial Number
24:63	XXX	Model Number
64:71	XXX	Firmware Revision
72	10h	Recommended Arbitration Burst
73:75	845D D7h	IEEE OUI Identifier
76	00h	Controller Multi-Path I/O and Namespace Sharing Capabilities
77	08h	Maximum Data Transfer Size
78:255	-	Reserved
256:257	04h	Optional Admin Command Support
258	03h	Abort Command Limit
259	03h	Asynchronous Event Request Limit
260	02h	Firmware Updates
261	02h	Log Page Attributes
262	07h	Error Log Page Entries
263	03h	Number of Power States Support
264	01h	Admin Vendor Specific Command Configuration
265:511	-	Reserved
512	66h	Submission Queue Entry Size
513	44h	Completion Queue Entry Size
514:515	-	Reserved
516:519	01h	Number of Namespaces
520:521	14h	Optional NVM Command Support
522:523	00h	Fused Operation Support
524	00h	Format NVM Attributes
525	01h	Volatile Write Cache
526:527	01h	Atomic Write Unit Normal
528:529	00h	Atomic Write Unit Power Fail
530	00h	NVM Vendor Specific Command Configuration

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531:2047	-	Reserved
2048:2079	00h	Power State 0 Descriptor
.....	-	N/A
3040：3071	00h	Power State 31 Descriptor
3072：4095	-	Reserved

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