

99 Series PCIe Gen4x4 M.2 2230 SSD Datasheet

PN:

TMS99128GP430Tx-00N0

TMS99256GP430Tx-00N0

TMS99512GP430Tx-00N0

TMS99001TP430Tx-00N0

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Key Features

Capacity

- 128GB/256GB/512GB/1TB

Form Factor

- M.2 2230

Features

- PCIe Gen 4 16Gb/s interface with up to 4 lanes
- Compliant with NVMe Revision 2.0
- Supporting host memory buffer
- Supporting initial data acceleration
- Supporting fast block acceleration
- Supporting ATA security
- Supporting SRAM ECC
- Supporting deep recovery mode for user data
- Supporting read-only mode for critical errors
- Supporting SM4(Optional)
- Supporting TCG opal(Optional)

Performance

128GB

- Read: Up to 3,000MB/s
- Write: Up to 1,500MB/s

256GB

- Read: Up to 6,600MB/s
- Write: Up to 3,300MB/s

512GB

- Read: Up to 7,000MB/s
- Write: Up to 6,400MB/s

1TB

- Read: Up to 7,000MB/s
- Write: Up to 6,400MB/s

TBW*

- 128GB: 384TB
- 256GB: 768TB
- 512GB: 1536TB
- 1TB: 3000TB

*(WAF=1)

Power Consumption

- Active read: 5,000 mW
- Active write: 5,500 mW

Temperatures

- Operating :
 - A99M3: -45°C~+85°C
 - K99M3: -25°C~+85°C
 - S99M3: -10°C~+70°C
- Non-operating : -55°C~+95°C

Shock & Vibration

- Shock: 1,500G, duration 0.5ms, Half Sine Wave
- Vibration: 10~2,000Hz, 20G

* Applicable only for cased product

MTBF

- 3,000,000 hours

UBER

- < 1 sector per 10¹⁵ bits read

Weight

- Max 5g

Certification

- Rohs/Reach/CE/FCC

Power

- L1.2: 5mW

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1 Introduction

1.1 General Description

This document describes the specifications of Industrial 99 Series M.2 2230 SSDs.

Industrial SSDs use NAND Flash Memory and provide high reliability in a small form factor. It supports the PCIe 4.0 interface standard with up to four lanes, showing a much better performance than SATA SSDs.

Industrial SSDs come in different capacities: 128GB, 256GB, 512GB, 1TB. With four lanes, their sequential performance is up to 7,000MB/s for read operation and 6,400MB/s for write operation, and their random performance is up to 1100k IOPS for read operation and 1050k IOPS for write operation. They also provide rugged features, delivering a high MTBF.

1.2 Product Line-up

Table 1-1 Product Line-up A99M3

Type	Capacity	Model	Part Number
PCIe M.2 2230 SSD	128GB	TIMAR A99M3 128GB SSD	TMS99128GP430TW-00N0
PCIe M.2 2230 SSD	256GB	TIMAR A99M3 256GB SSD	TMS99256GP430TW-00N0
PCIe M.2 2230 SSD	512GB	TIMAR A99M3 512GB SSD	TMS99512GP430TW-00N0
PCIe M.2 2230 SSD	1TB	TIMAR A99M3 1TB SSD	TMS99001TP430TW-00N0

Table 1-2 Product Line-up K99M3

Type	Capacity	Model	Part Number
PCIe M.2 2230 SSD	128GB	TIMAR K99M3 128GB SSD	TMS99128GP430TM-00N0
PCIe M.2 2230 SSD	256GB	TIMAR K99M3 256GB SSD	TMS99256GP430TM-00N0
PCIe M.2 2230 SSD	512GB	TIMAR K99M3 512GB SSD	TMS99512GP430TM-00N0
PCIe M.2 2230 SSD	1TB	TIMAR K99M3 1TB SSD	TMS99001TP430TM-00N0

Table 1-3 Product Line-up S99M3

Type	Capacity	Model	Part Number
PCIe M.2 2230 SSD	128GB	TIMAR S99M3 128GB SSD	TMS99128GP430TS-00N0
PCIe M.2 2230 SSD	256GB	TIMAR S99M3 256GB SSD	TMS99256GP430TS-00N0
PCIe M.2 2230 SSD	512GB	TIMAR S99M3 512GB SSD	TMS99512GP430TS-00N0
PCIe M.2 2230 SSD	1TB	TIMAR S99M3 1TB SSD	TMS99001TP430TS-00N0

1.3 SSD Function Block Diagram

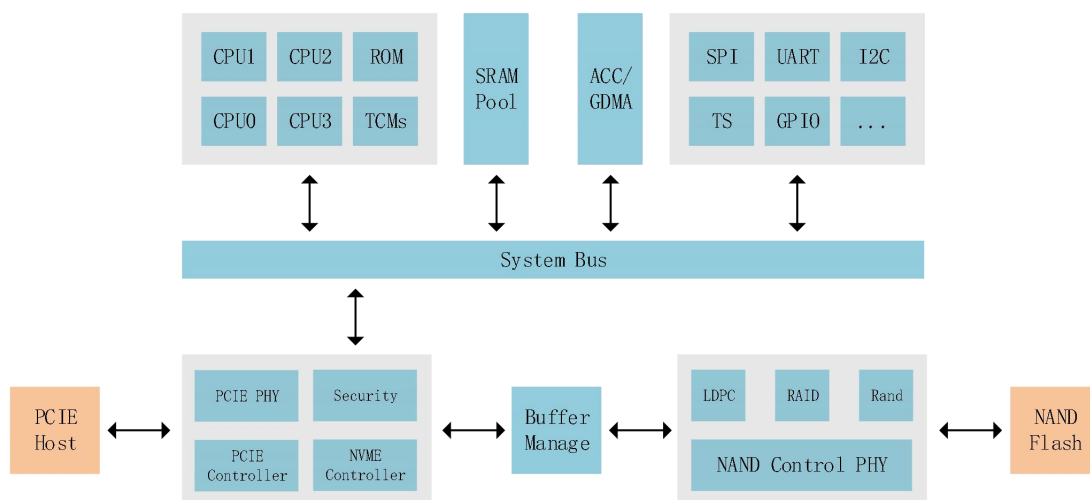


Figure 1 Function Block Diagram

2 Mechanical Specifications

Table 2 M.2 2230 SSD Physical Dimensions and Weight

Capacity	Height (mm)	Width (mm)	Length (mm)	Weight (gram)
128GB/256GB/512GB/1TB	MAX 3.6	22.00±0.15	30.00±0.15	MAX 5

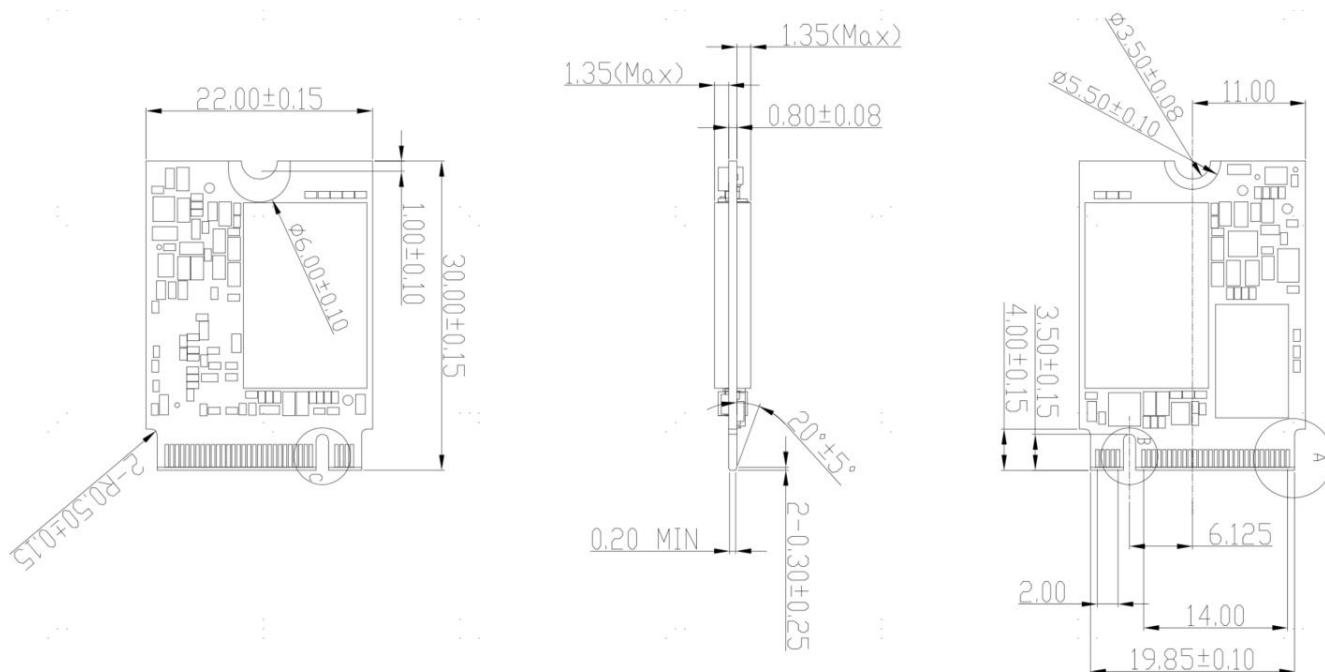


Figure 2 M.2 2230 Physical Dimension

3 Electrical Interface Specifications

3.1 Connector Pin Location

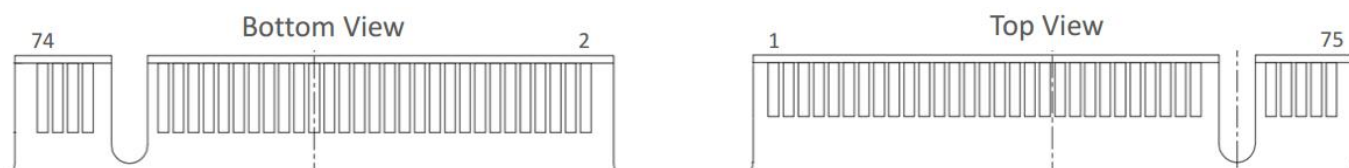


Figure 3 M.2 2230 Signal and Power pins

3.2 M.2 2230 Pin Assignments and Definition

Table 3 M.2 2230 Connector Pin Assignment

Pin #	Assignment	Description	Pin #	Assignment	Description
1	GND	Ground	2	3.3V	3.3V source
3	GND	Ground	4	3.3V	3.3V source
5	PETn3	PCIe TX based on SSD	6	N/C	N/C
7	PETp3	PCIe TX based on SSD	8	PLN#	Power Loss Notification
9	GND	Ground	10	LED_1#	Device Active Signal
11	PERn3	PCIe RX based on SSD	12	3.3V	3.3V source
13	PERp3	PCIe RX based on SSD	14	3.3V	3.3V source
15	GND	Ground	16	3.3V	3.3V source
17	PETn2	PCIe TX based on SSD	18	3.3V	3.3V source
19	PETp2	PCIe TX based on SSD	20	N/C	N/C
21	GND	Ground	22	N/C	N/C
23	PERn2	PCIe RX based on SSD	24	N/C	N/C
25	PERp2	PCIe RX based on SSD	26	N/C	N/C
27	GND	Ground	28	N/C	N/C
29	PETn1	PCIe TX based on SSD	30	PLA_S3#	Power Loss Acknowledge
31	PETp1	PCIe TX based on SSD	32	GND	Ground
33	GND	Ground	34	N/C	N/C
35	PERn1	PCIe RX based on SSD	36	N/C	N/C
37	PERp1	PCIe RX based on SSD	38	GND	Ground
39	GND	Ground	40	SMB_CLK	SMBus Clock
41	PETn0	PCIe TX based on SSD	42	SMB_DATA	SMBus Data
43	PETp0	PCIe TX based on SSD	44	ALERT#	SMBus Alert
45	GND	Ground	46	N/C	N/C
47	PERn0	PCIe RX based on SSD	48	N/C	N/C
49	PERp0	PCIe RX based on SSD	50	PERST#	PCIe Reset
51	GND	Ground	52	CLKREQ#	PCIe Device Clock Request
53	REFCLKN	PCIe Reference Clock	54	N/C	N/C
55	REFCLKP	PCIe Reference Clock	56	N/C	N/C

Pin #	Assignment	Description	Pin #	Assignment	Description
57	GND	Ground	58	N/C	N/C
59	N/C	Mechanical Notch	60	N/C	Mechanical Notch
61	N/C	Mechanical Notch	62	N/C	Mechanical Notch
63	N/C	Mechanical Notch	64	N/C	Mechanical Notch
65	N/C	Mechanical Notch	66	N/C	Mechanical Notch
67	N/C	N/C	68	N/C	N/C
69	N/C	N/C	70	3.3V	3.3V source
71	GND	Ground	72	3.3V	3.3V source
73	VIO_CFG	N/C	74	3.3V	3.3V source
75	GND	Ground			

Table 4 Simple Indicator Protocol for SSD LED States (Optional)

ASPM		LED Status
Active State (Host sends CMD to SSD)		Blinking
Idle	Low Power standby	Off
Deep Sleep	Deep Sleep Power savings	Off

Note: ASPM (Active State Power Management)

4 Contact information

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Revision History

Version	Date	Changes
1.0	2025.02	Initial release
1.1	2025.10.20	Update vibration & shock testing methods and standards