GemDisk



Design · Manufacturing · Offices

GemDisk Headquarters
Chip design, firmware & marketing
Shenzhen Bao'an, Guangdong, China

Shenzhen Pingshan Plant
Module manufacturing & testing
Shenzhen Pingshan, Guangdong, China

Industrial SSD

Five form factors, and one of them fits your board: M.2 PCIe NVMe, M.2 SATA (NGFF), mSATA (MO-300) and 2.5″ SATA, from 32 GB to 4 TB — designed and manufactured in our own plant in Pingshan, Shenzhen.

2015	10,000㎡	1,000,000	0.03%
Founded	Factory Area	SSD Produced Monthly	Defect Rate

www.gemdisk.com

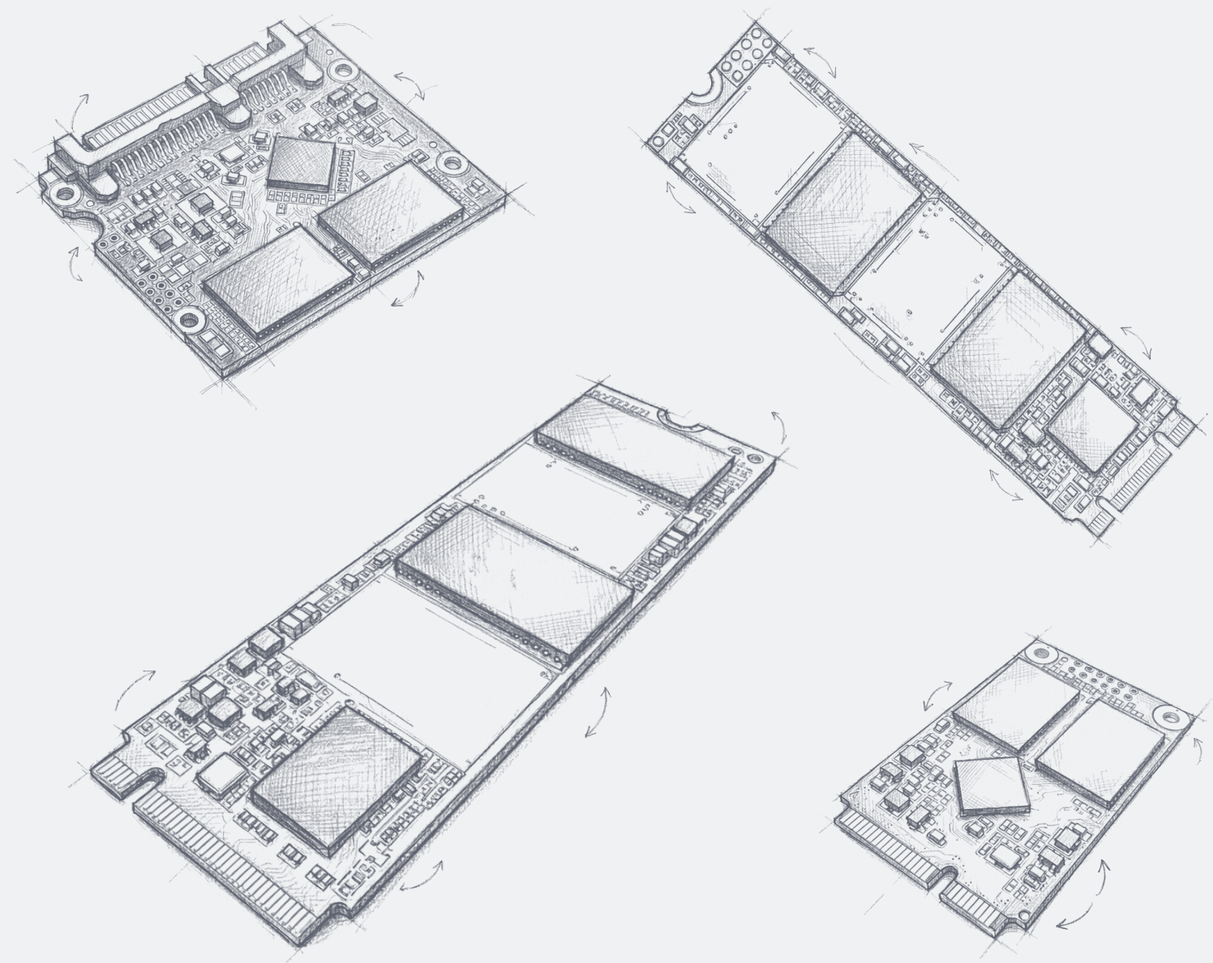
GemDisk

Focus on Industrial SSD
Since 2015

Version 2026

SSD PRODUCTS MANUAL

M.2 NVMe PCIe 4.0 / 3.0 · M.2 SATA · mSATA · 2.5″ SATA





About Us

GemDisk is a professional **AI storage solution provider** founded in 2015, headquartered in Shenzhen Bao'an, China. As a **National High-Tech Enterprise**, we focus on the storage-chip field with full-process capabilities covering chip design, firmware development, packaging & testing, module manufacturing and product application.

From the day of our establishment, we have been devoted to providing reliable and cost-effective storage solutions for industrial and embedded customers around the world.

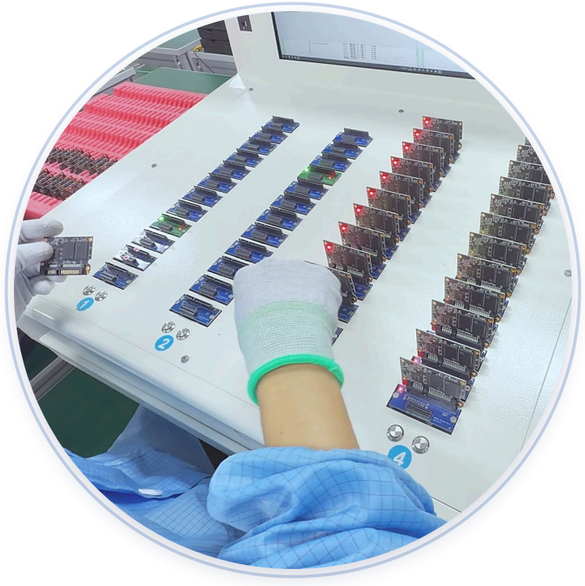
Our production floor covers more than **10,000 m²**, and our core testing platforms are developed in-house. We provide one-stop services from wafer testing, chip packaging and finished-product manufacturing to test verification and product integration.

We always put quality in the most important position. Incoming materials are screened under strict standards through a series of strict procedures — incoming inspection, production process control, product testing and quality risk control — to make sure every drive we ship is one we would use ourselves.

We are committed to high-quality, cost-effective products, constantly improving our pre-sale, in-sale and after-sales service, and creating lasting value for our customers.



Professional Services OEM & ODM



01 OEM Project-Based Custom Manufacturing

Deep customisation and production built to the customer's technical specifications — customer-led specs with support for designated controllers, Flash and firmware strategies, strict testing and quality control. Ideal for long-term programme co-operation.

02 ODM Market-Proven Solution Delivery

Based on mature SSD platforms for fast time-to-market: proven controller and Flash combinations already validated for stability and compatibility, supporting brand customisation and parameter-level configuration.

End-to-End Quality Control System From Incoming Materials to Final Shipment

IQC Incoming Inspection
SPI Solder-Paste Inspection
Online AOI
SMI First Article
IPQC Patrol Inspection
Offline AOI
X-RAY Solder Inspection
Compatibility Testing
QC Final Inspection

Document Review

The customer's BOM is reviewed as a key step: specifications, reference designators and process consistency are checked so data is 100% accurate before production starts.

Material Source Assurance

Clear, reliable material sourcing and specification information give customers full visibility of where materials come from and of their quality.

Risk Interception

Concise material codes defined by engineering make traceability easy and streamline later supply-chain and warehouse management.

Engineering Changes

Professional response always comes first: we actively support customers' R&D needs and respond to engineering changes quickly.

SERIES OVERVIEW

Five series. One of them fits your board.

Which drive fits is decided by the socket on the board, not by the drive. Two M.2 sockets that look identical may be wired to different channels — one carries PCIe, one carries SATA — and the wrong drive does not appear in the BIOS at all. This page is the ten-second version; each series has its own page with the full specification.

	 **M.2 PCIe NVMe 3.0** 2280 · 2242	 **M.2 PCIe NVMe 4.0** 2280	 **M.2 SATA (NGFF)** 2242 · 2280	 **mSATA (MO-300)** 50.8 × 29.85 mm	 **2.5″ SATA III** 100 × 69.85 × 7 mm
FORM FACTOR & INTERFACE					
Form Factor	M.2 2280 (2242 · 2260 to order)	M.2 2280 (2230 · 2242 · 2260 to order)	M.2 2242 / 2260 / 2280	mSATA MO-300	2.5″ · 7 mm
Interface Type	NVMe · PCIe Gen3 x4	NVMe · PCIe Gen4 x4	M.2 SATA · 6.0 Gb/s	mSATA · 6.0 Gb/s	SATA III · 6.0 Gb/s
Transport Protocol	PCIe · NVMe 1.3 / 1.4	PCIe · NVMe 1.4	AHCI	AHCI	AHCI
PERFORMANCE					
Max Seq. Read / Write	**3,100 / 3,000** MB/s	**5,200 / 4,600** MB/s	**550 / 500** MB/s	**550 / 510** MB/s	**556 / 508** MB/s
4KB Random R/W (IOPS)	113,343 / 76,113	183,522 / 164,128	55,681 / 72,943	40,627 / 68,930	61,783 / 70,804
CAPACITY & MEMORY					
Capacity Range	128 GB – 4 TB	512 GB – 4 TB	32 GB – 2 TB	32 GB – 2 TB	128 GB – 4 TB
NAND Flash Type	TLC / QLC	TLC / QLC	TLC / QLC	TLC / QLC	TLC / QLC
Cache	None	Built-in	None	None	None
Flash Brand	Intel · Micron · SAMSUNG · SK Hynix · SanDisk · Kioxia · YMTC				
Controller	Maxio (MAP) · SMI (SM) · Yeestor (YS) · Realtek (RN) etc				
ELECTRICAL & ENVIRONMENTAL					
Operating Voltage	3.3 V	3.3 V	3.3 V	3.3 V	5 V
Operating Temperature	0 – 70 °C	0 – 70 °C	0 – 70 °C	0–70 °C · wide-temp avail.	0–70 °C · wide-temp avail.
Net Weight	7 g	7 g	6 g	6 g	40 g
RELIABILITY & COMPLIANCE					
MTBF	>1,500,000 h	>1,500,000 h	1,000,000 h	1,000,000 h	1,000,000 h
Certification	CE · FCC · RoHS · KC — all series				
Warranty	3 years — all series				
OEM / ODM	Yes — label, shell, packaging, artwork, PCB and firmware				
WHERE EACH SERIES EARNS ITS PLACE					
Best fit for	Industrial motherboards, edge controllers and AI boxes. The default tier: fast enough for almost everything, and the one that gets re-ordered for years.	AI inference, video analytics and high-concurrency gateways — where the workload is genuinely throughput-bound. A POS terminal will not feel the difference.	Boards whose M.2 socket is wired to SATA — industrial control, POS, thin clients, kiosks. B&M key fits both socket types.	Equipment built years ago that is still in service — POS, networking, industrial. The customer is buying availability, not speed.	NVR and recording, and straight replacement of a 2.5″ hard drive. Same bay, same cables, lowest unit cost.

Sequential figures are the published maximum across each series' capacity range; per-capacity values are on each series page. Speed measurement is for reference only and differs with the test platform. Industrial wide-temperature (−40 to +85 °C) builds are available on request.

SERIES 5 OF 5

2.5″ SATA

The highest-compatibility, lowest-unit-cost form factor we build. It drops into the same bay and the same two cables as the 2.5″ hard drive it replaces.



> Capped by the SATA interface at ~550 MB/s whoever makes it. Where the machine has a PCIe M.2 slot and the workload is throughput-bound, the NVMe series is the honest answer.

2.5 inch
Form Factor

SATA III
Interface

up to 556 MB/s
Sequential Read

128 GB – 4 TB
Capacity Range

Model Name and EAN are issued with the quotation

CAPACITY & PERFORMANCE

	128GB	256GB	512GB	1TB	2TB	4TB
Min Seq. Read / Write (MB/s)	500/360	500/400	540/430	530/500	530/500	535/506
Max Seq. Read / Write (MB/s)	500/470	505/500	550/510	540/500	550/500	556/508

SPECIFICATIONS

GENERAL	
Product Series	2.5″ SATA SSD Series
Interface Type	SATA III (6.0 Gb/s)
Transport Protocol	AHCI
Form Factor	2.5 inch · 100 × 69.85 × 7 mm
Brand	GemDisk
Origin	CN (Origin)
Internal/External	Internal
Cache	None
Nand Flash Type	TLC / QLC
Flash Brand	Intel / Micron / SAMSUNG / SK Hynix / SanDisk / Kioxia / YMTC
Controller	SMI / Yeestor / Realtek / Maxio etc
RGB	No
Temperature Alert	No
OEM/ODM	Yes
Capacity Range	128GB – 4TB
PHYSICAL & ELECTRICAL	
Item Dimension	100 × 69.85 × 7 mm
Net Weight	40g
Gross Weight	65g
Operating Voltage	5V
Operating Temperature	0–70 °C standard · −40 to +85 °C wide-temperature build available
Storage Temperature	−40 to +85 °C
PERFORMANCE	
4KB Random Read	61783
4KB Random Write	70804
RELIABILITY & COMPLIANCE	
MTBF	1000000h
Factory testing	100% burn-in and environmental testing
Certificate	CE, FCC, RoHS, KC
Warranty	3 Years
APPLICATION	
Application	PC / NB / Server / All-in-one PC etc.
Compatible Systems	Windows · Unix · Linux · Mac

Speed measurement is for reference only, and differs with the test platform and computer configuration. Sequential figures are capacity-dependent; Model Name and EAN are issued with the quotation.

SERIES 2 OF 5

M.2 PCIe NVMe 4.0

The highest-throughput tier. Its bandwidth is real only where the workload is throughput-bound — AI model loading, video analytics, high-concurrency gateways.



> The board, CPU and slot must all support PCIe 4.0 to reach Gen 4 speed. Many industrial boards stop at Gen 3.

M.2 2280
Form Factor

PCIe Gen4 x4
Interface

up to 5,200 MB/s
Sequential Read

512 GB – 4 TB
Capacity Range

Model Name and EAN are issued with the quotation

CAPACITY & PERFORMANCE

	512GB	1TB	2TB	4TB
Min Seq. Read / Write (MB/s)	5000/2450	5000/4000	5000/4000	5000/4100
Max Seq. Read / Write (MB/s)	5000/2450	5050/4600	5050/4600	5200/4600

SPECIFICATIONS

GENERAL	
Product Series	M.2 PCIe NVMe 4.0 SSD Series
Interface Type	NVMe (PCIe Gen4 x4)
Transport Protocol	PCIe
Form Factor	M.2 2280 · 2230, 2242 and 2260 available to order
Brand	GemDisk
Origin	CN (Origin)
Internal/External	Internal
Cache	built-in
Nand Flash Type	TLC / QLC
Flash Brand	Intel / Micron / SAMSUNG / SK Hynix / SanDisk / Kioxia / YMTC
Controller	SMI / Yeestor / Realtek / Maxio etc
RGB	No
Temperature Alert	No
OEM/ODM	Yes
Capacity Range	512GB – 4TB
PHYSICAL & ELECTRICAL	
Item Dimension	22 × 80 × 3 mm
Net Weight	7g
Gross Weight	30g / 25g
Operating Voltage	3.3V
Operating Temperature	0–70 °C
Storage Temperature	−40 to +75 °C
PERFORMANCE	
4KB Random Read	183522
4KB Random Write	164128
RELIABILITY & COMPLIANCE	
MTBF	1500000h
Factory testing	100% burn-in and environmental testing, including 0–70 °C and −20 to +75 °C cycles
Certificate	CE, FCC, RoHS, KC
Warranty	3 Years
APPLICATION	
Application	PC / NB / Server / All-in-one PC etc.
Compatible Systems	Windows · Unix · Linux · Mac

Speed measurement is for reference only, and differs with the test platform and computer configuration. Sequential figures are capacity-dependent; Model Name and EAN are issued with the quotation.

SERIES 1 OF 5

M.2 PCIe NVMe 3.0 — 2280

The mainstream NVMe tier for industrial motherboards, edge controllers and AI boxes. Designed into new machines, supplied for the long run.



An M.2 socket wired to PCIe. In a Gen 4 slot it runs at Gen 3 speed — it will not be damaged, it just will not go faster.

M.2 2280
Form Factor

PCIe Gen3 x4
Interface

up to 3,100 MB/s
Sequential Read

128 GB – 4 TB
Capacity Range

Model Name and EAN are issued with the quotation

CAPACITY & PERFORMANCE

	128GB	256GB	512GB	1TB	2TB	4TB
Min Seq. Read / Write (MB/s)	1500/600	1650/1100	2000/1300	2100/1600	2300/1600	2300/1600
Max Seq. Read / Write (MB/s)	2170/650	2400/1100	2450/1750	2350/1800	3100/3000	3100/3000

SPECIFICATIONS

GENERAL	
Product Series	M.2 PCIe NVMe 3.0 SSD Series
Interface Type	NVMe (PCIe Gen3 x4)
Transport Protocol	PCIe
Form Factor	M.2 2280 · 2242 and 2260 available to order
Brand	GemDisk
Origin	CN (Origin)
Internal/External	Internal
Cache	None
Nand Flash Type	TLC / QLC
Flash Brand	Intel / Micron / SAMSUNG / SK Hynix / SanDisk / Kioxia / YMTC
Controller	SMI / Yeestor / Realtek / Maxio etc
RGB	No
Temperature Alert	No
OEM/ODM	Yes
Capacity Range	128GB – 4TB
PHYSICAL & ELECTRICAL	
Item Dimension	22 × 80 × 3 mm
Net Weight	7g
Gross Weight	30g / 25g
Operating Voltage	3.3V
Operating Temperature	0–70 °C
Storage Temperature	−40 to +75 °C
PERFORMANCE	
4KB Random Read	113343
4KB Random Write	76113
RELIABILITY & COMPLIANCE	
MTBF	1500000h
Factory testing	100% burn-in and environmental testing
Certificate	CE, FCC, RoHS, KC
Warranty	3 Years
APPLICATION	
Application	PC / NB / Server / All-in-one PC etc.
Compatible Systems	Windows · Unix · Linux · Mac

Speed measurement is for reference only, and differs with the test platform and computer configuration. Sequential figures are capacity-dependent; Model Name and EAN are issued with the quotation.

SERIES 1 OF 5 · 2242

M.2 PCIe NVMe 3.0 — 2242

The mainstream NVMe tier for industrial motherboards, edge controllers and AI boxes. The half-size M.2 for compact industrial boards, gateways and embedded systems.



An M.2 socket wired to PCIe. In a Gen 4 slot it runs at Gen 3 speed — it will not be damaged, it just will not go faster.

M.2 2242
Form Factor

PCIe Gen3 x4
Interface

up to 3,100 MB/s
Sequential Read

128 GB – 4 TB
Capacity Range

Model Name and EAN are issued with the quotation

CAPACITY & PERFORMANCE

	128GB	256GB	512GB	1TB	2TB	4TB
Min Seq. Read / Write (MB/s)	1500/600	1650/1100	2000/1300	2100/1600	2300/1600	2300/1600
Max Seq. Read / Write (MB/s)	2170/650	2400/1100	2450/1750	2350/1800	3100/3000	3100/3000

SPECIFICATIONS

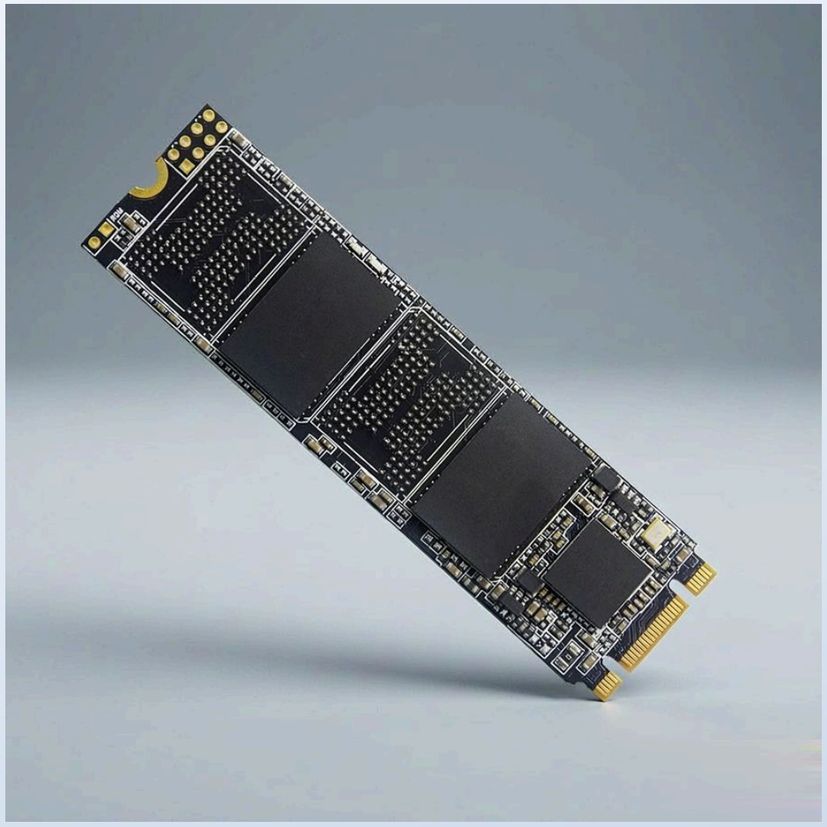
GENERAL	
Product Series	M.2 PCIe NVMe 3.0 SSD Series
Interface Type	NVMe (PCIe Gen3 x4)
Transport Protocol	PCIe
Form Factor	M.2 2242 · 2260 and 2280 available to order
Brand	GemDisk
Origin	CN (Origin)
Internal/External	Internal
Cache	None
Nand Flash Type	TLC / QLC
Flash Brand	Intel / Micron / SAMSUNG / SK Hynix / SanDisk / Kioxia / YMTC
Controller	SMI / Yeestor / Realtek / Maxio etc
RGB	No
Temperature Alert	No
OEM/ODM	Yes
Capacity Range	128GB – 4TB
PHYSICAL & ELECTRICAL	
Item Dimension	22 × 42 × 3 mm
Net Weight	6.8g
Gross Weight	26g / 20g
Operating Voltage	3.3V
Operating Temperature	0–70 °C
Storage Temperature	−40 to +75 °C
PERFORMANCE	
4KB Random Read	113343
4KB Random Write	76113
RELIABILITY & COMPLIANCE	
MTBF	1500000h
Factory testing	100% burn-in and environmental testing
Certificate	CE, FCC, RoHS, KC
Warranty	3 Years
APPLICATION	
Application	PC / NB / Server / All-in-one PC etc.
Compatible Systems	Windows · Unix · Linux · Mac

Speed measurement is for reference only, and differs with the test platform and computer configuration. Sequential figures are capacity-dependent; Model Name and EAN are issued with the quotation.

SERIES 3 OF 5

M.2 SATA (NGFF) — 2280

A compatibility series, not a performance series. It exists because a large installed base of industrial boards, thin clients and all-in-one PCs only has a SATA-channel M.2 slot.



B&M key — fits both B-key and M-key sockets. An M.2 socket wired to SATA does not recognise an NVMe drive at all.

M.2 2280
Form Factor

SATA 6.0 Gb/s
Interface

up to 550 MB/s
Sequential Read

32 GB – 2 TB
Capacity Range

Model Name and EAN are issued with the quotation

CAPACITY & PERFORMANCE

	32GB	64GB	128GB	256GB	512GB	1TB	2TB
Min Seq. Read / Write (MB/s)	248/166	475/305	500/360	500/390	500/390	510/450	510/450
Max Seq. Read / Write (MB/s)	248/166	475/305	520/450	520/460	520/460	520/500	550/500

SPECIFICATIONS

GENERAL	
Product Series	M.2 SATA NGFF 2242 / 2260 / 2280 SSD Series
Interface Type	M.2 SATA (6.0 Gb/s)
Transport Protocol	AHCI
Form Factor	M.2 2280 (22 mm wide)
Brand	GemDisk
Origin	CN (Origin)
Internal/External	Internal
Cache	None
Nand Flash Type	TLC / QLC
Flash Brand	Intel / Micron / SAMSUNG / SK Hynix / SanDisk / Kioxia / YMTC
Controller	SMI / Yeestor / Realtek / Maxio etc
RGB	No
Temperature Alert	No
OEM/ODM	Yes
Capacity Range	32GB – 2TB
PHYSICAL & ELECTRICAL	
Item Dimension	22 × 80 × 3 mm (2280)
Net Weight	6g
Gross Weight	26g / 20g
Operating Voltage	3.3V
Operating Temperature	0–70 °C
Storage Temperature	−40 to +75 °C
PERFORMANCE	
4KB Random Read	55681
4KB Random Write	72943
RELIABILITY & COMPLIANCE	
MTBF	1000000h
Factory testing	100% burn-in and environmental testing
Certificate	CE, FCC, RoHS, KC
Warranty	3 Years
APPLICATION	
Application	PC / NB / Server / All-in-one PC etc.
Compatible Systems	Windows · Unix · Linux · Mac

Speed measurement is for reference only, and differs with the test platform and computer configuration. Sequential figures are capacity-dependent; Model Name and EAN are issued with the quotation.

SERIES 3 OF 5 · 2242

M.2 SATA (NGFF) — 2242

A compatibility series, not a performance series. The half-size M.2 SATA drops into legacy M.2 SATA-only slots on industrial boards with no rework.



B&M key — fits both B-key and M-key sockets. An M.2 socket wired to SATA does not recognise an NVMe drive at all.

M.2 2242
Form Factor

SATA 6.0 Gb/s
Interface

up to 550 MB/s
Sequential Read

32 GB – 2 TB
Capacity Range

Model Name and EAN are issued with the quotation

CAPACITY & PERFORMANCE

	32GB	64GB	128GB	256GB	512GB	1TB	2TB
Min Seq. Read / Write (MB/s)	248/166	475/305	500/360	500/390	500/390	510/450	510/450
Max Seq. Read / Write (MB/s)	248/166	475/305	520/450	520/460	520/460	520/500	550/500

SPECIFICATIONS

GENERAL	
Product Series	M.2 SATA NGFF 2242 / 2260 / 2280 SSD Series
Interface Type	M.2 SATA (6.0 Gb/s)
Transport Protocol	AHCI
Form Factor	M.2 2242 (22 mm wide)
Brand	GemDisk
Origin	CN (Origin)
Internal/External	Internal
Cache	None
Nand Flash Type	TLC / QLC
Flash Brand	Intel / Micron / SAMSUNG / SK Hynix / SanDisk / Kioxia / YMTC
Controller	SMI / Yeestor / Realtek / Maxio etc
RGB	No
Temperature Alert	No
OEM/ODM	Yes
Capacity Range	32GB – 2TB
PHYSICAL & ELECTRICAL	
Item Dimension	22 × 42 × 3 mm (2242)
Net Weight	6g
Gross Weight	26g / 20g
Operating Voltage	3.3V
Operating Temperature	0–70 °C
Storage Temperature	−40 to +75 °C
PERFORMANCE	
4KB Random Read	55681
4KB Random Write	72943
RELIABILITY & COMPLIANCE	
MTBF	1000000h
Factory testing	100% burn-in and environmental testing
Certificate	CE, FCC, RoHS, KC
Warranty	3 Years
APPLICATION	
Application	PC / NB / Server / All-in-one PC etc.
Compatible Systems	Windows · Unix · Linux · Mac

Speed measurement is for reference only, and differs with the test platform and computer configuration. Sequential figures are capacity-dependent; Model Name and EAN are issued with the quotation.

SERIES 4 OF 5

mSATA (MO-300)

The maintenance market. These drives ship into equipment built years ago that is still in service — the customer is not buying speed, they are buying availability.



mSATA and mini-PCIe share a very similar connector and are not interchangeable — mSATA carries SATA, not PCIe.

mSATA · MO-300
Form Factor

50.8 × 29.85 mm
Item Dimension

up to 550 MB/s
Sequential Read

32 GB – 2 TB
Capacity Range

Model Name and EAN are issued with the quotation

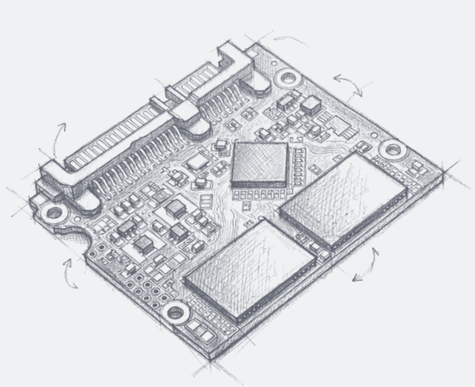
CAPACITY & PERFORMANCE

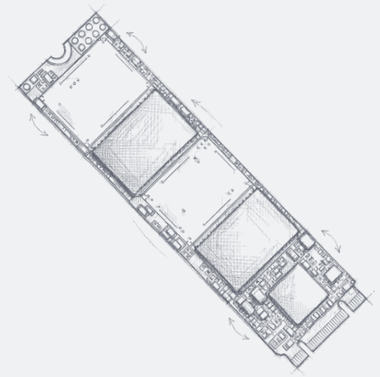
	32GB	64GB	128GB	256GB	512GB	1TB	2TB
Min Seq. Read / Write (MB/s)	282/72	290/224	500/360	500/400	500/400	500/420	510/450
Max Seq. Read / Write (MB/s)	282/72	290/224	510/480	520/490	520/500	550/510	550/500

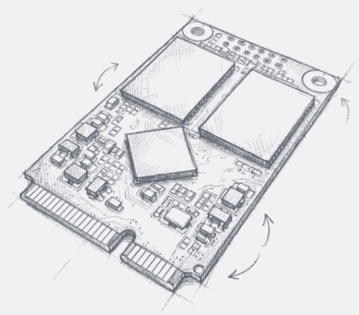
SPECIFICATIONS

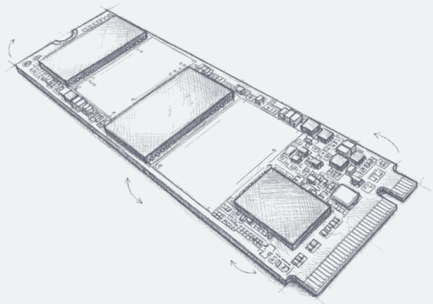
GENERAL	
Product Series	mSATA SSD (MO-300) Series
Interface Type	mSATA (6.0 Gb/s)
Transport Protocol	AHCI
Form Factor	mSATA · MO-300 · 50.8 × 29.85 mm
Brand	GemDisk
Origin	CN (Origin)
Internal/External	Internal
Cache	None
Nand Flash Type	TLC / QLC
Flash Brand	Intel / Micron / SAMSUNG / SK Hynix / SanDisk / Kioxia / YMTC
Controller	SMI / Yeestor / Realtek / Maxio etc
RGB	No
Temperature Alert	No
OEM/ODM	Yes
Capacity Range	32GB – 2TB
PHYSICAL & ELECTRICAL	
Item Dimension	50.8 × 29.85 × 3 mm
Net Weight	6g
Gross Weight	30g / 21g
Operating Voltage	3.3V
Operating Temperature	0–70 °C standard · −40 to +85 °C wide-temperature build available
Storage Temperature	−40 to +85 °C
PERFORMANCE	
4KB Random Read	40627
4KB Random Write	68930
RELIABILITY & COMPLIANCE	
MTBF	1000000h
Factory testing	100% burn-in and environmental testing
Certificate	CE, FCC, RoHS, KC
Warranty	3 Years
APPLICATION	
Application	PC / NB / Server / All-in-one PC etc.
Compatible Systems	Windows · Unix · Linux · Mac

Speed measurement is for reference only, and differs with the test platform and computer configuration. Sequential figures are capacity-dependent; Model Name and EAN are issued with the quotation.









GemDisk | Focus on Industrial SSD · Since 2015

Contact GemDisk

Tell us what you are sourcing — form factor, capacity and quantity are enough to start. We reply within 24 hours, and we will tell you plainly if we are not the right supplier for the part.

FASTEST RESPONSE
WhatsApp
+86 158 8954 3924
+86 181 2609 0191
Send a photo of the board or the drive you are replacing.

DETAILED ENQUIRIES
Email
sales@gemdisk.com
Best for specifications, drawings and quotations.

URGENT MATTERS
Phone
+86 158 8954 3924
Monday to Saturday, Shenzhen time.

ASIAN CUSTOMERS
WeChat
+86 158 8954 3924
Search this number in WeChat to add us. Same number as WhatsApp.

WHAT TO SEND US

· Host board / machine model
· Form factor & capacity required
· Annual volume & target price
· Special firmware or temperature needs

MANUFACTURING & OFFICES

Design & HQ — Shenzhen Bao'an
Production — Shenzhen Pingshan

OEM · ODM

We build industrial SSDs in our factory that carry our customers' names — on the box, on the casing and on the label. Inside, the controller and the flash are the suppliers' own parts. Everything else is yours to set: give us a target price and we will match the controller and the NAND to it, or give us a specification and we will quote the build.

WEBSITE

www.gemdisk.com

Datasheets, ordering information and product updates.

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