M.2 SATA 3D eNAND Flash Disk

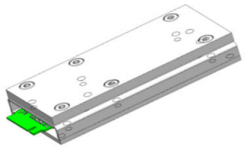
Photon Series · SATA3 · Industrial & Commercial · 120 GB to 2 TB · Rev 2026 V14.0

QUICK REFERENCE

Interface: SATA 1/2/3 · Protocol SATA 3.2
Capacity: M.2-2280: 120 GB – 1920 GB · M.2-2242: 125 GB – 2 TB
Read: Up to 560 MB/s · Write: Up to 515 MB/s
IOPS: M.2-2280 80K R / 81K W · M.2-2242 75K R / 75K W
Temperature: Commercial 0°C to +70°C · Industrial -40°C to +85°C · Extended -40°C to +95°C
Shock: 40 GRMS / 11ms
MTBF: 2,000,000 hours
OS: Windows · Linux · VxWorks® — no special drivers

560 MB/s	515 MB/s	1,500 G	2,000,000 hrs	2 TB
Max Sequential Read	Max Sequential Write	Shock (Op & Non-Op)	MTBF	Max Capacity (M.2-2242)

PRODUCT IMAGES — Photos for Reference Only



AS M.2 Conduction-Cooled Rugged Module

M.2-2280 & M.2-2242 SATA

Photon Series M.2-2242 SATA Module

PRODUCT OVERVIEW

The ASINE Photon Series M.2 SSD delivers 3D eNAND TLC flash storage via the universal SATA3 interface across M.2-2242 and M.2-2280 form factors. Designed from the ground up for mission-critical applications — defense, aerospace, industrial, airborne and embedded systems — it combines industrial temperature tolerance, 1,500G shock resistance, AES hardware encryption, and power loss protection in a proven, no-special-driver platform compatible with Windows, Linux and VxWorks®.

PERFORMANCE SPECIFICATIONS

Parameter	Specification	Notes
Sequential Read	Up to 560 MB/s sustained	SATA3; capacity & FS dependent
Sequential Write	Up to 515 MB/s sustained	Capacity & file system dependent
Random Read (4KB)	M.2-2280: 80K IOPS · M.2-2242: 75K IOPS	4KB block size
Random Write (4KB)	M.2-2280: 81K IOPS · M.2-2242: 75K IOPS	4KB block size
Interface Protocol	SATA 1/2/3, Protocol SATA 3.2	Universal platform compatibility
OS Support	Windows · Linux · VxWorks® · SATA native	No special drivers required

CAPACITY, FLASH GRADE & ENDURANCE — TBW per JESD218, 4KB random write

Configuration	Capacity	TBW	DWPD / 3yr	Notes
M.2-2280 (S7; T2)	2 TB	680 TBW	0.9 DWPD	Standard high-endurance grade
M.2-2242 (S6; T9)	2 TB	4,000 TBW	**1.5 DWPD**	128K sustained write
Enterprise (option V9) - M.2-2242	500 GB	10,000 TBW	**15 DWPD**	128K sustained write

ENVIRONMENTAL & MECHANICAL

Parameter	Specification
Operating Temp	Commercial (C) 0°C to +70°C · Industrial (Z) -40°C to +85°C · Extended (E) -40°C to +95°C
Storage Temp	-50°C to +95°C
Humidity	5% to 95% RH, non-condensing
Shock (Operating)	40 GRMS / 11ms
Vibration (Operating)	16.3 GRMS (10-2,000 Hz)
Vibration (Non-Op)	>16.3 GRMS (10-2,000 Hz)
Conformal Coating	Available MIL-grade · option -xyF
Conduction Cooling	Available — M.2-2280; M.2-2242 · options: xD0 / -xDF / -x63 single side conduction cooled, coated

RELIABILITY & POWER

Parameter	Specification
MTBF	2,000,000 hours
Error Correction	EDC/ECC LDPC — 64-bit BCH algorithm
Wear Leveling	Dynamic & Static wear-leveling algorithm
Self-Test	Built-in power-up self-test; automatic self-diagnostics
Power Protection (PLP/SPOR)	M.2-2280 · M.2-2242
Power — Idle	1.1 W
Power — Active (M.2-2280/2242)	2TB eNAND: 3.5W (2280) · 4.2W (2242) · pSLC 500GB 3.9W (2242)
Heat Management	Heat dissipation balancing for demanding applications

SECURITY FEATURES

Feature	Specification
Encryption	Crypto · AES hardware encryption · TCG OPAL (M.2-2280 S7;T2)
Secure Erase	Crypto Erase · ATA8 security feature set · Fast Sanitize Erase · H/W Trigger Fast Erase M.2-2242
Write Protect	Hardware write-protect M.2-2242 supported
Standards	FIPS-compliant · TCG OPAL (M.2-2280) · ATA Secure Erase

PHYSICAL DIMENSIONS

Form Factor	Dimensions (L × W × H mm)	Weight / Notes
M.2-2280	80 × 22 × 3.8 mm	~8 g
M.2-2242	42 × 22 × 3.8 mm	~6 g · M.2 type D5-BM
M.2-2280 Conduction Cooled	80 × 36.5 × 12.6 mm with H.S. · W/O H.S. 80 × 36.5 × 8.6 mm	~73 g with H.S. · ~46 g W/O H.S. · Consult factory
M.2-2242 Conduction Cooled	42 × 36.5 × 12.6 mm with H.S. · W/O H.S. 42 × 36.5 × 8.6 mm	~39 g with H.S. · ~25 g W/O H.S. · Consult factory

H.S.=Heat Sink

ORDERING — M.2-2242 · P/N: AS[C/Z]S6M24-[cccc]NAET9[-xyz]

Part Number	Description
ASZS6M24-1000NAHT900F	M.2-2242 D5-BM · eNAND 1 TB · SATA3 · Industrial temp. · AES MIL Coated · H/W Trigger SE · Optional WP
ASZS6M24-2000NAHT900F	M.2-2242 D5-BM · eNAND 2 TB · SATA3 · Industrial temp. · AES · MIL Coated · H/W Trigger SE · Optional WP
ASZS6M24-2000NAHT900F	M.2-2242 D5-BM · eNAND 2 TB · SATA3 · Industrial temp. · AES · MIL Coated · H/W Trigger SE · Optional WP
ASZS6M24-0250NAHV90DF	M.2-2242 D5-BM · pSLC 250 GB · SATA3 · Industrial temp. · AES · MIL Coated · H/W Trigger SE · Cond. Cool · Optional WP
ASZS6M24-0125NAHV900F	M.2-2242 D5-BM · pSLC 125 GB · SATA3 · Industrial temp. · AES · MIL Coated · H/W Trigger SE · Optional WP & Cond. Cool
ASZS6M24-0250NAHV900F	M.2-2242 D5-BM · pSLC 250 GB · SATA3 · Industrial temp. · AES · MIL Coated · H/W Trigger SE · Optional WP
ASZS6M24-0500NAHV900F	M.2-2242 D5-BM · pSLC 500 GB · SATA3 · Industrial temp. · AES · MIL Coated · H/W Trigger SE · Optional WP & Cond. Cool

Options: Industrial temp (Z>C) · Conformal Coated (-00F) · Enterprise ENAND (T>V, up to 500 GB)

ORDERING — M.2-2280 · P/N: AS[C/Z]S7M28-[cccc]NAET2[xyz]

Part Number	Description
ASZS7M28-0120NOET200F	M.2-2280 D5-BM · eNAND 120 GB · SATA3 · Industrial temp. · OPAL · MIL Coated
ASZS7M28-0240NAET200F	M.2-2280 D5-BM · eNAND 240 GB · SATA3 · Industrial temp. · OPAL · MIL Coated
ASZS7M28-0480NAET200F	M.2-2280 D5-BM · eNAND 480 GB · SATA3 · Industrial temp. · OPAL · MIL Coated
ASZS7M28-0960NAET200F	M.2-2280 D5-BM · eNAND 960 GB · SATA3 · Industrial temp. · OPAL · MIL Coated
ASZS7M28-1920NAET200F	M.2-2280 D5-BM · eNAND 1920 GB · SATA3 · Industrial temp. · OPAL · MIL Coated

Options: Industrial temp (C>Z) · AES (O>A) · Conformal Coated (-00F) · Conduction Cool (-0D0) · Coated & CC (-0DF) · Enterprise (TBD- T>V, up to 960 GB)

WHY ASINE 3D eNAND TLC — INDUSTRIAL GRADE ADVANTAGE

The 3D eNAND TLC used in this product is **not commodity TLC.** It is enterprise-screened, industrially qualified NAND that delivers lower Bit Error Rate (BER) than standard MLC — achieved through advanced LDPC ECC with 64-bit BCH correction, tighter 3D cell geometry, and die-level screening. Customers have validated operation at **+95°C junction temperature** — above the rated industrial I-Temp spec — making this solution suitable for ground vehicle, airborne and sealed-chassis deployments where thermal conditions are severe.

Parameter	Standard TLC (commodity)	ASINE 3D eNAND TLC	Significance
Bit Error Rate (BER)	10*16 NAND standard TLC	**10*17 Lower than MLC grade**	Data reliability under write stress
ECC Engine	Basic BCH	**LDPC + 64-bit BCH**	Stronger correction, longer drive life
TBW @ 2 TB (S7)	~400 TBW typical	**4000 TBW rated**	70% more endurance
Enterprise TBW @ 2 TB (V9)	~4,000 TBW typical	**40,000 TBW rated**	Mission-critical continuous write
Max Validated Temp	+85°C rated	**+95°C customer-validated**	Sealed chassis / ground vehicle deployments
DWPD @ 5yr (2 TB)	<1 DWPD typical Enterprise	**1.5 DWPD**	Sustained high-cycle workloads
Field Heritage	Limited industrial data	**8+ years mil/aero/fighters deployed**	Proven in active operational programs

VALIDATED APPLICATIONS

Defense, Aerospace & Industrial	Commercial & Embedded
Airborne & Rugged Computer Systems · Security / Homeland Security · High-Speed Data Recording · JBOD / NAS / SAN / RAID · Video Surveillance / JPEG2000	Industrial & Commercial PC/Tablet · Gaming · Navigation & Infotainment · Smart Terminals · Bootloader / Firmware / BIOS Embedded Storage