

Industrial 3D TLC NAND M.2 2280 NVMe SSD

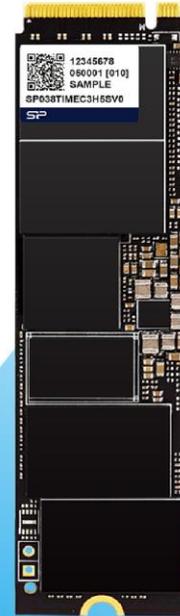
MEC3H0S SERIES

PCIe Gen4x4

TCG Opal 2.0

3K PE Cycles

R/W: 7,200 / 6,500 MB/s



PRODUCT FEATURES

- High-Quality 112-layer 3D TLC NAND Flash Technology.
- Industrial Standard PCIe Gen4x4 with NVMe 1.4 Compliant.
- Support TRIM command to remove data not in use to keep optimized performance.
- Dynamic SLC caching algorithm to deliver the better sustained performance.
- “Predict & Fetch” mechanism to improve read performance.
- When SSD is going to worn-out to activate Read Only Mode to prevent further data corruption.
- Lifetime Enhancements
 - Support Both Dynamic wear leveling and Static wear leveling.
 - Early bad block detect and Later bad block management.
 - Over-provisioning to reserve extra space to enhance reliability and endurance..
 - Block/Page RAID function to ensure data recovery.
- Reliable Industrial grade integrated Active PMU and complete protection design with OVP, OCP, surge rejection and Short protection.
- External DRAM to achieve the optimal sustained read/write performance.
- Power shielding firmware architecture to ensure power failure resilience.
- AES256 Encryption and TCG Opal 2.0 compliant.
- SP SMART Toolbox.
- SP SMART Embedded and SMART IoT service. (by request)
- Driven by a growing number of IOPS in heavy data applications, the biggest benefit of PCIe-based SSD is increased performance.
Reach up to R:7200 MB/s and W:6500 MB/s based on 32CE NAND flash.

PRODUCT SUMMARY

- Capacities : 480GB, 960GB, 1920GB, 3840GB
- Form Factor : M.2 2280 PCIe Solid State Drive (80 mm x 22 mm x 3.5 mm)
- Compliance : PCIe Gen 4x4 compliant with Gen1,2,3.
- Command Sets : NVMe1.4 standard command protocol.
- Performance :

	480GB	960GB	1920GB	3840GB
Sequential Read (MB/s Max.)	6,500	7,200	7,200	7,200
Sequential Write (MB/s Max.)	3,000	6,000	6,500	6,500
Random 4K Read (IOPS Max.)	450,000	750,000	750,000	750,000
Random 4K Write (IOPS Max.)	700,000	1,000,000	1,000,000	1,000,000

* Actual performance may vary based on the specific model and capacity

- Operating Temperature Range :
Normal : 0°C to 70°C
Wide : -40°C to 85°C (by request)
- Storage Temperature Range : -55°C to 95°C
- Operating Voltage : 3.3 V ± 10%
- Power Consumption :

(Unit: W)	480GB	960GB	1920GB	3840GB
Read (Max.)	8.8	10.1	10.6	10.9
Write (Max.)	7.5	9.4	10.5	11.0
Stand-by (Avg.)	<3.4	<3.4	<3.6	<3.6

* Actual value may vary based on the specific model and capacity

- Data Retention @40 °C : 10 Years @ Life Begin; 1 Year @ Life End
- Endurance in Tera Bytes Written (TBW) : (Unit: TB)

Workload	480GB	960GB	1920GB	3840GB
Sequential	350	750	1400	3000
Enterprise	TBD	TBD	TBD	TBD

TBW is estimated by formula $TBW = (\text{Capacity} \times \text{PE Cycles}) \times (1 + \text{OP}) \times (\text{WLE}) / (\text{WAF})$

OP (Over Provision) = (Physical Capacity / Logical Capacity) - 1

WAF = Write Amplification Factor

WLE = Wear Leveling Efficiency could be different depended on the workload or usage containing data size and access rate.

Sequential workload: Sequential write workload which is generated by VDBENCH script and tested by VDBENCH

Enterprise workload: Follow JESD219A enterprise workload which is generated by VDBENCH script and tested by VDBENCH.

- Mechanical (IEC-60068) :
Vibration : 15G, 10 ~ 2001Hz
Drop : 76cm
Shock : 1,500G@0.6ms
- LDPC ECC engine and Block/Page RAID to ensure reliable 3K PE cycles
- Mean Time Between Failure : > 2,000,000 hours
- Data Reliability: Non-recover Read (UBER) $\leq 10^{-16}$
- Serious quality control and assurance
100% NAND Flash screening
High endurance product design with 3D NAND product offerings
Implement high/low temperature dynamic burn-in in each lot production to monitor production quality to meet design specification
Reliability criteria compliant with international standards IEC-60068/61000