Silicon Power
INDUSTRIAL

Industrial 3D TLC NAND
M.2 2280 NVMe SSD

MEC3H0E SERIES

| PCIe Gen4x4 | DRAM-less |
| 3K PE Cycles | R/W: 4,700 / 3,800 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.
- 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. (by request)

  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.
- Power shielding firmware architecture to ensure power failure resilience.
- 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:4700 MB/s and W:3800 MB/s based on 16CE NAND flash.

PRODUCT SUMMARY

- Capacities : 256GB, 512GB, 1TB
- 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 :

	256GB	512GB	1TB
Sequential Read (MB/s Max.)	3,800	4,700	4,700
Sequential Write (MB/s Max.)	1,700	3,400	3,800
Random 4K Read (IOPS Max.)	200,000	450,000	570,000
Random 4K Write (IOPS Max.)	400,000	550,000	600,000

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

- Operating Temperature Range :
  Normal : 0°C to 70°C
- Storage Temperature Range : -55°C to 95°C
- Operating Voltage : 3.3 V ± 10%
- Power Consumption :

(Unit: W)	256GB	512GB	1TB
Read (Max.)	TBD	TBD	TBD
Write (Max.)	TBD	TBD	TBD
Stand-by (Avg.)	TBD	TBD	TBD

* 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	256GB	512GB	1TB
Sequential	>200	>300	>600
Enterprise	TBD	TBD	TBD

TBW is estimated by formula **TBW = (Capacity x PE Cycles) x (1+OP) x (WLE) / (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) ≤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