Silicon Power
INDUSTRIAL

Industrial 3D TLC NAND M.2 2242 NVMe SSD

MEA3K0 E SERIES

PCIe Gen3x4	NVMe
3K PE Cycles	3D TLC NAND

PRODUCT FEATURES

- High-Quality 3D TLC NAND Flash Technology
- Industrial Standard PCIe Gen3.0x4 with NVMe 1.3 Compliant
- Global Wear Leveling and Early weak block retirement
- TRIM, NCQ, DEVSLP, Support PCIe Gen1.0/2.0/3.0 interface
- Lifetime Enhancements

  Direct-to-TLC and SLC Cache enhancement to ensure the optimized WAF

  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
- Dynamic SLC cache
- Garbage collection and TRIM Data Set Management command
- Global wear leveling algorithm evens program/erase count
- Power shielding firmware architecture to ensure power failure resilience
- SP SMART Toolbox
- SP SMART Embedded and SMART IoT service (by request)

PRODUCT SUMMARY

- Capacities : 64GB,128GB, 256GB, 512GB
- Form Factor : M.2 2242 PCIe Solid State Drive (42 mm x 22 mm x 3.5 mm)
- Compliance : PCIe Gen3.0x4 compliant with Gen1.0/2.0/3.0
- Command Sets :NVMe1.3 standard command protocol.
- Performance : *(estimated)*

	64GB	128GB	256GB	512GB
Sequential Read (MB/s Max.)	1100	1100	2300	2500
Sequential Write (MB/s Max.)	280	230	470	950
Random 4K Read (IOPS Max.)	42,000	42,000	82,000	160,000
Random 4K Write (IOPS Max.)	64,000	54,000	105,000	208,000

** 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 : *(estimated)*

(Unit: mA)	64GB	128GB	256GB	512GB
Read (Max.)	1,450	1,500	1,890	1,890
Write (Max.)	1,450	1,300	1,500	1,700
Idle (Avg.)	< 170	< 170	< 170	< 170

** 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	64GB	128GB	256GB	512GB
Sequential (est.)	66	133	265	530
Enterprise (est.)	TBD	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