

Industrial 3D TLC NAND M.2 2280 NVMe SSD

MEC3K0 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
- AES256 Encryption and TCG Opal 2.0 compliant (by request)
- SP SMART Toolbox
- SP SMART Embedded and SMART IoT service (by request)

PRODUCT SUMMARY

- Capacities : 64GB, 128GB, 256GB, 512GB, 1TB
- Form Factor : M.2 2280 PCIe Solid State Drive (80 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 :

	64GB	128GB	256GB	512GB	1TB
Sequential Read (MB/s Max.)	1545	2250	2580	2580	2400
Sequential Write (MB/s Max.)	360	600	1100	1960	1600
Random 4K Read (IOPS Max.)	81000	TBD	81000	170000	295000
Random 4K Write (IOPS Max.)	86000	TBD	97000	198000	210000

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

- Operating Temperature Range :
 - Normal : 0°C to 70°C
 - Extended : -15°C to 85°C (by request)
 - 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: mA)	64GB	128GB	256GB	512GB	1TB
Read (Max.)	1060	TBD	930	TBD	TBD
Write (Max.)	1700	TBD	1500	TBD	TBD
Idle (Avg.)	< 280	TBD	< 200	< 200	< 200

* 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	1TB
Sequential (est.)	66	133	265	530	1061
Enterprise (est.)	TBD	TBD	TBD	TBD	TBD

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

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) $\leq 10^{-16}$
- 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