

Industrial 3D NAND M.2 2242 SSD

MDA3K0 SERIES

SATA III

6.0 Gbit/s

SLC Cache

3D NAND



PRODUCT FEATURES

- High-Quality 3D NAND Flash Technology
- Global Wear Leveling and Early weak block retirement
- TRIM, NCQ, DEVSLP, ATA Security Feature Set supported
- Lifetime Enhancements
 - Direct-to-TLC and SLC Cache enhancement to ensure the optimized WAF
 - Block/Page RAID function to ensure data recovery
 - StaticDataRefresh to keep data integrity
- Reliable Industrial-grade circuit design and complete protection design with OVP, OCP, surge rejection, and Short protection.
- 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)
- Native Command Queuing up to 32 commands
- Garbage collection and TRIM Data Set Management command
- Global wear leveling algorithm evens program/erase count

PRODUCT SUMMARY

- Capacities : 64GB, 128GB, 256GB, 512GB
- Form Factor : M.2 2242 SATA Solid State Drive (42 mm x 22 mm x 3.5 mm)
- Compliance : SATA Revision 3.1 - 6 Gbit/s (3 Gbit/s and 1.5 Gbit/s backward compatible)
- Command Sets : Supports ATA/ATAPI-8 and ACS-2
- Performance : *(estimated)*

	64GB	128GB	256GB	512GB
Sequential Read (MB/s Max.)	480	500	500	500
Sequential Write (MB/s Max.)	280	230	460	520
Random 4K Read (IOPS Max.)	20000	17000	28000	29000
Random 4K Write (IOPS Max.)	49000	53000	82000	86000

** 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 : 3.3V ± 10%
- Power Consumption : *(estimated)*

(Unit: mA)	64GB	128GB	256GB	512GB
Read (Max.)	470	470	480	500
Write (Max.)	425	400	525	570
Stand-by (Avg.)	130	130	130	130

** 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) (estimated)*

Workload	64GB	128GB	256GB	512GB
Sequential	91	182	364	728
Enterprise	25	51	101	202

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