Silicon Power
INDUSTRIAL

Industrial 3D NAND M.2 2280 SSD

MDC3K0E 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, 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
- 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, 1TB
- Form Factor : M.2 2280 SATA Solid State Drive (80 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	1TB
Sequential Read (MB/s Max.)	480	540	540	540	540
Sequential Write (MB/s Max.)	280	230	460	520	510
Random 4K Read (IOPS Max.)	20000	17000	28000	29000	28000
Random 4K Write (IOPS Max.)	49000	53000	82000	86000	84000

** 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	1TB
Read (Max.)	470	470	480	500	510
Write (Max.)	425	400	525	570	580
Idle(Avg.)	< 130	< 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	1TB
Sequential	91	182	364	728	1456
Enterprise	25	51	101	202	404

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