

Industrial 3D TLC NAND M.2 2280 NVMe SSD

MEC350 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
 - StaticDataRefresh to keep data integrity
- Reliable Industrial grade integrated Active PMU and complete protection design with OVP, OCP, surge rejection and Short protection
- External DRAM to achieve the optimal sustained read/write performance (S series)
- 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 : 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 :

	128GB	256GB	512GB	1TB	2TB
Sequential Read (MB/s Max.)	1500	3000	3400	3400	3400
Sequential Write (MB/s Max.)	400	800	1600	2000	2900
Random 4K Read (IOPS Max.)	83000	163000	290000	320000	345000
Random 4K Write (IOPS Max.)	61000	115000	260000	298000	354000

* 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)	128GB	256GB	512GB	1TB	2TB
Read (Max.)	1160	1790	1870	1920	TBD
Write (Max.)	1890	2240	2430	2430	
Stand-by (Avg.)	230	230	230	230	

* 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	128GB	256GB	512GB	1TB	2TB
Sequential	372	750	1500	3000	6000
Enterprise	69	139	277	554	1109

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