

Industrial 3D TLC NAND M.2 2280 NVMe SSD

MEC3F0 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.
- Power shielding firmware architecture to ensure power failure resilience
- AES256 Encryption and TCG Opal 2.0 compliant (Optional)
- SP SMART Toolbox
- SP SMART Embedded and SMART IoT service (by request)
- Driven by a growing number of IOPS in heavy data applications, the biggest benefit of PCIe-based SSD is increased performance. Reach up to R:3400 MB/s and W:3100 MB/s based on 32CE NAND flash.

PRODUCT SUMMARY

- Capacities : 1TB, 2TB, 4TB, 8TB
- 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 :

| | 1TB | 2TB | 4TB | 8TB |
|------------------------------|---------|---------|---------|---------|
| Sequential Read (MB/s Max.) | 3,400 | 3,400 | 3,400 | 3,400 |
| Sequential Write (MB/s Max.) | 1,900 | 3,100 | 3,000 | 3,000 |
| Random 4K Read (IOPS Max.) | 330,000 | 670,000 | 570,000 | 570,000 |
| Random 4K Write (IOPS Max.) | 500,000 | 645,000 | 650,000 | 660,000 |

* 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) | 1TB | 2TB | 4TB | 8TB |
|-----------------|------|------|------|------|
| Read (Max.) | 2000 | 1970 | 2425 | 1700 |
| Write (Max.) | 1760 | 1820 | 2070 | 1970 |
| Stand-by (Avg.) | 550 | 580 | 670 | 700 |

* 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 | 1TB | 2TB | 4TB | 8TB |
|------------|------|------|------|-----|
| Sequential | 1340 | 2720 | 6070 | TBD |
| Enterprise | TBD | TBD | TBD | TBD |

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