

The Micron 9650 is the world's fastest data center SSD and the first PCIe® Gen6 SSD

AI workloads often achieve less than 50% of peak GPU performance due to data bottlenecks¹. With read speeds up to 28GB/s and 5.5M+ IOPS, the Micron 9650 SSD helps eliminate these bottlenecks, ensuring GPUs stay productive and ROI is maximized.

Data centers already consume 1–2% of global electricity, and their demand is expected to see a 160% increase by 2030, largely due to AI.² But power budgets can't keep up. While data center storage capacity grows at a 24% CAGR, power budgets grow at just 7.5%.³ The Micron 9650 offers power efficiency and liquid cooling support to help mitigate the impact of this growth.

Solving all of these has become easier with the Micron 9650.

This performance-focused, PCIe Gen6 data center SSD features full-stack integration—from Micron G9 NAND and DRAM to controller, firmware, and validation to help simplify qualifications and streamline deployment.

Solutions like the Micron 9650 help deliver the data for a performant, sustainable, scalable infrastructure.



Micron 9650 NVMe SSD: E1.S 9.5mm and E3.S 1T

Micron 9650 SSD key benefits

The first PCIe Gen6 SSD with up to double the performance of PCIe Gen5 SSDs⁴

The Micron 9650 SSD is the first PCIe Gen6 SSD for the data center. It is also the fastest in the industry, demonstrating up to 28GB/s of sequential read bandwidth⁴. This unprecedented performance makes it ideal for the most demanding AI data center workloads.

Exceptional energy efficiency helps lower carbon emissions for AI.

Energy efficiency is crucial for reducing operational costs and minimizing environmental impact.

Tailoring the Micron 9650 SSD for both performance and efficiency—while engineering it for advanced liquid cooling—enables AI systems to handle complex storage workloads with greater sustainability.⁵

Qualify with confidence with Micron innovation and ecosystem collaboration

Vertically integrated architecture with Micron DRAM, NAND, SSD controller, firmware, and validation helps simplify qualifying the Micron 9650. By developing the first PCIe Gen6 SSD in collaboration with industry leaders, this SSD also accelerates technology adoption.⁶

Industry-leading six-plane NAND architecture provides higher degrees of parallelism, where more read/write commands can be issued to the NAND simultaneously to help improve performance. Micron G9 NAND offers 3.6GB/s, the fastest NAND I/O rate shipping in an SSD.⁷

micron.com/9650

1. See <https://arxiv.org/pdf/2503.08311> for additional details on the impacts of data fetch bottlenecks.

2. See <https://www.goldmansachs.com/insights/articles/AI-poised-to-drive-160-increase-in-power-demand> for additional details on data center power consumption.

3. See <https://www.fierce-network.com/cloud/heres-what-aws-microsoft-and-googles-capex-plans-mean-data-center-growth> for additional details on data center storage capacity CAGR and <https://www.gminsights.com/industry-analysis/data-center-power-market> for additional details on data center power budget growth.

4. The Micron 9650 is the first PCIe Gen6 data center SSD sampling to OEM customers (first to sample to OEM customers and fastest statement refers to public information available at the time of this document's initial publication. Double the performance statement refers to 128KB sequential read bandwidth comparison between the Micron 9650 SSD at 28GB/s and the Micron 9550 SSD at 14GB/s.

5. Liquid cooling options are supported in the Micron 9650 E1.S (9.5mm) form factor. Contact your Micron representative for details.

6. Micron collaborated with early PCIe Gen6 ecosystem leaders like Astera Labs (see <https://www.asteralabs.com/accelerating-the-pcie-6-x-ecosystem-industry-first-pcie-6-x-interop-demonstration-at-designcon/>) and Broadcom (<https://investors.broadcom.com/news-releases/news-release-details/broadcom-extends-pcie-industry-leadership-end-end-gen-6>), CPU and GPU leaders, as well as platform and networking designers, and the PCIe Gen6 broad ecosystem in developing the Micron 9650 SSD.

7. To learn more about this leading Micron NAND, see <https://investors.micron.com/news-releases/news-release-details/micron-announces-volume-production-ninth-generation-nand-flash>.

Leading performance to feed demanding AI workloads

Tap into the power of innovative storage with the Micron 9650 SSD—a trailblazer in PCIe Gen6 SSD speed. The Micron 9650 SSD is tailored for the most challenging AI and data center workloads to process immense data sets with industry-leading performance.

| Performance type | Micron 9650 SSD ⁸ | Prior generation | Micron 9650 SSD advantage |
|------------------|------------------------------|------------------|---------------------------|
| Sequential read | 28,000 MB/s | 14,000 MB/s | 100% higher |
| Sequential write | 14,000 MB/s | 10,000 MB/s | 40% higher |
| Random read | 5.5 MIOPS | 3.3 MIOS | 61% higher |
| Random write | 900 KIOPS | 720 KIOPS | 22% higher |

Table 1: Micron 9650 maximum performance improvements

Superior energy efficiency that's liquid-cooling ready

The Micron 9650 SSD is built for energy efficiency, complemented by its available support for liquid cooling. This combination helps performance under the most demanding workloads.⁹

| Workload | Micron 9650 SSD | Prior generation | Micron 9650 advantage | |
|---------------------------------|-----------------|------------------|------------------------------------------------|-------------|
| Sequential IO (read / write) | MB/s per watt | 1,120 | 560 | 2X better |
| | MB/s per watt | 560 | 400 | 1.4X better |
| Random IO (read / write) | KIOPS per watt | 220 | 132 | 1.7X better |
| | KIOPS per watt | 36 | 28.8 | 1.2X better |
| Liquid cooling support | Yes | No | Liquid cooling ready in E1.S 9.5mm form factor | |

Table 2: Micron 9650 energy efficiency improvements

Micron innovation is built in

The Micron 9650 NVMe SSD features Micron G9 TLC NAND, whose six-plane architecture delivers up to 3.6 GB/s I/O rate. Coupled with a PCIe Gen6 interface, this SSD enables top-tier performance.

Its vertically integrated design includes Micron DRAM, NAND, controller, firmware, and validation, helping ensure reliability. In contrast, ongoing PCIe Gen6 collaboration with ecosystem partners helps enhance platform interoperability in the expanding PCIe Gen6 market segment.

| Micron innovation | Benefit |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Vertical integration | Micron IP and components are fully vertically integrated, including Micron-designed SSD controller ASIC, Micron's leading G9 TLC NAND, Micron DRAM, and Micron-produced and validated SSD firmware. |
| Industry-leading G9 TLC NAND | Industry-leading six-plane NAND architecture provides higher degrees of parallelism to help improve performance, supporting more simultaneous read/write commands issued to the NAND. Supporting I/O rates up to 3.6 GB/s, this is the fastest NAND shipping in an SSD. ¹⁰ |
| Liquid Cooling optimized | E1.S 9.5mm hardware thermally designed from the ground up to support advanced liquid cooling solutions. |
| Security features built in ¹¹ | SPDM 1.2 device security, self-encrypting drive (SED) options, Micron Secure Execution Environment (SEE), FIPS 140-3 Level 2, and TAA compliant options. |

Table 3: Micron innovations

8. Values in Tables 1 and 2 reflect maximum values across all Micron 9650 capacities. For details, see the Micron 9650 key specifications table later in this document.

9. Efficiency values calculated as maximum performance / 25 watts power consumption. Micron 9650 SSD (28 GB/s / 25 watts = 1,120 GB/s per watt = 1,120 MB/s per watt); Micron 9550 SSD (14 GB/s / 25 watts = 0.56GB/s per watt = 560 MB/s per watt), 1,120 MB/s per watt / 560 MB/s per watt = 2X = 100% higher.

10. At the time of this document's initial publication.

11. No hardware, software, or system can provide absolute security under all conditions. Micron assumes no liability for lost, stolen, or corrupted data arising from the use of any Micron products, including those products that incorporate any of the mentioned security features.

Micron 9650 SSD key specifications

| Form Factors | Micron 9650 PRO | | | Micron 9650 MAX | | |
|-----------------------------------------|-----------------------------------------|--------------------|--------------------|---------------------------------------|--------------------|--------------------|
| | Read-intensive, one drive write per day | | | Mixed-use, three drive writes per day | | |
| E1.S (9.5mm) – liquid cooling optimized | ✓ | ✓ | | | | |
| E3.S 1T | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Capacities¹² | 7.68TB | 15.36TB | 30.72TB | 6.4TB | 12.8TB | 25.6TB |
| Sequential read (MB/s) ¹³ | 28,000 | 28,000 | 28,000 | 28,000 | 28,000 | 28,000 |
| Sequential write (MB/s) ¹³ | 14,000 | 14,000 | 14,000 | 14,000 | 14,000 | 14,000 |
| Random read (KIOPS) ¹³ | 5,400 | 5,500 | 5,500 | 5,400 | 5,500 | 5,500 |
| Random write (KIOPS) ¹³ | 500 | 530 | 570 | 900 | 900 | 900 |
| 70/30 Random read/write (KIOPS) | 1,000 | 1,100 | 1,100 | 1,500 | 1,500 | 1,500 |
| Latency (TYP, μs) ¹⁴ | 60 (rd.) 15 (wri.) | 60 (rd.) 15 (wri.) | 60 (rd.) 15 (wri.) | 60 (rd.) 15 (wri.) | 60 (rd.) 15 (wri.) | 60 (rd.) 15 (wri.) |
| Endurance (TBW) ¹⁵ | RND | 14,016 | 28,032 | 56,064 | 35,040 | 70,080 |
| | SEQ | 58,300 | 104,500 | 201,200 | 74,200 | 143,100 |

Table 4: Micron 9650 SSD performance summary

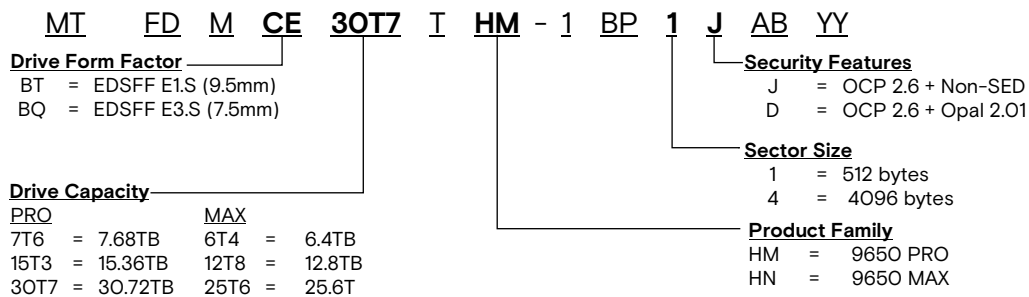
(Note: All values provided are for reference only and are not warranted values. For warranty information, visit <https://www.micron.com/sales-support/sales/returns-and-warranties/enterprise-ssd-warranty> or contact your Micron sales representative. Values represent the theoretical maximum endurance for the given transfer size and type. Actual lifetime will vary by workload.

| Micron 9650 SSD: Standard Features | | |
|------------------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Basic Attributes | Interface | PCIe Gen6.2 1x4, NVMe 2.0 |
| | NAND | Micron G9 TLC NAND |
| | OCP compliance | OCP 2.6 |
| Reliability | MTTF ¹⁶ | MTTF: 2.0M hours @ 0–55°C and 2.5M hours @ 0–50°C |
| | UBER | <1 sector per 10 ¹⁷ bits read |
| | Warranty | 5 years |
| Environmental Characteristics | Power | Sequential read (average RMS value): up to 18W (PRO and MAX) Sequential write (average RMS value): up to 16W (PRO and MAX) |
| | Operating Temp. | 0–70°C |

Table 5: Micron 9650 SSD standard features

Micron 9650 SSD part numbers

The Micron 9650 SSD part number information is provided below for configuration-dependent values (shown in bold). Other part number values in the example part number are fixed. See the parts catalog at micron.com/9560 for more information.



- Unformatted. 1GB = 1 billion bytes. Formatted capacity is less.
- Performance measured under the following conditions: Steady state as defined by SNIA Solid State Storage Performance Test Specification Enterprise v1.1; Drive write cache enabled; NVMe power state 0; Sequential workloads measured using FIO with a queue depth of 32; Random READ workloads measured using FIO with a queue depth of 512 (1,100,000 IOPS statement based on 4K sector size; Random WRITE workloads measured using FIO with a queue depth of 128).
- Latency values measured with random workloads using FIO, 4KB transfers, queue depth = 1; TYP = median, 50th percentile.
- Actual lifetime will vary by workload. Total bytes written are calculated assuming the drive is 100% full (user capacity) with a workload of 100% 4KB random in TB (first value) or 100% 128KB sequential (second value) in TB. Refer to the percentage used in the SMART/Health information (Log Identifier 02h) to check the device life used.
- Product achieves MTTF based on population statistics, not relevant to individual units.

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