Micron 6550 ION SSD Series Technical Product Specification

For additional technical and warranty information, contact your Micron sales representative.

Features

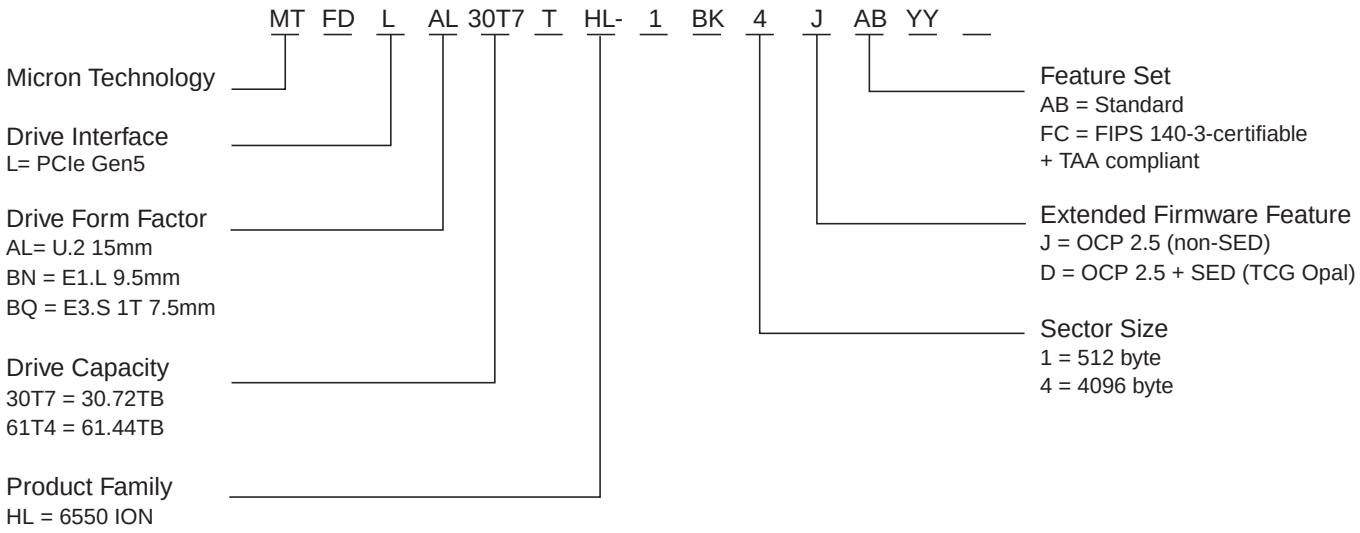
- Micron®3D TLC NAND Flash
- PCI Express Gen5
  - U.2 single port (x4)
  - EDSFF E1.L single port (x4)
  - EDSFF E3.S 1T single port (x4)
- NVM Express
  - Number of namespaces supported: 512
  - Weighted round robin with urgent arbitration supported
- OCP 2.5 Datacenter NVMe SSD specification
- TCG Storage Security Subsystem Class: Opal Rev 2.02
- Capacity (unformatted)
  - U.2: 30.72TB, 61.44TB
  - E1.L: 30.72TB, 61.44TB
  - E3.S 1T: 30.72TB, 61.44TB
- Endurance: Total bytes written (TBW)
  - Up to 112,000TB at 100% 128KB random writes
  - Up to 112,000TB at 100% 16KB random writes
  - Up to 28,000TB at 100% 4KB random writes
- Security
  - Digitally signed firmware (186-5)
  - FIPS 140-3 L2 certifiable
  - Self-encrypting drive (SED) SKUs
  - SPDM 1.2 specification
  - Isolated security environment
  - Micron enterprise security suite
  - Hardware Root of Trust and cryptographic chain of trust
  - TCG device identifier composition engine (DICE)
  - Secure hash SHA-512 (also supports SHA-384)
  - RSA key size and signature scheme 3K/4K
- Surprise insertion/surprise removal (SISR) and hot-plug capable
- Self-monitoring, analysis, and reporting technology (SMART)
- Field-upgradeable firmware with support for activate without reset
- Performance[1]
  - Sequential 128KB READ: Up to 14,000 MB/s
  - Sequential 128KB WRITE: Up to 8000 MB/s
  - Random 4KB READ: Up to 2000 KIOPS
  - Random 4KB WRITE: Up to 70 KIOPS
- Latency[2, 3]
  - READ (TYP): 70µs
  - WRITE (TYP): 25µs
- Reliability
  - MTTF: 2.0M hours @ 0–55°C and 2.5M hours @ 0–50°C[4]
  - Static and dynamic wear leveling
  - Uncorrectable bit error rate (UBER): <1 sector per 10^{17} bits read
  - OCP 2.5-compliant end-to-end data protection
  - Enterprise power-loss protection
- Operating temperature[5]
  - Commercial (0°C to +70°C)
- Form factor
  - U.2: 69.85 x 100.45 x 15.00mm
  - EDSFF E1.L thin: 38.40 x 318.75 x 9.5mm
  - EDSFF E3.S 1T: 76.00 x 112.5 x 7.5mm

Notes: 1. Steady state as defined by SNIA Solid State Storage Performance Test Specification Enterprise v1.1.
2. 4KB, queue depth 1 transfers used for READ/WRITE latency values.
3. TYP: Median, 50th percentile
4. Product achieves MTTF based on population statistics not relevant to individual units.
5. Temperature measured by SMART.

Part Numbering Information

Micron 6550 ION SSDs are available in different configurations and capacities. The chart below is a comprehensive list of options; not all options listed can be combined to define an offered product. Visit www.micron.com for a list of valid part numbers.

Figure 1: Part Number Chart



Important Notes and Warnings

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Automotive Applications. Products are not designed or intended for use in automotive applications unless specifically designated by Micron as automotive-grade by their respective data sheets. Distributor and customer/distributor shall assume the sole risk and liability for and shall indemnify and hold Micron harmless against all claims, costs, damages, and expenses and reasonable attorneys' fees arising out of, directly or indirectly, any claim of product liability, personal injury, death, or property damage resulting directly or indirectly from any use of non-automotive-grade products in automotive applications. Customer/distributor shall ensure that the terms and conditions of sale between customer/distributor and any customer of distributor/customer (1) state that Micron products are not designed or intended for use in automotive applications unless specifically designated by Micron as automotive-grade by their respective data sheets and (2) require such customer of distributor/customer to indemnify and hold Micron harmless against all claims, costs, damages, and expenses and reasonable attorneys' fees arising out of, directly or indirectly, any claim of product liability, personal injury, death, or property damage resulting from any use of non-automotive-grade products in automotive applications.

Critical Applications. Products are not authorized for use in applications in which failure of the Micron component could result, directly or indirectly in death, personal injury, or severe property or environmental damage ("Critical Applications"). Customer must protect against death, personal injury, and severe property and environmental damage by incorporating safety design measures into customer's applications to ensure that failure of the Micron component will not result in such harms. Should customer or distributor purchase, use, or sell any Micron component for any critical application, customer and distributor shall indemnify and hold harmless Micron and its subsidiaries, subcontractors, and affiliates and the directors, officers, and employees of each against all claims, costs, damages, and expenses and reasonable attorneys' fees arising out of, directly or indirectly, any claim of product liability, personal injury, or death arising in any way out of such critical application, whether or not Micron or its subsidiaries, subcontractors, or affiliates were negligent in the design, manufacture, or warning of the Micron product.

Customer Responsibility. Customers are responsible for the design, manufacture, and operation of their systems, applications, and products using Micron products. ALL SEMICONDUCTOR PRODUCTS HAVE INHERENT FAILURE RATES AND LIMITED USEFUL LIVES. IT IS THE CUSTOMER'S SOLE RESPONSIBILITY TO DETERMINE WHETHER THE MICRON PRODUCT IS SUITABLE AND FIT FOR THE CUSTOMER'S SYSTEM, APPLICATION, OR PRODUCT. Customers must ensure that adequate design, manufacturing, and operating safeguards are included in customer's applications and products to eliminate the risk that personal injury, death, or severe property or environmental damages will result from failure of any semiconductor component.

Limited Warranty. In no event shall Micron be liable for any indirect, incidental, punitive, special or consequential damages (including without limitation lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort, warranty, breach of contract or other legal theory, unless explicitly stated in a written agreement executed by Micron's duly authorized representative.

Performance

Measured performance can vary for a number of reasons. The major factors affecting drive performance are the capacity of the drive and the interface of the host. Additionally, overall system performance can affect the measured drive performance. When comparing drives, it is recommended that all system variables are the same, and only the drive being tested varies.

Performance numbers will vary depending on the host system configuration.

Table 1: Drive Performance for Power State 0 (Unconstrained at 25W Max)

Performance by SKU for Power State 0		U.2		E1.L		E3.S 1T		Unit
		30.72TB	61.44TB	30.72TB	61.44TB	30.72TB	61.44TB	
Sequential (128KB transfer)	Read	14,000	14,000	14,000	14,000	14,000	14,000	MB/s
	Write	8000	8000	8000	8000	8000	8000	
Random (4KB transfer)	Read	2000	2000	2000	2000	2000	2000	KIOPS
	Write	70	70	70	70	70	70	
	70/30 Read/Write	200	200	200	200	200	200	
Latency	Read (TYP)	70	70	70	70	70	70	µs
	Write (TYP)	25	25	25	25	25	25	
	Read (99%)	80	80	80	80	80	80	
	Write (99%)	40	40	40	40	40	40	

Table 2: Drive Performance by Power State

Performance Estimates for All SKUs by NVMe Power State		25W	20W	18W	16W	15W	14W	12W	10W	Unit
		PS0 (Default)	PS1	PS2	PS3	PS4	PS5	PS6	PS7	
Sequential (128KB transfer)	Read	14,000	14,000	11,000	9000	8000	7500	4500	1500	MB/s
	Write	8000	7000	6000	5000	4000	3600	1800	700	
Random (4KB transfer)	Read	2000	2000	1500	1400	1200	1100	750	350	KIOPS
	Write	70	70	60	50	45	35	20	8	
	70/30 Read/ Write	200	200	160	150	140	110	70	25	

Notes: 1. Performance values measured under the following conditions:

- Steady state as defined by SNIA Solid State Storage Performance Test Specification Enterprise v1.1
- 4KB sector size
- Drive write cache enabled
- NVMe power state 0
- Sequential READ and WRITE workloads measured using FIO with a queue depth of 128
- Random READ workloads measured using FIO with a queue depth of 512
- Random WRITE workloads measured using FIO with a queue depth of 128

2. Performance values measured with the following system configuration:
   - Asus ROG MAXIMUS Z790 Motherboard
   - 12th Gen Intel @ Core™ i7-12700K
   - 2–16GB DIMM = 32GB DDR5 @ 4800 MHz
3. Latency values measured under the following configuration:
   - Random workloads using FIO with 4KB transfers and a queue depth of 1
   - TYP = median, 50th percentile

4. System variations will affect measured results.

Endurance

Lifetime estimates for the device are shown in the following tables in total bytes written.

Table 3: Estimated Endurance

Estimated Endurance	Total Bytes Written (TBW) in TB		TBW per Day for 5 Years		Drive Writes per Day (DWPD) for 5 Years	
6550 ION Capacity	**30.72TB**	**61.44TB**	**30.72TB**	**61.44TB**	**30.72TB**	**61.44TB**
100% 128KB random writes	56,000	112,000	30.72TB	61.44TB	1.00	1.00
100% 16KB random writes	56,000	112,000	30.72TB	61.44TB	1.00	1.00
90% 16KB random writes 10% 4KB random writes	50,000	100,000	27.65TB	55.30TB	0.90	0.90
80% 16KB random writes 20% 4KB random writes	47,000	95,000	26.11TB	52.22TB	0.85	0.85
70% 16KB random writes 30% 4KB random writes	42,000	84,000	23.04TB	46.08TB	0.75	0.75
50% 16KB random writes 50% 4KB random writes	33,500	67,000	18.43TB	36.86TB	0.60	0.60
100% 8KB random writes	28,000	56,000	15.36TB	30.72TB	0.50	0.50
100% 4KB random writes	14,000	28,000	7.68TB	15.36TB	0.25	0.25
JESD219A workload mix	16,500	33,500	9.22TB	18.43TB	0.30	0.30

Notes: 1. Values represent the theoretical maximum endurance for the given transfer size and type. Actual lifetime will vary by workload. Refer to Percentage Used in the SMART/Health Information (Log Identifier 02h) to check the device life used.
2. All values provided are for reference only and are not warrantied values. For warranty information, visit https://www.micron.com/sales-support/sales/returns-and-warranties/enterprise-ssd-warranty.
3. 1TB = 1,000,000,000,000 bytes; 1GB = 1,000,000,000 bytes.
4. All random transfers are aligned to drive boundary.

Electrical Characteristics

Table 4: Maximum Power Consumption in Power State 0 (Unconstrained)

User Capacity	U.2		E1.L		E3.S 1T		Unit	Notes
	30.72TB	61.44TB	30.72TB	61.44TB	30.72TB	61.44TB		
128KB sequential read (average)	22	22	22	22	22	22	W	1, 2
128KB sequential write (average)	25	25	25	25	25	25	W	1, 2
4KB random read (maximum average)	18	19	18	19	18	19	W	1, 2
4KB random write (maximum average)	25	25	25	25	25	25	W	1, 2
4KB 70/30 random read/write (average)	23	23	23	23	23	23	W	1, 2
Idle (average)	<5	<5	<5	<5	<5	<5	W	1, 2, 3

Notes: 1. Power limiting is configured through Set/Get Features Power Management.
2. Power consumption measurements are for reference only; actual workload power consumption will vary.
3. Reported idle power values are in L1 ASPM for lowest power state.

Table 5: Power State Configurations

Power States per User Capacity	30.72TB	61.44TB	Unit
Power State 0 (PS0)	25	25	W
Power State 1 (PS1)	20	20	W
Power State 2 (PS2)	18	18	W
Power State 3 (PS3)	16	16	W
Power State 4 (PS4)	15	15	W
Power State 5 (PS5)	14	14	W
Power State 6 (PS6)	12	12	W
Power State 7 (PS7)	10	10	W

Note: 1. Power state limits the power to maximum indicated. Actual power may be lower depending on actual use case.

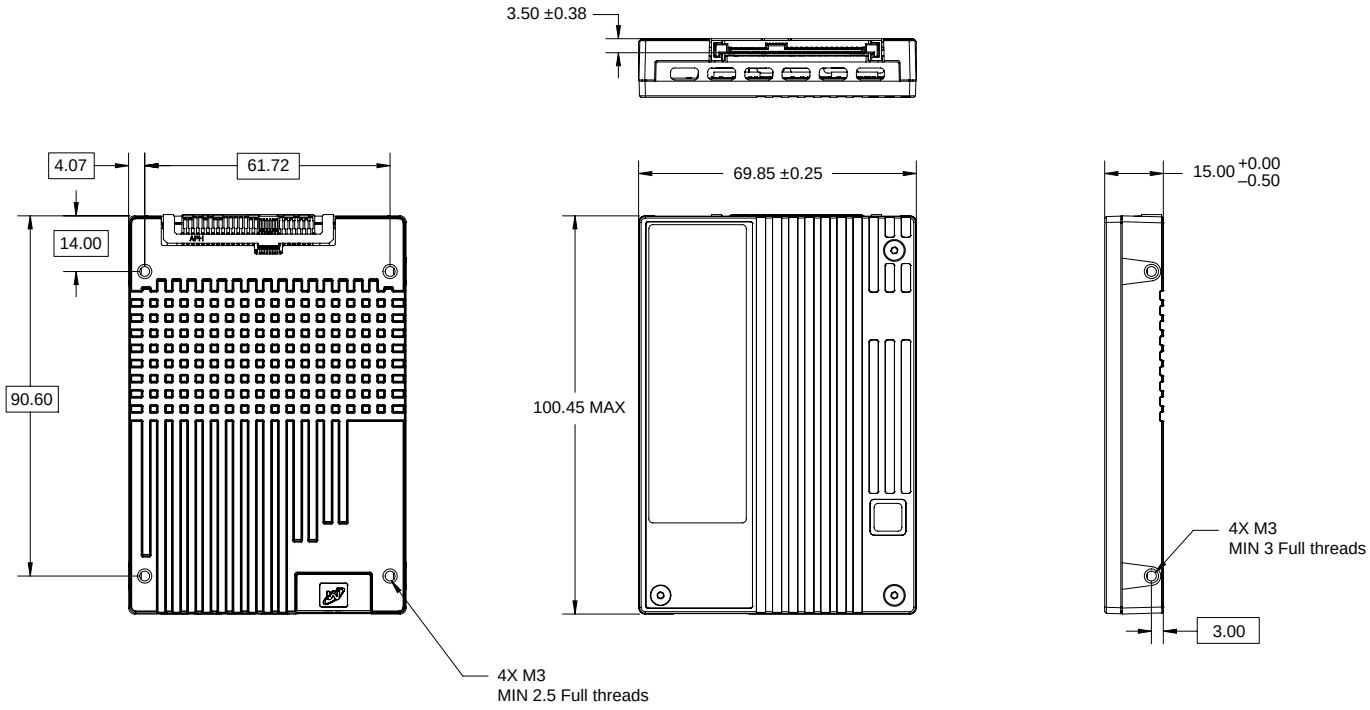
Table 6: Operating Voltage – U.2 and EDSFF

Power Rail	Electrical Parameter	Value
12V	Operating voltage	12 Vdc (±10%)
	MIN/MAX rise time	1ms/100ms
	Fall time	<5s
	MIN power-off time	50ms
	Inrush current, cold start (typical peak)	2.0A
	Inrush current, hot plug (typical peak)	3.125A
	MAX average current	U.2: 4.5A E1.L and E3.S 1T: 3.15A
3.3 V_{AUX}	Operating voltage	U.2: 3.3 Vdc (±10%) E1.L and E3.S 1T: 3.3 Vdc (±10%)
	MIN/MAX rise time	1ms/50ms
	MIN/MAX fall time	1ms/5s
	MAX average current	4mA

Physical Configuration

U.2 Enterprise PCIe (SFF-8201 and SFF-8639)

Figure 2: U.2 15mm Nominal Dimensions

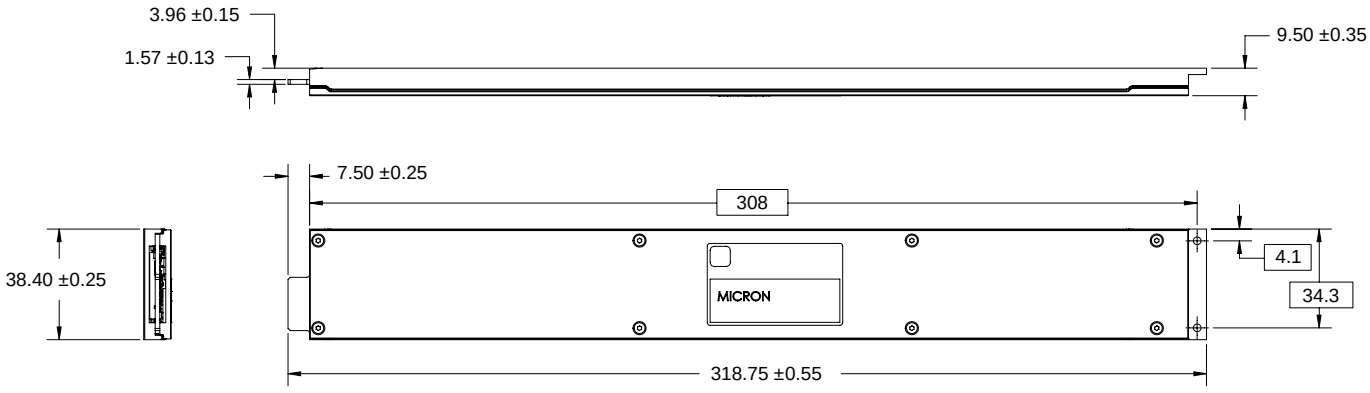


Notes: 1. All dimensions are in millimeters.

2. Mounting Hole Specifications: Screw: M3 x 0.5 with a maximum of 5mm encroachment into the SSD Torque: Maximum of 4 in-lbs @ <1000 rpm with an actuation style lever

E1.L Enterprise PCIe x4 (SFF-TA-1007)

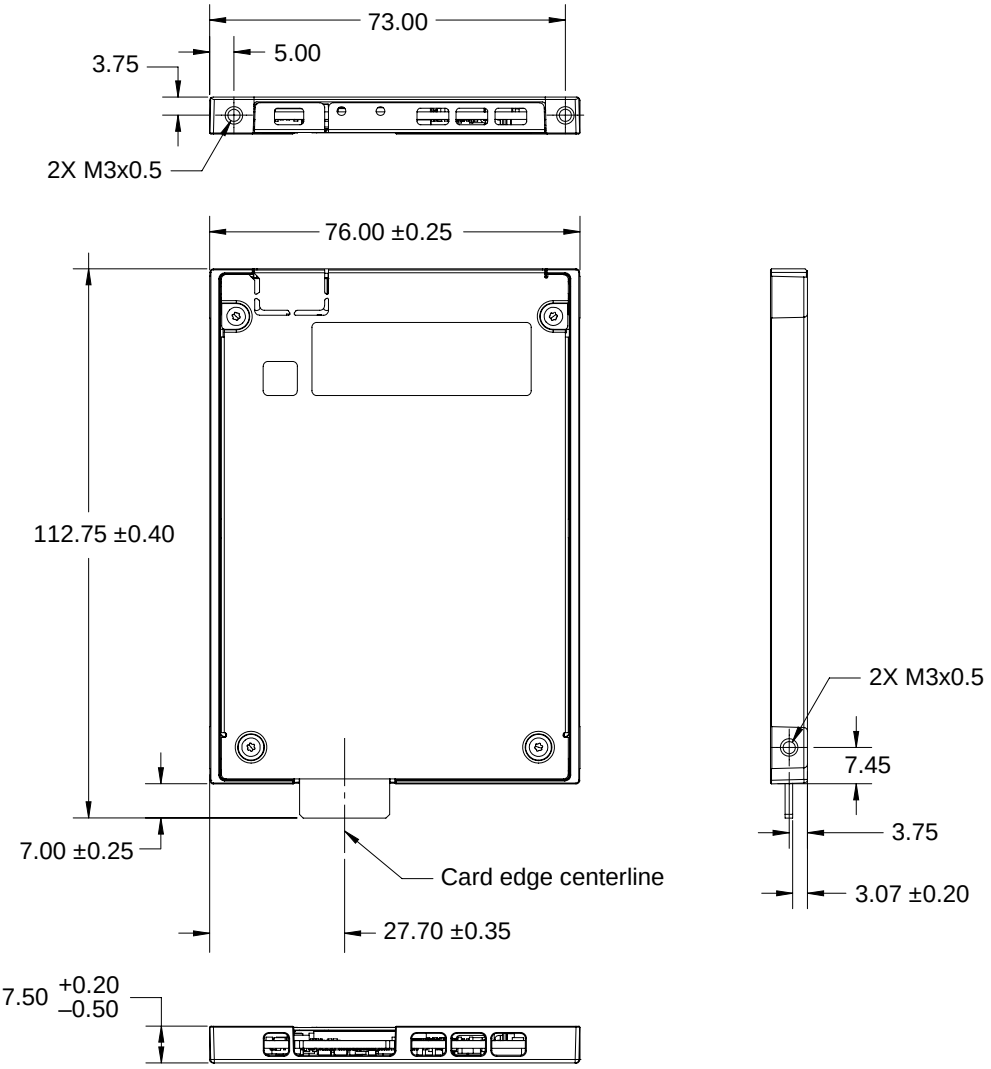
Figure 3: E1.L 9.5mm Nominal Dimensions



Note: 1. All dimensions are in millimeters.

E3.S 1T Enterprise PCIe x4 (SFF-TA-1008)

Figure 4: E3.S 1T 7.5mm Nominal Dimensions



Notes: 1. All dimensions are in millimeters.

2. Mounting hole specifications: Screw: M3 x 0.5 with a maximum of 5mm encroachment into the SSD torque: maximum of 4 in-lbs @ <1000 rpm with an actuation style lever.

Compliance

Micron SSDs comply with the following:

- Micron Green Standard
- Built with sulfur-resistant resistors
- CE (Europe): EN55032, EN55035 Class A, RoHS
- FCC: CFR Title 47, Part 15, Class A
- UL/cUL: approval to UL 62368-1
- BSMI (Taiwan): approval to CNS 13438, CSN 15936 Class A
- RCM (Australia, New Zealand): AS/NZS CISPR32 Class A
- KC RRL (Korea): approval to KS C 9832 Class A, KS C 9835 Class A
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- W.E.E.E.: Compliance with EU WEEE directive 2012/19/EC. Additional obligations may apply to customers who place these products in the markets where WEEE is enforced.
- TUV (Germany): approval to EN62368
- V_{CCI} (Japan): CISPR 32 Class A
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  取扱説明書に従って正しい取り扱いをして下さい。
  VCCIー A
- IC (Canada): ICES-003 Class A
  - This Class A digital apparatus complies with Canadian ICES-003.
  - Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.
- Morocco: EN55032, EN55035 Class A
- UKCA (UK): SI 2016/1091 Class A and SI 2012/3032 RoHS
- UkrSEPRO (Ukraine): EN55032/55035 Class A, IEC62368/EN62368, RoHS (Resolution 2017 No. 139)

FCC Rules

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Revision History

Rev. A – 5/2025

- Initial release

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208-368-4000, micron.com/support

This data sheet contains minimum and maximum limits specified over the power supply and temperature range set forth herein.
Although considered final, these specifications are subject to change, as further product development and data characterization sometimes occur.