

Micron 5400 Series SATA NAND Flash SSD Technical Product Specification

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

Features

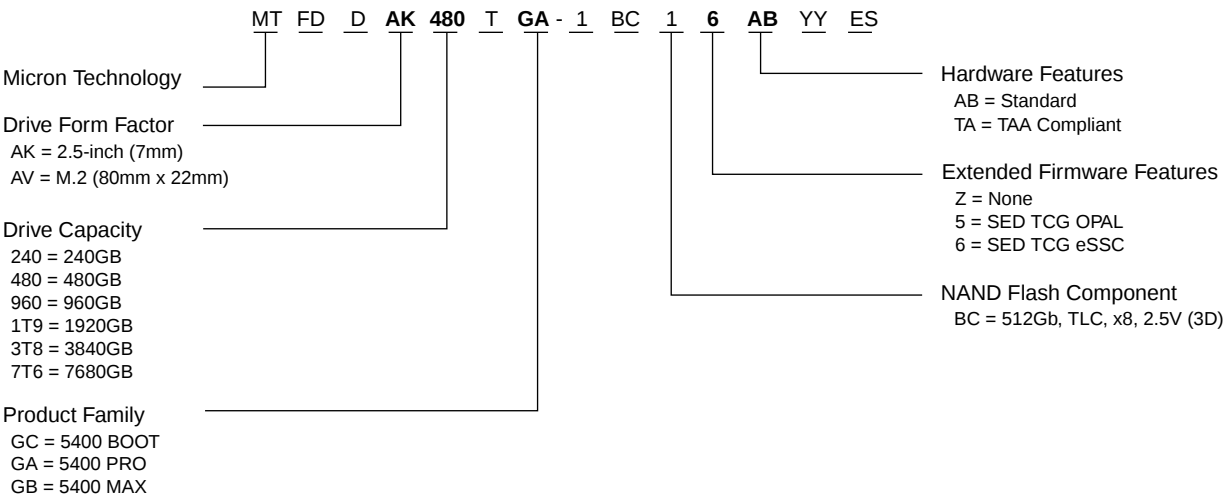
- Micron® 3D TLC NAND Flash
- Three performance/endurance levels
 - BOOT
 - PRO
 - MAX
- TCG Enterprise and TCG Opal 2.0 compliant self-encrypting drive (SED) options
- SATA 6 Gb/s interface
- ATA modes supported
 - PIO mode 3, 4
 - Multiword DMA mode 0, 1, 2
 - Ultra DMA mode 0, 1, 2, 3, 4, 5, 6
- 512-byte sector size support
- Hot-plug capable (2.5-inch only)
- ATA-8 ACS-4 command set compliant
- Security erase command set: fast and secure erase
- Performance (steady state)¹
 - Sequential 128KB read: Up to 540 MB/s
 - Sequential 128KB write: Up to 520 MB/s
 - Random 4KB read: Up to 95,000 IOPS
 - Random 4KB write: Up to 65,000 IOPS
- Endurance³: Total bytes written (TBW)
 - BOOT: Up to 438TB
 - PRO: Up to 10,512TB
 - MAX: Up to 23,827TB
- Reliability
 - MTTF: 3.0 million device hours²
 - Static and dynamic wear leveling
 - Uncorrectable bit error rate (UBER): <1 sector per 10¹⁷ bits read
 - End-to-end data protection
 - Enhanced power-loss data protection with data protection capacitor monitoring
- Self-monitoring, analysis, and reporting technology (SMART) command set
- Capacity³ (unformatted): 240GB, 480GB, 960GB, 1920GB, 3840GB, 7680GB
- Mechanical:
 - 2.5-inch x 7.0mm form factor
 - M.2 Type 2280 form factor
- RoHS-compliant package
- Secure field-upgradeable firmware with digitally signed firmware image
- Operating temperature
 - Commercial (0°C to 70°C)⁴

- Notes: 1. Performance varies by capacity and endurance.
 2. The product achieves a MTTF based on population statistics not relevant to individual units.
 3. 1GB = 1 billion bytes; formatted capacity is less.
 4. As reported by SMART.

Part Numbering Information

Micron’s 5400 SSD is available in different configurations and densities. The chart below is a comprehensive list of options for the 5400 series devices; not all options listed can be combined to define an offered product. Visit micron.com for a list of valid part numbers.

Figure 1: Part Number Chart



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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/HBA 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. Performance is measured using a single drive direct attached (no RAID) to an integrated SATA controller.

Table 1: Drive Performance – BOOT M.2

Parameter	Capacity	Unit
	240GB	
Sequential read (128KB transfer)	540	MB/s
Sequential write (128KB transfer)	290	MB/s
Random read (4KB transfer)	62,000	IOPS
Random write (4KB transfer)	12,000	IOPS
Random 70/30 R/W (4KB transfer)	24,000	IOPS
READ latency (99.9%)	170	µs
WRITE latency (99.9%)	390	µs

- Notes: 1. Performance measured using FIO with a queue depth of 32 in the steady state region.
 2. 4KB transfers with a queue depth of 1 are used to measure READ/WRITE latency values.
 3. System variations and HBA used will affect measured results.

Table 2: Drive Performance – PRO M.2/2.5"

Parameter	Capacity						Unit
	240GB	480GB	960GB	1920GB	3840GB	7680GB	
Sequential read (128KB transfer)	540	540	540	540	540	540	MB/s
Sequential write (128KB transfer)	350	520	520	520	520	520	MB/s
Random read (4KB transfer)	75,000	95,000	95,000	95,000	95,000	93,000	IOPS
Random write (4KB transfer)	37,000	37,000	33,000	33,000	30,000	10,500	IOPS
Random 70/30 R/W (4KB transfer)	49,000	59,000	58,000	58,000	51,000	30,000	IOPS
READ latency (99.9%)	170	170	170	170	170	170	µs
WRITE latency (99.9%)	150	42	80	120	210	400	µs

- Notes: 1. Performance measured using FIO with a queue depth of 32 in the steady state region.
 2. 4KB transfers with a queue depth of 1 are used to measure READ/WRITE latency values.
 3. System variations and HBA used will affect measured results.

Table 3: Drive Performance – MAX 2.5"

Parameter	Capacity				Unit
	480GB	960GB	1920GB	3840GB	
Sequential read (128KB transfer)	540	540	540	540	MB/s
Sequential write (128KB transfer)	520	520	520	520	MB/s
Random read (4KB transfer)	95,000	95,000	94,000	95,000	IOPS
Random write (4KB transfer)	58,000	65,000	63,000	34,000	IOPS
Random 70/30 R/W (4KB transfer)	69,000	77,000	79,000	63,000	IOPS
READ latency (99.9%)	170	170	170	170	μs
WRITE latency (99.9%)	36	35	120	90	μs

Notes: 1. Performance measured using FIO with a queue depth of 32 in the steady state region.
2. 4KB transfers with a queue depth of 1 are used to measure READ/WRITE latency values.
3. System variations and HBA used will affect measured results.

Endurance

Endurance for the SSD can be predicted based on the usage conditions applied to the device, the internal NAND component cycles, the write amplification factor, and the wear-leveling efficiency of the drive. Total bytes written measured with 55°C case temperature within the total bytes written values listed in this document. The table below shows the drive lifetime for each SSD capacity based on predefined usage conditions.

Table 4: Drive Lifetime

Capacity	Drive Lifetime (Total Bytes Written)			Unit
	BOOT	PRO	MAX	
240GB	438	657	2190	TB
480GB	–	1324	4380	
960GB	–	2628	8760	
1920GB	–	5256	17,520	
3840GB	–	8410	24,528	
7680GB	–	9110	–	

Notes: 1. Total bytes written were calculated assuming drive is 100% full (user capacity) and a workload of 100% random, aligned 4KB writes.
2. 1TB = 1,000,000,000,000 bytes

Electrical Characteristics

Table 5: SATA Power Consumption – 2.5-inch

Capacity	Idle Average	Sequential Write (128KB transfer)	Sequential Read (128KB transfer)
240GB	1.5W	3W	2.5W
480GB	1.5W	3.1W	2.5W
960GB	1.5W	3.1W	2.8W
1920GB	1.5W	3.6W	3.0W
3840GB	1.5W	3.8W	2.8W
7680GB	1.5W	3.9W	2.8W

Notes: 1. Data taken at 25°C using a 6 Gb/s SATA interface.

2. Sequential power measured during Iometer with 128KB transfer, RMS average over a 500ms window.

Table 6: SATA Power Consumption – M.2 Type 2280

Capacity	Idle Average	Sequential Write (128KB transfer)	Sequential Read (128KB transfer)
240GB	1.5W	3W	2.5W
480GB	1.5W	3.1W	2.5W
960GB	1.5W	3.1W	2.8W

Notes: 1. Data taken at 25°C using a 6 Gb/s SATA interface.

2. Sequential power measured during Iometer with 128KB transfer, RMS average over a 500ms window.

Table 7: Operating Voltage

Parameter/Condition	Symbol	Min	Max	Unit
Voltage input (2.5-inch) ¹	V12	10.8	13.2	V
	V5	4.5	5.5	V
Voltage input (M.2)	3V3	3.14	3.46	V
Operating temperature ²	T _C	0	70	°C
Non-operating temperature	–	–40	85	°C
Rate of temperature change	–	–	20	°C/hour
Relative humidity (non-condensing)	–	5	95	%

Notes: 1. 5V supply required; 12V supply optional

2. Based upon drive temperature reported by SMART

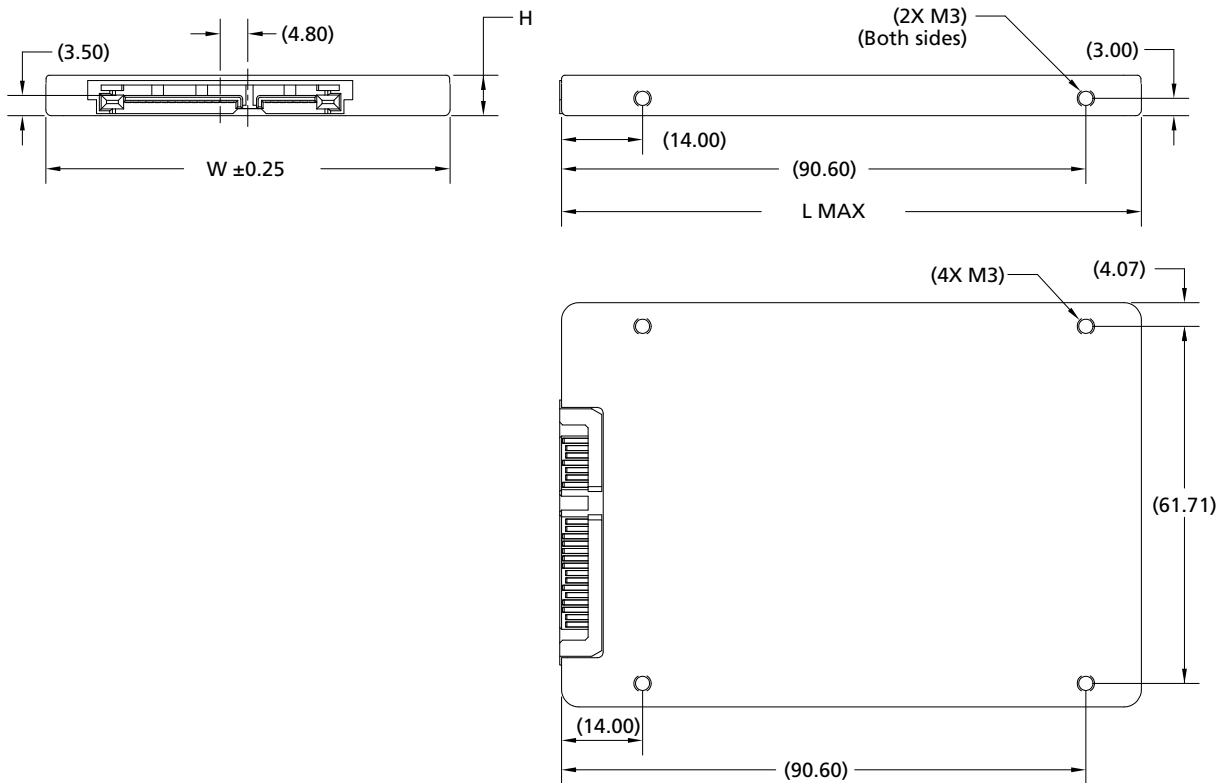
Physical Configuration

2.5-Inch 7mm

Screw: M3 x 0.5 with a maximum of 5mm encroachment into the SSD

Torque: Maximum of 4 in-lbs @ 200 rpm with an actuation style lever

Figure 2: 2.5-Inch Package – 7mm

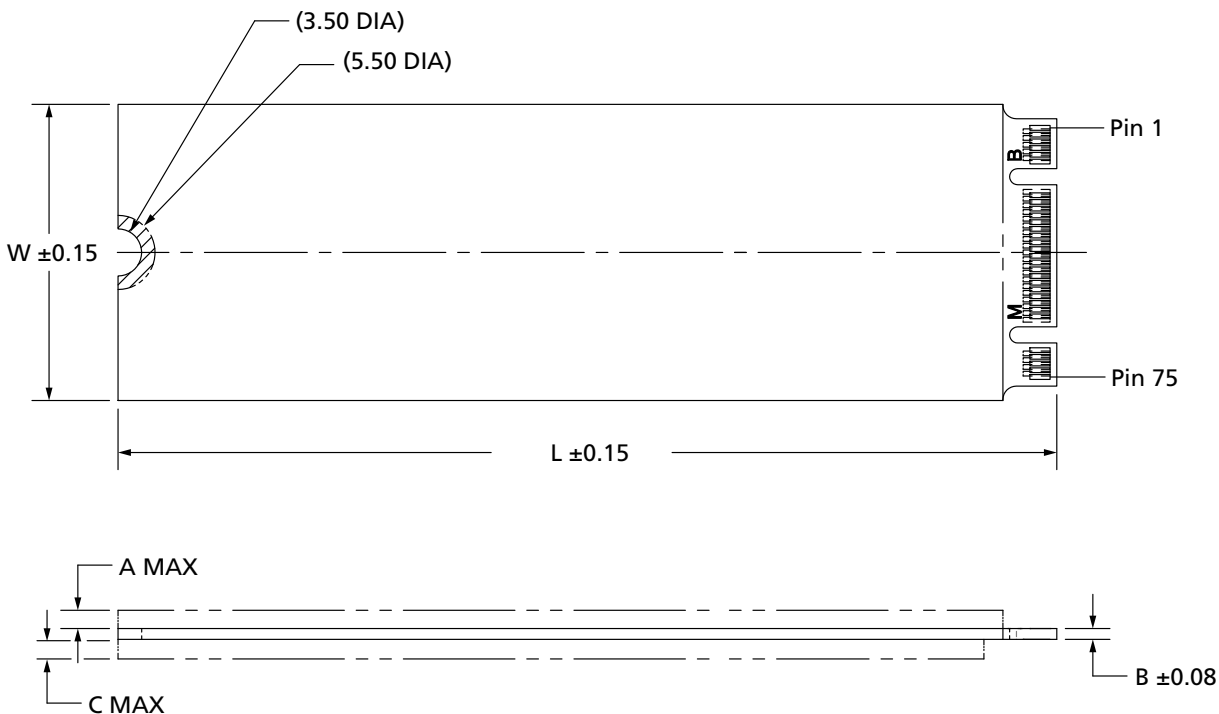


Note: 1. All dimensions are in millimeters.

M.2 2280

Physical dimensions conform to the applicable form factor specifications as listed in the figure below.

Figure 3: M.2 Type 2280 Package



Note: 1. All dimensions are in millimeters.

Compliance

Micron SSDs comply with the following:

- Micron Green Standard
- Built with sulfur resistant resistors
- CE (Europe): EN 55032 Class B, RoHS
- UKCA (UK): SI 2016/1091 Class B and SI 2012/3032 RoHS
- FCC: CFR Title 47, Part 15 Class B
- UL/cUL: approval to UL-60950-1, 2nd Edition, IEC 60950-1:2005 (2nd Edition); EN 60950-1 (2006) + A11:2009+ A1:2010 + A12:2011 + A2:2013
- BSMI (Taiwan): approval to CNS 13438 Class B and CNS 15663
- RCM (Australia, New Zealand): AS/NZS CISPR32 Class B
- KC RRA (Korea): approval to KN32 Class B, KN 35 Class B

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- TUV (Germany): approval to IEC60950/EN60950
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- UkrSEPRO (Ukraine): EN55032 Class B, IEC60950/EN60950, RoHS (Resolution 2017 No. 139)

Revision History

Rev. A – 09/2023

- Initial release

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