

PCIe NVMe SSD Module Datasheet

MKM280-680A030-256G-001

MKM280-660A029-512G-001

256GByte

512GByte

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1. Introduction

MK PCIe Series solid-state drive is a high-performance PCIe NVMe solution that is up to 3x faster than SATA-based SSDs and 40x faster than a 7200RPM hard-disk drive. Using a PCIe Gen 3.0 x4 interface and a 4-channel SMI SM2263XT controller, this drive features multi-cores to help power users blaze through even the toughest projects with high-speed data transfers of up to 2100MB/s.

PCIe NVMe SSD uses native OS drivers support HMB (Host Memory Buffer) feature takes advantage of the DMA capabilities of PCI Express to allow SSDs to use some of the DRAM attached to the CPU, instead of requiring the SSD to bring its own DRAM.

PCIe NVMe SSD is NVMe 1.3 compliant which allows users to take full advantage of the high throughput, IOPS and low latency that is available to systems that support NVMe. This protocol was designed specifically to support Flash-based storage versus SATA, which was developed for traditional spinning disks. It removes performance bottlenecks and provides the system with instant access to the device once the SSD is installed.

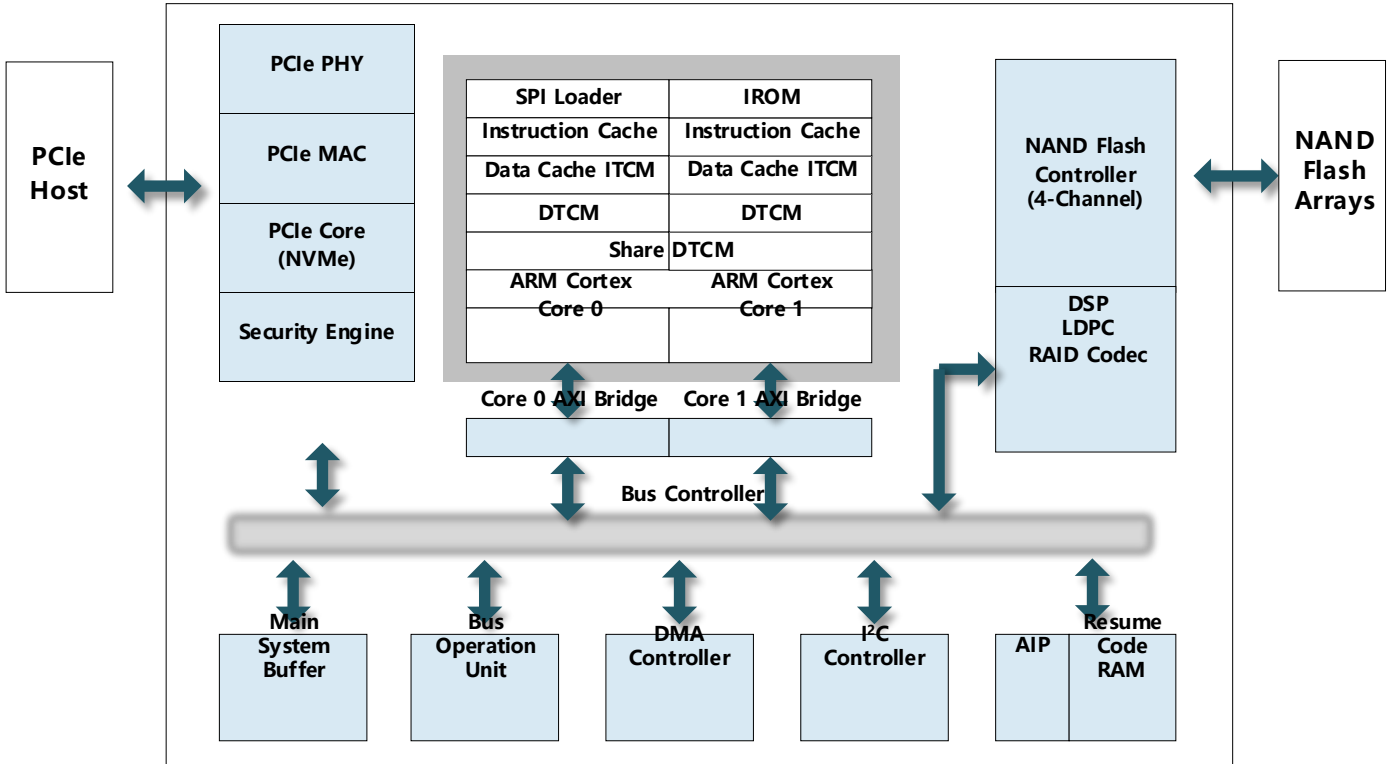
PCIe NVMe SSD is easily installed standard M.2 2280. There is a range of capacities available from 258GB to 1TB.

2. Controller Key Feature

SM2263XT

- ◆ **Host Interface**
 - PCIe Gen3 x4 Lane with L1.2 support
 - Compliant with PCIe 3.1
 - NVMe 1.3 register interface and command set
- ◆ **Data Integrity and Security**
 - Built-in AES-128/256 Encryption
 - TCG OPAL 2.0 compliant
 - Built-in hardware SHA256 and True Random Number Generator (TRNG)
- ◆ **Dual ARM Cortex R5 CPU @ 500MHz**
- ◆ **Power Management**
 - Support different power states (PS0, PS1, PS2, PS3, PS4)
 - PS4 power consumption under 2mW
 - Thermal throttling is supported with configurable temperatures
- ◆ **NAND Flash interface**
 - Supports 8 flash channel with 4 chip enable (CE) pins per channel
 - Support ONFI v4.0 and Toggle 3.0 interface, frequency up to 667MT/s
 - Support Async. SDR, Sync. DDR and Toggle DDR NAND
 - Support flash I/O power 1.8V/1.2V operation
 - Programmable driving strength fits different types of NAND configurations
- ◆ **Peripherals**
 - SPI bus interface to allow controller to boot up from external ROM
 - UART interface for debugging
 - Two temperature sensors at different locations on chip
- ◆ **Data Reliability**
 - Performance-optimized LDPC engine provides maximum error correction capability for 2D MLC/TLC as well as 3D MLCTLC
 - End-to-end data path protection with CRC parity (512Byte + 2Byte)
 - SECCDED SRAM ECC error handling and prevention on major memory buffers
 - RAID engine provides multi-page protection for NAND flash data
- ◆ **Package**
 - Lead-free and RoHS compliant

3. Block Diagram



4. Module Specification

PCIe NVMe SSD w/ SMI SM2263XT	
Interface	NVMe PCIe Gen 3.0 x 4 Lanes
Form Factor	M.2 2280
Disk Capacity	256GB, 512GB
Seq. Read/Write	2,000/1,000MB/s 2,100/1,600MB/s
Random 4K Read/Write	256GB - up to 120K (200K HMB)/180K IOPS 512GB - up to 140K (200K HMB)/200K IOPS
TBW	256GB - 140TB 512GB - 280TB
Power Consumption	0.03W idle / 2W avg. 2.1W (MAX) read / 7W (MAX) write
Storage Temp.	-40°C to 85°C
Operating Temp.	0°C to 70°C
Dimensions	80mm x 22mm x 3.5mm (M.2)
Weight	8~11g
Vibration@ Operating	2.17G peak (7-800Hz)
Vibration@ Non-Operating	20G peak (20-1000Hz)
MTBF	1,500,000hrs
Warranty	limited 3-years warranty with free technical support

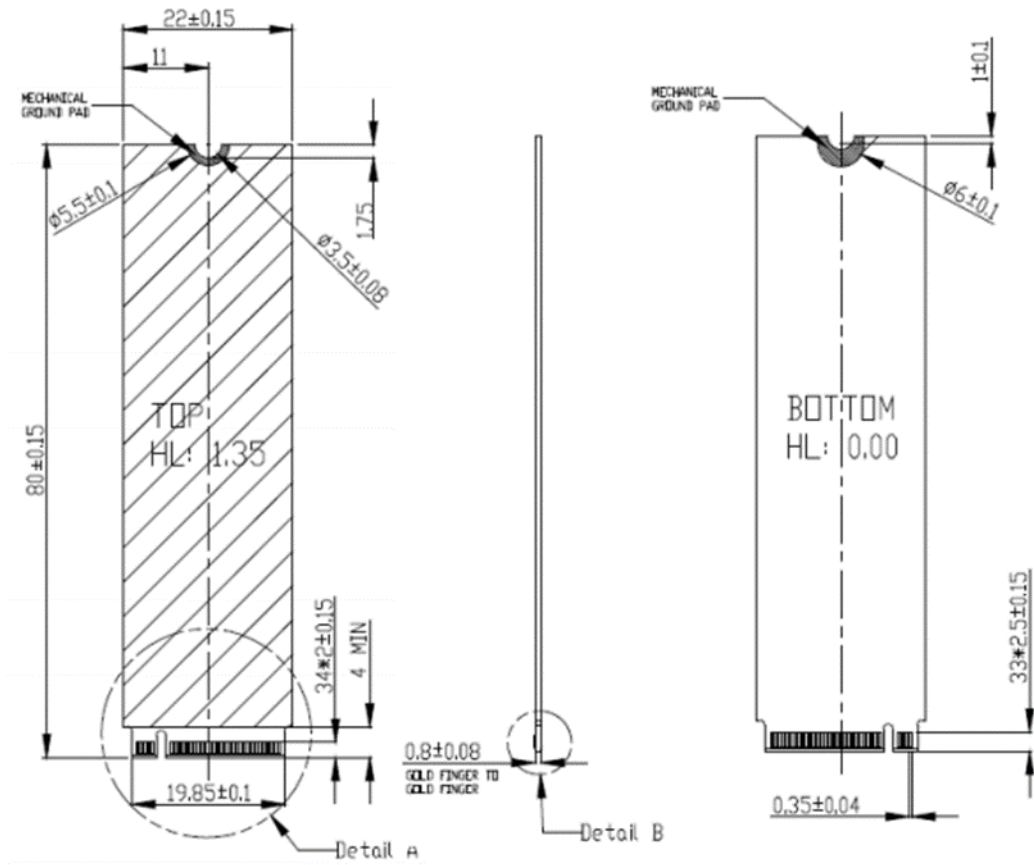
* Read/Write performance is base max. performance can be measured, speed may vary due to host hardware, software and usage.

* Total Bytes Written (TBW) is derived from the JEDEC Client Workload (JESD219A)

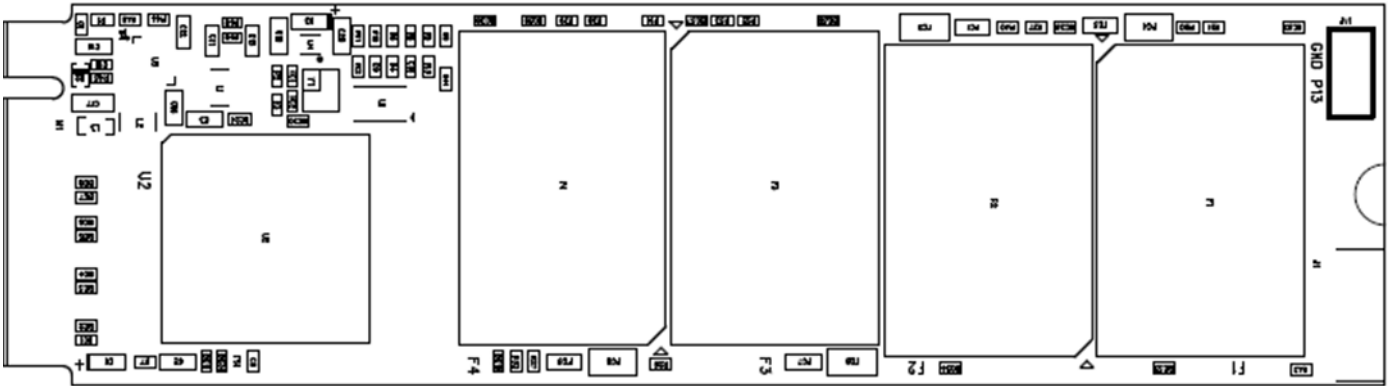
* Limited warranty based on 3-year or “Percentage Used” based on TBW limit

5. Mechanical Form Factor

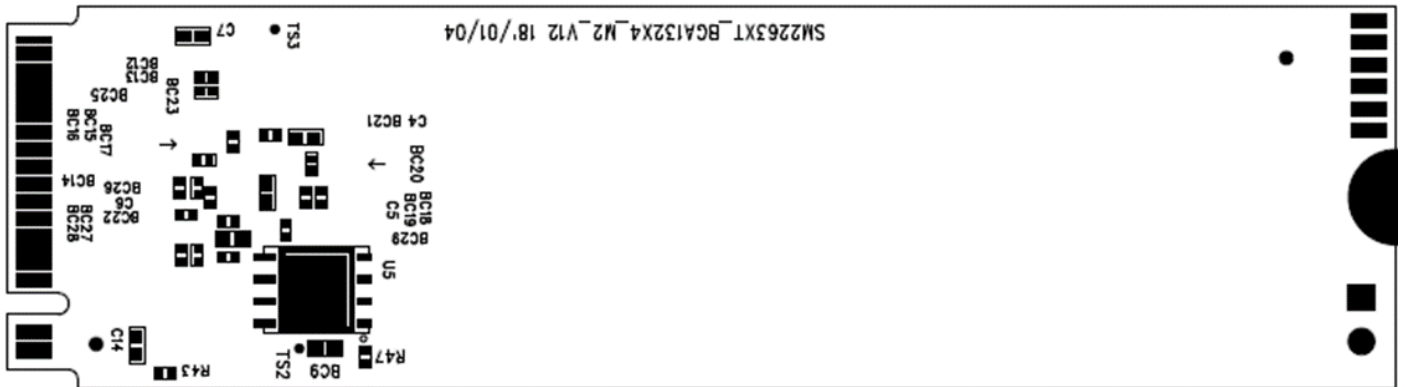
M.2 2280



TOP View



Bottom View



6. Packing Info

