EMBEDDED



PHISON Gen4-tify with Premium Performance

Phison PS5018-E18DI (Phison E18DI) is a marketproven PCIe Gen4 SSD controller IC solution boasting top-notch sequential read speed exceeding 7,000 MB/s. As a robust adaptation of the E18DI solution with highquality components and advanced error correction, the E18DI is born for the challenges from missioncritical environments. From the freezing depths of space to demanding terrestrial environments, the E18DI will perform consistently at high level in extreme temperature conditions.

Applications

Aerospace and Defense Deployments Factory Automation Applications High-end Medical Subsystems Edge Computing Endpoints Embedded Automotive Technologies PHISON PS5018-E18DI

Product Features

Industry-leading Performance

Manufactured using TSMC's 12nm process technology, the E18DI is optimized for a PCIe Gen4x4 interface, enabling SSDs with maximized bandwidths and link efficiency. Paired with state-of-the-art 3D NAND flash memory chips, the E18DI handles application payloads immaculately with minimal latency.

Triple-threat Data Protection

Phison's triple-layered data protection combines advanced NAND flash ECC, SmartECC[™] engine, and End-to-end Data Protection to ensure secure data transmission with reliable performance. The combination of technology safeguards against data corruption and ensures data integrity in even the most challenging environments.

Wide-range Temperature Durability

Paired with selected premium NAND flash and dexterous firmware mechanisms, the E18DI operates smoothly in extreme temperatures from -40°C to 85°C. Its reliable performance in demanding environments makes it a dependable choice for applications that require an all-in-one package of ruggedness, consistency, and reliability.

Space-Ready Reliability

Phison E18DI's ultra-reliable design passed rigorous aerospace flight qualification tests, including simulations of pressure and torque during rocket launches, as well as vacuum- and electromagneticinduced environment influences. The E18DI's space readiness is proven at deep cryogenic temperatures and certified with NASA's TRL-6 standard.

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CONTROLLER

PS5018-E18DI

Features	Specifications		
Host Interface	- PCle Gen 4x4 (Bandwidth: 16GT/s x4) - Backward compatible with existing PCle generation transfer rates - Compliance with PCI Express Base Specification Revision 3.1 - Compliance with NVMe 1.4		
Processor	- Triple-CPU architecture with built-in Arm Cortex-R5 - TSMC 12nm process technology		
Flash Controller	- Up to 8 Channels with 32 Chip Enable (CE) counts - Flash transfer rate up to 1600MT/s - Capacity up to 4TB - Support 3D TLC NAND flash memory - Flash I/O operating voltage supply 1.2V/1.8V		
DRAM Controller	- DDR4 (2666Mbps)		
Data Reliability	- Phison 4th generation LDPC ECC & RAID ECC - DDR ECC engine - End-To-End Data Path Protection		
Security	- TCG Pyrite - NVMe Format - Physical Presence SID (PSID) - Manufacturer's Secure ID (MSID) - Sanitize Operation - TCG Opal - AES 256		
Performance	- Sequential Read up to 7200MB/s - Sequential Write up to 6500MB/s - 4K Random Read up to 1000K IOPS - 4K Random Write up to 1000K IOPS		
Power Management	- L1.2 < 3mW (Optional)		
Temperature Range	- Operating range: 0~70 °C - Storage range: -40~85 °C		
Package	- 529-ball FCCSP, 12 mm x 12 mm		
Peripheral	- Built-in internal thermal sensor - GPIO pins - Built-in UART function - I2C and SPI for external ROM		



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Find more information and resources at: phisonblog.com and phison.com

SOLUTIONS

PS5018-E18DI

Product Series	MPD663		MPD665		
Interface	PCIe 4.0 x4 NVMe 1.4	PCle 4.0 x4 NVMe 1.4	PCIe 4.0 x4 NVMe 1.4	PCle 4.0 x4 NVMe 1.4	
Form Factor	M.2 2280	M.2 22110	M.2 2280	M.2 22110	
NAND Flash	3D TLC	3D TLC	3D TLC	3D TLC	
Capacity (1)	480 GB to 3840 GB	3840 GB / 7680 GB	480 GB to 1920 GB	3840 GB	
	Performance (2.3.4.5)				
Sequential Read	7200 MB/s	7200 MB/s	6000 MB/s	4300 MB/s	
Sequential Write	6500 MB/s	6300 MB/s	1700 MB/s	1700 MB/s	
4K Random Read	900K IOPS	950K IOPS	600K IOPS	340K IOPS	
4K Random Write	1000K IOPS	1000K IOPS	55K IOPS	45K IOPS	
	Power ⁽⁶⁾				
Supply Voltage	3.3V ± 5%	3.3V ± 5%	3.3V ± 5%	3.3V ± 5%	
Active (Average)	10.9 W	10.9 W	11.55 W	11.55 W	
Idle	2000 mW	2000 mW	4200 mW	4200 mW	
Low Power PS4 (L1.2) (Optional)	5 mW	5 mW	5 mW	5 mW	
Environmental					
Operating Temperature	0°C - 70°C (Normal Temp.) -40°C - 85°C (Wide Temp.)		-25°C - 85°C (Wide Temp.)		
Non-Operating Temperature	-40°C - 85°C				
Certification	- RoHS				
	Reliability & Warranty				
TBW (Max) (7)	6800 TB (3-year)	15200 TB (3-year)	3800 TB (5-year)	7600 TB (5-year)	
Warranty	3 years		5 years		
MTBF	2.0 million hours		2.0 million hours		
UBER	<10 ⁻¹⁶ bits		<10 ^{.17} bits		
Advanced Features	- Self Encrypting Function(Optional) : AES, TCG Opal, TCG Pyrite - SamrtECC™ : LDPC + RAID ECC - Thermal Protection Mechanism - Security Function (Optional) : Write Protect, Quick Erase, Data Destroy				

⁽¹⁾ 1 GB = 1,000,000,000 bytes.

⁽²⁾ MPD663 Sequential Performance is based on CrystalDiskMark 7.0, 1 GB range, QD=32, Thread=1 , and test drive set as secondary

⁽³⁾ MPD663 Random Performance is based on IOMeter, 1 GB range, 4K data size, QD=128, 16 worker, 4K aligned

⁽⁴⁾ MPD665 Sequential Performance is based on FIO on Linux: 128K sequential write with QD32 and worker 1 for full drive

⁽⁵⁾ MPD665 Random Performance is based on FIO on Linux: 4KB random write with QD256(QD32, worker 8) for full drive

⁽⁶⁾ Power consumption is measured during the sequential read and write operations performed by CrystalDiskMark with the conditions described in

(2)~(5)

(7) TBW is Total Bytes Written and the results are obtained in compliance with JEDEC219A Standards



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