PHISON

EMBEDDED



Cool and Collected On The Edge

Phison PS5012-E12DI (Phison E12DI) is a mature industrial grade adaptation of Phison's market-proven the E12DI NAND flash controller IC solution that brings true PCIe Gen3 storage performance in the shape of U.2 SSDs. Enabled with high capacity, advanced thermal resistance, and extensive power loss protection measures, the E12DI is well-prepared to tackle longwearing data logging and edge computing missions.

Applications Satellite Application Data Logging System Rugged Tablet Media System PHISON PS5012-E12DI

Product Features

Steady Performance

As a fully mature DDR4 DRAM-equipped PCIe Gen3 solution, the E12DI is able to attain top-notch sequential performance reaching above 3300MB/s while sustaining consistent performance with minimal latency. It is ideal for edge computing and media playback devices in need of the Gen3 3GB/s bandwidth.

Power Loss Protection

A combination of mounted capacitors, along with mission-specific circuits built into the controller IC, is tasked with preventing data corruption during abnormal power losses. Phison E12DI can be counted on with that extra layer of protection needed in applications with zero tolerance for mishandled data.

Excellent Scalability

The E12DI supports up to 8 NAND flash data transmitting channels with up to 64 Chip Enable (CE) counts running on mainstream NAND flash interfaces in ONFI and Toggle and allowing capacity scaling from 240 GB up to 15 TB.

Wide-range Temperature Durability

Paired with selected premium NAND flash and dexterous firmware mechanisms, the E12DI 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.

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CONTROLLER

PS5012-E12DI

Features	Specifications	
Host Interface	- PCIe Gen 3x4 (Bandwidth: 8GT/s x4) - Backward compatible with existing PCIe generation transfer rates - Compliance with PCI Express Base Specification Revision 3.1 - Compliance with NVMe 1.3	
Processor	- Dual-CPU architecture with built-in Arm Cortex-R5 - TSMC 28nm process technology	
Flash Controller	- Up to 8 Channels with 64 Chip Enable (CE) counts - Flash transfer rate up to 667MB/s - Capacity up to 8TB - Support 3D TLC NAND flash memory - Flash I/O operating voltage supply 1.2V/1.8V	
DRAM Controller	- DDR4 (1600Mbps)	
Data Reliability	- Phison LDPC ECC & RAID ECC - DDR ECC engine - End-To-End Data Path Protection	
Security	- TCG Pyrite - NVMe Format - TCG Opal - AES 256	
Performance	- Sequential Read up to 3300MB/s - Sequential Write up to 3100MB/s - 4K Random Read up to 650K IOPS - 4K Random Write up to 650K IOPS	
Power Management	- L1.2 < 2mW (Optional)	
Temperature Range	- Operating range: 0~70 °C - Storage range: -40~85 °C	
Package	- 529-ball TFBGA, 16 mm x 16 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

PS5012-E12DI

Product Series	MPD260		
Interface	PCIe 3.0 x4 NVMe 1.3d		
Form Factor	U.2	M.2 2280	
NAND Flash	3D TLC		
Capacity (1)	480 GB to 15360 GB	240 GB to 1920 GB	
	Performance (3,4)		
Sequential Read	3300 MB/s	3300 MB/s	
Sequential Write	1000 MB/s	1000 MB/s	
4K Random Read	600K IOPS	200K IOPS	
4K Random Write	200K IOPS	200K IOPS	
	Power ⁽⁵⁾		
Supply Voltage	12V ± 5%	3.3V ± 5%	
Active (Average)	7.5 W	5.7 W	
Idle	2300 mW	2000 mW	
Low Power PS4 (L1.2) (Optional)	5 mW	5 mW	
	Environmental		
Operating Temperature	0°C - 70°C (Normal Temp.) -40°C - 85°C (Wide Temp.) ⁽⁶⁾		
Non-Operating Temperature	-40°C - 85°C		
Certification	- RoHS		
	Reliability & Warranty		
TBW (Max) (7)	25000 TB	3200 TB	
Warranty	3 years		
MTBF	2.0 million hours		
UBER	<10 ⁻¹⁶ bits		
Advanced Features	- Self Encrypting Function(Optional) : AES, TCG Opal, TCG Pyrite - SamrtECC™ : LDPC + RAID ECC - Thermal Protection Mechanism - Security Function: Write Protect, Secure Erase		

(1) 1 GB = 1,000,000,000 bytes

⁽²⁾ Paired with micron B16C 3D TLC flash and M.2 2280 form factor, minimum capacity is 120GB

⁽³⁾ Sequential Performance is based on CrystalDiskMark 6.0, 1 GB range, QD=32, Thread=1

⁽⁴⁾ Random performance is based on IOMeter, 1 GB range, 4K data size, QD=32

⁽⁵⁾ Power consumption is measured during the sequential read and write operations performed by CrystalDiskMark with the conditions described in (2) ⁽⁶⁾ 3840GB only support normal operating temperature (0°C - 70°C)

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



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