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Rock-steady, Trustworthy

Phison PS3112-S12DI (Phison S12DI) is a market-proven NAND flash controller solution that takes full advantage of the SATA III interface. With a generous allowance of maximum chip-enabled-per-channel count, the S12DI powers high-density SATA SSDs with rock-steady performance to tackle diverse in-field workloads. And to battle harsh external environments, the S12DI module solutions come with various reinforcement measures to attend to thermal, power, and physical challenges.

Applications

Edge Computing Devices

Data Logging Subsystems

Medical-use System Boot-ups

Surveillance Applications

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PS3112-S12DI

Product Features

Steady Performance

As a fully mature DRAM-equipped SATA solution, the S12DI is able to reach for ceiling-touching sequential performance up to 550MB/s while sustaining consistent performance with minimal latency. It is ideal for edge computing devices in need of the full SATA potential.

Excellent Scalability

Phison S12DI supports up to 8 NAND flash data transmitting channels with up to 32 Chip Enable (CE) counts running on mainstream NAND flash interfaces in ONFI and Toggle and allowing capacity scaling from 240 GB up to 7680 GB.

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 S12DI can be counted on with that extra layer of protection needed in applications with zero tolerance for mishandled data.

Wide-range Temperature Durability

Paired with selected premium NAND flash and dexterous firmware mechanisms, the S12DI 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.

CONTROLLER

PS3112-S12DI

Features	Specifications
Host Interface	- SATA III interface - Backward compatible with existing SATA generation transfer rates - Compliance with SATA Revision 3.2
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 Toggle/ONFI interface - Capacity up to 8TB - Support 3D TLC NAND flash memory - Flash I/O operating voltage supply 1.2V/1.8V
DRAM Controller	- DDR3L (16 bit, 1600Mbps) - DDR4 (8/16 bit, 1600Mbps)
Data Reliability	- Phison LDPC ECC & RAID ECC - DDR ECC engine - End-To-End Data Path Protection
Security	- TCG Pyrite - TCG Opal - AES 256
Performance	- Sequential Read up to 550MB/s - Sequential Write up to 530MB/s - 4K Random Read up to 98K IOPS - 4K Random Write up to 90K IOPS
Temperature Range	- Operating range: 0~70 °C(Normal Temp.), -40 °C ~85 °C (Wide Temp.) - 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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SOLUTIONS

PS3112-S12DI

Product Series	MSD260		
Interface	SATA III Revision 3.1		
Form Factor	2.5"	M.2 2280	M.2 2242
NAND Flash	3D TLC	3D TLC	3D TLC
Capacity [1]	240 GB to 7680 GB	240 GB to 1920 GB	240 GB to 480 GB
Performance [2,3]			
Sequential Read	550 MB/s	550 MB/s	550 MB/s
Sequential Write	530 MB/s	530 MB/s	340 MB/s
4K Random Read	98K IOPS	98K IOPS	91K IOPS
4K Random Write	90K IOPS	90K IOPS	85K IOPS
Power Consumption [4]			
Supply Voltage	+ 5V ± 5%	+3.3V ± 5%	+3.3V ± 5%
Active (Average)	3.7W	3.0W	2.4W
Idle	1500mW	1200mW	1200mW
Low Power PS4 (L1.2) (Optional)	No support	No support	No support
Environmental			
Operating Temperature	0°C - 70°C (Normal Temp.) -40°C - 85°C (Wide Temp.)		
Non-Operating Temperature	-40°C - 85°C		
Certification	- RoHS		
Reliability & Warranty			
TBW (Max) [5]	14000 TB	3259 TB	695 TB
Warranty	3 years		
MTBF	1.5 million hours		
UBER	$<10^{-16}$ bits		
Advanced Features	- Self Encrypting Function (Optional): AES 256, TCG Opal 2.0 - Hardware Power Loss data Protection (HW PLP) (Optional) - SamrtECC™: LDPC + RAID ECC - Thermal Protection Mechanism - Security Function (Optional): Write Protect, Quick Erase, Sanitize Command, Physical Presence SID (PSID) - 2.5" support seudo SLC (pSLC) mode		

[1] 1 GB = 1,000,000,000 bytes
[2] Sequential Performance is based on CrystalDiskMark 6.0.0, 1 GB range, QD=32, Thread=1
[3] Random Performance is based on IOMeter v1.1.0, 1GB range, 4K data size, QD=32
[4] Power consumption is measured during the sequential read and write operations performed by CrystalDiskMark with the conditions described in (2)
[5] TBW is Total Bytes Written and the results are obtained in compliance with JEDEC219A Standards.

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