

Controller

**PS5012-E12S**

Features	Specifications
<b>Host Interface</b>	<ul style="list-style-type: none"> <li>• PCIe Gen 3x4 (Bandwidth: 8GT/s x4)</li> <li>• Compatible with PCIe Gen I(2.5Gbps), Gen II(5Gbps), Gen III(8Gbps)</li> <li>• Compliance with PCI Express Base Specification Revision 3.1</li> <li>• Compliance with NVMe 1.3</li> </ul>
<b>Processor</b>	<ul style="list-style-type: none"> <li>• Dual-CPU architecture with built-in 32-bit microcontroller</li> <li>• TSMC 28nm process technology</li> </ul>
<b>Flash Controller</b>	<ul style="list-style-type: none"> <li>• Up to 8 Channels with 32 chips enable (CE)</li> <li>• Flash transfer rate up to 667MT/s</li> <li>• Capacity up to 8TB</li> <li>• Support 3D TLC and QLC NAND flash memory</li> <li>• Compliance with Toggle 3.0 and ONFi 4.0</li> <li>• Flash I/O operating voltage supply 1.2V/1.8V</li> </ul>
<b>DRAM Controller</b>	<ul style="list-style-type: none"> <li>• DDR3L (16 bit, 1600Mbps)</li> <li>• DDR4 (8/16 bit, 1600Mbps)</li> </ul>
<b>Data Reliability</b>	<ul style="list-style-type: none"> <li>• Phison 3rd generation LDPC ECC &amp; RAID ECC</li> <li>• DDR ECC engine</li> <li>• End-To-End Data Path Protection</li> </ul>
<b>Security</b>	<ul style="list-style-type: none"> <li>• AES 256 encryption engine</li> <li>• Pyrite</li> <li>• TCG OPAL 2.0</li> </ul>
<b>Performance</b>	<ul style="list-style-type: none"> <li>• Sequential Read up to 3400MB/s</li> <li>• Sequential Write up to 3100MB/s</li> <li>• 4K Random Read up to 680K IOPS</li> <li>• 4K Random Write up to 670K IOPS</li> </ul>
<b>Power Management</b>	<ul style="list-style-type: none"> <li>• L1.2 &lt; 5mW</li> </ul>
<b>Temperature Range</b>	<ul style="list-style-type: none"> <li>• Operating range: 0~70°C</li> <li>• Storage range: -40~85°C</li> </ul>
<b>Package</b>	<ul style="list-style-type: none"> <li>• 529-ball HSLFBGA, 12 mm x 12 mm</li> </ul>
<b>Peripheral</b>	<ul style="list-style-type: none"> <li>• Built-in internal thermal sensor</li> <li>• GPIO pins</li> <li>• Built-in UART function</li> <li>• I2C and SPI for external ROM</li> </ul>

## Solutions

## PS5012- E12S

Capacity <sup>1</sup>	256GB	512GB	1024GB	2048GB	4096GB
Interface	PCIe Gen3x4 NVMe 1.3				
Form Factor	M.2 2280-S2, M2 2280-D2				
NAND Flash	3D TLC				
<b>Performance (Up to)<sup>2,3</sup></b>					
Sequential Read	3200 MB/s	3400 MB/s	3400 MB/s	3400 MB/s	3400 MB/s
Sequential Write	1300 MB/s	2400 MB/s	3100 MB/s	3100 MB/s	3000 MB/s
4K Random Read	210K IOPS	400K IOPS	680K IOPS	680K IOPS	580K IOPS
4K Random Write	315K IOPS	600K IOPS	670K IOPS	650K IOPS	650K IOPS
<b>Power <sup>4</sup></b>					
Supply Voltage	M.2 3.3V ± 5%				
Active Read (Average)	5.2W	5.4W	6.5W	6.3W	7.7W
Active Write (Average)	3.2W	4.9W	5.6W	5.9W	6.6W
PS3	16mW	16mW	16mW	26mW	24mW
Low Power PS4 (L1.2)	2mW	2mW	2mW	2mW	2mW
<b>Temperature</b>					
Operating <sup>5</sup>	0°C - 70°C				
Non-Operating	-40°C - 85°C				
Advanced Features	<ul style="list-style-type: none"> <li>• End-to-End Data Protection</li> <li>• Pyrite/OPAL Support</li> <li>• Thermal Monitoring</li> <li>• AHCI Support</li> </ul>				

<sup>1</sup> 1GB = 1,000,000,000 bytes

<sup>2</sup> 1MB/s = 1,000,000 bytes / second

<sup>3</sup> Performance is based on Crystal Disk Mark 6.0.0 for sequential test and Iometer for random test. Test size 1GiB. Test drive is set as secondary

<sup>4</sup> Measured power consumption during sequential read/write test on Crystal Disk Mark 6.0.0

<sup>5</sup> Operational temperature is measured by device temperature sensor

## Solutions

## PS5012- E12S

Capacity <sup>1</sup>	500GB	1000GB	2000GB	4000GB	8000GB
Interface	PCIe Gen3x4 NVMe 1.3				
Form Factor	M.2 2280-S2, M2 2280-D2				
NAND Flash	3D QLC				
<b>Performance (Up to)<sup>2,3</sup></b>					
Sequential Read	2000 MB/s	3400 MB/s	3400 MB/s	3400 MB/s	3400 MB/s
Sequential Write	950 MB/s	1900 MB/s	3000 MB/s	3000 MB/s	2900 MB/s
4K Random Read	95K IOPS	120K IOPS	250K IOPS	480K IOPS	600K IOPS
4K Random Write	250K IOPS	500K IOPS	650K IOPS	680K IOPS	660K IOPS
<b>Power <sup>4</sup></b>					
Supply Voltage	M.2 3.3V ± 5%				
Active Read (Average)	3.4W	3.9W	4.4W	4.9W	TBD
Active Write (Average)	3.3W	3.8W	5.4W	6.3W	TBD
PS3	20mW	20mW	20mW	20mW	TBD
Low Power PS4 (L1.2)	2mW	2mW	2mW	2mW	TBD
<b>Temperature</b>					
Operating <sup>5</sup>	0°C - 70°C				
Non-Operating	-40°C - 85°C				
Advanced Features	<ul style="list-style-type: none"> <li>• End-to-End Data Protection</li> <li>• Pyrite/OPAL Support</li> <li>• Thermal Monitoring</li> <li>• AHCI Support</li> </ul>				

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