



An Instant In-field Upgrade

As a fortified adaptation of the PS5013-E13TI, Phison PS5013-E13TI (Phison E13TI) adopts all the benefits of a cost-centric DRAM-less PCIe Gen3 SSD controller IC solution and more. On top of its consistent performance, the E13TI stands out with its refined power efficiency and robust hardware upgrades. With rich options in form factor deployment, the E13TI is a versatile solution designed for your perfect PCIe technology revamp.



Application

IPCs / Rugged Notebooks
Factory Automation Applications
Medical-use Tablets/Devices
Edge Logging Endpoints
Embedded Automotive Technologies

Product Features

Outstanding Cost-effectiveness

As a fully mature DRAM-less PCIe Gen3x4 solution, the E13TI is able to retain top-notch performance reaching above 2500MB/s in sequential read operations while enabling compelling cost-savings to create invaluable design-in opportunities in cost-sensitive business use cases.

Pseudo Single-level-cell (pSLC) Mode Support

With a combination of the pSLC technology, advanced ECC, and machine learning, the E13TI ensures system stability during extended periods of continuous operation. It is the optimal choice for flash storage applications that require reliable performance in extreme environments.

Deployment Versatility (IV)

Meant for storage in diverse electronic devices and subsystems in the PCIe Gen3 era, the E13TI is enabled on multiple form factors for flexible utility and adaptability. From generic M.2 and BGA SSDs to CFexpress cards, modules adopting Phison E13TI take on wide-ranging industrial and commercial applications as well as some cutting-edge 5G netcom equipments.

Wide-range Temperature Durability (I)

Paired with selected premium NAND flash and dexterous firmware mechanisms, the E13TI 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

PS5013-E13TI

Features	Specifications
Host Interface	<ul style="list-style-type: none">- PCIe Gen 3x4 (Bandwidth: 8GT/s x4)- Backward compatible with existing PCIe generation transfer rates- Compliance with PCI Express Base Specification Revision 3.0- Compliance with NVMe 1.3
Processor	<ul style="list-style-type: none">- Single-CPU architecture with built-in Arm Cortex-R5- TSMC 28nm process technology
Flash Controller	<ul style="list-style-type: none">- Up to 4 Channels with 16 Chip Enable (CE) counts- Flash transfer rate up to 800 MT/s- Capacity up to 2TB- Support 3D TLC NAND flash memory- Flash I/O operating voltage supply 1.2V/1.8V
Data Reliability	<ul style="list-style-type: none">- Phison 2nd generation LDPC ECC engine- End-To-End Data Path Protection
Security	<ul style="list-style-type: none">- NVMe Format- Sanitize Operation- SmartZIP- TCG Opal- AES 256
Performance	<ul style="list-style-type: none">- Sequential Read up to 2500MB/s- Sequential Write up to 1900MB/s- 4K Random Read up to 270K IOPS- 4K Random Write up to 420K IOPS
Power Management	<ul style="list-style-type: none">- L1.2 < 2.5 mW (Optional, default off)
Temperature Range	<ul style="list-style-type: none">- Operating range: 0°C - 70°C (Normal Temp.), -40°C - 85°C (Wide Temp.), -40°C - 105°C (Automotive Temp.)- Storage range: -40~85 °C, -40°C - 105°C (Automotive Temp.)
Package	<ul style="list-style-type: none">- 198-ball HSTFBGA, 7mm x 11mm- 216-ball TFBGA, 8 mm x 12 mm
Peripheral	<ul style="list-style-type: none">- Built-in internal thermal sensor- GPIO pins- Built-in UART function- I2C and SPI for external ROM

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Solutions

PS5013-E13TI

Product Serie		MPT160				MPT168
Interface		PCIe 3.0x4 NVMe 1.3d		PCIe 3.0x2 NVMe 1.3d		PCIe 3.0x2 NVMe 1.3d
Form Factor		M.2 2280	M.2 2242	M.2 2242 (BM Key)	BGA Type 1113	BGA Type 1620
NAND Flash		3D TLC	3D TLC	3D TLC	3D TLC	3D TLC
Capacity ^(1,2)		64GB - 2TB	64GB - 2TB	64GB - 2TB	64GB - 512GB	64GB - 512GB
Performance ^(3,4)						
Sequential Read		2450 MB/s	2450 MB/s	1700 MB/s	1700 MB/s	2200 MB/s
Sequential Write		1900 MB/s	1900 MB/s	1600 MB/s	1400 MB/s	1400 MB/s
4K Random Read		270K IOPS	270K IOPS	270K IOPS	180K IOPS	180K IOPS
4K Random Write		420K IOPS	420K IOPS	420K IOPS	300K IOPS	300K IOPS
Power Consumption ⁽⁵⁾						
Supply Voltage		+ 3.3V ± 5%			P1=2.5V, P2=1.2V, P3=0.9V	
Active (Average)		3.5 W	3.5 W	2.9 W	2.09 W	2.09 W
Idle		1500 mW	1500 mW	1500 mW	N/A	N/A
Low Power PS4 (L1.2) (Optional)		5 mW (default off)	5 mW (default off)	5 mW (default off)	3 mW	5 mW
Environmental						
Operating Temperature	Industrial	0°C - 70°C (Normal Temp.) -40°C - 85°C (Wide Temp.)			-40°C - 85°C	
	Automotive	N/A			-40°C - 105°C	N/A
Non-Operating Temperature		-40°C - 85°C			-40°C - 105°C	-40°C - 85°C
Certification		RoHS			- RoHS - MSL3	
Reliability & Warranty						
TBW (Max) ⁽⁶⁾		2400 TB	2400 TB	2400 TB	520 TB	520 TB
Warranty		3 years				
MTBF		2.0 million hours				
UBER		<10 ⁻¹⁶ bits				
Advanced Features						
<div><div></div><div><div><div>- End-to-End Data Protection</div><div>- Self Encrypting Function(Optional) : AES, TCG Opal, TCG Pyrite</div><div>- SamrECCTM : LDPC + RAID ECC</div><div>- Cross Die Bad Block Management</div><div>- SmartRefreshTM</div><div>- Thermal Protection Mechanism</div><div>- Security Function (Optional) : Crypto Erase, Secure Erase</div><div>- Firmware Upgrade</div><div>- Dynamic SLC cache, Over-provisioning(Optional)</div><div>- Read Only Mode (End of Life)</div></div></div></div>						

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

(2) 64 GB is supported by 128 GB with over-provision

(3) Sequential Performance is based on CrystalDiskMark 6.0, 1 GB range, QD=32, Thread=1, and test drive set as secondary

(4) Random Performance is based on IOMeter, 1 GB range, 4K data size, QD32T8, 4K aligned

(5) Power consumption is measured during the sequential read and write operations performed by CrystalDiskMark with the conditions described in (3)

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



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