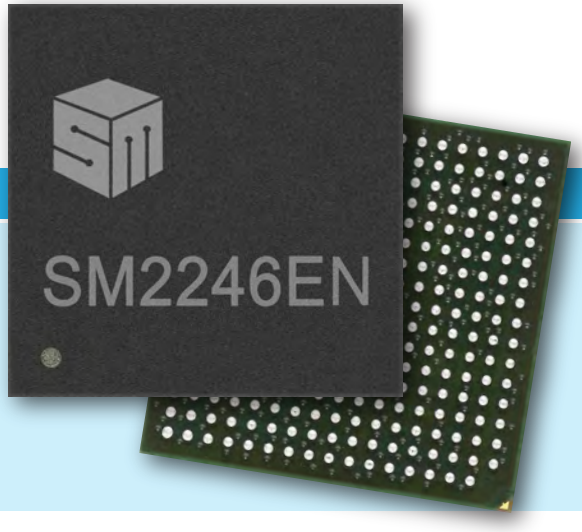
SiliconMotion



SM2246EN

SATA 6Gb/s SSD Controller

The SM2246EN is a high-performance SATA 6Gb/s SSD controller ideally suited for both client SSDs as well as NAND-cache drives used in low-cost and performance-enhancing hybrid storage solutions for PCs, Ultrabooks, tablet and other embedded applications. Its ultra-low power consumption effectively extends battery life and optimizes user experience. The SM2246EN fully supports the latest generation MLC/TLC/SLC* NAND in high-speed Toggle, ONFI, or Async mode, enabling the realization of high capacity and highly reliable SSDs on the market. In addition, SM2246EN incorporates advanced security protocols and is compliant with AES 128/256 and Trusted Computing Group (TCG) Opal full-drive encryption*.

KEY FEATURES

- **Ultra High Performance**
  - Sequential Read: 540 MB/s**
  - Sequential Write: 487 MB/s**
  - Random Read: 80,000 IOPS**
  - Random Write: 80,000 IOPS**
- **Best-in-class Low Power**
  - Average power consumption: 60mW
    (25% lower than the device power target of Intel 2014 Ultrabook Guidance with MobileMark'12)
- **Enhanced Security***
  - Real time full drive encryption with AES
  - TCG Opal protocol
  - Hardware SHA 256 and TRNG
- **Available in Commercial and Industrial Grades**







FEATURES

• Host Interface

- Industrial Standard SATA Revision 3.1 compliant
- Industrial Standard ATA/ATAPI-8 and ACS2 command compliant
- Supports SATA interface rate of 6Gb/s (backward compatible to 1.5Gb/s and 3Gb/s)
- Native Command Queuing up to 32 commands
- SATA Device Sleep (DevSleep)
- Data Set Management command (TRIM)
- Self-Monitoring, Analysis, and Reporting Technology (S.M.A.R.T.)
- Supports PHY Sleep mode (CFast PHYSLP)
- Supports 28-bit and 48-bit LBA (Logical Block Addressing) mode commands

• NAND Flash Support

- Supports 4 channels of NAND flash devices with up to 8 Chip Selects per channel
- Supports 1.8V/3.3V Flash I/O
- ONFI 3.0 Synchronous/Asynchronous interface
- Toggle 2.0 interface
- EDO mode support
- Supports 1x/1y/1z/2x/2ynm MLC, TLC and SLC*
- Supports 8KB and 16KB page size
- Supports 1-plane, 2-plane, and 4-plane operation

• DRAM Interface

- 16-bit wide DRAM interface
- Supports DDR2/DDR3/DDR3L

• Data Protection and Reliability

- Supports ATA8 security feature set
- Supports data security erase and quick erase
- Hardware BCH ECC capable of correcting errors up to 66-bit/1KB
- Internal data shaping technique increases data endurance
- Global wear leveling algorithm evens program/erase count and maximizes SSD lifespan
- Software/Hardware write protect option
- StaticDataRefresh technology ensures data integrity
- Early weak block retirement option

• Architecture

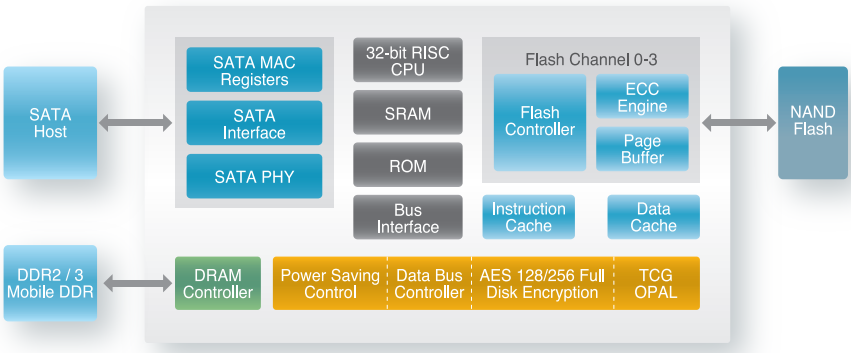
- 32-bit RISC CPU
- High-efficiency 64-bit system bus
- Automatic sleep and wake-up mechanism to save power
- Built-in voltage detectors for power failure protection
- Built-in power-on reset and voltage regulators
- Built-in temperature sensor for SSD temperature detection
- Supports JTAG emulator interface, bidirectional UART (RS-232) interface, and I2C master/slave interface for on-system debug

• Upgradeable Firmware

- Supports firmware in system programming (ISP) function for firmware upgrade

* The enhanced security firmware support will be available in Q4 2014.
** 256GB SSD with Toshiba 19nm MLC

BLOCK DIAGRAM



SPECIFICATIONS

Host Standards	**SATA 6Gb/s**
ATA Protocol	**ATA-8**
Flash I/F	**4 Channel**
CE/Channel	**8**
Commercial Temperature	**0°C to + 70°C**
Industrial Temperature	**-40°C to + 85°C**
Package	**288-ball TFBGA**

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