The SM2258 is a high-performance SATA 6Gb/s SSD controller ideally suited for client SSDs targeting HDD replacement, ultrabooks and tablets. The SM2258 is a complete merchant ASIC/firmware solution supporting 3D triple-level cell (TLC) NAND from all major NAND suppliers. Leveraging Silicon Motion's proprietary NANDXtend™ error-correcting code (ECC) technology, the SM2258 provides a comprehensive data protection and enhances the endurance and retention of 3D TLC NAND, delivering more than three times better durability for 3D TLC SSD. SM2258 also features advanced Direct-to-TLC and SLC Caching algorithms for optimal sustained performance with TLC NAND.

**Ultra High Performance**
- Sequential Read: 560 MB/s*
- Sequential Write: 520 MB/s*
- Random Read: 90,000 IOPS*
- Random Write: 80,000 IOPS*

**Optimal sustained Performance**
- Direct-to-TLC and SLC Caching

**Comprehensive NAND Flash Support**
- 3D TLC from all major NAND suppliers

**Enhanced Security**
- Real time full drive encryption with AES
- TCG Opal protocol
- Hardware SHA 256 and TRNG

**Available in Commercial and Industrial Grade**

* with IMFT 3D TLC NAND
**FEATURES**

- **Host Interface**
  - Industrial Standard SATA Revision 3.1 compliant
  - Industrial Standard ATA/ATAPI-8 and ACS-3 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
  - Supports SATA device sleep (DevSleep)
  - Data Set Management command (TRIM)
  - Self-Monitoring, Analysis, and Reporting Technology (S.M.A.R.T.)
  - Supports 28-bit and 48-bit LBA (Logical Block Addressing) mode commands

- **NAND Flash Support**
  - Supports 1z nm TLC and 3D MLC/TLC NAND
  - Supports ONFI 3.0, Toggle 2.0, and Asynchronous interface
  - Supports 1.8V/3.3V Flash I/O
  - Supports 8KB and 16KB page size
  - Supports 1-plane, 2-plane, and 4-plane operation
  - 4-channel flash interface supports up to 32 NAND flash devices

- **DRAM Interface**
  - 16-bit wide DRAM interface
  - Supports DDR3/DDR3L

- **Data Protection and Reliability**
  - Supports ATA8 security feature set
  - Proprietary NANDXtend™ error-correcting and data protection technology triples the P/E cycles for 3D TLC SSD devices.
  - Internal data shaping technique increases data endurance
  - StaticDataRefresh™ technology ensures data integrity
  - Early weak block retirement option
  - Global wear leveling algorithm evens program/erase count and extends SSD lifespan

- **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 interface, UART (RS-232) interface, and I2C interface for on-system debug

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Host Standards</th>
<th>SATA 6Gb/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATA Protocol</td>
<td>ATA-8</td>
</tr>
<tr>
<td>Flash I/F</td>
<td>4 Channel</td>
</tr>
<tr>
<td>CE/Channel</td>
<td>8</td>
</tr>
<tr>
<td>Commercial Temperature</td>
<td>0°C to 70°C</td>
</tr>
<tr>
<td>Industrial Temperature</td>
<td>-40°C to 85°C</td>
</tr>
<tr>
<td>Package</td>
<td>323-ball TFBGA</td>
</tr>
</tbody>
</table>