# Spansion® Industrial-Grade e.MMC

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# Today’s Announcement

## Spansion is launching industrial-grade e.MMC products

- 1st family of managed NAND products from Spansion
  - Launching 8GB and 16GB densities today
  - 4GB and 32GB are on the roadmap

- Targeting Spansion’s traditional embedded customers
  - Stringent qualification and testing
  - -40C to 85C temperature support
  - Data protection against abrupt power loss
  - Engineering tools support

# Spansion® Industrial-grade e.MMC

## *Designed for the Embedded Market*

### Optimized for Embedded

- Long Useful Life
- Self Monitoring and Reporting
- Protection from power disruption

### Quality Focused

- Stringent qualification and testing
- Low failure rate

***Spansion Difference***

### Engineering Support

- Memory Diagnostics Toolkit
- Global technical support
- Strong chipset partnerships

### Product Configuration

- Industrial temp (-40C to +85C)
- Multiple package options
  - 153ball BGA (11.5mm x 13mm)
  - 100ball BGA (14mm x 18mm)

# Target Markets

Durable Consumer

Industrial / Medical

Communications

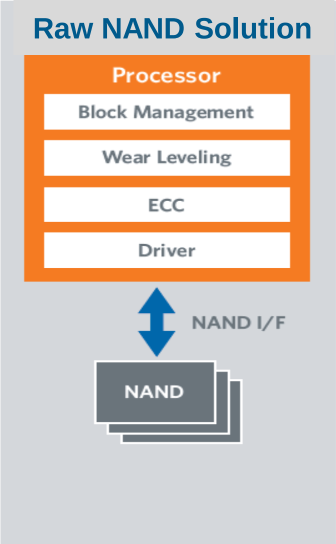
Available Now

Auto Infotainment

Planned Future Announcement

# Spansion NAND Solutions for Embedded

## Spansion SLC NAND



*Host processor requirements:*

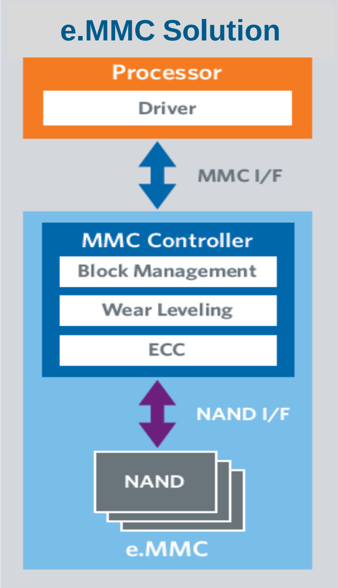
- *NAND Interface*
- *NAND Driver*
- ***Flash management***

**Smaller density: ≤ 2GByte (16Gbit)**

**High component level reliability**

- Program / erase cycles per block
- Data retention

## Spansion e.MMC



*Host processor requirements:*

- *e.MMC Interface*
- *e.MMC Driver*

**Larger density: ≥ 4GByte (32Gbit)**

**High system level reliability**

- Long Useful Life
- Data Protection

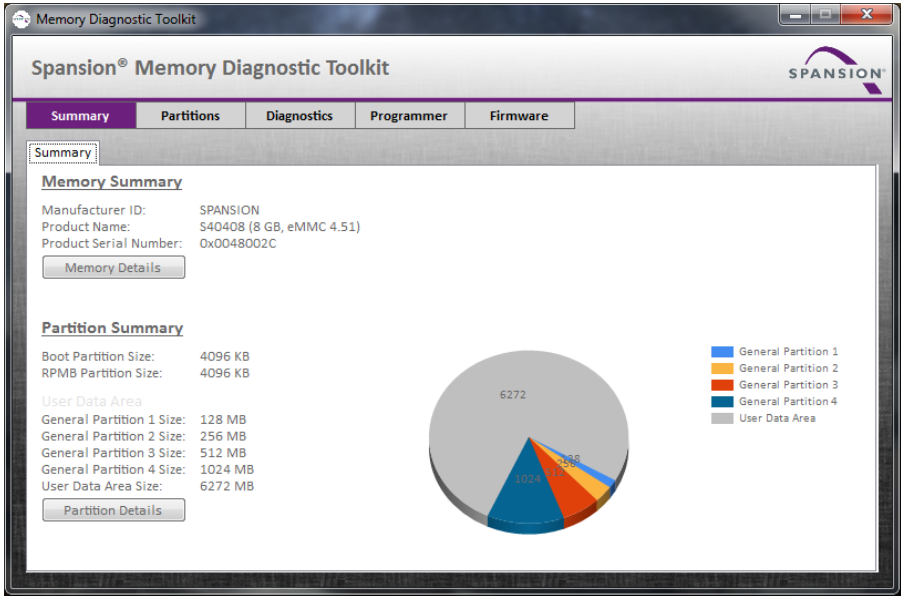
**NAND managed inside package**

- Performance (optimized for specific usage)
- Bad Block Management
- Wear Leveling

# e.MMC Support Tools

- Memory Diagnostics Toolkit (MDT)

  *What is it?*
  - *EV Board + User App*
  - *Product Configuration tool*
  - *Engineering Diagnostics tools*



Memory Summary

Manufacturer ID: SPANSION
Product Name: S40408 (8 GB, eMMC 4.51)
Product Serial Number: 0x0048002C

Partition Summary

Boot Partition Size: 4096 KB
RPMB Partition Size: 4096 KB

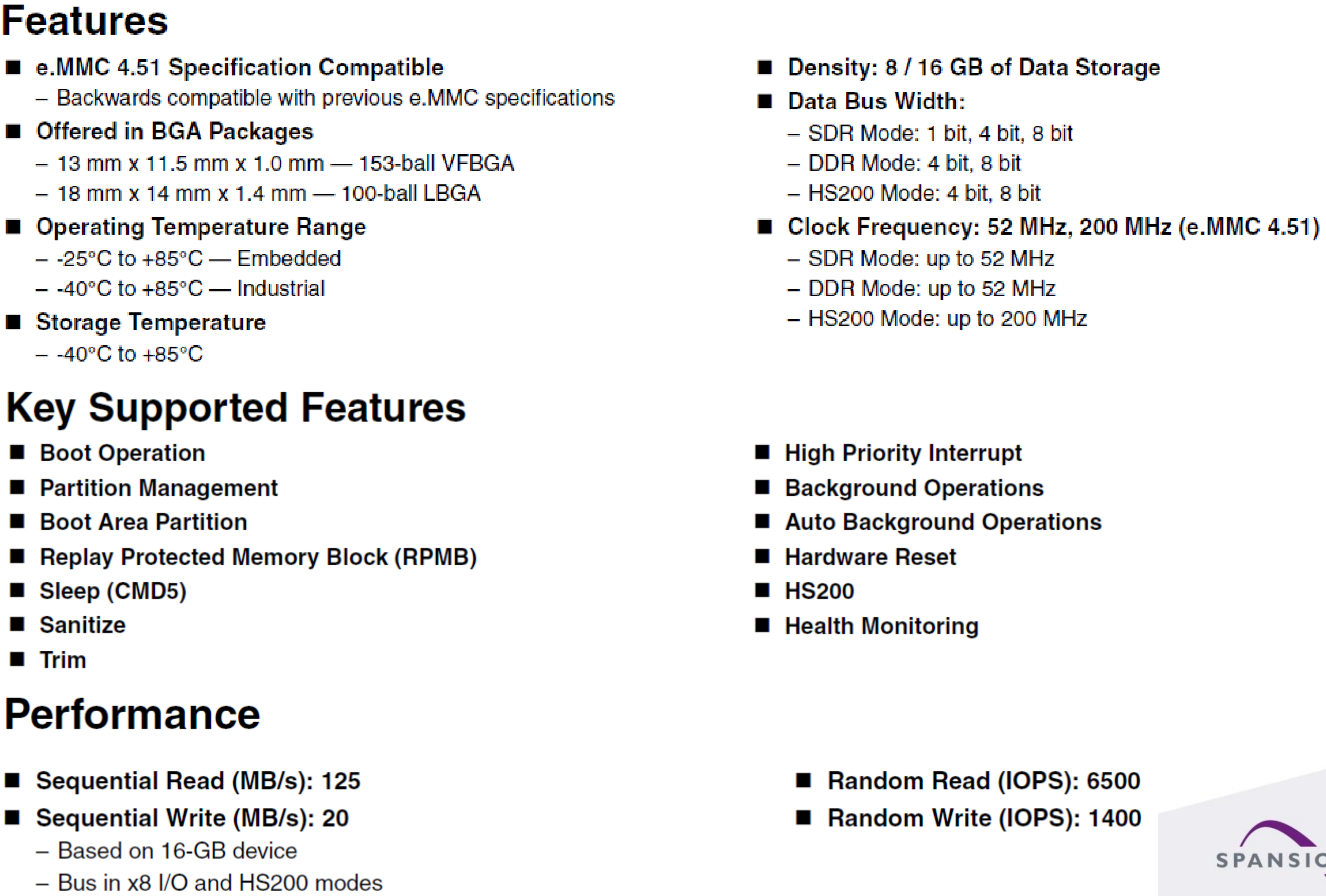
User Data Area
General Partition 1 Size: 128 MB
General Partition 2 Size: 256 MB
General Partition 3 Size: 512 MB
General Partition 4 Size: 1024 MB
User Data Area Size: 6272 MB

- MDT Features
  - *Device Information*
  - *Partition configuration*
  - *Programmer support*
  - *Health reporting*
  - *Usage modeling*
  - *Firmware Upgrade*

- e.MMC Card Evaluation Boards
  - *Plugs into card reader with e.MMC support*
  - *Available  for 153 BGA and 100 BGA sockets*

# S4041-1B1 e.MMC Flash

1.8V / 3.3V  --  GB / 16 GB



## Features

- e.MMC 4.51 Specification Compatible
  - Backwards compatible with previous e.MMC specifications
- Offered in BGA Packages
  - 13 mm x 11.5 mm x 1.0 mm — 153-ball VFBGA
  - 18 mm x 14 mm x 1.4 mm — 100-ball LBGA
- Operating Temperature Range
  - -25°C to +85°C — Embedded
  - -40°C to +85°C — Industrial
- Storage Temperature
  - -40°C to +85°C
- Density: 8 / 16 GB of Data Storage
- Data Bus Width:
  - SDR Mode: 1 bit, 4 bit, 8 bit
  - DDR Mode: 4 bit, 8 bit
  - HS200 Mode: 4 bit, 8 bit
- Clock Frequency: 52 MHz, 200 MHz (e.MMC 4.51)
  - SDR Mode: up to 52 MHz
  - DDR Mode: up to 52 MHz
  - HS200 Mode: up to 200 MHz

## Key Supported Features

- Boot Operation
- Partition Management
- Boot Area Partition
- Replay Protected Memory Block (RPMB)
- Sleep (CMD5)
- Sanitize
- Trim
- High Priority Interrupt
- Background Operations
- Auto Background Operations
- Hardware Reset
- HS200
- Health Monitoring

## Performance

- Sequential Read (MB/s): 125
- Sequential Write (MB/s): 20
  - Based on 16-GB device
  - Bus in x8 I/O and HS200 modes
- Random Read (IOPS): 6500
- Random Write (IOPS): 1400

# Ordering Information

| OPN | Density | eMMC Version | Package | Package Size | Temperature |
|---|---|---|---|---|---|
| S40410081B1B1I000 | 8GB | 4.51 | 153 BGA | 11.5 x 13 x 1.0mm | -40°C to +85°C |
| S40410081B1B1W000 | 8GB | 4.51 | 153 BGA | 11.5 x 13 x 1.0mm | -25°C to 85°C |
| S40410081B1B2I000 | 8GB | 4.51 | 100 BGA | 14 x 18 x 1.4mm | -40°C to +85°C |
| S40410081B1B2W000 | 8GB | 4.51 | 100 BGA | 14 x 18 x 1.4mm | -25°C to 85°C |
| S40410161B1B1I010 | 16GB | 4.51 | 153 BGA | 11.5 x 13 x 1.0mm | -40°C to +85°C |
| S40410161B1B1W010 | 16GB | 4.51 | 153 BGA | 11.5 x 13 x 1.0mm | -25°C to 85°C |
| S40410161B1B2I010 | 16GB | 4.51 | 100 BGA | 14 x 18 x 1.4mm | -40°C to +85°C |
| S40410161B1B2W010 | 16GB | 4.51 | 100 BGA | 14 x 18 x 1.4mm | -25°C to 85°C |

## ORDERING PART NUMBER GUIDE

| Family | Density | Revision | Controller | Package | Temp | Model Number | Packing Type |
|---|---|---|---|---|---|---|---|
| S4041 e.MMC | 008 = 8GB<br>016 = 16GB | 1 = MLC NAND | B1 = e.MMC 4.51 | B1 = VFBGA 153, 13mm x 11.5mm<br>B2 = LBGA 100, 18mm x 14mm | W = Embedded (-25°C to +85°C)<br>I = Industrial (-40°C to +85°C) | 00 = 1 NAND Die<br>01 = 2 NAND Die | 0 = Tray<br>3 = 13" Tape and Reel |

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