Designing With On-Die ECC for Embedded Applications

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Agenda

- Embedded Applications and Trends
- SLC NAND in Embedded Applications
- Parallel NAND vs. SPI NAND
- ECC Requirements and Trends
- On-Die ECC With Micron EC²NAND
- Summary
Embedded Applications and Trends

- Embedded devices are everywhere with several applications across multiple segments
- Multicore CPUs and increasing appetite for memory requirements
- Low-power and low-cost requirements are driving innovation
- System designers and architects have several memory options to choose from based on their application and go-to-market requirements

- Micron offers best-in-class memory solutions, engineered for YOUR innovation
Based on single-level cell technology (SLC) with high Endurance capability

High-performance discrete NAND offered in both low and high densities (1Gb to 512Gb+)

SLC NAND market is spread across several embedded applications
SLC NAND Is Everywhere

Connected Home
- Set-Top Box
- Home Networking
- Home Automation
- Wireless Modem

Consumer
- Digital Television
- Digital Still Camera
- Wearable
- Home Audio Hi-Fi
- Blu-Ray Disc Players
- OTT

IMM
- Factory/Building Automation
- POS
- Medical
- Energy
- Transportation
- Aerospace & Defense
- Surveillance

Automotive
- Infotainment
- Powertrain
Parallel NAND vs. SPI NAND

- **Legacy interface**
  - Higher BOM cost for the system
  - Larger package size
  - Secure

- **Simplified design with 4-signal SPI protocol**
  - Low overall BOM cost for the system
  - Reduced package size
  - Lower cost
  - Fast write performance
  - Secure
Why SPI NAND?

- New applications like wearables, DTV, STB, and routers/gateways are showing interest in SPI NAND
  - Low pin count for simpler design
  - Small size for small form factor design
- SPI NAND is a great solution to meet these needs
• Error correction code (ECC) requirements vary depending on cell technology and lithography shrinks
• SLC has the lowest ECC requirements due to high reliability
• ECC circuitry also gets complex depending on the ECC algorithm and the ECC bits
On-Die ECC With Micron EC²NAND

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<th>Features</th>
<th>Micron EC²NAND</th>
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<tr>
<td>High performance</td>
<td>✔</td>
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<tr>
<td>Parallel &amp; SPI interface</td>
<td>✔</td>
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<tr>
<td>1.8V &amp; 3.3V support</td>
<td>✔</td>
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<td>Wide temperature offerings</td>
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<td>Low/mid density offerings</td>
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Summary

• SLC NAND is the most reliable high-performance discrete NAND; hence, it is widely adopted in several embedded applications
• SPI NAND is becoming more popular due to simpler design; also suitable for cost-sensitive applications
• Micron EC²NAND offers built-in ECC and reduces burden on host for ECC needs, reducing design complexity for system designers

• Micron offers a very wide spectrum of SLC NAND, engineered for YOUR innovation