Applied Reflexion® LK Prime™ CMP System
Enabling High-Volume Manufacturing of Advanced 3D Microchips

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Transistors Transitioning from Planar to 3D

Planar Logic → 3D FinFET

2D NAND → 3D NAND

Chemical Mechanical Planarization (CMP) controls device performance.

More complex sequence demands higher productivity.

- Nanometer-level uniformity required
- Up to 10 additional CMP steps

- Planarization and process stability required for extremely long polish
- Up to 5 additional CMP steps

Comprehensive capabilities needed to meet requirements.

Images Source: Public announcements and conference publications
On-Wafer Performance
  - Improved uniformity
  - Fewer defects

Flexibility
  - Application-specific processes

Extendibility
  - Multi-generation capabilities

Productivity
  - More wafers, less fab space

Better on-wafer results enable new device architectures
Applied Reflexion® LK Prime™ CMP System

Sets new performance and productivity benchmarks for fabricating FinFET and 3D NAND devices.

Comprehensive CMP solution for next-generation devices
Enabling Technology for 3D Devices

- **Titan Edge™** polishing head improves removal uniformity
- **Enhanced FullVision™** process control
- New **pre-cleaning module** reduces defectivity
- Real-time process control for **new materials**
- 14 processing stations (polishing + cleaning)
- **Optimized** wafer handling

**Flexible, extendible** CMP for advanced architectures
Improved Productivity and Flexibility

- **Distributed** processing improves stability and polish precision
- **Sequential** processing enables multi-step applications
- **Parallel** processing improves productivity
The Platform for the Future

Designed to enable 3D device architectures
Smother Topography

Multi-step polishing stabilizes removal rate and profile
Smother Topography

Single Step

Multi-Step

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Smother Topography

Single Step

Multi-Step

Multi-step polishing **stabilizes removal rate and profile**
Smaller Topography

Single Step

Multi-Step

Multi-step polishing stabilizes removal rate and profile
Smother Topography

Single Step

Multi-Step

Residue

Dishing

No Residue

Minimal Dishing

Silicon

Oxide

Silicon

Oxide

Multi-step polishing **stabilizes removal rate and profile**
Smother Topography

Single Step

Multi-Step

Multi-step polishing stabilizes removal rate and profile
Within-Wafer Poly FinFET Uniformity

LK Prime enables *nanometer-scale process control*
LK Prime enables **nanometer-scale process control**
Best On-Wafer Performance
- Polish heads
- In-situ process control
- Chemical buff

Highest Throughput Density
- 14 processing stations
- Up to 2x higher throughput

Flexible and Extendible
- Batch, parallel, and sequential processing
- Multi-generation capabilities

Comprehensive CMP for 3D devices