

Future of Innovation: Semiconductor Manufacturing Equipment

Tom St. Dennis

Senior Vice President and General Manager
Silicon Systems Group

July 15, 2009



think it. apply it.™

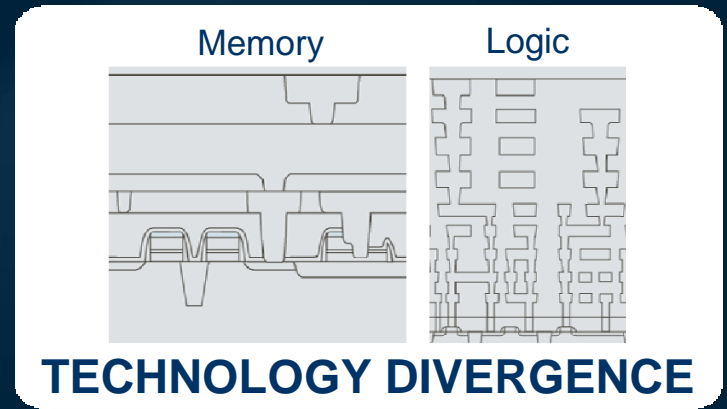
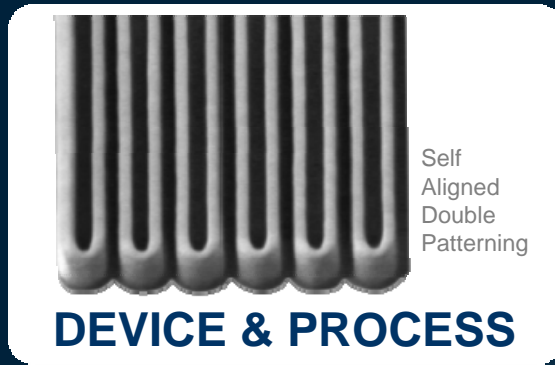
APPLIED MATERIALS.

EXTERNAL USE

Extending Moore's Law



Feature Size

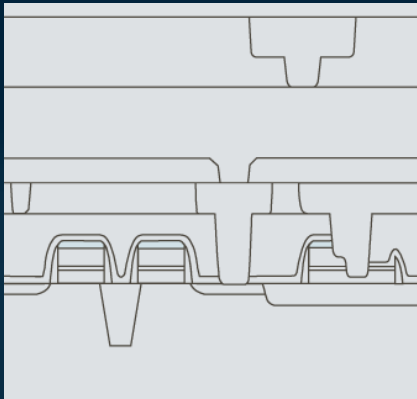


APPLIED MATERIALS.

Industry Maturity with Technical Divergence

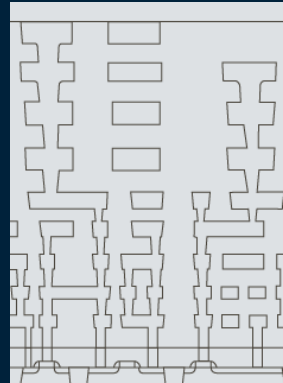


NAND



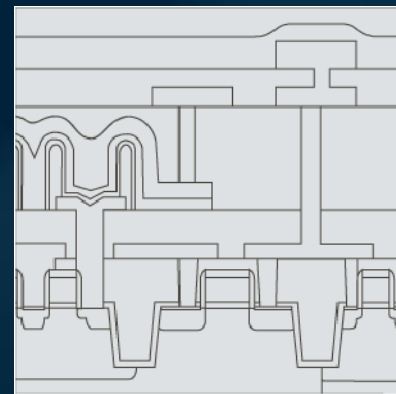
Floating Gate →
Charge Trap Flash or 3D

Logic



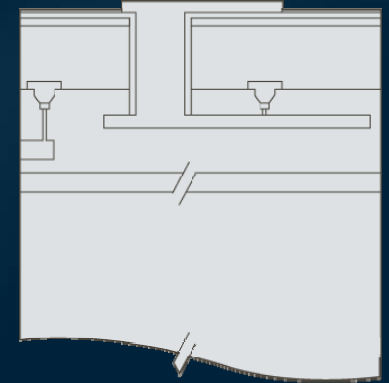
Planar (ONO) Transistors →
HKMG / FinFET

DRAM



Planar →
3D / Buried Wordline, Buried Bitline

Packaging



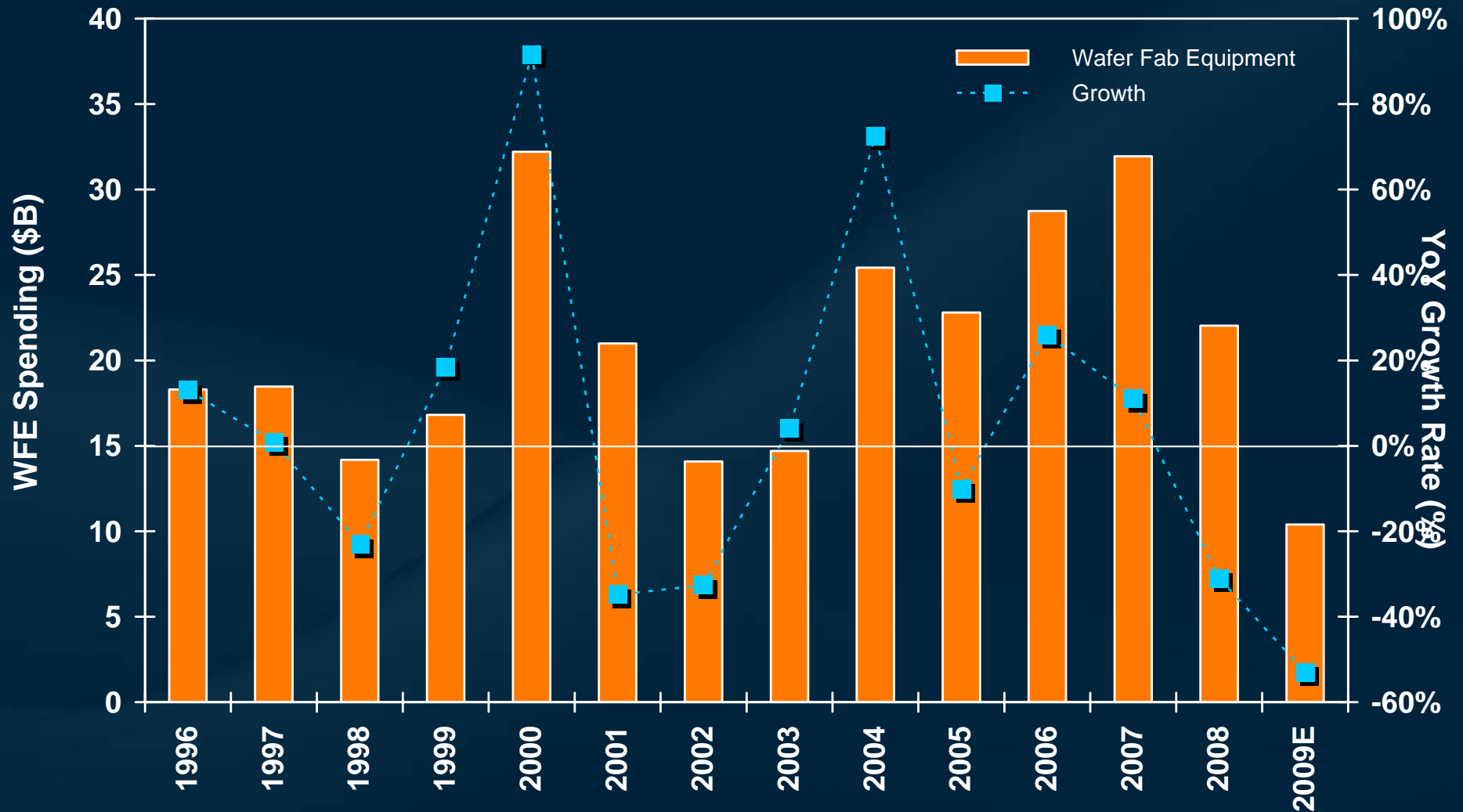
Flip Chip / Multichip →
3D Packages

Litho: 193nm → Double Patterning / EUV

Wafer Size: 300 mm → 450 mm

APPLIED MATERIALS.

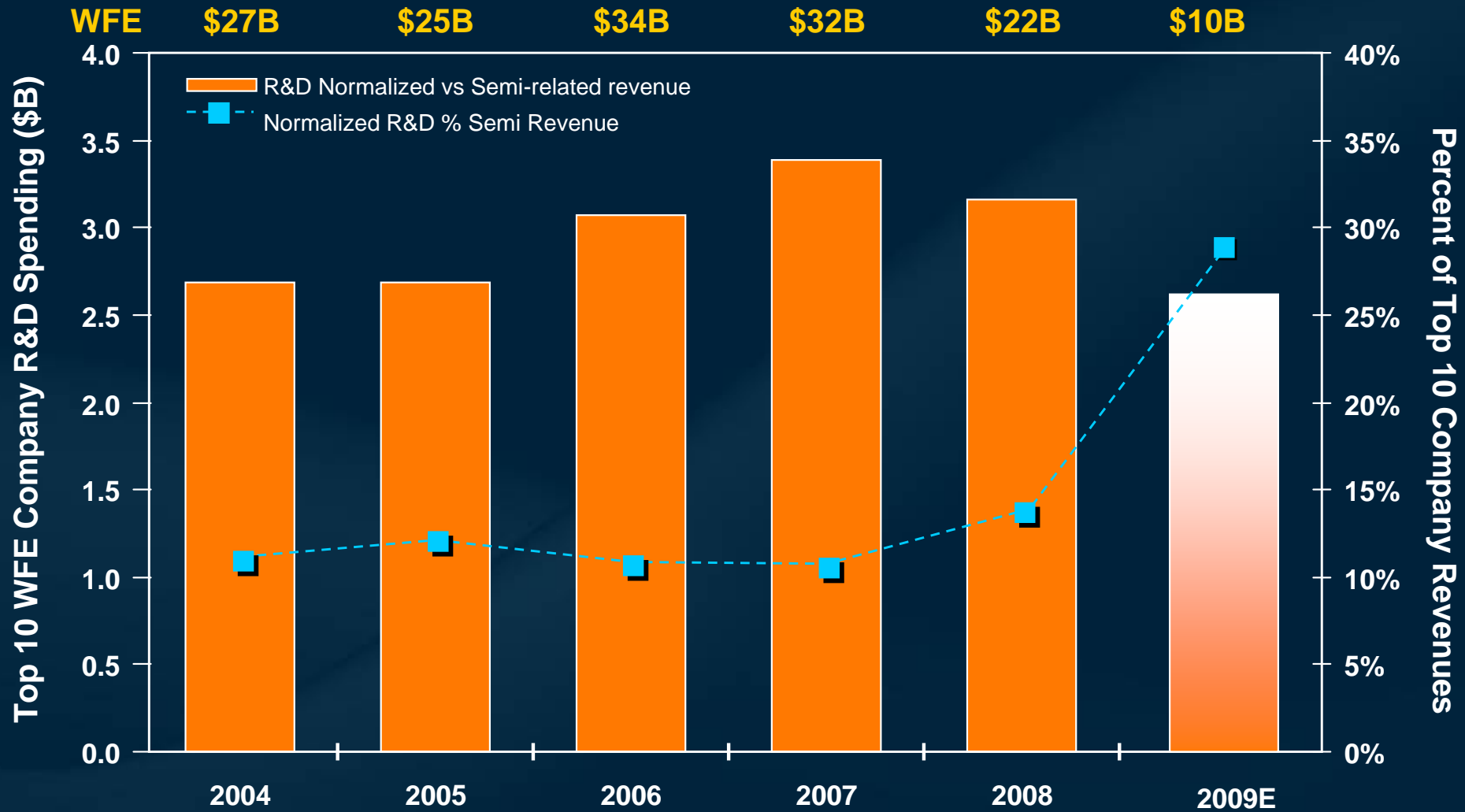
Wafer Fabrication Equipment Industry History



Source: SEMI, July 2009

APPLIED MATERIALS.

Development Expenditures



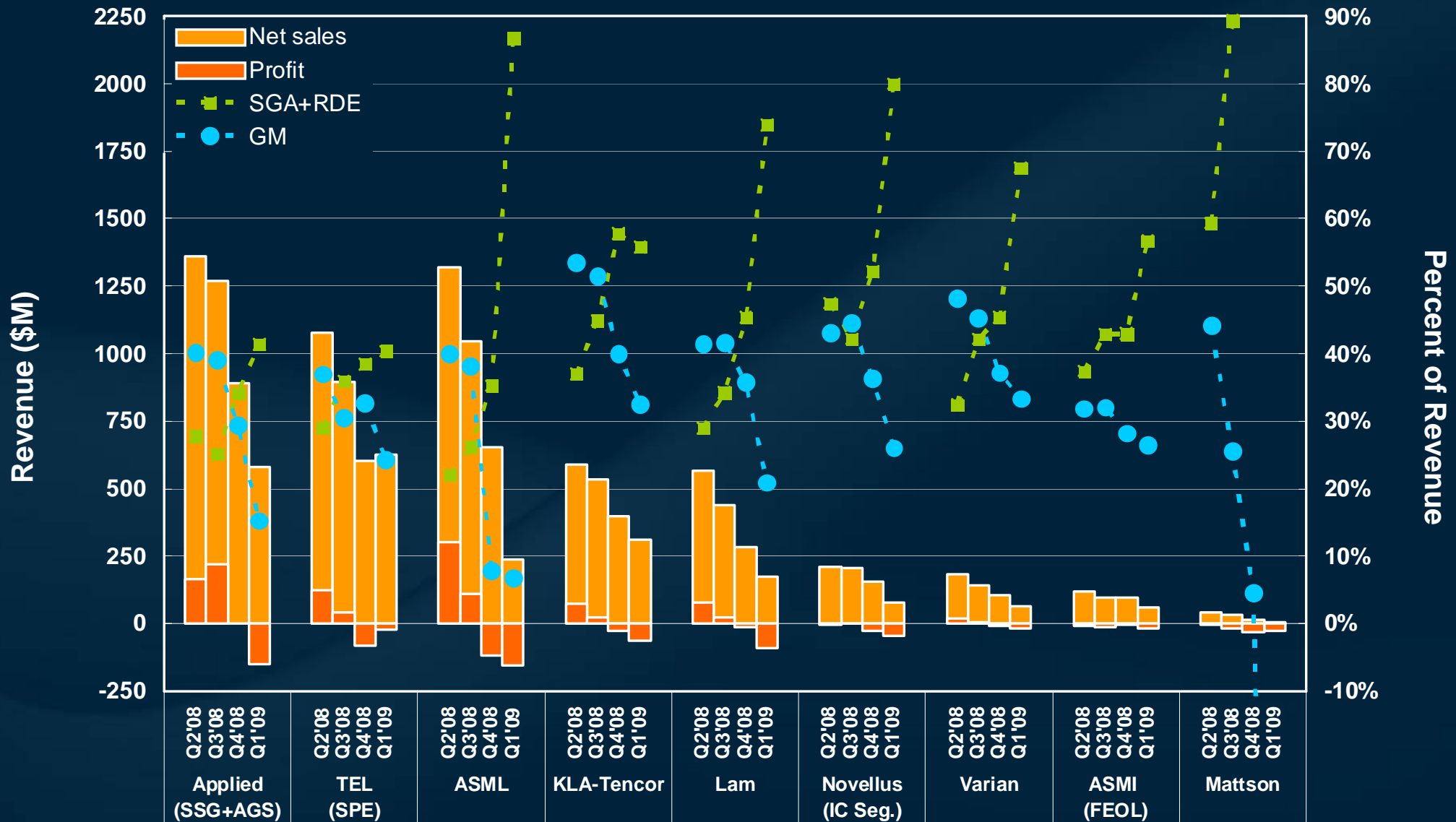
WFE of \$23B needed to return current R&D run-rate to historic proportion of revenues

Source: SEMI WFE values and estimates. Published R&D expenses for Applied Materials, Tokyo Electron, ASML, KLA-Tencor, Lam Research, Dai Nippon Steel, Hitachi High-Tech, ASM Int., Novellus Systems and Varian System.

Assumptions: Multi-segment company WFE R&D values estimated by normalizing to VLSI's semiconductor-related revenue. 2009 R&D value assumes R&D run-rate equal to Q1'09 reported results

APPLIED MATERIALS

Wafer Fab Equipment Financial Landscape



Source: Published results for Applied Materials, Tokyo Electron, ASML, KLA-Tencor, Lam Research, Novellus Systems, Varian Systems, ASM Int., and Mattson. Profit values exclude non-recurring charges.

APPLIED MATERIALS

The New Business Model



With Sub-Suppliers



Components

With WFE Companies



R&D Collaboration

SOKUDO

SEMITOOL

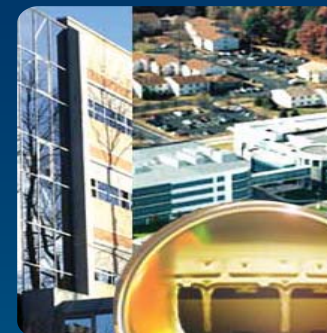


axcelis



Customer Support

With Customers



Process & Integration



Hardware & Software Support

APPLIED MATERIALS.



APPLIED MATERIALS.