



Dongbu HiTek
Semiconductor Business

Dongbu's Analog Process Technology Overview

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Dongbu HiTek Semiconductor
2009 Analog Leaders Forum

Current Situation

Digital

- **Process Technology Follows ITRS Roadmap**
- **Major Process Differentiator is Timing & Ramp Execution**
- **Product Differentiation Done via System/Design IP**
- **Technology Development is Mainly by Foundries**

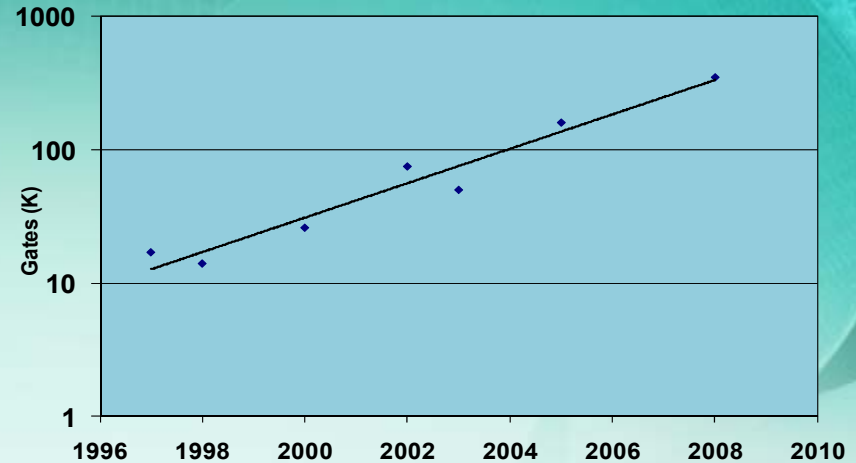
Analog/Power

- **No ITRS Roadmap for Process Technology**
- **Process Technology Remains a Critical IP**
- **High Level of Process/Product Collaboration for New Product Development**
- **Historically Dominated by IDMs, but Gap is Narrowing vs. Foundries**

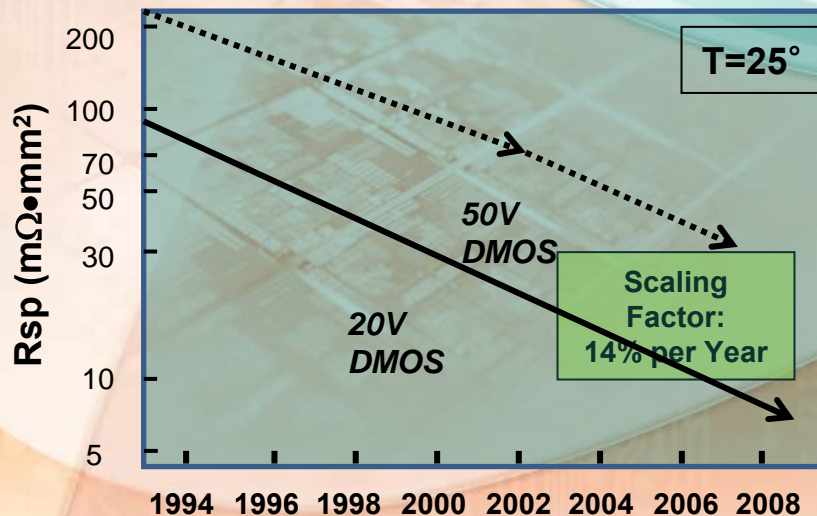
Trends

- **2 Opposing Trends:**
 - Analog/Power SOCs
 - Performance Differentiation
- **Modest to No Voltage Scaling**
- **Digital Content Increasing**
- **NVM Content Increasing**
- **More Power On-Chip**

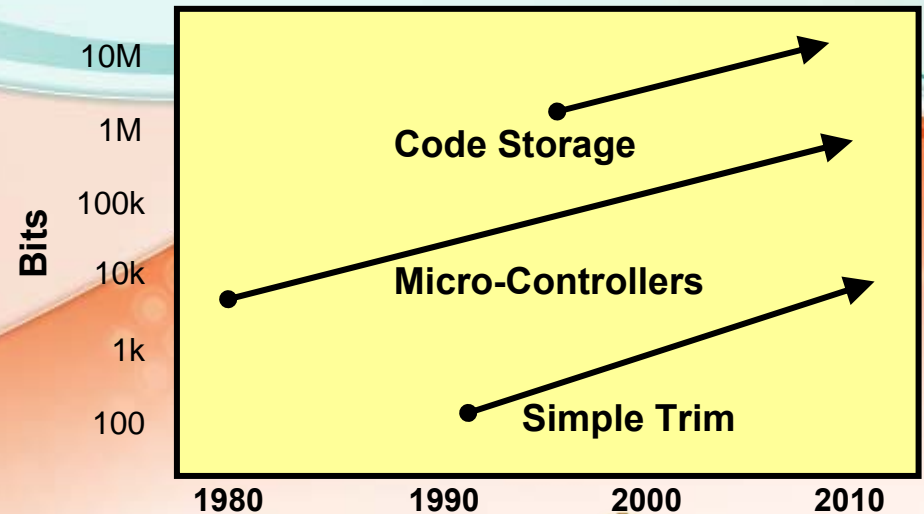
Gate Count Trend



Power LDMOS Scaling



Embedded NVM Trends



Analog Technology Space

3Q08

Density Analog CMOS:

- Logic & Analog CMOS
- Low VT CMOS Option
- Poly Resistor, MIM Cap
- DECMOS
- Focus on Density



Power BiCMOS:

- Bipolar, CMOS, and LDMOS
- Logic & Analog CMOS
- HV (60V) and LV (20V) Flavors
- LDMOS, DECMOS
- Poly Resistor, MIM Cap



Performance Analog CMOS:

- Logic & Analog CMOS
- Low 1/f Noise
- Thin Film Resistor
- Low-DA MIM Capacitor
- Focus on Performance



High-Speed BiCMOS:

- NPN or PNP Vertical Bipolar
- Logic & Analog CMOS
- Focus on Performance
- TF Resistor, MIM Capacitor
- SiGe Option



Analog Technology Space

4Q09 / 1Q10

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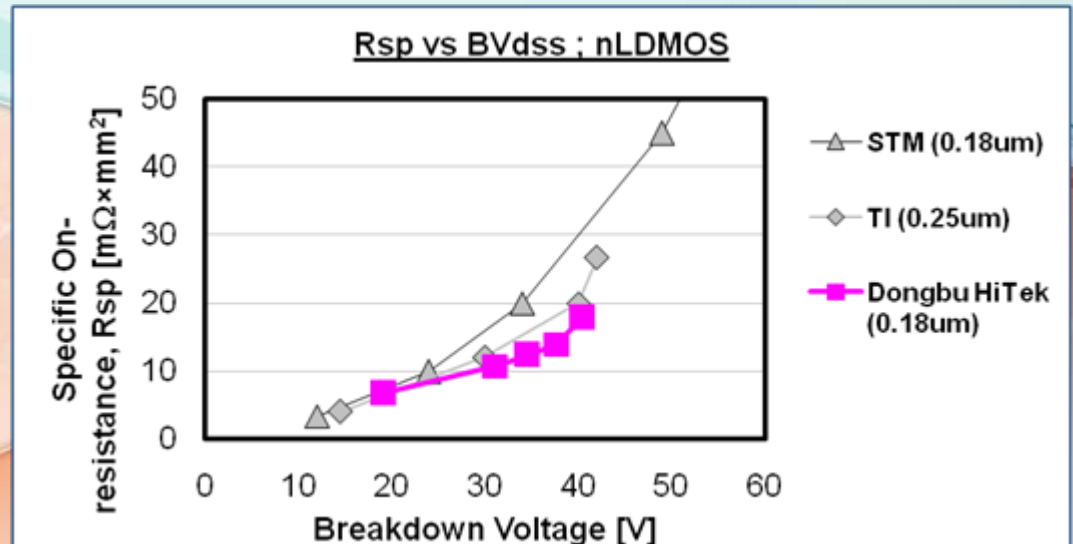
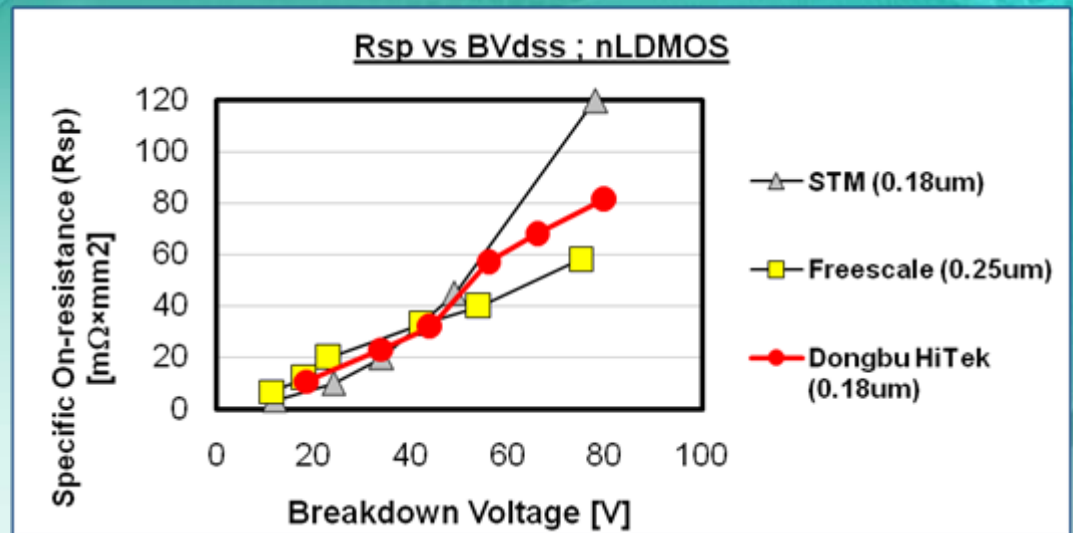
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0.18um BCDMOS Technologies

- 1 Poly, 6 Metal
- Gox: 30 & 125 Å
- M1 Pitch: 0.46 μm
- Thick Metal: Al or Cu
- CMOS: 1.8V & 5V
- Gate Density: 88K gt/mm²
- CMOS: Isolated
- CMOS: Low- V_T
- NLD MOS: 7V – 30V (60V)
- PLDMOS: 7V – 30V (60V)
- DECMOS: 7V – 30V (65V)
- NPN: 10V
- RESISTOR: Poly 215, 2K Ω/sq
- CAPACITOR: MIM 2 fF/ μm^2
- Schottky Diode
- NVM: E²PROM, OTP, Fuse
- PDK: Cadence, Mentor



The Analog/Power Mindset

Silicon Accuracy

- Rich Component Set
- Tight Parametric Distributions
- Exhaustive Device Characterization
- 2nd Order Effects – Noise, Matching...

Simulation Accuracy

- Thorough PDK That Works
- SPICE Models That Match Silicon
- Robust ESD Solutions
- Proven IP Blocks for Key Functions

Manufacturability

- Electrical Failure Analysis, ESD Reviews
- Zero Defects, DPPM Focus
- Flexibility – Handle Unusual Requests
- Eco-System

A
FOUNDRY
MUST
THINK
LIKE AN
IDM

Conclusions

- **Significant Additions to Technology Portfolio in 2009**
- **Aggressive Technologies, at IDM Performance Levels**
- **New, Improved Processes and Capabilities in 2010**
- **World-Class ‘Eco-System’ to Enable Customers**
- **Totally Focused on Analog**
- **Our Vision:**
‘The Most Respected Analog Foundry in the Industry’

Thank You!