



# **Power Integrity for I/O Interfaces: With Signal Integrity/ Power Integrity Co-Design (Prentice Hall Modern Semiconductor Design)**

*Vishram S. Pandit, Woong Hwan Ryu, Myoung Joon Choi*

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*Foreword by Joungho Kim*

## **The Hands-On Guide to Power Integrity in Advanced Applications, from Three Industry Experts**

In this book, three industry experts introduce state-of-the-art power integrity design techniques for today's most advanced digital systems, with real-life, system-level examples. They introduce a powerful approach to unifying power and signal integrity design that can identify signal impediments earlier, reducing cost and improving reliability.

After introducing high-speed, single-ended and differential I/O interfaces, the authors describe on-chip, package, and PCB power distribution networks (PDNs) and signal networks, carefully reviewing their interactions. Next, they walk through end-to-end PDN and signal network design in frequency domain, addressing crucial parameters such as self and transfer impedance. They thoroughly address modeling and characterization of on-chip components of PDNs and signal networks, evaluation of power-to-signal coupling coefficients, analysis of Simultaneous Switching Output (SSO) noise, and many other topics.

Coverage includes

- The exponentially growing challenge of I/O power integrity in high-speed digital systems
- PDN noise analysis and its timing impact for single-ended and differential interfaces
- Concurrent design and co-simulation techniques for evaluating all power integrity effects on signal integrity
- Time domain gauges for designing and optimizing components and systems
- Power/signal integrity interaction mechanisms, including power noise coupling onto signal trace and noise amplification through signal resonance
- Performance impact due to Inter Symbol Interference (ISI), crosstalk, and SSO noise, as well as their interactions
- Validation techniques, including low impedance VNA measurements, power noise measurements, and characterization of power-to-signal coupling effects

***Power Integrity for I/O Interfaces*** will be an indispensable resource for everyone concerned with power integrity in cutting-edge digital designs, including system design and hardware engineers, signal and power integrity engineers, graduate students, and researchers.

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