



BUENAVENTURA ELECTRON DEVICES & CIRCUITS & SYSTEM SOCIETIES

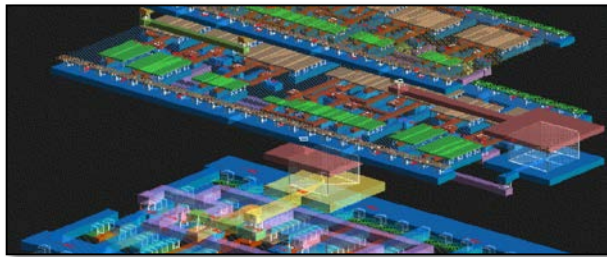
Optimizing Decoupling Capacitors and Troubleshooting Power Integrity Issues in FPGA Applications

Cosmin Iorga, Inphi Corporation

Wed Sep 23, 2015 at 6:30 pm

California Lutheran University, Swenson Center, Room 101

Meetings are free and open to the public



This presentation will start with an overview of power delivery networks (PDN) in die, package, and PCB structures. The fundamental concepts will be explained from intuitive and analytical perspectives. The attention will then focus on the specifics of power delivery in FPGA applications and in particular the selection of power supply decoupling capacitors. Optimization of decoupling

capacitors through on-die measurement of PDN impedance frequency profile is performed by configuring and using only logic blocks commonly available in existing FPGAs without the need of external test instruments. A case study implemented in a Spartan 3A FPGA has been able to measure the PDN impedance frequency profile at frequencies up to 500MHz and has identified resonance peaks not seen by board level measurements. Further application of the on-die PDN impedance measurement to troubleshooting power integrity issues will be presented and case studies will be analyzed. The presentation will conclude with a discussion of challenges in power delivery network design and validation in advanced multi-die, silicon interposer, and stacked-die 3D FPGAs.



Cosmin Iorga is a Principal Design Engineer at Inphi Corporation and a part time instructor at UCLA Extension. Cosmin brings combined expertise in CMOS and BiCMOS high-speed analog integrated circuit design, signal integrity, power integrity, and noise coupling suppression at die, package, and board levels, with more than 20 years of experience. Cosmin has earned his Ph.D. in Electrical Engineering from Stanford University, and he holds nine patents covering innovative solutions in circuit design, noise coupling reduction, and signal integrity. Cosmin is the author of the book *"Noise Coupling in Integrated Circuits: A Practical Approach to Analysis, Modeling, and Suppression"*.



Address:

Swenson Center, Room 101, 141 Faculty Street
 Thousand Oaks, CA 91360

Directions from Ventura:

Take the Ventura Freeway 101 South.
 Take Lynn Road Exit, turn left, drive 2.9 miles.
 Lynn Road turns into Olsen Road, drive .9 miles.
 Turn right onto Mountclef Boulevard - the University is on the right
 Turn Right onto Faculty Street
 Park on Faculty Street or adjacent streets.
 Visitors may park on the streets after 7 pm without a permit.
 Important: do not park in the spots marked "Homeowner Parking only".
 Before 7 pm, we recommend to park in the G lot on the southwest corner of Olsen and MountClef and walk to the Swenson building.

Directions from Los Angeles:

Take the Ventura Freeway 101 North.
 Take Lynn Road Exit, turn right, drive 2.9 miles.
 Lynn Road turns into Olsen Road, drive .9 miles.
 Turn right onto Mountclef Boulevard - the University is on the right.
 Turn Right onto Faculty Street
 Park on Faculty Street or adjacent streets.
 Parking on the street is open after 7 pm.
 Prior to 7 pm, Respect parking signs and do not park in faculty spots.
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