Dynamic Voltage Drop

What is IR Drop Issue?

The power supply (VDD and VSS) in a chip is uniformly distributed through the metal rails and stripes which is called Power Delivery Network (PDN) or power grid. Each metal layers used in PDN has finite resistivity. When current flow through the power delivery network, a part of the applied voltage will be dropped in PDN as per the Ohm's law. The amount of voltage drop will be V = I.R, which is called the IR drop.

Types of IR Drop:

There are two types of IR drop:

1. Static IR Drop.
2. Dynamic IR Drop.

Reasons for IR Drop

- Poor design of power delivery network (lesser metal width and more separation in the power stripes)
- inadequate via in power delivery network
- Inadequate number of decap cells availability
- High cell density and high switching in a particular region
- High impedance of the power delivery network
- Rush current
- Insufficient number of voltage sources
- High RC value of the metal layer used to create the power delivery network.
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