Mitigation of Chip Proximity Effect Using Air Cavity in Flip-Chip Interconnect

Rhonda Franklin Drayton (PI) , Young Seek Cho
Electrical and Computer Engineering, University of Minnesota

- DESCRIPTION OF WORK
  - The goal of the work is to investigate the chip proximity effect and mitigate it to design wide band flip-chip interconnect with low profile solder bump pad.
  - The conventional flip-chip interconnect with air cavity were characterized by simulation and measurements.
  - Design guidelines for the air cavity were developed.

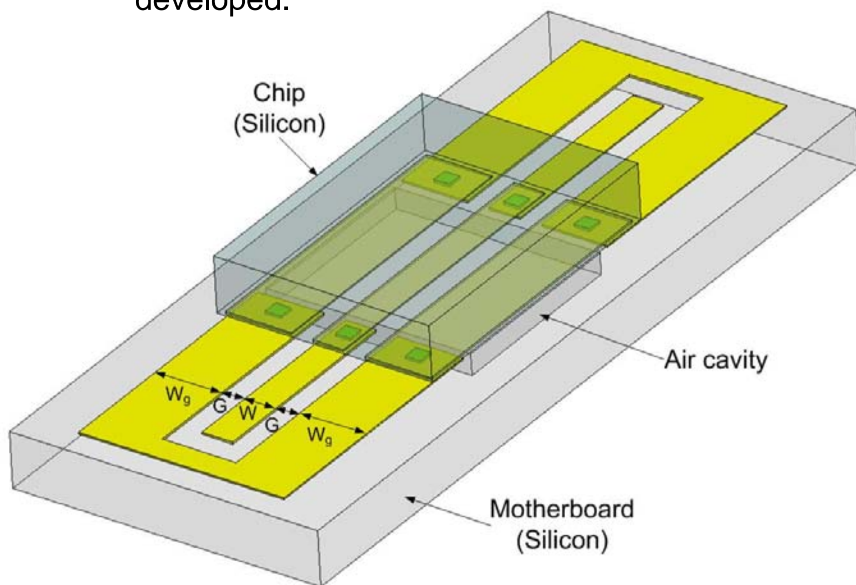

Fig. 1. Conventional flip-chip interconnect with an air cavity

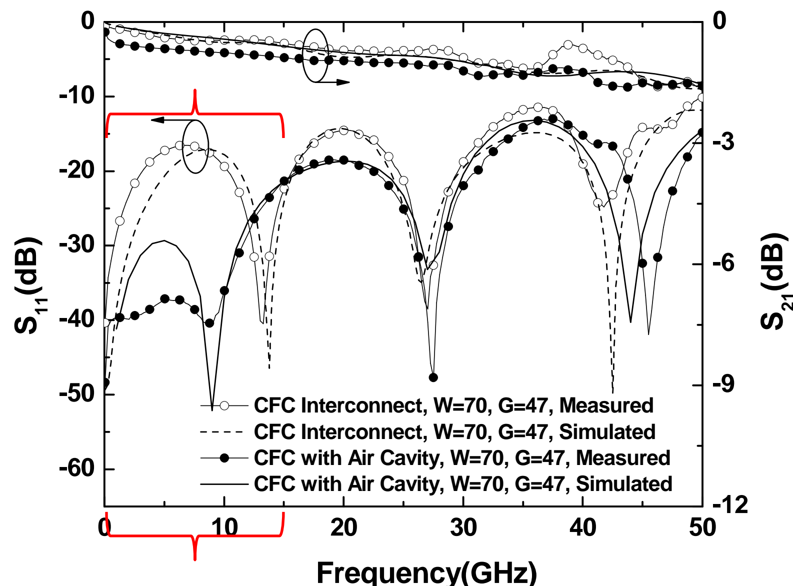

Fig. 2. Comparison of S-parameters between conventional flip-chip interconnect and conventional one with air cavity

- MAJOR OBSERVATIONS
  - The depth of the air cavity should be 2 times bigger than the gap (G) of signal line and ground plane of coplanar waveguide.
  - The bandwidth of return loss below 20 dB is achieved up to 15 GHz using the air cavity on the motherboard.