Avoiding Plasma Induced Damage to Gate Oxide with Conductive Top Film (CTF) on PECVD Contact Etch Stop Layer

Seung-Chul Song, Stan Filipiak, Asanga Perera, Michael Turner*, Fred Huang, Steven G. H. Anderson,
Laegu Kang, Byoung Min, Doug Menke, Stenly Tukunang, and Suresh Venkatesan
DigitalDNA Lab, Motorola, *Advanced Micro Devices, 3501 Ed Bluestein Blvd, MD: K-10, Austin, TX 78721

Significantly reduced plasma damage is demonstrated by including a thin conductive top film (CTF) on the contact etch stop layer (ESL) for the first time, which effectively blocks radiation generated by subsequent high density plasma processes. We also show that plasma damage exacerbates Negative Bias Temperature Instability (NBTI) in PMOS capacitors and can be effectively suppressed by the CTF process.