ABSTRACT

[0041] Methods to etch an opening in a substrate layer with reduced critical dimensions are described. A multi-layered mask including a lithographically patterned photoresist and an unpatterned organic antireflective coating (BARC) is formed over a substrate layer to be etched. The BARC layer is etched with a significant negative etch bias to reduce the critical dimension of the opening in the multi-layer mask below the lithographically define dimension in the photoresist. The significant negative etch bias of the BARC etch is then utilized to etch an opening having a reduced critical dimension into the substrate layer. To plasma etch an opening in the BARC with a significant negative etch bias, a polymerizing chemistry, such as CHF_3 is employed. In a further embodiment, the polymerizing chemistry provide at low pressure is energized at a relatively low power with a high frequency capacitively coupled source.

FIG. 1