ABSTRACT OF THE DISCLOSURE

MULTIPLE-STEP PLASMA ETCHING PROCESS FOR SILICON NITRIDE

A method for dry plasma selective etching of a pattern in a silicon nitride dielectric layer formed over a semiconductor substrate employed within a microelectronics fabrication. There is provided a semiconductor substrate having formed thereupon a pad oxide layer over which is formed a silicon nitride dielectric layer. There is formed over the substrate a patterned photoresist etch mask layer. There is then selectively etched the pattern of the photoresist etch mask layer into the silicon nitride layer employing a four-step etching process with three plasma etching environments which include; (1) a "break-through" etching step; (2) a "bulk" etching step to remove a majority of the silicon nitride layer and a "buffer" etching step to remove the remainder of the silicon nitride layer; and (3) an "over-etch" step to complete removal of silicon nitride without excessive etching of underlying material. These steps comprise the selective etching of the patterned silicon nitride layer while maintaining control of critical dimensions, with attenuated microloading and over-etching of underlying material.

(FIGURE 1 IS SUGGESTED FOR PUBLICATION)