

Abstract

RETAINING RING STRUCTURE FOR EDGE CONTROL DURING CHEMICAL-MECHANICAL POLISHING

5 An improved design for a retaining ring for a chemical mechanical poling machine is described which provides superior flexibility and instantaneous in-situ control of the polishing rate in the edge region of a wafer. The design has a plurality of straight slurry delivery groves, angled in the direction of rotation of said ring wherein each alternate channel is recessed away from the inner
10 circumference of the bottom, pad contacting, surface, of said retaining ring by a recess which extends upward from the bottom surface only sufficiently to prevent contact of the retaining ring with the polishing pad in the area of the recess. Each recess curves outwardly towards the inner circumference of the retaining ring in a manner to form a symmetrical segmented tab with a rounded edge, tangent to the
15 inner circumference of the retaining ring, and meeting the inner circumference at the exit end of an adjacent non-recessed slurry channel. For a 200 mm. diameter wafer, having a total of 12 slurry channels, the total effective contact length of the resulting six segmented tabs is about 11.5% of the wafer perimeter. This is sufficient to properly contain the wafer during polishing and provides a large area
20 of non distorted polishing pad at the wafer edge. By adjusting the operating pressures of the polishing head fitted with the improved retaining ring, it is possible to obtain polishing rates at the edge which are larger or smaller than the overall wafer polishing rate. The improved retaining ring provides a simpler and cheaper option for better wafer edge polishing rate as well as an increase is
25 useable wafer area.

(FIG. 3a)