APPARATUS AND METHOD TO REDUCE PARTICLES IN ADVANCE ANNEAL PROCESS

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] Embodiments described herein relate to apparatus and methods of thermal processing. More specifically, methods described herein relate to laser thermal treatment of semiconductor substrates using a pellicle to reduce contamination of an aperture member.

Description of the Related Art

[0002] Thermal processing is commonly practiced in the semiconductor industry. Semiconductor substrates are subjected to thermal processing in the context of many transformations, including doping, activation, and annealing of gate source, drain, and channel structures, silicidiing, crystallization, oxidation, and the like. Over the years, techniques of thermal processing have progressed from simple furnace baking, to various forms of increasingly rapid thermal processing such as RTP, spike annealing, and laser annealing.

[0003] Conventional laser annealing processes use laser emitters that may be semiconductor or solid state lasers with optics that focus, defocus, or variously image the laser beam into a desired shape. A common approach is to image the laser beam into a line or thin rectangle image. The laser beam is configured to pass through an aperture member and scan across a substrate (or the substrate moved beneath the laser beam) to process one field of the substrate at a time until the entire surface of the substrate is processed. The aperture member is typically a glass plate patterned with predetermined feature geometries that block the laser beam from passing through the aperture member. The laser beam is imaged on the substrate and only the area corresponding to the unblocked area of the aperture member is processed.

[0004] A problem with this approach is that the aperture member is very sensitive to particle contaminants that may land on the aperture member during the process,

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