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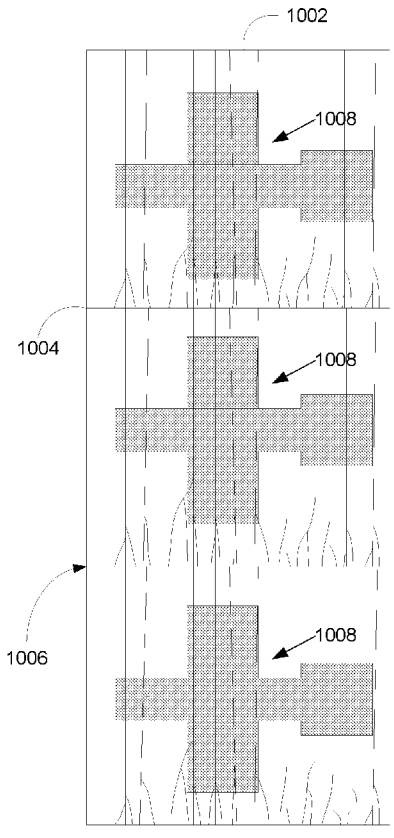
(54) Title: SYSTEMS AND METHODS FOR OPTIMIZING THE CRYSTALLIZATION OF AMORPHOUS SILICON



(57) Abstract: In a thin beam directional Crystallization System configured to anneal a silicon layer on a glass substrate uses a special laser beam profile with an intensity peak at one edge. The system entirely melts a spatially controlled portion of a silicon layer causing lateral crystal growth. By advancing the substrate or laser a certain step size and subjecting the silicon layer to successive "shots" from the laser, the entire silicon layer is crystallized. The lateral crystal growth creates a protrusion in the center of the melt area that must be re-melted. Accordingly the step size must allow for sufficient overlap between successive shots. i. e., melt zones, to ensure protrusion melting. This requires the step size to be less than half the beam width. The special laser profile used in accordance with the systems and methods described herein can increase the step size and thereby increase throughput and reduce costs.

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