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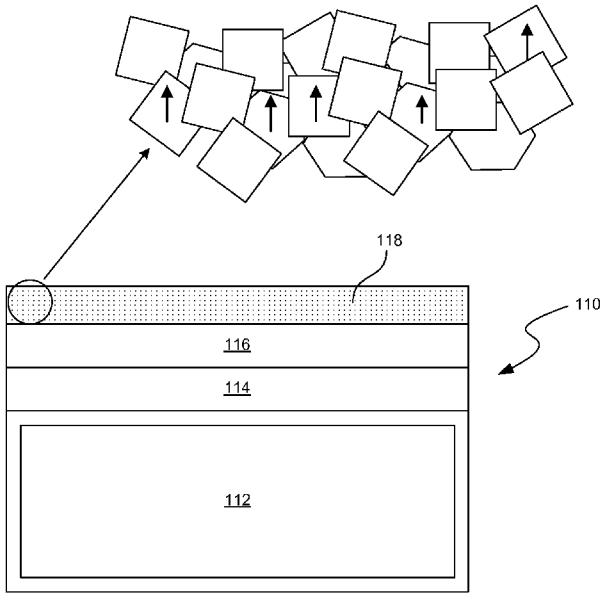


FIG. 4A

(57) Abstract: Gallium nitride wafer substrate for solid state lighting devices, and associated systems and methods. A method for making an SSL device substrate in accordance with one embodiment of the disclosure includes forming multiple crystals carried by a support member, with the crystals having an orientation selected to facilitate formation of gallium nitride. The method can further include forming a volume of gallium nitride carried by the crystals, with the selected orientation of the crystals at least partially controlling a crystal orientation of the gallium nitride, and without bonding the gallium nitride, as a unit, to the support member. In other embodiments, the number of crystals can be increased by a process that includes annealing a region in which the crystals are present, etching the region to remove crystals having an orientation other than the selected orientation, and/or growing the crystals having the selected orientation.

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